March 8, 2018

Nova Scotia Lands
45 Wabana Court
Harbourside Commercial Park
Sydney, Nova Scotia
B1P 6H2

ATTENTION: Mr. Frank Potter
Executive Director

Long Term Maintenance and Monitoring
Semi-Annual Surface Water Quality Monitoring Program - December 2017
Final Report

Following completion of the Sydney Tar Ponds and Coke Ovens Remediation Project, surface water quality monitoring was 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 2017 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 18, 2017, 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 (i.e., the Environmental Effects Monitoring and Surface Water Monitoring (EEMSWM) Program associated with the Sydney Tar Ponds remediation and past LTMM program events). Tasks associated with the December 2017 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);
- 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) had remained below laboratory detection limits, the surface water program

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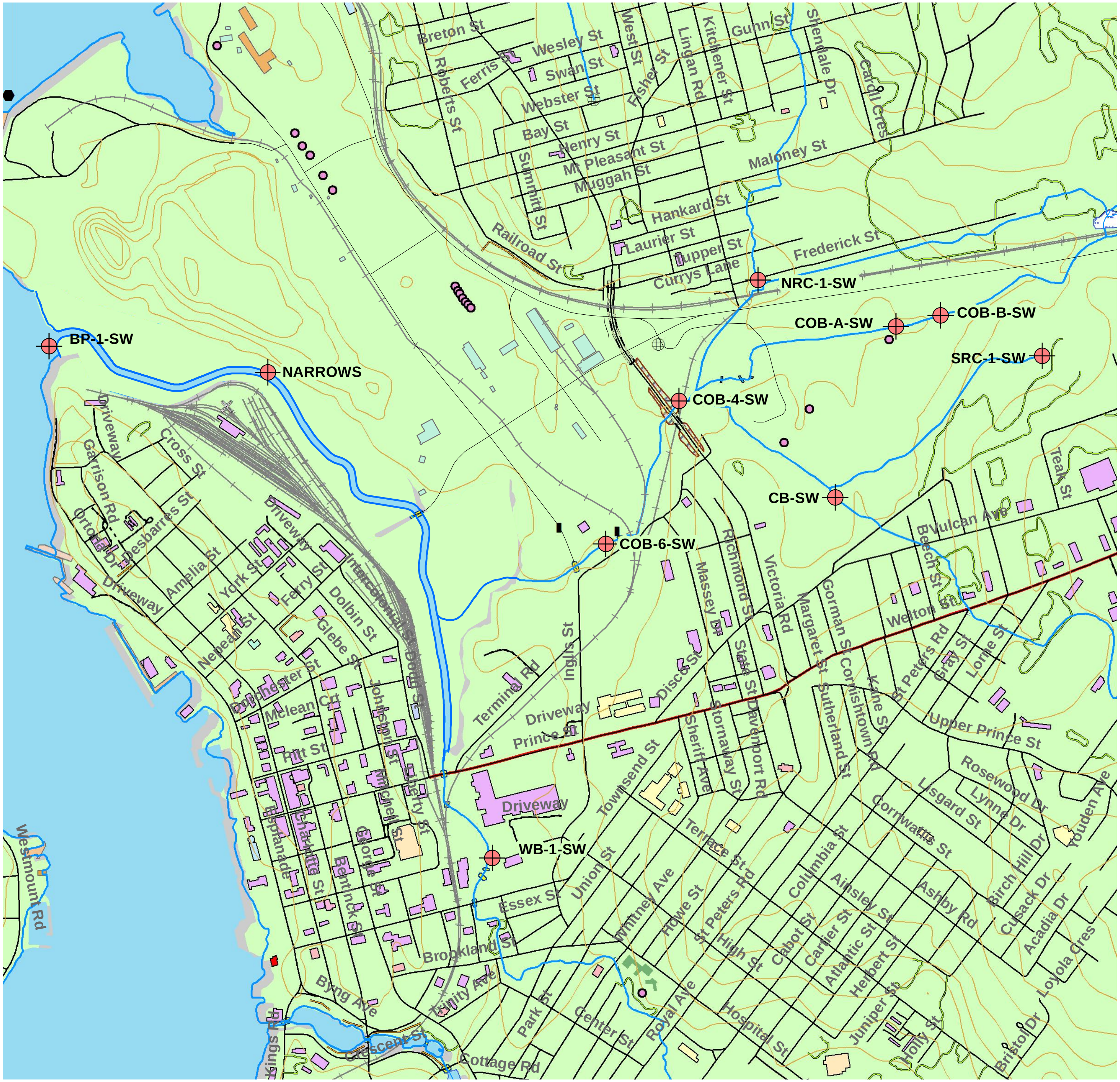

NS Lands
nova scotia lands

LONG TERM MAINTENANCE AND MONITORING
SURFACE WATER QUALITY MONITORING PROGRAM
DECEMBER 2017

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

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

DILLON CONSULTING

PROJECT: 14-1360
STATUS: FINAL
Date: 1/19/2018

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 2017 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 remediated 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 (m) 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 so that dissolved 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 2017 surface water monitoring program was approximately 118 millimeters (mm). No significant rainfall was recorded on the day of, or the four days leading up to, the sampling event.

Tidal information obtained from Meteo365 (https://www.tide-forecast.com) for December 18, 2017, indicated a high tide level of 1 m and a low tide level of 0.43 m.

FIELD OBSERVATIONS AND MEASUREMENTS

Observations at the ten surface water stations during the December 2017 monitoring program are summarized in Table 2. Field measurements are summarized in Table 3.

Table 2 – December 2017 Surface Water Quality Monitoring Station Field Observations

Monitoring Station ID	Field Observations	Corresponding Photograph Number
CB-SW	Abundant vegetation in channel.	1
NRC-1-SW	Debris (i.e., paper and plastic) observed in the channel and on the channel banks.	2
SRC-1-SW	Algae observed in the channel. Concrete channel walls had extensive spray painted graffiti visibly dissolving at the high water point. One paint can was observed in the channel.	3

Table 2 – December 2017 Surface Water Quality Monitoring Station Field Observations

Monitoring Station ID	Field Observations	Corresponding Photograph Number
COB-A-SW	Debris (i.e., plastic) observed on brook banks. Algae observed in stream and on stream banks. No flow was observed; standing water only.	4
COB-B-SW	Algae and vegetation observed in brook. Portions of the brook surface were frozen. Groundwater observed coming from the ground and flowing into the brook down gradient of the surface water sampling point (groundwater seepage observed in the same location during the December 2016 monitoring event).	5
COB-4-SW	Minor vegetation growth observed in brook.	6
COB-6-SW	Algae growth was observed in the book. Ducks observed in brook.	7
WB-1-SW	Debris (i.e., concrete, metal and plastic) observed within the brook and on the brook banks.	8
NARROWS	Majority of water surface was frozen.	9
BP-1-SW	Algae and seaweed observed on exposed shoreline rocks.	10

Note:
1 Photographs are presented in Appendix A.

Table 3 – December 2017 Surface Water Quality Monitoring Station Field Measurements

Monitoring Station ID	pH	Turbidity (NTU)	Conductivity (mS/cm)	Salinity (%)	Stream Flow[1] (m^3/s)
CB-SW	9.56	26.3	0.294	0	0.02
NRC-1-SW	9.74	34.4	0.085	7.02	0.069
SRC-1-SW	9.26	21.4	0	0	0.02
COB-A-SW[2]	8.95	22.6	0.583	0.1	No Flow
COB-B-SW	8.68	Off-Scale	0.531	0	0.006
COB-4-SW	9.59	31.6	0.320	0	0.31
COB-6-SW	10.28	28.6	0.357	0.1	0.35
WB-1-SW	9.96	23.7	0.134	0	0.08
NARROWS	10.28	25.6	3.08	0.1	Insufficient Data[3]
BP-1-SW[4]	11.12	21.3	14.5	13.53	0.52

Notes:
1 Stream flow is an approximate calculated value.
2 COB-A-SW had only standing water on the day of the event.
3 The majority of the surface of the Narrows was frozen during the December 2017 monitoring event; therefore, sufficient field data could not be collected to calculate flow.
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) (accessed online 2018). 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. Furthermore, 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 is routinely used to assess the stability of a solute plume (i.e., are concentration trends 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 2017 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 2017 event, and available post-remediation surface water data, are presented in the attached Tables B-1 and B-2 in Appendix B. Laboratory certificates of analysis are presented in Appendix C. As stated above, surface water samples were analyzed for PAHs and RCApMS. Samples were delivered to Maxxam Analytics in Sydney, Nova Scotia (Maxxam) for analysis. Maxxam is accredited through the Standard Council of Canada (SCC) and is a member of the Canadian Association for Laboratory Accreditation (CALA).

Review of the December 2017 data indicates:

- PAH results:
  - The benzo(a)pyrene concentration of 0.016 ug/L in SRC-1-SW exceeded the NSE Tier I EQS and CCME FWAL guideline of 0.015 ug/L; and,
  - The pyrene concentration of 0.035 ug/L in SRC-1-SW exceeded the Tier I EQS and CCME FWAL guideline of 0.025 ug/L.

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 2017 event relative to the calculated 95% UCLs is provided in Table 4. There were no exceedances of the relative calculated 95% UCLs for naphthalene and benzo(a)pyrene during the December 2017 monitoring event.

- General chemistry and metals results:
  - Concentrations of aluminum ranging from 6.7 ug/L to 3000 ug/L exceeded the Tier I EQS (fresh water) standard of 5 ug/L in CB-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. Aluminum concentrations ranging from 110 ug/L and 3000 ug/L at CB-SW, SRC-1-SW, WB-1- SW and the field duplicate sample of WB-1-SW exceeded the CCME FWAL guideline of 100 ug/L. The aluminum concentration of 3000 ug/L in SRC-1-SW also exceeded the Upstream Calculated 95% UCL of 220 ug/L (i.e., the only sampled location that exhibited aluminum concentrations above the Upstream Calculated 95% UCL);
  - The arsenic concentration of 4.1 ug/L at SRC-1-SW exceeded both the Upstream Calculated 95% UCL of 1.6 ug/L and Pre-Construction/Baseline Calculated 95% UCL of 1.98 ug/L;
  - Cadmium concentrations ranging from 0.015 ug/L to 0.31 ug/L in CB-SW, NRC-1-SW, SRC-1-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 cadmium concentration of 0.31 ug/L in SRC-1-SW also exceeded the CCME FWAL of 0.09 ug/L;
  - The chromium concentration of 4.9 ug/Lin SRC-1-SW exceeded the CCME FWAL of 1 ug/L;
  - The cobalt concentration of 1.7 ug/L in SRC-1-SW exceeded the Pre-Construction/ Baseline Calculated 95% UCL of 1.3 ug/L;

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	WB-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
		8/3/2017	<0.20	Dry	<0.20	Dry	Dry	<0.20	<0.20	<0.20	<0.20	<0.20
		12/18/2017	<0.20	<0.20	<0.20	Dry	<0.20	<0.20	0.54	<0.20	0.30	0.33
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
		8/3/2017	<0.010	Dry	<0.010	Dry	Dry	<0.010	<0.010	<0.010	<0.010	<0.010
		12/18/2018	<0.010	<0.010	0.016	Dry	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Notes:

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

[2] Added to the program in July 2015

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

- The copper concentration of 11 ug/L in SRC-1-SW exceeded the Tier I EQS and CCME FWAL of 2 ug/L;
- Iron concentrations of 300 ug/L and 4600 ug/L in CB-SW and SRC-1-SW, respectively exceeded the Tier I EQS (fresh water) and CCME FWAL concentration of 300 ug/L. The iron concentrations of 280 ug/L and 220 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 10 ug/L in SRC-1-SW exceeded the Tier I EQS and CCME FWAL of 1 ug/L and the Upstream Calculated 95% UCL of 1.2 ug/L;
- The manganese concentration of 2200 in SRC-1-SW exceeded the Tier I EQS of 820 ug/L, the Upstream Calculated 95% UCL of 583 ug/L and the Pre-Construction/Baseline Calculated 95% UCL of 800 ug/L. The manganese concentration of 72 ug/L for the Narrows was above the Battery Point/Narrows Calculated 95% UCL of 70 ug/L;
- Concentrations of strontium ranging from 140 ug/L to 190 ug/L were above the Upstream 95% UCL of 132 ug/L at SRC-1-SW, COB-B-SW and COB-6-SW.
- Sulphate concentrations ranging from of 42 mg/L to 120 mg/L at SRC-1-SW, COB-B-SW, COB-4-SW and COB-6-SW exceeded the Upstream Calculated 95% UCL of 26 mg/L. The sulphate concentration of 120 mg/L at COB-B-SW, also exceeded Pre-Construction/Baseline Calculated 95% UCL of 84 mg/L;
- The vanadium concentration of 7.5 ug/L in SRC-1-SW exceeded the Tier I EQS of 6 ug/L; and,
- The zinc concentration of 50 ug/L in SRC-1-SW exceeded the Tier I EQS and CCME FWAL of 30 ug/L.

The remaining general chemistry parameters were below applicable criteria. Table 5 provides a summary of concentrations for select inorganic parameters from the December 2017 sampling event relative to the calculated 95% UCLs.

TREND ANALYSIS

The groundwater quality trend analysis for the December 2017 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. Trend analysis results for these select parameters were generally stable or indicated fluctuations with no trend or a generally declining trend. Mann-Kendall results are presented in Appendix D.

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
	8/3/2017	12	150	1.4	<0.010	1.0	<0.40	750	0.61	380	<1.0	**340**
	12/18/2017	24	91	<1.0	0.015	<1.0	<0.40	300	<0.50	200	<1.0	130
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
	8/3/2017						Dry					
	12/18/2017	21	34	<1.0	0.016	<1.0	<0.40	140	<0.50	87	<1.0	31
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**
	8/3/2017	**54**	24	**1.8**	<0.010	<1.0	<0.40	150	<0.50	91	<1.0	**190**
	12/18/2017	**50**	**3,000**	**4.1**	**0.31**	4.9	1.7	**4,600**	**10**	**2,200**	<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**
	8/3/2017						Dry					
	12/18/2017						Dry					
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**
	8/3/2017						Dry					
	12/18/2017	**120**	6.7	<1.0	<0.010	<1.0	0.42	110	<0.50	490	<1.0	**190**
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
	8/3/2017	**110**	14	<1.0	0.011	<1.0	<0.40	83	<0.50	130	<1.0	**450**
	12/18/2017	**42**	53	<1.0	0.010	<1.0	<0.40	270	<0.50	120	<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**
	8/3/2017	**110**	42	1.3	0.011	<1.0	<0.40	<50	<0.50	35	<1.0	**500**
	12/18/2017	**48**	130	<1.0	0.010	<1.0	<0.40	260	<0.50	73	<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
	8/3/2017	**230**	28	1.0	0.027	<1.0	<0.40	680	<0.50	450	<1.0	**940**
	12/18/2017	8.0	110	<1.0	0.022	<1.0	<0.40	190	<0.50	63	<1.0	49
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
	8/3/2017	2,000	<50	<10	<0.10	<10	*<4.0*	<500	<5.0	***110***	<10	6100
	12/18/2017	150	110	<1.0	0.018	<1.0	<0.40	***280***	<0.50	***72***	<1.0	450
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
	8/3/2017	2,000	<50	<10	<0.10	<10	*<4.0*	<500	<5.0	***110***	<10	6,100
	12/18/2017	210	95	<1.0	0.020	<1.0	<0.40	***220***	<0.50	60	<1.0	630

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

QUALITY CONTROL PROCESS

The laboratory analytical certificate has 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 the following:

- A poor RCAp ion balance, due to sample matrix, was reported for CB-SW;
- Poor duplicate results, due to sample matrix, was reported for COB-B-SW;
- There was an increase in the reporting limit for total organic carbon in each of the nine surface water samples and the field duplicate sample due to turbidity; however, the reporting limit remained below the applicable comparison criteria; and,
- The laboratory detection limit for lead at BP-1-SW and the Narrows was elevated above the applicable criteria.

One field duplicate of sample WB-1-SW and one trip blank were collected during the December 2017 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 data quality is considered acceptable and the results representative.

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

SUMMARY

Analytical results of the December 2017 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 2017

Parameter	Location (Criteria and/or 95% UCL Exceedance)
Benzo(a)pyrene	· SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL)
Pyrene	· SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL)
Aluminum	· CB-SW (Tier I EQS (fresh water) and CCME FWAL) · NRC-1-SW (Tier I EQS (fresh water)) · SRC-1-SW (Tier I EQS (fresh water) CCME FWAL and Upstream Calculated 95% UCL) · COB-B-SW (Tier I EQS (fresh water)) · COB-4-SW (Tier I EQS (fresh water)) · COB-6-SW (Tier I EQS (fresh water))

Table 6 - Summary of Surface Water Station Criteria and 95 % UCL Exceedances December 2017

Parameter	Location (Criteria and/or 95% UCL Exceedance)
Aluminum	· WB-1-SW (and the field duplicate sample of WB-1-SW) (Tier I EQS (fresh water) and CCME FWAL)
Arsenic	· SRC-1-SW (Upstream Calculated 95% UCL and Pre-Construction/ Baseline Calculated 95% UCL)
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) and CCME FWAL) · WB-1-SW (and the field duplicate sample of WB-1-SW) (Tier I EQS (fresh water))
Chromium	· SRC-1-SW (CCME FWAL)
Cobalt	· SRC-1-SW (Pre-Construction/Baseline Calculated 95% UCL)
Copper	· SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL)
Iron	· CB-SW (Tier I EQS (fresh water) and CCME FWAL) · SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL) · BP-1-SW (Battery Point/Narrows Calculated 95%) · Narrows (Battery Point/Narrows Calculated 95%)
Lead	· SRC-1-SW (Tier I EQS (fresh water), CCME FWAL and Upstream Calculated 95% UCL)
Manganese	· SRC-1-SW (Tier I EQS, Upstream Calculated 95% UCL and Pre-Construction/Baseline Calculated 95% UCL. · Narrows (Battery Point/Narrows Calculated 95% UCL)
Strontium	· SRC-1-SW (Upstream Calculated 95% UCL) · COB-B-SW (Upstream Calculated 95% UCL) · COB-6-SW (Upstream Calculated 95% UCL)
Sulphate	· SRC-1-SW (Upstream 95% UCL) · COB-B-SW (Upstream 95% UCL and Pre-Construction/Baseline Calculated 95% UCL) · COB-4-SW (Upstream Calculated 95% UCL) · COB-6-SW (Upstream Calculated 95% UCL)
Vanadium	· SRC-1-SW (Tier I EQS (fresh water))
Zinc	· SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL)

Review of the surface water analytical data from the December 2017 monitoring event indicates the findings are generally consistent with findings of past LTMM events, with the exception of the following findings relative to monitoring location SRC-1-SW:

- This was the first event during the LTMM program to observe PAH exceedances (i.e., benzo(a)pyrene and pyrene) of the Tier I EQS and CCME FWAL at SRC-1-SW;

Table 6 - Summary of Surface Water Station Criteria and 95 % UCL Exceedances December 2017

Parameter	Location (Criteria and/or 95% UCL Exceedance)
	· WB-1-SW (and the field duplicate sample of WB-1-SW) (Tier I EQS (fresh water) and CCME FWAL)
Arsenic	· SRC-1-SW (Upstream Calculated 95% UCL and Pre-Construction/ Baseline Calculated 95% UCL)
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) and CCME FWAL) · WB-1-SW (and the field duplicate sample of WB-1-SW) (Tier I EQS (fresh water))
Chromium	· SRC-1-SW (CCME FWAL)
Cobalt	· SRC-1-SW (Pre-Construction/Baseline Calculated 95% UCL)
Copper	· SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL)
Iron	· CB-SW (Tier I EQS (fresh water) and CCME FWAL) · SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL) · BP-1-SW (Battery Point/Narrows Calculated 95%) · Narrows (Battery Point/Narrows Calculated 95%)
Lead	· SRC-1-SW (Tier I EQS (fresh water), CCME FWAL and Upstream Calculated 95% UCL)
Manganese	· SRC-1-SW (Tier I EQS, Upstream Calculated 95% UCL and Pre-Construction/Baseline Calculated 95% UCL. · Narrows (Battery Point/Narrows Calculated 95% UCL)
Strontium	· SRC-1-SW (Upstream Calculated 95% UCL) · COB-B-SW (Upstream Calculated 95% UCL) · COB-6-SW (Upstream Calculated 95% UCL)
Sulphate	· SRC-1-SW (Upstream 95% UCL) · COB-B-SW (Upstream 95% UCL and Pre-Construction/Baseline Calculated 95% UCL) · COB-4-SW (Upstream Calculated 95% UCL) · COB-6-SW (Upstream Calculated 95% UCL)
Vanadium	· SRC-1-SW (Tier I EQS (fresh water))
Zinc	· SRC-1-SW (Tier I EQS (fresh water) and CCME FWAL)

Review of the surface water analytical data from the December 2017 monitoring event indicates the findings are generally consistent with findings of past LTMM events, with the exception of the following findings relative to monitoring location SRC-1-SW:

- This was the first event during the LTMM program to observe PAH exceedances (i.e., benzo(a)pyrene and pyrene) of the Tier I EQS and CCME FWAL at SRC-1-SW;

- Aluminum concentrations at surface water locations CB-SW, NRC-1-SW, SRC-SW, COB-B-SW, COB-4-SW, COB-6-SW, WB-1-SW and the field duplicate sample of WB-1-SW had exceedances above applicable Tier I EQS and/or CCME FWAL. Aluminum has historically exceeded applicable guidelines at these sample locations; however, the concentration at SRC-1-SW is the highest concentration observed at this sampling location and the second highest aluminum concentration observed in any of the surface water locations during the LTMM (the highest concentration value was observed at COB-4-SW in November 2015);
- An arsenic exceedance of the Upstream Calculated 95% UCL and the Pre-Construction /Baseline Calculated 95% UCL was reported for SRC-1-SW. Arsenic exceedances of the Upstream Calculated 95% UCL were previously reported at this location in July 2016 and August 2017; however, this is the first arsenic exceedance of the Pre-Construction/Baseline Calculated 95% UCL observed at SRC-1-SW;
- Cadmium concentrations in CB-SW, NRC-1-SW, SRC-1-SW, WB-1-SW and the field duplicate sample of WB-1-SW exceeded the Tier I EQS. The cadmium concentration in SRC-1-SW also exceeded the CCME FWAL and is the highest concentration of cadmium observed at any of the sampling locations since the completion of the EEMSWM program;
- The cobalt concentration in SRC-1-SW exceeded the Pre-Construction/Baseline Calculated 95% UCL. This is the first time that cobalt has exceeded this criteria at SRC-1-SW during the LTMM;
- The lead concentration in SRC-1-SW exceeded the Tier I EQS, CCME FWAL and the Upstream Calculated 95% UCL. This is the first time that lead has exceeded the Upstream Calculated 95% UCL at SRC-1-SW since the commencement of the LTMM;
- The manganese concentration in SRC-1-SW exceeded the Tier I EQS, the Upstream Calculated 95% UCL and the Pre-Construction/Baseline Calculated 95% UCL . This is the first time during the LTMM that the manganese concentration at SRC-1-SW has exceeded these criteria;
- The vanadium concentration in SRC-1-SW exceeded the Tier I EQS. This is the first time that vanadium has exceeded the Tier I EQS at SRC-1-SW during the LTMM and only the second time that a vanadium concentration has exceeded criteria in any of the surface water monitoring locations since the start of the LTTM (the only other vanadium exceedance was in COB-4-SW in November 2015); and,
- The zinc concentration in SRC-1-SW exceeded the Tier I EQS and CCME FWAL. This is the first time that zinc has exceeded the Tier I EQS or the CCME FWAL at SRC-1-SW during the LTMM and only the second time that a zinc concentration has exceeded criteria in any of the criteria in any of the surface water monitoring locations since the start of the LTTM (the only other zinc exceedance was in COB-4-SW in November 2015).

As noted above in Table 1, monitoring of SRC-1-SW is undertaken to characterize surface water quality related to runoff from the upstream municipal landfill. There is potential that the above noted concentration changes at SRC-1-SW may be related to upstream operations associated with the landfill. Further investigation would be required to confirm this.

RECOMMENDATIONS

The next surface water monitoring event will be conducted in the summer (e.g., July 2018). It is recommended that summer 2018 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: 14-1360-1400

APPENDIX A
SITE PHOTOGRAPHS

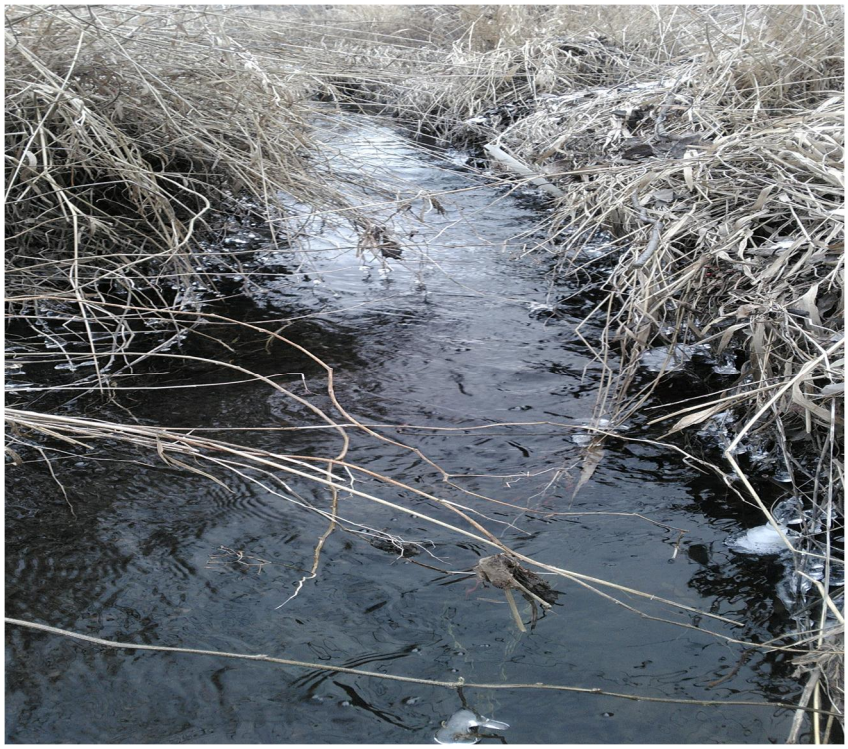

PHOTO 1: View of CB-SW looking southeast

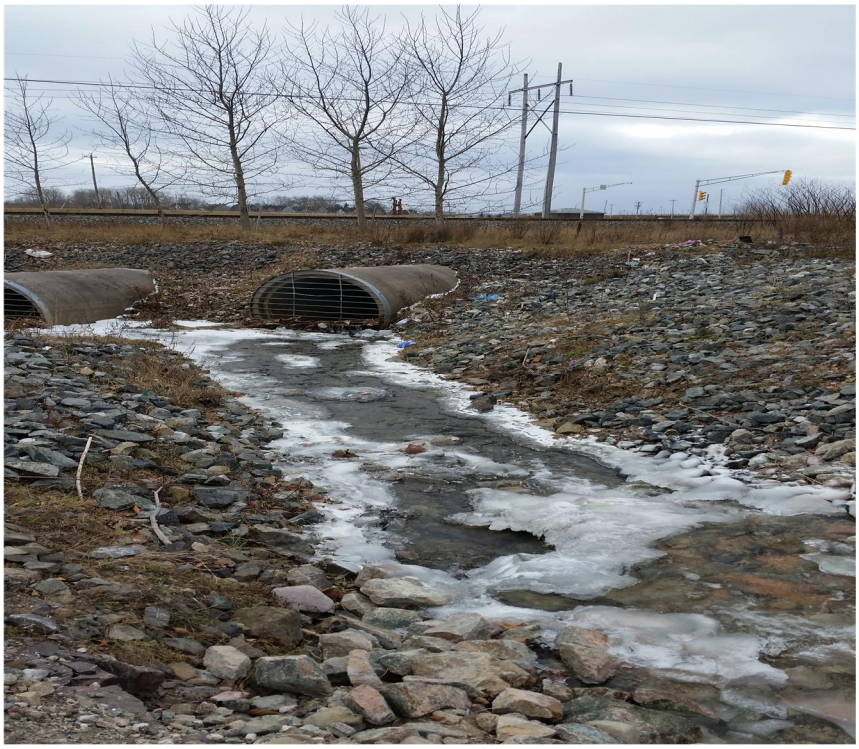

PHOTO 2: View looking from NRC-1-SW to the southeast.

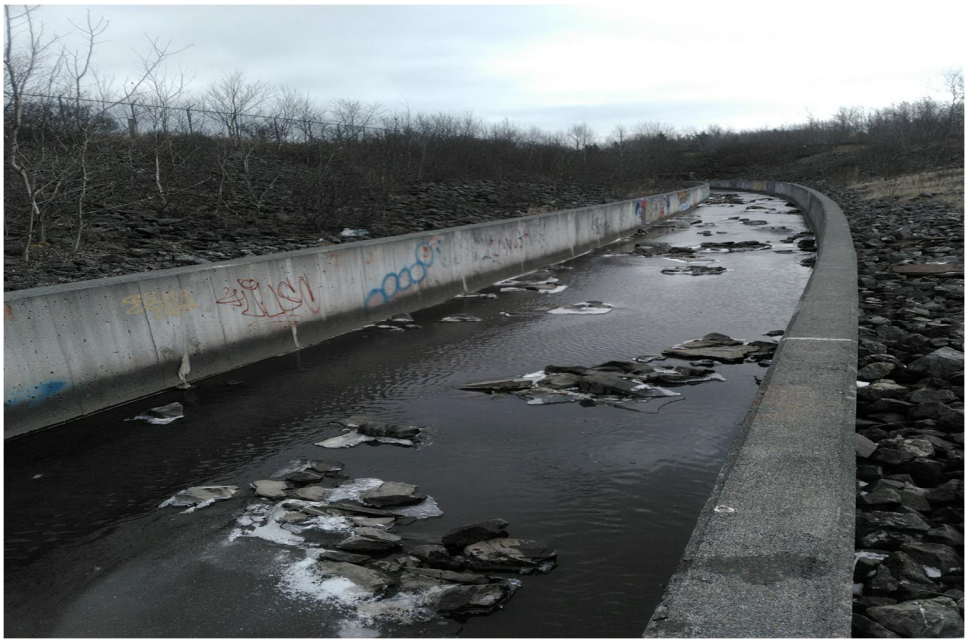

PHOTO 3: View of SRC-1-SW looking northeast.

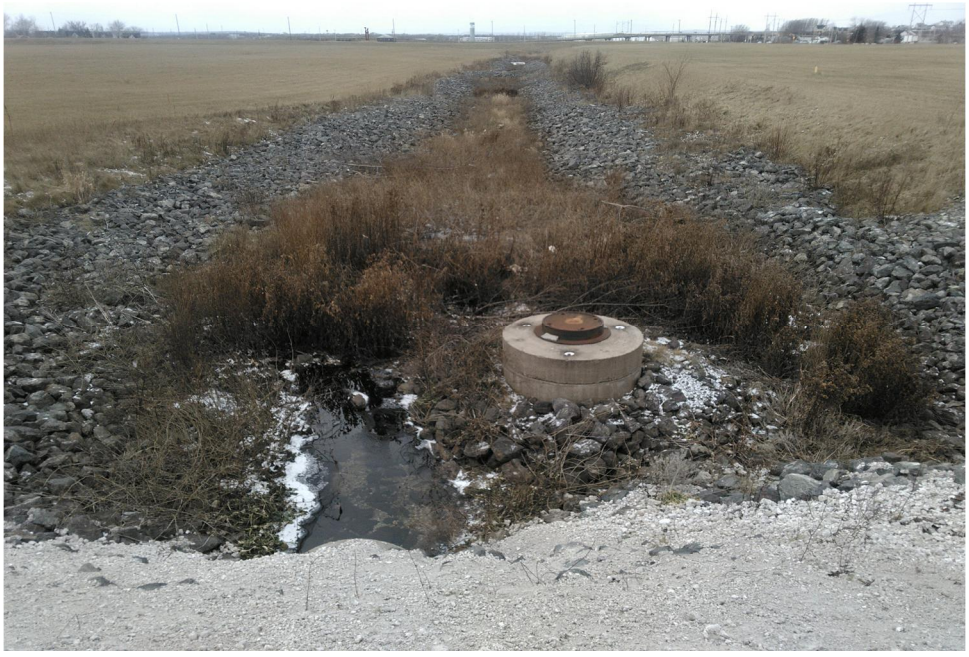

PHOTO 4: View of COB-A-SW looking west.

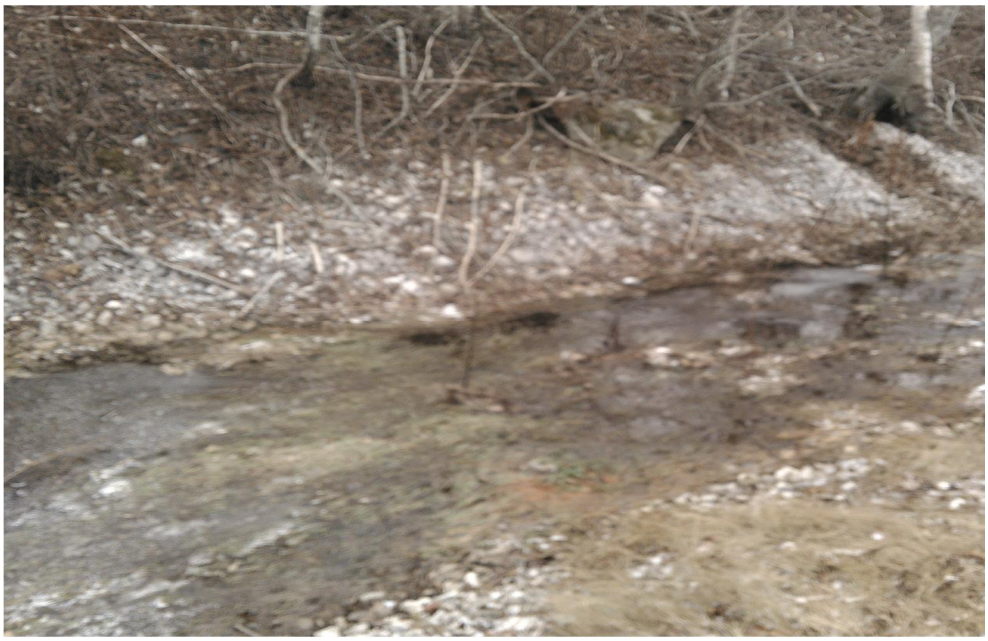

PHOTO 5: View of COB-B-SW looking southwest.

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

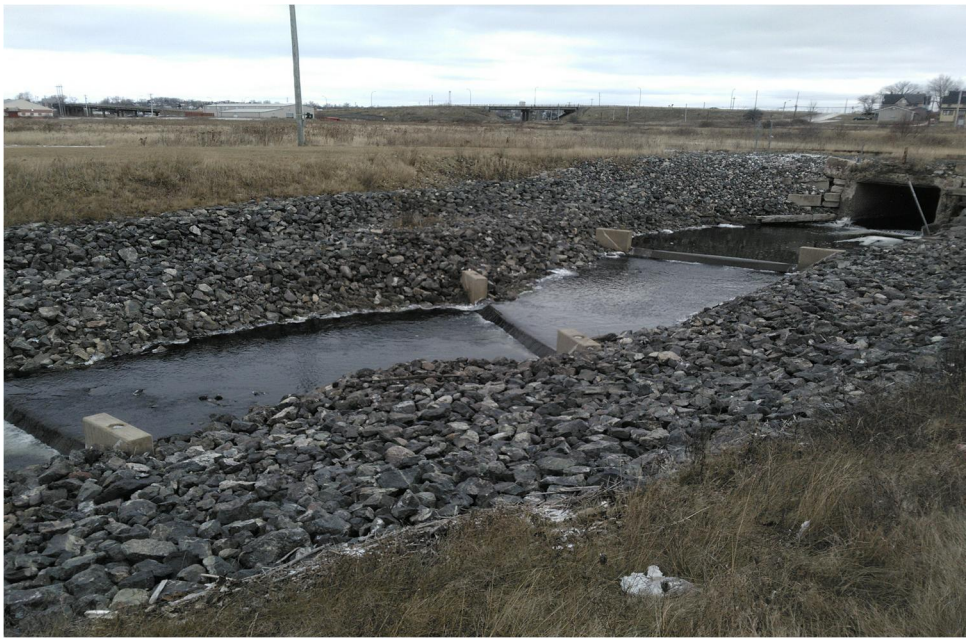

PHOTO 7: View of COB-6-SW looking northeast.

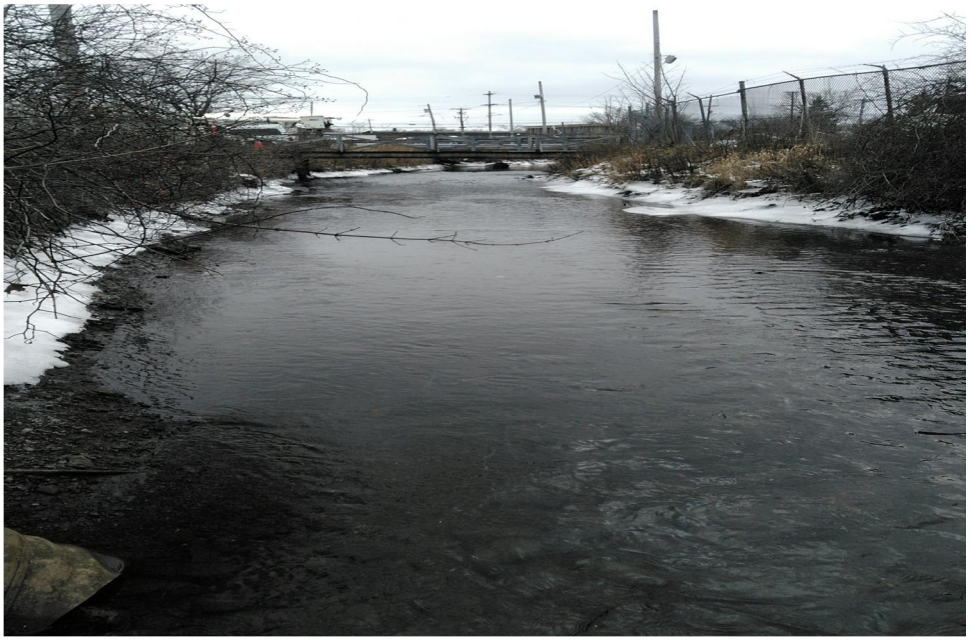

PHOTO 8: View of WB-1-SW looking southwest.

PHOTO 9: View of NARROWS looking northeast.

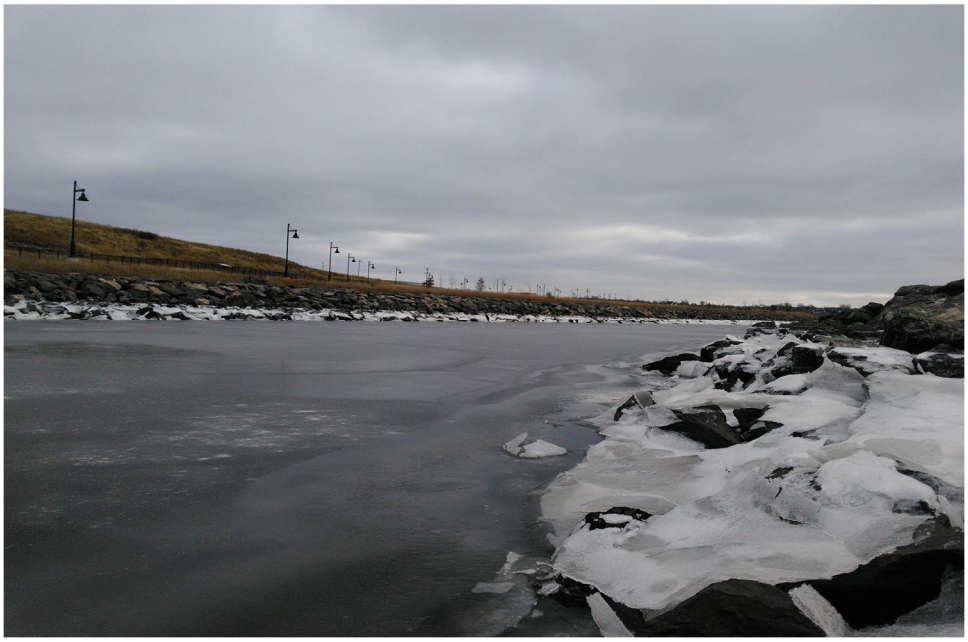

PHOTO 10: View of BP-1-SW looking southeast.

APPENDIX B
TABLES

TABLE B-1
SURFACE WATER ANALYTICAL RESULTS - PAHs
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - DECEMBER 2017

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 [3]	0.17	0.48 [3]	0.48 [3]	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
	8/3/17	0.071	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.062**	0.048	<0.010	<0.050	<0.050	<0.20	<0.010	0.037	**0.033**
	12/18/17	0.042	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.020	<0.010	<0.050	<0.050	<0.20	<0.010	0.018	0.011
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**
	8/3/17	DRY - NO SAMPLE																			
	12/18/17	<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
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
	8/3/17	<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
	12/18/17	<0.010	<0.010	<0.010	0.015	**0.016**	0.018	0.012	<0.010	<0.010	0.024	<0.010	0.040	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.021	**0.035**
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
	8/3/17	DRY - NO SAMPLE																			
	12/18/17	DRY - NO SAMPLE																			

TABLE B-1
SURFACE WATER ANALYTICAL RESULTS - PAHs
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - DECEMBER 2017

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 [3]	0.17	0.48 [3]	0.48 [3]	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	-	-	-
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
	8/3/17	DRY - NO SAMPLE																			
	12/18/17	<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
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**
	8/3/17	<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
	8/3/17 [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
	12/18/17	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-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
	8/3/17	0.052	0.030	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.036	0.024	<0.010	<0.050	<0.050	<0.20	<0.010	0.018	0.017
	12/18/17	0.13	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.048	<0.010	0.14	0.057	0.54	<0.010	0.030	0.012
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
	8/3/17	0.029	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	<0.010	**0.044**	0.016	<0.010	<0.050	<0.050	<0.20	<0.010	0.035	**0.027**
	12-18-17 [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
	12/18/17	<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 2017

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
	8/3/17	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	12/18/17	0.071	0.071	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	0.058	<0.010	0.091	<0.050	0.33	<0.010	0.044	0.018
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
	8/3/17	<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	<0.010	<0.010
	12/18/17	0.10	0.099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.022	0.080	<0.010	0.12	<0.050	0.30	<0.010	0.048	0.018

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 values for benzo(b)fluoranthene, benzo(j)fluoranthene and benzo(k)fluoranthene are to be compared to the sum of the parameters

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 2017

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 Balance	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	-	-	-	13	0.06	-	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
	8/3/17	33000	2200	30000	3900	97	12	56	10	0.15	330	<0.010	0.06	0.06	0.071	<5.0	1.9	0.88	370	7.99	92	96	<1.0	210	3.76	5.92	0.065	-0.185	7.93	8.18
	12/18/17	22000	1300	26000	3500	66	24	38	7.3	0.038	<100	0.13	<0.01	0.13	<0.050	26	5.7	2.1	280	7.79	80	65	<1.0	160	2.89	5.47	-0.345	-0.595	8.14	8.39
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
	8/3/17	DRY - NO SAMPLE																												
	12/18/17	15000	730	12000	1700	21	21	25	5.7	<0.010	<100	0.21	<0.01	0.21	<0.050	6.7	3.3	0.71	170	7.22	36	21	<1.0	94	1.57	6.44	-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
	8/3/17	50000	2800	51000	5400	120	54	85	10	<0.010	<100	0.014	<0.050	0.055	0.073	14	5.7	1.2	580	8.15	150	110	1.5	330	5.83	5.42	0.492	0.243	7.66	7.91
	12/18/17	40000	3000	44000	5300	87	50	73	8.7	<0.010	160	0.20	0.013	0.21	0.39	23	5.7	42	470	7.8	130	87	<1.0	290	4.87	2.42	-0.027	-0.276	7.83	8.08
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
	8/3/17	DRY - NO SAMPLE																												
	12/18/17	DRY - NO SAMPLE																												
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
	8/3/17	DRY - NO SAMPLE																												
	12/18/17	21000	2400	63000	9800	96	120	34	12	<0.010	<100	0.31	<0.010	0.31	0.06	<5.0	3.4	0.77	510	7.47	200	96	<1.0	320	5.37	4.07	-0.179	-0.428	7.65	7.89

TABLE B-2
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - DECEMBER 2017

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]	-	2 [6]	300	1 [7]	-	0.026	73	25 [8]	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
	8/3/17	**150**	<1.0	1.4	87	<1.0	<2.0	<50	<0.010	1.0	<0.40	<2.0	**750**	0.61	380	<0.013	<2.0	<2.0	<1.0	<0.10	340	<0.10	<2.0	2.9	<0.10	2.6	<5.0
	12/18/17	**91**	<1.0	<1.0	28	<1.0	<2.0	<50	**0.015**	<1.0	<0.40	<2.0	**300**	<0.50	200	<0.013	<2.0	<2.0	<1.0	<0.10	130	<0.10	<2.0	2.4	0.11	<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
	8/3/17	DRY - NO SAMPLE																									
	12/18/17	**34**	<1.0	<1.0	11	<1.0	<2.0	<50	**0.016**	<1.0	<0.40	<2.0	140	<0.50	87	<0.013	<2.0	<2.0	<1.0	<0.10	31	<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
	8/3/17	**24**	<1.0	1.8	19	<1.0	<2.0	130	<0.010	<1.0	<0.40	<2.0	150	<0.50	91	<0.013	<2.0	<2.0	<1.0	<0.10	190	<0.10	<2.0	<2.0	0.40	<2.0	<5.0
	12/18/17	**3000**	<1.0	4.1	79	<1.0	<2.0	91	**0.31**	4.9	1.7	**11**	**4600**	**10**	**2200**	<0.013	<2.0	3.2	<1.0	<0.10	140	<0.10	<2.0	46	0.58	**7.5**	**50**
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
	8/3/17	DRY - NO SAMPLE																									
	12/18/17	DRY - NO SAMPLE																									
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
	8/3/17	DRY - NO SAMPLE																									
	12/18/17	**6.7**	<1.0	<1.0	14	<1.0	<2.0	<50	<0.010	<1.0	0.42	<2.0	110	<0.50	490	<0.013	<2.0	<2.0	<1.0	<0.10	190	<0.10	<2.0	<2.0	0.18	<2.0	<5.0

TABLE B-2
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - DECEMBER 2017

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	-	-	-	13	0.06	-	1 [3]	-	-	-	-	6.5-9.0	-	-	-	-	-	-	-	-	-	-
Upstream Calculated 95% UCL		-	-	-	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-Construction/Baseline Calculated 95% UCL		-	-	-	-	-	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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
	8/3/17	44000	3300	78000	7600	130	110	72	11	<0.010	<100	<0.010	0.12	0.12	0.061	<5.0	2.6	0.46	690	7.98	230	130	1.2	410	6.98	3.41	0.543	0.295	7.44	7.68
	8/3/17[FD]	46000	3500	81000	7700	140	110	71	11	<0.010	<100	<0.010	0.10	0.10	0.11	<5.0	2.5	0.34	700	8.15	230	130	1.8	410	6.98	1.45	0.73	0.482	7.42	7.67
	12/18/17	20000	1200	28000	3000	45	42	32	7.8	<0.010	<100	0.22	<0.010	0.22	0.07	7.8	2.7	1.30	280	7.72	81	45	<1.0	160	2.71	3.24	-0.560	-0.810	8.28	8.53
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	1.0	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
	8/3/17	74000	3300	61000	5300	72	110	130	9.9	<0.010	<100	<0.010	0.082	0.082	0.093	6.3	3.1	0.29	760	8.83	170	67	4.3	430	7.29	3.7	0.989	0.74	7.84	8.09
	12/18/17	26000	1600	34000	3400	60	48	44	8.4	<0.010	<100	0.26	<0.010	0.26	0.05	13	3.5	2.7	350	7.6	99	60	<1.0	200	3.46	4.22	-0.473	-0.723	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
	8/3/17	940000	35000	82000	110000	97	230	1600	5.2	<0.010	<100	<0.010	0.055	0.055	0.075	9.0	2.6	1.8	5900	7.73	660	96	<1.0	3100	52	2.7	-0.088	-0.33	7.81	8.06
	12-18-17[FD]	11000	610	7400	1400	19	8.3	21	3.4	<0.010	<100	0.11	<0.010	0.11	<0.050	32	4.9	0.78	120	7.18	24	19	<1.0	66	1.16	7.91	-1.99	-2.24	9.17	9.42
	12/18/17	11000	590	7600	1400	19	8.0	21	3.4	<0.010	<100	0.11	<0.010	0.11	<0.050	30	4.8	0.75	110	7.28	25	19	<1.0	65	1.13	6.10	-1.88	-2.14	9.17	9.42
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	2.1	7000	7.56	780	52	<1.0	4100	72.9	3.02	-0.642	-0.883	8.2	8.44
	8/3/17	8400000	300000	340000	1000000	98	2000	13000	0.78	0.010	<1000	<0.010	0.057	0.057	0.13	<5.0	<5.0	1.5	40000	8.05	5000	97	1	25000	405	7.68	0.698	0.46	7.35	7.59
	12/18/17	720000	28000	50000	85000	52	210	1300	5.4	0.011	<100	0.20	<0.010	0.20	0.098	21	3.5	1.6	4500	8.10	480	52	<1.0	2400	42	0.51	-0.166	-0.409	8.26	8.51
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	1.2	6200	7.67	700	61	<1.0	3500	60.8	0.65	-0.418	-0.66	8.09	8.33
	8/3/17	8300000	300000	340000	990000	97	2000	12000	1.1	0.016	<1000	<0.010	0.077	0.077	0.21	<5.0	<5.0	1.4	40000	7.80	4900	97	<1.0	24000	392	8.83	0.450	0.213	7.36	7.59
	12/18/17	440000	18000	45000	53000	52	150	820	6.0	0.010	<100	0.21	<0.010	0.21	0.076	21	3.5	2.1	2900	7.82	330	52	<1.0	1600	27	2.06	-0.428	-0.672	8.25	8.49

TABLE B-2
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - DECEMBER 2017

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]	-	2 [6]	300	1 [7]	-	0.026	73	25 [8]	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	-	-	-	-	-	-
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
	8/3/17	**13**	<1.0	<1.0	36	<1.0	<2.0	58	**0.011**	<1.0	<0.40	<2.0	83	<0.50	120	<0.013	<2.0	<2.0	<1.0	<0.10	440	<0.10	<2.0	<2.0	0.50	<2.0	<5.0
	8/3/17[FD]	**14**	<1.0	<1.0	37	<1.0	<2.0	63	<0.010	<1.0	<0.40	<2.0	83	<0.50	130	<0.013	<2.0	<2.0	<1.0	<0.10	450	<0.10	<2.0	<2.0	0.54	<2.0	<5.0
	12/18/17	**53**	<1.0	<1.0	18	<1.0	<2.0	<50	0.010	<1.0	<0.40	<2.0	270	<0.50	120	<0.013	<2.0	<2.0	<1.0	<0.1	110	<0.10	<2.0	<2.0	0.16	<2.0	5.1
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	1.0	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	300	<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
	8/3/17	**42**	<1.0	1.3	38	<1.0	<2.0	59	**0.011**	<1.0	<0.40	<2.0	<50	<0.50	35	<0.013	<2.0	<2.0	<1.0	<0.10	500	<0.10	<2.0	<2.0	0.43	<2.0	<5.0
	12/18/17	**130**	<1.0	<1.0	20	<1.0	<2.0	<50	0.010	<1.0	<0.40	<2.0	260	<0.50	73	<0.013	<2.0	<2.0	<1.0	<0.10	160	<0.10	<2.0	3.0	0.19	<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
	8/3/17	**28**	<1.0	1	73	<1.0	<2.0	430	**0.027**	<1.0	<0.40	<2.0	**680**	<0.50	450	<0.013	<2.0	<2.0	<1.0	<0.10	940	<0.10	<2.0	<2.0	0.43	<2.0	<5.0
	12-18-17[FD]	**110**	<1.0	<1.0	12	<1.0	<2.0	<50	**0.027**	<1.0	<0.40	<2.0	190	<0.50	62	<0.013	<2.0	<2.0	<1.0	<0.10	48	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	12/18/17	**110**	<1.0	<1.0	12	<1.0	<2.0	<50	**0.022**	<1.0	<0.40	<2.0	190	<0.50	63	<0.013	<2.0	<2.0	<1.0	<0.10	49	<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	*<5.0*	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
	8/3/17	<50	<10	<10	25	<10	<20	3600	<0.10	*<10*	*<4.0*	*<20*	*<500*	*<5.0*	110	<0.013	*<20*	*<20*	*<10*	<1.0	6100	<1.0	<20	<20	2.5	*<20*	*<50*
	12/18/17	95	<1.0	<1.0	17	<1.0	<2.0	340	0.020	<1.0	<0.40	<2.0	220	<0.50	60	<0.013	<2.0	<2.0	<1.0	<0.10	630	<0.10	<2.0	3.6	0.35	<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
	8/3/17	<50	<10	<10	26	<10	<20	3600	<0.10	*<10*	*<4.0*	*<20*	*<500*	*<5.0*	110	<0.013	<20	*<20*	*<10*	<1.0	6100	<1.0	<20	<20	2.4	*<20*	*<50*
	12/18/17	110	<1.0	<1.0	17	<1.0	<2.0	210	0.018	<1.0	<0.40	<2.0	280	<0.50	72	<0.013	<2.0	<2.0	<1.0	<0.10	450	<0.10	<2.0	3.6	0.27	<2.0	5.8

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) 2017
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
6 - CCME FWAL guideline value for copper is based on a hardness value. If value is unknown, the guideline is 2µg/L
7 - CCME FWAL guideline value for lead is based on a hardness value. If value is unknown, the guideline is 1µg/L
8 - CCME FWAL guideline value for lead is based on a hardness value. If value is unknown, the guideline is 25µg/L

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 CERTIFICATE

Maxxam
A Bureau Veritas Group Company

Your Project #: 14-1360
Site#: NS LANDS SW PROGRAM
Site Location: NS LANDS SW PROGRAM

Attention: Nadine Wambolt

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

Your C.O.C. #: 641220, 641220-01-01, 641220-02-01

Report Date: 2017/12/28
Report #: R4923794
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7S5851
Received: 2017/12/18, 14:30

Sample Matrix: Water
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide (1)	10	N/A	2017/12/21	N/A	SM 22 4500-CO2 D
Alkalinity (1)	10	N/A	2017/12/27	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water) (1)	11	N/A	2017/12/22	N/A	Auto Calc.
Chloride (1)	10	N/A	2017/12/28	ATL SOP 00014	SM 22 4500-Cl- E m
Colour (1)	10	N/A	2017/12/27	ATL SOP 00020	SM 22 2120C m
Conductance - water (1)	10	N/A	2017/12/21	ATL SOP 00004	SM 22 2510B m
Hardness (calculated as CaCO3) (1)	1	N/A	2017/12/20	ATL SOP 00048	SM 22 2340 B
Hardness (calculated as CaCO3) (1)	9	N/A	2017/12/21	ATL SOP 00048	SM 22 2340 B
Mercury - Total (CVAA,LL) (1)	10	2017/12/20	2017/12/21	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS (1)	10	2017/12/20	2017/12/20	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference) (1)	10	N/A	2017/12/28	N/A	Auto Calc.
Anion and Cation Sum (1)	10	N/A	2017/12/22	N/A	Auto Calc.
Nitrogen Ammonia - water (1)	9	N/A	2017/12/21	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen Ammonia - water (1)	1	N/A	2017/12/22	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite (1)	10	N/A	2017/12/28	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite (1)	10	N/A	2017/12/27	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N) (1)	10	N/A	2017/12/28	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM) (1)	11	2017/12/21	2017/12/22	ATL SOP 00103	EPA 8270D 2007 m
pH (1, 2)	10	N/A	2017/12/21	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho (1)	10	N/A	2017/12/27	ATL SOP 00021	SM 22 4500-P E m
Sat. pH and Langelier Index (@ 20C) (1)	10	N/A	2017/12/28	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C) (1)	10	N/A	2017/12/28	ATL SOP 00049	Auto Calc.
Reactive Silica (1)	10	N/A	2017/12/27	ATL SOP 00022	EPA 366.0 m
Sulphate (1)	10	N/A	2017/12/27	ATL SOP 00023	ASTM D516-16 m
Total Dissolved Solids (TDS calc) (1)	10	N/A	2017/12/28	N/A	Auto Calc.
Organic carbon - Total (TOC) (1, 3)	10	N/A	2017/12/28	ATL SOP 00037	SM 22 5310C m
Turbidity (1)	10	N/A	2017/12/21	ATL SOP 00011	EPA 180.1 R2 m

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Maxxam
A Bureau Veritas Group Company

Your Project #: 14-1360
Site#: NS LANDS SW PROGRAM
Site Location: NS LANDS SW PROGRAM

Attention: Nadine Wambolt

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

Your C.O.C. #: 641220, 641220-01-01, 641220-02-01

Report Date: 2017/12/28
Report #: R4923794
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7S5851
Received: 2017/12/18, 14:30

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.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Natalie MacAskill, Sr. Project Manager
Email: NMacAskill@maxxam.ca
Phone# (902)567-1255 Ext:17

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This report has been generated and distributed using a secure automated process.
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.

Maxxam Job #: B7S5851
Report Date: 2017/12/28

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

RESULTS OF ANALYSES OF WATER

Maxxam ID		FTZ683		FTZ694			FTZ695		
Sampling Date		2017/12/18		2017/12/18			2017/12/18		
COC Number		641220-01-01		641220-01-01			641220-01-01		
	UNITS	CB-SW	QC Batch	NRC-1-SW	RDL	QC Batch	SRC-1-SW	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	2.89	5320466	1.57	N/A	5320466	4.87	N/A	5320466
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	65	5320462	21	1.0	5320462	87	1.0	5320462
Calculated TDS	mg/L	160	5320471	94	1.0	5320471	290	1.0	5320471
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	5320462	<1.0	1.0	5320462	<1.0	1.0	5320462
Cation Sum	me/L	2.59	5320466	1.38	N/A	5320466	4.64	N/A	5320466
Hardness (CaCO3)	mg/L	80	5320464	36	1.0	5320464	130	1.0	5320464
Ion Balance (% Difference)	%	5.47	5320465	6.44	N/A	5320465	2.42	N/A	5320465
Langelier Index (@ 20C)	N/A	-0.345	5320469	-1.74		5320469	-0.0270		5320469
Langelier Index (@ 4C)	N/A	-0.595	5320470	-1.99		5320470	-0.276		5320470
Nitrate (N)	mg/L	0.13	5320467	0.21	0.050	5320467	0.20	0.050	5320467
Saturation pH (@ 20C)	N/A	8.14	5320469	8.95		5320469	7.83		5320469
Saturation pH (@ 4C)	N/A	8.39	5320470	9.20		5320470	8.08		5320470
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	66	5327356	21	5.0	5327356	87	5.0	5327356
Dissolved Chloride (Cl)	mg/L	38	5327365	25	1.0	5327365	73	1.0	5327365
Colour	TCU	26	5327374	6.7	5.0	5327374	23	5.0	5327374
Nitrate + Nitrite (N)	mg/L	0.13	5327379	0.21	0.050	5327379	0.21	0.050	5327379
Nitrite (N)	mg/L	<0.010	5327383	<0.010	0.010	5327383	0.013	0.010	5327383
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	5326665	<0.050	0.050	5326665	0.39	0.050	5326665
Total Organic Carbon (C)	mg/L	5.7	5333501	3.3	0.50	5333501	5.7	0.50	5333501
Orthophosphate (P)	mg/L	0.038	5327377	<0.010	0.010	5327377	<0.010	0.010	5327377
pH	pH	7.79	5326516	7.22	N/A	5326516	7.80	N/A	5326516
Reactive Silica (SiO2)	mg/L	7.3	5327372	5.7	0.50	5327372	8.7	0.50	5327372
Dissolved Sulphate (SO4)	mg/L	24	5327369	21	2.0	5327369	50 (1)	10	5327369
Turbidity	NTU	2.1	5326555	0.71	0.10	5326556	42	0.10	5326555
Conductivity	uS/cm	280	5326517	170	1.0	5326517	470	1.0	5326517

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 #: B7S5851
Report Date: 2017/12/28

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

RESULTS OF ANALYSES OF WATER

Maxxam ID		FTZ696		FTZ697		FTZ698		
Sampling Date		2017/12/18		2017/12/18		2017/12/18		
COC Number		641220-01-01		641220-01-01		641220-01-01		
	UNITS	COB-B-SW	QC Batch	COB-4-SW	QC Batch	COB-6-SW	RDL	QC Batch
Calculated Parameters								
Anion Sum	me/L	5.37	5320466	2.71	5320466	3.46	N/A	5320466
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	96	5320462	45	5320462	60	1.0	5320462
Calculated TDS	mg/L	320	5320471	160	5320471	200	1.0	5320471
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	5320462	<1.0	5320462	<1.0	1.0	5320462
Cation Sum	me/L	4.95	5320466	2.54	5320466	3.18	N/A	5320466
Hardness (CaCO3)	mg/L	200	5320464	81	5320464	99	1.0	5320464
Ion Balance (% Difference)	%	4.07	5320465	3.24	5320465	4.22	N/A	5320465
Langelier Index (@ 20C)	N/A	-0.179	5320469	-0.560	5320469	-0.473		5320469
Langelier Index (@ 4C)	N/A	-0.428	5320470	-0.810	5320470	-0.723		5320470
Nitrate (N)	mg/L	0.31	5320467	0.22	5320467	0.26	0.050	5320467
Saturation pH (@ 20C)	N/A	7.65	5320469	8.28	5320469	8.08		5320469
Saturation pH (@ 4C)	N/A	7.89	5320470	8.53	5320470	8.33		5320470
Inorganics								
Total Alkalinity (Total as CaCO3)	mg/L	96	5327356	45	5327356	60	5.0	5327356
Dissolved Chloride (Cl)	mg/L	34	5327365	32	5327365	44	1.0	5327365
Colour	TCU	<5.0	5327374	7.8	5327374	13	5.0	5327374
Nitrate + Nitrite (N)	mg/L	0.31	5327379	0.22	5327379	0.26	0.050	5327379
Nitrite (N)	mg/L	<0.010	5327383	<0.010	5327383	<0.010	0.010	5327383
Nitrogen (Ammonia Nitrogen)	mg/L	0.060	5326665	0.065	5326665	0.053	0.050	5326673
Total Organic Carbon (C)	mg/L	3.4	5333501	2.7	5333505	3.5	0.50	5333505
Orthophosphate (P)	mg/L	<0.010	5327377	<0.010	5327377	<0.010	0.010	5327377
pH	pH	7.47	5326513	7.72	5326516	7.60	N/A	5326518
Reactive Silica (SiO2)	mg/L	12	5327372	7.8	5327372	8.4	0.50	5327372
Dissolved Sulphate (SO4)	mg/L	120	5327369	42 (1)	5327369	48 (1)	10	5327369
Turbidity	NTU	0.77	5326556	1.3	5326555	2.7	0.10	5326555
Conductivity	uS/cm	510	5326514	280	5326517	350	1.0	5326520

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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Report Date: 2017/12/28

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

RESULTS OF ANALYSES OF WATER

Maxxam ID		FTZ699			FTZ700		FTZ701		FTZ702		
Sampling Date		2017/12/18			2017/12/18		2017/12/18		2017/12/18		
COC Number		641220-01-01			641220-01-01		641220-01-01		641220-02-01		
	UNITS	WB-1-SW	RDL	QC Batch	NARROWS	RDL	BP-1-SW	RDL	FD-02	RDL	QC Batch
Calculated Parameters											
Anion Sum	me/L	1.13	N/A	5320466	27.3	N/A	42.1	N/A	1.16	N/A	5320466
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	19	1.0	5320462	52	1.0	52	1.0	19	1.0	5320462
Calculated TDS	mg/L	65	1.0	5320471	1600	1.0	2400	1.0	66	1.0	5320471
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	5320462	<1.0	1.0	<1.0	1.0	<1.0	1.0	5320462
Cation Sum	me/L	1.00	N/A	5320466	26.2	N/A	41.7	N/A	0.990	N/A	5320466
Hardness (CaCO3)	mg/L	25	1.0	5320464	330	1.0	480	1.0	24	1.0	5320464
Ion Balance (% Difference)	%	6.10	N/A	5320465	2.06	N/A	0.510	N/A	7.91	N/A	5320465
Langelier Index (@ 20C)	N/A	-1.88		5320469	-0.428		-0.166		-1.99		5320469
Langelier Index (@ 4C)	N/A	-2.14		5320470	-0.672		-0.409		-2.24		5320470
Nitrate (N)	mg/L	0.11	0.050	5320467	0.21	0.050	0.20	0.050	0.11	0.050	5320467
Saturation pH (@ 20C)	N/A	9.17		5320469	8.25		8.26		9.17		5320469
Saturation pH (@ 4C)	N/A	9.42		5320470	8.49		8.51		9.42		5320470
Inorganics											
Total Alkalinity (Total as CaCO3)	mg/L	19	5.0	5327356	52	5.0	52	5.0	19	5.0	5327356
Dissolved Chloride (Cl)	mg/L	21	1.0	5327365	820	5.0	1300	25	21	1.0	5327365
Colour	TCU	30	5.0	5327374	21	5.0	21	5.0	32	5.0	5327374
Nitrate + Nitrite (N)	mg/L	0.11	0.050	5327379	0.21	0.050	0.20	0.050	0.11	0.050	5327379
Nitrite (N)	mg/L	<0.010	0.010	5327383	<0.010	0.010	<0.010	0.010	<0.010	0.010	5327383
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	5326673	0.076	0.050	0.098	0.050	<0.050	0.050	5326673
Total Organic Carbon (C)	mg/L	4.8	0.50	5333505	3.5	0.50	3.5	0.50	4.9	0.50	5333505
Orthophosphate (P)	mg/L	<0.010	0.010	5327377	0.010	0.010	0.011	0.010	<0.010	0.010	5327377
pH	pH	7.28	N/A	5326518	7.82	N/A	8.10	N/A	7.18	N/A	5326516
Reactive Silica (SiO2)	mg/L	3.4	0.50	5327372	6.0	0.50	5.4	0.50	3.4	0.50	5327372
Dissolved Sulphate (SO4)	mg/L	8.0	2.0	5327369	150	10	210 (1)	40	8.3	2.0	5327369
Turbidity	NTU	0.75	0.10	5326556	2.1	0.10	1.6	0.10	0.78	0.10	5326555
Conductivity	uS/cm	110	1.0	5326520	2900	1.0	4500	1.0	120	1.0	5326517

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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Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

MERCURY BY COLD VAPOUR AA (WATER)

Maxxam ID		FTZ683	FTZ694	FTZ695	FTZ696	FTZ697	FTZ698		
Sampling Date		2017/12/18	2017/12/18	2017/12/18	2017/12/18	2017/12/18	2017/12/18		
COC Number		641220-01-01	641220-01-01	641220-01-01	641220-01-01	641220-01-01	641220-01-01		
	UNITS	CB-SW	NRC-1-SW	SRC-1-SW	COB-B-SW	COB-4-SW	COB-6-SW	RDL	QC Batch
Metals									
Total Mercury (Hg)	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.013	5325271

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		FTZ699	FTZ700	FTZ701	FTZ702		
Sampling Date		2017/12/18	2017/12/18	2017/12/18	2017/12/18		
COC Number		641220-01-01	641220-01-01	641220-01-01	641220-02-01		
	UNITS	WB-1-SW	NARROWS	BP-1-SW	FD-02	RDL	QC Batch
Metals							
Total Mercury (Hg)	ug/L	<0.013	<0.013	<0.013	<0.013	0.013	5325271

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Dillon Consulting Limited
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Site Location: NS LANDS SW PROGRAM

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		FTZ683	FTZ694	FTZ695	FTZ696	FTZ697	FTZ698		
Sampling Date		2017/12/18	2017/12/18	2017/12/18	2017/12/18	2017/12/18	2017/12/18		
COC Number		641220-01-01	641220-01-01	641220-01-01	641220-01-01	641220-01-01	641220-01-01		
	UNITS	CB-SW	NRC-1-SW	SRC-1-SW	COB-B-SW	COB-4-SW	COB-6-SW	RDL	QC Batch
Metals									
Total Aluminum (Al)	ug/L	91	34	3000	6.7	53	130	5.0	5324383
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	5324383
Total Arsenic (As)	ug/L	<1.0	<1.0	4.1	<1.0	<1.0	<1.0	1.0	5324383
Total Barium (Ba)	ug/L	28	11	79	14	18	20	1.0	5324383
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	5324383
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5324383
Total Boron (B)	ug/L	<50	<50	91	<50	<50	<50	50	5324383
Total Cadmium (Cd)	ug/L	0.015	0.016	0.31	<0.010	0.010	0.010	0.010	5324383
Total Calcium (Ca)	ug/L	26000	12000	44000	63000	28000	34000	100	5324383
Total Chromium (Cr)	ug/L	<1.0	<1.0	4.9	<1.0	<1.0	<1.0	1.0	5324383
Total Cobalt (Co)	ug/L	<0.40	<0.40	1.7	0.42	<0.40	<0.40	0.40	5324383
Total Copper (Cu)	ug/L	<2.0	<2.0	11	<2.0	<2.0	<2.0	2.0	5324383
Total Iron (Fe)	ug/L	300	140	4600	110	270	260	50	5324383
Total Lead (Pb)	ug/L	<0.50	<0.50	10	<0.50	<0.50	<0.50	0.50	5324383
Total Magnesium (Mg)	ug/L	3500	1700	5300	9800	3000	3400	100	5324383
Total Manganese (Mn)	ug/L	200	87	2200	490	120	73	2.0	5324383
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5324383
Total Nickel (Ni)	ug/L	<2.0	<2.0	3.2	<2.0	<2.0	<2.0	2.0	5324383
Total Phosphorus (P)	ug/L	<100	<100	160	<100	<100	<100	100	5324383
Total Potassium (K)	ug/L	1300	730	3000	2400	1200	1600	100	5324383
Total Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	5324383
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	5324383
Total Sodium (Na)	ug/L	22000	15000	40000	21000	20000	26000	100	5324383
Total Strontium (Sr)	ug/L	130	31	140	190	110	160	2.0	5324383
Total Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	5324383
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5324383
Total Titanium (Ti)	ug/L	2.4	<2.0	46	<2.0	<2.0	3.0	2.0	5324383
Total Uranium (U)	ug/L	0.11	<0.10	0.58	0.18	0.16	0.19	0.10	5324383
Total Vanadium (V)	ug/L	<2.0	<2.0	7.5	<2.0	<2.0	<2.0	2.0	5324383
Total Zinc (Zn)	ug/L	<5.0	<5.0	50	<5.0	5.1	<5.0	5.0	5324383

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Report Date: 2017/12/28

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		FTZ699	FTZ700	FTZ701	FTZ702		
Sampling Date		2017/12/18	2017/12/18	2017/12/18	2017/12/18		
COC Number		641220-01-01	641220-01-01	641220-01-01	641220-02-01		
	UNITS	WB-1-SW	NARROWS	BP-1-SW	FD-02	RDL	QC Batch
Metals							
Total Aluminum (Al)	ug/L	110	110	95	110	5.0	5324385
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	5324385
Total Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	5324385
Total Barium (Ba)	ug/L	12	17	17	12	1.0	5324385
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	5324385
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	5324385
Total Boron (B)	ug/L	<50	210	340	<50	50	5324385
Total Cadmium (Cd)	ug/L	0.022	0.018	0.020	0.027	0.010	5324385
Total Calcium (Ca)	ug/L	7600	45000	50000	7400	100	5324385
Total Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	5324385
Total Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	5324385
Total Copper (Cu)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	5324385
Total Iron (Fe)	ug/L	190	280	220	190	50	5324385
Total Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5324385
Total Magnesium (Mg)	ug/L	1400	53000	85000	1400	100	5324385
Total Manganese (Mn)	ug/L	63	72	60	62	2.0	5324385
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	5324385
Total Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	5324385
Total Phosphorus (P)	ug/L	<100	<100	<100	<100	100	5324385
Total Potassium (K)	ug/L	590	18000	28000	610	100	5324385
Total Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	5324385
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	5324385
Total Sodium (Na)	ug/L	11000	440000	720000	11000	100	5324385
Total Strontium (Sr)	ug/L	49	450	630	48	2.0	5324385
Total Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	5324385
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	5324385
Total Titanium (Ti)	ug/L	<2.0	3.6	3.6	<2.0	2.0	5324385
Total Uranium (U)	ug/L	<0.10	0.27	0.35	<0.10	0.10	5324385
Total Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	5324385
Total Zinc (Zn)	ug/L	<5.0	5.8	<5.0	<5.0	5.0	5324385

RDL = Reportable Detection Limit
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Report Date: 2017/12/28

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		FTZ683	FTZ694	FTZ695	FTZ696	FTZ697	FTZ698		
Sampling Date		2017/12/18	2017/12/18	2017/12/18	2017/12/18	2017/12/18	2017/12/18		
COC Number		641220-01-01	641220-01-01	641220-01-01	641220-01-01	641220-01-01	641220-01-01		
	UNITS	CB-SW	NRC-1-SW	SRC-1-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	0.14	0.050	5326702
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.057	0.050	5326702
Acenaphthene	ug/L	0.042	<0.010	<0.010	<0.010	0.012	0.13	0.010	5326702
Acenaphthylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	0.010	5326702
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Benzo(a)anthracene	ug/L	<0.010	<0.010	0.015	<0.010	<0.010	<0.010	0.010	5326702
Benzo(a)pyrene	ug/L	<0.010	<0.010	0.016	<0.010	<0.010	<0.010	0.010	5326702
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	0.018	<0.010	<0.010	<0.010	0.010	5326702
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	5320629
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	0.010	5326702
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Chrysene	ug/L	<0.010	<0.010	0.024	<0.010	<0.010	<0.010	0.010	5326702
Dibenz(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Fluoranthene	ug/L	0.014	<0.010	0.040	<0.010	<0.010	0.014	0.010	5326702
Fluorene	ug/L	0.020	<0.010	<0.010	<0.010	<0.010	0.048	0.010	5326702
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Naphthalene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.54	0.20	5326702
Perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Phenanthrene	ug/L	0.018	<0.010	0.021	<0.010	<0.010	0.030	0.010	5326702
Pyrene	ug/L	0.011	<0.010	0.035	<0.010	<0.010	0.012	0.010	5326702
Surrogate Recovery (%)									
D10-Anthracene	%	66	92	76	101	75	79		5326702
D14-Terphenyl	%	78	87	74	106	81	81		5326702
D8-Acenaphthylene	%	69	76	66	90	68	76		5326702

RDL = Reportable Detection Limit
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Maxxam Job #: B7S5851
Report Date: 2017/12/28

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		FTZ699	FTZ700	FTZ701	FTZ702	FTZ710		
Sampling Date		2017/12/18	2017/12/18	2017/12/18	2017/12/18	2017/12/18		
COC Number		641220-01-01	641220-01-01	641220-01-01	641220-02-01	641220-02-01		
	UNITS	WB-1-SW	NARROWS	BP-1-SW	FD-02	TB-02	RDL	QC Batch
Polyaromatic Hydrocarbons								
1-Methylnaphthalene	ug/L	<0.050	0.12	0.091	<0.050	<0.050	0.050	5326702
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5326702
Acenaphthene	ug/L	<0.010	0.10	0.071	<0.010	<0.010	0.010	5326702
Acenaphthylene	ug/L	<0.010	0.099	0.071	<0.010	<0.010	0.010	5326702
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	5320629
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Chrysene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Dibenz(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Fluoranthene	ug/L	<0.010	0.022	0.019	<0.010	<0.010	0.010	5326702
Fluorene	ug/L	<0.010	0.080	0.058	<0.010	<0.010	0.010	5326702
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Naphthalene	ug/L	<0.20	0.30	0.33	<0.20	<0.20	0.20	5326702
Perylene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5326702
Phenanthrene	ug/L	<0.010	0.048	0.044	<0.010	<0.010	0.010	5326702
Pyrene	ug/L	<0.010	0.018	0.018	<0.010	<0.010	0.010	5326702
Surrogate Recovery (%)								
D10-Anthracene	%	73	73	76	70	100		5326702
D14-Terphenyl	%	76	77	74	72	95		5326702
D8-Acenaphthylene	%	72	73	70	67	94		5326702

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7S5851
Report Date: 2017/12/28

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

GENERAL COMMENTS

Sample FTZ683 [CB-SW] : Poor RCAp Ion Balance due to sample matrix.

Sample FTZ694 [NRC-1-SW] : RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample FTZ699 [WB-1-SW] : RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample FTZ702 [FD-02] : RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Results relate only to the items tested.

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Maxxam Job #: B7S5851
Report Date: 2017/12/28

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5324383	BAN	Matrix Spike [FTZ696-02]	Total Aluminum (Al)	2017/12/20		102	%	80 - 120
			Total Antimony (Sb)	2017/12/20		104	%	80 - 120
			Total Arsenic (As)	2017/12/20		100	%	80 - 120
			Total Barium (Ba)	2017/12/20		97	%	80 - 120
			Total Beryllium (Be)	2017/12/20		100	%	80 - 120
			Total Bismuth (Bi)	2017/12/20		101	%	80 - 120
			Total Boron (B)	2017/12/20		105	%	80 - 120
			Total Cadmium (Cd)	2017/12/20		99	%	80 - 120
			Total Calcium (Ca)	2017/12/20		NC	%	80 - 120
			Total Chromium (Cr)	2017/12/20		99	%	80 - 120
			Total Cobalt (Co)	2017/12/20		99	%	80 - 120
			Total Copper (Cu)	2017/12/20		97	%	80 - 120
			Total Iron (Fe)	2017/12/20		106	%	80 - 120
			Total Lead (Pb)	2017/12/20		96	%	80 - 120
			Total Magnesium (Mg)	2017/12/20		107	%	80 - 120
			Total Manganese (Mn)	2017/12/20		NC	%	80 - 120
			Total Molybdenum (Mo)	2017/12/20		105	%	80 - 120
			Total Nickel (Ni)	2017/12/20		99	%	80 - 120
			Total Phosphorus (P)	2017/12/20		104	%	80 - 120
			Total Potassium (K)	2017/12/20		102	%	80 - 120
			Total Selenium (Se)	2017/12/20		104	%	80 - 120
			Total Silver (Ag)	2017/12/20		100	%	80 - 120
			Total Sodium (Na)	2017/12/20		106	%	80 - 120
			Total Strontium (Sr)	2017/12/20		NC	%	80 - 120
			Total Thallium (Tl)	2017/12/20		101	%	80 - 120
			Total Tin (Sn)	2017/12/20		104	%	80 - 120
			Total Titanium (Ti)	2017/12/20		103	%	80 - 120
			Total Uranium (U)	2017/12/20		105	%	80 - 120
			Total Vanadium (V)	2017/12/20		103	%	80 - 120
			Total Zinc (Zn)	2017/12/20		100	%	80 - 120
5324383	BAN	Spiked Blank	Total Aluminum (Al)	2017/12/20		102	%	80 - 120
			Total Antimony (Sb)	2017/12/20		102	%	80 - 120
			Total Arsenic (As)	2017/12/20		100	%	80 - 120
			Total Barium (Ba)	2017/12/20		97	%	80 - 120
			Total Beryllium (Be)	2017/12/20		99	%	80 - 120
			Total Bismuth (Bi)	2017/12/20		102	%	80 - 120
			Total Boron (B)	2017/12/20		103	%	80 - 120
			Total Cadmium (Cd)	2017/12/20		100	%	80 - 120
			Total Calcium (Ca)	2017/12/20		101	%	80 - 120
			Total Chromium (Cr)	2017/12/20		99	%	80 - 120
			Total Cobalt (Co)	2017/12/20		102	%	80 - 120
			Total Copper (Cu)	2017/12/20		100	%	80 - 120
			Total Iron (Fe)	2017/12/20		106	%	80 - 120
			Total Lead (Pb)	2017/12/20		97	%	80 - 120
			Total Magnesium (Mg)	2017/12/20		107	%	80 - 120
			Total Manganese (Mn)	2017/12/20		101	%	80 - 120
			Total Molybdenum (Mo)	2017/12/20		101	%	80 - 120
			Total Nickel (Ni)	2017/12/20		100	%	80 - 120
			Total Phosphorus (P)	2017/12/20		104	%	80 - 120
			Total Potassium (K)	2017/12/20		102	%	80 - 120
			Total Selenium (Se)	2017/12/20		103	%	80 - 120
			Total Silver (Ag)	2017/12/20		99	%	80 - 120
			Total Sodium (Na)	2017/12/20		102	%	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 Strontium (Sr)	2017/12/20		100	%	80 - 120
			Total Thallium (Tl)	2017/12/20		101	%	80 - 120
			Total Tin (Sn)	2017/12/20		102	%	80 - 120
			Total Titanium (Ti)	2017/12/20		103	%	80 - 120
			Total Uranium (U)	2017/12/20		104	%	80 - 120
			Total Vanadium (V)	2017/12/20		101	%	80 - 120
			Total Zinc (Zn)	2017/12/20		101	%	80 - 120
5324383	BAN	Method Blank	Total Aluminum (Al)	2017/12/20	<5.0		ug/L	
			Total Antimony (Sb)	2017/12/20	<1.0		ug/L	
			Total Arsenic (As)	2017/12/20	<1.0		ug/L	
			Total Barium (Ba)	2017/12/20	<1.0		ug/L	
			Total Beryllium (Be)	2017/12/20	<1.0		ug/L	
			Total Bismuth (Bi)	2017/12/20	<2.0		ug/L	
			Total Boron (B)	2017/12/20	<50		ug/L	
			Total Cadmium (Cd)	2017/12/20	<0.010		ug/L	
			Total Calcium (Ca)	2017/12/20	<100		ug/L	
			Total Chromium (Cr)	2017/12/20	<1.0		ug/L	
			Total Cobalt (Co)	2017/12/20	<0.40		ug/L	
			Total Copper (Cu)	2017/12/20	<2.0		ug/L	
			Total Iron (Fe)	2017/12/20	<50		ug/L	
			Total Lead (Pb)	2017/12/20	<0.50		ug/L	
			Total Magnesium (Mg)	2017/12/20	<100		ug/L	
			Total Manganese (Mn)	2017/12/20	<2.0		ug/L	
			Total Molybdenum (Mo)	2017/12/20	<2.0		ug/L	
			Total Nickel (Ni)	2017/12/20	<2.0		ug/L	
			Total Phosphorus (P)	2017/12/20	<100		ug/L	
			Total Potassium (K)	2017/12/20	<100		ug/L	
			Total Selenium (Se)	2017/12/20	<1.0		ug/L	
			Total Silver (Ag)	2017/12/20	<0.10		ug/L	
			Total Sodium (Na)	2017/12/20	<100		ug/L	
			Total Strontium (Sr)	2017/12/20	<2.0		ug/L	
			Total Thallium (Tl)	2017/12/20	<0.10		ug/L	
			Total Tin (Sn)	2017/12/20	<2.0		ug/L	
			Total Titanium (Ti)	2017/12/20	<2.0		ug/L	
			Total Uranium (U)	2017/12/20	<0.10		ug/L	
			Total Vanadium (V)	2017/12/20	<2.0		ug/L	
			Total Zinc (Zn)	2017/12/20	<5.0		ug/L	
5324383	BAN	RPD	Total Calcium (Ca)	2017/12/20	NC		%	20
			Total Sodium (Na)	2017/12/20	5.0		%	20
5324385	BAN	Matrix Spike [FTZ700-02]	Total Aluminum (Al)	2017/12/20		106	%	80 - 120
			Total Antimony (Sb)	2017/12/20		114	%	80 - 120
			Total Arsenic (As)	2017/12/20		102	%	80 - 120
			Total Barium (Ba)	2017/12/20		104	%	80 - 120
			Total Beryllium (Be)	2017/12/20		100	%	80 - 120
			Total Bismuth (Bi)	2017/12/20		102	%	80 - 120
			Total Boron (B)	2017/12/20		105	%	80 - 120
			Total Cadmium (Cd)	2017/12/20		104	%	80 - 120
			Total Calcium (Ca)	2017/12/20		NC	%	80 - 120
			Total Chromium (Cr)	2017/12/20		99	%	80 - 120
			Total Cobalt (Co)	2017/12/20		98	%	80 - 120
			Total Copper (Cu)	2017/12/20		93	%	80 - 120
			Total Iron (Fe)	2017/12/20		104	%	80 - 120
			Total Lead (Pb)	2017/12/20		100	%	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)	2017/12/20		NC	%	80 - 120
			Total Manganese (Mn)	2017/12/20		103	%	80 - 120
			Total Molybdenum (Mo)	2017/12/20		112	%	80 - 120
			Total Nickel (Ni)	2017/12/20		95	%	80 - 120
			Total Phosphorus (P)	2017/12/20		107	%	80 - 120
			Total Potassium (K)	2017/12/20		NC	%	80 - 120
			Total Selenium (Se)	2017/12/20		105	%	80 - 120
			Total Silver (Ag)	2017/12/20		101	%	80 - 120
			Total Sodium (Na)	2017/12/20		NC	%	80 - 120
			Total Strontium (Sr)	2017/12/20		NC	%	80 - 120
			Total Thallium (Tl)	2017/12/20		104	%	80 - 120
			Total Tin (Sn)	2017/12/20		115	%	80 - 120
			Total Titanium (Ti)	2017/12/20		103	%	80 - 120
			Total Uranium (U)	2017/12/20		112	%	80 - 120
			Total Vanadium (V)	2017/12/20		106	%	80 - 120
			Total Zinc (Zn)	2017/12/20		97	%	80 - 120
5324385	BAN	Spiked Blank	Total Aluminum (Al)	2017/12/20		99	%	80 - 120
			Total Antimony (Sb)	2017/12/20		102	%	80 - 120
			Total Arsenic (As)	2017/12/20		95	%	80 - 120
			Total Barium (Ba)	2017/12/20		96	%	80 - 120
			Total Beryllium (Be)	2017/12/20		93	%	80 - 120
			Total Bismuth (Bi)	2017/12/20		101	%	80 - 120
			Total Boron (B)	2017/12/20		97	%	80 - 120
			Total Cadmium (Cd)	2017/12/20		99	%	80 - 120
			Total Calcium (Ca)	2017/12/20		101	%	80 - 120
			Total Chromium (Cr)	2017/12/20		93	%	80 - 120
			Total Cobalt (Co)	2017/12/20		95	%	80 - 120
			Total Copper (Cu)	2017/12/20		93	%	80 - 120
			Total Iron (Fe)	2017/12/20		100	%	80 - 120
			Total Lead (Pb)	2017/12/20		96	%	80 - 120
			Total Magnesium (Mg)	2017/12/20		101	%	80 - 120
			Total Manganese (Mn)	2017/12/20		97	%	80 - 120
			Total Molybdenum (Mo)	2017/12/20		102	%	80 - 120
			Total Nickel (Ni)	2017/12/20		95	%	80 - 120
			Total Phosphorus (P)	2017/12/20		99	%	80 - 120
			Total Potassium (K)	2017/12/20		100	%	80 - 120
			Total Selenium (Se)	2017/12/20		99	%	80 - 120
			Total Silver (Ag)	2017/12/20		98	%	80 - 120
			Total Sodium (Na)	2017/12/20		95	%	80 - 120
			Total Strontium (Sr)	2017/12/20		100	%	80 - 120
			Total Thallium (Tl)	2017/12/20		100	%	80 - 120
			Total Tin (Sn)	2017/12/20		103	%	80 - 120
			Total Titanium (Ti)	2017/12/20		96	%	80 - 120
			Total Uranium (U)	2017/12/20		104	%	80 - 120
			Total Vanadium (V)	2017/12/20		97	%	80 - 120
			Total Zinc (Zn)	2017/12/20		97	%	80 - 120
5324385	BAN	Method Blank	Total Aluminum (Al)	2017/12/20	<5.0		ug/L	
			Total Antimony (Sb)	2017/12/20	<1.0		ug/L	
			Total Arsenic (As)	2017/12/20	<1.0		ug/L	
			Total Barium (Ba)	2017/12/20	<1.0		ug/L	
			Total Beryllium (Be)	2017/12/20	<1.0		ug/L	
			Total Bismuth (Bi)	2017/12/20	<2.0		ug/L	
			Total Boron (B)	2017/12/20	<50		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Cadmium (Cd)	2017/12/20	<0.010		ug/L	
			Total Calcium (Ca)	2017/12/20	<100		ug/L	
			Total Chromium (Cr)	2017/12/20	<1.0		ug/L	
			Total Cobalt (Co)	2017/12/20	<0.40		ug/L	
			Total Copper (Cu)	2017/12/20	<2.0		ug/L	
			Total Iron (Fe)	2017/12/20	<50		ug/L	
			Total Lead (Pb)	2017/12/20	<0.50		ug/L	
			Total Magnesium (Mg)	2017/12/20	<100		ug/L	
			Total Manganese (Mn)	2017/12/20	<2.0		ug/L	
			Total Molybdenum (Mo)	2017/12/20	<2.0		ug/L	
			Total Nickel (Ni)	2017/12/20	<2.0		ug/L	
			Total Phosphorus (P)	2017/12/20	<100		ug/L	
			Total Potassium (K)	2017/12/20	<100		ug/L	
			Total Selenium (Se)	2017/12/20	<1.0		ug/L	
			Total Silver (Ag)	2017/12/20	<0.10		ug/L	
			Total Sodium (Na)	2017/12/20	<100		ug/L	
			Total Strontium (Sr)	2017/12/20	<2.0		ug/L	
			Total Thallium (Tl)	2017/12/20	<0.10		ug/L	
			Total Tin (Sn)	2017/12/20	<2.0		ug/L	
			Total Titanium (Ti)	2017/12/20	<2.0		ug/L	
			Total Uranium (U)	2017/12/20	<0.10		ug/L	
			Total Vanadium (V)	2017/12/20	<2.0		ug/L	
			Total Zinc (Zn)	2017/12/20	<5.0		ug/L	
5324385	BAN	RPD [FTZ699-02]	Total Aluminum (Al)	2017/12/20	6.0		%	20
			Total Antimony (Sb)	2017/12/20	NC		%	20
			Total Arsenic (As)	2017/12/20	NC		%	20
			Total Barium (Ba)	2017/12/20	0.041		%	20
			Total Beryllium (Be)	2017/12/20	NC		%	20
			Total Bismuth (Bi)	2017/12/20	NC		%	20
			Total Boron (B)	2017/12/20	NC		%	20
			Total Cadmium (Cd)	2017/12/20	NC		%	20
			Total Calcium (Ca)	2017/12/20	4.0		%	20
			Total Chromium (Cr)	2017/12/20	NC		%	20
			Total Cobalt (Co)	2017/12/20	NC		%	20
			Total Copper (Cu)	2017/12/20	NC		%	20
			Total Iron (Fe)	2017/12/20	2.1		%	20
			Total Lead (Pb)	2017/12/20	NC		%	20
			Total Magnesium (Mg)	2017/12/20	3.2		%	20
			Total Manganese (Mn)	2017/12/20	5.8		%	20
			Total Molybdenum (Mo)	2017/12/20	NC		%	20
			Total Nickel (Ni)	2017/12/20	NC		%	20
			Total Phosphorus (P)	2017/12/20	NC		%	20
			Total Potassium (K)	2017/12/20	4.2		%	20
			Total Selenium (Se)	2017/12/20	NC		%	20
			Total Silver (Ag)	2017/12/20	NC		%	20
			Total Sodium (Na)	2017/12/20	2.0		%	20
			Total Strontium (Sr)	2017/12/20	1.4		%	20
			Total Thallium (Tl)	2017/12/20	NC		%	20
			Total Tin (Sn)	2017/12/20	NC		%	20
			Total Titanium (Ti)	2017/12/20	NC		%	20
			Total Uranium (U)	2017/12/20	NC		%	20
			Total Vanadium (V)	2017/12/20	NC		%	20
			Total Zinc (Zn)	2017/12/20	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
5325271	ARS	Matrix Spike [FTZ694-04]	Total Mercury (Hg)	2017/12/21		102	%	80 - 120
5325271	ARS	Spiked Blank	Total Mercury (Hg)	2017/12/21		103	%	80 - 120
5325271	ARS	Method Blank	Total Mercury (Hg)	2017/12/21	<0.013		ug/L	
5325271	ARS	RPD [FTZ683-04]	Total Mercury (Hg)	2017/12/21	NC		%	20
5326513	JMV	QC Standard	pH	2017/12/21		101	%	97 - 103
5326513	JMV	RPD	pH	2017/12/21	5.5 (1)		%	N/A
5326514	JMV	Spiked Blank	Conductivity	2017/12/21		102	%	80 - 120
5326514	JMV	Method Blank	Conductivity	2017/12/21	<1.0		uS/cm	
5326514	JMV	RPD	Conductivity	2017/12/21	0.36		%	25
5326516	JMV	QC Standard	pH	2017/12/21		100	%	97 - 103
5326516	JMV	RPD	pH	2017/12/21	2.1		%	N/A
5326517	JMV	Spiked Blank	Conductivity	2017/12/21		102	%	80 - 120
5326517	JMV	Method Blank	Conductivity	2017/12/21	1.5, RDL=1.0		uS/cm	
5326517	JMV	RPD	Conductivity	2017/12/21	0.52		%	25
5326518	JMV	QC Standard	pH	2017/12/21		100	%	97 - 103
5326518	JMV	RPD [FTZ698-01]	pH	2017/12/21	1.8		%	N/A
5326520	JMV	Spiked Blank	Conductivity	2017/12/21		101	%	80 - 120
5326520	JMV	Method Blank	Conductivity	2017/12/21	1.5, RDL=1.0		uS/cm	
5326520	JMV	RPD [FTZ698-01]	Conductivity	2017/12/21	0.58		%	25
5326555	JMV	QC Standard	Turbidity	2017/12/21		92	%	80 - 120
5326555	JMV	Spiked Blank	Turbidity	2017/12/21		91	%	80 - 120
5326555	JMV	Method Blank	Turbidity	2017/12/21	<0.10		NTU	
5326555	JMV	RPD	Turbidity	2017/12/21	0.35		%	20
5326556	JMV	QC Standard	Turbidity	2017/12/21		92	%	80 - 120
5326556	JMV	Spiked Blank	Turbidity	2017/12/21		92	%	80 - 120
5326556	JMV	Method Blank	Turbidity	2017/12/21	<0.10		NTU	
5326556	JMV	RPD	Turbidity	2017/12/21	3.9		%	20
5326665	MCN	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2017/12/21		102	%	80 - 120
5326665	MCN	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2017/12/21		101	%	80 - 120
5326665	MCN	Method Blank	Nitrogen (Ammonia Nitrogen)	2017/12/21	<0.050		mg/L	
5326665	MCN	RPD	Nitrogen (Ammonia Nitrogen)	2017/12/21	1.7		%	20
5326673	MCN	Matrix Spike [FTZ698-03]	Nitrogen (Ammonia Nitrogen)	2017/12/21		102	%	80 - 120
5326673	MCN	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2017/12/21		101	%	80 - 120
5326673	MCN	Method Blank	Nitrogen (Ammonia Nitrogen)	2017/12/21	<0.050		mg/L	
5326673	MCN	RPD [FTZ698-03]	Nitrogen (Ammonia Nitrogen)	2017/12/22	3.3		%	20
5326702	LGE	Matrix Spike	D10-Anthracene	2017/12/21		101	%	50 - 130
			D14-Terphenyl	2017/12/21		97	%	50 - 130
			D8-Acenaphthylene	2017/12/21		94	%	50 - 130
			1-Methylnaphthalene	2017/12/21		81	%	30 - 130
			2-Methylnaphthalene	2017/12/21		88	%	30 - 130
			Acenaphthene	2017/12/21		96	%	30 - 130
			Acenaphthylene	2017/12/21		85	%	30 - 130
			Anthracene	2017/12/21		91	%	30 - 130
			Benzo(a)anthracene	2017/12/21		94	%	30 - 130
			Benzo(a)pyrene	2017/12/21		88	%	30 - 130
			Benzo(b)fluoranthene	2017/12/21		113	%	30 - 130
			Benzo(g,h,i)perylene	2017/12/21		107	%	30 - 130
			Benzo(j)fluoranthene	2017/12/21		93	%	30 - 130
			Benzo(k)fluoranthene	2017/12/21		98	%	30 - 130
			Chrysene	2017/12/21		93	%	30 - 130
			Dibenz(a,h)anthracene	2017/12/21		92	%	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
			Fluoranthene	2017/12/21		98	%	30 - 130
			Fluorene	2017/12/21		90	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2017/12/21		95	%	30 - 130
			Naphthalene	2017/12/21		85	%	30 - 130
			Perylene	2017/12/21		92	%	30 - 130
			Phenanthrene	2017/12/21		87	%	30 - 130
			Pyrene	2017/12/21		93	%	30 - 130
5326702	LGE	Spiked Blank	D10-Anthracene	2017/12/21		97	%	50 - 130
			D14-Terphenyl	2017/12/21		94	%	50 - 130
			D8-Acenaphthylene	2017/12/21		88	%	50 - 130
			1-Methylnaphthalene	2017/12/21		76	%	30 - 130
			2-Methylnaphthalene	2017/12/21		81	%	30 - 130
			Acenaphthene	2017/12/21		88	%	30 - 130
			Acenaphthylene	2017/12/21		82	%	30 - 130
			Anthracene	2017/12/21		89	%	30 - 130
			Benzo(a)anthracene	2017/12/21		89	%	30 - 130
			Benzo(a)pyrene	2017/12/21		87	%	30 - 130
			Benzo(b)fluoranthene	2017/12/21		110	%	30 - 130
			Benzo(g,h,i)perylene	2017/12/21		95	%	30 - 130
			Benzo(j)fluoranthene	2017/12/21		97	%	30 - 130
			Benzo(k)fluoranthene	2017/12/21		94	%	30 - 130
			Chrysene	2017/12/21		86	%	30 - 130
			Dibenz(a,h)anthracene	2017/12/21		76	%	30 - 130
			Fluoranthene	2017/12/21		97	%	30 - 130
			Fluorene	2017/12/21		83	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2017/12/21		86	%	30 - 130
			Naphthalene	2017/12/21		81	%	30 - 130
			Perylene	2017/12/21		89	%	30 - 130
			Phenanthrene	2017/12/21		84	%	30 - 130
			Pyrene	2017/12/21		90	%	30 - 130
5326702	LGE	Method Blank	D10-Anthracene	2017/12/21		103	%	50 - 130
			D14-Terphenyl	2017/12/21		95	%	50 - 130
			D8-Acenaphthylene	2017/12/21		90	%	50 - 130
			1-Methylnaphthalene	2017/12/21	<0.050		ug/L	
			2-Methylnaphthalene	2017/12/21	<0.050		ug/L	
			Acenaphthene	2017/12/21	<0.010		ug/L	
			Acenaphthylene	2017/12/21	<0.010		ug/L	
			Anthracene	2017/12/21	<0.010		ug/L	
			Benzo(a)anthracene	2017/12/21	<0.010		ug/L	
			Benzo(a)pyrene	2017/12/21	<0.010		ug/L	
			Benzo(b)fluoranthene	2017/12/21	<0.010		ug/L	
			Benzo(g,h,i)perylene	2017/12/21	<0.010		ug/L	
			Benzo(j)fluoranthene	2017/12/21	<0.010		ug/L	
			Benzo(k)fluoranthene	2017/12/21	<0.010		ug/L	
			Chrysene	2017/12/21	<0.010		ug/L	
			Dibenz(a,h)anthracene	2017/12/21	<0.010		ug/L	
			Fluoranthene	2017/12/21	<0.010		ug/L	
			Fluorene	2017/12/21	<0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2017/12/21	<0.010		ug/L	
			Naphthalene	2017/12/21	<0.20		ug/L	
			Perylene	2017/12/21	<0.010		ug/L	
			Phenanthrene	2017/12/21	<0.010		ug/L	
			Pyrene	2017/12/21	<0.010		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5326702	LGE	RPD	1-Methylnaphthalene	2017/12/21	NC		%	40
			2-Methylnaphthalene	2017/12/21	NC		%	40
			Acenaphthene	2017/12/21	NC		%	40
			Acenaphthylene	2017/12/21	NC		%	40
			Anthracene	2017/12/21	NC		%	40
			Benzo(a)anthracene	2017/12/21	NC		%	40
			Benzo(a)pyrene	2017/12/21	NC		%	40
			Benzo(b)fluoranthene	2017/12/21	NC		%	40
			Benzo(g,h,i)perylene	2017/12/21	NC		%	40
			Benzo(j)fluoranthene	2017/12/21	NC		%	40
			Benzo(k)fluoranthene	2017/12/21	NC		%	40
			Chrysene	2017/12/21	NC		%	40
			Dibenz(a,h)anthracene	2017/12/21	NC		%	40
			Fluoranthene	2017/12/21	NC		%	40
			Fluorene	2017/12/21	NC		%	40
			Indeno(1,2,3-cd)pyrene	2017/12/21	NC		%	40
			Naphthalene	2017/12/21	NC		%	40
			Perylene	2017/12/21	NC		%	40
			Phenanthrene	2017/12/21	NC		%	40
			Pyrene	2017/12/21	NC		%	40
5327356	JHY	Matrix Spike [FTZ696-01]	Total Alkalinity (Total as CaCO3)	2017/12/27		NC	%	80 - 120
5327356	JHY	Spiked Blank	Total Alkalinity (Total as CaCO3)	2017/12/27		110	%	80 - 120
5327356	JHY	Method Blank	Total Alkalinity (Total as CaCO3)	2017/12/27	<5.0		mg/L	
5327356	JHY	RPD [FTZ696-01]	Total Alkalinity (Total as CaCO3)	2017/12/27	1.5		%	25
5327365	JHY	Matrix Spike [FTZ696-01]	Dissolved Chloride (Cl)	2017/12/28		NC	%	80 - 120
5327365	JHY	QC Standard	Dissolved Chloride (Cl)	2017/12/28		109	%	80 - 120
5327365	JHY	Spiked Blank	Dissolved Chloride (Cl)	2017/12/28		104	%	80 - 120
5327365	JHY	Method Blank	Dissolved Chloride (Cl)	2017/12/28	<1.0		mg/L	
5327365	JHY	RPD [FTZ696-01]	Dissolved Chloride (Cl)	2017/12/28	0.41		%	25
5327369	JHY	Matrix Spike [FTZ696-01]	Dissolved Sulphate (SO4)	2017/12/27		NC	%	80 - 120
5327369	JHY	Spiked Blank	Dissolved Sulphate (SO4)	2017/12/27		100	%	80 - 120
5327369	JHY	Method Blank	Dissolved Sulphate (SO4)	2017/12/27	<2.0		mg/L	
5327369	JHY	RPD [FTZ696-01]	Dissolved Sulphate (SO4)	2017/12/27	1.1		%	25
5327372	JHY	Matrix Spike [FTZ696-01]	Reactive Silica (SiO2)	2017/12/27		NC	%	80 - 120
5327372	JHY	Spiked Blank	Reactive Silica (SiO2)	2017/12/27		98	%	80 - 120
5327372	JHY	Method Blank	Reactive Silica (SiO2)	2017/12/27	<0.50		mg/L	
5327372	JHY	RPD [FTZ696-01]	Reactive Silica (SiO2)	2017/12/27	0.065		%	25
5327374	JHY	Spiked Blank	Colour	2017/12/27		93	%	80 - 120
5327374	JHY	Method Blank	Colour	2017/12/27	<5.0		TCU	
5327374	JHY	RPD [FTZ696-01]	Colour	2017/12/27	NC		%	20
5327377	JHY	Matrix Spike [FTZ696-01]	Orthophosphate (P)	2017/12/27		90	%	80 - 120
5327377	JHY	Spiked Blank	Orthophosphate (P)	2017/12/27		94	%	80 - 120
5327377	JHY	Method Blank	Orthophosphate (P)	2017/12/27	<0.010		mg/L	
5327377	JHY	RPD [FTZ696-01]	Orthophosphate (P)	2017/12/27	NC		%	25
5327379	JHY	Matrix Spike [FTZ696-01]	Nitrate + Nitrite (N)	2017/12/28		98	%	80 - 120
5327379	JHY	Spiked Blank	Nitrate + Nitrite (N)	2017/12/28		96	%	80 - 120
5327379	JHY	Method Blank	Nitrate + Nitrite (N)	2017/12/28	<0.050		mg/L	
5327379	JHY	RPD [FTZ696-01]	Nitrate + Nitrite (N)	2017/12/28	6.7		%	25
5327383	JHY	Matrix Spike [FTZ696-01]	Nitrite (N)	2017/12/27		98	%	80 - 120
5327383	JHY	Spiked Blank	Nitrite (N)	2017/12/27		97	%	80 - 120
5327383	JHY	Method Blank	Nitrite (N)	2017/12/27	<0.010		mg/L	
5327383	JHY	RPD [FTZ696-01]	Nitrite (N)	2017/12/27	NC		%	25
5333501	LMP	Matrix Spike	Total Organic Carbon (C)	2017/12/28		96	%	80 - 120

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Maxxam Job #: B7S5851
Report Date: 2017/12/28

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5333501	LMP	Spiked Blank	Total Organic Carbon (C)	2017/12/28		103	%	80 - 120
5333501	LMP	Method Blank	Total Organic Carbon (C)	2017/12/28	<0.50		mg/L	
5333501	LMP	RPD	Total Organic Carbon (C)	2017/12/28	4.7 (2)		%	20
5333505	LMP	Matrix Spike	Total Organic Carbon (C)	2017/12/28		96	%	80 - 120
5333505	LMP	Spiked Blank	Total Organic Carbon (C)	2017/12/28		100	%	80 - 120
5333505	LMP	Method Blank	Total Organic Carbon (C)	2017/12/28	<0.50		mg/L	
5333505	LMP	RPD	Total Organic Carbon (C)	2017/12/28	19 (2)		%	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 spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 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 (absolute difference <= 2x RDL).

(1) Poor duplicate results due to sample matrix, results confirmed by repeat analysis.

(2) Reporting limit was increased due to turbidity.

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Maxxam Job #: B7S5851
Report Date: 2017/12/28

Dillon Consulting Limited
Client Project #: 14-1360
Site Location: NS LANDS SW PROGRAM

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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APPENDIX D
MANN-KENDALL TABLES

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Anthracene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0					X		
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.005	0.012	0.016	0.019	0.017	0.014	0.33	0.011			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	1	1	1	1	1	1	0	0	7
Row 2: Compare to Event 2:			1	1	1	1	1	-1	0	0	4
Row 3: Compare to Event 3:				1	1	-1	1	-1	0	0	1
Row 4: Compare to Event 4:					-1	-1	1	-1	0	0	-2
Row 5: Compare to Event 5:						-1	1	-1	0	0	-1
Row 6: Compare to Event 6:							1	-1	0	0	0
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **8**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8					X		
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0					X		
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.016	0.018	0.005	0.011	0.005	0.017	0.005	0.015			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	-1	-1	-1	1	-1	-1	0	0	-3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	0	0	-6
Row 3: Compare to Event 3:				1	0	1	0	1	0	0	3
Row 4: Compare to Event 4:					-1	1	-1	1	0	0	0
Row 5: Compare to Event 5:						1	0	1	0	0	2
Row 6: Compare to Event 6:							-1	-1	0	0	-2
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-5**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5					X		
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	196	130	320	140	160	110	340	130			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	1	-1	-1	-1	1	-1	0	0	-3
Row 2: Compare to Event 2:			1	1	1	-1	1	0	0	0	3
Row 3: Compare to Event 3:				-1	-1	-1	1	-1	0	0	-3
Row 4: Compare to Event 4:					1	-1	1	-1	0	0	0
Row 5: Compare to Event 5:						-1	1	-1	0	0	-1
Row 6: Compare to Event 6:							1	1	0	0	2
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3					X		
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	2.5	6	9	6.1	2.5	2.5	2.5	2.5			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	1	1	0	0	0	0	0	0	3
Row 2: Compare to Event 2:			1	1	-1	-1	-1	-1	0	0	-2
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	0	0	-5
Row 4: Compare to Event 4:					-1	-1	-1	-1	0	0	-4
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-8**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8					X		
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	25	25	25	25	25	25	25	25			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0					X		
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: CB-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Sulphate	6.5	26	16	24	10	23	12	24			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	1	1	1	1	1	1	0	0	7
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	0	0	-6
Row 3: Compare to Event 3:				1	-1	1	-1	1	0	0	1
Row 4: Compare to Event 4:					-1	-1	-1	0	0	0	-3
Row 5: Compare to Event 5:						1	1	1	0	0	3
Row 6: Compare to Event 6:							-1	1	0	0	0
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart

S Value	**Total No. of Sampling Events**						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3					X		
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.005	0.005	0.005	0.037	0.021	0.01	0.005				
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17				
Row 1: Compare to Event 1:		0	0	1	1	1	0	0	0	0	3
Row 2: Compare to Event 2:			0	1	1	1	0	0	0	0	3
Row 3: Compare to Event 3:				1	1	1	0	0	0	0	3
Row 4: Compare to Event 4:					-1	-1	-1	0	0	0	-3
Row 5: Compare to Event 5:						-1	-1	0	0	0	-2
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3				X			
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Pyrene	0.019	0.005	0.005	0.14	0.005	0.027	0.005				
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17				
Row 1: Compare to Event 1:		-1	-1	1	-1	1	-1	0	0	0	-2
Row 2: Compare to Event 2:			0	1	0	1	0	0	0	0	2
Row 3: Compare to Event 3:				1	0	1	0	0	0	0	2
Row 4: Compare to Event 4:					-1	-1	-1	0	0	0	-3
Row 5: Compare to Event 5:						1	0	0	0	0	1
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-1**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1				X			
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.005	0.005	0.075	0.005	0.011	0.005				
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17				
Row 1: Compare to Event 1:		0	0	1	0	1	0	0	0	0	2
Row 2: Compare to Event 2:			0	1	0	1	0	0	0	0	2
Row 3: Compare to Event 3:				1	0	1	0	0	0	0	2
Row 4: Compare to Event 4:					-1	-1	-1	0	0	0	-3
Row 5: Compare to Event 5:						1	0	0	0	0	1
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3				X			
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Cadmium	0.021	0.022	0.019	0.14	0.016	0.025	0.016				
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17				
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	0	0	0	0
Row 2: Compare to Event 2:			-1	1	-1	1	-1	0	0	0	-1
Row 3: Compare to Event 3:				1	-1	1	-1	0	0	0	0
Row 4: Compare to Event 4:					-1	-1	-1	0	0	0	-3
Row 5: Compare to Event 5:						1	0	0	0	0	1
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-4**

Confidence Level Chart

S Value	**Total No. of Sampling Events**						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4				X			
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	64.7	32	54	36	52	34	31				
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17				
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	0	0	0	-6
Row 2: Compare to Event 2:			1	1	1	1	-1	0	0	0	3
Row 3: Compare to Event 3:				-1	-1	-1	-1	0	0	0	-4
Row 4: Compare to Event 4:					1	-1	-1	0	0	0	-1
Row 5: Compare to Event 5:						-1	-1	0	0	0	-2
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-11**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11				X			
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
X	Trend Is Present (≥90% Confidence)	
X	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	5.3	9.1	11	27	2.5	2.5	2.5				
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17				
Row 1: Compare to Event 1:		1	1	1	-1	-1	-1	0	0	0	0
Row 2: Compare to Event 2:			1	1	-1	-1	-1	0	0	0	-1
Row 3: Compare to Event 3:				1	-1	-1	-1	0	0	0	-2
Row 4: Compare to Event 4:					-1	-1	-1	0	0	0	-3
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-6**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6				X			
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	25	25	25	25	25	25	21				
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	18-Dec-17				
Row 1: Compare to Event 1:		0	0	0	0	0	-1	0	0	0	-1
Row 2: Compare to Event 2:			0	0	0	0	-1	0	0	0	-1
Row 3: Compare to Event 3:				0	0	0	-1	0	0	0	-1
Row 4: Compare to Event 4:					0	0	-1	0	0	0	-1
Row 5: Compare to Event 5:						0	-1	0	0	0	-1
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-6**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6				X			
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: NRC-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Suphate	19	20	22	15	15	16					
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16					
Row 1: Compare to Event 1:		1	1	-1	-1	-1	0	0	0	0	-1
Row 2: Compare to Event 2:			1	-1	-1	-1	0	0	0	0	-2
Row 3: Compare to Event 3:				-1	-1	-1	0	0	0	0	-3
Row 4: Compare to Event 4:					0	1	0	0	0	0	1
Row 5: Compare to Event 5:						1	0	0	0	0	1
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-4**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4			X				
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Anthracene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0					X		
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.005	0.018	0.005	0.005	0.005	0.011	0.005	0.035			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	0	0	0	1	0	1	0	0	3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	1	0	0	-4
Row 3: Compare to Event 3:				0	0	1	0	1	0	0	2
Row 4: Compare to Event 4:					0	1	0	1	0	0	2
Row 5: Compare to Event 5:						1	0	1	0	0	2
Row 6: Compare to Event 6:							-1	1	0	0	0
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **6**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6					X		
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Benzo(a)pyrene	0.005	0.013	0.005	0.005	0.005	0.005	0.005	0.016			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	0	0	0	0	0	1	0	0	2
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	1	0	0	-4
Row 3: Compare to Event 3:				0	0	0	0	1	0	0	1
Row 4: Compare to Event 4:					0	0	0	1	0	0	1
Row 5: Compare to Event 5:						0	0	1	0	0	1
Row 6: Compare to Event 6:							0	1	0	0	1
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3					X		
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.005	0.042	0.015	0.023	0.018	0.039	0.005	0.31			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	1	1	1	1	0	1	0	0	6
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	1	0	0	-4
Row 3: Compare to Event 3:				1	1	1	-1	1	0	0	3
Row 4: Compare to Event 4:					-1	1	-1	1	0	0	0
Row 5: Compare to Event 5:						1	-1	1	0	0	1
Row 6: Compare to Event 6:							-1	1	0	0	0
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **7**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7					X		
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Strontium	174	150	150	150	170	140	190	140			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	1	-1	0	0	-5
Row 2: Compare to Event 2:			0	0	1	-1	1	-1	0	0	0
Row 3: Compare to Event 3:				0	1	-1	1	-1	0	0	0
Row 4: Compare to Event 4:					1	-1	1	-1	0	0	0
Row 5: Compare to Event 5:						-1	1	-1	0	0	-1
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-6**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6					X		
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	2.5	7	9.5	2.5	2.5	5.7	2.5				
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17				
Row 1: Compare to Event 1:		1	1	0	0	1	0	0	0	0	3
Row 2: Compare to Event 2:			1	-1	-1	-1	-1	0	0	0	-3
Row 3: Compare to Event 3:				-1	-1	-1	-1	0	0	0	-4
Row 4: Compare to Event 4:					0	1	0	0	0	0	1
Row 5: Compare to Event 5:						1	0	0	0	0	1
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3				X			
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	57	110	64	57	91	54	130	91			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	1	0	1	-1	1	1	0	0	4
Row 2: Compare to Event 2:			-1	-1	-1	-1	1	-1	0	0	-4
Row 3: Compare to Event 3:				-1	1	-1	1	1	0	0	1
Row 4: Compare to Event 4:					1	-1	1	1	0	0	2
Row 5: Compare to Event 5:						-1	1	0	0	0	0
Row 6: Compare to Event 6:							1	1	0	0	2
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **4**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4					X		
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: SRC-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Sulphate	40	54	47	43	51	42	54	50			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	1	1	1	1	1	1	0	0	7
Row 2: Compare to Event 2:			-1	-1	-1	-1	0	-1	0	0	-5
Row 3: Compare to Event 3:				-1	1	-1	1	1	0	0	1
Row 4: Compare to Event 4:					1	-1	1	1	0	0	2
Row 5: Compare to Event 5:						-1	1	-1	0	0	-1
Row 6: Compare to Event 6:							1	1	0	0	2
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **5**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5					X		
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.005	0.005	0.12	0.005	0.013	0.005	0.005				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		0	1	0	1	0	0	0	0	0	2
Row 2: Compare to Event 2:			1	0	1	0	0	0	0	0	2
Row 3: Compare to Event 3:				-1	-1	-1	-1	0	0	0	-4
Row 4: Compare to Event 4:					1	0	0	0	0	0	1
Row 5: Compare to Event 5:						-1	-1	0	0	0	-2
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-1**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1				X			
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.005	0.012	0.74	0.005	0.04	0.005	0.005				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		1	1	0	1	0	0	0	0	0	3
Row 2: Compare to Event 2:			1	-1	1	-1	-1	0	0	0	-1
Row 3: Compare to Event 3:				-1	-1	-1	-1	0	0	0	-4
Row 4: Compare to Event 4:					1	0	0	0	0	0	1
Row 5: Compare to Event 5:						-1	-1	0	0	0	-2
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3				X			
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.005	0.39	0.005	0.028	0.005	0.005				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		0	1	0	1	0	0	0	0	0	2
Row 2: Compare to Event 2:			1	0	1	0	0	0	0	0	2
Row 3: Compare to Event 3:				-1	-1	-1	-1	0	0	0	-4
Row 4: Compare to Event 4:					1	0	0	0	0	0	1
Row 5: Compare to Event 5:						-1	-1	0	0	0	-2
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-1**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1				X			
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
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± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.014	0.005	0.29	0.005	0.014	0.011	0.01				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		-1	1	-1	0	-1	-1	0	0	0	-3
Row 2: Compare to Event 2:			1	0	1	1	1	0	0	0	4
Row 3: Compare to Event 3:				-1	-1	-1	-1	0	0	0	-4
Row 4: Compare to Event 4:					1	1	1	0	0	0	3
Row 5: Compare to Event 5:						-1	-1	0	0	0	-2
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3				X			
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
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± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Strontium	140	250	150	280	110	450	110				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17					
Row 1: Compare to Event 1:		1	1	1	-1	1	-1	0	0	0	2
Row 2: Compare to Event 2:			-1	1	-1	1	-1	0	0	0	-1
Row 3: Compare to Event 3:				1	-1	1	-1	0	0	0	0
Row 4: Compare to Event 4:					-1	1	-1	0	0	0	-1
Row 5: Compare to Event 5:						1	0	0	0	0	1
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0				X			
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Zinc	7.2	10	96	2.5	2.5	2.5	5.1				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		1	1	-1	-1	-1	-1	0	0	0	-2
Row 2: Compare to Event 2:			1	-1	-1	-1	-1	0	0	0	-3
Row 3: Compare to Event 3:				-1	-1	-1	-1	0	0	0	-4
Row 4: Compare to Event 4:					0	0	1	0	0	0	1
Row 5: Compare to Event 5:						0	1	0	0	0	1
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-6**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6				X			
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Boron	25	60	25	25	25	63	25				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		1	0	0	0	1	0	0	0	0	2
Row 2: Compare to Event 2:			-1	-1	-1	1	-1	0	0	0	-3
Row 3: Compare to Event 3:				0	0	1	0	0	0	0	1
Row 4: Compare to Event 4:					0	1	0	0	0	0	1
Row 5: Compare to Event 5:						1	0	0	0	0	1
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **1**

Confidence Level Chart

S Value	**Total No. of Sampling Events**						
	4	5	6	7	8	9	10
0							
± 1				X			
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

X	No Trend Indicated, Plume Not Diminishing or Expanding		
	X	CV<=1	Plume is Stable
		CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)		
		S < 0	Diminishing Plume
		S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-4-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Sulphate	47	100	41	74	39	110	42				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	0	0	0	0
Row 2: Compare to Event 2:			-1	-1	-1	1	-1	0	0	0	-3
Row 3: Compare to Event 3:				1	-1	1	1	0	0	0	2
Row 4: Compare to Event 4:					-1	1	-1	0	0	0	-1
Row 5: Compare to Event 5:						1	1	0	0	0	2
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-1**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1				X			
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Anthracene	0.015	0.005	0.005	0.005	0.005	0.01	0.005	0.005			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			0	0	0	1	0	0	0	0	1
Row 3: Compare to Event 3:				0	0	1	0	0	0	0	1
Row 4: Compare to Event 4:					0	1	0	0	0	0	1
Row 5: Compare to Event 5:						1	0	0	0	0	1
Row 6: Compare to Event 6:							-1	-1	0	0	-2
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-5**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5					X		
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Pyrene	0.026	0.013	0.005	0.03	0.005	0.038	0.017	0.012			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	1	-1	1	-1	-1	0	0	-3
Row 2: Compare to Event 2:			-1	1	-1	1	1	-1	0	0	0
Row 3: Compare to Event 3:				1	0	1	1	1	0	0	4
Row 4: Compare to Event 4:					-1	1	-1	-1	0	0	-2
Row 5: Compare to Event 5:						1	1	1	0	0	3
Row 6: Compare to Event 6:							-1	-1	0	0	-2
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-1**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1					X		
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.005	0.005	0.015	0.005	0.027	0.005	0.005			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		0	0	1	0	1	0	0	0	0	2
Row 2: Compare to Event 2:			0	1	0	1	0	0	0	0	2
Row 3: Compare to Event 3:				1	0	1	0	0	0	0	2
Row 4: Compare to Event 4:					-1	1	-1	-1	0	0	-2
Row 5: Compare to Event 5:						1	0	0	0	0	1
Row 6: Compare to Event 6:							-1	-1	0	0	-2
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3					X		
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.005	0.01	0.005	0.018	0.005	0.015	0.011	0.01			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	0	1	0	1	1	1	0	0	5
Row 2: Compare to Event 2:			-1	1	-1	1	1	0	0	0	1
Row 3: Compare to Event 3:				1	0	1	1	1	0	0	4
Row 4: Compare to Event 4:					-1	-1	-1	-1	0	0	-4
Row 5: Compare to Event 5:						1	1	1	0	0	3
Row 6: Compare to Event 6:							-1	-1	0	0	-2
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **6**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6					X		
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Strontium	645	180	300	180	300	160	500	160			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			1	0	1	-1	1	-1	0	0	1
Row 3: Compare to Event 3:				-1	0	-1	1	-1	0	0	-2
Row 4: Compare to Event 4:					1	-1	1	-1	0	0	0
Row 5: Compare to Event 5:						-1	1	-1	0	0	-1
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-9**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9					X		
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Zinc	2.5	6	7.4	2.5	2.5	2.5	2.5	2.5			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	1	0	0	0	0	0	0	0	2
Row 2: Compare to Event 2:			1	-1	-1	-1	-1	-1	0	0	-4
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	0	0	-5
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-7**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7					X		
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
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Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	66	25	52	25	25	25	59	25			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			1	0	0	0	1	0	0	0	2
Row 3: Compare to Event 3:				-1	-1	-1	1	-1	0	0	-3
Row 4: Compare to Event 4:					0	0	1	0	0	0	1
Row 5: Compare to Event 5:						0	1	0	0	0	1
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-6**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6					X		
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: COB-6-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Sulphate	170	56	91	44	64	41	110	48			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			1	-1	1	-1	1	-1	0	0	0
Row 3: Compare to Event 3:				-1	-1	-1	1	-1	0	0	-3
Row 4: Compare to Event 4:					1	-1	1	1	0	0	2
Row 5: Compare to Event 5:						-1	1	-1	0	0	-1
Row 6: Compare to Event 6:							1	1	0	0	2
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-8**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8					X		
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.005	0.005	0.005	0.005	0.025	0.005	0.005	0.005			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		0	0	0	1	0	0	0	0	0	1
Row 2: Compare to Event 2:			0	0	1	0	0	0	0	0	1
Row 3: Compare to Event 3:				0	1	0	0	0	0	0	1
Row 4: Compare to Event 4:					1	0	0	0	0	0	1
Row 5: Compare to Event 5:						-1	-1	-1	0	0	-3
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **1**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1					X		
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Pyrene	0.005	0.005	0.005	0.005	0.092	0.005	0.027	0.005			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		0	0	0	1	0	1	0	0	0	2
Row 2: Compare to Event 2:			0	0	1	0	1	0	0	0	2
Row 3: Compare to Event 3:				0	1	0	1	0	0	0	2
Row 4: Compare to Event 4:					1	0	1	0	0	0	2
Row 5: Compare to Event 5:						-1	-1	-1	0	0	-3
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **5**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5					X		
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.005	0.005	0.005	0.025	0.005	0.005	0.005			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		0	0	0	1	0	0	0	0	0	1
Row 2: Compare to Event 2:			0	0	1	0	0	0	0	0	1
Row 3: Compare to Event 3:				0	1	0	0	0	0	0	1
Row 4: Compare to Event 4:					1	0	0	0	0	0	1
Row 5: Compare to Event 5:						-1	-1	-1	0	0	-3
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **1**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1					X		
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.6	0.038	0.012	0.005	0.035	0.026	0.27	0.27			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-16	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			-1	-1	-1	-1	1	1	0	0	-2
Row 3: Compare to Event 3:				-1	1	1	1	1	0	0	3
Row 4: Compare to Event 4:					1	1	1	1	0	0	4
Row 5: Compare to Event 5:						-1	1	1	0	0	1
Row 6: Compare to Event 6:							1	1	0	0	2
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **1**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1					X		
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Strontium	4660	53	100	73	1300	61	940	49			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			1	1	1	1	1	-1	0	0	4
Row 3: Compare to Event 3:				-1	1	-1	1	-1	0	0	-1
Row 4: Compare to Event 4:					1	-1	1	-1	0	0	0
Row 5: Compare to Event 5:						-1	-1	-1	0	0	-3
Row 6: Compare to Event 6:							1	-1	0	0	0
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-8**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8					X		
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	25	10	7.9	2.5	11	2.5	2.5	2.5			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			-1	-1	1	-1	-1	-1	0	0	-4
Row 3: Compare to Event 3:				-1	1	-1	-1	-1	0	0	-3
Row 4: Compare to Event 4:					1	0	0	0	0	0	1
Row 5: Compare to Event 5:						-1	-1	-1	0	0	-3
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-16**

Confidence Level Chart

S Value	Total No. of Sampling Events						
	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16					X		
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results

	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
X	Trend Is Present (≥90% Confidence)	
X	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	2470	25	25	25	690	25	430	25			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			0	0	1	0	1	0	0	0	2
Row 3: Compare to Event 3:				0	1	0	1	0	0	0	2
Row 4: Compare to Event 4:					1	0	1	0	0	0	2
Row 5: Compare to Event 5:						-1	-1	-1	0	0	-3
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-4**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4					X		
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: WB-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Sulphate	1500	7.9	10	8.3	410	8.5	230	8			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			1	1	1	1	1	1	0	0	6
Row 3: Compare to Event 3:				-1	1	-1	1	-1	0	0	-1
Row 4: Compare to Event 4:					1	1	1	-1	0	0	2
Row 5: Compare to Event 5:						-1	-1	-1	0	0	-3
Row 6: Compare to Event 6:							1	-1	0	0	0
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-4**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4					X		
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Anthracene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0					X		
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Pyrene	0.01	0.036	0.005	0.022	0.005	0.016	0.005	0.018			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	0	0	1
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	0	0	-6
Row 3: Compare to Event 3:				1	0	1	0	1	0	0	3
Row 4: Compare to Event 4:					-1	-1	-1	-1	0	0	-4
Row 5: Compare to Event 5:						1	0	1	0	0	2
Row 6: Compare to Event 6:							-1	1	0	0	0
Row 7: Compare to Event 7:								1	0	0	1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3					X		
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)anthracene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0					X		
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.14	0.028	0.05	0.014	0.05	0.025	0.05	0.02			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			1	-1	1	-1	1	-1	0	0	0
Row 3: Compare to Event 3:				-1	0	-1	0	-1	0	0	-3
Row 4: Compare to Event 4:					1	1	1	1	0	0	4
Row 5: Compare to Event 5:						-1	0	-1	0	0	-2
Row 6: Compare to Event 6:							1	-1	0	0	0
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-9**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9					X		
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Strontium	6130	950	5300	580	5500	1000	6100	630			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			1	-1	1	1	1	-1	0	0	2
Row 3: Compare to Event 3:				-1	1	-1	1	-1	0	0	-1
Row 4: Compare to Event 4:					1	1	1	1	0	0	4
Row 5: Compare to Event 5:						-1	1	-1	0	0	-1
Row 6: Compare to Event 6:							1	-1	0	0	0
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-4**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4					X		
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	25	7.2	25	41	25	2.5	25	2.5			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	0	1	0	-1	0	-1	0	0	-2
Row 2: Compare to Event 2:			1	1	1	-1	1	-1	0	0	2
Row 3: Compare to Event 3:				1	0	-1	0	-1	0	0	-1
Row 4: Compare to Event 4:					-1	-1	-1	-1	0	0	-4
Row 5: Compare to Event 5:						-1	0	-1	0	0	-2
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-7**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7					X		
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Boron	3700	480	2900	330	3600	520	3600	340			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17				
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	0	0	-7
Row 2: Compare to Event 2:			1	-1	1	1	1	-1	0	0	2
Row 3: Compare to Event 3:				-1	1	-1	1	-1	0	0	-1
Row 4: Compare to Event 4:					1	1	1	1	0	0	4
Row 5: Compare to Event 5:						-1	0	-1	0	0	-2
Row 6: Compare to Event 6:							1	-1	0	0	0
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-5**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5					X		
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: BP-1-SW										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Sulphate	2000	270	1500	190	1600	290	2000	210			
	23-Jul-13	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17			
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	0	-1	0	0	-6
Row 2: Compare to Event 2:			1	-1	1	1	1	-1	0	0	2
Row 3: Compare to Event 3:				-1	1	-1	1	-1	0	0	-1
Row 4: Compare to Event 4:					1	1	1	1	0	0	4
Row 5: Compare to Event 5:						-1	1	-1	0	0	-1
Row 6: Compare to Event 6:							1	-1	0	0	0
Row 7: Compare to Event 7:								-1	0	0	-1
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-3**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3					X		
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Anthracene	0.014	0.005	0.005	0.005	0.005	0.005	0.005				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	0	0	0	-6
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-6**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6				X			
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Pyrene	0.03	0.014	0.019	0.005	0.016	0.005	0.018				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	0	0	0	-6
Row 2: Compare to Event 2:			1	-1	1	-1	1	0	0	0	1
Row 3: Compare to Event 3:				-1	-1	-1	-1	0	0	0	-4
Row 4: Compare to Event 4:					1	0	1	0	0	0	2
Row 5: Compare to Event 5:						-1	1	0	0	0	0
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-6**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4							
± 5							
± 6				X			
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzo(a)pyrene	0.005	0.005	0.005	0.005	0.005	0.005	0.005				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		0	0	0	0	0	0	0	0	0	0
Row 2: Compare to Event 2:			0	0	0	0	0	0	0	0	0
Row 3: Compare to Event 3:				0	0	0	0	0	0	0	0
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0				X			
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.027	0.05	0.012	0.05	0.029	0.05	0.018				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		1	-1	1	1	1	-1	0	0	0	2
Row 2: Compare to Event 2:			-1	0	-1	0	-1	0	0	0	-3
Row 3: Compare to Event 3:				1	1	1	1	0	0	0	4
Row 4: Compare to Event 4:					-1	0	-1	0	0	0	-2
Row 5: Compare to Event 5:						1	-1	0	0	0	0
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **0**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0				X			
± 1							
± 2							
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
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± 14							
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± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
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± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Strontium	610	5400	370	5400	890	6100	450				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		1	-1	1	1	1	-1	0	0	0	2
Row 2: Compare to Event 2:			-1	0	-1	1	-1	0	0	0	-2
Row 3: Compare to Event 3:				1	1	1	1	0	0	0	4
Row 4: Compare to Event 4:					-1	1	-1	0	0	0	-1
Row 5: Compare to Event 5:						1	-1	0	0	0	0
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **2**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2				X			
± 3							
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Sum Rows**
Zinc	7.3	25	63	25	15	25	5.8				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		1	1	1	1	1	-1	0	0	0	4
Row 2: Compare to Event 2:			1	0	-1	0	-1	0	0	0	-1
Row 3: Compare to Event 3:				-1	-1	-1	-1	0	0	0	-4
Row 4: Compare to Event 4:					-1	0	-1	0	0	0	-2
Row 5: Compare to Event 5:						1	-1	0	0	0	0
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **-4**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3							
± 4				X			
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Boron	300	3100	180	3500	460	3600	210				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		1	-1	1	1	1	-1	0	0	0	2
Row 2: Compare to Event 2:			-1	1	-1	1	-1	0	0	0	-1
Row 3: Compare to Event 3:				1	1	1	1	0	0	0	4
Row 4: Compare to Event 4:					-1	1	-1	0	0	0	-1
Row 5: Compare to Event 5:						1	-1	0	0	0	0
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3				X			
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Sulphate	170	1300	110	1400	270	2000	150				
	22-Dec-14	27-Jul-15	18-Nov-15	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17				
Row 1: Compare to Event 1:		1	-1	1	1	1	-1	0	0	0	2
Row 2: Compare to Event 2:			-1	1	-1	1	-1	0	0	0	-1
Row 3: Compare to Event 3:				1	1	1	1	0	0	0	4
Row 4: Compare to Event 4:					-1	1	-1	0	0	0	-1
Row 5: Compare to Event 5:						1	-1	0	0	0	0
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart							
S	Total No. of Sampling Events						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3				X			
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
	CV<=1	Plume is Stable
X	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: MW1										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzene	0.001	0.001	0.001	0.002							
	10-Jun-05	16-Aug-05	24-Aug-05	13-Mar-06							
Row 1: Compare to Event 1:		0	0	1	0	0	0	0	0	0	1
Row 2: Compare to Event 2:			0	1	0	0	0	0	0	0	1
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3	X						
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
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± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

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NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: MW1										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzene	0.001	0.001	0.001	0.002							
	10-Jun-05	16-Aug-05	24-Aug-05	13-Mar-06							
Row 1: Compare to Event 1:		0	0	1	0	0	0	0	0	0	1
Row 2: Compare to Event 2:			0	1	0	0	0	0	0	0	1
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3	X						
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
± 28							
± 29							
± 30							
± 31							
± 32							
± 33							
± 34							
± 35							
± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: MW1										
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	10-Jun-05	16-Aug-05	24-Aug-05	13-Mar-06							
Row 1: Compare to Event 1:		0	0	1	0	0	0	0	0	0	1
Row 2: Compare to Event 2:			0	1	0	0	0	0	0	0	1
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

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Mann-Kendall (S) Statistic = **3**

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S	**Total No. of Sampling Events**						
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0							
± 1							
± 2							
± 3	X						
± 4							
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± 6							
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± 11							
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± 34							
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± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

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MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

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Row 2: Compare to Event 2:			0	1	0	0	0	0	0	0	1
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

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± 45							

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MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
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Sydney, Nova Scotia

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Row 2: Compare to Event 2:			0	1	0	0	0	0	0	0	1
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

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MANN-KENDALL PLUME STABILITY ANALYSIS

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Sydney, Nova Scotia

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Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
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Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
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Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
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Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
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Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
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Row 2: Compare to Event 2:			0	1	0	0	0	0	0	0	1
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
± 2							
± 3	X						
± 4							
± 5							
± 6							
± 7							
±8							
± 9							
± 10							
± 11							
± 12							
± 13							
± 14							
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± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							
± 26							
± 27							
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± 36							
± 37							
± 38							
± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

Unshaded area indicates no trend
stable trend (if CV=<1)
fluctuating (if CV>1)

Shaded area indicates
Expanding trend if S>0
Declining trend if S<0

Stability Evaulation Results		
X	No Trend Indicated, Plume Not Diminishing or Expanding	
X	CV<=1	Plume is Stable
	CV>1	Plume is Fluctuating
	Trend Is Present (≥90% Confidence)	
	S < 0	Diminishing Plume
	S > 0	Expanding Plume

MANN-KENDALL PLUME STABILITY ANALYSIS

LTMM Surface Water Monitoring
NS Lands
Sydney, Nova Scotia

MANN-KENDALL ANALYSIS OF PLUME	MONITORING WELL NO: MW1										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Benzene	0.001	0.001	0.001	0.002							
	10-Jun-05	16-Aug-05	24-Aug-05	13-Mar-06							
Row 1: Compare to Event 1:		0	0	1	0	0	0	0	0	0	1
Row 2: Compare to Event 2:			0	1	0	0	0	0	0	0	1
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

1/2 detection limit used for analytical results having no concentrations detected; historical data assumed EQL of 0.001 mg/L

Mann-Kendall (S) Statistic = **3**

Confidence Level Chart							
S	**Total No. of Sampling Events**						
Value	4	5	6	7	8	9	10
0							
± 1							
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± 4							
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± 11							
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± 39							
± 40							
± 41							
± 42							
± 43							
± 44							
± 45							

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	10-Jun-05	16-Aug-05	24-Aug-05	13-Mar-06							
Row 1: Compare to Event 1:		0	0	1	0	0	0	0	0	0	1
Row 2: Compare to Event 2:			0	1	0	0	0	0	0	0	1
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

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Row 2: Compare to Event 2:			0	1	0	0	0	0	0	0	1
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
Row 9: Compare to Event 9:										0	0

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Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
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Row 2: Compare to Event 2:			0	1	0	0	0	0	0	0	1
Row 3: Compare to Event 3:				1	0	0	0	0	0	0	1
Row 4: Compare to Event 4:					0	0	0	0	0	0	0
Row 5: Compare to Event 5:						0	0	0	0	0	0
Row 6: Compare to Event 6:							0	0	0	0	0
Row 7: Compare to Event 7:								0	0	0	0
Row 8: Compare to Event 8:									0	0	0
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