Associated Environmental

REPORT

BC Ministry of Environment

South Shawnigan Creek
Water Quality Study
Quarterly Summary Report #1

October 2016

ISO 9001 and 14001 Certified | An Associated Engineering Company

Cover photo taken by B. Miskimmin at Site #7 on Shawnigan Creek, September 14, 2016.

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1 Introduction

Associated Environmental Consultants Inc. (Associated) was retained by the Ministry of Environment (MOE) to provide an independent Water Quality Study in the mainstem and selected tributaries of South Shawnigan Creek, including in the vicinity of Stebbings Road Lot 23 (the Cobble Hill Holdings contaminated soil treatment facility and contaminated soil landfill) and Stebbings Road Lot 21. The Water Quality Study is being conducted to address the concerns of residents, First Nations, local politicians, and other interested parties in the area about water quality in South Shawnigan Creek in relation to development around this key inflow to Shawnigan Lake. Concerns include the health of the aquatic habitat and the water quality in the lake, which is used as a drinking water source.

1.1 BACKGROUND INFORMATION

In July 2016, Brenda Miskimmin of Associated finalized a Study Design report to monitor water quality over a period of one year along South Shawnigan Creek (including areas around Lots 21 and 23 on Stebbings Road and key tributaries) (Associated 2016). The report outlined the proposed sampling program (including methods, sites, parameters to test, and frequency of sampling). Associated recommended monthly sampling for one year beginning mid-July, as well as weekly sampling in late summer (August – September low flows) and during fall rains (October - November) to provide five consecutive samples in 30 days ("5-in-30"). Data collected at this frequency represents the long-term average or chronic effect level (i.e., growth and reproduction), as required for certain water quality guideline parameters and captures variability during representative time periods. The data will be summarized in three quarterly reports and a final report in July 2017.

Between July 18 and September 14, 2016, Associated collected the first set of monthly water quality samples and five sets of weekly water quality samples as part of the first quarterly sampling event for the Shawnigan Creek Water Quality Study. This first quarterly report presents the results of the first six sampling events.

1.2 OVERALL STUDY OBJECTIVES

Data collected for this Water Quality Study will add to existing data collected under the Shawnigan Lake Water Quality Objectives (WQO) attainment monitoring program and other studies. The Water Quality Study data will be used to:

- Establish current water quality at the monitoring sites;
- Assess water quality along South Shawnigan Creek – in particular, determine if surface water quality degrades along South Shawnigan Creek and compare surface water quality to BC water quality guidelines;
- Help determine if existing permitted activities on Stebbings Road at Lot 23 and/or historical activities on Lot 21 are impacting downstream water quality;
- Help determine if other activities in the South Shawnigan Creek watershed are impacting water quality in South Shawnigan Creek;

- Supplement any other data already being collected by the MOE and the Permittee at Lot 23 to assess the effectiveness of *Environmental Management Act* (EMA) Permit 105809; and
- Recommend future studies for South Shawnigan Creek, and inform updates (if necessary) to the Water Quality Objectives report for Shawnigan Lake (MOE 2007).

2 Methodology

2.1 SAMPLING SITES

The sampling sites include those identified in the Study Design report, and represent locations upstream and downstream of Lot 21 seepage, Lot 23 ephemeral creek, and a key tributary to South Shawnigan Creek, Van Horne Creek (Associated 2016). Table 2-1 lists the nine sites that were included in the Water Quality Study. Figure 2-1 show the locations of the sites.

Table 2-1
List of sampling sites and Environmental Monitoring Site identification numbers

Site Number	EMS ID[1]	Description of sample location
S-1	E294426	South Shawnigan Creek upstream of developments (control sample, far upstream) – downstream of Elkington Forest
S-2	E306323	South Shawnigan Creek upstream of Lots 21 and 23
S-3	E306324	Ephemeral creek downstream of Lot 23, near water treatment facility discharge,[1] upstream of the confluence with South Shawnigan Creek
S-4	E294425	South Shawnigan Creek downstream of Lot 21 and upstream of the Lot 23 ephemeral creek inflow
S-5	E306325	South Shawnigan Creek downstream of the confluence with ephemeral creek and upstream of Van Horne Creek confluence
S-6	E306326	South Shawnigan Creek downstream of Van Horne Creek
S-6B	--	Van Horne Creek, upstream of the confluence with South Shawnigan Creek
S-7	E306327	South Shawnigan Creek at Sooke Lake Road (upstream of disturbed area)
S-8	1199906	South Shawnigan Creek as near as possible to the inflow to Shawnigan Lake (downstream of all other sites).

Note:
[1]EMS = Environmental Monitoring Site

Photographs of each sampling site are included in Appendix A.

2.2 CHALLENGES ASSOCIATED WITH SITES

Every attempt was made to sample all proposed sites during each sampling event. In some cases, samples could not be collected due to lack of sufficient water upstream of the confluence with Van Horne Creek, or

[1] Discharge from the containment/settling pond is intermittent based on storm event and other inflows.

access issues (active logging or obstructed access). Where there was a lack of flowing water, we collected samples from isolated pools if water was at least 25 cm deep. Table 2-2 summarizes the sites sampled during each event, and issues encountered in the field that prevented sample collection at some sites. Site S-6B (lower Van Horne Creek) was not identified until the September 14 sampling event, and was selected for sampling that day because neither S-5 or S-6 could be sampled due to active logging.

Table 2-2
Summary of sites sampled during each event

Site Number	EMS ID	18-Jul-16	16-Aug-16	23-Aug-16	30-Aug-16	6-Sep-16	14-Sep-16
S-1	E294426	samp/pond	samp/pond	samp/pond	samp/pond	samp/pond	too shal/ns
S-2	E306323	dry ns	dry ns	dry ns	dry ns	dry ns	dry ns
S-3	E306324	dry ns	dry ns	dry ns	dry ns	dry ns	samp/ds seep[2]
S-4	E294425	samp/ds seep	samp/ds seep	samp/ds seep	samp/ds seep	samp/ds seep	samp/ds seep
S-5	E306325	samp/pool	no access/ns	samp/pool	samp/pool	unsafe/ns	unsafe/ns
S-6	E306326	samp/fl	no access/ns	samp/fl	samp/fl	samp/fl	unsafe/ns
S-6B	--	ns (location not identified until Sep 14)					samp/fl
S-7	E306327	samp/fl	samp/fl	samp/fl	samp/fl	samp/fl	samp/fl
S-8	1199906	samp/fl	samp/fl	samp/fl	samp/fl	samp/fl	samp/fl

Notes:
EMS = Environmental Monitoring Site
dry ns = location dry; no sample
too shal/ns = too shallow to sample
samp/fl = sample collected from flowing water
samp/pond = sample collected from ponded water; sometimes = large puddle
samp/ds seep = sample collected from standing water downstream of seep, no flow
no access/ns = no sample due to access issues (locked gate).
unsafe/ns = no sample due to unsafe (active logging) conditions

The lack of water is supported by daily total precipitation data from the Malahat climate station (ID 1014820), which is approximately 7 km southeast of the southern tip of Shawnigan Lake. Data from this climate station indicates that there was 37.8 mm total precipitation between July 15 and September 14 (Environment Canada 2016). The most rain was the week before the September 6 trip at 24.6 mm (Environment Canada 2016), and there was still no flow at sites S-1 through S-4 (Environmental Canada 2016). Many weeks had zero or very little rain.

[2] S-3 was sampled this day despite being very shallow at <25 cm deep.

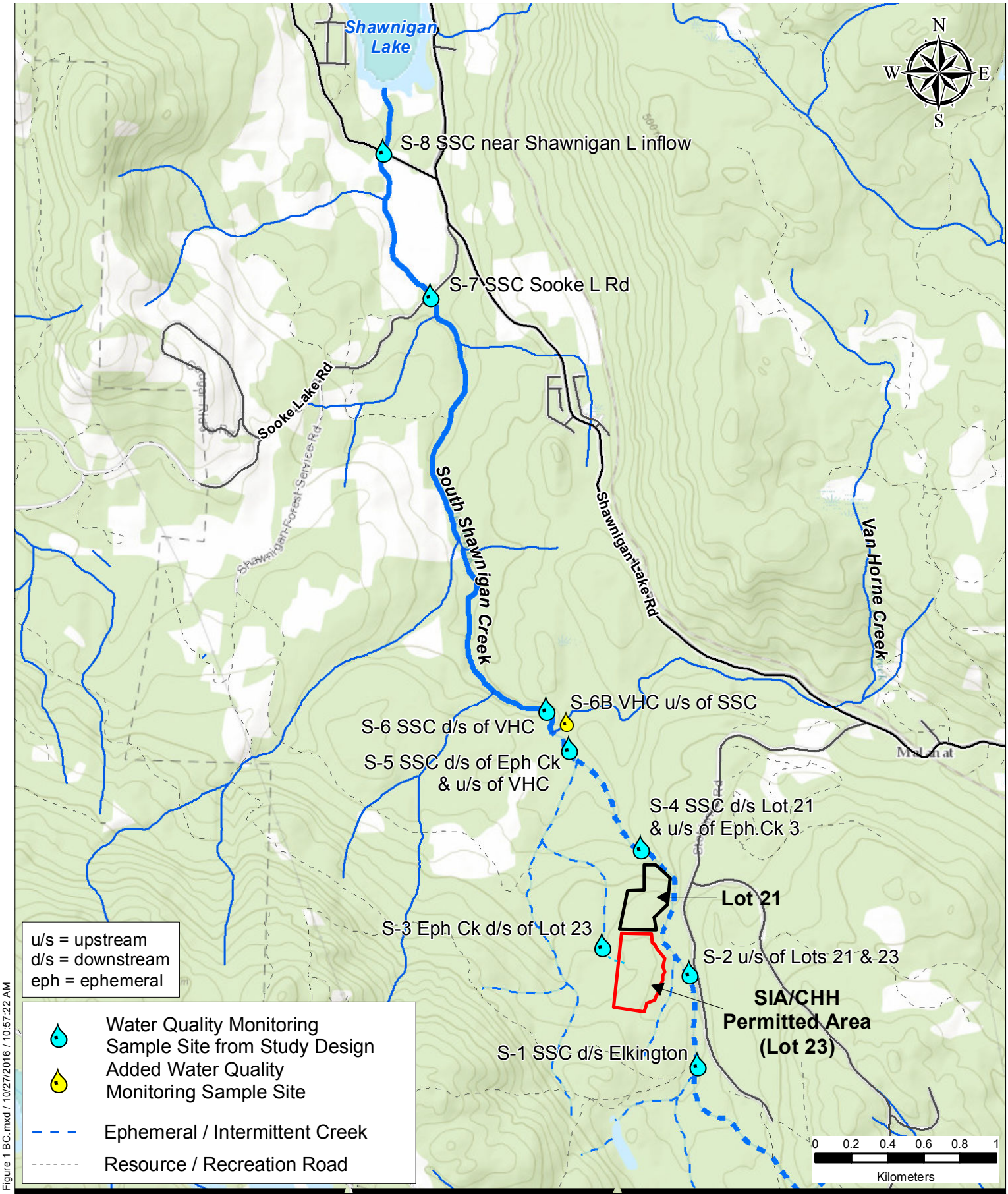

Figure 1 BC.mxd / 10/27/2016 / 10:57:22 AM

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PROJECT NO.: 2016-8097.000.000
DATE: October 2016
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FIGURE 2-1: WATER QUALITY MONITORING SITES ON AND NEAR SOUTH SHAWNIGAN CREEK

South Shawnigan Creek Water Quality Monitoring Study

2.3 SAMPLING PROTOCOL

Water samples were collected from the shore near the surface at one point in the cross-section of flow, according to BC water quality sampling protocols (MWLAP 2013). Wherever it was safe and practical to do so, samples were collected at mid-stream. All samples were collected in laboratory-supplied bottles, and were filtered and preserved in the field (as necessary). A field form was filled out for each site to record site conditions, weather conditions, water temperature and other relevant comments (e.g. access or safety issues).

All samples were stored in coolers with ice and delivered following chain-of-custody protocol to an ALS Depot in Victoria, and then shipped by courier to ALS Burnaby for analysis of the following parameters, according to the Study Design report:

- routine water chemistry (including pH, conductivity, turbidity, total suspended solids, hardness, sodium, chloride, and sulphate);
- nutrients (ammonia-N, nitrate-N, nitrite-N, total Kjeldahl nitrogen, organic nitrogen, total nitrogen, total phosphorus, and dissolved ortho-phosphate);
- total and dissolved organic carbon (TOC, DOC);
- total and dissolved metals; and
- organic contaminants (polycyclic aromatic hydrocarbons [PAHs] and light and heavy extractable petroleum hydrocarbons [LEPH/HEPH]).

2.4 QUALITY ASSURANCE AND QUALITY CONTROL

To assess the quality of the sampling and analytical results, two randomly selected sets of duplicate samples were collected at two sites during each sampling event. Collection and analysis of duplicate samples provides information on the combined (field and analytical) precision of the sampling and analytical program. The individual analytical results for each analyte in each sample of the duplicate pair were compared, and the relative percent difference (RPD) was calculated for each analyte. The RPD limits may vary somewhat depending on natural variability, the analysis involved and the concentration of the analyte. The RPD tends to increase as the result approaches the detection limit (MWLAP 2013).

In addition to the collection of duplicate samples, the quality assurance and quality control program included collection of trip blank and field blank samples. Trip blanks are sealed water samples of known quality (i.e., deionized water) that are taken from the laboratory to the sampling site and transported back to the laboratory without being exposed to sampling procedures. Their purpose is to detect any widespread contamination resulting from the container or preservative during transport and storage.

Field blanks are samples of deionized water that are poured into the laboratory bottles in the field, then preserved and shipped to the laboratory along with the field samples. They are exposed to the sampling

environment at the sample site and handled in the same manner as the real sample (e.g., preserved, filtered); therefore, they provide information on contamination resulting from handling techniques and from exposure to the atmosphere.

2.5 WATER QUALITY GUIDELINES

All water quality data were tabulated and compared with BC guidelines for the protection of aquatic life and with Health Canada drinking water guidelines. The aquatic life guidelines applied were the BC Approved and Working Water Quality Guidelines (MOE 2015, 2016). For some parameters, the two guidelines are listed: the long-term average (i.e., chronic) guidelines, which are intended to protect the most sensitive species and life-stage, and the short-term maximum (i.e., acute) guidelines, which are set to protect against severe effects such as lethality to the most sensitive species and life stage over a defined short-term exposure period (e.g., 96 hours). Compliance with the chronic guidelines is assessed by calculating the average concentration from five weekly samples collected in a period of 30 days (5-in-30).

For screening purposes, all results were first compared with the most stringent aquatic life guideline, including chronic guidelines where available. Where results were found to exceed the chronic guidelines, the result was further assessed by calculating the 5-in-30 average concentration and comparing that result with the chronic guideline. In some cases, it was not possible to sample sites on all 5-in-30 dates, as will be discussed in the next section. Exceedances of acute or chronic guidelines are highlighted in the data tables.

Results were compared with the Guidelines for Canadian Drinking Water Quality (Health Canada 2014), because Shawnigan Lake is used as a drinking water source. This comparison is conservative because it assumes that the lake water is consumed without treatment.

3 Results and Discussion

3.1 OVERVIEW OF RESULTS

As shown on Figure 2-1, South Shawnigan Creek upstream of the confluence with Van Horne Creek is ephemeral and was *not flowing* for all sampling efforts so far. Samples from the non-flowing reaches were collected from a series of isolated pools at the pre-selected sampling locations. Where we discuss results from these isolated pools (i.e. S-1 through S-5; note for S-2 no pool was present), the data only characterizes those locations on that day, and would not influence sites further downstream. Sites S-6 through S-8 represented connected flowing water between the confluence with Van Horne Creek and near the inflow to Shawnigan Lake. In one case, a sample was collected from lower Van Horne Creek (S-6B on September 14).

The water quality at the sites was generally good, with only two exceedance of the applicable guidelines (dissolved cadmium on one date at S-7; naphthalene on one date at S-6B Van Horne Ck). Importantly, there were **no** 5-in-30 chronic guideline exceedances at any of the sites sampled at this frequency. The following sections include a discussion on key results by site. Tables 3-1 to 3-3 show the measured concentrations of key detected parameters at each site, with results exceeding the aquatic life or drinking

water guidelines highlighted. Photographs of all sites taken on September 14 are in Appendix A. All tabulated water quality data, including all tested parameters, are provided in Appendix B.

3.2 ISOLATED POOL SITES

In the isolated pool and seep sites (S-1, S-4, S-5), a few patterns emerged. The water tended to be quite cool, even during the warm summer, when downstream flowing water sites were warmer. Temperatures in the isolated pool sites in July and August ranged from 11.5 to 14.6°C (S-1, S-4, S-5; Table 3-1). This likely indicates the connection with cooler groundwater, which keeps any water in the small pools cooler during the dry period and warm summer. There was no surface runoff contribution due to the lack of precipitation.

Several ions were found at higher concentrations in sample S-4 than in sample S-1 and S-5, including total sodium, chloride, calcium and magnesium, but total and dissolved iron and dissolved aluminum were higher in S-1. While these pools are not presently connected, they are both within the ephemeral creek channel that is connected during higher runoff conditions. There were no guideline exceedances at these sites.

We have included S-3 in the tabulated results in Appendix B only, not with the other sites tabulated here because of the potential that the samples were compromised by the small pool size and sampling effort. At the time of sampling on September 14, very little water (puddle; < 25 cm deep) was present. Bottles could not be completely filled because the water was shallower than the height of the bottles.

Further interpretation will be postponed for S-3 until future sampling results are obtained, which will occur during the rainy season. Note that there were no exceedances of acute guidelines in this one-time sample so far.

3.3 FLOWING WATER SITES (DOWNSTREAM OF VHC)

The flowing water sites included S-6, S-7, S-8 and a single sample from Van Horne Creek (S-6B). Unlike the isolated pool sites, these sites were connected by moving water that flowed throughout the dry period sampled. No notable water quality degradation was recorded for S-6 (Table 3-2), just downstream of the confluence with Van Horne Creek. However, a hydrocarbon was detected in Site 6-B Van Horne Creek, with a guideline exceedance for naphthalene (guideline = 1.0 µg/L; measurement = 1.99 µg/L; MOE 2016a). This site is outside of the influence of any activity along South Shawnigan Creek. It does flow near Shawnigan Lake Road for a brief distance, and there is active logging in the area of the sampling site. Further interpretation of the source of naphthalene in Van Horne Creek in this one-time sample, is beyond the scope of this study.

Sites S-7 and S-8 are in the lower reach of South Shawnigan Creek and therefore receive flows from further upstream. The temperature at these sites tended to be warmer than upstream sites during July and August, with warmest water at S-8, with one exception: S-8 had cooler water than S-7 on July 18, where S-8 measured 15.9°C compared to 17.0°C at the upstream S-7 (Table 3-3). Nitrate, total nitrogen and sulphate were generally higher at S-7 than S-8. The only exceedance of the acute guideline for the protection of

aquatic life occurred with dissolved cadmium at S-7 on September 6 (measured 0.233 µg/L with a calculated hardness-based guideline of 0.183 µg/L).

Other differences noted between S-7 and S-8 included that total suspended solids (TSS), turbidity, total aluminum (on 3 of 6 dates), total arsenic, ammonia, iron and manganese concentrations were higher at S-8 than at S-7. Higher turbidity at S-8 than just upstream at S-7 was notably visible on the September 14 sampling date. There was no rainfall and the day was warm and sunny, so it is unclear as to the cause of elevated turbidity and other parameters at S-8.

As stated previously, naphthalene in Van Horne Creek at S-6B exceeded the aquatic life guideline (maximum concentration of 1 µg/L). Acenaphthene and fluorene were also detected in S-6B, but results were below guidelines. Acenaphthene was also detected in S-8 in the August 23 and September 14 samples, but results were below aquatic life guidelines. At all other sites, hydrocarbons were not detected on any of the up to six sample dates.

None of the flowing water sites received flows from above the confluence of Van Horne Creek.

Table 3-1
Concentrations of key detected parameters at S-1, S-4, and S-5

			S-1 (d/s of Elkington)						S-4 (d/s Lot 21 & u/s of eph Ck 3)							S-5 (SSC u/s of Van Horne Ck)		
		AE Site ID	S-1	S-1		S-1	S-1	S-1	S-4	S-4	S-4	S-4	S-4		S-4	S-5	S-5	S-5
		Sample Type	Normal	Normal	Duplicate	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Duplicate	Normal	Normal	Normal	Normal
		Date Sampled	18-Jul-16	16-Aug-16		23-Aug-16	30-Aug-16	6-Sep-16	18-Jul-16	16-Aug-16	23-Aug-16	30-Aug-16	6-Sep-16		14-Sep-16	18-Jul-16	23-Aug-16	30-Aug-16
Analyte	**Units**	**Aquatic Life WQG**	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Temperature	°C	18	12.8	13.5	13.5	12.6	11.5	10.2	13.3	13.4	11.2	12.2	11.5	11.5	9.9	14.6	12.3	12.7
Hardness (as CaCO3)	mg/L	-	20.1	22.4	22.4	19.7	20.7	18.5	61.4	101	111	132	53.1	53.5	110	21	24	24.2
pH	pH	6.5 - 9	-	6.88	6.77	7.09	6.8	6.58	-	7.6	7.96	7.99	7.45	7.53	7.99	-	7.29	7.28
Total Suspended Solids	mg/L	-	4.2	1.2	<1.0	<1.0	1.3	<1.0	1.6	5.2	3.7	<1.0	<3.0	<3.0	<1.0	<1.0	1.1	<1.0
Turbidity	NTU	-	0.35	0.75	0.75	0.44	0.78	0.54	0.23	2.09	1.03	1.01	0.39	0.39	0.39	0.21	0.72	0.36
Ammonia, Total (as N)	mg/L	0.102	0.008	0.0115	0.0125	0.0103	0.0172	0.0067	<0.0050	0.0055	<0.0050	<0.0050	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	<0.0050
Chloride (Cl)	mg/L	150	-	2.63	2.62	3.07	3.26	3.18	-	12.7	15.2	17.1	9.8	9.8	15.1	-	3.51	3.59
Nitrate and Nitrite (as N)	mg/L	-	-	0.0462	0.0458	0.0367	0.0459	0.0307	-	0.221	0.236	0.237	0.0496	0.0489	0.236	-	0.0509	0.0412
Total Nitrogen	mg/L	-	0.202	0.109	0.098	0.118	0.147	0.145	0.172	0.471	0.349	0.315	0.198	0.194	0.282	0.139	0.137	0.073
Orthophosphate-Dissolved (as P)	mg/L	-	-	<0.0010	<0.0010	0.0019	0.0024	<0.0010	-	0.0012	0.0022	0.0025	<0.0010	<0.0010	0.0012	-	0.0014	0.0014
Phosphorus (P)-Total	mg/L	-	0.0064	0.0044	0.0027	0.0063	0.0085	0.012	0.0028	0.0064	0.0064	0.0059	0.0061	0.0071	0.0021	0.0028	0.0059	0.0037
Sulfate (SO4)	mg/L	128	-	2.49	2.48	2.69	2.83	2.78	-	10.6	8.76	8.38	12.4	12.4	9.81	-	2.05	2.01
Dissolved Organic Carbon	mg/L	-	-	1.02	0.91	1.35	1.34	1.66	-	2.13	2.9	3.01	3.54	3.32	2.41	-	1.63	1.15
Total Organic Carbon	mg/L	-	1.76	0.93	0.86	1.5	1.44	1.62	1.58	2.41	3.18	3.14	3.64	3.6	2.58	1.08	1.45	1.19
Aluminum (Al)-Total	mg/L	-	0.0152	0.0291	0.0305	0.0298	0.0357	0.029	0.0182	0.04	0.0118	0.012	0.0188	0.0167	0.00996	0.015	0.0222	0.0282
Arsenic (As)-Total	mg/L	0.005	0.000066	0.000088	0.000067	0.000055	0.000058	0.000067	0.000079	0.000111	0.000109	0.000124	0.000122	0.000122	0.000097	0.000045	0.000056	0.000066
Cadmium (Cd)-Total	ug/L	-	<0.0050	0.0053	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0293	<0.0050
Calcium (Ca)-Total	mg/L	-	5.92	7.94	7.63	5.68	6.21	5.97	17.3	32.1	32.6	36.3	16.2	15.9	29.9	6.48	7.32	7.3
Copper (Cu)-Total	mg/L	0.002	0.000287	0.000302	0.000287	0.000277	0.000261	0.000342	0.00031	0.000465	0.000345	0.000371	0.000695	0.00064	0.000365	0.000237	0.000272	0.000249
Iron (Fe)-Total	mg/L	1	0.0747	0.296	0.286	0.0567	0.0898	0.0788	0.0354	0.0545	0.0155	0.0165	0.0479	0.0425	0.0106	0.0362	0.0283	0.0417
Lead (Pb)-Total	mg/L	0.003	0.0000066	0.0000174	1.77E-05	0.0000133	0.0000158	0.0000167	0.0000181	0.0000422	0.0000093	0.0000106	0.0000178	0.000011	0.0000071	0.0000098	0.0000151	0.0000199
Magnesium (Mg)-Total	mg/L	-	1.07	0.952	0.898	1.13	1.32	1.29	4.85	7.52	8.25	9.45	4.33	4.46	8.41	1.45	1.36	1.45
Manganese (Mn)-Total	mg/L		0.0269	0.176	0.162	0.0279	0.0464	0.0561	0.0124	0.043	0.0272	0.0307	0.0309	0.0272	0.0179	0.0121	0.0302	0.0456
Sodium (Na)-Total	mg/L	-	2.27	2.49	2.34	2.6	2.79	2.61	5.4	9.92	10.5	11.7	6.05	5.98	9.9	2.86	2.82	2.81
Zinc (Zn)-Total	mg/L	0.0075	0.00097	0.0011	0.001	0.00053	0.00728	0.00073	0.00063	0.00088	0.00045	0.00081	0.00219	0.00293	0.00036	0.00033	0.00075	0.00101
Aluminum (Al)-Dissolved	mg/L	0.05	0.0624[A]	0.0142	0.0122	0.0174	0.0176	0.017	0.0055	0.00598	0.00554	0.00499	0.00996	0.0105	0.00597	0.0083	0.0123	0.012
Arsenic (As)-Dissolved	mg/L	0.005	0.000074	0.000065	0.000063	0.000052	0.000056	0.000058	0.000084	0.000092	0.000113	0.000117	0.000104	0.000098	0.000105	0.000053	0.000059	0.000064
Cadmium (Cd)-Dissolved	ug/L	Calculated	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.027	<0.0050
Calcium (Ca)-Dissolved	mg/L	4	6.23	7.48	7.47	5.93	6.19	5.35	16.7	28.2	31.2	37.5	14.6	14.5	30.5	6.14	7.34	7.27
Copper (Cu)-Dissolved	mg/L	0.002	0.000413 *	0.000238	0.000236	0.000278	0.000241	0.000289	0.00031	0.000364	0.000318	0.000339	0.000548	0.000537	0.00039	0.000214	0.000256	0.000237
Iron (Fe)-Dissolved	mg/L	0.35	0.135	0.167	0.159	0.0291	0.0383	0.0515	0.0042	0.0057	0.0049	0.004	0.025	0.0223	0.0044	0.025	0.0162	0.0207
Lead (Pb)-Dissolved	mg/L	0.003	0.0000497	0.0000076	0.000006	0.0000068	0.0000063	0.0000092	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	<0.0000050	<0.0000050	0.0000111	0.0000068	0.0000074
Magnesium (Mg)-Dissolved	mg/L	-	1.1	0.903	0.899	1.18	1.26	1.26	4.81	7.43	8.08	9.3	4.06	4.19	8.14	1.37	1.38	1.46
Manganese (Mn)-Dissolved	mg/L		0.0398 *	0.164	0.151	0.0223	0.0354	0.0468	0.00447	0.0157	0.0207	0.0248	0.0196	0.0173	0.017	0.00977	0.028	0.0412
Sodium (Na)-Dissolved	mg/L	-	2.31	2.3	2.23	2.75	2.67	2.76	5.45	8.48	10.5	11.5	6.08	6.16	10.4	2.78	2.76	2.88
Zinc (Zn)-Dissolved	mg/L	0.0075	0.00119	0.00102	0.00104	0.0010	0.00687	0.00093	0.00346 *	0.00066	0.00044	0.00054	0.00126	0.00124	0.00058 *	0.00036	0.00058	0.00061
EPH10-19	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25
EPH19-32	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25
LEPH	mg/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25
HEPH	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25

Applied Guideline:	**British Columbia Approved and Working Water Quality Guidelines (MAY, 2015) - BCAWWQG - Freshwater Aquatic Life**
Color Key:	Notes:
Within Guideline	A (S-1; dissolved aluminum): Because S-1 was not sampled on September 14, the 5-in-30 average concentration could not be calculated. The average aluminum concentration using all available data was 0.023 mg/L, which is below the chronic guideline. The single result of 0.0624 mg/L met the acute aquatic life guideline of 0.1 mg/L.
Exceeds Guideline	
Detection limit is higher than the guideline	
* = Result Qualified	

Table 3-2
Concentrations of key detected parameters at S-6 and S-6B

			S-6 (SSC d/s of Van Horne Ck)						S-6B (VHC)
		AE Site ID	S-6	S-6	S-6	S-6	S-6		S-6B VanHorne
		Sample Type	Normal	Normal	Duplicate	Normal	Normal	Duplicate	Normal
		Date Sampled	18-Jul-16	23-Aug-16		30-Aug-16	6-Sep-16		14-Sep-16
Analyte	**Units**	**Aquatic Life WQG**	Water	Water	Water	Water	Water	Water	Water
Temperature	°C	18	14.8	13.1	13.1	13.5	11.8	11.8	10.5
Hardness (as CaCO3)	mg/L	-	30.5	31.4	34.5	34.8	33.9	33.8	42.5
pH	pH	6.5 - 9	-	7.65	7.65	7.71	7.31	7.41	7.85
Total Suspended Solids	mg/L	-	<1.0	1.9	1.8	4.6	<3.0	<3.0	<1.0
Turbidity	NTU	-	0.3	1.73	1.26	1.16	0.31	0.29	0.39
Ammonia, Total (as N)	mg/L	0.102	0.0056	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0134
Chloride (Cl)	mg/L	150	-	3.84	3.79	3.91	4.78	4.77	4.39
Nitrate and Nitrite (as N)	mg/L	-	-	0.0602	0.0593	0.0317	<0.0032	<0.0032	<0.0032
Total Nitrogen	mg/L	-	0.121	0.139	0.118	0.106	0.108	0.109	0.069
Orthophosphate-Dissolved (as P)	mg/L	-	-	0.0021	0.0021	0.0028	0.0023	0.002	0.0038
Phosphorus (P)-Total	mg/L	-	0.005	0.0057	0.0051	0.0079	0.0069	0.0067	0.0094
Sulfate (SO4)	mg/L	128	-	3.03	2.81	2.65	2.73	2.72	3.1
Dissolved Organic Carbon	mg/L	-	-	1.79	1.84	1.82	2.99	2.97	1.83
Total Organic Carbon	mg/L	-	1.93	1.96	1.78	2.1	3.11	3.14	2.16
Aluminum (Al)-Total	mg/L	-	0.0181	0.0289	0.047	0.0274	0.0177	0.0145	0.0155
Arsenic (As)-Total	mg/L	0.005	0.000108	0.000102	0.000114	0.000107	0.000115	0.000114	0.000114
Cadmium (Cd)-Total	ug/L	-	<0.0050	0.0111	0.0079	<0.0050	0.0057	0.0073	<0.0050
Calcium (Ca)-Total	mg/L	-	8.61	9.18	9.59	9.45	10.2	9.83	10.5
Copper (Cu)-Total	mg/L	0.002	0.000297	0.00031	0.000351	0.000295	0.000322	0.0003	0.000195
Iron (Fe)-Total	mg/L	1	0.0351	0.0413	0.0667	0.0489	0.046	0.0412	0.0605
Lead (Pb)-Total	mg/L	0.003	0.0000135	0.0000236	0.0000431	0.0000214	0.0000138	0.0000113	0.0000116
Magnesium (Mg)-Total	mg/L	-	2.43	2.37	2.36	2.44	2.9	2.93	3.46
Manganese (Mn)-Total	mg/L		0.0028	0.011	0.0184	0.0108	0.00677	0.00334	0.00645
Sodium (Na)-Total	mg/L	-	4.2	4.14	4.25	4.11	4.49	4.36	4.63
Zinc (Zn)-Total	mg/L	0.0075	0.00065	0.0007	0.00076	0.00106	0.00046	0.00042	0.00039
Aluminum (Al)-Dissolved	mg/L	0.05	0.0108	0.00869	0.00886	0.0101	0.00903	0.00929	0.0113
Arsenic (As)-Dissolved	mg/L	0.005	0.000098	0.000094	0.000095	0.000103	0.000115	0.000108	0.000131
Cadmium (Cd)-Dissolved	ug/L	Calculated	<0.0050	0.012	0.0105	<0.0050	0.0051	0.0057	<0.0050
Calcium (Ca)-Dissolved	mg/L	4	8.45	8.61	9.82	9.87	8.81	8.83	10.9
Copper (Cu)-Dissolved	mg/L	0.002	0.000291	0.000272	0.000275	0.000262	0.00031	0.000338	0.000241
Iron (Fe)-Dissolved	mg/L	0.35	0.0197	0.0143	0.0143	0.0225	0.0333	0.0334	0.0491
Lead (Pb)-Dissolved	mg/L	0.003	0.0000059	0.0000052	0.0000061	0.0000074	0.0000094	0.0000069	0.0000088
Magnesium (Mg)-Dissolved	mg/L	-	2.28	2.4	2.41	2.46	2.89	2.85	3.75
Manganese (Mn)-Dissolved	mg/L		0.000986	0.00366	0.00344	0.00401	0.00158	0.00157	0.00389
Sodium (Na)-Dissolved	mg/L	-	4.12	3.86	4.11	4.32	4.59	4.66	4.86
Zinc (Zn)-Dissolved	mg/L	0.0075	0.00063	0.00079	0.00125 *	0.00106	0.00072 *	0.00069 *	0.00103 *
EPH10-19	mg/L	-	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050
LEPH	mg/L	0.05	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050
HEPH	mg/L	-	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050
2-Bromobenzotrifluoride	%	-	95.9	91.7	90.6	98.8	89.4	85.4	112.4
Acenaphthene	mg/L	0.006	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000085
Fluorene	mg/L	0.012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00002
Naphthalene	mg/L	0.001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00199

Applied Guideline:	**British Columbia Approved and Working Water Quality Guidelines (MAY, 2015) - BCAWWQG - Freshwater Aquatic Life**
Color Key:	
Within Guideline	
Exceeds Guideline	
Detection limit is higher than the guideline	
* = Result Qualified	

Table 3-3
Concentrations of key detected parameters at S-7 and S-8

			S-7 (SSC at Sooke L Rd)										S-8 (SSC near Shawnigan L inflow)									
		AE Site ID	S-7		S-7	S-7		S-7		S-7	S-7		S-8		S-8		S-8	S-8		S-8	S-8	
		Sample Type	Normal	Duplicate	Normal	Normal	Duplicate	Normal	Duplicate	Normal	Normal	Duplicate	Normal	Duplicate	Normal	Duplicate	Normal	Normal	Duplicate	Normal	Normal	Duplicate
		Date Sampled	18-Jul-16		16-Aug-16	23-Aug-16		30-Aug-16		6-Sep-16	14-Sep-16		18-Jul-16		16-Aug-16		23-Aug-16	30-Aug-16		6-Sep-16	14-Sep-16	
Analyte	**Units**	**Aquatic Life WQG**	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Temperature	°C	18	17.0	17.0	17	15.3	15.3	14.3	14.3	12.9	12.8	12.8	15.9	15.9	17	17	16.3	15.5	15.5	13.4	12.9	12.9
Hardness (as CaCO3)	mg/L	-	32.7	28.8	36.6	36.4	33.3	37.5	37.1	32.3	36.1	36.2	31.7	31.1	35.3	32	35.5	36.8	35.5	29.5	34.8	35.5
pH	pH	6.5 - 9	-	-	7.57	7.69	7.66	7.72	7.67	7.11	7.65	7.68	-	-	7.09	7.08	7.49	7.23	7.26	6.75	7.69	7.61
Total Suspended Solids	mg/L	-	1.3	7.2	<1.0	<1.0	<1.0	<1.0	<1.0	<3.0	1.2	<1.0	3.9	2.6	3.5	2.4	2.3	2.1	1.2	<3.0	2.3	2
Turbidity	NTU	-	0.3	2.11	0.37	0.39	0.34	0.62	0.52	0.53	0.32	0.35	0.84	0.8	1.05	1.02	1.18	1.13	1.11	0.6	2.5	2.09
Ammonia, Total (as N)	mg/L	0.102	0.0079	0.0228	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0117	0.0107	0.0166	0.0165	0.0206	0.016	0.016	0.009	0.0169	0.0174
Chloride (Cl)	mg/L	150	-	-	4.41	4.39	4.38	4.49	4.49	5.08	4.61	4.61	-	-	4.88	4.88	4.96	5.18	5.19	5.18	5.19	5.19
Nitrate and Nitrite (as N)	mg/L	-	-	-	0.354	0.337	0.335	0.293	0.293	0.395	0.32	0.32	-	-	0.0609	0.0618	0.0512	0.047	0.047	0.0664	0.0748	0.074
Total Nitrogen	mg/L	-	0.432	0.458	0.415	0.389	0.385	0.335	0.349	0.464	0.352	0.33	0.308	0.275	0.155	0.146	0.131	0.139	0.128	0.139	0.15	0.159
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	<0.0010	0.0014	0.0011	0.0016	0.0016	0.0011	<0.0010	<0.0010	-	-	<0.0010	<0.0010	0.0024	0.0016	0.0022	0.0012	0.0016	0.0014
Phosphorus (P)-Total	mg/L	-	0.0027	0.017	<0.0020	0.0029	0.003	0.003	0.0033	0.0037	<0.0020	<0.0020	0.0135	0.0093	0.004	0.0047	0.0079	0.0073	0.0067	0.0059	0.0087	0.0088
Sulfate (SO4)	mg/L	128	-	-	4.91	4.82	4.81	4.78	4.79	5.36	4.57	4.57	-	-	2.69	2.69	2.49	2.68	2.69	3.02	2.93	2.92
Dissolved Organic Carbon	mg/L	-	-	-	1.56	1.85	1.94	1.63	1.73	2.16	1.53	1.41	-	-	1.82	1.79	2.27	2.11	2.18	2.28	1.97	2.08
Total Organic Carbon	mg/L	-	1.64	2.25	1.98	1.85	1.71	1.69	1.68	2.24	1.53	1.53	2.5	2.4	1.92	1.82	2.23	2.09	2.17	2.16	2.24	2.28
Aluminum (Al)-Total	mg/L	-	0.0186	0.147	0.0166	0.0332	0.0219	0.0155	0.0149	0.0164	0.0147	0.0137	0.0532	0.0457	0.0231	0.02	0.029	0.0592	0.0363	0.0162	0.0695	0.0638
Arsenic (As)-Total	mg/L	0.005	0.000099	0.000131	0.000109	0.000096	0.000093	0.00009	0.000099	0.000099	0.00009	0.000082	0.000116	0.000123	0.00016	0.000174	0.000196	0.000181	0.000178	0.000123	0.000145	0.000132
Cadmium (Cd)-Total	ug/L	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)-Total	mg/L	-	9.04	7.9	9.73	9.38	9.78	10.2	9.54	9.52	9.22	9.74	8.59	8.75	9.92	9.38	9.46	10.5	10.8	9.17	9.3	8.96
Copper (Cu)-Total	mg/L	0.002	0.000401	0.000859	0.000383	0.00039	0.00033	0.000339	0.000353	0.00044	0.000341	0.00036	0.00054	0.000541	0.000399	0.000393	0.000363	0.000428	0.000397	0.000381	0.000539	0.000472
Iron (Fe)-Total	mg/L	1	0.0314	0.184	0.0336	0.0539	0.0377	0.0331	0.0311	0.0366	0.0292	0.0285	0.154	0.144	0.358	0.325	0.514	0.576	0.496	0.288	0.335	0.301
Lead (Pb)-Total	mg/L	0.003	0.0000091	0.000202	0.0000087	2.51E-05	0.0000134	8.4E-06	8.7E-06	0.00001	7.5E-06	8.8E-06	5.32E-05	3.93E-05	0.0000147	0.0000135	0.0000211	0.0000389	2.49E-05	0.0000105	0.0000563	0.0000464
Magnesium (Mg)-Total	mg/L	-	2.63	2.41	2.94	2.96	2.86	2.95	2.99	2.82	2.88	2.82	2.45	2.43	2.51	2.37	2.34	2.4	2.45	2.49	2.54	2.5
Manganese (Mn)-Total	mg/L		0.00261	0.0117	0.00328	0.00647	0.00354	0.00253	0.0026	0.00215	0.00207	0.00196	0.0257	0.0238	0.0923	0.0857	0.107	0.151	0.117	0.0458	0.066	0.0592
Sodium (Na)-Total	mg/L	-	5.17	4.58	5.09	4.83	5.03	4.95	5.01	5.25	4.91	4.95	4.77	5.01	5.14	4.82	4.73	4.9	4.96	4.75	4.77	4.78
Zinc (Zn)-Total	mg/L	0.0075	0.00035	0.00309	0.00031	0.00042	0.00053	0.00044	0.00043	0.00024	0.00024	0.00025	0.00097	0.00086	0.00053	0.00048	0.00054	0.00081	0.00104	0.00028	0.00088	0.00078
Aluminum (Al)-Dissolved	mg/L	0.05	0.0177	0.0152	0.0129	0.0121	0.0121	0.0116	0.0111	0.0123	0.0112	0.0115	0.0108	0.0101	0.0142	0.0141	0.0154	0.0141	0.0135	0.00831	0.0151	0.0161
Arsenic (As)-Dissolved	mg/L	0.005	0.000108	0.000101	0.000097	0.00009	0.000087	0.000091	0.000099	0.000095	0.000088	0.000084	0.000098	0.000101	0.000148	0.000153	0.000166	0.000152	0.00015	0.000097	0.000125	0.000126
Cadmium (Cd)-Dissolved	ug/L	Calculated	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.233*	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)-Dissolved	mg/L	4	8.75	7.74	9.78	10	8.72	10.2	9.92	8.41	9.56	9.7	8.61	8.65	9.92	8.82	10.3	10.7	10.2	7.95	9.85	10
Copper (Cu)-Dissolved	mg/L	0.002	0.000469	0.000594	0.000323	0.000333	0.000345	0.000341	0.000341	0.000489	0.000334	0.00035	0.000456	0.000408	0.000383	0.000382	0.000356	0.000351	0.000314	0.000392	0.000449	0.000362
Iron (Fe)-Dissolved	mg/L	0.35	0.0274	0.0221	0.0254	0.0211	0.0222	0.0206	0.0228	0.0298	0.0211	0.0213	0.0755	0.073	0.209	0.219	0.303	0.272	0.283	0.12	0.159	0.172
Lead (Pb)-Dissolved	mg/L	0.003	0.0000158	0.0000198	0.0000116	5.8E-06	0.0000086	0.000006	7.3E-06	0.0000287 *	0.000006	6.5E-06	1.23E-05	1.15E-05	0.0000076	0.0000079	0.000012	0.000215 *	9.1E-06	0.0000066	0.0000184	0.0000154
Magnesium (Mg)-Dissolved	mg/L	-	2.64	2.3	2.97	2.76	2.79	2.9	3	2.76	2.97	2.91	2.47	2.31	2.55	2.43	2.39	2.42	2.44	2.34	2.48	2.53
Manganese (Mn)-Dissolved	mg/L		0.00328 *	0.00309	0.00259	0.00171	0.0017	0.0017	0.00191	0.00133	0.00142	0.00145	0.0185	0.0166	0.0892	0.0879	0.101	0.0933	0.0973	0.0352	0.0531	0.0566
Sodium (Na)-Dissolved	mg/L	-	5.08	4.63	5.09	5.07	4.81	5.22	5.07	5.38	5.1	5.14	4.75	4.83	4.86	4.83	4.92	4.83	4.78	4.8	4.97	4.92
Zinc (Zn)-Dissolved	mg/L	0.0075	0.00092 *	0.00196	0.00039	0.00033	0.00044	0.0005	0.00038	0.00090 *	0.00050 *	0.00046	0.00335 *	0.00071	0.00051	0.00058	0.00061	0.00047	0.00042	0.00057 *	0.0009	0.00112 *
EPH10-19	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
LEPH	mg/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
HEPH	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
Acenaphthene	mg/L	0.006	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000018	<0.000010	<0.000010	<0.000010	0.000018	0.000015

Applied Guideline:	**British Columbia Approved and Working Water Quality Guidelines (MAY, 2015) - BCAWWQG - Freshwater Aquatic Life**
Color Key:	
Within Guideline	
Exceeds Guideline	
Detection limit is higher than the guideline	
* = Result Qualified	

3.4 GRAPHICAL COMPARISON OF WATER QUALITY BETWEEN SITES

The purpose of the first 5-in-30 sampling survey was to characterize water quality during late summer (August-September) low flow conditions. As discussed, some sites had isolated pools or no water (S-2) at the time of sampling. Due to the intermittently dry creek bed, most of the sites could not be considered connected with one another. This was especially the case for all sample sites upstream of the confluence of South Shawnigan Creek with Van Horne Creek (Figure 2-1). The only sites that had flowing water and were accessible for sampling during all sampling trips were S-7 and S-8.

Figures 3-1 to 3-9 depict the average concentrations of key detected parameters from upstream to downstream sample sites. With the exception of S-3 and S-6B, which were only sampled once, the concentrations shown are the average concentrations based on all collected data. For S-3 and S-6B, the single measured value is depicted. Again, the results from S-3 should be *viewed with caution* until further results are available, due to the very shallow nature of the isolated pool.

General Parameters

Laboratory measured turbidity (Figure 3-1) ranged from 0.21 NTU at S-5 (July 18) to 2.5 NTU at S-8 (September 14). As previously noted, the higher turbidity at S-8 compared to other sites was notably visible on September 14.

With the exception of S-3, which had a chloride concentration of 134.0 mg/L, average chloride was low (less than 20 mg/L) across all sites (Figure 3-2). Total phosphorus was also relatively low at all sites (Figure 3-3). The highest average total phosphorus concentration was 0.0077 mg/L, which was found at S-8. The lowest average total phosphorus concentration was 0.0039 mg/L, which was found at S-7. Average concentrations at all sites (where averages could be calculated) were below 0.010 mg/L, and are considered within the oligogrophic (low productivity) range. Total nitrogen was also relatively low (Figure 3-4) with average concentrations below 0.60 mg/L. Ammonia-N was generally <0.0050 mg/L (and therefore no graph is shown) in S-4, S-5, S-6, and S-7. In contrast, ammonia-N was detected every time at S-1 (control sample) and S-8 (farthest downstream sample). The average ammonia-N concentration in S-1 was 0.011 mg/L and the average in S-8 was 0.015 mg/L. These concentrations were well below the most stringent (in this case the chronic) guideline of 0.102 mg/L.

Metals

There were some notable differences in average concentrations of metals between sites, as follows:

- The highest concentration of total and dissolved sodium was in S-3 (both greater than 50 mg/L) (Figure 3-5). For other sites, average concentrations of both total and dissolved sodium were below 10 mg/L.
- Concentrations of total and dissolved arsenic (Figure 3-6) were highest at S-3 (single sample), followed by S-8 (6 samples). *All concentrations were below the applicable guidelines*.
- Average concentrations of total and dissolved copper (Figure 3-7) were relatively consistent across the sites and generally less than 0.0005 mg/L, with the exception of total copper in S-3 (0.00086 mg/L). *All concentrations were below the applicable guidelines*.

- The highest average total iron (0.349 mg/L) and dissolved iron (0.189 mg/L) were found at S-8 (Figure 3-8). The results for metals at S-8 were consistent with those reported for the summer of 2013 in the Shawnigan Lake Water Quality attainment report (MOE 2016b). S-7, which is a short distance upstream from S-8, had much lower average concentrations of total and dissolved iron of 0.050 and 0.023 mg/L, respectively; again, this suggests a source downstream of S-7. Across all sites, the second highest average levels of iron were found at control site S-1 (0.147 mg/L total iron; 0.097 mg/L dissolved iron).
- S-1 had the highest average concentration of total and dissolved zinc (0.00194 and 0.0020 mg/L, respectively) (Figure 3-9). Other sites had similar concentrations of both total and dissolved zinc. *All concentrations were below the applicable guidelines*.

Figure 3-1: Average turbidity

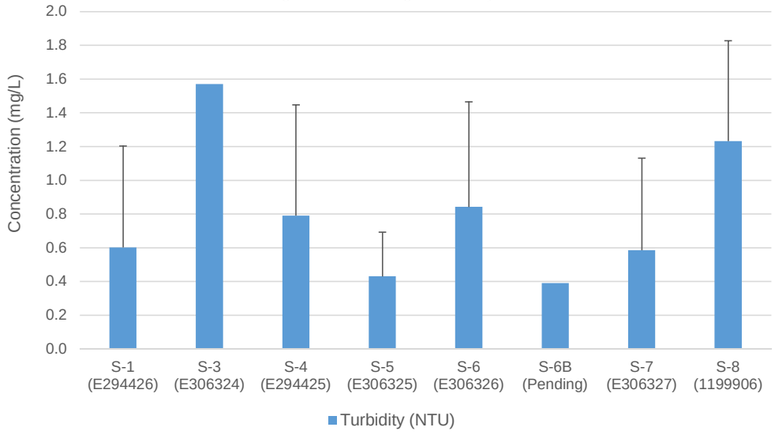


Figure 3-2: Average chloride concentrations

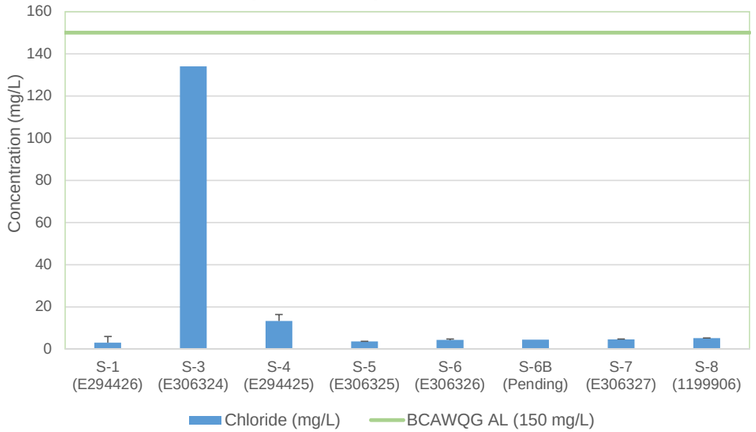


Figure 3-3: Average total phosphorus concentrations

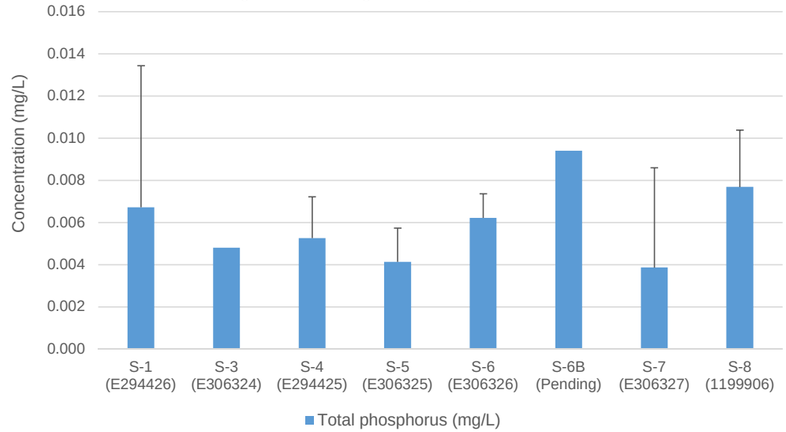


Figure 3-4: Average total nitrogen concentrations

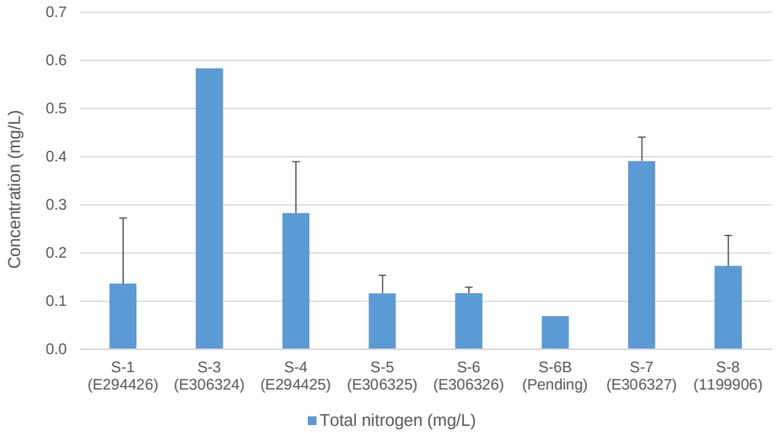


Figure 3-5: Average total and dissolved sodium concentrations

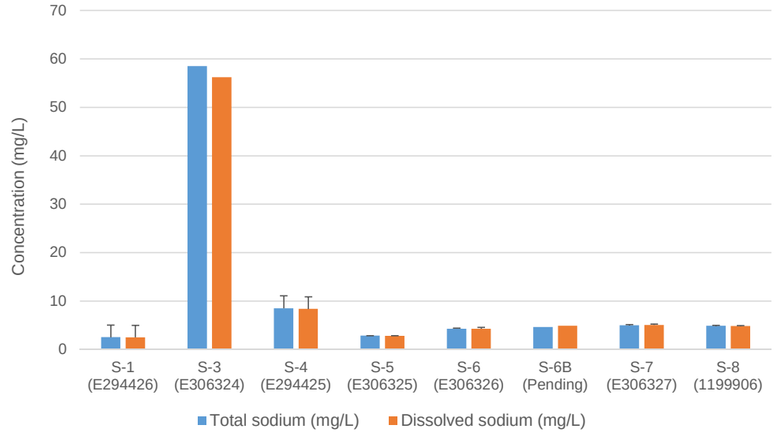


Figure 3-6: Average total and dissolved arsenic concentrations

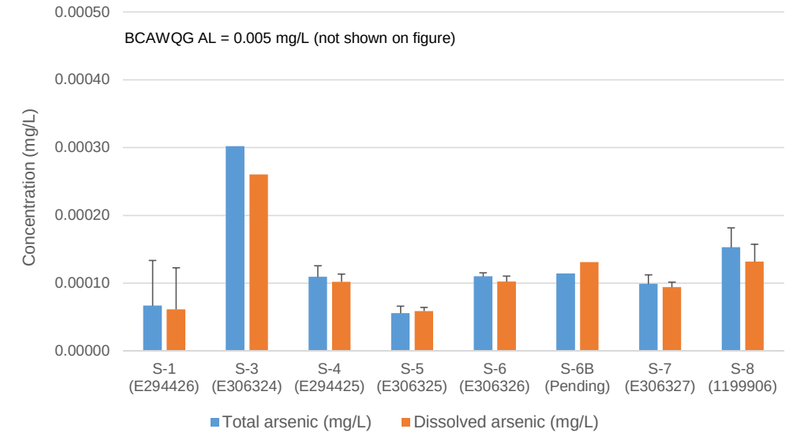


Figure 3-7: Average total and dissolved copper concentrations

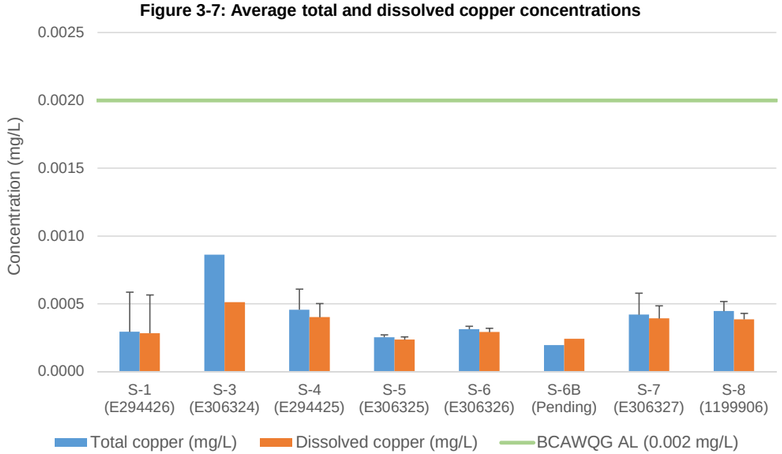


Figure 3-8: Average total and dissolved iron concentrations

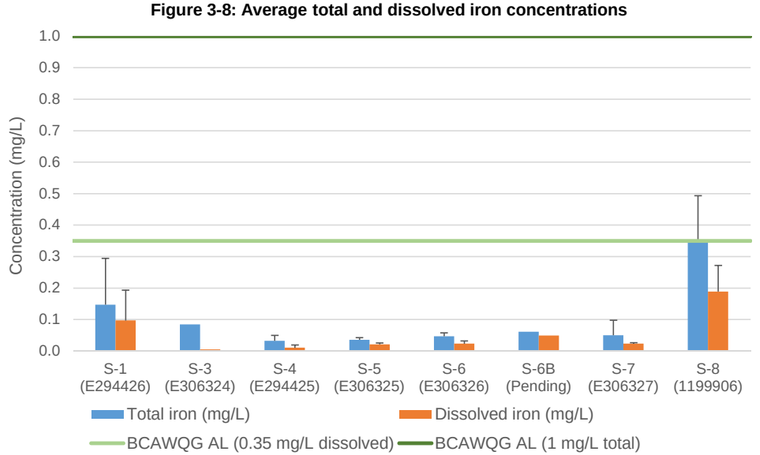
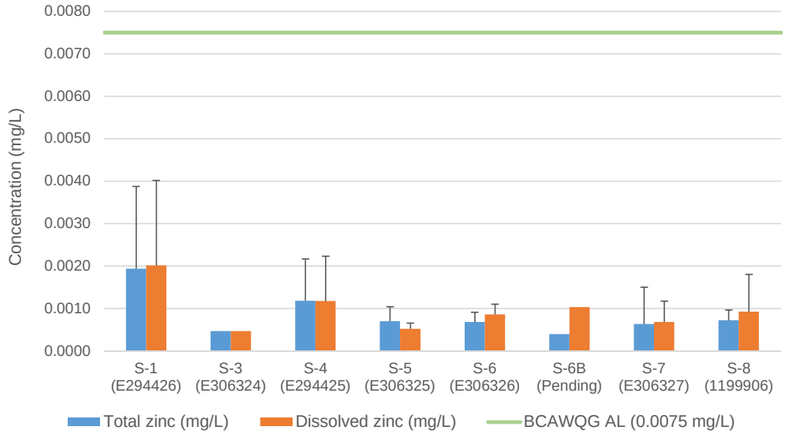


Figure 3-9: Average total and dissolved zinc concentrations



3.5 EXCEEDANCES OF DRINKING WATER MAXIMUM ACCEPTABLE CONCENTRATION AND AESTHETIC OBJECTIVE

The results at all sites generally met the drinking water guidelines, with the exception of total and dissolved iron and manganese. The guideline levels for both iron and manganese are based on *aesthetic concerns* (i.e., staining of plumbing fixtures) and *not on health-based concerns* (Health Canada 2014). The results are as follows:

- S-1 (upstream control) had total manganese concentrations ranging from 0.0269 to 0.176 mg/L, and dissolved manganese concentrations ranging from 0.0223 to 0.164 mg/L. The drinking water guideline for manganese is 0.05 mg/L.
- S-3 had a total manganese concentration of 0.357 mg/L and a dissolved manganese concentration of 0.112 mg/L.
- S-8, near the inflow to Shawnigan Lake, had concentrations of iron and manganese above the drinking water guidelines during the August 16, August 23, August 30, and September 14 sampling events:
    - The maximum concentrations of total iron and dissolved iron at S-8 were 0.576 mg/L (August 30) and 0.303 mg/L (August 23), respectively. The guideline is 0.3 mg/L.
    - The maximum concentrations of total manganese and dissolved manganese were 0.151 mg/L (August 30) and 0.101 mg/L (August 23), respectively. The manganese guideline is 0.05 mg/L.

S-1 and S-3 are not drinking water sources, nor were they connected with the flowing waters of South Shawnigan Creek during the dry period the way S-6, S-6B, S-7 and S-8 were. The fact that there were exceedances of the iron aesthetic objectives at S-8 but not at S-7 or S-6 suggests there may be a source of these parameters between S-7 and S-8. The concentrations of iron and manganese were higher at S-8 than at S-7 or S-6 on all sampling dates. The highest concentration of total iron (0.576 mg/L) and total manganese (0.151 mg/L) at S-8 occurred on August 30. On the same sample date at upstream site S-7, the concentration of total iron and total manganese was 0.0331 and 0.0026 mg/L, respectively (Table 3-3). It is important to note that South Shawnigan Creek is not a direct drinking water source.

During the field visits (and from Google Earth), an industry or business was observed on Sooke Lake Road, along the east side of the creek between S-7 and S-8 (Figure 3-10). The activities that are occurring at that business and other developments nearby are unknown; we are seeking information about this location given the differences in water quality observed between S-7 and S-8.

Figure 3-10
Land use near South Shawnigan Creek between Sites S-7 and S-8 (Google Earth image, 7/6/2015)

3.6 QUALITY ASSURANCE AND QUALITY CONTROL

The average RPD, based on 12 duplicate sample pairs, was 11%, which is reasonable agreement between sample analyses. Higher variability than this can sometimes occur with surface water, given the variability that occurs within a flowing stream.

A number of parameters were detected in both the field and trip blanks (see Appendix B for a summary). For the field blanks, detected parameters included select dissolved and total metals. For the trip blanks, detected parameters included select total metals and nitrogen parameters. We are working with ALS to determine the source of detected analytes in sample blanks.

4 Conclusions and Next Steps

4.1 CONCLUSIONS AND KEY FINDINGS

Between July 18 and September 14, 2016, six sets of water quality samples were collected as part of the first quarterly sampling event for the Shawnigan Creek Water Quality Study. Key findings are as follows:

- The water quality overall was relatively good. The only exceedances included the following:
  - dissolved cadmium in S-7, which exceeded the acute aquatic life guideline on September 6;
  - naphthalene in S-6B, which exceeded the acute aquatic life guideline (there is no chronic guideline) on September 14;
  - total and dissolved manganese, which exceeded the drinking water aesthetic objective in S-1, S-3, and S-8; and
  - total and dissolved iron, which exceeded the drinking water aesthetic objective in S-8.
- Three sites (S-4, S-7, and S-8) were sampled during all six events. As discussed, the other sites could not be sampled during all events due to lack of water, access issues, or unsafe conditions. Sites S-1, S-5, S-6 were sampled three to five times, S-3 and S-6B were sampled once, and S-2 was not sampled at all because the creek was dry at this location.
- Lack of water was the main problem with sites upstream of the confluence of South Shawnigan Creek with Van Horne Creek. Therefore, sampling did not capture surface runoff to South Shawnigan Creek from Cobble Hill Holdings or other disturbed sites upstream of the confluence with Van Horne Creek. Groundwater (sub-surface seepage) likely fed each of the isolated pool sites. We have marked South Shawnigan Creek on the map as ephemeral/intermittent upstream of Van Horne Creek.
- Due to the lack of flowing water during sampling, the farthest upstream sites with isolated pools *cannot be considered connected* with the downstream sites (S-6, S-7, and S-8). 5-in-30 average concentrations at those sites sampled at that frequency resulted in no chronic guideline exceedances.
- S-8 had higher average concentrations of dissolved and total iron, turbidity and a number of other parameters than the other flowing water sites, and had a detectable hydrocarbon (acenaphthene) on September 14. This hydrocarbon, higher turbidity and other parameters were not observed at the nearest upstream site S-7, suggesting there may be a source contributing to the elevated concentrations between S-7 and S-8.
- Further interpretation of S-3 will be provided after the next sampling events, which are scheduled to occur during the rainy season.

4.2 NEXT STEPS AND RECENT EVENTS

The fall rainy season is the focus of the next sampling event, with planned sampling dates every week through November 2016. We are hopeful that the additional precipitation will provide flows for the length of South Shawnigan Creek, and will provide comparative upstream to downstream samples. In addition, as a follow-up to the discussion at the stakeholder meeting in June 2015, Ministry of Environment will be collecting sediment samples at select locations in the South Shawnigan Creek watershed.

We are aware that Cobble Hill Holdings has recently been in the news (Wilson 2016). On October 12, 2016, MOE issued a Pollution Prevention Order in response to a spill on the site property (MOE 2016c). Heavy precipitation caused a sand cover to erode, which allowed runoff that had come in contact with the soil to leave the property boundaries (Wilson 2016). As indicated in the Study Design, the sampling schedule may result in missing certain upset events, such as this one. Sampling reported here was during a dry period and did not capture runoff to South Shawnigan Creek from Cobble Hill Holdings or other disturbed sites upstream of Van Horne Creek. If the data gathered from that event are available to us, they can be considered in the next summary report.

Results described in this report and any results received from the upcoming rainy period will be presented and discussed at the upcoming meeting of interested parties in January, 2017.

References

Associated Environmental Consultants Inc. (Associated). 2016. South Shawnigan Creek Final Monitoring Study Design. Prepared for the British Columbia Ministry of Environment.

British Columbia Ministry of Environment (MOE). 2007. Water Quality Assessment and Objectives for Shawnigan Lake Technical Appendix. Science & Information Branch, Water Stewardship Division. January 23, 2007. Available at: http://www.env.gov.bc.ca/wat/wq/objectives/shawnigan/shawnigan_tech07.pdf

British Columbia Ministry of Environment (MOE). 2013. Ambient Water Quality Guidelines for Sulphate – Technical Appendix Update. April 2013. Available at: http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/sulphate_final_guideline.pdf.

British Columbia Ministry of Environment (MOE). 2015. British Columbia Working Water Quality Guidelines. Ministry of Environment, Water Protection and Sustainability Branch. Updated April 2015. Available at: http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/bc_env_working_water_quality_guidelines.pdf.

British Columbia Ministry of Environment (MOE). 2016a. British Columbia Approved Water Quality Guidelines Summary Report. Ministry of Environment, Water Protection and Sustainability Branch. Updated March 2016. Available at: http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/final_approved_wqg_summary_march_2016.pdf.

British Columbia Ministry of Environment (MOE). 2016b. Water Quality Objectives Attainment for Shawnigan Lake and Update for the Shawnigan Lake Watershed. Environmental Protection Division, Environmental Sustainability Division and Strategic Policy Division. July 2016.

British Columbia Ministry of Environment (MOE). 2016c. Pollution Prevention Order, Cobble Hill Holdings Ltd. October 12, 2016. Available at: http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/sia/2016-10-12_108608-chh_ppo.pdf

British Columbia Ministry of Water, Land and Air Protection (MWLAP). 2013. British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples. Prepared and published by Water, Air and Climate Change Branch. Province of British Columbia. Available at: http://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/monitoring/emre/field_sample_man2013.pdf.

Environment Canada. 2016. Daily Total Precipitation Data, Malahat Climate Station (ID 1014820). Available at http://climate.weather.gc.ca/historical_data/search_historic_data_e.html.

Health Canada. 2014. Guidelines for Canadian Drinking Water Quality – Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. Available at: http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php.

Wilson, D. 2016. Contaminated soil dup at Shawnigan Lake compliant after 22K litres leak, environment minister says. CBC Canada. Available at: http://www.cbc.ca/news/canada/british-columbia/shawnigan-lake-contaminated-soil-dump-leak-1.3809315

Appendix A – Photographs

Figure A-1: Site S-1 - South Shawnigan Creek, downsteram of Elkington Forest on September 14, 2016

Figure A-2: Site S-3 - Ephemeral creek downstream of Lot 23 and upstream of the confluence with South Shawnigan Creek on September 14, 2016

Figure A-3: Site S-4 - South Shawnigan Creek, downstream of Lot 21 and upstream of the Lot 23 ephemeral creek inflow on September 14, 2016

Figure A-4: Site S-6B Van Horne Creek, upstream of the confluence with South Shawnigan Creek on September 14, 2016

Figure A-5: Site S-7, South Shawnigan Creek at Sooke Lake Road on September 14, 2016

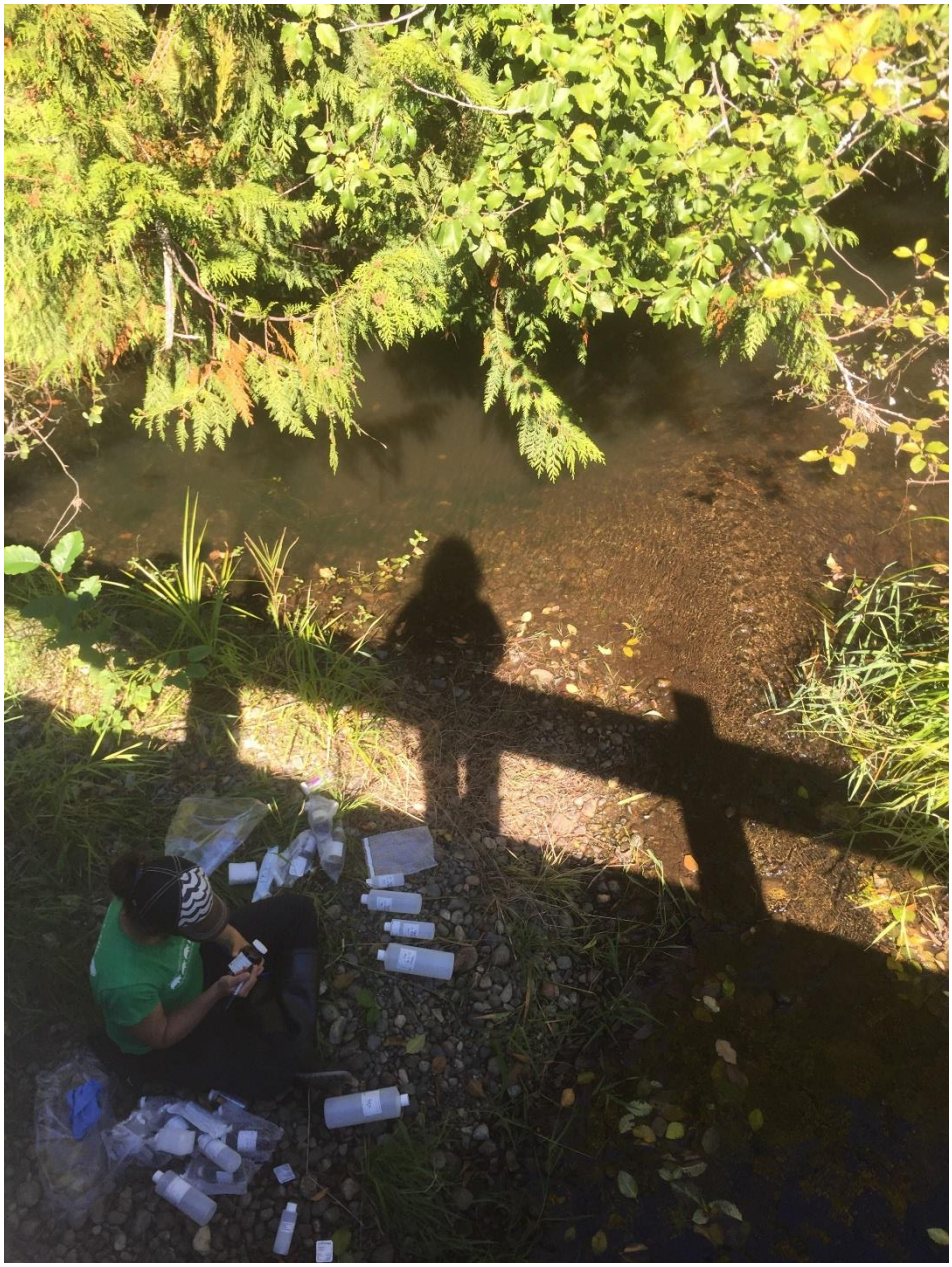


Figure A-6: Site S-8, South Shawnigan Creek as near as possible to the inflow to Shawnigan Lake (downstream of all other sites) on September 14, 2016. Note turbid water condition.

Appendix B – Water Quality Data: Summer 2016

Quarterly Summary Report #1
All Results from each Site

		AE Site ID	S-1 (EMS E294426)						S-3 (EMS E306324)	S-4 (EMS E294425)							S-5 (EMS E306325)		
10/16/2016		ALS ID	L1803324-1	L1815912-1	L1815913-1	L1819437-1	L1822131-1	L1825866-1	L1830193-1	L1803307-1	L1815914-1	L1819438-1	L1822202-1	L1825987-1	L1825987-2	L1830206-1	L1803306-1	L1819439-1	L1822194-1
Multiple Work Orders		Date/time sampled	7/18/2016 12:00:00 AM	8/16/2016 9:50:00 AM	8/16/2016 6:50:00 PM	8/23/2016 9:15:00 AM	8/30/2016 6:50:00 AM	9/6/2016 6:50:00 AM	9/14/2016 9:45:00 AM	7/18/2016 12:00:00 AM	8/16/2016 8:20:00 AM	8/23/2016 8:00:00 AM	8/30/2016 8:10:00 AM	9/6/2016 8:05:00 AM	9/6/2016 8:05:00 AM	9/14/2016 10:20:00 AM	7/18/2016 12:00:00 AM	8/23/2016 10:15:00 AM	8/30/2016 9:50:00 AM
Analyte	**Units**	BCAWWQG-FAL	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Conductivity	uS/cm	-	-	59.1	59.7	51.2	55.1	55.7	1170	-	234	256	285	151	150	263	-	57.6	61.9
Hardness (as CaCO3)	mg/L	-	20.1	22.4	22.4	19.7	20.7	18.5	414	61.4	101	111	132	53.1	53.5	110	21	24	24.2
pH	pH	6.5-9	-	6.88	6.77	7.09	6.8	6.58	8.17	-	7.6	7.96	7.99	7.45	7.53	7.99	-	7.29	7.28
Total Suspended Solids	mg/L	-	4.2	1.2	<1.0	<1.0	1.3	<1.0	-	1.6	5.2	3.7	<1.0	<3.0	<3.0	<1.0	<1.0	1.1	<1.0
Turbidity	NTU	-	0.35	0.75	0.75	0.44	0.78	0.54	1.57	0.23	2.09	1.03	1.01	0.39	0.39	0.39	0.21	0.72	0.36
Ammonia, Total (as N)	mg/L	0.102	0.008	0.0115	0.0125	0.0103	0.0172	0.0067	0.0271	<0.0050	0.0055	<0.0050	<0.0050	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	<0.0050
Chloride (Cl)	mg/L	150	-	2.63	2.62	3.07	3.26	3.18	134	-	12.7	15.2	17.1	9.8	9.8	15.1	-	3.51	3.59
Nitrate and Nitrite (as N)	mg/L	-	-	0.0462	0.0458	0.0367	0.0459	0.0307	0.514	-	0.221	0.236	0.237	0.0496	0.0489	0.236	-	0.0509	0.0412
Nitrate (as N)	mg/L	3	-	0.0462	0.0458	0.0367	0.0459	0.0307	0.506	-	0.221	0.236	0.237	0.0496	0.0489	0.236	-	0.0509	0.0412
Nitrite (as N)	mg/L	0.02	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0077	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	0.161	0.063	0.052	0.081	0.101	0.115	0.069	0.113	0.25	0.114	0.079	0.149	0.145	<0.050	0.066	0.086	<0.050
Total Nitrogen	mg/L	-	0.202	0.109	0.098	0.118	0.147	0.145	0.583	0.172	0.471	0.349	0.315	0.198	0.194	0.282	0.139	0.137	0.073
Total Organic Nitrogen	mg/L	-	0.153	0.051	<0.050	0.071	0.084	0.108	<0.12	0.113	0.245	0.11	0.075	0.146	0.145	<0.056	0.066	0.082	<0.050
Dissolved Kjeldahl Nitrogen	mg/L	-	-	0.065	0.061	0.093	0.083	0.102	0.076	-	0.094	0.126	0.086	0.13	0.124	0.053	-	0.107	<0.050
Total Dissolved Nitrogen	mg/L	-	-	0.111	0.107	0.13	0.129	0.133	0.589	-	0.315	0.361	0.323	0.18	0.172	0.289	-	0.158	0.068
Orthophosphate-Dissolved (as P)	mg/L	-	-	<0.0010	<0.0010	0.0019	0.0024	<0.0010	0.0014	-	0.0012	0.0022	0.0025	<0.0010	<0.0010	0.0012	-	0.0014	0.0014
Phosphorus (P)-Total	mg/L	-	0.0064	0.0044	0.0027	0.0063	0.0085	0.012	0.0048	0.0028	0.0064	0.0064	0.0059	0.0061	0.0071	0.0021	0.0028	0.0059	0.0037
Sulfate (SO4)	mg/L	128	-	2.49	2.48	2.69	2.83	2.78	248^	-	10.6	8.76	8.38	12.4	12.4	9.81	-	2.05	2.01
Dissolved Organic Carbon	mg/L	-	-	1.02	0.91	1.35	1.34	1.66	3.11	-	2.13	2.9	3.01	3.54	3.32	2.41	-	1.63	1.15
Total Organic Carbon	mg/L	-	1.76	0.93	0.86	1.5	1.44	1.62	3.47	1.58	2.41	3.18	3.14	3.64	3.6	2.58	1.08	1.45	1.19
Mercury (Hg)-Total	mg/L	0.00001	<0.0000050	<0.0000050	-	<0.0000050	<0.000050	<0.000050	<0.000050	<0.0000050	<0.0000050	<0.0000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.0000050	<0.0000050	<0.000050
Aluminum (Al)-Total	mg/L	-	0.0152	0.0291	0.0305	0.0298	0.0357	0.029	0.0687	0.0182	0.04	0.0118	0.012	0.0188	0.0167	0.00996	0.015	0.0222	0.0282
Antimony (Sb)-Total	mg/L	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000058	<0.000020	<0.000020	<0.000020	<0.000020	0.000024	0.000024	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)-Total	mg/L	0.005	0.000066	0.000088	0.000067	0.000055	0.000058	0.000067	0.000302	0.000079	0.000111	0.000109	0.000124	0.000122	0.000122	0.000097	0.000045	0.000056	0.000066
Barium (Ba)-Total	mg/L	1	0.00472	0.00815	0.00792	0.00452	0.00457	0.00443	0.0562	0.0103	0.0185	0.0177	0.019	0.00845	0.00892	0.0167	0.00493	0.00573	0.00577
Beryllium (Be)-Total	mg/L	0.00013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	1.2	0.0067	0.0059	0.0053	0.0054	0.0059	0.0054	0.0558	0.0087	0.0101	0.009	0.01	0.0079	0.0082	0.0092	0.0055	0.006	0.0069
Cadmium (Cd)-Total	ug/L		<0.0050	0.0053	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0293	<0.0050
Calcium (Ca)-Total	mg/L	-	5.92	7.94	7.63	5.68	6.21	5.97	141	17.3	32.1	32.6	36.3	16.2	15.9	29.9	6.48	7.32	7.3
Cesium (Cs)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	mg/L	0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	0.004	0.000134	0.000727	0.000723	0.000167	0.000248	0.000267	0.00125	0.0000565	0.000124	0.0000526	0.0000518	0.000105	0.0000987	0.000043	0.0000486	0.000076	0.000118
Copper (Cu)-Total	mg/L	0.002	0.000287	0.000302	0.000287	0.000277	0.000261	0.000342	0.000862	0.00031	0.000465	0.000345	0.000371	0.000695	0.00064	0.000365	0.000237	0.000272	0.000249
Gallium (Ga)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)-Total	mg/L	1	0.0747	0.296	0.286	0.0567	0.0898	0.0788	0.0838	0.0354	0.0545	0.0155	0.0165	0.0479	0.0425	0.0106	0.0362	0.0283	0.0417
Lanthanum (La)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)-Total	mg/L	0.003	0.0000066	0.0000174	0.0000177	0.0000133	0.0000158	0.0000167	0.0000664	0.0000181	0.0000422	0.0000093	0.0000106	0.0000178	0.000011	0.0000071	0.0000098	0.0000151	0.0000199
Lithium (Li)-Total	mg/L	0.014	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	1.07	0.952	0.898	1.13	1.32	1.29	21.4	4.85	7.52	8.25	9.45	4.33	4.46	8.41	1.45	1.36	1.45
Manganese (Mn)-Total	mg/L	0.768	0.0269	0.176	0.162	0.0279	0.0464	0.0561	0.357	0.0124	0.043	0.0272	0.0307	0.0309	0.0272	0.0179	0.0121	0.0302	0.0456
Molybdenum (Mo)-Total	mg/L	1	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00401	0.000052	0.000057	0.000068	0.000062	0.000096	0.000094	0.000072	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	0.025	0.000142	0.000284	0.000261	0.000137	0.000149	0.00016	0.000964	0.000206	0.000325	0.00027	0.000271	0.000364	0.00107	0.000259	0.000139	0.000155	0.000164
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Total	mg/L	373	0.202	0.327	0.305	0.293	0.312	0.328	3.93	0.273	0.488	0.562	0.563	0.363	0.364	0.453	0.168	0.212	0.208
Rhenium (Re)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium (Rb)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	mg/L	0.001	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000141	<0.000040	<0.000040	0.000051	0.000055	0.000045	<0.000040	0.000048	<0.000040	<0.000040	<0.000040
Silicon (Si)-Total	mg/L	-	3.52	4.11	3.85	3.84	4.28	3.97	7.61	4.02	4.45	4.05	3.98	3.22	3.31	3.99	3.55	3.44	3.46
Silver (Ag)-Total	mg/L	0.00005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	2.27	2.49	2.34	2.6	2.79	2.61	58.5	5.4	9.92	10.5	11.7	6.05	5.98	9.9	2.86	2.82	2.81
Strontium (Sr)-Total	mg/L	-	0.0224	0.0467	0.0388	0.0184	0.02	0.0191	0.562	0.0697	0.12	0.118	0.148	0.0679	0.0642	0.121	0.0289	0.0309	0.0319
Tellurium (Te)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	mg/L	0.0008	0.0000021	0.000003	0.0000029	0.0000021	0.0000039	0.0000035	0.0000035	<0.0000020	<0.0000020	0.000003	0.0000041	0.0000044	0.0000045	0.0000037	<0.0000020	0.0000026	0.0000037
Thorium (Th)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Titanium (Ti)-Total	mg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten (W)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	mg/L	0.0085	0.0000027	0.0000034	0.0000032	0.0000034	0.0000042	0.0000039	0.0036	0.0000052	0.0000152	0.0000277	0.0000357	0.0000278	0.0000267	0.0000241	<0.0000020	0.0000025	0.0000028
Vanadium (V)-Total	mg/L	0.006	<0.00020	0.00025	0.00024	<0.00020	<0.00020	<0.00020	0.0004	<0.00020	0.00022	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00024	0.00026
Yttrium (Y)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	mg/L	0.0075	0.00097	0.0011	0.001	0.00053	0.00728	0.00073	0.00046	0.00063	0.00088	0.00045	0.00081	0.00219	0.00293	0.00036	0.00033	0.00075	0.00101
Zirconium (Zr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (Al)-Dissolved	mg/L	0.05	0.0624^B	0.0142	0.0122	0.0174	0.0176	0.017	0.00156	0.0055	0.00598	0.00554	0.00499	0.00996	0.0105	0.00597	0.0083	0.0123	0.012
Antimony (Sb)-Dissolved	mg/L	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000051	<0.000020	<0.000020	<0.000020	<0.000020	0.000022	0.000024	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)-Dissolved	mg/L	0.005	0.000074	0.000065	0.000063	0.000052	0.000056	0.000058	0.00026	0.000084	0.000092	0.000113	0.000117	0.000104	0.000098	0.000105	0.000053	0.000059	0.000064
Barium (Ba)-Dissolved	mg/L	1	0.00509	0.00787	0.00772	0.00435	0.0044	0.00429	0.0542	0.00933	0.0174	0.0177	0.0185	0.00864	0.00837	0.016	0.00511	0.00534	0.00605
Beryllium (Be)-Dissolved	mg/L	0.00013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

Quarterly Summary Report #1
All Results from each Site

		AE Site ID	S-1 (EMS E294426)						S-3 (EMS E306324)	S-4 (EMS E294425)							S-5 (EMS E306325)		
10/16/2016		ALS ID	L1803324-1	L1815912-1	L1815913-1	L1819437-1	L1822131-1	L1825866-1	L1830193-1	L1803307-1	L1815914-1	L1819438-1	L1822202-1	L1825987-1	L1825987-2	L1830206-1	L1803306-1	L1819439-1	L1822194-1
Multiple Work Orders		Date/time sampled	7/18/2016 12:00:00 AM	8/16/2016 9:50:00 AM	8/16/2016 6:50:00 PM	8/23/2016 9:15:00 AM	8/30/2016 6:50:00 AM	9/6/2016 6:50:00 AM	9/14/2016 9:45:00 AM	7/18/2016 12:00:00 AM	8/16/2016 8:20:00 AM	8/23/2016 8:00:00 AM	8/30/2016 8:10:00 AM	9/6/2016 8:05:00 AM	9/6/2016 8:05:00 AM	9/14/2016 10:20:00 AM	7/18/2016 12:00:00 AM	8/23/2016 10:15:00 AM	8/30/2016 9:50:00 AM
Analyte	**Units**	BCAWWQG-FAL	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Bismuth (Bi)-Dissolved	mg/L	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	1.2	0.0062	0.0059	0.0056	0.0053	0.0061	0.0053	0.052	0.0082	0.0091	0.0088	0.0096	0.0079	0.0082	0.0088	0.0055	0.0056	0.0065
Cadmium (Cd)-Dissolved	ug/L	Calculated	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.027	<0.0050
Calcium (Ca)-Dissolved	mg/L	4	6.23	7.48	7.47	5.93	6.19	5.35	131	16.7	28.2	31.2	37.5	14.6	14.5	30.5	6.14	7.34	7.27
Chromium (Cr)-Dissolved	mg/L	0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	mg/L	0.004	0.000234 *	0.000695	0.000678	0.000134	0.00019	0.000211	0.000279	0.0000223	0.0000361	0.0000382	0.0000365	0.0000775	0.0000727	0.0000357	0.0000346	0.0000708	0.0000915
Copper (Cu)-Dissolved	mg/L	0.002	0.000413 *	0.000238	0.000236	0.000278	0.000241	0.000289	0.000511	0.00031	0.000364	0.000318	0.000339	0.000548	0.000537	0.00039	0.000214	0.000256	0.000237
Iron (Fe)-Dissolved	mg/L	0.35	0.135 *	0.167	0.159	0.0291	0.0383	0.0515	0.0042	0.0042	0.0057	0.0049	0.004	0.025	0.0223	0.0044	0.025	0.0162	0.0207
Lead (Pb)-Dissolved	mg/L	0.003	0.0000497 *	0.0000076	0.000006	0.0000068	0.0000063	0.0000092	0.0000149	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	<0.0000050	<0.0000050	0.0000111	0.0000068	0.0000074
Lithium (Li)-Dissolved	mg/L	0.014	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	1.1	0.903	0.899	1.18	1.26	1.26	21	4.81	7.43	8.08	9.3	4.06	4.19	8.14	1.37	1.38	1.46
Manganese (Mn)-Dissolved	mg/L	0.768	0.0398 *	0.164	0.151	0.0223	0.0354	0.0468	0.112	0.00447	0.0157	0.0207	0.0248	0.0196	0.0173	0.017	0.00977	0.028	0.0412
Mercury (Hg)-Dissolved	mg/L	0.00001	-	-	<0.0000050	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	mg/L	1	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00434	0.000058	0.000053	0.000064	0.000054	0.000093	0.000072	0.000063	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved	mg/L	0.025	0.000238	0.000255	0.000237	0.00012	0.000133	0.000168	0.000631	0.00019	0.000272	0.000247	0.00026	0.00034	0.000356	0.000248	0.000119	0.000142	0.000148
Potassium (K)-Dissolved	mg/L	373	0.205	0.292	0.31	0.295	0.303	0.327	3.77	0.28	0.428	0.541	0.551	0.374	0.363	0.475	0.16	0.206	0.204
Selenium (Se)-Dissolved	mg/L	0.001	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000154	<0.000040	<0.000040	0.000043	0.000056	<0.000040	<0.000040	0.000044	<0.000040	<0.000040	<0.000040
Silicon (Si)-Dissolved	mg/L	-	3.61	3.61	3.75	4.01	4.11	4.06	7.4	3.84	4	3.95	3.97	3.27	3.27	4.01	3.46	3.51	3.5
Silver (Ag)-Dissolved	mg/L	0.00005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	2.31	2.3	2.23	2.75	2.67	2.76	56.2	5.45	8.48	10.5	11.5	6.08	6.16	10.4	2.78	2.76	2.88
Strontium (Sr)-Dissolved	mg/L	-	0.0226	0.0424	0.0405	0.0186	0.0198	0.0187	0.559	0.0682	0.109	0.113	0.145	0.0641	0.0634	0.119	0.0281	0.0309	0.0317
Thallium (Tl)-Dissolved	mg/L	0.0008	0.0000024	0.0000028	0.0000028	<0.0000020	0.000003	<0.0000020	0.0000038	<0.0000020	<0.0000020	0.0000023	0.0000031	<0.0000020	0.0000021	0.0000027	<0.0000020	<0.0000020	0.0000029
Tin (Sn)-Dissolved	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L	0.0085	0.0000068 *	0.000002	0.0000021	0.0000026	0.000003	0.0000026	0.0035	0.0000045	0.000013	0.000027	0.0000346	0.0000233	0.0000233	0.000023	<0.0000020	<0.0000020	<0.0000020
Vanadium (V)-Dissolved	mg/L	0.006	0.00021	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00022	0.00022
Zinc (Zn)-Dissolved	mg/L	0.0075	0.00119 *	0.00102	0.00104	0.00100 *	0.00687	0.00093 *	0.00046	0.00346 *	0.00066	0.00044	0.00054	0.00126	0.00124	0.00058 *	0.00036	0.00058	0.00061
BOD	mg/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0
BOD Carbonaceous	mg/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0
EPH10-19	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25
EPH19-32	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25
LEPH	mg/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25
HEPH	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25
2-Bromobenzotrifluoride	%	-	87	101.6	107.7	103.8	93.4	88	108.2	103.2	104.1	96.6	95.7	79.9	94.8	110.2	118.5	97.2	95.6
Acenaphthene	mg/L	0.006	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	0.00005	<0.000010	<0.00010 *	<0.00010 *	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	0.00001	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.0000050	<0.0000050
Fluoranthene	mg/L	0.0002	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	0.012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020 *	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	0.001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	0.0003	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	0.00002	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	0.0034	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	-	86.7	78.3	85.2	99.9	101.4	86.4	91.3	87.2	79.1	92.1	87.6	89	86.7	88.3	90.1	96.7	94.1
Chrysene d12	%	-	92.4	95.3	94.9	120.3	106.3	98	84.5	91.3	86.1	111.4	95.2	100.3	99.2	82.2	99.1	111.5	101.8
Naphthalene d8	%	-	80.8	76.9	76.6	92.2	97	92.7	105.8	80	75.7	86.7	90.8	93.3	93.4	101	84.8	89.9	98
Phenanthrene d10	%	-	99.4	88.5	86	102.9	116.5	100.8	93.2	100.3	86.2	97.1	106	102.5	101.7	91.3	105.4	102.3	115.4

Applied Guideline:	
Color Key:	**British Columbia Approved and Working Water Quality Guidelines (MAY, 2015) - BCAWWQG - Freshwater Aquatic Life**
Within Guideline	
Exceeds Guideline	
Detection limit is higher than the guideline	
Exceeds the drinking water aesthetic objectives	

Notes:
A (S-3; sulphate): Because S-3 was sampled only once, its 5-in-30 average concentration could not be compared to the guideline.
B (S-1; dissolved aluminum): Because S-1 was not sampled on September 14, the 5-in-30 average concentration could not be calculated. The average aluminum concentration using all available data was 0.023 mg/L, which is below the chronic guideline. The single result of 0.0624 mg/L met the acute aquatic life guideline of 0.1 mg/L.

Quarterly Summary Report #1
All Results from each Site

		AE Site ID	S-6 (EMS E306326)						S-6B VanHorne	S-7 (EMS E306327)									
10/16/2016		ALS ID	L1803291-1	L1819440-1	L1819440-2	L1822188-1	L1825985-1	L1825985-2	L1830210-1	L1803290-1	L1803290-2	L1815915-1	L1819441-1	L1819441-2	L1822181-1	L1822181-2	L1825982-1	L1830180-1	L1830180-2
Multiple Work Orders		Date/time sampled	7/18/2016 12:00:00 AM	8/23/2016 10:50:00 AM	8/23/2016 10:50:00 AM	8/30/2016 10:20:00 AM	9/6/2016 10:10:00 AM	9/6/2016 10:10:00 AM	9/14/2016 11:45:00 AM	7/18/2016 12:00:00 AM	7/18/2016 12:00:00 AM	8/16/2016 11:25:00 AM	8/23/2016 12:30:00 PM	8/23/2016 12:30:00 PM	8/30/2016 11:20:00 AM	8/30/2016 11:20:00 AM	9/6/2016 12:10:00 PM	9/14/2016 12:35:00 PM	9/14/2016 12:35:00 PM
Analyte	**Units**	BCAWWQG-FAL	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Conductivity	uS/cm	-	-	84.1	82.8	83.4	98	98.3	107	-	-	102	95.3	95.9	96	95.5	100	93.4	91.1
Hardness (as CaCO3)	mg/L	-	30.5	31.4	34.5	34.8	33.9	33.8	42.5	32.7	28.8	36.6	36.4	33.3	37.5	37.1	32.3	36.1	36.2
pH	pH	6.5-9	-	7.65	7.65	7.71	7.31	7.41	7.85	-	-	7.57	7.69	7.66	7.72	7.67	7.11	7.65	7.68
Total Suspended Solids	mg/L	-	<1.0	1.9	1.8	4.6	<3.0	<3.0	<1.0	1.3	7.2	<1.0	<1.0	<1.0	<1.0	<1.0	<3.0	1.2	<1.0
Turbidity	NTU	-	0.3	1.73	1.26	1.16	0.31	0.29	0.39	0.3	2.11	0.37	0.39	0.34	0.62	0.52	0.53	0.32	0.35
Ammonia, Total (as N)	mg/L	0.102	0.0056	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0134	0.0079	0.0228	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chloride (Cl)	mg/L	150	-	3.84	3.79	3.91	4.78	4.77	4.39	-	-	4.41	4.39	4.38	4.49	4.49	5.08	4.61	4.61
Nitrate and Nitrite (as N)	mg/L	-	-	0.0602	0.0593	0.0317	<0.0032	<0.0032	<0.0032	-	-	0.354	0.337	0.335	0.293	0.293	0.395	0.32	0.32
Nitrate (as N)	mg/L	3	-	0.0602	0.0593	0.0317	<0.0030	<0.0030	<0.0030	-	-	0.354	0.337	0.335	0.293	0.293	0.395	0.32	0.32
Nitrite (as N)	mg/L	0.02	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	0.135	0.078	0.059	0.075	0.108	0.109	0.069	0.143	0.261	0.061	0.053	<0.050	<0.050	0.056	0.069	<0.050	<0.050
Total Nitrogen	mg/L	-	0.121	0.139	0.118	0.106	0.108	0.109	0.069	0.432	0.458	0.415	0.389	0.385	0.335	0.349	0.464	0.352	0.33
Total Organic Nitrogen	mg/L	-	0.129	0.076	0.057	0.073	0.108	0.109	0.055	0.135	0.238	<0.083	<0.078	<0.077	<0.067	<0.070	<0.093	<0.070	<0.066
Dissolved Kjeldahl Nitrogen	mg/L	-	-	0.091	0.064	0.075	0.122	0.109	0.069	-	-	0.073	0.088	0.055	<0.050	<0.050	0.062	<0.050	<0.050
Total Dissolved Nitrogen	mg/L	-	-	0.151	0.123	0.106	0.122	0.109	0.069	-	-	0.427	0.425	0.39	0.32	0.334	0.457	0.337	0.334
Orthophosphate-Dissolved (as P)	mg/L	-	-	0.0021	0.0021	0.0028	0.0023	0.002	0.0038	-	-	<0.0010	0.0014	0.0011	0.0016	0.0016	0.0011	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	-	0.005	0.0057	0.0051	0.0079	0.0069	0.0067	0.0094	0.0027	0.017	<0.0020	0.0029	0.003	0.003	0.0033	0.0037	<0.0020	<0.0020
Sulfate (SO4)	mg/L	128	-	3.03	2.81	2.65	2.73	2.72	3.1	-	-	4.91	4.82	4.81	4.78	4.79	5.36	4.57	4.57
Dissolved Organic Carbon	mg/L	-	-	1.79	1.84	1.82	2.99	2.97	1.83	-	-	1.56	1.85	1.94	1.63	1.73	2.16	1.53	1.41
Total Organic Carbon	mg/L	-	1.93	1.96	1.78	2.1	3.11	3.14	2.16	1.64	2.25	1.98	1.85	1.71	1.69	1.68	2.24	1.53	1.53
Mercury (Hg)-Total	mg/L	0.00001	<0.0000050	<0.0000050	<0.0000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Aluminum (Al)-Total	mg/L	-	0.0181	0.0289	0.047	0.0274	0.0177	0.0145	0.0155	0.0186	0.147	0.0166	0.0332	0.0219	0.0155	0.0149	0.0164	0.0147	0.0137
Antimony (Sb)-Total	mg/L	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000021	0.00003	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)-Total	mg/L	0.005	0.000108	0.000102	0.000114	0.000107	0.000115	0.000114	0.000114	0.000099	0.000131	0.000109	0.000096	0.000093	0.00009	0.000099	0.000099	0.00009	0.000082
Barium (Ba)-Total	mg/L	1	0.00549	0.00634	0.00636	0.00573	0.00666	0.00703	0.00536	0.00484	0.00562	0.0059	0.00549	0.00508	0.00494	0.00511	0.00416	0.00441	0.00436
Beryllium (Be)-Total	mg/L	0.00013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	1.2	0.0067	0.0066	0.0066	0.0074	0.0062	0.0065	0.0066	0.0116	0.0109	0.0138	0.0127	0.0133	0.014	0.0145	0.0121	0.0124	0.0129
Cadmium (Cd)-Total	ug/L		<0.0050	0.0111	0.0079	<0.0050	0.0057	0.0073	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0071	<0.0050	<0.0050
Calcium (Ca)-Total	mg/L	-	8.61	9.18	9.59	9.45	10.2	9.83	10.5	9.04	7.9	9.73	9.38	9.78	10.2	9.54	9.52	9.22	9.74
Cesium (Cs)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	mg/L	0.001	<0.00010	0.00013	0.00016	0.00012	0.00011	<0.00010	<0.00010	<0.00010	0.00026	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001
Cobalt (Co)-Total	mg/L	0.004	0.000028	0.0000523	0.0000821	0.0000544	0.0000359	0.0000268	0.0000253	0.0000437	0.000139	0.0000495	0.0000673	0.0000494	0.000043	0.0000454	0.0000488	0.0000405	0.0000405
Copper (Cu)-Total	mg/L	0.002	0.000297	0.00031	0.000351	0.000295	0.000322	0.0003	0.000195	0.000401	0.000859	0.000383	0.00039	0.00033	0.000339	0.000353	0.00044	0.000341	0.00036
Gallium (Ga)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)-Total	mg/L	1	0.0351	0.0413	0.0667	0.0489	0.046	0.0412	0.0605	0.0314	0.184	0.0336	0.0539	0.0377	0.0331	0.0311	0.0366	0.0292	0.0285
Lanthanum (La)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)-Total	mg/L	0.003	0.0000135	0.0000236	0.0000431	0.0000214	0.0000138	0.0000113	0.0000116	0.0000091	0.000202	0.0000087	0.0000251	0.0000134	0.0000084	0.0000087	0.00001	0.0000075	0.0000088
Lithium (Li)-Total	mg/L	0.014	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	2.43	2.37	2.36	2.44	2.9	2.93	3.46	2.63	2.41	2.94	2.96	2.86	2.95	2.99	2.82	2.88	2.82
Manganese (Mn)-Total	mg/L	0.768	0.0028	0.011	0.0184	0.0108	0.00677	0.00334	0.00645	0.00261	0.0117	0.00328	0.00647	0.00354	0.00253	0.0026	0.00215	0.00207	0.00196
Molybdenum (Mo)-Total	mg/L	1	0.000079	0.000099	0.000096	0.000089	0.000114	0.000124	0.000159	0.000077	0.000062	0.000092	0.000099	0.00009	0.000091	0.000096	0.000091	0.000085	0.000104
Nickel (Ni)-Total	mg/L	0.025	0.000211	0.000352	0.00038	0.000368	0.000277	0.00029	0.000089	0.000146	0.000314	0.000136	0.000163	0.000142	0.000138	0.000146	0.000146	0.000124	0.000123
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Total	mg/L	373	0.363	0.467	0.477	0.461	0.698	0.675	0.519	0.452	0.461	0.477	0.456	0.474	0.441	0.421	0.507	0.404	0.409
Rhenium (Re)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium (Rb)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	mg/L	0.001	<0.000040	<0.000040	<0.000040	0.000044	0.000043	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Total	mg/L	-	5.01	5.14	5.15	5.2	5.91	5.91	7.24	6.58	6.12	7.87	7.71	7.64	7.6	7.65	7.03	7.74	7.33
Silver (Ag)-Total	mg/L	0.00005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	4.2	4.14	4.25	4.11	4.49	4.36	4.63	5.17	4.58	5.09	4.83	5.03	4.95	5.01	5.25	4.91	4.95
Strontium (Sr)-Total	mg/L	-	0.0356	0.0386	0.0381	0.0383	0.0387	0.041	0.0418	0.0385	0.0355	0.0455	0.0419	0.0424	0.0446	0.0446	0.04	0.0413	0.041
Tellurium (Te)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	mg/L	0.0008	0.000002	0.0000022	0.0000022	0.0000035	0.0000038	0.0000037	0.0000041	0.0000021	0.0000022	<0.0000020	<0.0000020	<0.0000020	0.0000025	0.0000031	0.000003	0.0000032	0.0000029
Thorium (Th)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Titanium (Ti)-Total	mg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten (W)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	mg/L	0.0085	0.0000021	0.0000025	0.0000032	0.0000025	0.0000024	0.0000021	<0.0000020	0.0000031	0.0000057	0.0000025	0.0000029	0.0000026	0.0000023	0.0000023	0.0000031	0.0000025	0.0000027
Vanadium (V)-Total	mg/L	0.006	0.00032	0.00031	0.00037	0.00031	0.00031	0.0003	0.00039	0.00059	0.0009	0.00063	0.00069	0.00061	0.00059	0.00061	0.00054	0.00051	0.00052
Yttrium (Y)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	mg/L	0.0075	0.00065	0.0007	0.00076	0.00106	0.00046	0.00042	0.00039	0.00035	0.00309	0.00031	0.00042	0.00053	0.00044	0.00043	0.00024	0.00024	0.00025
Zirconium (Zr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (Al)-Dissolved	mg/L	0.05	0.0108	0.00869	0.00886	0.0101	0.00903	0.00929	0.0113	0.0177	0.0152	0.0129	0.0121	0.0121	0.0116	0.0111	0.0123	0.0112	0.0115
Antimony (Sb)-Dissolved	mg/L	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000024	0.000021	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)-Dissolved	mg/L	0.005	0.000098	0.000094	0.000095	0.000103	0.000115	0.000108	0.000131	0.000108	0.000101	0.000097	0.00009	0.000087	0.000091	0.000099	0.000095	0.000088	0.000084
Barium (Ba)-Dissolved	mg/L	1	0.0052	0.00583	0.00593	0.00541	0.00664	0.00557	0.00529	0.00465	0.00442	0.00564	0.00496	0.00474	0.0048	0.0057	0.00422	0.00434	0.00416
Beryllium (Be)-Dissolved	mg/L	0.00013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

Quarterly Summary Report #1
All Results from each Site

		AE Site ID	S-6 (EMS E306326)						S-6B VanHorne	S-7 (EMS E306327)									
10/16/2016		ALS ID	L1803291-1	L1819440-1	L1819440-2	L1822188-1	L1825985-1	L1825985-2	L1830210-1	L1803290-1	L1803290-2	L1815915-1	L1819441-1	L1819441-2	L1822181-1	L1822181-2	L1825982-1	L1830180-1	L1830180-2
Multiple Work Orders		Date/time sampled	7/18/2016 12:00:00 AM	8/23/2016 10:50:00 AM	8/23/2016 10:50:00 AM	8/30/2016 10:20:00 AM	9/6/2016 10:10:00 AM	9/6/2016 10:10:00 AM	9/14/2016 11:45:00 AM	7/18/2016 12:00:00 AM	7/18/2016 12:00:00 AM	8/16/2016 11:25:00 AM	8/23/2016 12:30:00 PM	8/23/2016 12:30:00 PM	8/30/2016 11:20:00 AM	8/30/2016 11:20:00 AM	9/6/2016 12:10:00 PM	9/14/2016 12:35:00 PM	9/14/2016 12:35:00 PM
Analyte	**Units**	BCAWWQG-FAL	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Bismuth (Bi)-Dissolved	mg/L	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	1.2	0.0066	0.0063	0.0065	0.0072	0.0066	0.0063	0.0064	0.0118	0.0117	0.0134	0.0127	0.0125	0.0144	0.0098	0.0118	0.0123	0.0122
Cadmium (Cd)-Dissolved	ug/L	Calculated	<0.0050	0.012	0.0105	<0.0050	0.0051	0.0057	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.233	<0.0050	<0.0050
Calcium (Ca)-Dissolved	mg/L	4	8.45	8.61	9.82	9.87	8.81	8.83	10.9	8.75	7.74	9.78	10	8.72	10.2	9.92	8.41	9.56	9.7
Chromium (Cr)-Dissolved	mg/L	0.001	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010
Cobalt (Co)-Dissolved	mg/L	0.004	0.0000177	0.0000237	0.0000243	0.0000255	0.0000189	0.0000183	0.0000191	0.0000445	0.0000423	0.000047	0.0000392	0.0000415	0.0000374	0.0000407	0.0000408	0.0000392	0.0000399
Copper (Cu)-Dissolved	mg/L	0.002	0.000291	0.000272	0.000275	0.000262	0.00031	0.000338	0.000241	0.000469	0.000594	0.000323	0.000333	0.000345	0.000341	0.000341	0.000489	0.000334	0.00035
Iron (Fe)-Dissolved	mg/L	0.35	0.0197	0.0143	0.0143	0.0225	0.0333	0.0334	0.0491	0.0274	0.0221	0.0254	0.0211	0.0222	0.0206	0.0228	0.0298	0.0211	0.0213
Lead (Pb)-Dissolved	mg/L	0.003	0.0000059	0.0000052	0.0000061	0.0000074	0.0000094	0.0000069	0.0000088	0.0000158	0.0000198	0.0000116	0.0000058	0.0000086	0.000006	0.0000073	0.0000287 *	0.000006	0.0000065
Lithium (Li)-Dissolved	mg/L	0.014	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	2.28	2.4	2.41	2.46	2.89	2.85	3.75	2.64	2.3	2.97	2.76	2.79	2.9	3	2.76	2.97	2.91
Manganese (Mn)-Dissolved	mg/L	0.768	0.000986	0.00366	0.00344	0.00401	0.00158	0.00157	0.00389	0.00328 *	0.00309	0.00259	0.00171	0.0017	0.0017	0.00191	0.00133	0.00142	0.00145
Mercury (Hg)-Dissolved	mg/L	0.00001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	mg/L	1	0.000087	0.000089	0.000097	0.000083	0.000101	0.0001	0.000152	0.000075	0.000076	0.000083	0.000085	0.000085	0.00009	0.000088	0.000077	0.000089	0.000081
Nickel (Ni)-Dissolved	mg/L	0.025	0.00018	0.00031	0.000315	0.000336	0.000274	0.000275	0.000093	0.00019	0.000177	0.000163	0.00014	0.000135	0.000131	0.000133	0.000196	0.00013	0.000129
Potassium (K)-Dissolved	mg/L	373	0.359	0.426	0.478	0.469	0.7	0.695	0.549	0.48	0.46	0.496	0.453	0.477	0.45	0.45	0.519	0.41	0.39
Selenium (Se)-Dissolved	mg/L	0.001	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000042	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Dissolved	mg/L	-	4.86	5.21	5.21	5.3	5.87	6.08	7.43	6.74	5.73	7.91	7.27	7.26	7.7	7.71	7.12	7.75	7.89
Silver (Ag)-Dissolved	mg/L	0.00005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	4.12	3.86	4.11	4.32	4.59	4.66	4.86	5.08	4.63	5.09	5.07	4.81	5.22	5.07	5.38	5.1	5.14
Strontium (Sr)-Dissolved	mg/L	-	0.0366	0.038	0.0365	0.0396	0.0374	0.0376	0.0394	0.0382	0.0347	0.0432	0.0443	0.0408	0.0474	0.0348	0.0374	0.041	0.0379
Thallium (Tl)-Dissolved	mg/L	0.0008	0.0000022	<0.0000020	<0.0000020	0.0000028	<0.0000020	<0.0000020	0.0000026	0.0000002	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000026	0.0000024	<0.0000020	0.0000023	0.0000023
Tin (Sn)-Dissolved	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L	0.0085	<0.0000020	<0.0000020	<0.0000020	0.0000021	<0.0000020	<0.0000020	<0.0000020	0.0000029	0.000003	0.0000022	0.0000022	0.0000022	0.0000022	0.0000021	0.0000025	0.0000025	0.0000023
Vanadium (V)-Dissolved	mg/L	0.006	0.0003	0.00026	0.00026	0.00027	0.00026	0.00027	0.00039	0.00059	0.00056	0.00061	0.00057	0.00055	0.00059	0.00058	0.00048	0.00053	0.00053
Zinc (Zn)-Dissolved	mg/L	0.0075	0.00063	0.00079	0.00125 *	0.00106	0.00072 *	0.00069 *	0.00103 *	0.00092 *	0.00196	0.00039	0.00033	0.00044	0.0005	0.00038	0.00090 *	0.00050 *	0.00046
BOD	mg/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<10 *	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
BOD Carbonaceous	mg/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<10 *	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
EPH10-19	mg/L	-	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
LEPH	mg/L	0.05	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
HEPH	mg/L	-	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
2-Bromobenzotrifluoride	%	-	95.9	91.7	90.6	98.8	89.4	85.4	112.4	112.5	95.2	111.5	84.8	93.8	96.9	97.6	89.3	108.1	110
Acenaphthene	mg/L	0.006	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000085	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	0.00005	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	0.00001	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	0.0002	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	0.012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00002	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	0.001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00199	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	0.0003	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	0.00002	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	0.0034	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	-	84.7	99.6	93.7	97	85.7	86.9	89.6	86.2	78	81.2	80.7	82	97.9	88.9	82.9	87.2	76.3
Chrysene d12	%	-	81.3	113.8	111.8	103.1	97.1	97.1	83.4	92.1	91.5	88.5	89.5	90.6	102.8	95.5	92.6	79.8	75.7
Naphthalene d8	%	-	80.4	87.3	86.6	100.1	87	89	101.2	79.9	83.7	76.5	76.8	69.8	95.9	90.4	86.9	103.2	92.3
Phenanthrene d10	%	-	95.8	100.3	99	115.6	98.3	99.4	91.9	96.1	88.4	88.1	87.9	88.5	114.7	106.4	94.2	89.7	80.7

Applied Guideline:	
Color Key:	**British Columbia Approved and Working Water Quality Guidelines (MAY, 2015) - BCAWWQG - Freshwater Aquatic Life**
Within Guideline	
Exceeds Guideline	
Detection limit is higher than the guideline	
Exceeds the drinking water aesthetic objectives	

Quarterly Summary Report #1
All Results from each Site

		AE Site ID	S-8 (EMS 1199906)									
10/16/2016		ALS ID	L1803289-1	L1803289-2	L1815910-1	L1815911-1	L1819442-1	L1822170-1	L1822170-2	L1825970-1	L1830218-1	L1830218-2
Multiple Work Orders		Date/time sampled	7/18/2016 12:00:00 AM	7/18/2016 12:00:00 AM	8/16/2016 12:00:00 PM	8/16/2016 12:00:00 PM	8/23/2016 1:30:00 PM	8/30/2016 12:10:00 PM	8/30/2016 12:10:00 PM	9/6/2016 12:35:00 PM	9/14/2016 1:10:00 PM	9/14/2016 1:10:00 PM
Analyte	**Units**	BCAWWQG-FAL	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Conductivity	uS/cm	-	-	-	94.7	94	90.5	89.8	87.9	92.1	94.2	94.2
Hardness (as CaCO3)	mg/L	-	31.7	31.1	35.3	32	35.5	36.8	35.5	29.5	34.8	35.5
pH	pH	6.5-9	-	-	7.09	7.08	7.49	7.23	7.26	6.75	7.69	7.61
Total Suspended Solids	mg/L	-	3.9	2.6	3.5	2.4	2.3	2.1	1.2	<3.0	2.3	2
Turbidity	NTU	-	0.84	0.8	1.05	1.02	1.18	1.13	1.11	0.6	2.5	2.09
Ammonia, Total (as N)	mg/L	0.102	0.0117	0.0107	0.0166	0.0165	0.0206	0.016	0.016	0.009	0.0169	0.0174
Chloride (Cl)	mg/L	150	-	-	4.88	4.88	4.96	5.18	5.19	5.18	5.19	5.19
Nitrate and Nitrite (as N)	mg/L	-	-	-	0.0609	0.0618	0.0512	0.047	0.047	0.0664	0.0748	0.074
Nitrate (as N)	mg/L	3	-	-	0.0599	0.0607	0.0512	0.047	0.047	0.0664	0.0748	0.074
Nitrite (as N)	mg/L	0.02	-	-	0.0011	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	0.193	0.16	0.094	0.084	0.08	0.092	0.081	0.072	0.075	0.085
Total Nitrogen	mg/L	-	0.308	0.275	0.155	0.146	0.131	0.139	0.128	0.139	0.15	0.159
Total Organic Nitrogen	mg/L	-	0.181	0.149	0.078	0.068	0.059	0.076	0.065	0.063	0.058	0.068
Dissolved Kjeldahl Nitrogen	mg/L	-	-	-	0.089	0.086	0.067	0.078	0.068	0.085	0.06	0.056
Total Dissolved Nitrogen	mg/L	-	-	-	0.15	0.148	0.118	0.125	0.115	0.151	0.135	0.13
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	<0.0010	<0.0010	0.0024	0.0016	0.0022	0.0012	0.0016	0.0014
Phosphorus (P)-Total	mg/L	-	0.0135	0.0093	0.004	0.0047	0.0079	0.0073	0.0067	0.0059	0.0087	0.0088
Sulfate (SO4)	mg/L	128	-	-	2.69	2.69	2.49	2.68	2.69	3.02	2.93	2.92
Dissolved Organic Carbon	mg/L	-	-	-	1.82	1.79	2.27	2.11	2.18	2.28	1.97	2.08
Total Organic Carbon	mg/L	-	2.5	2.4	1.92	1.82	2.23	2.09	2.17	2.16	2.24	2.28
Mercury (Hg)-Total	mg/L	0.00001	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Aluminum (Al)-Total	mg/L	-	0.0532	0.0457	0.0231	0.02	0.029	0.0592	0.0363	0.0162	0.0695	0.0638
Antimony (Sb)-Total	mg/L	-	0.000022	0.000021	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)-Total	mg/L	0.005	0.000116	0.000123	0.00016	0.000174	0.000196	0.000181	0.000178	0.000123	0.000145	0.000132
Barium (Ba)-Total	mg/L	1	0.0066	0.0067	0.008	0.00775	0.00765	0.00818	0.00804	0.00712	0.00699	0.00699
Beryllium (Be)-Total	mg/L	0.00013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	1.2	0.0096	0.0104	0.0111	0.0116	0.011	0.0109	0.0118	0.0099	0.0104	0.0105
Cadmium (Cd)-Total	ug/L		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)-Total	mg/L	-	8.59	8.75	9.92	9.38	9.46	10.5	10.8	9.17	9.3	8.96
Cesium (Cs)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	mg/L	0.001	0.00014	0.00013	0.00013	0.00012	0.00015	0.00016	0.00014	0.00011	0.00017	0.00017
Cobalt (Co)-Total	mg/L	0.004	0.00011	0.0000969	0.000235	0.000219	0.000267	0.000415	0.000317	0.000154	0.000186	0.000173
Copper (Cu)-Total	mg/L	0.002	0.00054	0.000541	0.000399	0.000393	0.000363	0.000428	0.000397	0.000381	0.000539	0.000472
Gallium (Ga)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)-Total	mg/L	1	0.154	0.144	0.358	0.325	0.514	0.576	0.496	0.288	0.335	0.301
Lanthanum (La)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)-Total	mg/L	0.003	0.0000532	0.0000393	0.0000147	0.0000135	0.0000211	0.0000389	0.0000249	0.0000105	0.0000563	0.0000464
Lithium (Li)-Total	mg/L	0.014	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	2.45	2.43	2.51	2.37	2.34	2.4	2.45	2.49	2.54	2.5
Manganese (Mn)-Total	mg/L	0.768	0.0257	0.0238	0.0923	0.0857	0.107	0.151	0.117	0.0458	0.066	0.0592
Molybdenum (Mo)-Total	mg/L	1	0.000058	0.000075	0.00008	0.000076	0.000075	0.000071	0.000077	0.00008	0.00007	0.000065
Nickel (Ni)-Total	mg/L	0.025	0.000215	0.000212	0.000229	0.000202	0.000245	0.000245	0.000234	0.000164	0.000237	0.000225
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)-Total	mg/L	373	0.435	0.436	0.449	0.423	0.443	0.411	0.423	0.395	0.413	0.424
Rhenium (Re)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-
Rubidium (Rb)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	mg/L	0.001	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Total	mg/L	-	5.92	5.9	6.1	6.15	5.87	5.83	5.96	5.83	5.91	5.97
Silver (Ag)-Total	mg/L	0.00005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	4.77	5.01	5.14	4.82	4.73	4.9	4.96	4.75	4.77	4.78
Strontium (Sr)-Total	mg/L	-	0.0418	0.0424	0.0469	0.0486	0.0471	0.0495	0.0504	0.0437	0.0442	0.0448
Tellurium (Te)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	mg/L	0.0008	<0.0000020	0.0000022	<0.0000020	<0.0000020	0.0000021	0.0000027	0.0000028	0.000003	0.0000036	0.0000032
Thorium (Th)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Titanium (Ti)-Total	mg/L	2	-	-	-	-	-	-	-	-	-	-
Tungsten (W)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	mg/L	0.0085	0.0000036	0.0000035	0.0000023	0.0000022	0.0000027	0.0000038	0.0000029	0.0000021	0.0000036	0.0000036
Vanadium (V)-Total	mg/L	0.006	0.00058	0.00055	0.00052	0.00047	0.00053	0.00064	0.00052	0.00046	0.00055	0.00054
Yttrium (Y)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Total	mg/L	0.0075	0.00097	0.00086	0.00053	0.00048	0.00054	0.00081	0.00104	0.00028	0.00088	0.00078
Zirconium (Zr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-
Aluminum (Al)-Dissolved	mg/L	0.05	0.0108	0.0101	0.0142	0.0141	0.0154	0.0141	0.0135	0.00831	0.0151	0.0161
Antimony (Sb)-Dissolved	mg/L	-	0.00002	0.00002	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)-Dissolved	mg/L	0.005	0.000098	0.000101	0.000148	0.000153	0.000166	0.000152	0.00015	0.000097	0.000125	0.000126
Barium (Ba)-Dissolved	mg/L	1	0.00747	0.00625	0.00745	0.00788	0.00754	0.00864	0.00702	0.00596	0.00657	0.00673
Beryllium (Be)-Dissolved	mg/L	0.00013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

Quarterly Summary Report #1
All Results from each Site

		AE Site ID	S-8 (EMS 1199906)									
10/16/2016		ALS ID	L1803289-1	L1803289-2	L1815910-1	L1815911-1	L1819442-1	L1822170-1	L1822170-2	L1825970-1	L1830218-1	L1830218-2
Multiple Work Orders		Date/time sampled	7/18/2016 12:00:00 AM	7/18/2016 12:00:00 AM	8/16/2016 12:00:00 PM	8/16/2016 12:00:00 PM	8/23/2016 1:30:00 PM	8/30/2016 12:10:00 PM	8/30/2016 12:10:00 PM	9/6/2016 12:35:00 PM	9/14/2016 1:10:00 PM	9/14/2016 1:10:00 PM
Analyte	**Units**	BCAWWQG-FAL	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Bismuth (Bi)-Dissolved	mg/L	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	1.2	0.0099	0.0102	0.0104	0.0112	0.0107	0.0119	0.0114	0.0096	0.0102	0.0105
Cadmium (Cd)-Dissolved	ug/L	Calculated	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)-Dissolved	mg/L	4	8.61	8.65	9.92	8.82	10.3	10.7	10.2	7.95	9.85	10
Chromium (Cr)-Dissolved	mg/L	0.001	<0.00010	<0.00010	0.0001	0.0001	0.00012	0.00011	0.00011	0.0001	0.0001	0.00011
Cobalt (Co)-Dissolved	mg/L	0.004	0.0000638	0.0000565	0.000226	0.00021	0.000243	0.000251	0.000243	0.0000912	0.000137	0.000141
Copper (Cu)-Dissolved	mg/L	0.002	0.000456	0.000408	0.000383	0.000382	0.000356	0.000351	0.000314	0.000392	0.000449	0.000362
Iron (Fe)-Dissolved	mg/L	0.35	0.0755	0.073	0.209	0.219	0.303	0.272	0.283	0.12	0.159	0.172
Lead (Pb)-Dissolved	mg/L	0.003	0.0000123	0.0000115	0.0000076	0.0000079	0.000012	0.000215 *	0.0000091	0.0000066	0.0000184	0.0000154
Lithium (Li)-Dissolved	mg/L	0.014	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	2.47	2.31	2.55	2.43	2.39	2.42	2.44	2.34	2.48	2.53
Manganese (Mn)-Dissolved	mg/L	0.768	0.0185	0.0166	0.0892	0.0879	0.101	0.0933	0.0973	0.0352	0.0531	0.0566
Mercury (Hg)-Dissolved	mg/L	0.00001	-	-	-	<0.0000050	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	mg/L	1	0.000087	0.000072	0.000073	0.000075	0.000074	0.000081	0.000071	0.000065	0.000066	0.000061
Nickel (Ni)-Dissolved	mg/L	0.025	0.000205	0.000175	0.000216	0.000202	0.000201	0.000199	0.000205	0.000148	0.000173	0.00018
Potassium (K)-Dissolved	mg/L	373	0.427	0.412	0.463	0.435	0.449	0.405	0.4	0.391	0.433	0.423
Selenium (Se)-Dissolved	mg/L	0.001	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Dissolved	mg/L	-	6.03	5.65	6.3	5.68	5.94	5.79	5.86	5.78	5.92	6.47
Silver (Ag)-Dissolved	mg/L	0.00005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	4.75	4.83	4.86	4.83	4.92	4.83	4.78	4.8	4.97	4.92
Strontium (Sr)-Dissolved	mg/L	-	0.0422	0.0417	0.0468	0.0478	0.047	0.0571	0.0494	0.0399	0.0423	0.042
Thallium (Tl)-Dissolved	mg/L	0.0008	0.0000027	0.0000023	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000023	<0.0000020	0.0000025	0.0000023
Tin (Sn)-Dissolved	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000280 *	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L	0.0085	0.0000021	<0.0000020	<0.0000020	<0.0000020	0.000002	<0.0000020	<0.0000020	<0.0000020	0.0000021	0.000002
Vanadium (V)-Dissolved	mg/L	0.006	0.00042	0.00039	0.00042	0.00039	0.00038	0.00037	0.00037	0.00032	0.00035	0.00037
Zinc (Zn)-Dissolved	mg/L	0.0075	0.00335 *	0.00071	0.00051	0.00058	0.00061	0.00047	0.00042	0.00057 *	0.0009	0.00112 *
BOD	mg/L	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10 *	<10 *
BOD Carbonaceous	mg/L	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10 *	<10 *
EPH10-19	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
LEPH	mg/L	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
HEPH	mg/L	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050
2-Bromobenzotrifluoride	%	-	92.4	122.1	91.7	107.5	90.8	94.2	93.6	99.4	94.1	102.2
Acenaphthene	mg/L	0.006	<0.000010	<0.000010	<0.000010	<0.000010	0.000018	<0.000010	<0.000010	<0.000010	0.000018	0.000015
Acenaphthylene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	0.00005	<0.000010	<0.000010	<0.00010 *	<0.00010 *	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	0.00001	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	0.0002	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	0.012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	0.001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	0.0003	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	0.00002	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	0.0034	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	-	85.1	92.2	79.3	79.6	85	71.8	73.1	89.2	81.7	85.3
Chrysene d12	%	-	96.1	104.7	87.2	99.5	93.1	102.6	104.9	98	78.9	82.1
Naphthalene d8	%	-	85.2	87.4	72.7	74.6	80.3	93.9	97.8	92.2	93.5	100
Phenanthrene d10	%	-	99	105.1	88.4	85.9	90.9	114.8	118.6	100.9	84.9	90.5

Applied Guideline:	
Color Key:	**British Columbia Approved and Working Water Quality Guidelines (MAY, 2015) - BCAWWQG - Freshwater Aquatic Life**
Within Guideline	
Exceeds Guideline	
Detection limit is higher than the guideline	
Exceeds the drinking water aesthetic objectives	

Quarterly Summary Report #1
Blank QA/QC Samples - All Results

	Sample ID	Field Blank	Trip Blank	Field Blank	Trip Blank	Field Blank	Field Blank	Trip Blank	Trip Blank	Field Blank	Trip Blank	Field Blank	Field Blank	Trip Blank
	ALS ID	L1803286-1	L1803311-1	L1816500-1	L1816501-1	L1819443-1	L1823542-1	L1819444-1	L1822150-1	L1822158-1	L1825914-1	L1825927-1	L1830223-1	L1830225-1
	Date Sampled	7/18/2016 4:50:00 PM	7/18/2016 12:00:00 AM	8/16/2016 12:45:00 PM	8/16/2016 12:00:00 AM	8/23/2016 12:00:00 PM	8/23/2016 12:00:00 AM	8/23/2016 12:00:00 AM	8/30/2016 12:00:00 AM	8/30/2016 10:50:00 AM	9/6/2016 12:00:00 AM	9/6/2016 11:20:00 AM	9/14/2016 1:45:00 PM	9/14/2016 12:00:00 AM
Analyte	**Units**	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Conductivity	uS/cm	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as CaCO3)	mg/L	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50 *	<0.50 *	<0.50	<0.50 *	<0.50	<0.50	-
pH	pH	-	-	5.62	5.62	5.43	5.33	5.42	5.76	5.6	6.29	5.75	5.83	5.57
Total Suspended Solids	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.0	<3.0	<1.0	<1.0
Turbidity	NTU	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ammonia, Total (as N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0060 *	<0.0050	<0.0050	0.0054	<0.0050	<0.0050	0.0218
Chloride (Cl)	mg/L	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nitrate and Nitrite (as N)	mg/L	-	-	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032
Nitrate (as N)	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Nitrite (as N)	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Nitrogen	mg/L	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.032 *
Total Organic Nitrogen	mg/L	<0.060	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dissolved Kjeldahl Nitrogen	mg/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.116
Total Dissolved Nitrogen	mg/L	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.116 *
Orthophosphate-Dissolved (as P)	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Sulfate (SO4)	mg/L	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Dissolved Organic Carbon	mg/L	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Organic Carbon	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50 *	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Mercury (Hg)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Aluminum (Al)-Total	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00062 *	0.00032 *	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Antimony (Sb)-Total	mg/L	<0.000020	<0.000020	<0.000020	<0.0000050	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.0000050
Arsenic (As)-Total	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Barium (Ba)-Total	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Beryllium (Be)-Total	mg/L	<0.000010	<0.000010	<0.000010	<0.0000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000020
Bismuth (Bi)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000010
Boron (B)-Total	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cadmium (Cd)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	<0.010	0.011 *	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cesium (Cs)-Total	mg/L	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	<0.0000050
Chromium (Cr)-Total	mg/L	<0.00010	<0.00010	<0.00010	<0.000050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050
Cobalt (Co)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Copper (Cu)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Gallium (Ga)-Total	mg/L	-	-	-	<0.000050	-	-	-	-	-	-	-	-	<0.000050
Iron (Fe)-Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Lanthanum (La)-Total	mg/L	-	-	-	<0.000010	-	-	-	-	-	-	-	-	<0.000010
Lead (Pb)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Lithium (Li)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00020
Magnesium (Mg)-Total	mg/L	<0.010	<0.010	<0.010	<0.0010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0010
Manganese (Mn)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.0000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010
Nickel (Ni)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phosphorus (P)-Total	mg/L	-	-	-	<0.0020	-	-	-	-	-	-	-	-	<0.0020
Potassium (K)-Total	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Rhenium (Re)-Total	mg/L	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	<0.0000050
Rubidium (Rb)-Total	mg/L	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	<0.0000050
Selenium (Se)-Total	mg/L	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Total	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Strontium (Sr)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000020	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000020
Tellurium (Te)-Total	mg/L	-	-	-	<0.000010	-	-	-	-	-	-	-	-	<0.000010
Thallium (Tl)-Total	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000010	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000010
Thorium (Th)-Total	mg/L	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	<0.0000050
Tin (Sn)-Total	mg/L	<0.000010	0.000024	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Titanium (Ti)-Total	mg/L	-	-	-	<0.000050	-	-	-	-	-	-	-	-	<0.000050
Tungsten (W)-Total	mg/L	-	-	-	<0.000010	-	-	-	-	-	-	-	-	<0.000010
Uranium (U)-Total	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000010	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000010
Vanadium (V)-Total	mg/L	<0.00020	<0.00020	<0.00020	<0.000010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.000010
Yttrium (Y)-Total	mg/L	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	<0.0000050
Zinc (Zn)-Total	mg/L	0.00011 *	0.00016 *	<0.00010	0.00017 *	<0.00010	<0.00010	0.00020 *	0.00022 *	0.00013 *	<0.00010	<0.00010	<0.00010	<0.00010
Zirconium (Zr)-Total	mg/L	-	-	-	<0.000010	-	-	-	-	-	-	-	-	<0.000010
Aluminum (Al)-Dissolved	mg/L	<0.00020	<0.00020	0.00064 *	-	<0.00020	<0.00050	-	-	0.00042 *	-	<0.00020	0.00035 *	-
Antimony (Sb)-Dissolved	mg/L	<0.000020	<0.000020	<0.000020	-	<0.000020	<0.000020	-	-	<0.000020	-	<0.000020	<0.000020	-
Arsenic (As)-Dissolved	mg/L	<0.000020	<0.000020	<0.000020	-	<0.000020	<0.000020	-	-	<0.000020	-	<0.000020	<0.000020	-
Barium (Ba)-Dissolved	mg/L	<0.000020	<0.000020	<0.000020	-	<0.000020	<0.000050	-	-	<0.000020	-	<0.000020	<0.000020	-
Beryllium (Be)-Dissolved	mg/L	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	-	-	<0.000010	-	<0.000010	<0.000010	-
Bismuth (Bi)-Dissolved	mg/L	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-	-	<0.0000050	-	<0.0000050	<0.0000050	-
Boron (B)-Dissolved	mg/L	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.010	-	-	<0.0050	-	<0.0050	<0.0050	-
Cadmium (Cd)-Dissolved	mg/L	<0.0000050	<0.0000050	<0.0000050	-	0.0000275 *	<0.0000050	-	-	<0.0000050	-	<0.0000050	<0.0000050	-
Calcium (Ca)-Dissolved	mg/L	0.016 *	<0.010	<0.010	-	<0.010	<0.010	-	-	<0.010	-	<0.010	<0.010	-
Chromium (Cr)-Dissolved	mg/L	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	-	-	<0.00010	-	<0.00010	<0.00010	-
Cobalt (Co)-Dissolved	mg/L	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-	-	<0.0000050	-	<0.0000050	<0.0000050	-
Copper (Cu)-Dissolved	mg/L	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	-	-	<0.000050	-	<0.000050	<0.000050	-
Iron (Fe)-Dissolved	mg/L	0.0014 *	<0.0010	<0.0010	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010	<0.0010	-

Quarterly Summary Report #1
Blank QA/QC Samples - All Results

	Sample ID	Field Blank	Trip Blank	Field Blank	Trip Blank	Field Blank	Field Blank	Trip Blank	Trip Blank	Field Blank	Trip Blank	Field Blank	Field Blank	Trip Blank
	ALS ID	L1803286-1	L1803311-1	L1816500-1	L1816501-1	L1819443-1	L1823542-1	L1819444-1	L1822150-1	L1822158-1	L1825914-1	L1825927-1	L1830223-1	L1830225-1
	Date Sampled	7/18/2016 4:50:00 PM	7/18/2016 12:00:00 AM	8/16/2016 12:45:00 PM	8/16/2016 12:00:00 AM	8/23/2016 12:00:00 PM	8/23/2016 12:00:00 AM	8/23/2016 12:00:00 AM	8/30/2016 12:00:00 AM	8/30/2016 10:50:00 AM	9/6/2016 12:00:00 AM	9/6/2016 11:20:00 AM	9/14/2016 1:45:00 PM	9/14/2016 12:00:00 AM
Analyte	**Units**	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Lead (Pb)-Dissolved	mg/L	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-	-	<0.0000050	-	<0.0000050	<0.0000050	-
Lithium (Li)-Dissolved	mg/L	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	-	-	<0.00050	-	<0.00050	<0.00050	-
Magnesium (Mg)-Dissolved	mg/L	<0.010	<0.010	<0.010	-	<0.010	<0.010	-	-	<0.010	-	<0.010	<0.010	-
Manganese (Mn)-Dissolved	mg/L	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	-	-	<0.000050	-	<0.000050	<0.000050	-
Mercury (Hg)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	mg/L	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	-	-	<0.000050	-	<0.000050	<0.000050	-
Nickel (Ni)-Dissolved	mg/L	0.000053 *	<0.000050	<0.000050	-	<0.000050	<0.000050	-	-	<0.000050	-	<0.000050	<0.000050	-
Potassium (K)-Dissolved	mg/L	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	-	-	<0.0050	-	<0.0050	<0.0050	-
Selenium (Se)-Dissolved	mg/L	<0.000040	<0.000040	<0.000040	-	<0.000040	<0.000040	-	-	<0.000040	-	<0.000040	<0.000040	-
Silicon (Si)-Dissolved	mg/L	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	-	<0.050	-	<0.050	<0.050	-
Silver (Ag)-Dissolved	mg/L	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	-	-	<0.0000050	-	<0.0000050	<0.0000050	-
Sodium (Na)-Dissolved	mg/L	<0.010	<0.010	<0.010	-	<0.010	<0.020	-	-	<0.010	-	<0.010	<0.010	-
Strontium (Sr)-Dissolved	mg/L	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.00020	-	-	<0.000050	-	<0.000050	<0.000050	-
Thallium (Tl)-Dissolved	mg/L	<0.0000020	<0.0000020	<0.0000020	-	<0.0000020	<0.0000020	-	-	<0.0000020	-	<0.0000020	<0.0000020	-
Tin (Sn)-Dissolved	mg/L	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	-	-	<0.000010	-	<0.000010	<0.000010	-
Uranium (U)-Dissolved	mg/L	<0.0000020	<0.0000020	<0.0000020	-	<0.0000020	<0.0000020	-	-	<0.0000020	-	<0.0000020	<0.0000020	-
Vanadium (V)-Dissolved	mg/L	<0.00020	<0.00020	<0.00020	-	<0.00020	<0.00020	-	-	<0.00020	-	<0.00020	<0.00020	-
Zinc (Zn)-Dissolved	mg/L	0.00089 *	0.00030 *	0.00047 *	-	0.00058 *	<0.00050	-	-	0.00031 *	-	0.00059 *	0.00024 *	-
BOD	mg/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10 *	<10 *
BOD Carbonaceous	mg/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10 *	<10 *
EPH10-19	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050
EPH19-32	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050
LEPH	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050
HEPH	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050
2-Bromobenzotrifluoride	%	94.6	90.9	87.4	93.8	107.4	70.9	97.3	94.3	93.6	87.4	91.6	92.1	105.8
Acenaphthene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	101.6	92.9	71.9	77	85.7	76.2	95.5	95.5	95.1	89.4	88.5	77.7	84.9
Chrysene d12	%	95.7	97.8	86.5	94	97	84.9	112.3	105.5	101.8	103.1	104	78.1	89.3
Naphthalene d8	%	88.6	85.3	71.1	73.7	78.7	72.6	89.5	97.1	91.3	94.9	95.4	91.9	79.4
Phenanthrene d10	%	115.7	105.8	87.9	87.7	91.4	83.6	100.4	116.2	113.3	103.4	103.9	83.9	87.7

* = Result Qualified
Color Key:
Detected concentration

Note: We are working with ALS to determine the source of detected analytes in sample blanks.