May 3, 2017

Nova Scotia Lands
45 Wabana Court
Harbourside Commercial Park
Sydney, NS
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ATTENTION: Mr. Frank Potter
Executive Director

Long Term Maintenance and Monitoring
Semi-Annual Surface Water Quality Monitoring Program
December 2016 Final Report

Surface water quality monitoring has been implemented as part of the long term maintenance and monitoring (LTMM) program to provide ongoing data and compliance commitments to regulatory agencies and/or stakeholders. Nova Scotia Lands (NS Lands) is a Crown Corporation of the Province of Nova Scotia responsible for the LTMM semi-annual surface water quality program. NS Lands retained Dillon Consulting Limited (Dillon) to conduct the December 2016 LTMM Surface Water Quality Monitoring Program, the details of which are provided herein.

PROJECT METHODOLOGY

The fall Surface Water Quality Monitoring program, which was completed on December 8, 2016, was scheduled to consist of the collection of surface water samples at ten stations (i.e., CB-SW, NRC-1-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW, COB-6-SW, WB-1-SW, Narrows and BP-1-SW) (Figure 1). A GPS unit was used to confirm that the monitoring locations sampled as part of the LTMM Surface Water Quality Monitoring Program were the same as those used during historical surface water monitoring events (e.g., the Environmental Effects Monitoring and Surface Water Monitoring (EEMSWM) Program associated with the Sydney Tar Ponds remediation). Tasks associated with the December 2016 surface water monitoring included:

- Documenting ecological activity in the surface water bodies, if observed;
- Recording of physical conditions and potential contaminants (i.e., debris, precipitate);
- Measurement of field parameters (e.g., pH, conductivity, temperature, salinity and turbidity) with a calibrated Horiba U-52 multi-probe;
- Flow calculation; and,
- Collection of surface water samples for polycyclic aromatic hydrocarbons (PAHs), general chemistry and total metals (including mercury) (RCApMS) analysis. As concentrations of petroleum hydrocarbons (PHC) and polychlorinated biphenyls (PCBs) have remained below laboratory detection limits for the duration of the

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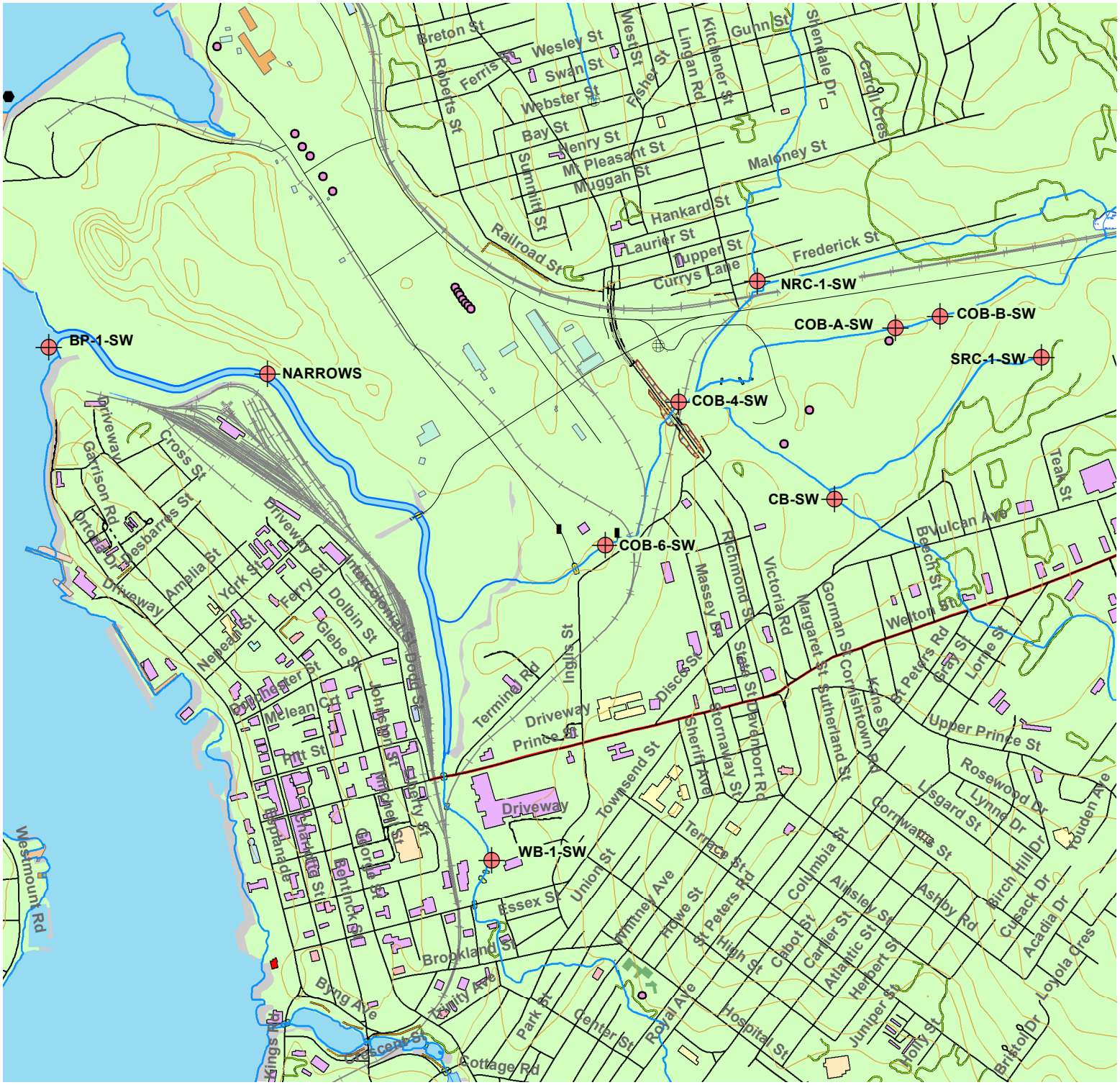

NS Lands
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LONG TERM MAINTENANCE
AND MONITORING
SURFACE WATER QUALITY MONITORING PROGRAM
DECEMBER 2016

SURFACE WATER LOCATIONS
FIGURE 1

LEGEND

Surface Water Locations

0 100 200 400 600 m

MAP DRAWING INFORMATION:
Province of Nova Scotia Mapping

MAP CREATED BY: MCL
MAP CHECKED BY: NJW
MAP PROJECTION: NAD 1983 UTM Zone 20N

FILE LOCATION: \\DILLON.CA\DILLON_DFS\SYDNEY
\SYDNEYCAD\GIS\141360

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PROJECT: 14-1360
STATUS: FINAL
DATE: 01/26/17

LTMM program, the surface water program was modified in July 2016 to consist of PAH and RCApMS analysis only (following approval from Nova Scotia Environment (NSE) and NS Lands).

A summary of the surface water stations included in the December 2016 monitoring program is presented in Table 1.

Table 1 – Surface Water Quality Monitoring Stations

Monitoring Station ID	Water Body	Rationale for Sampling
CB-SW	Cagney Brook	To characterize surface water quality within the urban area of Sydney upstream of CO7/CO8[1].
NRC-1-SW	North Realigned Channel	To characterize surface water quality within the urban area of Whitney Pier upstream of CO7/CO8.
SRC-1-SW	South Realigned Channel	To characterize surface water quality related to runoff from the municipal landfill upstream of CO7/CO8.
COB-A-SW	Coke Ovens Brook - concrete riffles upstream of Stable Drive	To characterize surface water quality from runoff and leachate associated with the municipal landfill upstream of CO1[2], CO6[3] and CO7/CO8.
COB-B-SW[4]	Coke Oven Brook along SPAR Road, east of COB-A-SW	To further characterize the potential for impacts from the municipal landfill to COB-A-SW.
COB-4-SW	COB-A-SW	To characterize surface water quality from the upstream areas of CO1, CO6 and CO7/CO8. This sampling location is also upstream of TP6B[5].
COB-6-SW	Coke Ovens Brook	To further characterize surface water quality from the upstream areas of CO1, CO6 and CO7/CO8. This sampling location is also upstream of TP6B.
WB-1-SW	Coke Ovens Brook	To characterize surface water quality within the urban area of Sydney upstream of TP6B and TP7[6].
NARROWS	Wash Brook	To characterize surface water quality downgradient of the majority of the remediation sites.
BP-1-SW[7]	North Channel, Open Hearth Park	To further characterize surface water quality downgradient of the remediation sites and as it discharges to Sydney Harbour.

Notes:
1 CO7/CO8: Collection System (CO7)/Water Treatment Plant (CO8).
2 CO1: Coke Oven Brook.
3 CO6: Surface Cap.
4 Upstream monitoring station COB-B-SW was added to the monitoring program in 2015 to further characterize the potential for impacts from the municipal landfill to COB-A-SW.
5 TP6B: Solidification/Stabilization/Channel.
6 TP7: Tar Ponds Cap.
7 The LTMM location of surface water station BP-1-SW is similar to the location used during Pre-Construction activities associated with the EEM Program and is approximately 40 meters upstream from the collection point utilized during the Construction period of the EEM Program.

Field data was recorded on site specific data sheets. Stream flow measurements were calculated by measuring the width of the stream at the sampling location and by measuring the depth of the stream at ¼, ½ and ¾ width intervals. The stream flow velocity was also measured at ¼, ½ and ¾ intervals. Using a spreadsheet formula, the approximate stream flow was calculated for each monitoring station. Due to the depth of surface water station BP-1-SW, it was not possible to obtain field measurements across the entire stream width. Dillon personnel collected as much field data at this deeper location as safely possible (i.e., from the stream banks/shoreline). Stream flow velocity for this location was calculated using the Muggah Creek North Channel Survey (CBCL Limited, October 2014) provided by NS Lands.

Sample containers were pre-labelled by the laboratory with the sample identification, analysis required and the project number. The date and time of sample collection were noted on the sample containers in the field at the time of collection. New nitrile gloves were worn by field staff for each sample to avoid cross-contamination between sampling stations. Samples were collected by opening the container facing upstream. Where samples were collected directly into the sample bottles containing preservative, the container was not fully submerged during sampling to avoid washing the preservative out of the container. Metals sample bottles contained nitric acid preservative to ensure that the metals remained in solution.

WEATHER CONDITIONS

Weather information obtained from Environment Canada's climate station at the Sydney Airport indicates that accumulated precipitation for the 30 days preceding the December 2016 surface water monitoring program was approximately 167.3 millimeters (mm). No significant rainfall was recorded on the day of, or the five days leading up to, the sampling event.

Tidal information obtained from Meteo365 (https://www.tide-forecast.com) for December 8, 2016, indicated a high tide level of 1 meter (m) and a low tide level of 0.32 m.

FIELD OBSERVATIONS AND MEASUREMENTS

Observations at the ten surface water stations during the December 2016 monitoring program are summarized in Table 2. Field measurements are summarized in Table 3.

Table 2 – December 2016 Surface Water Quality Monitoring Station Field Observations

Monitoring Station ID	Field Observations	Corresponding Photograph Number
CB-SW	Debris (i.e., plastic and wood) observed in brook.	1
NRC-1-SW	Debris (i.e., Styrofoam, brick and metal) observed in the channel and on the channel banks. Construction work (i.e., digging as part of a planned culvert replacement within the surface water station) was underway immediately up gradient of the surface water station on the day of the monitoring program (see corresponding photograph number 11). No observed turbidity increase within the surface water was noted at the time of sampling as a result of the construction activities.	2
SRC-1-SW	Algae observed in the channel. Concrete channel walls had extensive spray painted graffiti visibly dissolving at the high water point.	3
COB-A-SW	Algae observed on brook rocks. Visible orange staining observed on rock lining the brook banks.	4
COB-B-SW	Algae observed on brook rocks. Groundwater observed coming from the ground and flowing into the brook down gradient of the surface water sampling point (see corresponding photograph number 12).	5
COB-4-SW	Debris (i.e., plastic) observed on brook banks.	6
COB-6-SW	Debris (i.e., plastic) observed within the brook.	7
WB-1-SW	Debris (i.e., pressure treated wood, creosote timbers and metal) observed within the brook and on the brook banks.	8
NARROWS	Algae observed within the channel and on channel rocks.	9
BP-1-SW	Debris (i.e., plastic) observed on the rock banks. Algae, seaweed, snails and barnacles observed on exposed shoreline rocks. Seabirds visible in water and on shoreline.	10

Note:
Photographs are presented in Appendix A.

Table 3 – December 2016 Surface Water Quality Monitoring Station Field Measurements

Monitoring Station ID	pH	Turbidity (NTU)	Conductivity (mS/cm)	Salinity (%)	Stream Flow[1] (m3/s)
CB-SW	8.28	2.9	0.291	0	0.064
NRC-1-SW	8.18	4.0	0.163	0	0.335
SRC-1-SW	8.32	1.0	0.536	0	0.136
COB-A-SW	8.14	4.9	0.638	0	0.022
COB-B-SW	7.20	4.2	1.46	0	0.081
COB-4-SW	8.12	1.0	0.274	0	0.291
COB-6-SW	8.17	55	0.344	0	2.39

Table 3 – December 2016 Surface Water Quality Monitoring Station Field Measurements

Monitoring Station ID	pH	Turbidity (NTU)	Conductivity (mS/cm)	Salinity (%)	Stream Flow [1] (m3/s)
WB-1-SW	9.41[2]	1.0	0.156	0	0.339
NARROWS	7.12	2.6	7.31	0.3	1.92[3]
BP-1-SW[4]	7.64	2.8	7.95	0.4	3.28[3]

Notes:
1 Stream flow is an approximate calculated value.
2 The generally increasing pH in WB-1-SW is interpreted to be related to off-site sources.
3 As surface water stations Narrows and BP-1-SW were monitored at different times of the day, there is some difference in the calculated flow rates due to tidal fluctuation. Both locations were monitored during low tide.
4 Collected during low tide conditions.

REGULATORY FRAMEWORK

As specified in Section 4.2, page 21 of the NS Lands LTMM Plan, the remedial criteria used for eight of the ten surface water stations included in the LTMM monitoring program (i.e., CB-SW, NRC-1-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW, COB-6-SW and WB-1-SW) were the Nova Scotia Contaminated Sites Regulations (NS CSRs) Tier I Environmental Quality Standards (EQS) (which came into effect July 6, 2013) for surface water (fresh water) and the Canadian Council of Ministers of the Environment (CCME) for the protection of fresh water aquatic life (FWAL), 2016. Analytical results for the remaining two surface water stations included in the monitoring program (i.e., Narrows and BP-1-SW) were compared to the NS CSRs Tier I EQS for surface water (marine) and the CCME guidelines for the protection of aquatic life (marine).

Additionally, as specified in Section 4.2, page 21 of the NS Lands LTMM Plan, analytical results for surface water samples collected at the upstream sampling stations were compared to previously calculated 95% upper confidence limits (UCL) of available Pre-Construction/Baseline analytical data from the EEMSWCM Program associated with the Sydney Tar Ponds remediation. Further, analytical results for the upstream sampling stations were also compared to calculated 95% UCLs of available historical upstream analytical data (i.e., the Upstream Calculated 95% UCL). Analytical results for the two sampling stations near Sydney Harbour were compared to the calculated 95% UCLs of available Pre-Construction/Baseline analytical data for the Battery Point sampling station.

SURFACE WATER QUALITY TREND ANALYSIS – MANN KENDALL

Mann-Kendall analysis as a non-parametric statistic test routinely used to assess the stability of solute plume (i.e., stable, decreasing, or increasing). At least four independent sampling events are required to evaluate surface water quality trends via Mann-Kendall analysis. The Mann-Kendall test procedure starts by comparing the most

recent round of water quality data with the results of earlier rounds. Non-detect data values are typically assigned a value that is half the laboratory detection limit. The Mann-Kendall test is not designed to account for seasonal variation in data.

Based on a review of the analytical results from the 2016 monitoring events and historical monitoring events, select parameters, with concentrations above (or historically above) applicable guidelines were selected for Mann-Kendall analysis. These include PAH indicator parameters anthracene, pyrene and benzo(a)pyrene and inorganic chemistry indicator parameters boron, cadmium, strontium, sulphate and zinc.

In certain situations, Mann-Kendall analysis results may be biased due to elevated laboratory detection limits. Non-detected data on the Mann-Kendall analysis of indicator parameters was identified and confirmed the influence of non-detected data is minimal.

SURFACE WATER RESULTS

The surface water quality results for the December 2016 event, and available post-remediation surface water data, are presented in the attached Tables B-1 and B-2 in Appendix B. As stated above, surface water samples were analyzed for PAHs and RCApMS. Samples were delivered to Maxxam Analytics in Sydney, Nova Scotia (Maxxam) who are contracted directly by NS Lands to conduct the sample analysis. Maxxam is a Canadian Association for Laboratory Accreditation (CALA) certified laboratory for the parameters analyzed. Review of the data indicates:

- PAH results:
  - The pyrene concentration of 0.027 ug/L in NRC-1-SW exceeded the Tier I EQS and CCME FWAL guideline of 0.025 ug/L;
  - The anthracene (0.013 ug/L), benzo(a)anthracene (0.021 ug/L), benzo(a)pyrene (0.28 ug/L), fluoranthene (0.043 ug/L) and pyrene (0.04 ug/L) concentrations in COB-4-SW exceeded the Tier I EQS (fresh water) and CCME FWAL guidelines of 0.012 ug/L, 0.018 ug/L, 0.015 ug/L, 0.04 ug/L and 0.025 ug/L, respectively; and,
  - The benzo(a)pyrene (0.027 ug/L) and fluoranthene (0.043 ug/L) concentrations in COB-6-SW exceeded the Tier I EQS (fresh water) and CCME FWAL guidelines of 0.015 ug/L and 0.04 ug/L, respectively.

The remaining PAH parameters analyzed were below criteria. A summary of concentrations of select organic parameters (i.e., naphthalene and benzo(a)pyrene) at each station recorded during the December 2016 event relative to the calculated 95% UCLs is provided in Table 4.

Table 4 - Summary of Organic Surface Water Indicator Parameter Concentrations relative to Calculated 95% (ug/L)												
Parameter	**Pre-Construction/ Baseline Calculated 95% UCL[1]**	**Date**	**Sample Location**									
			CB-SW	**NRC-1-SW**	**SRC-1-SW**	**COB-A-SW**	**COB-B-SW[2]**	**COB-4-SW**	**COB-6-SW**	**WE-1-SW**	**NARROWS**	**BP-1-SW**
Naphthalene	1.8	12/22/2014	<0.20	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20	0.22	<0.20
		7/27/2015	<0.20	<0.20	<0.20	Dry	Dry	<0.20	<0.20	<0.20	<0.20	<0.20
		11/18/2015	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
		7/22/2016	<0.20	<0.20	<0.20	Dry	Dry	<0.20	<0.20	<0.20	<0.20	<0.20
		12/8/2016	<0.20	0.20	<0.20	<0.20	<0.20	<0.20	0.38	<0.20	0.21	<0.20
Benzo(a)pyrene	0.05	12/22/2014	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
		7/27/2015	<0.010	<0.010	<0.010	Dry	Dry	<0.010	<0.010	<0.010	<0.010	<0.010
		11/18/2015	<0.010	**0.068**	<0.010	<0.010	<0.010	**0.39**	0.015	<0.010	<0.010	<0.010
		7/22/2016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.025	<0.010	<0.010
		12/8/2016	<0.010	0.011	<0.010	<0.010	<0.010	0.028	0.027	<0.010	<0.010	<0.010

Notes:

[1] Pre-Construction/Baseline Calculated 95% UCLare from the EEMSWCM Program

[2] Added to the program in July 2015

Bold indicates the concentration exceeds the Pre-Construction/Baseline Calculated 95% UCL

- General chemistry and metals results:
  - Concentrations of aluminum ranging from 8.5 ug/L to 300 ug/L exceeded the Tier I EQS (fresh water) standard of 5 ug/L in CB-SW, NRC-1-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW, COB-6-SW and WB-1-SW. The aluminum concentrations ranging from 110 ug/L to 300 ug/L in NRC-1-SW, SRC-1-SW, COB-4-SW, COB-6-SW and the field duplicate sample of WB-1-SW exceeded the CCME FWAL guideline of 100 ug/L. The concentration of 300 ug/L in SRC-1-SW exceeded the of Upstream Calculated 95% UCL of 220 ug/L;
  - Concentrations of cadmium ranging from 0.017 ug/L to 0.039 ug/L at CB-1-SW, NRC-1-SW, SRC-1-SW, COB-B-SW, COB-4-SW, COB-6-SW, WB-1-SW and the field duplicate sample of WB-1-SW exceeded the Tier I EQS (fresh water) standard of 0.01 ug/L;
  - The copper concentration of 2.7 ug/L exceeded the Tier I EQS of 2.0 ug/L at SRC-1-SW;
  - Iron concentrations ranging from 330 ug/L to 400 ug/L in CB-SW, NRC-1-SW, SRC-1-SW, COB-4-SW and COB-6-SW exceed the Tier I EQS (fresh water) and CCME FWAL guideline of 300 ug/L. The iron concentrations of 250 ug/L and 280 ug/L in the Narrows and BP-1-SW , respectively, exceeded the Battery Point/Narrows Calculated 95% UCL of 190 ug/L;
  - The lead concentration of 1.6 ug/L in SRC-1-SW exceeded the Tier I EQS and the Upstream Calculated 95% UCL;
  - The manganese concentration of 1,400 ug/L at COB-B-SW exceeded the Tier I EQS of 820 ug/L and was above the Upstream Calculated 95% UCL of 583 ug/L and the Pre-Construction/Baseline Calculated 95% UCL of 800 ug/L. The manganese concentrations of 100 ug/L and 110 ug/L at BP-1-SW and the Narrows, respectively, are above the Battery Point/Narrows Calculated 95% UCL of 70 ug/L;
  - Concentrations of strontium ranging from 140 ug/L to 480 ug/L are above the Upstream 95% UCL of 132 ug/L at SRC-1-SW, COB-A-SW, COB-B-SW and COB-6-SW. The concentrations of 250 ug/L and 480 ug/L at COB-A-SW and COB-B-SW, respectively, also exceed the Pre-Construction/Baseline 95% UCL of 210 ug/L;
  - Sulphate concentrations ranging from 39 ug/L to 440 ug/L at SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW and COB-6-SW exceed the Upstream Calculated 95% UCL of 26 ug/L. The concentrations of 150 ug/L and 440 ug/L at COB-A-SW and COB-B-SW, respectively, also exceeded the Pre-Construction/ Baseline Calculated 95% UCL of 84 mg/L; and,
  - The chloride concentration of 140 mg/L at COB-B-SW exceeded the CCME (FWAL) guideline of 120 mg/L.

Table 5 – Summary of Inorganic Surface Water Indicator Parameter Concentrations relative to Calculated 95% UCLs

Sample Location	Date	SO4	Al	As	Cd	Cr	Co	Fe	Pb	Mn	Se	Sr
	Units	(mg/L)	(ug/L)									
Upstream Calculated 95% UCL[1]		**26**	**220**	**1.6**	**0.1**	**8.3**	**-**	**3,318**	**1.2**	**583**	**1.9**	**132**
Pre-Construction/Baseline Calculated 95% UCL[1]		**84**	**-**	**1.98**	**-**	**-**	**1.3**	**1,900**	**-**	**800**	**-**	**210**
CB-SW	12/22.2014	26	110	<1.0	0.018	<1.0	<0.40	290	<0.50	190	<1.0	130
	7/27/2015	16	28	<1.0	<0.010	<1.0	<0.40	260	<0.50	61	<1.0	**320**
	11/18/2015	24	130	<1.0	0.011	<1.0	<0.40	280	<0.50	140	<1.0	**140**
	7/22/2016	10	55	1.4	<0.010	<1.0	<0.40	640	<0.50	71	<1.0	**160**
	12/8/2016	23	84	<1.0	0.017	<1.0	<0.40	330	<0.50	310	<1.0	110
NRC-1-SW	12/22.2014	20	58	<1.0	0.022	<1.0	<0.40	150	<0.50	85	<1.0	32
	7/27/2015	22	45	<1.0	0.019	<1.0	<0.40	1,300	<0.50	75	<1.0	54
	11/18/2015	15	**1,500**	**3.5**	**0.14**	1.9	1.5	**3,800**	**9.5**	**1,100**	<1.0	36
	7/22/2016	15	31	<1.0	0.016	<1.0	<0.40	970	0.61	47	<1.0	52
	12/8/2016	16	110	<1.0	0.025	<1.0	<0.40	360	0.8	200	<1.0	34
SRC-1-SW	12/22.2014	**54**	**290**	<1.0	0.035	<1.0	<0.40	340	1.2	190	<1.0	**150**
	7/27/2015	**47**	51	1.0	0.013	<1.0	<0.40	210	1.1	260	<1.0	**150**
	11/18/2015	**43**	**240**	<1.0	0.023	1.2	<0.40	310	0.75	230	<1.0	**150**
	7/22/2016	**51**	50	**1.9**	0.018	<1.0	<0.40	350	<0.50	350	<1.0	**170**
	12/8/2016	**42**	**300**	<1.0	0.039	1.0	<0.40	400	**1.6**	200	<1.0	**140**
COB-A-SW	12/22/2014	**160**	16	<1.0	<0.010	<1.0	<0.40	51	<0.50	25	<1.0	**260**
	7/27/2015						Dry					
	11/18/2015	**170**	5.1	<1.0	<0.010	<1.0	<0.40	82	<0.50	74	<1.0	**260**
	7/22/2016						Dry					
	12/8/2016	**150**	8.5	<1.0	<0.010	<1.0	<0.40	68	<0.50	92	<1.0	**250**
COB-B-SW[2]	7/27/2015						Dry					
	11/18/2015	**190**	7.9	<1.0	<0.010	<1.0	<0.40	<50	<0.50	21	<1.0	**250**
	7/22/2016						Dry					
	12/8/2016	**440**	13	<1.0	0.027	<1.0	0.90	130	<0.50	**1,400**	<1.0	**480**
COB-4-SW	12/22.2014	**47**	82	<1.0	0.014	<1.0	<0.40	210	<0.50	95	<1.0	**140**
	7/27/2015	**100**	51	<1.0	<0.010	<1.0	<0.40	460	<0.50	110	<1.0	**250**
	11/18/2015	**41**	**7,100**	**13**	**0.29**	8.0	4.6	**14,000**	**37**	**1,500**	<1.0	**150**
	7/22/2016	**74**	28	<1.0	<0.010	<1.0	<0.40	300	<0.50	140	<1.0	**270**
	12/8/2016	**39**	120	<1.0	0.014	<1.0	<0.40	390	0.99	180	<1.0	110
COB-6-SW	12/22.2014	**56**	61	<1.0	0.01	<1.0	<0.40	170	<0.50	56	<1.0	**180**
	7/27/2015	**91**	39	<1.0	<0.010	<1.0	<0.40	160	<0.50	23	<1.0	**300**
	11/18/2015	**44**	220	<1.0	0.018	<1.0	<0.40	490	**1.5**	79	<1.0	**180**
	7/22/2016	**64**	46	1.0	<0.010	<1.0	<0.40	180	<0.50	37	<1.0	**300**
	12/8/2016	**41**	200	<1.0	0.015	<1.0	<0.40	360	1.0	110	<1.0	**160**
WB-1-SW	12/22.2014	7.9	160	<1.0	0.038	<1.0	<0.40	270	0.71	95	<1.0	53
	7/27/2015	10	89	<1.0	0.012	<1.0	<0.40	480	<0.50	41	<1.0	100
	11/18/2015	8.3	63	<1.0	<0.010	<1.0	<0.40	200	<0.50	43	<1.0	73
	7/22/2016	**410**	87	<1.0	0.035	<1.0	<0.40	590	0.56	160	<1.0	**1300**
	12/8/2016	8.4	100	<1.0	0.026	<1.0	<0.40	220	<0.50	100	<1.0	61
Battery Point/ Narrows Calculated 95% UCL[1]		**2,180**	**-**	**-**	**-**	**-**	**0.9**	**190**	**-**	**70**	**-**	**7,000**
NARROWS	12/22.2014	270	110	<1.0	0.027	<1.0	<0.40	***250***	<0.50	63	<1.0	610
	7/27/2015	1,500	86	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***100***	<10	5,400
	11/18/2015	110	76	<1.0	0.012	<1.0	<0.40	***320***	<0.50	45	<1.0	370
	7/22/2016	1,400	51	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***120***	<10	5,400
	12/8/2016	270	75	<1.0	0.029	<1.0	<0.40	***250***	<0.50	***110***	<1.0	890
BP-1-SW	12/22.2014	170	110	<1.0	0.028	<1.0	<0.40	***240***	<0.50	61	<1.0	950
	7/27/2015	1,300	140	<10	<0.10	<10	*<4.0*	*<500*	<5.0	59	<10	5,300
	11/18/2015	190	140	<1.0	0.014	<1.0	<0.40	***410***	<0.50	57	<1.0	580
	7/22/2016	1,600	63	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***71***	<10	5,500
	12/8/2016	290	86	<1.0	0.025	<1.0	<0.40	***280***	<0.50	***100***	<1.0	1,000

Notes:

[1] Upstream, Pre-Construction/Baseline and Battery Point/Narrows Calculated 95% UCLs are from the EEMSWCM Program

[2] Added to the program in July 2015

Bold indicates the concentration exceeds the Upstream Calculated 95% UCL

Underline indicates exceedance of the Pre-Construction/Baseline Calculated 95% UCL

Italics Bold indicates exceedance of the Battery Point/Narrows Calculated 95% UCL

Italics indicates that the laboratory detection limit is greater than the comparison criteria

The remaining general chemistry parameters were below applicable criteria. Table 5 provides a summary of concentrations for select inorganic parameters from the December 2016 sampling event relative to the calculated 95% UCLs.

TREND ANALYSIS

The groundwater quality trend analysis for the 2016 monitoring event was based on the available analytical results (i.e., four rounds of sampling events are required) for select parameters, including PAH indicator parameters anthracene, pyrene and benzo(a)pyrene and inorganic chemistry indicator parameters boron, cadmium, strontium, sulphate and zinc. Concentrations of benzo(a)pyrene at NRC-1-SW and pyrene at COB-6-SW showed a generally increasing trend. Trend analysis results for the remaining parameters and surface water stations indicated fluctuations with no trend or a generally declining trend.

QUALITY CONTROL PROCESS

The laboratory analytical certificates have been reviewed for quality assurance/quality control purposes. The laboratory completed quality control analysis including duplicates, blanks, spikes, surrogate recoveries and spiked blanks to assess accuracy and precision as well as the potential for bias, contamination and degradation or matrix effects. Review of the laboratory report indicated a poor RCAp ion balance due to sample matrix was reported for CB-SW, SRC-1-SW, COB-4-SW and COB-6-SW

One field duplicate of sample, WB-1-SW, and one trip blank were collected during the December 2016 monitoring event. The relative percent difference (RPD) was calculated between the sample and associated field duplicate results. The RPD was not calculated for those parameters where one or both of the results associated with the original and/or field duplicate sample exhibited concentrations less than five times the laboratory reportable detection limit (RDL). The calculated RPDs were within established limit (i.e., less than 30% RPD) for each parameter with the exception of %ion balance and aluminum. It is further noted that the aluminum concentrations in both the original and duplicate samples exceeded the Tier I EQS; however, the concentration in the field duplicate also exceeded the CCME FWAL criteria whereas the original sample did not. As the remainder of analyzed parameters were within the calculated RPD established limit, and no other criteria exceedance discrepancies were identified, the data quality is considered acceptable and the results representative with no identification of significant quality issues requiring further investigation or resampling.

PAH compounds were not detected in the trip blank. There were no holding time exceedances.

SUMMARY

Analytical results of the December 2016 surface water monitoring program indicate that concentrations of the majority of the analyzed parameters are below the applicable criteria and respective 95% UCLs. Criteria and 95% UCL exceedances are summarized in Table 6.

Table 6 Summary of Surface Water Station Criteria and 95 % UCL Exceedances
December 2016

Parameter	Location (Criteria and/or 95% UCL Exceedance)
Anthracene	· COB-4-SW (Tier I EQS (fresh water) and CCME FWAL)
Benzo(a)anthracene	· COB-4-SW (Tier I EQS (fresh water) and CCME FWAL)
Benzo(a)pyrene	· COB-4-SW (Tier I EQS (fresh water) and CCME FWAL) · COB-6-SW (Tier I EQS (fresh water) and CCME FWAL)
Fluoranthene	· COB-4-SW (Tier I EQS (fresh water) and CCME FWAL) · COB-6-SW (Tier I EQS (fresh water) and CCME FWAL)
Pyrene	· COB-4-SW (Tier I EQS (fresh water) and CCME FWAL) · NRC-1-SW (Tier I EQS (fresh water) and CCME FWAL)
Aluminum	· CB-SW (Tier I EQS (fresh water)) · NRC-1-SW (Tier I EQS (fresh water) and CCME FWAL) · SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL) · COB-A-SW (Tier I EQS (fresh water)) · COB-B-SW (Tier I EQS (fresh water)) · COB-4-SW (Tier I EQS (fresh water) and CCME FWAL) · COB-6-SW (Tier I EQS (fresh water) and CCME FWAL) · WB-1-SW (Tier I EQS (fresh water)) · Field Duplicate of WB-1-SW (Tier I EQS (fresh water) and CCME FWAL)
Cadmium	· CB-1-SW (Tier I EQS (fresh water)) · NRC-1-SW (Tier I EQS (fresh water)) · SRC-1-SW (Tier I EQS (fresh water)) · COB-B-SW (Tier I EQS (fresh water)) · COB-4-SW (Tier I EQS (fresh water)) · COB-6-SW (Tier I EQS (fresh water)) · WB-1-SW and the field duplicate of WB-1-SW (Tier I EQS (fresh water))
Chloride	· COB-B-SW (CCME FWAL)

Table 6 Summary of Surface Water Station Criteria and 95 % UCL Exceedances
December 2016

Parameter	Location (Criteria and/or 95% UCL Exceedance)
Iron	· CB-1-SW (Tier I EQS (fresh water) and CCME FWAL) · NRC-1-SW (Tier I EQS (fresh water) and CCME FWAL) · SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL) · COB-4-SW (Tier I EQS (fresh water) and CCME FWAL) · COB-6-SW (Tier I EQS (fresh water) and CCME FWAL) • BP-1-SW (Battery Point Calculated 95%) • Narrows (Battery Point Calculated 95%)
Lead	· SRC-1-SW (Tier I EQS (fresh water) and Upstream Calculated 95% UCL)
Manganese	· COB-B-SW (Tier I EQS (fresh water) and Upstream Calculated 95% UCL) · BP-1-SW (Battery Point/Narrows Calculated 95%) · Narrows (Battery Point/Narrows Calculated 95%)
Strontium	· SRC-1-SW (Upstream 95% UCL) · COB-A-SW (Upstream 95% UCL and Pre-Construction/ Baseline 95% UCL) · COB-B-SW (Upstream 95% UCL and Pre-Construction/Baseline 95% UCL) · COB-6-SW (Upstream 95% UCL)
Sulphate	· SRC-1-SW (Upstream 95% UCL) · COB-A-SW (Upstream Calculated 95% UCL and Pre-Construction/Baseline Calculated 95% UCL) · COB-B-SW (Upstream Calculated 95% UCL and Pre-Construction/Baseline Calculated 95% UCL) · COB-4-SW (Upstream 95% UCL) · COB-6-SW (Upstream 95% UCL)

Concentrations of anthracene at NRC-1-SW were elevated (i.e., above criteria) during the November 2015 and July 2016 monitoring programs. Prior to November 2015, the anthracene concentration at NRC-1-SW was below laboratory detection limits. During the December 2016 monitoring program, the anthracene concentration was reported at the detection limit and below applicable criteria.

The benzo(a)pyrene and fluoranthene exceedances of the Tier I EQS and CCME FWAL were the first observed for these parameters at COB-6-SW during the LTMM program. Exceedances of these parameters were noted in upstream sampling station COB-4-SW both during the December 2016 and November 2015 monitoring programs.

Exceedances of these parameters were also noted at further upstream sampling location NRC-1-SW during the November 2015 monitoring program.

RECOMMENDATIONS

The next surface water monitoring event will be conducted in the summer (e.g., July 2017). It is recommended that Summer 2016 sampling program include the collection of surface water samples at ten stations (i.e., CB-SW, NRC-1-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW, COB-6-SW, WB-1-SW, Narrows and BP-1-SW) for PAH and RCApMS analysis.

DISCLAIMER

This report was prepared exclusively for the purposes, project and site location outlined in the report. The report is based on information provided to, or obtained by Dillon Consulting Limited ("Dillon") as indicated in the report, and applies solely to site conditions existing at the time of the site investigation. Although a reasonable investigation was conducted by Dillon, Dillon's investigation was by no means exhaustive and cannot be construed as a certification of the absence of any contaminants from the site. Rather, Dillon's report represents a reasonable review of available information within an agreed work scope, schedule and budget. It is therefore possible that currently unrecognized contamination or potentially hazardous materials may exist at the site, and that the levels of contamination or hazardous materials may vary across the site. Further review and updating of the report may be required as local and site conditions, and the regulatory and planning frameworks, change over time.

CLOSING

We trust this information is adequate for your needs. Please, however, contact the undersigned if you have any comments or questions regarding the content of this report.

Yours truly,

DILLON CONSULTING LIMITED

Nadine J. Wambolt, B. Tech., CET
Project Manager

NJW:kme
Our File: 14-1360-1200

APPENDIX A
SITE PHOTOGRAPHS

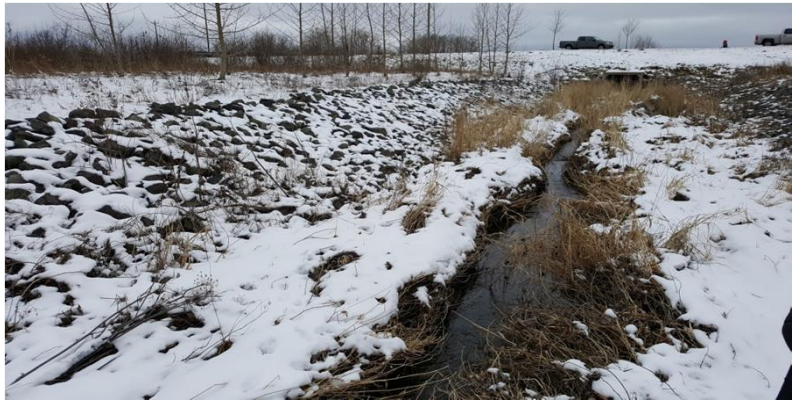

PHOTO 1: View of CB-SW looking northwest

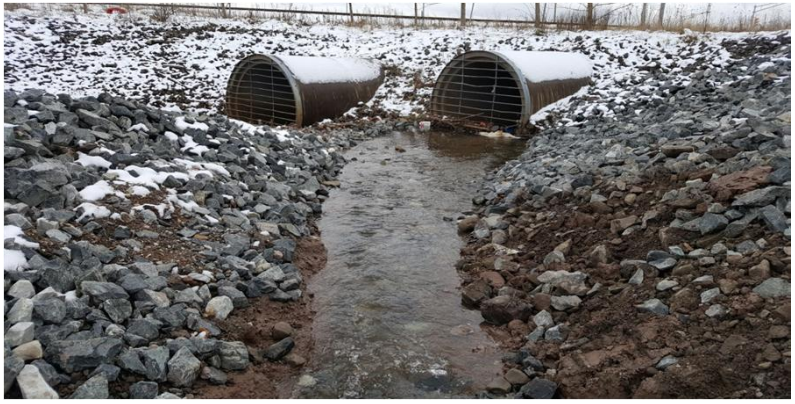

PHOTO 2: View of NRC-1-SW looking southeast.

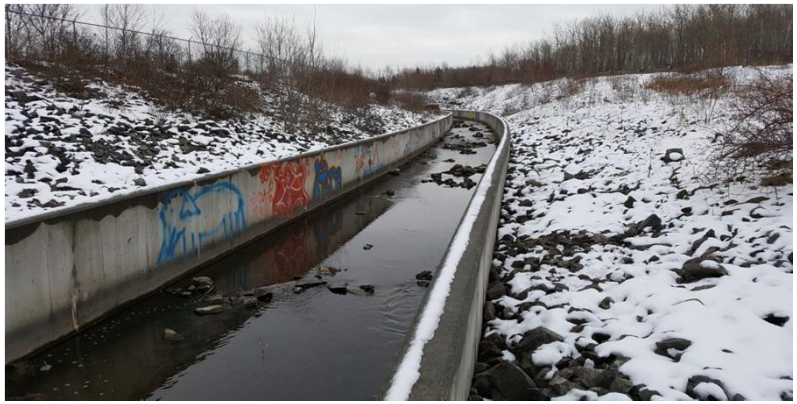

PHOTO 3: View of SRC-1-SW looking northeast.

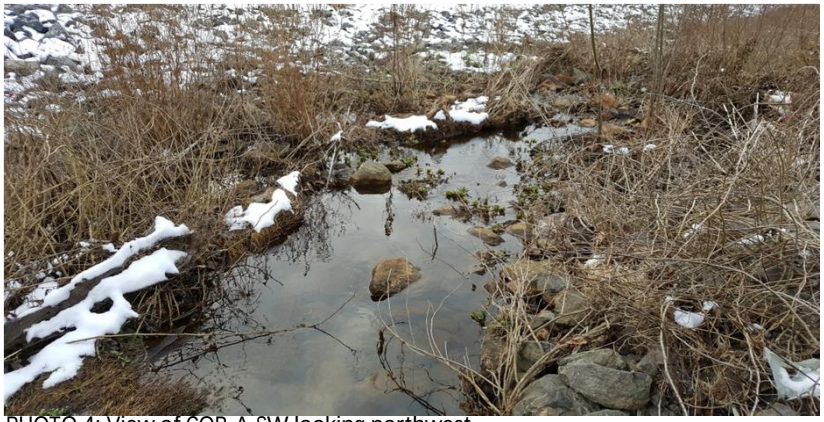

PHOTO 4: View of COB-A-SW looking northwest.

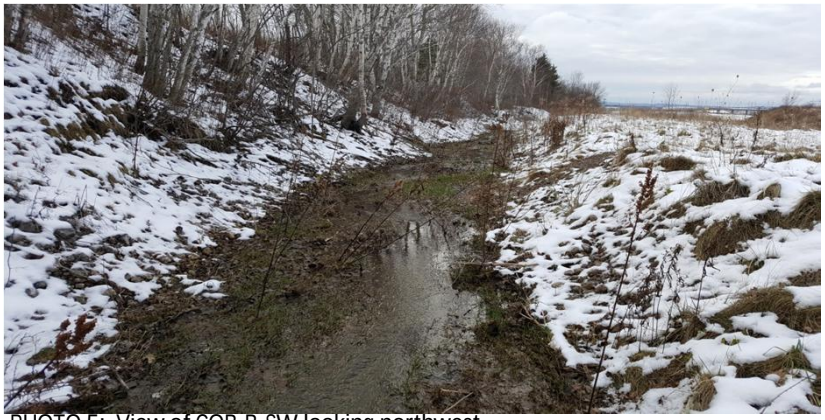

PHOTO 5: View of COB-B-SW looking northwest.

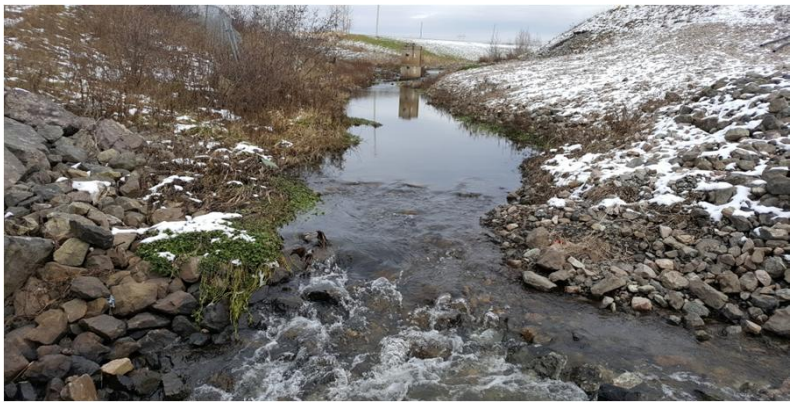

PHOTO 6: View of COB-4-SW looking northeast.

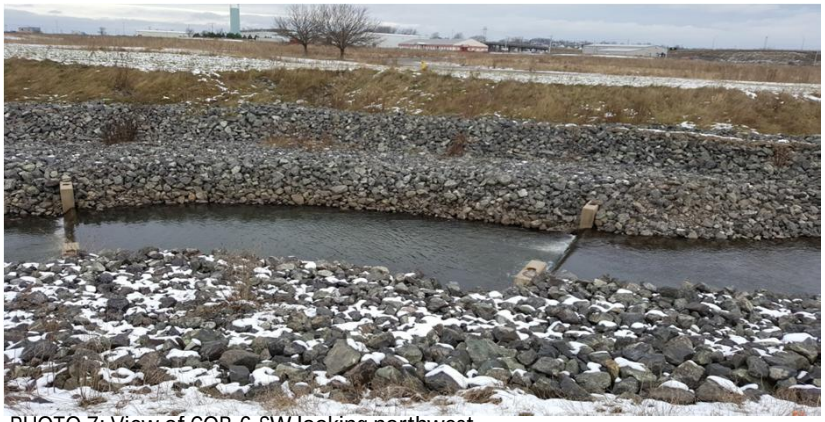

PHOTO 7: View of COB-6-SW looking northwest.

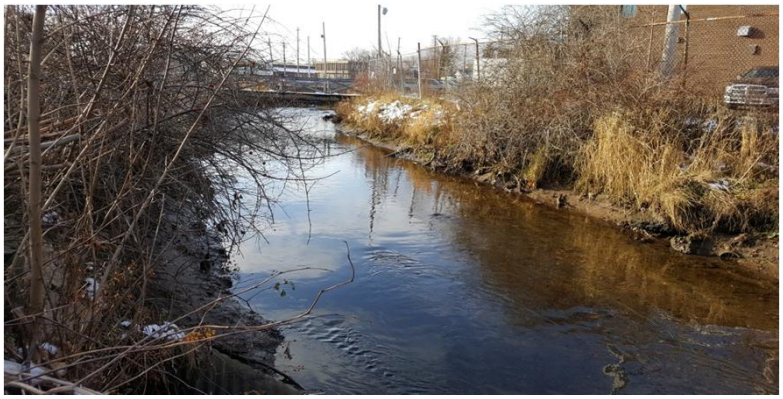

PHOTO 8: View of WB-1-SW looking southwest.

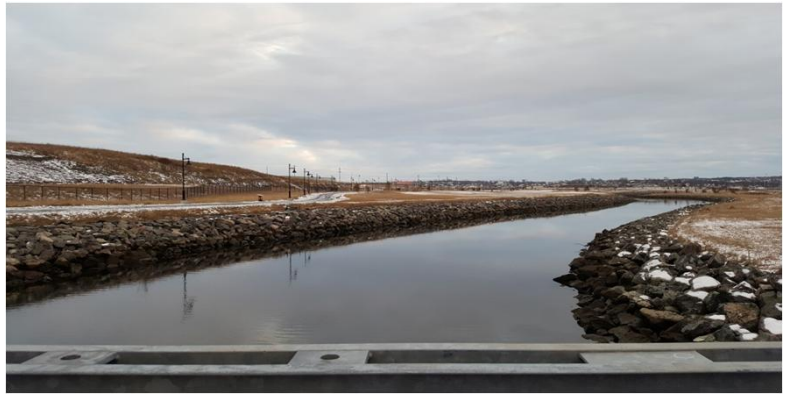

PHOTO 9: View of NARROWS looking southeast.

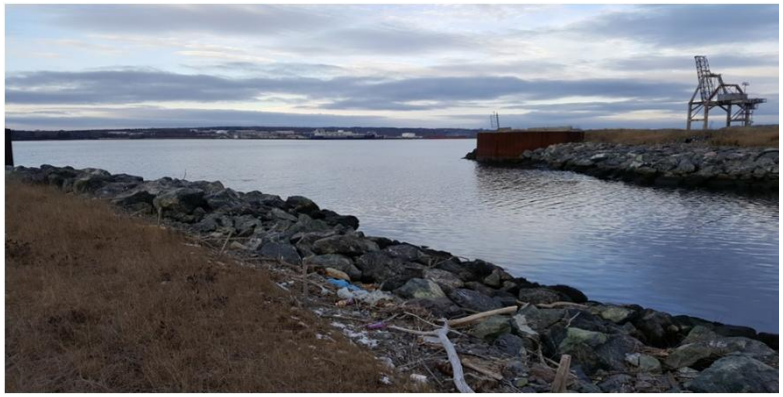

PHOTO 10: View of BP-1-SW looking northwest.

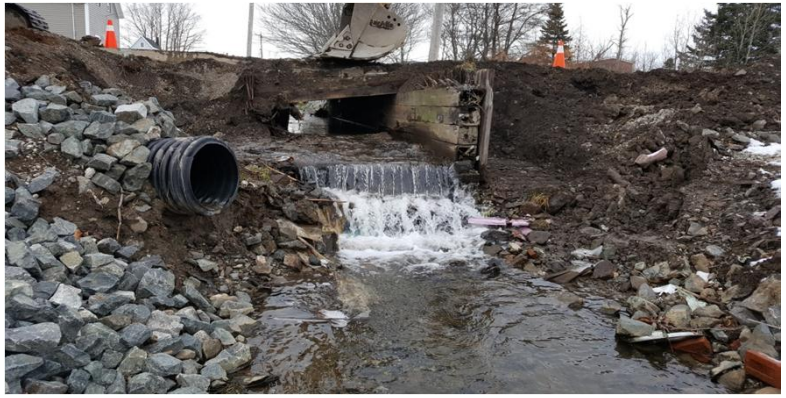

PHOTO 11: View of NRC-1-SW looking northwest to a culvert replacement that was taking place immediately up-gradient of the surface water station.

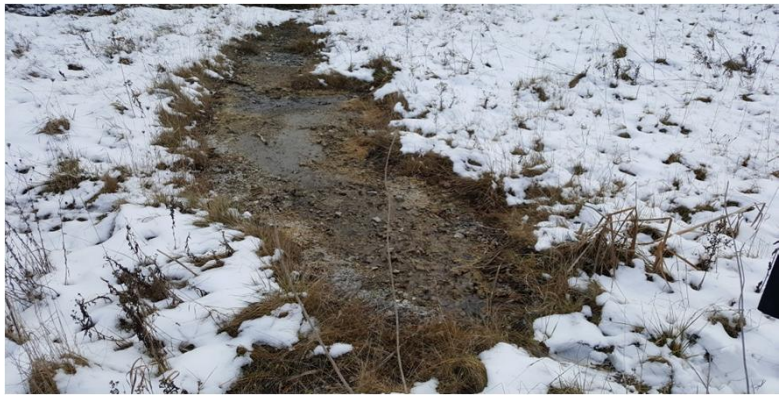

PHOTO 12: View of groundwater seep observed downgradient of COB-B-SW looking northwest.

APPENDIX B
TABLES

Table B-1
SURFACE WATER ANALYTICAL RESULTS - PAHs
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - DECEMBER 2016

Sample Location	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Perylene	Phenanthrene	Pyrene
Units		µg/L																			
NSE Tier 1 EQS Fresh Water [1]		5.8	4.6	0.012	0.018	0.015	0.48	0.17	-	0.48	1.4	0.26	0.04	3	0.21	2	2	1.1	-	0.4	0.025
CCME FWAL [2]		5.8	-	0.012	0.018	0.015	-	-	-	-	-	-	0.04	3	-	-	-	1.1	-	0.4	0.025
Upstream Calculated 95% UCL		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-Construction/Baseline Calculated 95% UCL		-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-
CB-SW	07/23/13	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.050	<0.05	<0.010	<0.010	<0.010
	12/22/14	0.049	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	0.028	<0.010	<0.050	<0.050	<0.20	<0.010	0.017	0.012
	07/27/15	0.066	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.039	<0.010	<0.050	<0.050	<0.20	<0.010	0.017	0.016
	11/18/15	0.049	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.025	0.027	<0.010	<0.050	<0.050	<0.20	<0.010	0.026	0.019
	07/22/16	0.11	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.025	0.051	<0.010	<0.050	<0.050	<0.20	<0.010	0.05	0.017
	12/8/16	0.056	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.028	<0.010	<0.050	<0.050	<0.20	<0.010	0.028	0.014
NRC-1-SW	07/23/13	0.022	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.025	0.015	<0.010	<0.20	<0.050	<0.05	<0.010	0.025	0.019
	12/22/14	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15	0.014	<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	<0.050	<0.050	<0.20	<0.010	0.011	<0.010
	11/18/15	0.022	<0.010	**0.037**	**0.075**	**0.068**	0.068	0.039	0.038	0.032	0.091	0.017	**0.18**	0.021	0.041	<0.050	<0.050	<0.20	0.017	0.13	**0.14**
	07/22/16	0.028	<0.010	**0.021**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.050	<0.050	<0.20	<0.010	0.018	<0.010
	12/8/16	0.059	<0.010	0.010	0.011	0.011	0.011	<0.010	<0.010	<0.010	0.016	<0.010	0.03	0.036	<0.010	<0.050	0.056	0.20	<0.010	0.066	**0.027**
SRC-1-SW	07/23/13	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.050	<0.05	<0.010	<0.010	<0.010
	12/22/14[FD]	<0.010	<0.010	<0.010	<0.010	0.013	0.013	0.010	<0.010	<0.010	0.011	<0.010	0.021	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.012	0.018
	12/22/14	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15[FD]	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/22/16	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/8/16	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.013	0.011
COB-A-SW	07/23/13	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.050	<0.05	<0.010	<0.010	<0.010
	12/22/14	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	0.01
	07/27/15	DRY - NO SAMPLE																			
	11/18/15	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/22/16	DRY - NO SAMPLE																			
	12/8/16	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010

Table B-1
SURFACE WATER ANALYTICAL RESULTS - PAHs
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - DECEMBER 2016

Sample Location	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Perylene	Phenanthrene	Pyrene
Units		µg/L																			
COB-B-SW	07/27/15	DRY - NO SAMPLE																			
	11/18/15	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/22/16	DRY - NO SAMPLE																			
	12/8/16	0.012	<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	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
COB-4-SW	12/22/14	0.013	<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	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.010	0.012
	11/18/15	0.14	0.027	**0.12**	**0.43**	**0.39**	0.33	**0.24**	0.20	0.19	0.48	0.073	**0.88**	0.078	**0.22**	<0.050	<0.050	<0.20	0.10	**0.48**	**0.74**
	07/22/16	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/22/16[FD]	0.018	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/8/16	0.059	<0.010	**0.013**	**0.021**	**0.028**	0.026	0.018	0.017	0.014	0.031	<0.010	**0.043**	0.036	0.013	<0.050	<0.050	<0.20	<0.010	0.065	**0.04**
COB-6-SW	07/23/13	0.073	0.025	**0.015**	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.034	0.034	<0.010	<0.20	<0.050	<0.05	<0.010	0.048	**0.026**
	12/22/14	0.089	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.02	0.026	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	0.013
	07/27/15	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15	0.016	<0.010	<0.010	0.015	0.015	0.016	0.019	<0.010	<0.010	0.018	<0.010	0.030	<0.010	0.016	<0.050	<0.050	<0.20	<0.010	0.014	**0.030**
	07/22/16	0.014	<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	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/8/16	0.11	0.012	0.01	0.018	**0.027**	0.025	0.019	0.016	0.013	0.029	<0.010	**0.043**	0.052	0.013	0.083	<0.050	0.38	0.011	0.049	0.038
WB-1-SW	07/23/13	0.11	0.021	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.018	0.054	<0.010	<0.20	<0.050	<0.05	<0.010	0.066	<0.010
	12/22/14	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.011	<0.010
	07/27/15	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15[FD]	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/22/16	0.019	<0.010	<0.010	<0.010	**0.025**	0.029	0.012	0.013	0.017	0.15	<0.010	**0.16**	0.011	0.011	<0.050	<0.050	<0.20	<0.010	0.07	**0.092**
	12/8/16[FD]	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/8/16	<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	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010

Table B-1
SURFACE WATER ANALYTICAL RESULTS - PAHs
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - DECEMBER 2016

Sample Location	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Perylene	Phenanthrene	Pyrene
Units		µg/L																			
NSE Tier 1 EQS Marine Water [1]		6	6	-	-	0.01	-	-	-	-	0.1	-	11	12	-	1	2	1.4	-	4.6	0.02
CCME MAL [2]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	-	-	-
Battery Point/Narrows Calculated 95% UCL		-	-	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BP-1-SW	07/23/13	0.02	<0.03	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.012	0.025	<0.010	<0.20	<0.050	<0.05	<0.03	0.034	0.01
	12/22/14	0.069	0.10	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.041	0.083	<0.010	0.094	<0.050	<0.20	<0.010	0.065	0.036
	07/27/15	0.014	0.018	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	<0.010	<0.050	<0.050	<0.20	<0.010	0.015	<0.010
	11/18/15	0.052	0.067	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.018	0.058	<0.010	0.057	<0.050	<0.20	<0.010	0.042	0.022
	07/22/16	0.014	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	<0.010	<0.050	<0.050	<0.20	<0.010	0.012	<0.010
	12/8/16	0.059	0.055	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	0.046	<0.010	0.072	<0.050	<0.20	<0.010	0.03	0.016
NARROWS	12/22/14	0.10	0.11	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.033	0.089	<0.010	0.013	<0.050	0.22	<0.51	0.065	0.030
	07/27/15	0.035	0.037	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.016	0.033	<0.010	<0.050	<0.050	<0.20	<0.010	0.026	0.014
	11/18/15	0.074	0.099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.023	0.071	<0.010	0.068	<0.050	<0.20	<0.010	0.041	0.019
	07/22/16	0.024	0.02	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	0.021	<0.010	<0.050	<0.050	<0.20	<0.010	0.016	<0.010
	12/8/16	0.078	0.058	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.049	<0.010	0.069	<0.050	0.21	<0.010	0.031	0.016

NOTES:

FD - Field Duplicate

NM - Not Measured or not analyzed

mg/L - milligrams per liter

UCL - Upper Concentration Limit

- No applicable guideline criteria

1 - Nova Scotia Environment Tier I Environmental Quality Standards (EQS) for surface water (freshwater and marine) 2013

2 - Canadian Council of Ministers of the Environment (CCME) for the protection of aquatic life (freshwater and marine) 2014

Bold	Concentration exceeds Tier I EQS for surface water (freshwater)
Underline	Concentration exceeds Tier I EQS for surface water (marine)
Shading	Concentration exceeds CCME FWAL
Shading	Concentration exceeds CCME MAL
Double Underline	Concentration exceeds Upstream Calculated 95% Upper Concentration Limit
Dashed Border	Concentration exceeds Battery Point/Narrows Calculated 95% Upper Concentration Limit
Red	Concentration exceeds Pre-Construction/Baseline Calculated 95% Upper Concentration Limit

This summary is to be used in conjunction with, not as a replacement of, the Laboratory Certificates of Analysis

TABLE B-2
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - DECEMBER 2016

Sample Location	Sample Date	Na	K	Ca	Mg	ALK	SO4	Cl	SiO2	OPO4	P	NO3	NO2	NO2-NO3	NH3	Colour	TOC	TURBIDITY	CONDUCTIVITY	pH	HARDNESS	BICARB ALKALINITY	CARB ALKALINITY	TDS	Anion Sum	Ion Balalance	Langelier Index (@20C)	Langelier Index (@4C)	Sat. pH (@20C)	Sat. pH (@4C)
	Units	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	TCU	mg/L	NTU	µS/cm	pH	mg/L	mg/L	mg/L	mg/L	me/L	%	unitless	unitless	unitless	unitless
	NSE Tier 1 EQS Fresh Water [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CCME FWAL [2]	-	-	-	-	-	-	120	-	-	-	12	0.6	-	1 [3]	-	-	-	-	6.5-9.0	-	-	-	-	-	-	-	-	-	-
	Upstream Calculated 95% UCL	-	-	-	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pre-Construction/Baseline Calculated 95% UCL	-	-	-	-	-	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-SW	07/23/13	41100	1710	52000	5620	140	6.5	67	8.7	<0.010	<100	<0.05	<0.010	<0.05	<0.05	24	4.4	0.5	500	7.63	150	140	<1.0	270	4.81	0.93	0.08	-0.17	7.55	7.8
	12/22/14	20000	1400	27000	3700	62	26	30	7.3	0.046	110	0.18	<0.010	0.18	0.081	29	4.4	1.1	270	7.74	82	61	<1.0	150	2.65	1.53	-0.418	-0.669	8.16	8.41
	07/27/15	38000	1800	33000	4300	96	16	55	10.0	0.12	210	<0.050	<0.010	<0.050	0.087	9	2.0	1.1	380	7.95	99	95	<1.0	220	3.81	1.60	0.0480	-0.201	7.90	8.15
	11/18/15	27000	1700	28000	3800	72	24	43	7.6	0.048	110	0.12	<0.010	0.12	<0.050	20	5.3	2.1	320	7.81	84	72	<1.0	180	3.17	4.11	-0.271	-0.521	8.08	8.33
	07/22/16	27000	1400	27000	3500	75	10	40	8.6	0.096	140	0.11	0.012	0.12	0.052	65	9.8	1.6	270	7.88	82	75	<1.0	160	2.86	0	-0.188	-0.439	8.07	8.32
	12/8/16	22000	1400	26000	3400	65	23	48	7.1	0.033	<100	0.19	<0.010	0.19	<0.050	30	4.9	1.9	280	7.46	78	65	<1.0	170	3.12	9.86	-0.694	-0.944	8.15	8.4
NRC-1-SW	07/23/13	27800	1560	16600	1370	46	19	27	9.6	0.022	<100	0.092	0.011	0.1	0.098	19	3.9	1.3	220	8.31	47	45	<1.0	131	2.09	2.56	-0.172	-0.423	8.48	8.73
	12/22/14	13000	640	12000	1500	17	20	20	5.1	<0.010	<100	0.21	<0.010	0.21	<0.050	10	2.2	0.51	140	7.28	36	17	<1.0	84	1.34	0.37	-1.75	-2.01	9.03	9.28
	07/27/15	20000	480	19000	2100	44	22	29	6.0	<0.010	<100	0.077	<0.010	0.077	0.077	42	5.8	2.4	220	7.47	56	44	<1.0	130	2.16	2.61	-0.963	-1.21	8.43	8.68
	11/18/15	14000	1000	12000	1800	25	15	25	5.7	<0.010	130	0.10	<0.010	0.10	<0.050	15	4.2	21	160	7.37	38	25	<1.0	95	1.51	0.980	-1.49	-1.74	8.86	9.11
	07/22/16	20000	690	18000	2200	49	15	25	5.8	0.012	<100	0.13	<0.010	0.13	<0.050	42	8.1	1.6	200	7.96	55	48	<1.0	120	2	0.25	-0.447	-0.698	8.41	8.66
	12/8/16	15000	680	12000	1600	21	16	26	5.3	<0.010	<100	0.19	<0.010	0.19	0.1	11	2.2	2.3	160	7.21	36	21	<1.0	90	1.49	3.47	-1.74	-1.99	8.95	9.2
SRC-1-SW	07/23/13	39700	2290	51700	7230	110	40	59	6.7	<0.010	<100	<0.05	<0.010	<0.05	<0.05	14	4.9	0.46	500	8.37	160	110	2.4	272	4.67	3.11	0.7	0.451	7.67	7.92
	12/22/14 [FD]	34000	2700	46000	4800	87	53	56	8.3	<0.010	<100	0.24	0.025	0.26	0.20	16	4.6	5.0	450	7.92	130	86	<1.0	260	4.44	2.42	0.108	-0.141	7.81	8.06
	12/22/14	34000	2600	46000	4800	86	54	56	7.6	<0.010	<100	0.23	0.023	0.25	0.21	16	4.8	5.4	440	7.80	140	85	<1.0	260	4.43	1.84	-0.01	-0.259	7.81	8.06
	07/27/15 [FD]	40000	1900	42000	4700	95	46	55	6.6	<0.010	<100	0.092	<0.010	0.092	0.084	17	5.0	1.5	430	7.79	120	94	<1.0	250	4.41	1.73	-0.024	-0.273	7.81	8.06
	07/27/15	38000	1800	41000	4300	95	47	57	6.7	<0.010	<100	0.092	<0.010	0.092	0.079	16	5.0	1.6	430	7.66	120	95	<1.0	250	4.49	4.54	-0.157	-0.407	7.82	8.07
	11/18/15	32000	2700	41000	4600	94	43	51	5.7	<0.010	<100	0.076	<0.010	0.076	<0.050	13	5.0	4.4	430	7.87	120	93	<1.0	240	4.22	3.94	0.0500	-0.200	7.82	8.07
	07/22/16	33000	2900	48000	5600	100	51	46	8.9	0.013	<100	0.08	<0.010	0.08	<0.050	22	7.3	1.8	420	7.99	140	100	<1.0	260	4.39	0	0.266	0.016	7.73	7.98
	12/8/16	51000	2300	42000	4500	86	42	110	7.8	0.012	<100	0.15	0.012	0.16	0.17	19	4.3	7.3	520	7.58	120	86	<1.0	310	5.58	7.72	-0.29	-0.539	7.87	8.12
COB-A-SW	07/23/13	94700	27000	336000	34900	150	740	150	22	<0.010	<100	3.5	<0.010	3.5	<0.05	5.3	4.8	0.1	2000	7.90	980	150	1.1	1510	22.8	3.51	1	0.756	6.9	7.14
	12/22/14	23000	3300	88000	13000	97	160	37	13	<0.010	<100	0.4	<0.010	0.4	<0.050	5.4	2	0.41	640	7.68	270	96	<1.0	400	6.32	1.94	0.165	-0.084	7.52	7.76
	07/27/15	DRY - NO SAMPLE																												
	11/18/15	24000	3700	88000	13000	120	170	33	12	0.013	<100	0.25	<0.010	0.25	<0.050	<5.0	2.6	0.25	640	7.95	270	120	<1.0	420	6.88	2.38	0.505	0.257	7.44	7.69
	07/22/16	DRY - NO SAMPLE																												
	12/8/16	22000	4000	81000	11000	110	150	47	13	0.015	<100	0.49	0.012	0.51	0.59	6.3	2.8	0.35	640	7.75	250	100	<1.0	400	6.65	4.64	0.235	-0.014	7.52	7.77
COB-B-SW	07/27/15	DRY - NO SAMPLE																												
	11/18/15	25000	3800	89000	13000	110	190	35	11	0.013	<100	0.35	<0.010	0.35	<0.050	<5.0	2.4	<0.10	670	7.86	280	110	<1.0	430	7.13	3.03	0.393	0.144	7.46	7.71
	07/22/16	DRY - NO SAMPLE																												
	12/8/16	68000	20000	200000	21000	170	440	140	17	0.017	<100	0.56	0.017	0.58	8.1	9.7	6.2	0.4	1600	7.4	590	170	<1.0	1000	16.7	2.77	0.378	0.132	7.02	7.27
COB-4-SW	12/22/14	20000	1600	34000	3600	53	47	31	7.4	<0.010	<100	0.26	<0.010	0.26	0.057	12	3	1.5	300	7.70	99	52	<1.0	180	2.92	0.17	-0.431	-0.681	8.13	8.38
	07/27/15	37000	2900	60000	6300	94	100	58	8.5	<0.010	<100	0.31	0.013	0.33	<0.050	11	4.1	1.8	530	7.72	180	93	<1.0	330	5.65	4.15	0.036	-0.213	7.68	7.93
	11/18/15	21000	2800	33000	4600	58	41	33	7.5	0.012	390	0.18	<0.010	0.18	<0.050	14	9.3	140	310	7.56	100	58	<1.0	190	2.96	8.50	-0.540	-0.790	8.10	8.35
	07/22/16	34000	2400	55000	5300	98	74	54	9.2	0.015	<100	0.15	<0.010	0.15	<0.050	19	5.2	1.3	460	7.91	160	98	<1.0	300	5.06	3.27	0.223	-0.026	7.69	7.94
	07/22/16 [FD]	36000	2500	55000	5700	99	72	49	9.1	0.016	<100	0.15	<0.010	0.15	<0.050	18	4.8	1.2	460	7.85	160	99	<1.0	290	4.89	0.31	0.169	-0.081	7.68	7.93
	12/8/16	19000	1300	28000	2900	49	39	34	7.4	0.012	<100	0.27	<0.010	0.27	0.083	8.8	2.6	2.7	270	7.76	81	49	<1.0	160	2.79	5.08	-0.477	-0.727	8.24	8.49
COB-6-SW	07/23/13	69200	5110	98900	9820	81	170	110	11	<0.010	<100	0.35	<0.010	0.35	<0.05	7.2	2.4	0.38	890	8.36	290	79	1.7	520	8.18	4.1	0.78	0.532	7.58	7.83
	12/22/14	22000	1800	39000	3800	58	56	35	8.3	<0.010	<100	0.28	0.011	0.29	0.1	11	2.6	0.87	340	7.86	110	57	<1.0	200	3.33	0.76	-0.173	-0.423	8.04	8.29
	07/27/15	39000	2600	57000	5000	93	91	61	8.4	<0.010	<100	0.18	0.015	0.19	<0.050	10	3.7	0.98	520	8.46	160	91	2.5	320	5.5	4.46	0.75	0.501	7.71	7.96
	11/18/15	27000	2100	37000	3700	70	44	42	7.6	0.012	<100	0.16	<0.010	0.16	<0.050	10	3.7	4.9	360	7.96	110	69	<1.0	210	3.51	1.89	-0.023	-0.273	7.98	8.23
	07/22/16	40000	2400	55000	4700	99	64	67	8.2	0.015	<100	0.081	<0.010	0.081	<0.050	23	5.3	1	490	8.05	160	98	1	300	5.21	2.46	0.365	0.116	7.69	7.94
	12/8/16	26000	1700	34000	3400	60	41	53	7.9	0.014	<100	0.27	0.01	0.28	<0.050	12	2.9	3.4	340	7.87	100	60	<1.0	210	3.56	5.33	-0.203	-0.453	8.08	8.33
WB-1-SW	07/23/13	5750000	210000	323000	667000	83	1500	11000	2	<0.010	<1000	0.051	<0.010	0.051	0.2	9.6	<5	6	31000	7.65	3600	82	<1.0	19000	330	0.43	0.178	-0.059	7.47	7.71
	12/22/14	12000	700	7500	1400	17	7.9	21	3.4	0.011	<100	0.14	<0.010	0.14	0.12	32	3.7	0.83	120	7.19	25	17	<1.0	65	1.1	2.33	-2.04	-2.29	9.23	9.48
	07/27/15	19000	860	12000	2200	28	10	32	3.6	0.023	<100	0.16	0.016	0.18	0.18	51	6.3	0.82	170	7.44	39	28	<1.0	98	1.68	0.00	-1.37	-1.62	8.82	9.07
	11/18/15 [FD]	14000	760	9200	1600	23	8.3	26	3.9	0.012	<100	0.098	<0.010	0.098	<0.050	30	4.5	0.18	140	7.42	29	23	<1.0	77	1.36	6.25	-1.59	-1.84	9.01	9.26
	11/18/15	14000	760	9600	1600	23	8.3	24	3.9	0.012	<100	0.11	<0.010	0.11	<0.050	30	4.3	0.67	140	7.45	31	23	<1.0	77	1.32	3.13	-1.54	-1.79	8.99	9.24
	07/22/16	1600000	54000	79000	190000	62	410	2900	4.2	0.024	<100	0.22	0.021	0.24	0.084	37	16	2.2	8500	7.52	980	62	<1.0	5300	92.8	2.21	-0.583	-0.823	8.11	8.35
	12/8/16 [FD]	14000	770	9400	1700	22	8.5	24	3.7	0.03	<100	0.15	<0.010	0.15	0.13	26	3.7	1.1	140	7.29	30	22	<1.0	76	1.3	1.56	-1.71	-1.97	9.01	9.26
	12/8/16	14000	800	9700	1600	22	8.4	25	3.8	0.03	<100	0.15	<0.010	0.15	0.14	27	3.6	1.2	140	7.46	31	22	<1.0	77	1.33	3.1	-1.54	-1.79	9	9.25
	NSE Tier 1 EQS Marine Water [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CCME MAL [2]	-	-	-	-	-	-	-	-	-	-	200	-	-	-	-	-	-	-	7.0-8.7	-	-	-	-	-	-	-	-	-	-
	Battery Point/Narrows Calculated 95% UCL	-	-	-	-	-	2180	-	-	-	-	-	-	-	-	-	-	88	-	-	-	-	-	-	-	-	-	-	-	-
BP-1-SW	07/23/13	8480000	304000	343000	1000000	84	2000	14000	<0.5	<0.010	<1000	<0.05	<0.010	<0.05	<0.05	<5	<5	7.2	41000	8.07	5000	83	<1.0	26000	434	4.66	0.664	0.425	7.41	7.65
	12/22/14	1000000	38000	68000	120000	56	270	1900	5.5	0.012	<100	0.19	0.019	0.21	0.11	18	2.3	1.1	6300	8.42	680	54	1.3	3500	60.8	1.58	0.248	0.007	8.17	8.41
	07/27/15	7100000	260000	300000	870000	88	1500	13000	1.1	0.018	<1000	0.11	0.011	0.12	0.05	6.8	<5.0	0.6	37000	7.83	4300	87	<1.0	23000	393	0.97	0.369	0.131	7.46	7.7
	11/18/15	650000	27000	52000	71000	58	190	1200	5.4	0.015	<100	0.14	<0.010	0.14	0.064	25	3.3	1.0	4200	8.00	420	57	<1.0	2200	38.8	1.80	-0.189	-0.432	8.19	8.44
	07/22/16	7500000	280000	300000	910000	92	1600	13000	1	0.026	<1000	0.092	0.01	0.1	0.088	8.3	<5.0	1.2	36000	7.99	4500	91	<1.0	24000	411	1.77	0.559	0.321	7.43	7.67
	12/8/16	1200000	45000	70000	150000	52	290	2300	4.8	0.015	<100	0.21	<0.010	0.21	0.088	20	<5.0 (1)	2.1	7000	7.56	780	52	<1.0	4100	72.9	3.02	-0.642	-0.883	8.2	8.44
NARROWS	12/22/14	600000	24000	58000	74000	57	170	1100	5.6	0.013	<100	0.22	0.016	0.24	0.11	16	2	1	3900	8.56	450	55	1.9	2100	36	0.1	0.403	0.16	8.15	8.4
	07/27/15	7200000	270000	300000	900000	91	1300	13000	1.2	<0.010	<1000	0.067	<0.010	0.067	0.067	7.4	<5.0	0.36	37000	7.96	4400	90	<1.0	23000	383	3.36	0.502	0.265	7.45	7.69
	11/18/15	330000	15000	38000	36000	55	110	640	5.8	0.016	<100	0.15	<0.010	0.15	0.053	21	3.7	1.7	2400	7.86	240	55	<1.0	1200	21.6	4.13	-0.398	-0.643	8.26	8.50
	07/22/16	7500000	270000	300000	900000	93	1400	12000	1.3	0.017	<1000	0.05	0.01	0.06	0.08	9.9	2.3	1.2	36000	7.97	4400	92	<1.0	23000	378	5.2	0.533	0.295	7.44	7.68
	12/8/16	1000000	38000	72000	130000	61	270	1900	6.1	0.016	<100	0.21	<0.010	0.21	0.082	21	<5.0 (1)	1.2	6200	7.67	700	61	<1.0	3500	60.8	0.65	-0.418	-0.66	8.09	8.33

NOTES:
FD - Field Duplicate
NM - Not Measured or not analyzed
mg/L - milligrams per liter
UCL - Upper Concentration Limit
- No applicable guideline criteria

1 - Nova Scotia Environment Tier I Environmental Quality Standards (EQS) for surface water (freshwater and marine) 2013
2 - Canadian Council of Ministers of the Environment (CCME) for the protection of aquatic life (freshwater and marine) 2014
3 - Guideline value for NH3 is based on a pH value of 8 and a temperature of 10 C
4 - Guideline for chromium is based on CR6+
5 - Guideline value for aluminum based on a pH >6.5

Bold	Concentration exceeds Tier I EQS for surface water (freshwater)
Underline	Concentration exceeds Tier I EQS for surface water (marine)
Shading	Concentration exceeds CCME FWAL
Shading	Concentration exceeds CCME MAL
Double Underline	Concentration exceeds Upstream Calculated 95% UCL
Dashed Border	Concentration exceeds Battery Point/Narrows Calculated 95% Upper Concentration Limit
Red	Concentration exceeds Pre-Construction/Baseline Calculated 95% Upper Concentration Limit
italics	Laboratory detection limit is higher than guideline criteria

This summary is to be used in conjunction with, not as a replacement of, the Laboratory Certificates of Analysis

TABLE B-2
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL MET
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - DECEMBER 2016

Sample Location	Sample Date	Al	Sb	As	Ba	Be	Bi	B	Cd	Cr	Co	Cu	Fe	Pb	Mn	Hg	Mo	Ni	Se	Ag	Sr	Tl	Sn	Ti	U	V	Zn
	Units	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
	NSE Tier 1 EQS Fresh Water [1]	5	20	5.0	1000	5.3	-	1200	0.01	-	10	2	300	1	820	0.026	73	25	1.0	0.1	21000	0.8	-	-	300	6	30
	CCME FWAL [2]	100 [5]	-	5	-	-	-	1500	0.09	1 [4]	-	-	300	-	-	0.026	73	-	1	0.25	-	0.8	-	-	15	-	30
	Upstream Calculated 95% UCL	220	-	1.6	-	-	-	-	0.1	8.3	-	-	3318	1.2	583	-	-	-	1.9	-	132	-	-	-	-	-	-
	Pre-Construction/Baseline Calculated 95% UCL	-	-	1.98	-	-	-	-	-	-	1.3	-	1900	-	800	-	-	-	-	-	210	-	-	-	-	-	-
CB-SW	07/23/13	**28.5**	<1.0	1.4	61.9	<1.0	<2.0	<50	**0.016**	1.3	<0.40	2.0	**454**	<0.50	**3690**	NM	<2.0	<2.0	<1.0	<0.10	**196**	<0.10	<2.0	<2.0	0.37	<2.0	<5
	12/22/14	**110**	<1.0	<1.0	27	<1.0	<2.0	<50	**0.018**	<1.0	<0.40	<2.0	290	<0.50	190	<0.013	<2.0	<2.0	<1.0	<0.10	130	<0.10	<2.0	3.5	0.17	<2.0	6.0
	07/27/15	**28**	<1.0	<1.0	52	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	260	<0.50	61	<0.013	<2.0	<2.0	<1.0	<0.10	320	<0.10	<2.0	<2.0	<0.10	<2.0	9.0
	11/18/15	**130**	<1.0	<1.0	29	<1.0	<2.0	<50	**0.011**	<1.0	<0.40	<2.0	280	<0.50	140	<0.013	<2.0	<2.0	<1.0	<0.10	140	<0.10	<2.0	4.3	0.12	<2.0	6.1
	07/22/16	**55**	<1.0	1.4	30	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	**640**	<0.50	71	<0.013	<2.0	<2.0	<1.0	<0.10	160	<0.10	<2.0	5.6	<0.10	<2.0	<5.0
	12/8/16	**84**	<1.0	<1.0	25	<1.0	<2.0	<50	**0.017**	<1.0	<0.40	<2.0	**330**	<0.50	310	<0.013	<2.0	<2.0	<1.0	<0.10	110	<0.10	<2.0	<2.0	0.14	<2.0	<5.0
NRC-1-SW	07/23/13	**131**	<1.0	1.4	11.8	<1.0	<2.0	<50	**0.021**	<1.0	<0.40	**3.1**	148	**1.53**	69.1	NM	<2.0	<2.0	<1.0	<0.10	64.7	<0.10	<2.0	2.4	0.21	2.2	5.3
	12/22/14	**58**	<1.0	<1.0	12	<1.0	<2.0	<50	**0.022**	<1.0	<0.40	<2.0	150	<0.50	85	<0.013	<2.0	<2.0	<1.0	<0.10	32	<0.10	<2.0	<2.0	<0.10	<2.0	9.1
	07/27/15	**45**	<1.0	<1.0	11	<1.0	<2.0	<50	**0.019**	<1.0	<0.40	<2.0	**1300**	<0.50	75	<0.013	<2.0	<2.0	<1.0	<0.10	54	<0.10	<2.0	<2.0	<0.10	<2.0	11
	11/18/15	**1500**	<1.0	3.5	29	<1.0	<2.0	<50	**0.14**	1.9	1.5	**5**	**3800**	**9.5**	**1100**	<0.013	<2.0	3.3	<1.0	<0.10	36	<0.10	<2.0	34	0.14	3	27
	07/22/16	**31**	<1.0	<1.0	10	<1.0	<2.0	<50	**0.016**	<1.0	<0.40	<2.0	**970**	0.61	47	<0.013	<2.0	<2.0	<1.0	<0.10	52	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	12/8/16	**110**	<1.0	<1.0	19	<1.0	<2.0	<50	**0.025**	<1.0	<0.40	<2.0	**360**	0.8	200	<0.013	<2.0	<2.0	<1.0	<0.10	34	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
SRC-1-SW	07/23/13	**29**	<1.0	1.2	10.2	<1.0	<2.0	57	<0.01	<1.0	<0.40	<2	69	<0.50	41.4	NM	<2.0	<2.0	<1.0	<0.10	**174**	<0.10	<2.0	<2.0	0.38	<2.0	<5
	12/22/14[FD]	**350**	<1.0	<1.0	17	<1.0	<2.0	110	**0.042**	<1.0	<0.40	**2.8**	**350**	**1.2**	200	<0.013	<2.0	<2.0	<1.0	<0.10	**150**	<0.10	<2.0	6.8	0.40	<2.0	7.0
	12/22/14	**290**	<1.0	<1.0	17	<1.0	<2.0	110	**0.035**	<1.0	<0.40	**2.6**	**340**	**1.2**	190	<0.013	<2.0	<2.0	<1.0	<0.10	**150**	<0.10	<2.0	6.6	0.40	<2.0	6.9
	07/27/15[FD]	**51**	<1.0	1.0	17	<1.0	<2.0	64	**0.015**	1.5	<0.40	<2.0	190	<0.50	260	<0.013	<2.0	<2.0	<1.0	<0.10	**150**	<0.10	<2.0	<2.0	0.32	<2.0	8.4
	07/27/15	**51**	<1.0	1.0	16	<1.0	<2.0	63	**0.013**	<1.0	<0.40	**24**	210	**1.1**	260	<0.013	<2.0	<2.0	<1.0	<0.10	**150**	<0.10	<2.0	2.4	0.29	<2.0	9.5
	11/18/15	**240**	<1.0	<1.0	16	<1.0	<2.0	57	**0.023**	1.2	<0.40	**2.2**	**310**	0.75	230	<0.013	<2.0	<2.0	<1.0	<0.10	**150**	<0.10	<2.0	5.3	0.33	<2.0	<5.0
	07/22/16	**50**	<1.0	1.9	11	<1.0	<2.0	91	**0.018**	<1.0	<0.40	<2.0	**350**	<0.50	350	<0.013	<2.0	<2.0	<1.0	<0.10	170	<0.10	<2.0	2.1	0.38	<2.0	<5.0
	12/8/16	**300**	<1.0	<1.0	18	<1.0	<2.0	54	**0.039**	1.0	<0.40	**2.7**	**400**	**1.6**	200	<0.013	<2.0	<2.0	<1.0	<0.10	140	<0.10	<2.0	13	0.35	<2.0	5.7
COB-A-SW	07/23/13	**17.2**	<1.0	<1.0	56.2	<1.0	<2.0	415	**0.015**	<1.0	<0.40	<2.0	56	<0.50	27.9	NM	<2.0	<2.0	<1.0	<0.10	671	<0.10	<2.0	<2.0	2.14	<2.0	<5
	12/22/14	**16**	<1.0	<1.0	14	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	51	<0.50	25	<0.013	<2.0	<2.0	<1.0	<0.10	260	<0.10	<2.0	<2.0	0.38	<2.0	<5.0
	07/27/15	DRY - NO SAMPLE																									
	11/18/15	**5.1**	<1.0	<1.0	15	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	82	<0.50	74	<0.013	<2.0	<2.0	<1.0	<0.10	260	<0.10	<2.0	<2.0	0.42	<2.0	<5.0
	07/22/16	DRY - NO SAMPLE																									
	12/8/16	**8.5**	<1.0	<1.0	12	<1.0	<2.0	85	<0.010	<1.0	<0.40	<2.0	68	<0.50	92	<0.013	<2.0	<2.0	<1.0	<0.10	250	<0.10	<2.0	<2.0	0.32	<2.0	<5.0
COB-B-SW	07/27/15	DRY - NO SAMPLE																									
	11/18/15	**7.9**	<1.0	<1.0	18	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	<50	<0.50	21	<0.013	<2.0	<2.0	<1.0	<0.10	250	<0.10	<2.0	<2.0	0.42	<2.0	<5.0
	07/22/16	DRY - NO SAMPLE																									
	12/8/16	**13**	<1.0	<1.0	52	<1.0	<2.0	540	**0.027**	<1.0	0.90	<2.0	130	<0.50	**1400**	<0.013	<2.0	2.8	<1.0	<0.10	480	<0.10	<2.0	<2.0	0.68	<2.0	<5.0
COB-4-SW	12/22/14	**82**	<1.0	<1.0	20	<1.0	<2.0	<50	**0.014**	<1.0	<0.40	<2.0	210	<0.50	95	<0.013	<2.0	<2.0	<1.0	<0.10	140	<0.10	<2.0	3.2	0.18	<2.0	7.2
	07/27/15	**51**	<1.0	<1.0	32	<1.0	<2.0	60	<0.010	<1.0	<0.40	<2.0	**460**	<0.50	110	<0.013	<2.0	<2.0	<1.0	<0.10	250	<0.10	<2.0	2.1	0.35	<2.0	10
	11/18/15	**7100**	<1.0	13	77	<1.0	<2.0	<50	**0.29**	8.0	4.6	**17**	**14000**	**37**	**1500**	**0.082**	<2.0	9.5	<1.0	<0.10	150	0.18	<2.0	200	0.53	**14**	**96**
	07/22/16	**28**	<1.0	<1.0	24	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	300	<0.50	140	<0.013	<2.0	<2.0	<1.0	<0.10	270	<0.10	<2.0	<2.0	0.32	<2.0	<5.0
	07/22/16[FD]	**42**	<1.0	<1.0	26	<1.0	<2.0	<50	<0.010	<1.0	<0.40	2	**310**	<0.50	140	<0.013	<2.0	<2.0	<1.0	<0.10	280	<0.10	<2.0	<2.0	0.33	<2.0	<5.0
	12/8/16	**120**	<1.0	<1.0	19	<1.0	<2.0	<50	**0.014**	<1.0	<0.40	<2.0	**390**	0.99	180	<0.013	<2.0	<2.0	<1.0	<0.10	110	<0.10	<2.0	<2.0	0.18	<2.0	<5.0
COB-6-SW	07/23/13	**65.7**	<1.0	1.0	66.6	<1.0	<2.0	66	<0.01	<1.0	<0.40	<2.0	61	<0.50	30.3	NM	<2.0	<2.0	<1.0	<0.10	645	<0.10	<2.0	<2.0	0.68	<2.0	<5
	12/22/14	**61**	<1.0	<1.0	22	<1.0	<2.0	<50	0.01	<1.0	<0.40	<2.0	170	<0.50	56	<0.013	<2.0	<2.0	<1.0	<0.10	180	<0.10	<2.0	<2.0	0.22	<2.0	6.0
	07/27/15	**39**	<1.0	<1.0	29	<1.0	<2.0	52	<0.010	<1.0	<0.40	**2.2**	160	<0.50	23	<0.013	<2.0	<2.0	<1.0	<0.10	300	<0.10	<2.0	<2.0	0.34	<2.0	7.4
	11/18/15	**220**	<1.0	<1.0	21	<1.0	<2.0	<50	**0.018**	<1.0	<0.40	<2.0	**490**	**1.5**	79	<0.013	<2.0	<2.0	<1.0	<0.10	180	<0.10	<2.0	4	0.22	<2.0	<5.0
	07/22/16	**46**	<1.0	1	26	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	180	<0.50	37	<0.013	<2.0	<2.0	<1.0	<0.10	200	<0.10	<2.0	<2.0	0.3	<2.0	<5.0
	12/8/16	**200**	<1.0	<1.0	21	<1.0	<2.0	<50	**0.015**	<1.0	<0.40	<2.0	**360**	1.0	110	<0.013	<2.0	<2.0	<1.0	<0.10	160	<0.10	<2.0	3	0.23	<2.0	<5.0
WB-1-SW	07/23/13	*<50*	<10	<10	280	<10	<20	**2470**	**0.6**	*<10*	*<4.0*	*<20*	**936**	*<5*	**1920**	NM	*<20*	*<20*	*<10*	*<1.0*	4660	*<1*	<20	<20	1.6	<20	*<50*
	12/22/14	**180**	<1.0	<1.0	15	<1.0	<2.0	<50	**0.038**	<1.0	<0.40	<2.0	270	0.71	95	<0.013	<2.0	<2.0	<1.0	<0.10	53	<0.10	<2.0	4.6	<0.10	<2.0	10
	07/27/15	**89**	<1.0	<1.0	18	<1.0	<2.0	<50	**0.012**	<1.0	<0.40	<2.0	**480**	<0.50	41	<0.013	<2.0	<2.0	<1.0	<0.10	100	<0.10	<2.0	<2.0	<0.10	<2.0	7.9
	11/18/15[FD]	**63**	<1.0	<1.0	15	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	200	<0.50	41	<0.013	<2.0	<2.0	<1.0	<0.10	70	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	11/18/15	**63**	<1.0	<1.0	15	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	200	<0.50	43	<0.013	<2.0	<2.0	<1.0	<0.10	73	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	07/22/16	**87**	<1.0	<1.0	39	<1.0	<2.0	690	**0.035**	<1.0	<0.40	<2.0	**590**	0.56	160	<0.013	<2.0	<2.0	<1.0	<0.10	1300	<0.10	<2.0	<2.0	0.47	<2.0	11
	12/8/16[FD]	**140**	<1.0	<1.0	15	<1.0	<2.0	<50	**0.025**	<1.0	<0.40	<2.0	220	<0.50	98	<0.013	<2.0	<2.0	<1.0	<0.10	59	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	12/8/16	**100**	<1.0	<1.0	16	<1.0	<2.0	<50	**0.026**	<1.0	<0.40	<2.0	220	<0.50	100	<0.013	<2.0	<2.0	<1.0	<0.10	61	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	NSE Tier 1 EQS Marine Water [1]	-	500	12.5	500	100	-	1200	0.12	-	-	2	-	2	-	0.016	-	8.3	2	1.5	-	21.3	-	-	100	50	10
	CCME MAL [2]	-	-	12.5	-	-	-	-	0.12	1.5 [5]	-	-	-	-	-	0.016	-	-	-	-	-	-	-	-	-	-	-
	Battery Point/Narrows Calculated 95% UCL	-	-	-	-	-	-	-	-	-	0.9	-	190	-	70	0.189	-	-	-	-	7000	-	-	-	-	-	-
BP-1-SW	07/23/13	168	<10	<10	41	<10	<20	3700	0.14	*<10*	*<4.0*	*<20*	1990	*<5*	109	<0.013	*<20*	*<20*	*<10*	<1.0	6130	<1	<20	<20	2.6	<20	*<50*
	12/22/14	110	<1.0	<1.0	19	<1.0	<2.0	480	0.028	<1.0	<0.40	<2.0	240	<0.50	61	<0.013	*<2.0*	<2.0	<1.0	<0.10	950	<0.10	<2.0	<2.0	0.41	<2.0	7.2
	07/27/15	86	<10	<10	19	<10	<20	2900	<0.10	*<10*	*<4.0*	<20	*<500*	*<5.0*	59	<0.013	*<20*	*<20*	*<10*	<1.0	5300	<1.0	<20	<20	2.1	<20	*<50*
	11/18/15	140	<1.0	<1.0	16	<1.0	<2.0	330	0.014	<1.0	<0.40	<2.0	*410*	*<0.50*	57	0.070	*<2.0*	<2.0	*<1.0*	<0.10	580	<0.10	<2.0	<2.0	0.29	<2.0	41
	07/22/16	63	<10	<10	23	<10	<20	3600	<0.10	<10	<4.0	<20	*<500*	*<5.0*	71	<0.013	*<20*	*<20*	*<10*	<1.0	5500	<1.0	<20	<20	2.4	<20	*<50*
	12/8/16	86	<1.0	<1.0	20	<1.0	<2.0	520	0.025	<1.0	<0.40	<2.0	280	<0.50	100	<0.013	*<2.0*	<2.0	<1.0	<0.10	1000	<0.10	<2.0	<2.0	0.48	<2.0	<5.0
NARROWS	12/22/14	110	<1.0	<1.0	19	<1.0	<2.0	300	0.027	<1.0	<0.40	<2.0	250	<0.50	63	<0.013	*<2.0*	<2.0	<1.0	<0.10	610	<0.10	<2.0	2.4	0.32	<2.0	7.3
	07/27/15	140	<10	<10	21	<10	<20	3100	<0.10	*<10*	*<4.0*	*<20*	*<500*	*<5.0*	100	<0.013	*<20*	*<20*	*<10*	<1.0	5400	<1.0	<20	<20	2.2	<20	*<50*
	11/18/15	76	1.8	<1.0	15	<1.0	<2.0	180	0.012	<1.0	<0.40	<2.0	*320*	*<0.50*	45	<0.013	*<2.0*	<2.0	*<1.0*	<0.10	370	<0.10	<2.0	<2.0	0.22	<2.0	63
	07/22/16	51	<10	<10	28	<10	<20	3500	<0.10	<10	*<4.0*	*<20*	*<500*	*<5.0*	120	<0.013	*<20*	*<20*	*<10*	<1.0	5400	<1.0	<20	<20	2.1	<20	*<50*
	12/8/16	75	<1.0	<1.0	20	<1.0	<2.0	460	0.029	<1.0	<0.40	<2.0	250	<0.50	110	<0.013	*<2.0*	<2.0	<1.0	<0.10	890	<0.10	<2.0	<2.0	0.58	<2.0	15

NOTES:
FD - Field Duplicate
NM - Not Measured or not analyzed
mg/L - milligrams per liter
UCL - Upper Concentration Limit
- No applicable guideline criteria

1 - Nova Scotia Environment Tier I Environmental Quality Standards (EQS) for surface water (freshwater and marine) 2013
2 - Canadian Council of Ministers of the Environment (CCME) for the protection of aquatic life (freshwater and marine) 2014
3 - Guideline value for NH3 is based on a pH value of 8 and a temperature of 10 C
4 - Guideline for chromium is based on CR6+
5 - Guideline value for aluminum based on a pH >6.5

Bold	Concentration exceeds Tier I EQS for surface water (freshwater)
Underline	Concentration exceeds Tier I EQS for surface water (marine)
Shading	Concentration exceeds CCME FWAL
Shading	Concentration exceeds CCME MAL
Double Underline	Concentration exceeds Upstream Calculated 95% UCL
Dashed Border	Concentration exceeds Battery Point/Narrows Calculated 95% Upper Concentration Limit
Red	Concentration exceeds Pre-Construction/Baseline Calculated 95% Upper Concentration Limit
Italics	Laboratory detection limit is higher than guideline criteria

This summary is to be used in conjunction with, not as a replacement of, the Laboratory Certificates of Analysis

APPENDIX C
LABORATORY CERTIFICATES

Maxxam
A Bureau Veritas Group Company

Your Project #: 4104251070
Site#: LTMM SURFACE WATER MONITORING
Site Location: LTMM SURFACE WATER MONITORING
Your C.O.C. #: 587827

Attention:Nadine Wambolt

Dillon Consulting Limited
275 Charlotte St
Sydney, NS
B1P 1C6

Report Date: 2016/12/16
Report #: R4289951
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6Q7451
Received: 2016/12/08, 14:05

Sample Matrix: Water
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide (1)	8	N/A	2016/12/10	N/A	SM 22 4500-CO2 D
Carbonate, Bicarbonate and Hydroxide (1)	2	N/A	2016/12/12	N/A	SM 22 4500-CO2 D
Carbonate, Bicarbonate and Hydroxide (1)	1	N/A	2016/12/13	N/A	SM 22 4500-CO2 D
Alkalinity (1)	8	N/A	2016/12/14	ATL SOP 00013	EPA 310.2 R1974 m
Alkalinity (1)	3	N/A	2016/12/15	ATL SOP 00013	EPA 310.2 R1974 m
Chloride (1)	4	N/A	2016/12/15	ATL SOP 00014	SM 22 4500-Cl- E m
Chloride (1)	7	N/A	2016/12/16	ATL SOP 00014	SM 22 4500-Cl- E m
Colour (1)	11	N/A	2016/12/14	ATL SOP 00020	SM 22 2120C m
Conductance - water (1)	8	N/A	2016/12/10	ATL SOP 00004	SM 22 2510B m
Conductance - water (1)	3	N/A	2016/12/12	ATL SOP 00004	SM 22 2510B m
Hardness (calculated as CaCO3) (1)	11	N/A	2016/12/13	ATL SOP 00048	SM 22 2340 B
Mercury - Total (CVAA,LL) (1)	11	2016/12/12	2016/12/13	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS (1)	8	2016/12/12	2016/12/12	ATL SOP 00058	EPA 6020A R1 m
Metals Water Total MS (1)	3	2016/12/12	2016/12/13	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference) (1)	11	N/A	2016/12/16	N/A	Auto Calc.
Anion and Cation Sum (1)	11	N/A	2016/12/15	N/A	Auto Calc.
Nitrogen Ammonia - water (1)	11	N/A	2016/12/15	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite (1)	11	N/A	2016/12/14	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite (1)	11	N/A	2016/12/15	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N) (1)	11	N/A	2016/12/15	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM) (1)	7	2016/12/12	2016/12/13	ATL SOP 00103	EPA 8270D 2007 m
PAH in Water by GC/MS (SIM) (1)	5	2016/12/12	2016/12/14	ATL SOP 00103	EPA 8270D 2007 m
pH (1, 2)	8	N/A	2016/12/10	ATL SOP 00003	SM 22 4500-H+ B m
pH (1, 2)	2	N/A	2016/12/12	ATL SOP 00003	SM 22 4500-H+ B m
pH (1, 2)	1	N/A	2016/12/13	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho (1)	11	N/A	2016/12/14	ATL SOP 00021	EPA 365.2 m
Sat. pH and Langelier Index (@ 20C) (1)	11	N/A	2016/12/16	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C) (1)	11	N/A	2016/12/16	ATL SOP 00049	Auto Calc.
Reactive Silica (1)	11	N/A	2016/12/14	ATL SOP 00022	EPA 366.0 m
Sulphate (1)	11	N/A	2016/12/14	ATL SOP 00023	ASTMD516-11 m

Maxxam Analytics International Corporation o/a Maxxam Analytics 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.maxxam.ca

Your Project #: 4104251070
Site#: LTMM SURFACE WATER MONITORING
Site Location: LTMM SURFACE WATER MONITORING
Your C.O.C. #: 587827

Attention:Nadine Wambolt

Dillon Consulting Limited
275 Charlotte St
Sydney, NS
B1P 1C6

Report Date: 2016/12/16
Report #: R4289951
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6Q7451
Received: 2016/12/08, 14:05

Sample Matrix: Water
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Total Dissolved Solids (TDS calc) (1)	11	N/A	2016/12/16	N/A	Auto Calc.
Organic carbon - Total (TOC) (1, 3)	11	N/A	2016/12/14	ATL SOP 00037	SM 22 5310C m
Turbidity (1)	11	N/A	2016/12/13	ATL SOP 00011	EPA 180.1 R2 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Bedford
(2) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(3) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

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Your Project #: 4104251070
Site#: LTMM SURFACE WATER MONITORING
Site Location: LTMM SURFACE WATER MONITORING
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275 Charlotte St
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B1P 1C6

Report Date: 2016/12/16
Report #: R4289951
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6Q7451
Received: 2016/12/08, 14:05

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Candace Hillier, Cl Svc - Sydney
Email: chillier@maxxam.ca
Phone# (902) 567 1255
==========
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B6Q7451
Report Date: 2016/12/16

Dillon Consulting Limited
Client Project #: 4104251070
Site Location: LTMM SURFACE WATER MONITORING

RESULTS OF ANALYSES OF WATER

Maxxam ID		DPB677	DPB732			DPB733			DPB734		
Sampling Date		2016/12/08	2016/12/08			2016/12/08			2016/12/08		
COC Number		587827	587827			587827			587827		
	UNITS	CB-SW	NRC-1-SW	RDL	QC Batch	SRC-1-SW	RDL	QC Batch	COB-A-SW	RDL	QC Batch
Calculated Parameters											
Anion Sum	me/L	3.12	1.49	N/A	4784670	5.58	N/A	4784670	6.65	N/A	4784670
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	65	21	1.0	4784668	86	1.0	4784668	100	1.0	4784668
Calculated TDS	mg/L	170	90	1.0	4784673	310	1.0	4784673	400	1.0	4784673
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	<1.0	1.0	4784668	<1.0	1.0	4784668	<1.0	1.0	4784668
Cation Sum	me/L	2.56	1.39	N/A	4784670	4.78	N/A	4784670	6.06	N/A	4784670
Hardness (CaCO3)	mg/L	78	36	1.0	4784548	120	1.0	4784548	250	1.0	4784548
Ion Balance (% Difference)	%	9.86	3.47	N/A	4784669	7.72	N/A	4784669	4.64	N/A	4784669
Langelier Index (@ 20C)	N/A	-0.694	-1.74		4784671	-0.290		4784671	0.235		4784671
Langelier Index (@ 4C)	N/A	-0.944	-1.99		4784672	-0.539		4784672	-0.0140		4784672
Nitrate (N)	mg/L	0.19	0.19	0.050	4784508	0.15	0.050	4785686	0.49	0.050	4785686
Saturation pH (@ 20C)	N/A	8.15	8.95		4784671	7.87		4784671	7.52		4784671
Saturation pH (@ 4C)	N/A	8.40	9.20		4784672	8.12		4784672	7.77		4784672
Inorganics											
Total Alkalinity (Total as CaCO3)	mg/L	65	21	5.0	4790224	86	5.0	4790280	110	25	4790280
Dissolved Chloride (Cl)	mg/L	48	26	1.0	4790225	110	1.0	4790290	47	1.0	4790290
Colour	TCU	30	11	5.0	4790229	19	5.0	4790294	6.3	5.0	4790294
Nitrate + Nitrite (N)	mg/L	0.19	0.19	0.050	4790231	0.16	0.050	4790297	0.51	0.050	4790297
Nitrite (N)	mg/L	<0.010	<0.010	0.010	4790232	0.012	0.010	4790298	0.012	0.010	4790298
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.10	0.050	4791791	0.17	0.050	4791791	0.59	0.050	4791791
Total Organic Carbon (C)	mg/L	4.9	2.2	0.50	4792232	4.3	0.50	4792232	2.8	0.50	4792232
Orthophosphate (P)	mg/L	0.033	<0.010	0.010	4790230	0.012	0.010	4790296	0.015	0.010	4790296
pH	pH	7.46	7.21	N/A	4787580	7.58	N/A	4787436	7.75	N/A	4787436
Reactive Silica (SiO2)	mg/L	7.1	5.3	0.50	4790228	7.8	0.50	4790292	13	0.50	4790292
Dissolved Sulphate (SO4)	mg/L	23	16	2.0	4790227	42	10	4790291	150	10	4790291
Turbidity	NTU	1.9	2.3	0.10	4789755	7.3	0.10	4789755	0.35	0.10	4789750
Conductivity	uS/cm	280	160	1.0	4787584	520	1.0	4787437	640	1.0	4787437

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B6Q7451
Report Date: 2016/12/16

Dillon Consulting Limited
Client Project #: 4104251070
Site Location: LTMM SURFACE WATER MONITORING

RESULTS OF ANALYSES OF WATER

Maxxam ID		DPB735			DPB736			DPB737		
Sampling Date		2016/12/08			2016/12/08			2016/12/08		
COC Number		587827			587827			587827		
	UNITS	COB-B-SW	RDL	QC Batch	COB-4-SW	RDL	QC Batch	COB-6-SW	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	16.7	N/A	4784670	2.79	N/A	4784670	3.56	N/A	4784670
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	170	1.0	4784668	49	1.0	4784668	60	1.0	4784668
Calculated TDS	mg/L	1000	1.0	4784673	160	1.0	4784673	210	1.0	4784673
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	4784668	<1.0	1.0	4784668	<1.0	1.0	4784668
Cation Sum	me/L	15.8	N/A	4784670	2.52	N/A	4784670	3.20	N/A	4784670
Hardness (CaCO3)	mg/L	590	1.0	4784548	81	1.0	4784548	100	1.0	4784548
Ion Balance (% Difference)	%	2.77	N/A	4784669	5.08	N/A	4784669	5.33	N/A	4784669
Langelier Index (@ 20C)	N/A	0.378		4784671	-0.477		4784671	-0.203		4784671
Langelier Index (@ 4C)	N/A	0.132		4784672	-0.727		4784672	-0.453		4784672
Nitrate (N)	mg/L	0.56	0.050	4785686	0.27	0.050	4785686	0.27	0.050	4785686
Saturation pH (@ 20C)	N/A	7.02		4784671	8.24		4784671	8.08		4784671
Saturation pH (@ 4C)	N/A	7.27		4784672	8.49		4784672	8.33		4784672
Inorganics										
Total Alkalinity (Total as CaCO3)	mg/L	170	25	4790280	49	5.0	4790280	60	5.0	4790280
Dissolved Chloride (Cl)	mg/L	140	1.0	4790290	34	1.0	4790290	53	1.0	4790290
Colour	TCU	9.7	5.0	4790294	8.8	5.0	4790294	12	5.0	4790294
Nitrate + Nitrite (N)	mg/L	0.58	0.050	4790297	0.27	0.050	4790297	0.28	0.050	4790297
Nitrite (N)	mg/L	0.017	0.010	4790298	<0.010	0.010	4790298	0.010	0.010	4790298
Nitrogen (Ammonia Nitrogen)	mg/L	8.1	0.25	4791791	0.083	0.050	4791791	<0.050	0.050	4791791
Total Organic Carbon (C)	mg/L	6.2 (1)	5.0	4792232	2.6	0.50	4792232	2.9	0.50	4792232
Orthophosphate (P)	mg/L	0.017	0.010	4790296	0.012	0.010	4790296	0.014	0.010	4790296
pH	pH	7.40	N/A	4787436	7.76	N/A	4787586	7.87	N/A	4787436
Reactive Silica (SiO2)	mg/L	17	0.50	4790292	7.4	0.50	4790292	7.9	0.50	4790292
Dissolved Sulphate (SO4)	mg/L	440	40	4790291	39	2.0	4790291	41	10	4790291
Turbidity	NTU	0.40	0.10	4789750	2.7	0.10	4789755	3.4	0.10	4789750
Conductivity	uS/cm	1600	1.0	4787437	270	1.0	4787588	340	1.0	4787437

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Elevated reporting limit due to sample matrix.

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Maxxam Job #: B6Q7451
Report Date: 2016/12/16

Dillon Consulting Limited
Client Project #: 4104251070
Site Location: LTMM SURFACE WATER MONITORING

RESULTS OF ANALYSES OF WATER

Maxxam ID		DPB738			DPB739		DPB740		
Sampling Date		2016/12/08			2016/12/08		2016/12/08		
COC Number		587827			587827		587827		
	UNITS	WB-1-SW	RDL	QC Batch	BP-1-SW	RDL	NARROWS	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	1.33	N/A	4784670	72.9	N/A	60.8	N/A	4784670
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	22	1.0	4784668	52	1.0	61	1.0	4784668
Calculated TDS	mg/L	77	1.0	4784673	4100	1.0	3500	1.0	4784673
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	4784668	<1.0	1.0	<1.0	1.0	4784668
Cation Sum	me/L	1.25	N/A	4784670	68.6	N/A	60.0	N/A	4784670
Hardness (CaCO3)	mg/L	31	1.0	4784548	780	1.0	700	1.0	4784548
Ion Balance (% Difference)	%	3.10	N/A	4784669	3.02	N/A	0.650	N/A	4784669
Langelier Index (@ 20C)	N/A	-1.54		4784671	-0.642		-0.418		4784671
Langelier Index (@ 4C)	N/A	-1.79		4784672	-0.883		-0.660		4784672
Nitrate (N)	mg/L	0.15	0.050	4785686	0.21	0.050	0.21	0.050	4785686
Saturation pH (@ 20C)	N/A	9.00		4784671	8.20		8.09		4784671
Saturation pH (@ 4C)	N/A	9.25		4784672	8.44		8.33		4784672
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	22	5.0	4790280	52	5.0	61	5.0	4790280
Dissolved Chloride (Cl)	mg/L	25	1.0	4790290	2300	20	1900	20	4790290
Colour	TCU	27	5.0	4790294	20	5.0	21	5.0	4790294
Nitrate + Nitrite (N)	mg/L	0.15	0.050	4790297	0.21	0.050	0.21	0.050	4790297
Nitrite (N)	mg/L	<0.010	0.010	4790298	<0.010	0.010	<0.010	0.010	4790298
Nitrogen (Ammonia Nitrogen)	mg/L	0.14	0.050	4791791	0.088	0.050	0.082	0.050	4791791
Total Organic Carbon (C)	mg/L	3.6	0.50	4792232	<5.0 (1)	5.0	<5.0 (1)	5.0	4792232
Orthophosphate (P)	mg/L	0.030	0.010	4790296	0.015	0.010	0.016	0.010	4790296
pH	pH	7.46	N/A	4787436	7.56	N/A	7.67	N/A	4787436
Reactive Silica (SiO2)	mg/L	3.8	0.50	4790292	4.8	0.50	6.1	0.50	4790292
Dissolved Sulphate (SO4)	mg/L	8.4	2.0	4790291	290	40	270	60	4790291
Turbidity	NTU	1.2	0.10	4789750	2.1	0.10	1.2	0.10	4789755
Conductivity	uS/cm	140	1.0	4787437	7000	1.0	6200	1.0	4787437

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Maxxam Job #: B6Q7451
Report Date: 2016/12/16

Dillon Consulting Limited
Client Project #: 4104251070
Site Location: LTMM SURFACE WATER MONITORING

RESULTS OF ANALYSES OF WATER

Maxxam ID		DPB741		
Sampling Date		2016/12/08		
COC Number		587827		
	UNITS	FD-023	RDL	QC Batch
Calculated Parameters				
Anion Sum	me/L	1.30	N/A	4784670
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	22	1.0	4784668
Calculated TDS	mg/L	76	1.0	4784673
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	4784668
Cation Sum	me/L	1.26	N/A	4784670
Hardness (CaCO3)	mg/L	30	1.0	4784548
Ion Balance (% Difference)	%	1.56	N/A	4784669
Langelier Index (@ 20C)	N/A	-1.71		4784671
Langelier Index (@ 4C)	N/A	-1.97		4784672
Nitrate (N)	mg/L	0.15	0.050	4785686
Saturation pH (@ 20C)	N/A	9.01		4784671
Saturation pH (@ 4C)	N/A	9.26		4784672
Inorganics				
Total Alkalinity (Total as CaCO3)	mg/L	22	5.0	4790280
Dissolved Chloride (Cl)	mg/L	24	1.0	4790290
Colour	TCU	26	5.0	4790294
Nitrate + Nitrite (N)	mg/L	0.15	0.050	4790297
Nitrite (N)	mg/L	<0.010	0.010	4790298
Nitrogen (Ammonia Nitrogen)	mg/L	0.13	0.050	4791791
Total Organic Carbon (C)	mg/L	3.7	0.50	4792232
Orthophosphate (P)	mg/L	0.030	0.010	4790296
pH	pH	7.29	N/A	4787436
Reactive Silica (SiO2)	mg/L	3.7	0.50	4790292
Dissolved Sulphate (SO4)	mg/L	8.5	2.0	4790291
Turbidity	NTU	1.1	0.10	4789751
Conductivity	uS/cm	140	1.0	4787437

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QC Batch = Quality Control Batch
N/A = Not Applicable

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Report Date: 2016/12/16

Dillon Consulting Limited
Client Project #: 4104251070
Site Location: LTMM SURFACE WATER MONITORING

MERCURY BY COLD VAPOUR AA (WATER)

Maxxam ID		DPB677	DPB732	DPB733	DPB734		DPB735	DPB736		
Sampling Date		2016/12/08	2016/12/08	2016/12/08	2016/12/08		2016/12/08	2016/12/08		
COC Number		587827	587827	587827	587827		587827	587827		
	UNITS	CB-SW	NRC-1-SW	SRC-1-SW	COB-A-SW	QC Batch	COB-B-SW	COB-4-SW	RDL	QC Batch
Metals										
Total Mercury (Hg)	ug/L	<0.013	<0.013	<0.013	<0.013	4788139	<0.013	<0.013	0.013	4788141

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		DPB737	DPB738	DPB739	DPB740	DPB741		
Sampling Date		2016/12/08	2016/12/08	2016/12/08	2016/12/08	2016/12/08		
COC Number		587827	587827	587827	587827	587827		
	UNITS	COB-6-SW	WB-1-SW	BP-1-SW	NARROWS	FD-023	RDL	QC Batch
Metals								
Total Mercury (Hg)	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	0.013	4788141

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6Q7451
Report Date: 2016/12/16

Dillon Consulting Limited
Client Project #: 4104251070
Site Location: LTMM SURFACE WATER MONITORING

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		DPB677	DPB732	DPB733	DPB734	DPB735	DPB736	DPB737		
Sampling Date		2016/12/08	2016/12/08	2016/12/08	2016/12/08	2016/12/08	2016/12/08	2016/12/08		
COC Number		587827	587827	587827	587827	587827	587827	587827		
	UNITS	CB-SW	NRC-1-SW	SRC-1-SW	COB-A-SW	COB-B-SW	COB-4-SW	COB-6-SW	RDL	QC Batch
Metals										
Total Aluminum (Al)	ug/L	84	110	300	8.5	13	120	200	5.0	4788181
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	4788181
Total Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	4788181
Total Barium (Ba)	ug/L	25	19	18	12	52	19	21	1.0	4788181
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	4788181
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4788181
Total Boron (B)	ug/L	<50	<50	54	85	540	<50	<50	50	4788181
Total Cadmium (Cd)	ug/L	0.017	0.025	0.039	<0.010	0.027	0.014	0.015	0.010	4788181
Total Calcium (Ca)	ug/L	26000	12000	42000	81000	200000	28000	34000	100	4788181
Total Chromium (Cr)	ug/L	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	1.0	4788181
Total Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	0.90	<0.40	<0.40	0.40	4788181
Total Copper (Cu)	ug/L	<2.0	<2.0	2.7	<2.0	<2.0	<2.0	<2.0	2.0	4788181
Total Iron (Fe)	ug/L	330	360	400	68	130	390	360	50	4788181
Total Lead (Pb)	ug/L	<0.50	0.80	1.6	<0.50	<0.50	0.99	1.0	0.50	4788181
Total Magnesium (Mg)	ug/L	3400	1600	4500	11000	21000	2900	3400	100	4788181
Total Manganese (Mn)	ug/L	310	200	200	92	1400	180	110	2.0	4788181
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4788181
Total Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	2.8	<2.0	<2.0	2.0	4788181
Total Phosphorus (P)	ug/L	<100	<100	<100	<100	<100	<100	<100	100	4788181
Total Potassium (K)	ug/L	1400	680	2300	4000	20000	1300	1700	100	4788181
Total Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	4788181
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	4788181
Total Sodium (Na)	ug/L	22000	15000	51000	22000	68000	19000	26000	100	4788181
Total Strontium (Sr)	ug/L	110	34	140	250	480	110	160	2.0	4788181
Total Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	4788181
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4788181
Total Titanium (Ti)	ug/L	<2.0	<2.0	13	<2.0	<2.0	<2.0	3.0	2.0	4788181
Total Uranium (U)	ug/L	0.14	<0.10	0.35	0.32	0.68	0.18	0.23	0.10	4788181
Total Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4788181
Total Zinc (Zn)	ug/L	<5.0	<5.0	5.7	<5.0	<5.0	<5.0	<5.0	5.0	4788181

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Report Date: 2016/12/16

Dillon Consulting Limited
Client Project #: 4104251070
Site Location: LTMM SURFACE WATER MONITORING

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		DPB738		DPB739		DPB740		DPB741		
Sampling Date		2016/12/08		2016/12/08		2016/12/08		2016/12/08		
COC Number		587827		587827		587827		587827		
	UNITS	WB-1-SW	RDL	BP-1-SW	RDL	NARROWS	RDL	FD-023	RDL	QC Batch
Metals										
Total Aluminum (Al)	ug/L	100	5.0	86	5.0	75	5.0	140	5.0	4788181
Total Antimony (Sb)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	4788181
Total Arsenic (As)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	4788181
Total Barium (Ba)	ug/L	16	1.0	20	1.0	20	1.0	15	1.0	4788181
Total Beryllium (Be)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	4788181
Total Bismuth (Bi)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	4788181
Total Boron (B)	ug/L	<50	50	520	50	460	50	<50	50	4788181
Total Cadmium (Cd)	ug/L	0.026	0.010	0.025	0.010	0.029	0.010	0.025	0.010	4788181
Total Calcium (Ca)	ug/L	9700	100	70000	100	72000	100	9400	100	4788181
Total Chromium (Cr)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	4788181
Total Cobalt (Co)	ug/L	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	4788181
Total Copper (Cu)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	4788181
Total Iron (Fe)	ug/L	220	50	280	50	250	50	220	50	4788181
Total Lead (Pb)	ug/L	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	4788181
Total Magnesium (Mg)	ug/L	1600	100	150000	1000	130000	1000	1700	100	4788181
Total Manganese (Mn)	ug/L	100	2.0	100	2.0	110	2.0	98	2.0	4788181
Total Molybdenum (Mo)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	4788181
Total Nickel (Ni)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	4788181
Total Phosphorus (P)	ug/L	<100	100	<100	100	<100	100	<100	100	4788181
Total Potassium (K)	ug/L	800	100	45000	100	38000	100	770	100	4788181
Total Selenium (Se)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	4788181
Total Silver (Ag)	ug/L	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	4788181
Total Sodium (Na)	ug/L	14000	100	1200000	1000	1000000	100	14000	100	4788181
Total Strontium (Sr)	ug/L	61	2.0	1000	2.0	890	2.0	59	2.0	4788181
Total Thallium (Tl)	ug/L	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	4788181
Total Tin (Sn)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	4788181
Total Titanium (Ti)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	4788181
Total Uranium (U)	ug/L	<0.10	0.10	0.48	0.10	0.58	0.10	<0.10	0.10	4788181
Total Vanadium (V)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	4788181
Total Zinc (Zn)	ug/L	<5.0	5.0	<5.0	5.0	15	5.0	<5.0	5.0	4788181

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Report Date: 2016/12/16

Dillon Consulting Limited
Client Project #: 4104251070
Site Location: LTMM SURFACE WATER MONITORING

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		DPB677	DPB732	DPB733	DPB734	DPB735	DPB736	DPB737		
Sampling Date		2016/12/08	2016/12/08	2016/12/08	2016/12/08	2016/12/08	2016/12/08	2016/12/08		
COC Number		587827	587827	587827	587827	587827	587827	587827		
	UNITS	CB-SW	NRC-1-SW	SRC-1-SW	COB-A-SW	COB-B-SW	COB-4-SW	COB-6-SW	RDL	QC Batch
Polyaromatic Hydrocarbons										
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.083	0.050	4788143
2-Methylnaphthalene	ug/L	<0.050	0.056	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4788143
Acenaphthene	ug/L	0.056	0.059	<0.010	<0.010	0.012	0.059	0.11	0.010	4788143
Acenaphthylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	0.010	4788143
Anthracene	ug/L	<0.010	0.010	<0.010	<0.010	<0.010	0.013	0.010	0.010	4788143
Benzo(a)anthracene	ug/L	<0.010	0.011	<0.010	<0.010	<0.010	0.021	0.018	0.010	4788143
Benzo(a)pyrene	ug/L	<0.010	0.011	<0.010	<0.010	<0.010	0.028	0.027	0.010	4788143
Benzo(b)fluoranthene	ug/L	<0.010	0.011	<0.010	<0.010	<0.010	0.026	0.025	0.010	4788143
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.018	0.019	0.010	4788143
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.016	0.010	4788143
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.013	0.010	4788143
Chrysene	ug/L	<0.010	0.016	<0.010	<0.010	<0.010	0.031	0.029	0.010	4788143
Dibenz(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Fluoranthene	ug/L	0.017	0.030	0.015	<0.010	<0.010	0.043	0.043	0.010	4788143
Fluorene	ug/L	0.028	0.036	<0.010	<0.010	<0.010	0.036	0.052	0.010	4788143
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	0.013	0.010	4788143
Naphthalene	ug/L	<0.20	0.20	<0.20	<0.20	<0.20	<0.20	0.38	0.20	4788143
Perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	0.010	4788143
Phenanthrene	ug/L	0.028	0.066	0.013	<0.010	<0.010	0.065	0.049	0.010	4788143
Pyrene	ug/L	0.014	0.027	0.011	<0.010	<0.010	0.040	0.038	0.010	4788143
Surrogate Recovery (%)										
D10-Anthracene	%	77	76	78	90	82	79	76		4788143
D14-Terphenyl	%	78	78	83	98	86	79	81		4788143
D8-Acenaphthylene	%	76	78	78	95	96	76	76		4788143

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6Q7451
Report Date: 2016/12/16

Dillon Consulting Limited
Client Project #: 4104251070
Site Location: LTMM SURFACE WATER MONITORING

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		DPB738	DPB739	DPB740	DPB741	DPB761		
Sampling Date		2016/12/08	2016/12/08	2016/12/08	2016/12/08	2016/12/08		
COC Number		587827	587827	587827	587827	587827		
	UNITS	WB-1-SW	BP-1-SW	NARROWS	FD-023	TB-034	RDL	QC Batch
Polyaromatic Hydrocarbons								
1-Methylnaphthalene	ug/L	<0.050	0.072	0.069	<0.050	<0.050	0.050	4788143
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4788143
Acenaphthene	ug/L	<0.010	0.059	0.078	<0.010	<0.010	0.010	4788143
Acenaphthylene	ug/L	<0.010	0.055	0.058	<0.010	<0.010	0.010	4788143
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Chrysene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Dibenz(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Fluoranthene	ug/L	<0.010	0.015	0.017	<0.010	<0.010	0.010	4788143
Fluorene	ug/L	<0.010	0.046	0.049	<0.010	<0.010	0.010	4788143
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Naphthalene	ug/L	<0.20	<0.20	0.21	<0.20	<0.20	0.20	4788143
Perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4788143
Phenanthrene	ug/L	<0.010	0.030	0.031	<0.010	<0.010	0.010	4788143
Pyrene	ug/L	<0.010	0.016	0.016	<0.010	<0.010	0.010	4788143
Surrogate Recovery (%)								
D10-Anthracene	%	76	66	65	76	91		4788143
D14-Terphenyl	%	82	67	69	78	94		4788143
D8-Acenaphthylene	%	75	75	75	75	96		4788143

RDL = Reportable Detection Limit
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GENERAL COMMENTS

Sample DPB677 [CB-SW] : Poor RCAp Ion Balance due to sample matrix.

Sample DPB733 [SRC-1-SW] : Poor RCAp Ion Balance due to sample matrix.

Sample DPB736 [COB-4-SW] : Poor RCAp Ion Balance due to sample matrix.

Sample DPB737 [COB-6-SW] : Poor RCAp Ion Balance due to sample matrix.

Results relate only to the items tested.

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Maxxam Job #: B6Q7451
Report Date: 2016/12/16

Dillon Consulting Limited
Client Project #: 4104251070
Site Location: LTMM SURFACE WATER MONITORING

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4787436	JMV	QC Standard	pH	2016/12/10		101	%	97 - 103
4787436	JMV	RPD	pH	2016/12/10	1.7		%	N/A
4787437	JMV	Spiked Blank	Conductivity	2016/12/10		105	%	80 - 120
4787437	JMV	Method Blank	Conductivity	2016/12/10	1.5, RDL=1.0		uS/cm	
4787437	JMV	RPD	Conductivity	2016/12/10	0.44		%	25
4787580	JMV	QC Standard	pH	2016/12/12		100	%	97 - 103
4787580	JMV	RPD	pH	2016/12/12	3.2 (1)		%	N/A
4787584	JMV	Spiked Blank	Conductivity	2016/12/12		103	%	80 - 120
4787584	JMV	Method Blank	Conductivity	2016/12/12	1.6, RDL=1.0		uS/cm	
4787584	JMV	RPD	Conductivity	2016/12/12	0.90		%	25
4787586	JMV	QC Standard	pH	2016/12/12		100	%	97 - 103
4787586	JMV	RPD	pH	2016/12/12	1.5		%	N/A
4787588	JMV	Spiked Blank	Conductivity	2016/12/12		107	%	80 - 120
4787588	JMV	Method Blank	Conductivity	2016/12/12	1.6, RDL=1.0		uS/cm	
4787588	JMV	RPD	Conductivity	2016/12/12	0.68		%	25
4788139	ARS	Matrix Spike	Total Mercury (Hg)	2016/12/13		99	%	80 - 120
4788139	ARS	Spiked Blank	Total Mercury (Hg)	2016/12/13		99	%	80 - 120
4788139	ARS	Method Blank	Total Mercury (Hg)	2016/12/13	<0.013		ug/L	
4788139	ARS	RPD	Total Mercury (Hg)	2016/12/13	NC		%	20
4788141	ARS	Matrix Spike [DPB736-05]	Total Mercury (Hg)	2016/12/13		98	%	80 - 120
4788141	ARS	Spiked Blank	Total Mercury (Hg)	2016/12/13		99	%	80 - 120
4788141	ARS	Method Blank	Total Mercury (Hg)	2016/12/13	<0.013		ug/L	
4788141	ARS	RPD [DPB735-05]	Total Mercury (Hg)	2016/12/13	NC		%	20
4788143	RST	Matrix Spike [DPB732-04]	D10-Anthracene	2016/12/13		66	%	30 - 130
			D14-Terphenyl	2016/12/13		70	%	30 - 130
			D8-Acenaphthylene	2016/12/13		76	%	30 - 130
			1-Methylnaphthalene	2016/12/13		73	%	30 - 130
			2-Methylnaphthalene	2016/12/13		75	%	30 - 130
			Acenaphthene	2016/12/13		76	%	30 - 130
			Acenaphthylene	2016/12/13		75	%	30 - 130
			Anthracene	2016/12/13		71	%	30 - 130
			Benzo(a)anthracene	2016/12/13		77	%	30 - 130
			Benzo(a)pyrene	2016/12/13		78	%	30 - 130
			Benzo(b)fluoranthene	2016/12/13		80	%	30 - 130
			Benzo(g,h,i)perylene	2016/12/13		70	%	30 - 130
			Benzo(j)fluoranthene	2016/12/13		77	%	30 - 130
			Benzo(k)fluoranthene	2016/12/13		81	%	30 - 130
			Chrysene	2016/12/13		75	%	30 - 130
			Dibenz(a,h)anthracene	2016/12/13		58	%	30 - 130
			Fluoranthene	2016/12/13		75	%	30 - 130
			Fluorene	2016/12/13		79	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2016/12/13		62	%	30 - 130
			Naphthalene	2016/12/13		75	%	30 - 130
			Perylene	2016/12/13		84	%	30 - 130
			Phenanthrene	2016/12/13		90	%	30 - 130
			Pyrene	2016/12/13		74	%	30 - 130
4788143	RST	Spiked Blank	D10-Anthracene	2016/12/13		93	%	30 - 130
			D14-Terphenyl	2016/12/13		99	%	30 - 130
			D8-Acenaphthylene	2016/12/13		90	%	30 - 130
			1-Methylnaphthalene	2016/12/13		85	%	30 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2-Methylnaphthalene	2016/12/13		89	%	30 - 130
			Acenaphthene	2016/12/13		88	%	30 - 130
			Acenaphthylene	2016/12/13		89	%	30 - 130
			Anthracene	2016/12/13		102	%	30 - 130
			Benzo(a)anthracene	2016/12/13		90	%	30 - 130
			Benzo(a)pyrene	2016/12/13		91	%	30 - 130
			Benzo(b)fluoranthene	2016/12/13		95	%	30 - 130
			Benzo(g,h,i)perylene	2016/12/13		77	%	30 - 130
			Benzo(j)fluoranthene	2016/12/13		92	%	30 - 130
			Benzo(k)fluoranthene	2016/12/13		95	%	30 - 130
			Chrysene	2016/12/13		86	%	30 - 130
			Dibenz(a,h)anthracene	2016/12/13		61	%	30 - 130
			Fluoranthene	2016/12/13		104	%	30 - 130
			Fluorene	2016/12/13		93	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2016/12/13		68	%	30 - 130
			Naphthalene	2016/12/13		87	%	30 - 130
			Perylene	2016/12/13		98	%	30 - 130
			Phenanthrene	2016/12/13		95	%	30 - 130
			Pyrene	2016/12/13		103	%	30 - 130
4788143	RST	Method Blank	D10-Anthracene	2016/12/13		109	%	30 - 130
			D14-Terphenyl	2016/12/13		116	%	30 - 130
			D8-Acenaphthylene	2016/12/13		105	%	30 - 130
			1-Methylnaphthalene	2016/12/13	<0.050		ug/L	
			2-Methylnaphthalene	2016/12/13	<0.050		ug/L	
			Acenaphthene	2016/12/13	<0.010		ug/L	
			Acenaphthylene	2016/12/13	<0.010		ug/L	
			Anthracene	2016/12/13	<0.010		ug/L	
			Benzo(a)anthracene	2016/12/13	<0.010		ug/L	
			Benzo(a)pyrene	2016/12/13	<0.010		ug/L	
			Benzo(b)fluoranthene	2016/12/13	<0.010		ug/L	
			Benzo(g,h,i)perylene	2016/12/13	<0.010		ug/L	
			Benzo(j)fluoranthene	2016/12/13	<0.010		ug/L	
			Benzo(k)fluoranthene	2016/12/13	<0.010		ug/L	
			Chrysene	2016/12/13	<0.010		ug/L	
			Dibenz(a,h)anthracene	2016/12/13	<0.010		ug/L	
			Fluoranthene	2016/12/13	<0.010		ug/L	
			Fluorene	2016/12/13	<0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2016/12/13	<0.010		ug/L	
			Naphthalene	2016/12/13	<0.20		ug/L	
			Perylene	2016/12/13	<0.010		ug/L	
			Phenanthrene	2016/12/13	<0.010		ug/L	
			Pyrene	2016/12/13	<0.010		ug/L	
4788143	RST	RPD [DPB677-04]	1-Methylnaphthalene	2016/12/13	NC		%	40
			2-Methylnaphthalene	2016/12/13	NC		%	40
			Acenaphthene	2016/12/13	1.4		%	40
			Acenaphthylene	2016/12/13	NC		%	40
			Anthracene	2016/12/13	NC		%	40
			Benzo(a)anthracene	2016/12/13	NC		%	40
			Benzo(a)pyrene	2016/12/13	NC		%	40
			Benzo(b)fluoranthene	2016/12/13	NC		%	40
			Benzo(g,h,i)perylene	2016/12/13	NC		%	40
			Benzo(j)fluoranthene	2016/12/13	NC		%	40
			Benzo(k)fluoranthene	2016/12/13	NC		%	40

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Chrysene	2016/12/13	NC		%	40
			Dibenz(a,h)anthracene	2016/12/13	NC		%	40
			Fluoranthene	2016/12/13	NC		%	40
			Fluorene	2016/12/13	NC		%	40
			Indeno(1,2,3-cd)pyrene	2016/12/13	NC		%	40
			Naphthalene	2016/12/13	NC		%	40
			Perylene	2016/12/13	NC		%	40
			Phenanthrene	2016/12/13	NC		%	40
			Pyrene	2016/12/13	NC		%	40
4788181	BAN	Matrix Spike	Total Aluminum (Al)	2016/12/12		90	%	80 - 120
			Total Antimony (Sb)	2016/12/12		106	%	80 - 120
			Total Arsenic (As)	2016/12/12		97	%	80 - 120
			Total Barium (Ba)	2016/12/12		95	%	80 - 120
			Total Beryllium (Be)	2016/12/12		88	%	80 - 120
			Total Bismuth (Bi)	2016/12/12		96	%	80 - 120
			Total Boron (B)	2016/12/12		92	%	80 - 120
			Total Cadmium (Cd)	2016/12/12		95	%	80 - 120
			Total Calcium (Ca)	2016/12/12		97	%	80 - 120
			Total Chromium (Cr)	2016/12/12		89	%	80 - 120
			Total Cobalt (Co)	2016/12/12		96	%	80 - 120
			Total Copper (Cu)	2016/12/12		NC	%	80 - 120
			Total Iron (Fe)	2016/12/12		97	%	80 - 120
			Total Lead (Pb)	2016/12/12		93	%	80 - 120
			Total Magnesium (Mg)	2016/12/12		98	%	80 - 120
			Total Manganese (Mn)	2016/12/12		96	%	80 - 120
			Total Molybdenum (Mo)	2016/12/12		101	%	80 - 120
			Total Nickel (Ni)	2016/12/12		83	%	80 - 120
			Total Phosphorus (P)	2016/12/12		100	%	80 - 120
			Total Potassium (K)	2016/12/12		97	%	80 - 120
			Total Selenium (Se)	2016/12/12		98	%	80 - 120
			Total Silver (Ag)	2016/12/12		96	%	80 - 120
			Total Sodium (Na)	2016/12/12		NC	%	80 - 120
			Total Strontium (Sr)	2016/12/12		101	%	80 - 120
			Total Thallium (Tl)	2016/12/12		97	%	80 - 120
			Total Tin (Sn)	2016/12/12		102	%	80 - 120
			Total Titanium (Ti)	2016/12/12		102	%	80 - 120
			Total Uranium (U)	2016/12/12		104	%	80 - 120
			Total Vanadium (V)	2016/12/12		97	%	80 - 120
			Total Zinc (Zn)	2016/12/12		NC	%	80 - 120
4788181	BAN	Spiked Blank	Total Aluminum (Al)	2016/12/12		95	%	80 - 120
			Total Antimony (Sb)	2016/12/12		104	%	80 - 120
			Total Arsenic (As)	2016/12/12		96	%	80 - 120
			Total Barium (Ba)	2016/12/12		97	%	80 - 120
			Total Beryllium (Be)	2016/12/12		93	%	80 - 120
			Total Bismuth (Bi)	2016/12/12		100	%	80 - 120
			Total Boron (B)	2016/12/12		94	%	80 - 120
			Total Cadmium (Cd)	2016/12/12		98	%	80 - 120
			Total Calcium (Ca)	2016/12/12		98	%	80 - 120
			Total Chromium (Cr)	2016/12/12		96	%	80 - 120
			Total Cobalt (Co)	2016/12/12		97	%	80 - 120
			Total Copper (Cu)	2016/12/12		98	%	80 - 120
			Total Iron (Fe)	2016/12/12		100	%	80 - 120
			Total Lead (Pb)	2016/12/12		98	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Magnesium (Mg)	2016/12/12		99	%	80 - 120
			Total Manganese (Mn)	2016/12/12		99	%	80 - 120
			Total Molybdenum (Mo)	2016/12/12		102	%	80 - 120
			Total Nickel (Ni)	2016/12/12		99	%	80 - 120
			Total Phosphorus (P)	2016/12/12		102	%	80 - 120
			Total Potassium (K)	2016/12/12		100	%	80 - 120
			Total Selenium (Se)	2016/12/12		99	%	80 - 120
			Total Silver (Ag)	2016/12/12		100	%	80 - 120
			Total Sodium (Na)	2016/12/12		93	%	80 - 120
			Total Strontium (Sr)	2016/12/12		104	%	80 - 120
			Total Thallium (Tl)	2016/12/12		100	%	80 - 120
			Total Tin (Sn)	2016/12/12		104	%	80 - 120
			Total Titanium (Ti)	2016/12/12		95	%	80 - 120
			Total Uranium (U)	2016/12/12		106	%	80 - 120
			Total Vanadium (V)	2016/12/12		96	%	80 - 120
			Total Zinc (Zn)	2016/12/12		96	%	80 - 120
4788181	BAN	Method Blank	Total Aluminum (Al)	2016/12/12	6.0, RDL=5.0		ug/L	
			Total Antimony (Sb)	2016/12/12	<1.0		ug/L	
			Total Arsenic (As)	2016/12/12	<1.0		ug/L	
			Total Barium (Ba)	2016/12/12	<1.0		ug/L	
			Total Beryllium (Be)	2016/12/12	<1.0		ug/L	
			Total Bismuth (Bi)	2016/12/12	<2.0		ug/L	
			Total Boron (B)	2016/12/12	<50		ug/L	
			Total Cadmium (Cd)	2016/12/12	<0.010		ug/L	
			Total Calcium (Ca)	2016/12/12	<100		ug/L	
			Total Chromium (Cr)	2016/12/12	<1.0		ug/L	
			Total Cobalt (Co)	2016/12/12	<0.40		ug/L	
			Total Copper (Cu)	2016/12/12	<2.0		ug/L	
			Total Iron (Fe)	2016/12/12	<50		ug/L	
			Total Lead (Pb)	2016/12/12	<0.50		ug/L	
			Total Magnesium (Mg)	2016/12/12	<100		ug/L	
			Total Manganese (Mn)	2016/12/12	<2.0		ug/L	
			Total Molybdenum (Mo)	2016/12/12	<2.0		ug/L	
			Total Nickel (Ni)	2016/12/12	<2.0		ug/L	
			Total Phosphorus (P)	2016/12/12	<100		ug/L	
			Total Potassium (K)	2016/12/12	<100		ug/L	
			Total Selenium (Se)	2016/12/12	<1.0		ug/L	
			Total Silver (Ag)	2016/12/12	<0.10		ug/L	
			Total Sodium (Na)	2016/12/12	<100		ug/L	
			Total Strontium (Sr)	2016/12/12	<2.0		ug/L	
			Total Thallium (Tl)	2016/12/12	<0.10		ug/L	
			Total Tin (Sn)	2016/12/12	<2.0		ug/L	
			Total Titanium (Ti)	2016/12/12	<2.0		ug/L	
			Total Uranium (U)	2016/12/12	<0.10		ug/L	
			Total Vanadium (V)	2016/12/12	<2.0		ug/L	
			Total Zinc (Zn)	2016/12/12	<5.0		ug/L	
4788181	BAN	RPD	Total Aluminum (Al)	2016/12/12	NC		%	20
			Total Antimony (Sb)	2016/12/12	NC		%	20
			Total Arsenic (As)	2016/12/12	NC		%	20
			Total Barium (Ba)	2016/12/12	NC		%	20
			Total Beryllium (Be)	2016/12/12	NC		%	20
			Total Bismuth (Bi)	2016/12/12	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Boron (B)	2016/12/12	NC		%	20
			Total Cadmium (Cd)	2016/12/12	NC		%	20
			Total Calcium (Ca)	2016/12/12	3.1		%	20
			Total Chromium (Cr)	2016/12/12	NC		%	20
			Total Cobalt (Co)	2016/12/12	NC		%	20
			Total Copper (Cu)	2016/12/12	NC		%	20
			Total Iron (Fe)	2016/12/12	NC		%	20
			Total Lead (Pb)	2016/12/12	NC		%	20
			Total Magnesium (Mg)	2016/12/12	0.73		%	20
			Total Manganese (Mn)	2016/12/12	2.6		%	20
			Total Molybdenum (Mo)	2016/12/12	NC		%	20
			Total Nickel (Ni)	2016/12/12	NC		%	20
			Total Phosphorus (P)	2016/12/12	NC		%	20
			Total Potassium (K)	2016/12/12	2.6		%	20
			Total Selenium (Se)	2016/12/12	NC		%	20
			Total Silver (Ag)	2016/12/12	NC		%	20
			Total Sodium (Na)	2016/12/12	0.80		%	20
			Total Strontium (Sr)	2016/12/12	2.3		%	20
			Total Thallium (Tl)	2016/12/12	NC		%	20
			Total Tin (Sn)	2016/12/12	NC		%	20
			Total Titanium (Ti)	2016/12/12	NC		%	20
			Total Uranium (U)	2016/12/12	NC		%	20
			Total Vanadium (V)	2016/12/12	NC		%	20
			Total Zinc (Zn)	2016/12/12	3.6		%	20
4789750	JMV	QC Standard	Turbidity	2016/12/13		89	%	80 - 120
4789750	JMV	Spiked Blank	Turbidity	2016/12/13		96	%	80 - 120
4789750	JMV	Method Blank	Turbidity	2016/12/13	<0.10		NTU	
4789750	JMV	RPD	Turbidity	2016/12/13	4.5		%	20
4789751	JMV	QC Standard	Turbidity	2016/12/13		88	%	80 - 120
4789751	JMV	Spiked Blank	Turbidity	2016/12/13		95	%	80 - 120
4789751	JMV	Method Blank	Turbidity	2016/12/13	<0.10		NTU	
4789751	JMV	RPD	Turbidity	2016/12/13	3.9		%	20
4789755	JMV	QC Standard	Turbidity	2016/12/13		88	%	80 - 120
4789755	JMV	Spiked Blank	Turbidity	2016/12/13		95	%	80 - 120
4789755	JMV	Method Blank	Turbidity	2016/12/13	<0.10		NTU	
4789755	JMV	RPD	Turbidity	2016/12/13	1.0		%	20
4790224	NRG	Matrix Spike	Total Alkalinity (Total as CaCO3)	2016/12/15		NC	%	80 - 120
4790224	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2016/12/14		118	%	80 - 120
4790224	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2016/12/14	<5.0		mg/L	
4790224	NRG	RPD	Total Alkalinity (Total as CaCO3)	2016/12/15	5.2		%	25
4790225	NRG	Matrix Spike	Dissolved Chloride (Cl)	2016/12/16		NC	%	80 - 120
4790225	NRG	QC Standard	Dissolved Chloride (Cl)	2016/12/16		113	%	80 - 120
4790225	NRG	Spiked Blank	Dissolved Chloride (Cl)	2016/12/15		105	%	80 - 120
4790225	NRG	Method Blank	Dissolved Chloride (Cl)	2016/12/15	<1.0		mg/L	
4790225	NRG	RPD	Dissolved Chloride (Cl)	2016/12/16	0.15		%	25
4790227	NRG	Matrix Spike	Dissolved Sulphate (SO4)	2016/12/14		NC	%	80 - 120
4790227	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2016/12/14		97	%	80 - 120
4790227	NRG	Method Blank	Dissolved Sulphate (SO4)	2016/12/14	<2.0		mg/L	
4790227	NRG	RPD	Dissolved Sulphate (SO4)	2016/12/14	4.6		%	25
4790228	NRG	Matrix Spike	Reactive Silica (SiO2)	2016/12/14		NC	%	80 - 120
4790228	NRG	Spiked Blank	Reactive Silica (SiO2)	2016/12/14		96	%	80 - 120
4790228	NRG	Method Blank	Reactive Silica (SiO2)	2016/12/14	<0.50		mg/L	
4790228	NRG	RPD	Reactive Silica (SiO2)	2016/12/14	1.9		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4790229	NRG	Spiked Blank	Colour	2016/12/14		100	%	80 - 120
4790229	NRG	Method Blank	Colour	2016/12/14	<5.0		TCU	
4790229	NRG	RPD	Colour	2016/12/14	NC		%	20
4790230	NRG	Matrix Spike	Orthophosphate (P)	2016/12/14		95	%	80 - 120
4790230	NRG	Spiked Blank	Orthophosphate (P)	2016/12/14		94	%	80 - 120
4790230	NRG	Method Blank	Orthophosphate (P)	2016/12/14	<0.010		mg/L	
4790230	NRG	RPD	Orthophosphate (P)	2016/12/14	NC		%	25
4790231	NRG	Matrix Spike	Nitrate + Nitrite (N)	2016/12/14		100	%	80 - 120
4790231	NRG	Spiked Blank	Nitrate + Nitrite (N)	2016/12/14		101	%	80 - 120
4790231	NRG	Method Blank	Nitrate + Nitrite (N)	2016/12/14	<0.050		mg/L	
4790231	NRG	RPD	Nitrate + Nitrite (N)	2016/12/14	6.8		%	25
4790232	NRG	Matrix Spike	Nitrite (N)	2016/12/15		95	%	80 - 120
4790232	NRG	Spiked Blank	Nitrite (N)	2016/12/15		98	%	80 - 120
4790232	NRG	Method Blank	Nitrite (N)	2016/12/15	<0.010		mg/L	
4790232	NRG	RPD	Nitrite (N)	2016/12/15	NC		%	25
4790280	NRG	Matrix Spike	Total Alkalinity (Total as CaCO3)	2016/12/14		NC	%	80 - 120
4790280	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2016/12/15		107	%	80 - 120
4790280	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2016/12/15	<5.0		mg/L	
4790280	NRG	RPD	Total Alkalinity (Total as CaCO3)	2016/12/14	3.3		%	25
4790290	NRG	Matrix Spike	Dissolved Chloride (Cl)	2016/12/16		NC	%	80 - 120
4790290	NRG	QC Standard	Dissolved Chloride (Cl)	2016/12/16		114	%	80 - 120
4790290	NRG	Spiked Blank	Dissolved Chloride (Cl)	2016/12/15		105	%	80 - 120
4790290	NRG	Method Blank	Dissolved Chloride (Cl)	2016/12/15	<1.0		mg/L	
4790290	NRG	RPD	Dissolved Chloride (Cl)	2016/12/16	2.4		%	25
4790291	NRG	Matrix Spike	Dissolved Sulphate (SO4)	2016/12/14		NC	%	80 - 120
4790291	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2016/12/14		102	%	80 - 120
4790291	NRG	Method Blank	Dissolved Sulphate (SO4)	2016/12/14	<2.0		mg/L	
4790291	NRG	RPD	Dissolved Sulphate (SO4)	2016/12/14	29 (2)		%	25
4790292	NRG	Matrix Spike	Reactive Silica (SiO2)	2016/12/14		92	%	80 - 120
4790292	NRG	Spiked Blank	Reactive Silica (SiO2)	2016/12/14		96	%	80 - 120
4790292	NRG	Method Blank	Reactive Silica (SiO2)	2016/12/14	<0.50		mg/L	
4790292	NRG	RPD	Reactive Silica (SiO2)	2016/12/14	NC		%	25
4790294	NRG	Spiked Blank	Colour	2016/12/14		104	%	80 - 120
4790294	NRG	Method Blank	Colour	2016/12/14	<5.0		TCU	
4790294	NRG	RPD	Colour	2016/12/14	NC		%	20
4790296	NRG	Matrix Spike	Orthophosphate (P)	2016/12/14		94	%	80 - 120
4790296	NRG	Spiked Blank	Orthophosphate (P)	2016/12/14		94	%	80 - 120
4790296	NRG	Method Blank	Orthophosphate (P)	2016/12/14	<0.010		mg/L	
4790296	NRG	RPD	Orthophosphate (P)	2016/12/14	NC		%	25
4790297	NRG	Matrix Spike	Nitrate + Nitrite (N)	2016/12/14		NC	%	80 - 120
4790297	NRG	Spiked Blank	Nitrate + Nitrite (N)	2016/12/14		100	%	80 - 120
4790297	NRG	Method Blank	Nitrate + Nitrite (N)	2016/12/14	<0.050		mg/L	
4790297	NRG	RPD	Nitrate + Nitrite (N)	2016/12/14	0.53		%	25
4790298	NRG	Matrix Spike	Nitrite (N)	2016/12/15		NC	%	80 - 120
4790298	NRG	Spiked Blank	Nitrite (N)	2016/12/15		95	%	80 - 120
4790298	NRG	Method Blank	Nitrite (N)	2016/12/15	<0.010		mg/L	
4790298	NRG	RPD	Nitrite (N)	2016/12/15	4.3		%	25
4791791	NRG	Matrix Spike [DPB739-03]	Nitrogen (Ammonia Nitrogen)	2016/12/15		97	%	80 - 120
4791791	NRG	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2016/12/15		97	%	80 - 120
4791791	NRG	Method Blank	Nitrogen (Ammonia Nitrogen)	2016/12/15	<0.050		mg/L	
4791791	NRG	RPD [DPB739-03]	Nitrogen (Ammonia Nitrogen)	2016/12/15	NC		%	20
4792232	SMT	Matrix Spike [DPB734-03]	Total Organic Carbon (C)	2016/12/14		95	%	80 - 120
4792232	SMT	Spiked Blank	Total Organic Carbon (C)	2016/12/14		107	%	80 - 120

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Maxxam Job #: B6Q7451
Report Date: 2016/12/16

Dillon Consulting Limited
Client Project #: 4104251070
Site Location: LTMM SURFACE WATER MONITORING

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4792232	SMT	Method Blank	Total Organic Carbon (C)	2016/12/14	<0.50		mg/L	
4792232	SMT	RPD	Total Organic Carbon (C)	2016/12/14	NC (3)		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Duplicates do not meet laboratory acceptance criteria, insufficient sample voluem for repeat analysis.

(2) Poor duplicate agreement due to sample matrix. Results confirmed with repeat analysis.

(3) Elevated reporting limit due to sample matrix.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Mike MacGillivray, Scientific Specialist (Inorganics)

Rosemarie MacDonald, Scientific Specialist (Organics)

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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