September 9, 2021

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Long-Term Maintenance and Monitoring Semi-Annual Surface Water Quality Monitoring Program Summer 2021 - Final Report

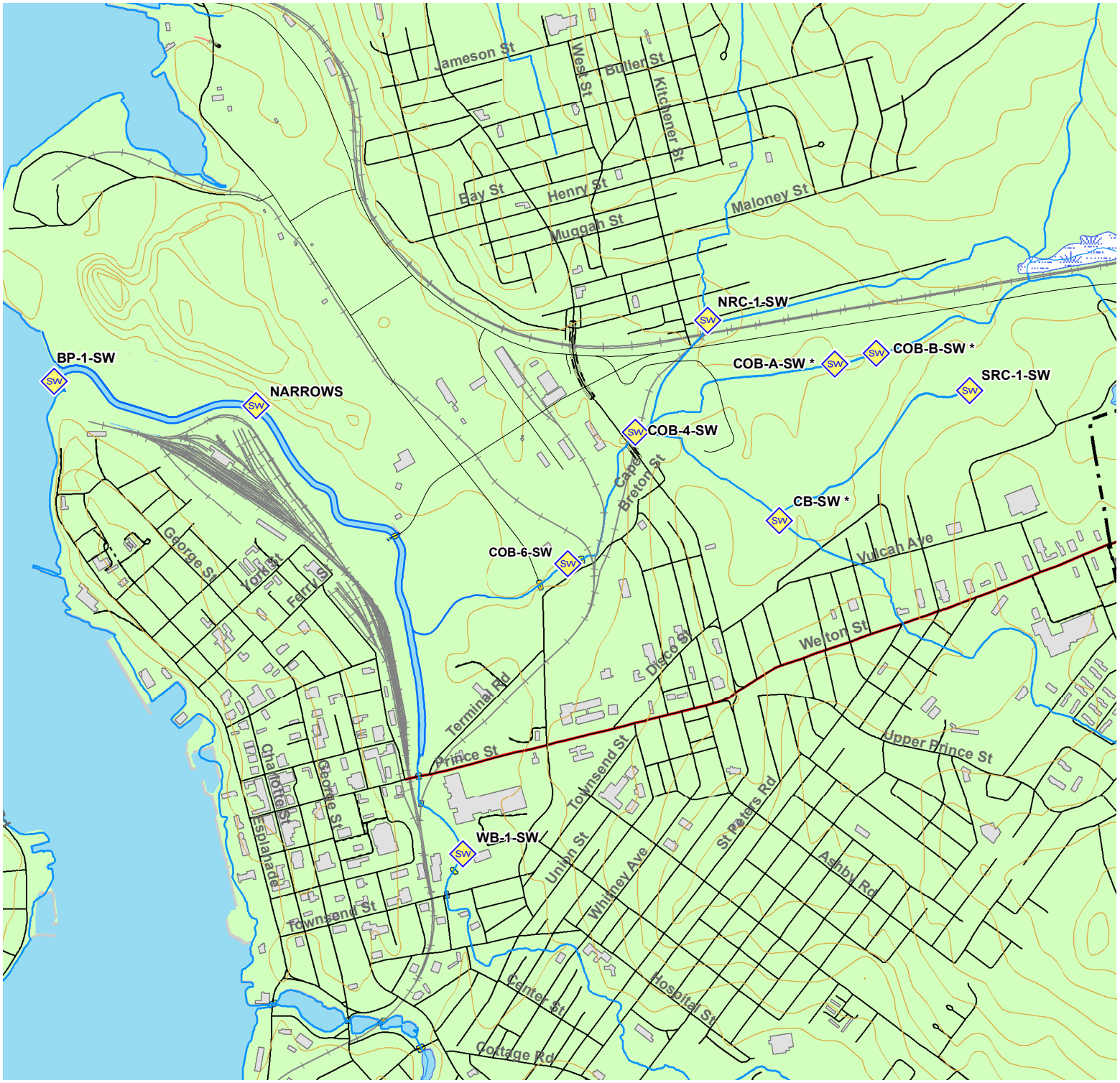
Following completion of the Sydney Tar Ponds and Coke Ovens Remediation Project, surface water quality monitoring was implemented as part of a long-term maintenance and monitoring (LTMM) program to provide ongoing data and compliance commitments to regulatory agencies and/or stakeholders. Nova Scotia Lands Inc. ("NSLI") is a Crown Corporation of the Province of Nova Scotia responsible for the LTMM semi-annual surface water quality program. NSLI retained Dillon Consulting Limited ("Dillon") to conduct the summer (July 2021) LTMM Surface Water Quality Monitoring Program, the details of which are provided herein.

Project Methodology

The summer 2021 Surface Water Quality Monitoring Program, which was completed on July 13, 2021, was planned to 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) (see Figure 1). Surface water samples were not collected at three (i.e., CB-SW, COB-A-SW and COB-B-SW) of the ten stations, as these locations were found to be dry or have standing/stagnant water with no flow.

A GPS unit was used to confirm that the monitoring locations sampled as part of the summer 2021 LTMM surface water quality monitoring program were the same as those used during historical surface water monitoring events (i.e., historical LTMM events and 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 summer 2021 Surface Water Monitoring Program included:

- Documenting ecological activity in the surface water bodies, if observed;
- Recording physical conditions and potential contaminants (i.e., debris, precipitate);
- Measurement of field parameters (i.e., pH, conductivity, temperature, salinity and turbidity);



NS Lands
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LONG TERM MAINTENANCE
AND MONITORING
SURFACE WATER QUALITY MONITORING PROGRAM
July 2021

SURFACE WATER LOCATIONS 2021

FIGURE 1

SW Surface Water Locations

* Dry/Standing Water Only - No Sample

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

DILLON CONSULTING

PROJECT: 20-2862

Date: 2021-08-18

Document Path: G:\GIS\141360\NSLI Figures\Surface Water\Figure 1 Surface Water 2021.mxd

- Flow calculation;
- Collection of two surface water samples (i.e., COB-4-SW and COB-6-SW) for polycyclic aromatic hydrocarbon (PAH) analysis. Of note, following completion of the fall 2020 surface water sampling event, it was recommended that PAH analysis be removed from the program as review of historical data and select PAH indicator parameters indicated that PAH exceedances potentially related to remediation activities, or the site, had not been observed since 2016. NSLI, under the direction of NSE, approved removal of PAH analysis from eight of the ten sampling locations, noting that two (i.e., COB-4-SW and COB-6-SW) of the locations should continue to be sampled for PAHs due to their location downstream of the a water treatment plant outfall; and,
- Collection of seven (noting three of the ten sampling locations were found to be dry or had stagnant/standing water with no flow and, therefore, were not sampled) surface water samples for general chemistry and total metals (including mercury) (RCApMS) analysis.

A summary of the surface water stations included in the summer 2021 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.

Table 1: **Surface Water Quality Monitoring Stations**

Monitoring Station ID	Water Body	Rationale for Sampling
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	Wash 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 electronic 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 (where possible). Due to the depth of surface water at the Narrows and BP-1-SW it was not possible to obtain field measurements across the entire channel widths. Dillon personnel collected as much field data at these deeper locations as safely possible (i.e., from the stream banks/shoreline, and from the bridge at the Narrows). The Muggah Creek North Channel Survey (CBCL Limited, October 2014) provided by NSLI is used in calculating the stream flow velocity for BP-1-SW.

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. The sample bottles for metals analysis contained nitric acid preservative so that dissolved metals remained in solution.

As noted previously, surface water samples were not collected at three (i.e., CB-SW, COB-A-SW and COB-B-SW) of the ten stations, as these locations were found to be dry or have standing water with no flow. Downstream locations of the three sampling points were also assessed as potential sampling points and found to have similar conditions.

Weather Conditions

Weather information obtained from Environment Canada's climate station Sydney CS, near the Sydney Airport, indicates that the total precipitation recorded between July 1, 2021 and July 13, 2021 (the day of the surface water monitoring program) was approximately 67 millimeters (mm). No significant rainfall was recorded on the days preceding the sampling event. No rainfall occurred during the sampling event.

Tidal information obtained from Meteo365 (https://www.tide-forecast.com) for July 13, 2021 indicated a high tide level of 1.21 m and a low tide level of 0.18 m.

Field Observations and Measurements

Observations at the ten surface water stations during the summer 2021 monitoring program are summarized in Table 2. Field measurements are summarized in Table 3.

Table 2: Summer 2021 **Surface Water Quality Monitoring Field Observations**

Monitoring Station ID	Field Observations	Corresponding Photograph Numbers[1]
CB-SW	Sampling location observed to be dry with vegetation growing in the brook and on the banks. No sample collected.	1 and 2
NRC-1-SW	Vegetation observed in the channel and on the banks. Debris (i.e., textile and cigarettes) observed in the channel and on the channel banks.	3 and 4

Table 2: Summer 2021 **Surface Water Quality Monitoring Field Observations**

Monitoring Station ID	Field Observations	Corresponding Photograph Numbers[1]
SRC-1-SW	Moss and algae observed on the concrete channel bottom and edges. Tadpoles and ducks observed. The concrete channel walls have spray painted graffiti visibly dissolving at the high water point. Plastic, Styrofoam, aerosol cans, and metal debris observed in the channel.	5 and 6
COB-A-SW	Sampling location was observed to have pockets of stagnant standing water with no flow. No sample collected. Vegetation growth observed on the brook banks and within the brook. Minor plastic debris observed on banks.	7 and 8
COB-B-SW	Sampling location was observed to have stagnant standing water with no flow. No sample collected. Yellow/orange staining observed on stream bed soils and vegetation lining the brook. What appeared to be a manganese sheen and iron precipitate was observed near the edges of the brook. The historically observed periodic nearby groundwater seep was dry.	9 and 10
COB-4-SW	Vegetation observed growing in and around the brook. Ducks and tadpoles observed. Minor metal and plastic debris observed on the brook banks.	11 and 12
COB-6-SW	Vegetation observed along the channel banks, with moss and algae observed on the channel bottom. Plastic and Styrofoam debris observed along the brook banks.	13 and 14
WB-1-SW	Fish observed in the brook and vegetation observed along brook banks. Metal and wood debris observed in the brook and along the banks.	15 and 16
NARROWS	Snails, seaweed and barnacles observed on the rocks. Minor sheen on water surface. Source unknown.	17 and 18
BP-1-SW	Seaweed, barnacles, and snails observed on the rocks below the high tide water mark. Fish, algae and moss observed in the water.	19 and 20

Note:
1. Photographs are presented in Appendix A.

Table 3: Summer 2021 Surface Water Quality Monitoring Field Measurements

Monitoring Station ID	pH	Turbidity (NTU)	Conductivity (mS/cm)	Salinity (%)	Stream Flow[1] (m^3/s)
CB-SW	Dry				
NRC-1-SW	8.36	0	0.26	0.12	0.02
SRC-1-SW	7.78	48.3	0.624	0.3	0.038
COB-A-SW	7.86[3]	0[3]	0.654[3]	0.42[3]	0
COB-B-SW	7.5[3]	1000[3]	0.874[3]	0.44[3]	0
COB-4-SW	7.97	0	0.586	0.28	0.0567
COB-6-SW	8.38	0	0.667	0.32	0.137
WB-1-SW	8.24	0	0.970	0.45	0.073
NARROWS	7.49	0	45.7	28.42	5.60
BP-1-SW [2]	7.97	0	42.2	27.05	NC[4]

Notes:
1. Stream flow is an approximate calculated value.
2. Collected during low tide conditions.
3. Field reading collected from area of standing water with no flow. No sample was collected.
4. NC denotes not calculated. Information required for the stream flow calculation could not be safely collected during the July 2021 event due to the low tide (i.e., field instrument could not reach far enough into the channel to obtain readings).

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) are the Nova Scotia Contaminated Sites Regulations (NS CSRs) Tier I Environmental Quality Standards (EQS) (which came into effect in 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 August 2021). Analytical results for the remaining two surface water stations included in the monitoring program (i.e., Narrows and BP-1-SW) are 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 NSLI 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 is a non-parametric statistic test routinely used to assess concentration trends (e.g., stable, decreasing, fluctuating, 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 summer 2021 monitoring event, 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 Dillon confirmed that the influence of non-detected data is negligible.

Surface Water Results

The surface water quality results for the summer 2021 event, and available post-remediation surface water data, are presented Tables B-1 and B-2, attached in Appendix B. Laboratory certificates of analysis are presented in Appendix C. As stated above, surface water samples were analyzed for PAHs (i.e., two locations only: COB-4-SW and COB-6-SW) and RCApMS. Samples were delivered to Bureau Veritas Laboratory in Sydney, Nova Scotia for analysis. Bureau Veritas is accredited through the Standard Council of Canada (SCC) and is a member of the Canadian Association for Laboratory Accreditation (CALA).

Review of the summer 2021 data indicates analyzed PAH parameters were non-detect and/or below the comparison criteria. A summary of concentrations of select organic parameters (i.e., naphthalene and benzo(a)pyrene) reported at each station relative to the calculated 95% UCLs is provided in Table 4. There were no PAH exceedances of the relative calculated 95% UCLs during the summer 2021 monitoring event.

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**		
			COB-4-SW	**COB-6-SW**
Naphthalene	1.8	12-22-14	<0.20	<0.20
		07-27-15	<0.20	<0.20
		11-18-15	<0.20	<0.20
		07-22-16	<0.20	<0.20
		12-08-16	<0.20	0.38
		08-03-17	<0.20	<0.20
		12-18-17	<0.20	0.54
		07-25-18	<0.20	<0.20
		11-23-18	<0.20	0.49
		07-29-19	<0.20	<0.20
		12-13-19	<0.20	0.75
		07-21-20	<0.20	<0.20
		12-01-20	<0.20	<0.20
		07-13-21	<0.20	<0.20
Benzo(a)pyrene	0.05	12-22-14	<0.010	<0.010
		07-27-15	<0.010	<0.010
		11-18-15	**0.39**	0.015
		07-22-16	<0.010	<0.010
		12-08-16	0.028	0.027
		08-03-17	<0.010	<0.010
		12-18-18	<0.010	<0.010
		07-25-18	<0.010	<0.010
		11-23-18	<0.010	<0.010
		07-29-19	<0.010	<0.010
		12-13-19	<0.010	<0.010
		07-21-20	<0.010	<0.010
		12-01-20	<0.010	<0.010
		07-13-21	<0.010	<0.010

Notes:

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

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

Review of the summer 2021 general chemistry and metals results indicates:

- Aluminum concentrations ranging from 19 µg/L to 87 µg/L exceeded the Tier I EQS (fresh water) of 5 µg/L in NRC-1-SW, SRC-1-SW, COB-4-SW, COB-6-SW, WB-1-SW, and FD-08 (the duplicate sample of WB-1-SW).
- Boron concentrations of 2,500 ug/L and 2,900 ug/L in the Narrows and BP-1-SW, respectively, exceeded the Tier I EQS (marine water) of 1,200 ug/L.
- Cadmium concentrations of 0.022 µg/L to 0.024 µg/L in WB-1-SW, and FD-08 (the duplicate sample of WB-1-SW), respectively, exceeded the Tier I EQS (fresh water) of 0.01 µg/L.
- The chloride concentration of 180 ug/L in WB-1-SW, and FD-08 (the field duplicate sample of WB-1-SW), exceed the CCME FWAL guideline of 120 ug/L.
- The copper concentration of 2.5 ug/L in COB-4-SW exceeded the Tier I EQS (fresh water) and CCME FWAL guideline of 2 ug/L.
- Iron concentrations of 590 ug/L and 560 ug/L in WB-1-SW, and FD-08 (the field duplicate sample of WB-1-SW), respectively, exceeded the Tier I EQS (fresh water) and CCME FWAL guideline of 300 ug/L.
- Manganese concentrations of 92 ug/L and 150 ug/L in the Narrows and BP-1-SW, respectively, exceeded the Battery Point/Narrows Calculated 95% UCL of 70 ug/L.
- Strontium concentrations ranging from 160 µg/L to 340 µg/L in SRC-1-SW, COB-4-SW, COB-6-SW, WB-1-SW, and FD-08 (the field duplicate sample of WB-1-SW) exceeded the Upstream Calculated 95% UCL of 132 ug/L. The strontium concentrations of 270 ug/L and 340 µg/L in COB-4-SW and COB-6-SW, respectively, also exceeded the Pre-Construction/ Baseline Calculated 95% UCL of 210 ug/L. While the strontium concentration of 110 ug/L at NRC-1-SW did not exceed comparison criteria, it is noted that this concentration is at a level nearly double that of previous concentrations reported for this sampling location.
- Sulphate concentrations ranging from 32 µg/L to 100 µg/L in SRC-1-SW, COB-4-SW, COB-6-SW, WB-1-SW, and FD-08 (the field duplicate sample of WB-1-SW) exceeded the Upstream Calculated 95% UCL of 26 ug/L. The sulphate concentrations ranging from 86 µg/L to 100 ug/L in SRC-1-SW, COB-4-SW and, COB-6-SW also exceeded the Pre-Construction/Baseline Calculated 95% UCL of 84 ug/L.
- The zinc concentration of 14 ug/L in NRC-1-SW exceeded the CCME FWAL calculated guideline of 6.01 ug/L.
- The laboratory detection limits for chromium, cobalt, copper, iron, lead, nickel, selenium and zinc were elevated above one or more comparison criteria for the Narrows and BP-1-SW.

Table 5 provides a summary of concentrations reported for select inorganic parameters relative to the calculated 95% UCLs. Inorganic parameter exceedances of the Upstream Calculated 95% UCLs occurred for sulphate and strontium in SRC-1-SW, COB-4-SW, COB-6-SW, and WB-1-SW. Inorganic parameter exceedances of the Pre-Construction/Baseline Calculated 95% UCLs occurred for sulphate and strontium in COB-4-SW and COB-6-SW, and sulphate in SCR-1-SW. Exceedances of the Battery Point/Narrows Calculated 95% UCL for magnesium also occurred at the Narrows and BP-1-SW.

Trend Analysis

The surface water quality trend analysis for the summer 2021 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. Cadmium at NRC-1-SW and COB-4-SW and pyrene at COB-6-SW indicate declining trends. Cadmium and zinc at SRC-1-SW; boron at COB-4-SW and WB-1-SW; and strontium, sulphate and zinc at WB-1-SW indicated fluctuations with no trend.

Pyrene at COB-4-SW appears to be statistically fluctuating; however, when studied further, results show concentrations are stable (rather than fluctuating) at/near the detection limits of the parameter.

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	12-22-14	26	110	<1.0	0.018	<1.0	<0.40	290	<0.50	190	<1.0	130
	07-27-15	16	28	<1.0	<0.010	<1.0	<0.40	260	<0.50	61	<1.0	**320**
	11-18-15	24	130	<1.0	0.011	<1.0	<0.40	280	<0.50	140	<1.0	**140**
	07-22-16	10	55	1.4	<0.010	<1.0	<0.40	640	<0.50	71	<1.0	**160**
	12-08-16	23	84	<1.0	0.017	<1.0	<0.40	330	<0.50	310	<1.0	110
	08-03-17	12	150	1.4	<0.010	1.0	<0.40	750	0.61	380	<1.0	**340**
	12-18-17	24	91	<1.0	0.015	<1.0	<0.40	300	<0.50	200	<1.0	130
	07-25-18	Dry										
	11-23-18	**32**	91	<1.0	0.014	<1.0	<0.40	210	<0.50	210	<1.0	77
	07-29-19	Dry										
	12-13-19	**35**	**430**	<1.0	0.026	1.3	0.52	830	**2**	270	<0.50	78
	07-21-20	Dry - No Sample										
	12-01-20	**28**	45	<1.0	0.011	<1.0	<0.40	160	<0.50	83	<0.50	99
	07-13-21	Dry - No Sample										
NRC-1-SW	12-22-14	20	58	<1.0	0.022	<1.0	<0.40	150	<0.50	85	<1.0	32
	07-27-15	22	45	<1.0	0.019	<1.0	<0.40	1,300	<0.50	75	<1.0	54
	11-18-15	15	**1,500**	**3.5**	**0.14**	1.9	1.5	**3,800**	**9.5**	**1,100**	<1.0	36
	07-22-16	15	31	<1.0	0.016	<1.0	<0.40	970	0.61	47	<1.0	52
	12-08-16	16	110	<1.0	0.025	<1.0	<0.40	360	0.8	200	<1.0	34
	08-03-17	Dry										
	12-18-17	21	34	<1.0	0.016	<1.0	<0.40	140	<0.50	87	<1.0	31
	07-25-18	12	**270**	<1.0	0.012	<1.0	<0.40	460	0.99	62	<1.0	60
	11-23-18	17	36	<1.0	0.015	<1.0	<0.40	130	<0.50	61	<1.0	35
	07-29-19	15	46	<1.0	0.018	<1.0	<0.40	1400	<0.50	130	<1.0	55
	12-13-19	18	92	<1.0	0.020	<1.0	<0.40	270	<0.50	150	<0.50	34
	07-21-20	11	99	<1.0	0.011	<1.0	<0.40	160	2.7	26	<0.50	60
	12-01-20	**27**	14	<1.0	0.011	<1.0	<0.40	62	<0.50	37	<0.50	47
	07-13-21	18	19	<1.0	<0.010	<1.0	<0.40	130	<0.50	31	<0.50	110
SRC-1-SW	12-22-14	**54**	**290**	<1.0	0.035	<1.0	<0.40	340	1.2	190	<1.0	**150**
	07-27-15	**47**	51	1.0	0.013	<1.0	<0.40	210	1.1	260	<1.0	**150**
	11-18-15	**43**	**240**	<1.0	0.023	1.2	<0.40	310	0.75	230	<1.0	**150**
	07-22-16	**51**	50	**1.9**	0.018	<1.0	<0.40	350	<0.50	350	<1.0	**170**
	12-08-16	**42**	**300**	<1.0	0.039	1.0	<0.40	400	**1.6**	200	<1.0	**140**
	08-03-17	**54**	24	**1.8**	<0.010	<1.0	<0.40	150	<0.50	91	<1.0	**190**
	12-18-17	**50**	**3,000**	**4.1**	**0.31**	4.9	1.7	**4,600**	**10**	**2,200**	<1.0	**140**
	07-25-18	**43**	**2,500**	**4.9**	**0.26**	4.0	1.9	**5,500**	**12**	**2,600**	<1.0	**170**
	11-23-18	**46**	**320**	<1.0	0.027	<1.0	<0.40	420	**1.3**	160	<1.0	130
	07-29-19	Insufficient Water Present - No Sample										
	12-13-19	**47**	**460**	1.2	0.034	1.4	<0.40	770	**1.6**	150	<0.50	130
	07-21-20	**98**	96	**1.8**	0.019	<1.0	<0.40	350	<0.50	280	<0.50	200
	12-01-20	**43**	190	<1.0	0.017	<1.0	<0.40	280	0.72	190	<0.50	**150**
	07-13-21	**86**	19	1.3	<0.010	<1.0	<0.40	170	<0.50	94	<0.50	**160**

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**
COB-A-SW	12-22-14	**160**	16	<1.0	<0.010	<1.0	<0.40	51	<0.50	25	<1.0	**260**
	07-27-15	Dry										
	11-18-15	**170**	5.1	<1.0	<0.010	<1.0	<0.40	82	<0.50	74	<1.0	**260**
	07-22-16	Dry										
	12-08-16	**150**	8.5	<1.0	<0.010	<1.0	<0.40	68	<0.50	92	<1.0	**250**
	08-03-17	Dry										
	12-18-17	Dry										
	07-25-18	**100**	**300**	**2.6**	0.058	<1.0	1.6	**9,100**	**1.4**	**2,900**	<1.0	**270**
	11-23-18	**110**	46	<1.0	<0.010	<1.0	<0.40	810	<0.50	300	<1.0	**210**
	07-29-19	**100**	10	<1.0	<0.010	<1.0	<0.40	240	<0.50	290	<1.0	**240**
	12-13-19	**120**	7.5	<1.0	<0.010	<1.0	<0.40	<50	<0.50	35	<0.50	**220**
	07-21-20	Dry - No Sample										
	12-01-20	Standing Water/No Flow - No Sample										
	07-13-21	Standing Water/No Flow - No Sample										
COB-B-SW[2]	12-22-14	Dry										
	11-18-15	**190**	7.9	<1.0	<0.010	<1.0	<0.40	<50	<0.50	21	<1.0	**250**
	07-22-16	Dry										
	12-08-16	**440**	13	<1.0	0.027	<1.0	0.90	130	<0.50	**1,400**	<1.0	**480**
	08-03-17	Dry										
	12-18-17	**120**	6.7	<1.0	<0.010	<1.0	0.42	110	<0.50	490	<1.0	**190**
	07-25-18	Dry										
	11-23-18	**110**	7.0	<1.0	<0.010	<1.0	0.46	200	<0.50	500	<1.0	**200**
	07-29-19	Dry										
	12-13-19	**120**	6.1	<1.0	<0.010	<1.0	<0.40	78	<0.50	190	<0.50	**200**
	07-21-20	**140**	6	<1.0	<0.010	<1.0	<0.40	85	<0.50	210	<0.50	**240**
	12-01-20	**150**	6.4	<1.0	<0.010	<1.0	<0.40	96	<0.50	210	<0.50	**220**
	07-13-21	Standing Water/No Flow - No Sample										
COB-4-SW	12-22-14	**47**	82	<1.0	0.014	<1.0	<0.40	210	<0.50	95	<1.0	**140**
	07-27-15	**100**	51	<1.0	<0.010	<1.0	<0.40	460	<0.50	110	<1.0	**250**
	11-18-15	**41**	**7,100**	**13**	**0.29**	8.0	4.6	**14,000**	**37**	**1,500**	<1.0	**150**
	07-22-16	**74**	28	<1.0	<0.010	<1.0	<0.40	300	<0.50	140	<1.0	**270**
	12-08-16	**39**	120	<1.0	0.014	<1.0	<0.40	390	0.99	180	<1.0	110
	08-03-17	**110**	14	<1.0	0.011	<1.0	<0.40	83	<0.50	130	<1.0	**450**
	12-18-17	**42**	53	<1.0	0.010	<1.0	<0.40	270	<0.50	120	<1.0	110
	07-25-18	**100**	43	1.0	<0.010	<1.0	<0.40	51	0.75	23	<1.0	**430**
	11-23-18	**41**	140	<1.0	0.014	<1.0	<0.40	230	0.55	99	<1.0	130
	07-29-19	**69**	28	<1.0	<0.010	<1.0	<0.40	370	<0.50	150	<1.0	**230**
	12-13-19	**43**	35	<1.0	0.015	<1.0	<0.40	170	<0.50	130	<0.50	**110**
	07-21-20	**99**	20	<1.0	<0.010	<1.0	<0.40	120	<0.50	220	<0.50	**340**
	12-01-20	**57**	41	<1.0	<0.010	<1.0	<0.40	160	<0.50	160	<0.50	**170**
	07-13-21	**91**	58	<1.0	<0.010	<1.0	<0.40	250	<0.50	210	<0.50	**270**

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**
COB-6-SW	12-22-14	**56**	61	<1.0	0.01	<1.0	<0.40	170	<0.50	56	<1.0	**180**
	07-27-15	**91**	39	<1.0	<0.010	<1.0	<0.40	160	<0.50	23	<1.0	**300**
	11-18-15	**44**	220	<1.0	0.018	<1.0	<0.40	490	**1.5**	79	<1.0	**180**
	07-22-16	**64**	46	1.0	<0.010	<1.0	<0.40	180	<0.50	37	<1.0	**300**
	12-08-16	**41**	200	<1.0	0.015	<1.0	<0.40	360	1.0	110	<1.0	**160**
	08-03-17	**110**	42	1.3	0.011	<1.0	<0.40	<50	<0.50	35	<1.0	**500**
	12-18-17	**48**	130	<1.0	0.010	<1.0	<0.40	260	<0.50	73	<1.0	**160**
	07-25-18	**95**	23	<1.0	<0.010	<1.0	<0.40	140	<0.50	110	<1.0	**350**
	11-23-18	**45**	150	<1.0	0.015	<1.0	<0.40	360	0.87	130	<1.0	**140**
	07-29-19	**76**	37	<1.0	<0.010	<1.0	<0.40	130	<0.50	31	<1.0	**300**
	12-13-19	**49**	88	<1.0	0.014	<1.0	<0.40	220	<0.50	88	<0.50	**150**
	07-21-20	**110**	32	<1.0	0.016	<1.0	<0.40	<50	<0.50	32	<0.50	**430**
	12-01-20	**54**	52	<1.0	<0.010	<1.0	<0.40	120	<0.50	56	<0.50	**180**
	07-13-21	**100**	34	<1.0	<0.010	<1.0	<0.40	68	<0.50	32	<0.50	**340**
WB-1-SW	12-22-14	7.9	160	<1.0	0.038	<1.0	<0.40	270	0.71	95	<1.0	53
	07-27-15	10	89	<1.0	0.012	<1.0	<0.40	480	<0.50	41	<1.0	100
	11-18-15	8.3	63	<1.0	<0.010	<1.0	<0.40	200	<0.50	43	<1.0	73
	07-22-16	**410**	87	<1.0	0.035	<1.0	<0.40	590	0.56	160	<1.0	**1300**
	12-08-16	8.4	100	<1.0	0.026	<1.0	<0.40	220	<0.50	100	<1.0	61
	08-03-17	**230**	28	1.0	0.027	<1.0	<0.40	680	<0.50	450	<1.0	**940**
	12-18-17	8.0	110	<1.0	0.022	<1.0	<0.40	190	<0.50	63	<1.0	49
	07-25-18	**71**	120	<1.0	0.024	<1.0	<0.40	330	**1.8**	140	<1.0	**320**
	11-23-18	6.5	**1200**	**4.3**	**0.15**	3.5	1.2	**3700**	**28**	200	<1.0	50
	07-29-19	14	69	<1.0	0.02	<1.0	<0.40	290	<0.50	64	<1.0	120
	12-13-19	6.6	110	<1.0	0.027	<1.0	<0.40	210	<0.50	67	<0.50	39
	07-21-20	**330**	55	<1.0	0.087	<1.0	<0.40	420	<0.50	610	<0.50	**1200**
	12-01-20	7.0	110	<1.0	0.027	<1.0	<0.40	330	<0.50	69	<0.50	57
	07-13-21	**32**	87	<1.0	0.024	<1.0	<0.40	590	0.74	68	<0.50	**160**

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**
Battery Point/Narrows Calculated 95% UCL[1]		**2,180**	**-**	**-**	**-**	**-**	**0.9**	**190**	**-**	**70**	**-**	**7,000**
NARROWS	12-22-14	270	110	<1.0	0.027	<1.0	<0.40	***250***	<0.50	63	<1.0	610
	07-27-15	1,500	86	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***100***	<10	5,400
	11-18-15	110	76	<1.0	0.012	<1.0	<0.40	***320***	<0.50	45	<1.0	370
	07-22-16	1,400	51	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***120***	<10	5,400
	12-08-16	270	75	<1.0	0.029	<1.0	<0.40	***250***	<0.50	***110***	<1.0	890
	08-03-17	2,000	<50	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***110***	<10	6,100
	12-18-17	150	110	<1.0	0.018	<1.0	<0.40	***280***	<0.50	***72***	<1.0	450
	07-25-18	1,700	56	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***100***	<10	5,000
	11-23-18	180	86	<1.0	0.021	<1.0	<0.40	***220***	<0.50	52	<1.0	500
	07-29-19	1,700	110	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***120***	<10	5,000
	12-13-19	120	110	<1.0	0.021	<1.0	<0.40	***290***	<0.50	65	<0.50	340
	07-21-20	2,100	66	<10	0.13	<10	*<4.0*	*<500*	<5.0	***120***	<5.0	5,600
	12-01-20	1,700	<50	<10	<0.10	<10	*<4.0*	*<500*	<5.0	38	<5.0	4,500
	07-13-21	1,700	<50	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***92***	<5.0	4,100
BP-1-SW	12-22-14	170	110	<1.0	0.028	<1.0	<0.40	***240***	<0.50	61	<1.0	950
	07-27-15	1,300	140	<10	<0.10	<10	*<4.0*	*<500*	<5.0	59	<10	5,300
	11-18-15	190	140	<1.0	0.014	<1.0	<0.40	***410***	<0.50	57	<1.0	580
	07-22-16	1,600	63	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***71***	<10	5,500
	12-08-16	290	86	<1.0	0.025	<1.0	<0.40	***280***	<0.50	***100***	<1.0	1,000
	08-03-17	2,000	<50	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***110***	<10	6,100
	12-18-17	210	95	<1.0	0.020	<1.0	<0.40	***220***	<0.50	60	<1.0	630
	07-25-18	1,900	58	<10	<0.10	<10	*<4.0*	***1,000***	<5.0	***94***	<10	5,900
	11-23-18	250	86	<1.0	0.024	<1.0	<0.40	***240***	<0.50	50	<1.0	730
	07-29-19	1,700	<50	<10	<0.10	<10	*<4.0*	*<500*	<5.0	50	<10	5,000
	12-13-19	250	88	<1.0	0.021	<1.0	*<0.40*	***220***	<0.50	51	<0.50	660
	07-21-20	2,100	63	<10	0.110	<10	*<4.0*	*<500*	<5.0	44	<5.0	5,500
	12-01-20	2,100	<50	<10	<0.10	<10	*<4.0*	*<500*	<5.0	22	<5.0	5,600
	07-13-21	1,900	<50	<10	<0.10	<10	*<4.0*	*<500*	<5.0	***150***	<5.0	4,800

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 no concern relative to data quality.

One field duplicate sample (i.e., FD-08) was collected at WB-1-SW during the summer 2021 monitoring event. The relative percent difference (RPD) was calculated between the original 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). Calculations indicate that the RPDs of the analyzed parameters were within the acceptable RPD range (i.e., 40% for organics and 25% for inorganics), with calculated RPDs ranging from 0% to 18.75%. The data quality is considered acceptable and the results representative. There were no holding time exceedances.

Summary

Analytical results of the summer 2021 Surface Water Monitoring Program indicate that concentrations of the analyzed parameters are generally 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 Summer 2021

Parameter	Location (Criteria and/or 95% UCL Exceedance)
General Chemistry and Metals	
Aluminum	• NRC-1-SW (Tier I EQS (fresh water)) • SRC-1-SW (Tier I EQS (fresh water)) • COB-4-SW (Tier I EQS (fresh water)) • COB-6-SW (Tier I EQS (fresh water)) • WB-1-SW and FD=08 (the field duplicate sample of WB-1-SW)) (Tier I EQS (fresh water))
Boron	• BP-1-SW (Tier I EQS (marine water)) • Narrows (Tier I EQS (marine water))
Cadmium	• WB-1-SW and FD-08 (the field duplicate sample of WB-1-SW) (Tier I EQS (fresh water))
Chloride	• WB-1-SW and FD=08 (the field duplicate sample of WB-1-SW) (CCME FWAL)
Copper	• COB-4-SW (Tier I EQS (fresh water) and CCME FWAL)

Table 6: **Summary of Surface Water Station** Criteria and 95% UCL Exceedances Summer 2021

Parameter	Location (Criteria and/or 95% UCL Exceedance)
Iron	• WB-1-SW and FD=08 (the field duplicate sample of WB-1-SW) (Tier I EQS (fresh water) and CCME FWAL)
Manganese	• Narrows (Battery Point/Narrows Calculated 95% UCL) • BP-1-SW (Battery Point/Narrows Calculated 95% UCL)
Strontium	• SRC-1-SW (Upstream Calculated 95% UCL) • COB-4-SW (Upstream Calculated 95% UCL and Pre-Construction/ Baseline Calculated 95% UCL) • COB-6-SW (Upstream Calculated 95% UCL and Pre-Construction/ Baseline Calculated 95% UCL) • WB-1-SW and FD=08 (the field duplicate samples of WB-1-SW) (Upstream Calculated 95% UCL)
Sulphate	• SRC-1-SW (Upstream Calculated 95% UCL and Pre-Construction/Baseline Calculated) • COB-4-SW (Upstream Calculated 95% UCL and Pre-Construction/Baseline Calculated) • COB-6-SW (Upstream Calculated 95% UCL and Pre-Construction/Baseline Calculated) • WB-1-SW and FD=08 (the field duplicate samples of WB-1-SW) (Upstream Calculated 95% UCL)
Zinc	• NRC-1-SW (CCME FWAL)

Review of the surface water analytical data from the summer 2021 monitoring event indicates findings are generally consistent with past LTMM events, with the following exceptions:

- NRC-1-SW: The zinc exceedance of the CCME FWAL guideline is the first exceedance observed for this parameter at this location since 2015; and
- COB-4-SW: The copper exceedance of the Tier I EQS (fresh water) and CCME FWAL guideline is the first exceedance for this parameter at this location since 2015.
- The manganese exceedance of the Battery Point/Narrows Calculated 95% UCL is the highest concentration observed for this parameter at this location since the LTMM commenced.
- While the strontium concentration of 110 ug/L at NRC-1-SW did not exceed comparison criteria, it is noted that this concentration is at a level nearly double that of previous concentrations reported for this sampling location.

Recommendations

The next semi-annual surface water monitoring event will be conducted in fall 2021. It is recommended that the fall 2021 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 RCApMS analysis. Samples will be collected from COB-4-SW and COB-6-SW for PAH 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, Associate

NJW:kme

Attachments
Our file: 20-2862

Appendix A

Site Photographs

Photo No. 1: View of CB-SW looking southeast.

Photo No. 2: View of CB-SW looking northwest.

Photo No. 3: View of NRC-1-SW looking north.

Photo No. 4: View of NRC-1-SW looking southeast.

Photo No. 5: View of SRC-1-SW looking northwest.

Photo No. 6: View of SRC-1-SW looking east**.**

Photo No. 7: View northeast of COB-A-SW, looking northeast.

Photo No. 8: View of COB-A-SW looking west.

Photo No. 9: View of COB-B-SW looking northeast.

Photo No. 10: View of nearby intermittent groundwater surface seepage location north of COB-B-SW. Seepage was observed to be dry during the summer 2021 sampling event.

Photo No. 11: View of COB-4-SW looking west.

Photo No. 12: View of COB-4-SW looking northeast.

Photo No. 13: View of COB-6-SW looking west.

Photo No. 14: View of COB-6-SW looking northeast.

Photo No. 15: View of WB-1-SW looking northeast.

Photo No. 16: View of WB-1-SW looking southwest.

Photo No. 17: View of the Narrows looking northwest.

Photo No. 18: View of the Narrows looking east.

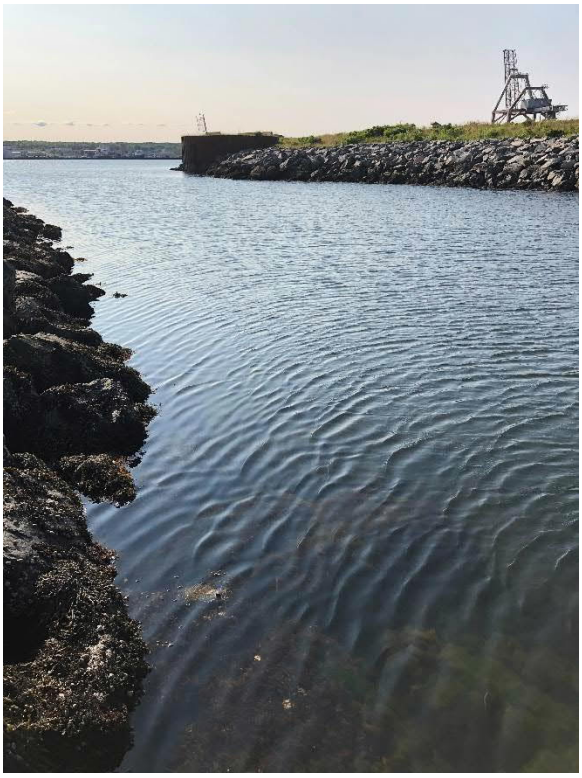

Photo No. 19: View of BP-1-SW looking northwest.

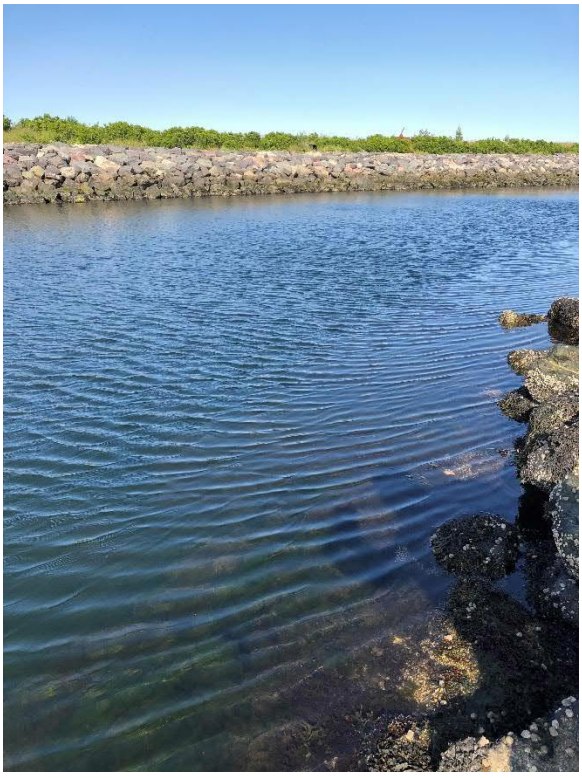

Photo No. 20: View of BP-1-SW looking east.

Appendix B

Tables

TABLE B-1

LTMM SURFACE WATER QUALITY MONITORING PROGRAM - SUMMER 2021
SURFACE WATER ANALYTICAL RESULTS - PAHs

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-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**
	08-03-17	<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
	07-25-18	0.011	<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	<0.010
	11-23-18	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.012	<0.010
	07-29-19	0.029	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.016	<0.010	<0.050	<0.050	<0.20	<0.020 *	0.013	<0.010
	12-13-19	0.031	<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	<0.050	<0.050	<0.20	<0.010	0.011	<0.010
	07-21-20	0.037	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.018	<0.010	<0.050	<0.050	<0.20	<0.010	0.013	<0.010
	12-01-20	0.025	<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	0.014	<0.010
	07-13-21	0.035	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	0.022	<0.010	<0.050	<0.050	<0.20	<0.010	0.013	<0.010

TABLE B-1
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - SUMMER 2021
SURFACE WATER ANALYTICAL RESULTS - PAHs

Sample Location	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Perylene	Phenanthrene	Pyrene
Units		µg/L																			
COB-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
	08-03-17	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
	07-25-18	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
	11-23-18	0.15	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	0.076	<0.010	0.13	0.062	0.49	<0.010	0.043	0.01
	07-29-19	<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	<0.020 *	<0.010	<0.010
	12-13-19	0.19	0.019	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.091	<0.010	0.18	0.083	0.75	<0.010	0.049	0.015
	07-21-20	<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
	12-01-20	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
	07-13-21	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010

NOTES:

ug/L - micrograms 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) accessed online August 2021.

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)
Shading	Concentration exceeds CCME FWAL
Double Underline	Concentration exceeds Upstream 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
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - SUMMER 2021
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

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)
	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
	NSE Tier 1 EQS Fresh Water [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CCME FWAL [2]	-	-	-	-	-	-	120	-	-	-	13	0.06	-	10.3 [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
	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
	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
	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
	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
	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
	8-3-17	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
	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
	07-25-18	DRY - NO SAMPLE																											
	11-23-18	68000	1300	29000	3500	58	32	130	6.5	<0.010	<100	0.19	<0.010	0.19	0.059	36	5.8	1.2	550	7.70	88	58	<1.0	300	5.38	6.11	-0.494	-0.743	8.19
	07-29-19	DRY - NO SAMPLE																											
	12-13-19	24000	1400	31000	3900	66	35	42	7.3	0.011	<100	0.21	<0.010	0.21	0.053	27	4.6	10	310	7.93	94	66	<1.0	190	3.24	3.68	-0.139	-0.389	8.07
	07-21-20	DRY - NO SAMPLE																											
	12-01-20	25000	1500	29000	3700	62	28	43	5.9	0.024	<100	0.13	0.014	0.14	0.063	27	6.8	1.8	310	7.66	87	62	<1.0	170	3.05	3.21	-0.464	-0.714	8.13
	07-13-21	DRY - NO SAMPLE																											
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
	07/23/13[L]	NM	NM	NM	NM	NM	19	27	9.5	0.028	NM	NM	0.011	0.1	NM	16	NM	NM	220	8.22	NM	NM	NM	NM	NM	NM	NM	NM	NM
	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
	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
	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
	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
	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
	8-3-17	DRY - NO SAMPLE																											
	12-18-17	15000	730	12000	1700	21	21	25	5.7	<0.010	<100	0.21	<0.010	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
	07-25-18	25000	770	20000	2400	48	12	39	5.5	<0.010	<100	0.12	<0.010	0.12	<0.050	24	6.4	1.7	260	7.73	59	48	<1.0	140	2.32	0.22	-0.657	-0.907	8.38
	11-23-18	49000	710	12000	1700	21	17	87	5.0	<0.010	<100	0.14	<0.010	0.14	<0.050	12	2.7	0.89	350	6.98	38	21	<1.0	190	3.24	5.37	-1.99	-2.24	8.97
	07-29-19	24000	630	19000	2400	52	15	34	6.6	<0.010	<100	<0.010	0.077	0.077	<0.050	49	6.2	2.7	220	7.86	57	52	<1.0	130	2.32	1.98	-0.508	-0.759	8.37
	12-13-19	17000	680	13000	1700	26	18	29	5.5	<0.010	<100	0.17	<0.010	0.17	<0.050	11	2.4	0.87	160	7.11	38	26	<1.0	100	1.71	5.88	-1.71	-1.96	8.82
	07-21-20	17000	680	18000	1600	44	11	30	4.9	<0.010	<100	<0.050	<0.010	<0.050	0.05	13	4.8	1.3	200	7.67	52	44	<1.0	110	1.95	4	-0.775	-1.03	8.44
	12-01-20	20000	760	16000	2200	24	27	37	4.8	<0.010	<100	0.11	<0.010	0.11	<0.050	5.6	2.1	0.27	220	7.42	49	24	<1.0	120	2.08	5.32	-1.35	-1.60	8.77
	07-13-21	24000	820	21000	2700	60	18	28	5.7	0.020	<100	<0.050	<0.010	<0.050	<0.050	12	3.9	0.77	240	7.70	63	59	<1.0	140	2.35	0.64	-0.572	-0.822	8.27
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
	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
	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
	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
	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
	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
	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
	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
	8-3-17	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
	12-18-17	24000	5200	110000	22000	86	290	25	13	<0.3	<100	0.17	<0.06	0.17	0.2	72	2.6	17	740	7.7	380	85	<1	545	8.39	2.1	0.214	-0.034	7.49
	07-25-18[FD]	45000	2700	50000	6000	120	43	63	1.8	<0.010	140	0.066	<0.010	0.066	<0.050	19	8.5	250	530	8	150	120	1.1	290	5.06	1.65	0.348	0.099	7.65
	07-25-18	48000	2700	48000	2600	110	43	69	2.0	<0.010	180	0.085	<0.010	0.085	<0.050	18	11	140	540	8.14	140	110	1.4	290	5.09	0.1	0.447	0.197	7.69
	11-23-18	50000	2200	40000	4400	91	46	90	7.7	<0.010	<100	0.19	0.011	0.20	0.41	22	5.3	6.8	530	7.71	120	91	<1.0	300	5.32	6.61	-0.152	-0.401	7.86
	07-29-19	INSUFFICIENT WATER PRESENT - NO SAMPLE																											
	12-13-19	48000	2300	42000	4400	89	47	74	7.6	<0.010	<100	0.19	0.012	0.21	0.24	23	4.9	18	500	7.72	120	88	<1.0	280	4.87	2.10	-0.117	-0.366	7.84
	07-21-20	65000	4600	74000	8200	120	98	99	7.2	<0.010	<100	0.24	<0.010	0.24	0.06	14	6.2	3	730	7.82	220	120	<1.0	430	7.21	0.62	0.307	0.058	7.52
	12-01-20	47000	2300	46000	5000	100	43	75	6.9	<0.010	<100	0.10	<0.010	0.10	<0.050	13	5.0	6.1	520	7.90	140	100	<1.0	290	5.03	2.34	0.144	-0.106	7.75
	07-13-21	47000	4300	61000	6500	110	86	66	6.6	<0.010	<100	0.50	0.012	0.51	0.064	16	6.2	1.4	610	7.80	180	110	<1.0	340	5.8	0.35	0.176	-0.073	7.62

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - SUMMER 2021
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

Sample Location	Sample Date	Sat. pH (@4C)	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	unitless	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	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 [6]	1 [4]	-	2 [6]	300	1 [7]	-	0.026	73	25 [8]	1	0.25	-	0.8	-	-	15	-	See Note [9]
	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	7.8	**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	8.41	**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	8.15	**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	8.33	**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	8.32	**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	8.4	**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	8.18	**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	8.39	**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
	07-25-18		DRY - NO SAMPLE																									
	11-23-18	8.44	**91**	<1.0	<1.0	16	<1.0	<2.0	<50	**0.014**	<1.0	<0.40	<2.0	210	<0.50	210	<0.013	<2.0	<2.0	<1.0	<0.10	77	<0.10	<2.0	2.4	0.19	<2.0	5.5
	07-29-19		DRY - NO SAMPLE																									
	12-13-19	8.32	**430**	<1.0	<1.0	15	<1.0	<2.0	<50	**0.026**	1.3	0.52	**2.6**	**830**	**2.0**	270	<0.013	<2.0	<2.0	<0.50	<0.10	78	<0.10	<2.0	11	0.22	2.5	12
	07-21-20		DRY - NO SAMPLE																									
	12-01-20	8.38	**45**	<1.0	<1.0	15	<1.0	<2.0	<50	**0.011**	<1.0	<0.40	1.4	160	<0.50	83	<0.013	<2.0	<2.0	<0.50	<0.10	99	<0.10	<2.0	<2.0	0.11	<2.0	6.5
	07-13-21		DRY - NO SAMPLE																									
NRC-1-SW	07-23-13	8.73	**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
	07/23/13 [L]	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	12-22-14	9.28	**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	8.68	**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	9.11	**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	8.66	**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	9.2	**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	9.2	**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
	07-25-18	8.63	**270**	<1.0	<1.0	14	<1.0	<2.0	<50	**0.012**	<1.0	<0.40	**2.5**	**460**	0.99	62	<0.013	<2.0	<2.0	<1.0	<0.10	60	<0.10	<2.0	7.0	0.10	<2.0	<5.0
	11-23-18	9.22	**36**	<1.0	<1.0	13	<1.0	<2.0	<50	**0.015**	<1.0	<0.40	<2.0	130	<0.50	61	<0.013	<2.0	<2.0	<1.0	<0.10	35	<0.10	<2.0	<2.0	<0.1	<2.0	6.7
	07-29-19	8.62	**46**	<1.0	<1.0	9.7	<1.0	<2.0	<50	**0.018**	<1.0	<0.40	0.77	**1400**	<0.50	130	<0.013	<2.0	<2.0	<1.0	<0.10	55	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	12-13-19	9.07	**92**	<1.0	<1.0	12	<1.0	<2.0	<50	**0.020**	<1.0	<0.40	0.82	270	<0.50	150	<0.013	<2.0	<2.0	<0.50	<0.10	34	<0.10	<2.0	2.1	<0.10	<2.0	5.1
	07-21-20	8.70	**99**	<1.0	<1.0	11	<1.0	<2.0	<50	**0.011**	<1.0	<0.40	1.9	160	**2.7**	26	<0.013	<2.0	<2.0	<0.50	<0.10	60	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	12-01-20	9.02	**14**	<1.0	<1.0	13	<1.0	<2.0	<50	**0.011**	<1.0	<0.40	0.54	62	<0.50	37	<0.013	<2.0	<2.0	<0.50	<0.10	47	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	07-13-21	8.52	**19**	<1.0	<1.0	26	<1.0	<2.0	<50	<0.010	<1.0	<0.40	1.2	130	<0.50	31	<0.013	<2.0	<2.0	<0.50	<0.10	110	<0.10	<2.0	<2.0	<0.10	<2.0	14
SRC-1-SW	07-23-13	7.92	**29**	<1.0	1.2	10.2	<1.0	<2.0	57	<0.01	<1.0	<0.40	<2.0	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]	8.06	**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	8.06	**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]	8.06	**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	8.07	**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	8.07	**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	7.98	**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	8.12	**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	7.91	**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	0.4	<2.0	<5.0
	12-18-17	7.73	**17**	<0.4	<0.6	25	<0.5	<2	<100	0.017	2.8	2.1	<2	**1400**	<1	1500	<0.013	<4	<3	<1	<0.1	350	<0.8	<20	<3	0.31	<2.0	6.2
	07-25-18 [FD]	7.9	**1600**	<1.0	3.5	45	<1.0	<2.0	120	**0.18**	2.5	1.2	**5.3**	3400	**9.5**	2600	**0.04**	<2.0	2.1	<1.0	<0.10	180	<0.10	<2.0	34	0.54	4.9	**30**
	07-25-18	7.94	**2500**	1.1	4.9	58	<1.0	<2.0	120	**0.26**	4.0	1.9	**7.9**	5500	**12**	2600	**0.04**	<2.0	3.4	<1.0	<0.10	170	<0.10	<2.0	50	0.56	**7.4**	**47**
	11-23-18	8.11	**320**	<1.0	<1.0	16	<1.0	<2.0	74	**0.027**	<1.0	<0.40	**2.7**	**420**	**1.3**	160	<0.013	<2.0	<2.0	<1.0	<0.10	130	<0.10	<2.0	9.3	0.32	<2.0	6.2
	07-29-19		INSUFFICIENT WATER PRESENT - NO SAMPLE																									
	12-13-19	8.09	**460**	<1.0	1.2	19	<1.0	<2.0	74	**0.034**	1.4	<0.40	**2.8**	**770**	**1.6**	150	<0.013	<2.0	<2.0	<0.5	<0.10	130	<0.10	<2.0	13	0.39	<2.0	7.3
	07-21-20	7.77	**96**	<1.0	1.8	24	<1.0	<2.0	210	**0.019**	<1.0	<0.40	1.9	**350**	<0.50	280	<0.013	<2.0	<2.0	<0.5	<0.10	200	<0.10	<2.0	2.8	0.47	<2.0	<5.0
	12-01-20	8.00	**190**	<1.0	<1.0	16	<1.0	<2.0	<50	**0.017**	<1.0	<0.40	1.9	280	0.72	190	<0.013	<2.0	<2.0	<0.50	<0.10	150	<0.10	<2.0	5.9	0.34	<2.0	<5.0
	07-13-21	7.87	**19**	<1.0	1.3	13	<1.0	<2.0	200	<0.010	<1.0	<0.40	1.6	170	<0.50	94	<0.013	<2.0	<2.0	<0.50	<0.10	160	<0.10	<2.0	<2.0	0.42	<2.0	<5.0

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - SUMMER 2021
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

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)
	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
	NSE Tier 1 EQS Fresh Water [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CCME FWAL [2]	-	-	-	-	-	-	120	-	-	-	13	0.06	-	10.3 [3]	-	-	-	-	6.5-9.0	-	-	-	-	-	-	-	-	-
	Upstream Calculated 95% UCL	-	-	-	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pre-Construction/Baseline Calculated 95% UCL	-	-	-	-	-	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	1,510	22.8	3.51	1	0.756	6.9
	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
	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
	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
	8-3-17	DRY - NO SAMPLE																											
	12-18-17	DRY - NO SAMPLE																											
	07-25-18	27000	1600	80	9300	140	100	37	16	<0.010	0.16	<0.05	<0.010	<0.05	<0.050	8.2	3.3	2.4	600	8.05	240	140	1.5	370	5.99	2.44	0.658	0.409	7.39
	11-23-18	21000	2300	70000	10,000	110	110	32	13	<0.010	<100	0.24	<0.010	0.24	0.050	6.2	2.3	14	540	7.78	220	110	<1.0	330	5.42	0.840	0.216	-0.033	7.56
	07-29-19	29000	1700	75000	9,000	140	100	40	15	<0.010	<100	<0.010	<0.050	<0.050	<0.050	9.2	2.6	0.84	550	8.02	220	140	1.4	360	6.09	2.78	0.611	0.363	7.41
	12-13-19	21000	2100	71000	9700	110	120	33	13	<0.010	<100	0.21	0.011	0.22	<0.050	5.1	2.5	0.21	510	7.95	220	110	<1.0	330	5.58	2.48	0.405	0.156	7.54
	07-21-20	DRY - NO SAMPLE																											
	12-01-20	STANDING WATER/NO FLOW - NO SAMPLE																											
	07-13-21	STANDING WATER/NO FLOW - 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
	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	1,000	16.7	2.77	0.378	0.132	7.02
	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
	07-25-18	DRY - NO SAMPLE																											
	11-23-18	21000	2200	65000	9200	95	110	32	11	<0.010	<100	0.30	<0.010	0.30	0.065	6.2	2.2	1.1	520	7.41	200	94	<1.0	310	5.10	1.29	-0.229	-0.478	7.64
	07-29-19	DRY - NO SAMPLE																											
	12-13-19	21000	2100	69000	9000	98	120	34	11	<0.010	<100	0.29	<0.010	0.29	<0.050	<5.0	2.2	0.32	530	7.56	210	98	<1.0	330	5.44	2.74	-0.04	-0.289	7.60
	07-21-20	26000	1700	87000	11000	130	140	35	17	<0.010	<100	<0.050	<0.010	<0.050	<0.050	8	2.7	5.1	620	7.48	260	130	<1.0	400	6.51	0.7	0.086	-0.162	7.4
	12-01-20	28000	3000	78000	11000	110	150	43	11	<0.010	<100	0.25	<0.010	0.25	<0.050	<5.0	2.4	0.42	630	7.77	240	110	<1.0	390	6.44	2.88	0.248	0.000	7.53
	07-13-21	STANDING WATER/NO FLOW - NO SAMPLE																											
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
	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
	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
	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
	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
	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
	8-3-17	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
	8/3/17[FD]	46000	3500	81000	7700	140	110	71	11	<0.010	<100	<0.010	0.1	0.1	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
	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
	07-25-18	64000	2500	60000	5200	76	100	110	7.9	<0.010	<100	<0.05	<0.010	<0.05	<0.050	12	4.0	0.42	720	8.84	170	71	4.6	400	6.68	3.01	1.02	0.772	7.81
	11-23-18	56000	1800	38000	4200	73	41	97	7.1	<0.010	<100	0.26	<0.010	0.26	0.21	23	5.0	2.0	520	7.85	110	72	<1.0	290	5.07	3.79	-0.130	-0.379	7.98
	07-29-19	35000	1700	51000	5000	97	69	53	10	<0.010	<100	<0.010	0.11	0.11	0.074	18	4.1	1.4	470	7.80	150	96	<1.0	280	4.88	3.61	0.0810	-0.168	7.72
	12-13-19	20000	1100	29000	2900	52	43	35	8	<0.010	<100	0.2	<0.010	0.2	0.061	9.8	2.4	1.3	270	7.66	84	52	<1.0	170	2.93	5.97	-0.542	-0.792	8.20
	07-21-20	42000	2700	76000	7000	110	99	71	11	<0.010	<100	0.17	<0.010	0.17	0.075	9.6	3.6	0.68	640	7.69	220	110	<1.0	380	6.36	0.63	0.185	-0.064	7.5
	12-01-20	27000	1700	38000	4000	60	57	47	8.2	<0.010	<100	0.18	0.010	0.19	0.072	14	2.3	0.79	380	7.71	110	59	<1.0	220	3.72	3.62	-0.328	-0.578	8.04
	07-13-21	38000	2400	60000	6300	110	91	51	11	<0.010	<100	0.12	<0.010	0.12	0.067	8.7	3.5	2.6	570	7.75	180	110	<1.0	320	5.46	2.15	0.13	-0.119	7.63

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - SUMMER 2021
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

Sample Location	Sample Date	Sat. pH (@4C)	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	unitless	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	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 [6]	1 [4]	-	2 [6]	300	1 [7]	-	0.026	73	25 [8]	1	0.25	-	0.8	-	-	15	-	See Note[9]
	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-A-SW	07-23-13	7.14	**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	7.76	**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	7.69	**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	7.77	**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																										
	07-25-18	7.64	**300**	<1.0	2.6	73	<1.0	<2.0	58	**0.058**	<1.0	1.6	**2.2**	**9100**	**1.4**	**2900**	<0.013	<2.0	3	<1.0	<0.10	270	<0.10	<2.0	4.6	0.5	<2.0	14
	11-23-18	7.81	**46**	<1.0	<1.0	16	<1.0	<2.0	<50	<0.010	<1.0	<0.40	<2.0	**810**	<0.50	300	<0.013	<2.0	<2.0	<1.0	<0.10	210	<0.10	<2.0	2	0.31	<2.0	<5.0
	07-29-19	7.66	**10**	<1.0	<1.0	18	<1.0	<2.0	53	<0.010	<1.0	<0.40	<0.50	240	<0.50	290	<0.013	<2.0	<2.0	<1.0	<0.10	240	<0.10	<2.0	<2.0	0.49	<2.0	<5.0
	12-13-19	7.79	**7.5**	<1.0	<1.0	13	<1.0	<2.0	57	<0.010	<1.0	<0.40	<0.50	<50	<0.50	35	<0.013	<2.0	<2.0	<0.5	<0.10	220	<0.10	<2.0	<2.0	0.31	<2.0	<5.0
	07-21-20	DRY - NO SAMPLE																										
	12-01-20	STANDING WATER/NO FLOW - NO SAMPLE																										
	07-13-21	STANDING WATER/NO FLOW - NO SAMPLE																										
COB-B-SW	07-27-15	DRY - NO SAMPLE																										
	11-18-15	7.71	**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	7.27	**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	7.89	**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
	07-25-18	DRY - NO SAMPLE																										
	11-23-18	7.88	**7.0**	<1.0	<1.0	17	<1.0	<2.0	<50	<0.010	<1.0	0.46	<2.0	200	<0.50	500	<0.013	<2.0	<2.0	<1.0	<0.1	200	<0.10	<2.0	<2.0	0.27	<2.0	<5.0
	07-29-19	DRY - NO SAMPLE																										
	12-13-19	7.85	**6.1**	<1.0	<1.0	16	<1.0	<2.0	67	<0.010	<1.0	<0.40	<0.50	78	<0.50	190	<0.013	<2.0	<2.0	<0.5	<0.10	200	<0.10	<2.0	<2.0	0.29	<2.0	<5.0
	07-21-20	7.65	**6.0**	<1.0	<1.0	14	<1.0	<2.0	66	<0.010	<1.0	<0.40	<0.50	85	<0.50	210	<0.013	<2.0	<2.0	<0.5	<0.10	240	<0.10	<2.0	<2.0	0.45	<2.0	<5.0
	12-01-20	7.77	**6.4**	<1.0	<1.0	12	<1.0	<2.0	52	<0.010	<1.0	<0.40	<0.50	96	<0.50	210	<0.013	<2.0	<2.0	<0.50	<0.10	220	<0.10	<2.0	<2.0	0.36	<2.0	<5.0
	07-13-21	STANDING WATER/NO FLOW - NO SAMPLE																										
COB-4-SW	12-22-14	8.38	**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	7.93	**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	8.35	**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	7.94	**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]	7.93	**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	8.49	**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	7.68	**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	0.5	<2.0	<5.0
	8/3/17[FD]	7.67	**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	8.53	**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	<0.10	110	<0.10	<2.0	<2.0	0.16	<2.0	5.1
	07-25-18	8.06	**43**	<1.0	1.0	33	<1.0	<2.0	57	<0.010	<1.0	<0.40	<2.0	51	0.75	23	<0.013	<2.0	<2.0	<1.0	<0.10	430	<0.10	<2.0	<2.0	0.48	<2.0	<5.0
	11-23-18	8.23	**140**	<1.0	<1.0	17	<1.0	<2.0	<50	**0.014**	<1.0	<0.40	2.0	230	0.55	99	<0.013	<2.0	<2.0	<1.0	<0.10	130	<0.10	<2.0	3.6	0.27	<2.0	<5.0
	07-29-19	7.97	**28**	<1.0	<1.0	26	<1.0	<2.0	<50	<0.010	<1.0	<0.40	1.2	**370**	<0.50	150	<0.013	<2.0	<2.0	<1.0	<0.10	230	<0.10	<2.0	<2.0	0.35	<2.0	<5.0
	12-13-19	8.45	**35**	<1.0	<1.0	18	<1.0	<2.0	<50	**0.015**	<1.0	<0.40	0.70	170	<0.50	130	<0.013	<2.0	<2.0	<0.5	<0.10	110	<0.10	<2.0	<2.0	0.21	<2.0	<5.0
	07-21-20	7.75	**20**	<1.0	<1.0	33	<1.0	<2.0	54	<0.010	<1.0	<0.40	1.3	120	<0.50	220	<0.013	<2.0	<2.0	<0.5	<0.10	340	<0.10	<2.0	<2.0	0.42	<2.0	<5.0
	12-01-20	8.29	**41**	<1.0	<1.0	24	<1.0	<2.0	<50	<0.010	<1.0	<0.40	0.75	160	<0.50	160	<0.013	<2.0	<2.0	<0.5	<0.10	170	<0.10	<2.0	<2.0	0.17	<2.0	<5.0
	07-13-21	7.87	**58**	<1.0	<1.0	31	<1.0	<2.0	66	<0.010	<1.0	<0.40	**2.5**	250	<0.50	210	<0.013	<2.0	<2.0	<0.50	<0.10	270	<0.10	<2.0	<2.0	0.39	<2.0	5.8

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - SUMMER 2021
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

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 ALKALNITY	CARB ALKALINITY	TDS	Anion Sum	Ion Balance	Langelier Index (@20C)	Langelier Index (@4C)	Sat_ pH (@20C)
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
NSE Tier 1 EQS Fresh Water [1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCME FWAL [2]		-	-	-	-	-	-	120	-	-	-	13	0.06	-	10.3 [3]	-	-	-	-	6.5-9.0	-	-	-	-	-	-	-	-	-
Upstream Calculated 95% UCL		-	-	-	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-Construction/Baseline Calculated 95% UCL		-	-	-	-	-	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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
	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
	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
	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
	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
	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
	8-3-17	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
	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
	07-25-18	43000	2800	72000	6600	130	95	67	9.7	<0.010	<100	0.14	<0.010	0.14	<0.050	12	4.1	0.6	640	7.99	210	120	1.1	370	6.41	2.56	0.499	0.25	7.49
	11-23-18	44000	1500	33000	3400	56	45	76	7.6	<0.010	<100	0.20	<0.010	0.20	0.084	15	3.5	1.8	440	7.95	96	55	<1.0	240	4.19	3.71	-0.191	-0.440	8.14
	07-29-19	44000	2100	56000	4300	100	76	72	8.9	<0.010	<100	<0.010	0.064	0.06	<0.050	16	4.1	1.0	530	8.68	160	96	4.3	320	5.63	4.65	0.986	0.737	7.70
	12-13-19	29000	1600	36000	3400	68	49	54	8.3	<0.010	<100	0.24	0.013	0.25	0.058	13	3.2	2.8	370	7.78	100	67	<1.0	220	3.91	6.68	-0.228	-0.478	8.01
	07-21-20	60000	2900	77000	6300	120	110	96	8.1	<0.010	<100	0.056	<0.010	0.056	<0.050	12	3.7	0.52	750	8.28	220	120	2.1	440	7.42	2.42	0.78	0.531	7.5
	12-01-20	33000	1800	41000	4100	72	54	56	7.4	<0.010	<100	0.15	0.010	0.16	<0.050	9.8	<5.0**	2.3	430	7.88	120	71	<1.0	240	4.15	3.49	-0.0550	-0.305	7.94
	07-13-21	55000	3200	67000	5900	100	100	77	8.9	<0.010	<100	<0.050	<0.010	<0.050	0.086	8.9	4.0	0.71	670	8.00	190	100	<1.0	380	6.31	0.16	0.389	0.141	7.61
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	19,000	330	0.43	0.178	-0.059	7.47
	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
	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
	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
	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
	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	5,300	92.8	2.21	-0.583	-0.823	8.11
	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
	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
	8-3-17	940000	35000	82000	110000	97	230	1600	5.2	<0.010	<100	<0.010	0.055	0.055	0.075	9	2.6	1.8	5900	7.73	660	96	<1.0	3,100	52	2.7	-0.088	-0.33	7.81
	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
	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
	07-25-18	220000	8500	33000	26000	63	71	460	4.0	<0.010	<100	0.16	0.013	0.17	0.051	21	4.3	1.3	1800	7.96	190	63	<1.0	870	15.8	7.17	-0.25	-0.497	8.21
	11-23-18	15000	820	7700	1600	17	6.5	26	3.0	<0.010	160	0.091	<0.010	0.091	<0.050	38	6.3	83	130	7.63	26	17	<1.0	75	1.21	4.35	-1.58	-1.83	9.21
	11-23-18 [FD]	15000	780	8000	1500	16	6.5	26	3.0	<0.010	<100	0.12	<0.010	0.12	0.41	39	6.2	50	130	7.29	26	16	<1.0	75	1.20	6.25	-1.93	-2.18	9.22
	07-29-19	33000	1500	16000	3900	35	14	67	4.0	<0.010	<100	<0.010	0.091	0.091	<0.050	43	5.3	0.79	300	7.55	55	35	<1.0	160	2.89	5.28	-1.09	-1.34	8.64
	07-29-19 [FD]	39000	1500	16000	4800	36	16	77	3.9	<0.010	<100	<0.010	0.13	0.13	<0.050	40	5.2	0.91	320	7.54	60	36	<1.0	180	3.23	4.70	-1.08	-1.33	8.62
	12-13-19	12000	500	6700	1300	16	6.6	23	3.2	<0.010	<100	0.1	<0.010	0.1	<0.050	33	3.9	1.3	110	7.22	22	16	<1.0	64	1.12	6.16	-2.08	-2.33	9.29
	12-13-19 [FD]	12000	490	6200	1200	16	7.5	24	3.2	<0.010	<100	0.098	<0.010	0.1	<0.050	31	3.9	1.1	110	7.13	21	16	<1.0	65	1.16	10.5	-2.19	-2.44	9.31
	07-21-20	1200000	47000	90000	150000	60	330	2500	4.3	<0.010	<100	0.086	<0.010	0.086	0.099	15	3.9	2	7700	7.59	860	60	<1.0	4,400	78.2	3.63	-0.451	-0.691	8.04
	12-01-20	13000	580	8100	1500	16	7.0	26	2.9	<0.010	<100	0.095	<0.010	0.095	<0.050	37	<5.0**	2.0	120	7.22	26	16	<1.0	69	1.20	4.35	-1.99	-2.24	9.21
	12-01-20 [FD]	13000	580	8000	1500	18	7.5	26	3.2	<0.010	<100	0.098	<0.010	0.098	<0.050	38	5.4	5.1	130	7.29	26	18	<1.0	72	1.26	5.88	-1.89	-2.14	9.17
	07-13-21	100000	4000	17000	12000	34	32	180	3.7	<0.010	<100	0.095	<0.010	0.095	0.087	45	5.8	1.7	780	7.51	92	34	<1.0	370	6.46	0.23	-1.17	-1.42	8.69
	07-13-21 [FD]	110000	4000	17000	13000	33	38	180	3.7	<0.010	<100	0.11	<0.010	0.11	0.064	41	5.9	1.4	760	7.57	94	33	<1.0	380	6.47	1.22	-1.13	-1.38	8.70

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - SUMMER 2021
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

Sample Location	Sample Date	Sat_ pH (@4C)	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	**unitless**	**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 [6]	1 [4]	-	2 [6]	300	1 [7]	-	0.026	73	25 [8]	1	0.25	-	0.8	-	-	15	-	See Note[9]
	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-6-SW	07-23-13	7.83	**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	8.29	**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	7.96	**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	8.23	**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	7.94	**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	8.33	**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	8.09	**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	8.33	**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
	07-25-18	7.74	**23**	<1.0	<1.0	35	<1.0	<2.0	62	<0.010	<1.0	<0.40	<2.0	140	<0.50	110	<0.013	<2.0	<2.0	<1.0	<0.10	350	<0.10	<2.0	<2.0	0.5	<2.0	<5.0
	11-23-18	8.39	**150**	<1.0	<1.0	20	<1.0	<2.0	<50	**0.015**	<1.0	<0.40	<2.0	**360**	0.87	130	<0.013	<2.0	<2.0	<1.0	<0.10	140	<0.10	<2.0	4.8	0.22	<2.0	6.4
	07-29-19	7.95	**37**	<1.0	<1.0	25	<1.0	<2.0	<50	<0.010	<1.0	<0.40	1.2	130	<0.50	31	<0.013	<2.0	<2.0	<1.0	<0.10	300	<0.10	<2.0	<2.0	0.39	<2.0	<5.0
	12-13-19	8.26	**88**	<1.0	<1.0	19	<1.0	<2.0	<50	**0.014**	<1.0	<0.40	1.1	220	<0.50	88	<0.013	<2.0	<2.0	<0.5	<0.10	150	<0.10	<2.0	<2.0	0.24	<2.0	<5.0
	07-21-20	7.75	**32**	<1.0	<1.0	32	<1.0	<2.0	81	**0.016**	<1.0	<0.40	1.3	<50	<0.50	32	<0.013	<2.0	<2.0	<0.5	<0.10	430	<0.10	<2.0	<2.0	0.44	<2.0	<5.0
	12-01-20	8.19	**52**	<1.0	<1.0	21	<1.0	<2.0	<50	<0.010	<1.0	<0.40	1.1	120	<0.50	56	<0.013	<2.0	<2.0	<0.50	<0.10	180	<0.10	<2.0	<2.0	0.22	<2.0	<5.0
	07-13-21	7.86	**34**	<1.0	<1.0	29	<1.0	<2.0	93	<0.010	<1.0	<0.40	1.7	68	<0.50	32	<0.013	<2.0	<2.0	<0.50	<0.10	340	<0.10	<2.0	<2.0	0.45	<2.0	<5.0
WB-1-SW	07-23-13	7.71	*<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	9.48	**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	9.07	**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]	9.26	**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	9.24	**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	8.35	**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]	9.26	**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	9.25	**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	8.06	**28**	<1.0	1.0	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]	9.42	**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	9.42	**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
	07-25-18	8.46	**120**	<1.0	<1.0	35	<1.0	<2.0	110	**0.024**	<1.0	<0.40	**4.7**	**330**	**1.8**	140	<0.013	<2.0	<2.0	<1.0	<0.1	320	<0.10	<2.0	2.7	0.18	<2.0	6.0
	11-23-18	9.47	**1800**	<1.0	4.3	37	<1.0	<2.0	<50	0.14	3.5	1.2	**9.7**	3500	**29**	210	**0.037**	<2.0	2.8	<1.0	**1.7**	50	<0.10	<2.0	25	0.17	**6.8**	**79**
	11-23-18 [FD]	9.47	**1200**	<1.0	3.9	40	<1.0	<2.0	<50	0.15	3.3	1.2	**9.2**	3700	**28**	200	**0.033**	<2.0	2.3	<1.0	**1.5**	50	<0.10	<2.0	23	0.15	5.2	**160**
	07-29-19	8.89	**69**	<1.0	<1.0	20	<1.0	<2.0	<50	**0.020**	<1.0	<0.40	0.94	290	<0.50	64	<0.013	<2.0	<2.0	<1.0	<0.10	120	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	07-29-19 [FD]	8.87	**71**	<1.0	<1.0	21	<1.0	<2.0	<50	**0.021**	<1.0	<0.40	0.89	**310**	<0.50	71	<0.013	<2.0	<2.0	<1.0	<0.10	120	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	12-13-19	9.55	**110**	<1.0	<1.0	12	<1.0	<2.0	<50	**0.027**	<1.0	<0.40	<0.50	210	<0.50	67	<0.013	<2.0	<2.0	<0.5	<0.10	39	<0.10	<2.0	<2.0	<0.10	<2.0	**5.0**
	12-13-19 [FD]	9.57	**110**	<1.0	<1.0	11	<1.0	<2.0	<50	**0.029**	<1.0	<0.40	<0.50	180	<0.50	61	<0.013	<2.0	<2.0	<0.5	<0.10	37	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	07-21-20	8.28	**55**	<1.0	<1.0	95	<1.0	<2.0	550	**0.087**	<1.0	<0.40	1.8	**420**	<0.50	610	<0.013	<2.0	<2.0	<0.5	<0.10	1200	<0.10	<2.0	<2.0	0.39	<2.0	6.9
	12-01-20	9.46	**110**	<1.0	<1.0	14	<1.0	<2.0	<50	**0.027**	<1.0	<0.40	0.71	**330**	<0.50	69	<0.013	<2.0	<2.0	<0.50	<0.10	57	<0.10	<2.0	2.4	<0.10	<2.0	**7.1**
	12-01-20[FD]	9.43	**97**	<1.0	<1.0	14	<1.0	<2.0	<50	**0.013**	<1.0	<0.40	0.65	300	<0.50	65	<0.013	<2.0	<2.0	<0.50	<0.10	58	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0
	07-13-21	8.93	**87**	<1.0	<1.0	20	<1.0	<2.0	53	**0.022**	<1.0	<0.40	1.2	**590**	0.74	68	<0.013	<2.0	<2.0	<0.50	<0.10	160	<0.10	<2.0	<2.0	<0.10	<2.0	6.9
	07-13-21[FD]	8.95	**72**	<1.0	<1.0	21	<1.0	<2.0	52	**0.024**	<1.0	<0.40	1.1	**560**	0.65	65	<0.013	<2.0	<2.0	<0.50	<0.10	160	<0.10	<2.0	<2.0	<0.10	<2.0	<5.0

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - SUMMER 2021
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

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)
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
NSE Tier 1 EQS Fresh Water [1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CCME FWAL [2]		-	-	-	-	-	-	120	-	-	-	13	0.06	-	10.3 [3]	-	-	-	-	6.5-9.0	-	-	-	-	-	-	-	-	-
Upstream Calculated 95% UCL		-	-	-	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-Construction/Baseline Calculated 95% UCL		-	-	-	-	-	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	11-26-12	2500000	84000	130000	300000	68	650	4400	5.8	0.011	<100	0.17	0.02	0.19	0.091	14	<5	29	15000	7.8	1600	67	<1	8,190	140	1.16	-0.131	-0.37	7.93
	11/26/12 [FL]	2600000	98000	130000	330000	NM	NM	NM	6.7	NM	<100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	11/26/12 [F]	2400000	110000	150000	350000	64	660	4500	6.1	0.011	<100	0.16	0.02	0.18	0.13	14	<5	19	14000	7.8	1800	64	<1	8,230	143	0.07	-0.083	-0.321	7.88
	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
	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	3,500	60.8	1.58	0.248	0.007	8.17
	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	23,000	393	0.97	0.369	0.131	7.46
	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	2,200	38.8	1.80	-0.189	-0.432	8.19
	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	24,000	411	1.77	0.559	0.321	7.43
	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	4,100	72.9	3.02	-0.642	-0.883	8.2
	8-3-17	8400000	300000	340000	1000000	98	2000	13000	0.78	0.01	<1000	<0.010	0.057	0.057	0.13	<5.0	<5.0	1.5	40000	8.05	5000	97	1	25,000	405	7.68	0.698	0.46	7.35
	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	2,400	42	0.51	-0.166	-0.409	8.26
	07-25-18	8300000	290000	330000	980000	98	1900	12000	0.81	0.022	<1000	0.051	0.012	0.063	0.076	9	2.4	1.1	39,000	8.14	4800	96	1.3	24,000	377	10.3	0.767	0.529	7.37
	11-23-18	860000	33,000	62000	98000	60	250	1600	5	<0.010	<100	0.16	0.011	0.17	0.075	24	3.9	1.8	5500	8.74	560	56	2.9	3,000	52.7	3.16	0.573	0.331	8.17
	07-29-19	6900000	250,000	280000	860000	94	1700	12000	0.69	<0.010	<1000	<0.010	<0.050	<0.050	0.060	8.7	2.6	0.96	36000	8.26	4200	92	1.6	22,000	382	1.23	0.788	0.55	7.47
	12-13-19	800000	30000	55000	92000	57	250	1600	5.2	<0.010	<100	0.16	0.016	0.18	0.068	16	3.5	2.6	5100	8.68	520	55	<1.0	2,900	51.3	5.67	0.452	0.21	8.23
	07-21-20	6700000	270000	310000	850000	92	2100	14000	0.71	<0.010	<1000	<0.050	<0.010	<0.050	0.09	8.1	2.1	0.84	39000	7.95	4300	91	<1.0	25,000	447	7.45	0.53	0.292	7.42
	12-01-20	7900000	280000	320000	960000	91	2100	15000	1.0	0.015	<1000	0.068	0.013	0.081	0.080	<5.0	1.7	0.74	39000	7.58	4700	91	<1.0	27,000	472	3.14	0.185	-0.0530	7.40
	07-13-21	6600000	250000	270000	800000	91	1900	12000	1.8	<0.010	<1000	0.053	<0.010	0.053	0.11	7.5	2.9	0.98	36000	7.82	4000	90	<1.0	21,000	367	0.910	0.317	0.0790	7.51
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	2,100	36	0.1	0.403	0.16	8.15
	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	23,000	383	3.36	0.502	0.265	7.45
	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	1,200	21.6	4.13	-0.398	-0.643	8.26
	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	23,000	378	5.2	0.533	0.295	7.44
	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	3,500	60.8	0.65	-0.418	-0.66	8.09
	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	7.8	4900	97	<1.0	24,000	392	8.83	0.45	0.213	7.36
	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	1,600	27	2.06	-0.428	-0.672	8.25
	07-25-18	6600000	240000	300000	780000	97	1700	11000	2.0	0.018	<1000	0.064	0.012	0.076	0.09	8.3	<5	0.73	34000	8.08	3900	96	1.1	20,000	334	5.38	0.641	0.404	7.44
	11-23-18	530000	21,000	50000	60000	58	180	1100	5.3	<0.010	<100	0.18	<0.010	0.18	0.076	28	4.1	1.7	3700	8.78	370	54	3.1	1,900	34.5	5.13	0.574	0.331	8.21
	07-29-19	6800000	250,000	280000	850000	93	1700	12000	1.3	<0.010	<1000	<0.010	<0.050	<0.050	0.088	7.8	<5.0 *	1.4	35000	7.88	4200	93	<1.0	22,000	376	1.51	0.415	0.177	7.47
	12-13-19	350000	14000	36000	43000	45	120	660	5.2	<0.010	<100	0.14	0.017	0.15	0.056	27	3.7	2.3	2300	8.13	270	45	<1.0	1,300	22.2	2.5	-0.246	-0.491	8.38
	07-21-20	6800000	270000	310000	880000	95	2100	14000	1.3	<0.010	<1000	<0.050	<0.010	<0.050	0.075	7.1	2.3	1.1	38000	7.91	4400	94	<1.0	25,000	443	6.12	0.503	0.265	7.41
	07-21-20 [FD]	6500000	260000	290000	840000	95	2100	14000	1.2	<0.010	<1000	<0.050	<0.010	<0.050	0.078	7.2	2.2	1.8	38000	7.93	4200	94	<1.0	24,000	435	7.67	0.493	0.256	7.43
	12-01-20	6300000	230000	260000	770000	86	1700	10000	1.6	0.012	<1000	0.085	0.013	0.098	0.074	5.6	3.7	0.59	35000	7.83	3800	86	<1.0	20,000	331	3.62	0.284	0.0470	7.55
	07-13-21	5700000	210000	240000	680000	95	1700	11000	2.4	<0.010	<1000	0.082	<0.010	0.082	0.13	8.4	2.8	0.81	35000	7.73	3400	95	<1.0	19,000	336	2.39	0.198	-0.0390	7.53

TABLE B-2
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - SUMMER 2021
SURFACE WATER ANALYTICAL RESULTS - GENERAL CHEMISTRY AND TOTAL METALS

Sample Location	Sample Date	Sat. pH (@4C)	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		**unitless**	**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 [6]	1 [4]	-	2 [6]	300	1 [7]	-	0.026	73	25 [8]	1	0.25	-	0.8	-	-	15	-	See Note [9]
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	-	-	-	-	-	-
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 [4]	-	-	-	-	-	0.016	-	-	-	-	-	-	-	-	-	-	-
Battery Point/Narrows Calculated 95% UCL		-	-	-	-	-	-	-	-	-	-	0.9	-	190	-	70	0.189	-	-	-	-	7000	-	-	-	-	-	-
BP-1-SW	11-26-12	8.17	310	<1	6.3	47	<0.5	<2	1200	0.053	1	*<1*	<2	310	1.2	100	0.017	<4	<3	7	2.4	2300	<0.8	<20	5.5	0.98	<2	5.4
	11/26/12 [FL]	NM	530	<1	6.4	53	<0.5	<2	1200	0.054	1.5	*<1*	<2	650	1.5	120	NM	<4	<3	6	1.8	2300	<0.8	<20	12	0.99	<2	6.9
	11/26/12 [F]	8.12	350	<1	6.2	49	<0.5	<2	1200	0.052	2	*<1*	<2	340	1.3	110	0.018	<4	<3	5.7	2	2300	<0.8	<20	6.6	0.97	<2	6.2
	07-23-13	7.65	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	8.41	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	7.7	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	8.44	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	7.67	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	8.44	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	7.59	<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	8.51	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
	07-25-18	7.61	58	<10	<10	23	<10	<20	3500	<0.10	*<10*	*<4.0*	*<20*	1000	*<5.0*	94	<0.013	<20	*<20*	*<10*	<1.0	5900	<1.0	<20	<20	2.5	<20	*<50*
	11-23-18	8.41	86	<1.0	<1.0	18	<1.0	<2.0	420	0.024	<1.0	<0.40	<2.0	240	<0.50	50	<0.013	<2.0	<2.0	<1.0	<0.10	730	<0.10	<2.0	<2.0	0.4	<2.0	<5.0
	07-29-19	7.71	<50	<10	<10	18	<10	<20	3100	<0.10	*<10*	*<4.0*	5.6	*<500*	*<5.0*	50	<0.013	<20	*<20*	*<10*	<1.0	5000	<1.0	<20	<20	2.4	<20	*<50*
	12-13-19	8.47	88	<1.0	<1.0	13	<1.0	<2.0	360	0.021	<1.0	<0.40	0.96	220	<0.50	51	<0.013	<2.0	<2.0	<0.5	<0.10	340	<0.10	<2.0	<2.0	0.35	<2.0	<5.0
	07-21-20	7.66	63	<1.0	<1.0	19	<1.0	<20	3200	0.11	*<10*	*<4.0*	*<5.0*	*<500*	*<5.0*	44	<0.013	<20	*<20*	*<5.0*	<1.0	5500	<1.0	<20	<20	2.3	<20	*<50*
	12-01-20	7.63	<50	<10	<10	12	<10	<20	3600	<0.10	*<10*	*<4.0*	*<5.0*	*<500*	*<5.0*	22	0.015 [A]	<20	*<20*	*<5.0*	<1.0	5600	<1.0	<20	<20	2.5	<20	*<50*
	07-13-21	7.74	<50	<10	<10	23	<10	<20	2900	<0.10	*<10*	*<4.0*	*<5.0*	*<500*	*<5.0*	150	<0.013	<20	*<20*	*<5.0*	<1.0	4800	<1.0	<20	<20	2.0	<20	*<50*
NARROWS	12-22-14	8.4	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	7.69	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	8.50	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	7.68	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	8.33	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	7.59	<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	8.49	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
	07-25-18	7.68	56	<10	*<10*	29	<10	<20	2800	<0.10	*<10*	*<4.0*	*<20*	*<500*	*<5.0*	100	<0.013	<20	*<20*	*<10*	<1.0	5000	<1.0	<20	<20	2	<20	*<50*
	11-23-18	8.45	86	<1.0	<1.0	17	<1.0	<2.0	260	0.021	<1.0	<0.40	<2.0	220	<0.50	52	<0.013	<2.0	<2.0	<1.0	<0.10	500	<0.10	<2.0	<2.0	0.32	<2.0	8.8
	07-29-19	7.70	110	<10	*<10*	21	<10	<20	3000	<0.10	*<10*	*<4.0*	*<5.0*	*<500*	*<5.0*	120	<0.013	<20	*<20*	*<10*	<1.0	5000	<1.0	<20	<20	2.0	<20	*<50*
	12-13-19	8.62	110	<1.0	<1.0	15	<1.0	<2.0	180	0.021	<1.0	<0.40	2.7	290	<0.50	65	<0.013	<2.0	<2.0	<0.5	<0.10	660	<0.10	<2.0	<2.0	0.22	<2.0	7.2
	07-21-20	7.64	66	<10	<10	24	<10	<20	3200	0.13	*<10*	*<4.0*	*<5.0*	*<500*	*<5.0*	120	<0.013	<20	*<20*	*<5.0*	<1.0	5600	<1.0	<20	<20	2.5	<20	*<50*
	07-21-20 [FD]	7.67	67	<10	<10	20	<10	<20	3100	<0.10	*<10*	*<4.0*	*<5.0*	*<500*	*<5.0*	110	<0.013	<20	*<20*	*<5.0*	<1.0	5300	<1.0	<20	<20	2.2	<20	*<50*
	12-01-20	7.79	<50	<10	<10	15	<10	<20	2600	<0.10	*<10*	*<4.0*	*<5.0*	*<500*	*<5.0*	38	<0.013	<20	*<20*	*<5.0*	<1.0	4500	<1.0	<20	<20	1.9	<20	*<50*
	07-13-21	7.77	<50	<10	<10	23	<10	<20	2500	<0.10	*<10*	*<4.0*	*<5.0*	*<500*	*<5.0*	92	<0.013	<20	*<20*	*<5.0*	<1.0	4100	<1.0	<20	<20	1.8	<20	*<50*

NOTES:
FD - Field Duplicate
NM - Not Measured or not analyzed
mg/L - milligrams per liter
UCL - Upper Concentration Limit
- No applicable guideline criteria
* Elevated reporting limit due to sample matrix
** Elevated reporting limit due to turbidity
A - Total mercury analysis was preformed on nitric acid preserved sample aliquot.
Environmental Quality Standards (EQS) for surface water (freshwater and Environment (CCME) for the protection of aquatic life (freshwater and marine)
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 values for cadmium and copper are based on a hardness value. If value is unknown, the guideline is 2 µg/L. The most conservative number, based on the lowest hardness, was used.
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 nickle is based on a hardness value. If value is unknown, the guideline is 25µg/L. The lowest concration, most conservative, of hardness was use.
9. - The long-term CWQG for zinc is calculated using the following equation: CWQG = exp{0.947[ln(hardness mg·L-1)] - 0.815[pH] + 0.398[ln(DOC mg·L-1)] + 4.625). A DOC value of 0.3 was used.
The CWQG equation is valid between hardness 23.4 and 399 mg CaCO3·L−1, pH 6.5 and 8.13 and DOC 0.3 to 22.9 mg·L−1. DOC is not not part of the analytical package, therefore the most conservative value is used.
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

Your Project #: 20-2862-1000
Site#: NS LANDS SW PROGRAM
Site Location: NS LANDS SW PROGRAM

Attention: Nadine Wambolt

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

Report Date: 2021/07/22
Report #: R6731214
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1J4842
Received: 2021/07/14, 09:30

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Carbonate, Bicarbonate and Hydroxide (1)	8	N/A	2021/07/21	N/A	SM 23 4500-CO2 D
Alkalinity (1)	8	N/A	2021/07/21	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water) (1)	2	N/A	2021/07/19	N/A	Auto Calc.
Chloride (1)	6	N/A	2021/07/21	ATL SOP 00014	SM 23 4500-Cl- E m
Chloride (1)	2	N/A	2021/07/22	ATL SOP 00014	SM 23 4500-Cl- E m
Colour (1)	8	N/A	2021/07/21	ATL SOP 00020	SM 23 2120C m
Conductance - water (1)	8	N/A	2021/07/20	ATL SOP 00004	SM 23 2510B m
Hardness (calculated as CaCO3) (1)	7	N/A	2021/07/20	ATL SOP 00048	Auto Calc
Hardness (calculated as CaCO3) (1)	1	N/A	2021/07/21	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL) (1)	8	2021/07/20	2021/07/20	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS (1)	7	2021/07/15	2021/07/19	ATL SOP 00058	EPA 6020B R2 m
Metals Water Total MS (1)	1	2021/07/15	2021/07/20	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference) (1)	8	N/A	2021/07/22	N/A	Auto Calc.
Anion and Cation Sum (1)	8	N/A	2021/07/21	N/A	Auto Calc.
Nitrogen Ammonia - water (1)	8	N/A	2021/07/20	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite (1)	8	N/A	2021/07/21	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite (1)	8	N/A	2021/07/21	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N) (1)	8	N/A	2021/07/22	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM) (1)	2	2021/07/16	2021/07/16	ATL SOP 00103	EPA 8270E R6 m
pH (1, 2)	8	N/A	2021/07/20	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho (1)	8	N/A	2021/07/21	ATL SOP 00021	SM 23 4500-P E m
Sat. pH and Langelier Index (@ 20C) (1)	8	N/A	2021/07/22	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C) (1)	8	N/A	2021/07/22	ATL SOP 00049	Auto Calc.
Reactive Silica (1)	8	N/A	2021/07/21	ATL SOP 00022	EPA 366.0 m
Sulphate (1)	6	N/A	2021/07/21	ATL SOP 00023	ASTM D516-16 m
Sulphate (1)	2	N/A	2021/07/22	ATL SOP 00023	ASTM D516-16 m
Total Dissolved Solids (TDS calc) (1)	8	N/A	2021/07/22	N/A	Auto Calc.
Organic carbon - Total (TOC) (1, 3)	6	N/A	2021/07/21	ATL SOP 00203	SM 23 5310B m
Organic carbon - Total (TOC) (1, 3)	2	N/A	2021/07/22	ATL SOP 00203	SM 23 5310B m
Turbidity (1)	8	N/A	2021/07/20	ATL SOP 00011	EPA 180.1 R2 m

Remarks:

Your Project #: 20-2862-1000
Site#: NS LANDS SW PROGRAM
Site Location: NS LANDS SW PROGRAM

Attention: Nadine Wambolt

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

Report Date: 2021/07/22
Report #: R6731214
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1J4842
Received: 2021/07/14, 09:30

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas 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, Key Account Specialist
Email: Natalie.MacAskill@bureauveritas.com
Phone# (902)567-1255 Ext:17
==========
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Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: C1J4842
Report Date: 2021/07/22

Dillon Consulting Limited
Client Project #: 20-2862-1000
Site Location: NS LANDS SW PROGRAM
Sampler Initials: MS

RESULTS OF ANALYSES OF WATER

BV Labs ID		QBZ062		QBZ063		QBZ064	QBZ065		QBZ066		
Sampling Date		2021/07/13		2021/07/13		2021/07/13	2021/07/13		2021/07/13		
	UNITS	NRC-1-SW	RDL	SRC-1-SW	RDL	COB-4-SW	COB-6-SW	RDL	WB-1-SW	RDL	QC Batch
Calculated Parameters											
Anion Sum	me/L	2.35	N/A	5.80	N/A	5.46	6.31	N/A	6.46	N/A	7462612
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	59	1.0	110	1.0	110	100	1.0	34	1.0	7462605
Calculated TDS	mg/L	140	1.0	340	1.0	320	380	1.0	370	1.0	7462619
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	<1.0	1.0	7462605
Cation Sum	me/L	2.32	N/A	5.76	N/A	5.23	6.29	N/A	6.43	N/A	7462612
Hardness (CaCO3)	mg/L	63	1.0	180	1.0	180	190	1.0	92	1.0	7462225
Ion Balance (% Difference)	%	0.640	N/A	0.350	N/A	2.15	0.160	N/A	0.230	N/A	7462611
Langelier Index (@ 20C)	N/A	-0.572		0.176		0.130	0.389		-1.17		7462614
Langelier Index (@ 4C)	N/A	-0.822		-0.0730		-0.119	0.141		-1.42		7462615
Nitrate (N)	mg/L	<0.050	0.050	0.50	0.050	0.12	<0.050	0.050	0.095	0.050	7462446
Saturation pH (@ 20C)	N/A	8.27		7.62		7.63	7.61		8.69		7462614
Saturation pH (@ 4C)	N/A	8.52		7.87		7.87	7.86		8.93		7462615
Inorganics											
Total Alkalinity (Total as CaCO3)	mg/L	60	5.0	110	25	110	100	10	34	5.0	7472443
Dissolved Chloride (Cl-)	mg/L	28	1.0	66	1.0	51	77	1.0	180	5.0	7472450
Colour	TCU	12	5.0	16	5.0	8.7	8.9	5.0	45	5.0	7472454
Nitrate + Nitrite (N)	mg/L	<0.050	0.050	0.51	0.050	0.12	<0.050	0.050	0.095	0.050	7472457
Nitrite (N)	mg/L	<0.010	0.010	0.012	0.010	<0.010	<0.010	0.010	<0.010	0.010	7472458
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	0.064	0.050	0.067	0.086	0.050	0.087	0.050	7471985
Total Organic Carbon (C)	mg/L	3.9	0.50	6.2	0.50	3.5	4.0	0.50	5.8	0.50	7474332
Orthophosphate (P)	mg/L	0.020	0.010	<0.010	0.010	<0.010	<0.010	0.010	<0.010	0.010	7472455
pH	pH	7.70		7.80		7.75	8.00		7.51		7472492
Reactive Silica (SiO2)	mg/L	5.7	0.50	6.6	0.50	11	8.9	0.50	3.7	0.50	7472452
Dissolved Sulphate (SO4)	mg/L	18	2.0	86	2.0	91	100	2.0	32	2.0	7472451
Turbidity	NTU	0.77	0.10	1.4	0.10	2.6	0.71	0.10	1.7	0.10	7472266
Conductivity	uS/cm	240	1.0	610	1.0	570	670	1.0	780	1.0	7472481

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

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: C1J4842
Report Date: 2021/07/22

Dillon Consulting Limited
Client Project #: 20-2862-1000
Site Location: NS LANDS SW PROGRAM
Sampler Initials: MS

RESULTS OF ANALYSES OF WATER

BV Labs ID		QBZ067			QBZ068			QBZ069		
Sampling Date		2021/07/13			2021/07/13			2021/07/13		
	UNITS	NARROWS	RDL	QC Batch	BP-1-SW	RDL	QC Batch	FD-08	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	336	N/A	7462612	367	N/A	7462612	6.47	N/A	7462612
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	95	1.0	7462605	90	1.0	7462605	33	1.0	7462605
Calculated TDS	mg/L	19000	1.0	7462619	21000	1.0	7461935	380	1.0	7461935
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	7462605	<1.0	1.0	7462605	<1.0	1.0	7462605
Cation Sum	me/L	320	N/A	7462612	374	N/A	7462612	6.63	N/A	7462612
Hardness (CaCO3)	mg/L	3400	1.0	7462225	4000	1.0	7462225	94	1.0	7462225
Ion Balance (% Difference)	%	2.39	N/A	7462611	0.910	N/A	7462611	1.22	N/A	7462610
Langelier Index (@ 20C)	N/A	0.198		7462613	0.317		7462614	-1.13		7462613
Langelier Index (@ 4C)	N/A	-0.0390		7462615	0.0790		7462615	-1.38		7461933
Nitrate (N)	mg/L	0.082	0.050	7462446	0.053	0.050	7462446	0.11	0.050	7462446
Saturation pH (@ 20C)	N/A	7.53		7462613	7.51		7462614	8.70		7462613
Saturation pH (@ 4C)	N/A	7.77		7462615	7.74		7462615	8.95		7461933
Inorganics										
Total Alkalinity (Total as CaCO3)	mg/L	95	5.0	7472476	91	5.0	7472443	33	5.0	7472443
Dissolved Chloride (Cl-)	mg/L	11000	250	7472482	12000	250	7472450	180	5.0	7472450
Colour	TCU	8.4	5.0	7472486	7.5	5.0	7472454	41	5.0	7472454
Nitrate + Nitrite (N)	mg/L	0.082	0.050	7472488	0.053	0.050	7472457	0.11	0.050	7472457
Nitrite (N)	mg/L	<0.010	0.010	7472489	<0.010	0.010	7472458	<0.010	0.010	7472458
Nitrogen (Ammonia Nitrogen)	mg/L	0.13	0.050	7471985	0.11	0.050	7471985	0.064	0.050	7471985
Total Organic Carbon (C)	mg/L	2.8	0.50	7474332	2.9	0.50	7474337	5.9	0.50	7474337
Orthophosphate (P)	mg/L	<0.010	0.010	7472487	<0.010	0.010	7472455	<0.010	0.010	7472455
pH	pH	7.73		7472492	7.82		7472492	7.57		7472492
Reactive Silica (SiO2)	mg/L	2.4	0.50	7472484	1.8	0.50	7472452	3.7	0.50	7472452
Dissolved Sulphate (SO4)	mg/L	1700	2.0	7472483	1900	100	7472451	38	2.0	7472451
Turbidity	NTU	0.81	0.10	7472446	0.98	0.10	7472266	1.4	0.10	7472266
Conductivity	uS/cm	35000	1.0	7472481	36000	1.0	7472481	760	1.0	7472481

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

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BV Labs Job #: C1J4842
Report Date: 2021/07/22

Dillon Consulting Limited
Client Project #: 20-2862-1000
Site Location: NS LANDS SW PROGRAM
Sampler Initials: MS

MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		QBZ062	QBZ063	QBZ064	QBZ065	QBZ066	QBZ067	QBZ068		
Sampling Date		2021/07/13	2021/07/13	2021/07/13	2021/07/13	2021/07/13	2021/07/13	2021/07/13		
	UNITS	NRC-1-SW	SRC-1-SW	COB-4-SW	COB-6-SW	WB-1-SW	NARROWS	BP-1-SW	RDL	QC Batch
Metals										
Total Mercury (Hg)	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.013	7469810

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		QBZ069		
Sampling Date		2021/07/13		
	UNITS	FD-08	RDL	QC Batch
Metals				
Total Mercury (Hg)	ug/L	<0.013	0.013	7469810

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C1J4842
Report Date: 2021/07/22

Dillon Consulting Limited
Client Project #: 20-2862-1000
Site Location: NS LANDS SW PROGRAM
Sampler Initials: MS

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		QBZ062	QBZ063	QBZ064	QBZ065	QBZ066		QBZ067		
Sampling Date		2021/07/13	2021/07/13	2021/07/13	2021/07/13	2021/07/13		2021/07/13		
	UNITS	NRC-1-SW	SRC-1-SW	COB-4-SW	COB-6-SW	WB-1-SW	RDL	NARROWS	RDL	QC Batch
Metals										
Total Aluminum (Al)	ug/L	19	19	58	34	87	5.0	<50	50	7465093
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<10	10	7465093
Total Arsenic (As)	ug/L	<1.0	1.3	<1.0	<1.0	<1.0	1.0	<10	10	7465093
Total Barium (Ba)	ug/L	26	13	31	29	20	1.0	23	10	7465093
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<10	10	7465093
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<20	20	7465093
Total Boron (B)	ug/L	<50	200	66	93	53	50	2500	500	7465093
Total Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	<0.010	0.022	0.010	<0.10	0.10	7465093
Total Calcium (Ca)	ug/L	21000	61000	60000	67000	17000	100	240000	1000	7465093
Total Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<10	10	7465093
Total Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	<4.0	4.0	7465093
Total Copper (Cu)	ug/L	1.2	1.6	2.5	1.7	1.2	0.50	<5.0	5.0	7465093
Total Iron (Fe)	ug/L	130	170	250	68	590	50	<500	500	7465093
Total Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.74	0.50	<5.0	5.0	7465093
Total Magnesium (Mg)	ug/L	2700	6500	6300	5900	12000	100	680000	1000	7465093
Total Manganese (Mn)	ug/L	31	94	210	32	68	2.0	92	20	7465093
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<20	20	7465093
Total Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<20	20	7465093
Total Phosphorus (P)	ug/L	<100	<100	<100	<100	<100	100	<1000	1000	7465093
Total Potassium (K)	ug/L	820	4300	2400	3200	4000	100	210000	1000	7465093
Total Selenium (Se)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	<5.0	5.0	7465093
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	<1.0	1.0	7465093
Total Sodium (Na)	ug/L	24000	47000	38000	55000	100000	100	5700000	1000	7465093
Total Strontium (Sr)	ug/L	110	160	270	340	160	2.0	4100	20	7465093
Total Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	<1.0	1.0	7465093
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<20	20	7465093
Total Titanium (Ti)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<20	20	7465093
Total Uranium (U)	ug/L	<0.10	0.42	0.39	0.45	<0.10	0.10	1.8	1.0	7465093
Total Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<20	20	7465093
Total Zinc (Zn)	ug/L	14	<5.0	5.8	<5.0	6.9	5.0	<50	50	7465093

RDL = Reportable Detection Limit
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Dillon Consulting Limited
Client Project #: 20-2862-1000
Site Location: NS LANDS SW PROGRAM
Sampler Initials: MS

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		QBZ068		QBZ069		
Sampling Date		2021/07/13		2021/07/13		
	UNITS	BP-1-SW	RDL	FD-08	RDL	QC Batch
Metals						
Total Aluminum (Al)	ug/L	<50	50	72	5.0	7465093
Total Antimony (Sb)	ug/L	<10	10	<1.0	1.0	7465093
Total Arsenic (As)	ug/L	<10	10	<1.0	1.0	7465093
Total Barium (Ba)	ug/L	23	10	21	1.0	7465093
Total Beryllium (Be)	ug/L	<10	10	<1.0	1.0	7465093
Total Bismuth (Bi)	ug/L	<20	20	<2.0	2.0	7465093
Total Boron (B)	ug/L	2900	500	52	50	7465093
Total Cadmium (Cd)	ug/L	<0.10	0.10	0.024	0.010	7465093
Total Calcium (Ca)	ug/L	270000	1000	17000	100	7465093
Total Chromium (Cr)	ug/L	<10	10	<1.0	1.0	7465093
Total Cobalt (Co)	ug/L	<4.0	4.0	<0.40	0.40	7465093
Total Copper (Cu)	ug/L	<5.0	5.0	1.1	0.50	7465093
Total Iron (Fe)	ug/L	<500	500	560	50	7465093
Total Lead (Pb)	ug/L	<5.0	5.0	0.65	0.50	7465093
Total Magnesium (Mg)	ug/L	800000	1000	13000	100	7465093
Total Manganese (Mn)	ug/L	150	20	65	2.0	7465093
Total Molybdenum (Mo)	ug/L	<20	20	<2.0	2.0	7465093
Total Nickel (Ni)	ug/L	<20	20	<2.0	2.0	7465093
Total Phosphorus (P)	ug/L	<1000	1000	<100	100	7465093
Total Potassium (K)	ug/L	250000	1000	4000	100	7465093
Total Selenium (Se)	ug/L	<5.0	5.0	<0.50	0.50	7465093
Total Silver (Ag)	ug/L	<1.0	1.0	<0.10	0.10	7465093
Total Sodium (Na)	ug/L	6600000	1000	110000	100	7465093
Total Strontium (Sr)	ug/L	4800	20	160	2.0	7465093
Total Thallium (Tl)	ug/L	<1.0	1.0	<0.10	0.10	7465093
Total Tin (Sn)	ug/L	<20	20	<2.0	2.0	7465093
Total Titanium (Ti)	ug/L	<20	20	<2.0	2.0	7465093
Total Uranium (U)	ug/L	2.0	1.0	<0.10	0.10	7465093
Total Vanadium (V)	ug/L	<20	20	<2.0	2.0	7465093
Total Zinc (Zn)	ug/L	<50	50	<5.0	5.0	7465093

RDL = Reportable Detection Limit
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Site Location: NS LANDS SW PROGRAM
Sampler Initials: MS

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		QBZ064	QBZ065		
Sampling Date		2021/07/13	2021/07/13		
	UNITS	COB-4-SW	COB-6-SW	RDL	QC Batch
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	ug/L	<0.050	<0.050	0.050	7466582
2-Methylnaphthalene	ug/L	<0.050	<0.050	0.050	7466582
Acenaphthene	ug/L	0.035	0.012	0.010	7466582
Acenaphthylene	ug/L	<0.010	<0.010	0.010	7466582
Anthracene	ug/L	<0.010	<0.010	0.010	7466582
Benzo(a)anthracene	ug/L	<0.010	<0.010	0.010	7466582
Benzo(a)pyrene	ug/L	<0.010	<0.010	0.010	7466582
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	0.010	7466582
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	0.020	7461451
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	0.010	7466582
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	0.010	7466582
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	0.010	7466582
Chrysene	ug/L	<0.010	<0.010	0.010	7466582
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	0.010	7466582
Fluoranthene	ug/L	0.011	0.013	0.010	7466582
Fluorene	ug/L	0.022	<0.010	0.010	7466582
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	0.010	7466582
Naphthalene	ug/L	<0.20	<0.20	0.20	7466582
Perylene	ug/L	<0.010	<0.010	0.010	7466582
Phenanthrene	ug/L	0.013	<0.010	0.010	7466582
Pyrene	ug/L	<0.010	<0.010	0.010	7466582
Surrogate Recovery (%)					
D10-Anthracene	%	94	93		7466582
D14-Terphenyl	%	96	96		7466582
D8-Acenaphthylene	%	90	88		7466582

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

GENERAL COMMENTS

Sample QBZ062 [NRC-1-SW] : ortho-Phosphate > Phosphorus: Both values fall within the method uncertainty for duplicates and are likely equivalent.

Sample QBZ067 [NARROWS] : Elevated reporting limits for trace metals due to sample matrix.

Sample QBZ068 [BP-1-SW] : Elevated reporting limits for trace metals due to sample matrix.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7465093	BAN	Matrix Spike	Total Aluminum (Al)	2021/07/19		NC	%	80 - 120
			Total Antimony (Sb)	2021/07/19		105	%	80 - 120
			Total Arsenic (As)	2021/07/19		NC	%	80 - 120
			Total Barium (Ba)	2021/07/19		95	%	80 - 120
			Total Beryllium (Be)	2021/07/19		97	%	80 - 120
			Total Bismuth (Bi)	2021/07/19		101	%	80 - 120
			Total Boron (B)	2021/07/19		NC	%	80 - 120
			Total Cadmium (Cd)	2021/07/19		96	%	80 - 120
			Total Calcium (Ca)	2021/07/19		NC	%	80 - 120
			Total Chromium (Cr)	2021/07/19		99	%	80 - 120
			Total Cobalt (Co)	2021/07/19		100	%	80 - 120
			Total Copper (Cu)	2021/07/19		100	%	80 - 120
			Total Iron (Fe)	2021/07/19		NC	%	80 - 120
			Total Lead (Pb)	2021/07/19		99	%	80 - 120
			Total Magnesium (Mg)	2021/07/19		NC	%	80 - 120
			Total Manganese (Mn)	2021/07/19		NC	%	80 - 120
			Total Molybdenum (Mo)	2021/07/19		NC	%	80 - 120
			Total Nickel (Ni)	2021/07/19		102	%	80 - 120
			Total Phosphorus (P)	2021/07/19		106	%	80 - 120
			Total Potassium (K)	2021/07/19		NC	%	80 - 120
			Total Selenium (Se)	2021/07/19		97	%	80 - 120
			Total Silver (Ag)	2021/07/19		97	%	80 - 120
			Total Sodium (Na)	2021/07/19		NC	%	80 - 120
			Total Strontium (Sr)	2021/07/19		NC	%	80 - 120
			Total Thallium (Tl)	2021/07/19		100	%	80 - 120
			Total Tin (Sn)	2021/07/19		98	%	80 - 120
			Total Titanium (Ti)	2021/07/19		97	%	80 - 120
			Total Uranium (U)	2021/07/19		101	%	80 - 120
			Total Vanadium (V)	2021/07/19		NC	%	80 - 120
			Total Zinc (Zn)	2021/07/19		95	%	80 - 120
7465093	BAN	Spiked Blank	Total Aluminum (Al)	2021/07/19		99	%	80 - 120
			Total Antimony (Sb)	2021/07/19		103	%	80 - 120
			Total Arsenic (As)	2021/07/19		98	%	80 - 120
			Total Barium (Ba)	2021/07/19		100	%	80 - 120
			Total Beryllium (Be)	2021/07/19		99	%	80 - 120
			Total Bismuth (Bi)	2021/07/19		102	%	80 - 120
			Total Boron (B)	2021/07/19		100	%	80 - 120
			Total Cadmium (Cd)	2021/07/19		101	%	80 - 120
			Total Calcium (Ca)	2021/07/19		100	%	80 - 120
			Total Chromium (Cr)	2021/07/19		102	%	80 - 120
			Total Cobalt (Co)	2021/07/19		102	%	80 - 120
			Total Copper (Cu)	2021/07/19		104	%	80 - 120
			Total Iron (Fe)	2021/07/19		105	%	80 - 120
			Total Lead (Pb)	2021/07/19		102	%	80 - 120
			Total Magnesium (Mg)	2021/07/19		104	%	80 - 120
			Total Manganese (Mn)	2021/07/19		104	%	80 - 120
			Total Molybdenum (Mo)	2021/07/19		104	%	80 - 120
			Total Nickel (Ni)	2021/07/19		105	%	80 - 120
			Total Phosphorus (P)	2021/07/19		103	%	80 - 120
			Total Potassium (K)	2021/07/19		103	%	80 - 120
			Total Selenium (Se)	2021/07/19		100	%	80 - 120
			Total Silver (Ag)	2021/07/19		99	%	80 - 120
			Total Sodium (Na)	2021/07/19		104	%	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)	2021/07/19		101	%	80 - 120
			Total Thallium (Tl)	2021/07/19		101	%	80 - 120
			Total Tin (Sn)	2021/07/19		102	%	80 - 120
			Total Titanium (Ti)	2021/07/19		105	%	80 - 120
			Total Uranium (U)	2021/07/19		106	%	80 - 120
			Total Vanadium (V)	2021/07/19		102	%	80 - 120
			Total Zinc (Zn)	2021/07/19		103	%	80 - 120
7465093	BAN	Method Blank	Total Aluminum (Al)	2021/07/19	<5.0		ug/L	
			Total Antimony (Sb)	2021/07/19	<1.0		ug/L	
			Total Arsenic (As)	2021/07/19	<1.0		ug/L	
			Total Barium (Ba)	2021/07/19	<1.0		ug/L	
			Total Beryllium (Be)	2021/07/19	<1.0		ug/L	
			Total Bismuth (Bi)	2021/07/19	<2.0		ug/L	
			Total Boron (B)	2021/07/19	<50		ug/L	
			Total Cadmium (Cd)	2021/07/19	<0.010		ug/L	
			Total Calcium (Ca)	2021/07/19	<100		ug/L	
			Total Chromium (Cr)	2021/07/19	<1.0		ug/L	
			Total Cobalt (Co)	2021/07/19	<0.40		ug/L	
			Total Copper (Cu)	2021/07/19	<0.50		ug/L	
			Total Iron (Fe)	2021/07/19	<50		ug/L	
			Total Lead (Pb)	2021/07/19	<0.50		ug/L	
			Total Magnesium (Mg)	2021/07/19	<100		ug/L	
			Total Manganese (Mn)	2021/07/19	<2.0		ug/L	
			Total Molybdenum (Mo)	2021/07/19	<2.0		ug/L	
			Total Nickel (Ni)	2021/07/19	<2.0		ug/L	
			Total Phosphorus (P)	2021/07/19	<100		ug/L	
			Total Potassium (K)	2021/07/19	<100		ug/L	
			Total Selenium (Se)	2021/07/19	<0.50		ug/L	
			Total Silver (Ag)	2021/07/19	<0.10		ug/L	
			Total Sodium (Na)	2021/07/19	<100		ug/L	
			Total Strontium (Sr)	2021/07/19	<2.0		ug/L	
			Total Thallium (Tl)	2021/07/19	<0.10		ug/L	
			Total Tin (Sn)	2021/07/19	<2.0		ug/L	
			Total Titanium (Ti)	2021/07/19	<2.0		ug/L	
			Total Uranium (U)	2021/07/19	<0.10		ug/L	
			Total Vanadium (V)	2021/07/19	<2.0		ug/L	
			Total Zinc (Zn)	2021/07/19	<5.0		ug/L	
7465093	BAN	RPD	Total Aluminum (Al)	2021/07/20	4.3		%	20
			Total Antimony (Sb)	2021/07/20	4.5		%	20
			Total Arsenic (As)	2021/07/20	0.49		%	20
			Total Barium (Ba)	2021/07/20	4.1		%	20
			Total Beryllium (Be)	2021/07/20	NC		%	20
			Total Bismuth (Bi)	2021/07/20	NC		%	20
			Total Boron (B)	2021/07/20	2.3		%	20
			Total Cadmium (Cd)	2021/07/20	9.7 (1)		%	20
			Total Calcium (Ca)	2021/07/20	3.9		%	20
			Total Chromium (Cr)	2021/07/20	8.4		%	20
			Total Cobalt (Co)	2021/07/20	2.5		%	20
			Total Iron (Fe)	2021/07/20	0.075		%	20
			Total Lead (Pb)	2021/07/20	6.6		%	20
			Total Magnesium (Mg)	2021/07/20	3.3		%	20
			Total Manganese (Mn)	2021/07/20	2.5		%	20
			Total Molybdenum (Mo)	2021/07/20	2.2		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Nickel (Ni)	2021/07/20	2.5		%	20
			Total Phosphorus (P)	2021/07/20	NC		%	20
			Total Potassium (K)	2021/07/20	2.1		%	20
			Total Selenium (Se)	2021/07/20	7.0		%	20
			Total Silver (Ag)	2021/07/20	NC		%	20
			Total Sodium (Na)	2021/07/20	3.4		%	20
			Total Strontium (Sr)	2021/07/20	4.1		%	20
			Total Thallium (Tl)	2021/07/20	4.4		%	20
			Total Tin (Sn)	2021/07/20	NC		%	20
			Total Titanium (Ti)	2021/07/20	8.6		%	20
			Total Uranium (U)	2021/07/20	NC		%	20
			Total Vanadium (V)	2021/07/20	5.1		%	20
			Total Zinc (Zn)	2021/07/20	16		%	20
7466582	LGE	Matrix Spike [QBZ065-06]	D10-Anthracene	2021/07/16		87	%	50 - 130
			D14-Terphenyl	2021/07/16		91	%	50 - 130
			D8-Acenaphthylene	2021/07/16		90	%	50 - 130
			1-Methylnaphthalene	2021/07/16		98	%	50 - 130
			2-Methylnaphthalene	2021/07/16		103	%	50 - 130
			Acenaphthene	2021/07/16		97	%	50 - 130
			Acenaphthylene	2021/07/16		98	%	50 - 130
			Anthracene	2021/07/16		101	%	50 - 130
			Benzo(a)anthracene	2021/07/16		111	%	50 - 130
			Benzo(a)pyrene	2021/07/16		93	%	50 - 130
			Benzo(b)fluoranthene	2021/07/16		104	%	50 - 130
			Benzo(g,h,i)perylene	2021/07/16		90	%	50 - 130
			Benzo(j)fluoranthene	2021/07/16		99	%	50 - 130
			Benzo(k)fluoranthene	2021/07/16		100	%	50 - 130
			Chrysene	2021/07/16		112	%	50 - 130
			Dibenzo(a,h)anthracene	2021/07/16		90	%	50 - 130
			Fluoranthene	2021/07/16		110	%	50 - 130
			Fluorene	2021/07/16		105	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2021/07/16		90	%	50 - 130
			Naphthalene	2021/07/16		102	%	50 - 130
			Perylene	2021/07/16		99	%	50 - 130
			Phenanthrene	2021/07/16		109	%	50 - 130
			Pyrene	2021/07/16		109	%	50 - 130
7466582	LGE	Spiked Blank	D10-Anthracene	2021/07/16		93	%	50 - 130
			D14-Terphenyl	2021/07/16		96	%	50 - 130
			D8-Acenaphthylene	2021/07/16		101	%	50 - 130
			1-Methylnaphthalene	2021/07/16		108	%	50 - 130
			2-Methylnaphthalene	2021/07/16		114	%	50 - 130
			Acenaphthene	2021/07/16		111	%	50 - 130
			Acenaphthylene	2021/07/16		107	%	50 - 130
			Anthracene	2021/07/16		112	%	50 - 130
			Benzo(a)anthracene	2021/07/16		115	%	50 - 130
			Benzo(a)pyrene	2021/07/16		98	%	50 - 130
			Benzo(b)fluoranthene	2021/07/16		113	%	50 - 130
			Benzo(g,h,i)perylene	2021/07/16		93	%	50 - 130
			Benzo(j)fluoranthene	2021/07/16		108	%	50 - 130
			Benzo(k)fluoranthene	2021/07/16		106	%	50 - 130
			Chrysene	2021/07/16		118	%	50 - 130
			Dibenzo(a,h)anthracene	2021/07/16		84	%	50 - 130
			Fluoranthene	2021/07/16		120	%	50 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Fluorene	2021/07/16		115	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2021/07/16		91	%	50 - 130
			Naphthalene	2021/07/16		114	%	50 - 130
			Perylene	2021/07/16		105	%	50 - 130
			Phenanthrene	2021/07/16		119	%	50 - 130
			Pyrene	2021/07/16		118	%	50 - 130
7466582	LGE	Method Blank	D10-Anthracene	2021/07/16		99	%	50 - 130
			D14-Terphenyl	2021/07/16		100	%	50 - 130
			D8-Acenaphthylene	2021/07/16		96	%	50 - 130
			1-Methylnaphthalene	2021/07/16	<0.050		ug/L	
			2-Methylnaphthalene	2021/07/16	<0.050		ug/L	
			Acenaphthene	2021/07/16	<0.010		ug/L	
			Acenaphthylene	2021/07/16	<0.010		ug/L	
			Anthracene	2021/07/16	<0.010		ug/L	
			Benzo(a)anthracene	2021/07/16	<0.010		ug/L	
			Benzo(a)pyrene	2021/07/16	<0.010		ug/L	
			Benzo(b)fluoranthene	2021/07/16	<0.010		ug/L	
			Benzo(g,h,i)perylene	2021/07/16	<0.010		ug/L	
			Benzo(j)fluoranthene	2021/07/16	<0.010		ug/L	
			Benzo(k)fluoranthene	2021/07/16	<0.010		ug/L	
			Chrysene	2021/07/16	<0.010		ug/L	
			Dibenzo(a,h)anthracene	2021/07/16	<0.010		ug/L	
			Fluoranthene	2021/07/16	<0.010		ug/L	
			Fluorene	2021/07/16	<0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2021/07/16	<0.010		ug/L	
			Naphthalene	2021/07/16	<0.20		ug/L	
			Perylene	2021/07/16	<0.010		ug/L	
			Phenanthrene	2021/07/16	<0.010		ug/L	
			Pyrene	2021/07/16	<0.010		ug/L	
7466582	LGE	RPD [QBZ064-06]	1-Methylnaphthalene	2021/07/16	NC		%	40
			2-Methylnaphthalene	2021/07/16	NC		%	40
			Acenaphthene	2021/07/16	4.1		%	40
			Acenaphthylene	2021/07/16	NC		%	40
			Anthracene	2021/07/16	NC		%	40
			Benzo(a)anthracene	2021/07/16	NC		%	40
			Benzo(a)pyrene	2021/07/16	NC		%	40
			Benzo(b)fluoranthene	2021/07/16	NC		%	40
			Benzo(g,h,i)perylene	2021/07/16	NC		%	40
			Benzo(j)fluoranthene	2021/07/16	NC		%	40
			Benzo(k)fluoranthene	2021/07/16	NC		%	40
			Chrysene	2021/07/16	NC		%	40
			Dibenzo(a,h)anthracene	2021/07/16	NC		%	40
			Fluoranthene	2021/07/16	1.8		%	40
			Fluorene	2021/07/16	1.4		%	40
			Indeno(1,2,3-cd)pyrene	2021/07/16	NC		%	40
			Naphthalene	2021/07/16	NC		%	40
			Perylene	2021/07/16	NC		%	40
			Phenanthrene	2021/07/16	6.2		%	40
			Pyrene	2021/07/16	NC		%	40
7469810	NHU	Matrix Spike	Total Mercury (Hg)	2021/07/20		103	%	80 - 120
7469810	NHU	Spiked Blank	Total Mercury (Hg)	2021/07/20		103	%	80 - 120
7469810	NHU	Method Blank	Total Mercury (Hg)	2021/07/20	<0.013		ug/L	
7469810	NHU	RPD	Total Mercury (Hg)	2021/07/20	NC		%	20

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7471985	EMT	Matrix Spike [QBZ069-03]	Nitrogen (Ammonia Nitrogen)	2021/07/20		95	%	80 - 120
7471985	EMT	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2021/07/20		106	%	80 - 120
7471985	EMT	Method Blank	Nitrogen (Ammonia Nitrogen)	2021/07/20	<0.050		mg/L	
7471985	EMT	RPD [QBZ069-03]	Nitrogen (Ammonia Nitrogen)	2021/07/20	NC		%	20
7472266	SHW	QC Standard	Turbidity	2021/07/20		105	%	80 - 120
7472266	SHW	Spiked Blank	Turbidity	2021/07/20		106	%	80 - 120
7472266	SHW	Method Blank	Turbidity	2021/07/20	<0.10		NTU	
7472266	SHW	RPD	Turbidity	2021/07/20	5.1		%	20
7472443	EMT	Matrix Spike [QBZ062-01]	Total Alkalinity (Total as CaCO3)	2021/07/21		NC	%	80 - 120
7472443	EMT	Spiked Blank	Total Alkalinity (Total as CaCO3)	2021/07/21		105	%	80 - 120
7472443	EMT	Method Blank	Total Alkalinity (Total as CaCO3)	2021/07/21	<5.0		mg/L	
7472443	EMT	RPD [QBZ062-01]	Total Alkalinity (Total as CaCO3)	2021/07/21	2.9		%	20
7472446	SHW	QC Standard	Turbidity	2021/07/20		105	%	80 - 120
7472446	SHW	Spiked Blank	Turbidity	2021/07/20		106	%	80 - 120
7472446	SHW	Method Blank	Turbidity	2021/07/20	<0.10		NTU	
7472446	SHW	RPD [QBZ067-01]	Turbidity	2021/07/20	9.0		%	20
7472450	EMT	Matrix Spike [QBZ062-01]	Dissolved Chloride (Cl-)	2021/07/21		107	%	80 - 120
7472450	EMT	Spiked Blank	Dissolved Chloride (Cl-)	2021/07/21		94	%	80 - 120
7472450	EMT	Method Blank	Dissolved Chloride (Cl-)	2021/07/21	<1.0		mg/L	
7472450	EMT	RPD [QBZ062-01]	Dissolved Chloride (Cl-)	2021/07/21	5.6		%	20
7472451	EMT	Matrix Spike [QBZ062-01]	Dissolved Sulphate (SO4)	2021/07/21		110	%	80 - 120
7472451	EMT	Spiked Blank	Dissolved Sulphate (SO4)	2021/07/21		97	%	80 - 120
7472451	EMT	Method Blank	Dissolved Sulphate (SO4)	2021/07/21	<2.0		mg/L	
7472451	EMT	RPD [QBZ062-01]	Dissolved Sulphate (SO4)	2021/07/21	6.8		%	20
7472452	EMT	Matrix Spike [QBZ062-01]	Reactive Silica (SiO2)	2021/07/21		91	%	80 - 120
7472452	EMT	Spiked Blank	Reactive Silica (SiO2)	2021/07/21		96	%	80 - 120
7472452	EMT	Method Blank	Reactive Silica (SiO2)	2021/07/21	<0.50		mg/L	
7472452	EMT	RPD [QBZ062-01]	Reactive Silica (SiO2)	2021/07/21	0.71		%	20
7472454	EMT	Spiked Blank	Colour	2021/07/21		93	%	80 - 120
7472454	EMT	Method Blank	Colour	2021/07/21	<5.0		TCU	
7472454	EMT	RPD [QBZ062-01]	Colour	2021/07/21	0.60		%	20
7472455	EMT	Matrix Spike [QBZ062-01]	Orthophosphate (P)	2021/07/21		101	%	80 - 120
7472455	EMT	Spiked Blank	Orthophosphate (P)	2021/07/21		96	%	80 - 120
7472455	EMT	Method Blank	Orthophosphate (P)	2021/07/21	<0.010		mg/L	
7472455	EMT	RPD [QBZ062-01]	Orthophosphate (P)	2021/07/21	5.7		%	20
7472457	EMT	Matrix Spike [QBZ062-01]	Nitrate + Nitrite (N)	2021/07/21		105	%	80 - 120
7472457	EMT	Spiked Blank	Nitrate + Nitrite (N)	2021/07/21		88	%	80 - 120
7472457	EMT	Method Blank	Nitrate + Nitrite (N)	2021/07/21	<0.050		mg/L	
7472457	EMT	RPD [QBZ062-01]	Nitrate + Nitrite (N)	2021/07/21	NC		%	20
7472458	EMT	Matrix Spike [QBZ062-01]	Nitrite (N)	2021/07/21		101	%	80 - 120
7472458	EMT	Spiked Blank	Nitrite (N)	2021/07/21		108	%	80 - 120
7472458	EMT	Method Blank	Nitrite (N)	2021/07/21	<0.010		mg/L	
7472458	EMT	RPD [QBZ062-01]	Nitrite (N)	2021/07/21	NC		%	20
7472476	EMT	Matrix Spike [QBZ067-01]	Total Alkalinity (Total as CaCO3)	2021/07/21		NC	%	80 - 120
7472476	EMT	Spiked Blank	Total Alkalinity (Total as CaCO3)	2021/07/21		102	%	80 - 120
7472476	EMT	Method Blank	Total Alkalinity (Total as CaCO3)	2021/07/21	<5.0		mg/L	
7472476	EMT	RPD [QBZ067-01]	Total Alkalinity (Total as CaCO3)	2021/07/21	0.73		%	20
7472481	SHW	Spiked Blank	Conductivity	2021/07/20		101	%	80 - 120
7472481	SHW	Method Blank	Conductivity	2021/07/20	<1.0		uS/cm	
7472481	SHW	RPD	Conductivity	2021/07/20	0.56		%	10
7472482	EMT	Matrix Spike [QBZ067-01]	Dissolved Chloride (Cl-)	2021/07/22		NC	%	80 - 120
7472482	EMT	Spiked Blank	Dissolved Chloride (Cl-)	2021/07/21		109	%	80 - 120
7472482	EMT	Method Blank	Dissolved Chloride (Cl-)	2021/07/21	<1.0		mg/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7472482	EMT	RPD [QBZ067-01]	Dissolved Chloride (Cl-)	2021/07/22	3.5		%	20
7472483	EMT	Matrix Spike [QBZ067-01]	Dissolved Sulphate (SO4)	2021/07/22		NC	%	80 - 120
7472483	EMT	Spiked Blank	Dissolved Sulphate (SO4)	2021/07/21		113	%	80 - 120
7472483	EMT	Method Blank	Dissolved Sulphate (SO4)	2021/07/21	<2.0		mg/L	
7472483	EMT	RPD [QBZ067-01]	Dissolved Sulphate (SO4)	2021/07/22	1.6		%	20
7472484	EMT	Matrix Spike [QBZ067-01]	Reactive Silica (SiO2)	2021/07/21		93	%	80 - 120
7472484	EMT	Spiked Blank	Reactive Silica (SiO2)	2021/07/21		97	%	80 - 120
7472484	EMT	Method Blank	Reactive Silica (SiO2)	2021/07/21	<0.50		mg/L	
7472484	EMT	RPD [QBZ067-01]	Reactive Silica (SiO2)	2021/07/21	1.4		%	20
7472486	EMT	Spiked Blank	Colour	2021/07/21		96	%	80 - 120
7472486	EMT	Method Blank	Colour	2021/07/21	<5.0		TCU	
7472486	EMT	RPD [QBZ067-01]	Colour	2021/07/21	5.5		%	20
7472487	EMT	Matrix Spike [QBZ067-01]	Orthophosphate (P)	2021/07/21		91	%	80 - 120
7472487	EMT	Spiked Blank	Orthophosphate (P)	2021/07/21		97	%	80 - 120
7472487	EMT	Method Blank	Orthophosphate (P)	2021/07/21	<0.010		mg/L	
7472487	EMT	RPD [QBZ067-01]	Orthophosphate (P)	2021/07/21	NC		%	20
7472488	EMT	Matrix Spike [QBZ067-01]	Nitrate + Nitrite (N)	2021/07/21		89	%	80 - 120
7472488	EMT	Spiked Blank	Nitrate + Nitrite (N)	2021/07/21		87	%	80 - 120
7472488	EMT	Method Blank	Nitrate + Nitrite (N)	2021/07/21	<0.050		mg/L	
7472488	EMT	RPD [QBZ067-01]	Nitrate + Nitrite (N)	2021/07/21	1.7		%	20
7472489	EMT	Matrix Spike [QBZ067-01]	Nitrite (N)	2021/07/21		107	%	80 - 120
7472489	EMT	Spiked Blank	Nitrite (N)	2021/07/21		108	%	80 - 120
7472489	EMT	Method Blank	Nitrite (N)	2021/07/21	<0.010		mg/L	
7472489	EMT	RPD [QBZ067-01]	Nitrite (N)	2021/07/21	NC		%	20
7472492	SHW	Spiked Blank	pH	2021/07/20		100	%	97 - 103
7472492	SHW	RPD	pH	2021/07/20	1.3		%	N/A
7474332	NGI	Matrix Spike	Total Organic Carbon (C)	2021/07/21		99	%	85 - 115
7474332	NGI	Spiked Blank	Total Organic Carbon (C)	2021/07/21		101	%	80 - 120
7474332	NGI	Method Blank	Total Organic Carbon (C)	2021/07/21	<0.50		mg/L	
7474332	NGI	RPD	Total Organic Carbon (C)	2021/07/21	7.5		%	15
7474337	NGI	Matrix Spike	Total Organic Carbon (C)	2021/07/22		98	%	85 - 115
7474337	NGI	Spiked Blank	Total Organic Carbon (C)	2021/07/22		102	%	80 - 120
7474337	NGI	Method Blank	Total Organic Carbon (C)	2021/07/22	<0.50		mg/L	
7474337	NGI	RPD	Total Organic Carbon (C)	2021/07/22	6.5		%	15

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) Elevated reporting limits for trace metals due to sample matrix.

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BV Labs Job #: C1J4842
Report Date: 2021/07/22

Dillon Consulting Limited
Client Project #: 20-2862-1000
Site Location: NS LANDS SW PROGRAM
Sampler Initials: MS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Eric Dearman, Scientific Specialist

Phil Deveau, Scientific Specialist (Organics)

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, 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: 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	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	
	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
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 Value	Total No. of Sampling Events						
	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: 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	0.000016	0.000025	0.000016	0.000012	0.000015	0.000018	0.00002	0.000011	0.000011	0.000005	
	22-Jul-16	8-Dec-16	18-Dec-17	07-25-18	11-23-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	0	-1	-1	1	1	-1	-1	-1	-2
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				-1	-1	1	1	-1	-1	-1	-3
Row 4: Compare to Event 4:					1	1	1	-1	-1	-1	0
Row 5: Compare to Event 5:						1	1	-1	-1	-1	-1
Row 6: Compare to Event 6:							1	-1	-1	-1	-2
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									0	-1	-1
Row 9: Compare to Event 9:										-1	-1

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 = **-21**

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							
± 17							
± 18							
± 19							
± 20							
± 21							X
± 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
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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	0.052	0.034	0.031	0.06	0.035	0.055	0.034	0.06	0.047	0.11	
	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	-1	1	-1	1	-1	1	-1	1	-1
Row 2: Compare to Event 2:			-1	1	1	1	0	1	1	1	5
Row 3: Compare to Event 3:				1	1	1	1	1	1	1	7
Row 4: Compare to Event 4:					-1	-1	-1	0	-1	1	-3
Row 5: Compare to Event 5:						1	-1	1	1	1	3
Row 6: Compare to Event 6:							-1	1	-1	1	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	1	0
Row 9: Compare to Event 9:										1	1

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 = **15**

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							
± 12							
± 13							
± 14							
± 15							X
± 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:	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
Sulphate	15	16	21	12	17	15	18	11	27	18	
	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	1	-1	1	0	1	-1	1	1	4
Row 2: Compare to Event 2:			1	-1	1	-1	1	-1	1	1	2
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	1	-1	-5
Row 4: Compare to Event 4:					1	1	1	-1	1	1	4
Row 5: Compare to Event 5:						-1	1	-1	1	1	1
Row 6: Compare to Event 6:							1	-1	1	1	2
Row 7: Compare to Event 7:								-1	1	0	0
Row 8: Compare to Event 8:									1	1	2
Row 9: Compare to Event 9:										-1	-1

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 Value	Total No. of Sampling Events						
	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:	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	0.0025	0.0025	0.0025	0.0025	0.0067	0.0025	0.0051	0.0025	0.0025	0.014	
	22-Jul-16	8-Dec-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		0	0	0	1	0	1	0	0	1	3
Row 2: Compare to Event 2:			0	0	1	0	1	0	0	1	3
Row 3: Compare to Event 3:				0	1	0	1	0	0	1	3
Row 4: Compare to Event 4:					1	0	1	0	0	1	3
Row 5: Compare to Event 5:						-1	-1	-1	-1	1	-3
Row 6: Compare to Event 6:							1	0	0	1	2
Row 7: Compare to Event 7:								-1	-1	1	-1
Row 8: Compare to Event 8:									0	1	1
Row 9: Compare to Event 9:										1	1

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 = **12**

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							X
± 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: 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	0.091	0.054	0.13	0.05	0.12	0.074	0.074	0.21	0.025	0.2	
	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	1	-1	1	-1	-1	1	-1	1	-1
Row 2: Compare to Event 2:			1	-1	1	1	1	1	-1	1	4
Row 3: Compare to Event 3:				-1	-1	-1	-1	1	-1	1	-3
Row 4: Compare to Event 4:					1	1	1	1	-1	1	4
Row 5: Compare to Event 5:						-1	-1	1	-1	1	-1
Row 6: Compare to Event 6:							0	1	-1	1	1
Row 7: Compare to Event 7:								1	-1	1	1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

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	
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: 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	0.000018	0.000039	0.000005	0.000017	0.00026	0.000027	0.000034	0.000019	0.000017	0.000005	
	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	-1	1	1	1	1	-1	-1	1
Row 2: Compare to Event 2:			-1	-1	1	-1	-1	-1	-1	-1	-6
Row 3: Compare to Event 3:				1	1	1	1	1	1	0	6
Row 4: Compare to Event 4:					1	1	1	1	0	-1	3
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	-1	-1	-1	-2
Row 7: Compare to Event 7:								-1	-1	-1	-3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										-1	-1

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 Value	Total No. of Sampling Events						
	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	
	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: 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	0.17	0.14	0.19	0.35	0.18	0.13	0.13	0.2	0.15	0.16	
	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	1	1	1	-1	-1	1	-1	-1	-1
Row 2: Compare to Event 2:			1	1	1	-1	-1	1	1	1	4
Row 3: Compare to Event 3:				1	-1	-1	-1	1	-1	-1	-3
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						-1	-1	1	-1	-1	-3
Row 6: Compare to Event 6:							0	1	1	1	3
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

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	
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: 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	51	42	54	290	43	46	47	98	43	86	
	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	1	1	-1	-1	-1	1	-1	1	-1
Row 2: Compare to Event 2:			1	1	1	1	1	1	1	1	8
Row 3: Compare to Event 3:				1	-1	-1	-1	1	-1	1	-1
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						1	1	1	0	1	4
Row 6: Compare to Event 6:							1	1	-1	1	2
Row 7: Compare to Event 7:								1	-1	1	1
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

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 Value	Total No. of Sampling Events						
	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: 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	0.0025	0.0057	0.0025	0.0062	0.047	0.0062	0.0073	0.0025	0.0025	0.0025	
	22-Jul-16	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	0	1	1	1	1	0	0	0	5
Row 2: Compare to Event 2:			-1	1	1	1	1	-1	-1	-1	0
Row 3: Compare to Event 3:				1	1	1	1	0	0	0	4
Row 4: Compare to Event 4:					1	0	1	-1	-1	-1	-1
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	-1	-1	-1	-2
Row 7: Compare to Event 7:								-1	-1	-1	-3
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 Value	Total No. of Sampling Events						
	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	
	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
Anthracene	0.000013	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
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 = **-9**

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							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

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	0.00004	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
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 = **-9**

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							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	
	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	0.000028	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
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 = **-9**

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							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

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	0.025	0.063	0.025	0.057	0.025	0.025	0.025	0.054	0.025	0.66	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	0	1	0	0	0	1	0	1	4
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	1	-6
Row 3: Compare to Event 3:				1	0	0	0	1	0	1	3
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	1	-4
Row 5: Compare to Event 5:						0	0	1	0	1	2
Row 6: Compare to Event 6:							0	1	0	1	2
Row 7: Compare to Event 7:								1	0	1	2
Row 8: Compare to Event 8:									-1	1	0
Row 9: Compare to Event 9:										1	1

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: 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	0.000014	0.000011	0.00001	0.000005	0.000014	0.000005	0.000015	0.000005	0.000005	0.000005	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	-1	-1	0	-1	1	-1	-1	-1	-6
Row 2: Compare to Event 2:			-1	-1	1	-1	1	-1	-1	-1	-4
Row 3: Compare to Event 3:				-1	1	-1	1	-1	-1	-1	-3
Row 4: Compare to Event 4:					1	0	1	0	0	0	2
Row 5: Compare to Event 5:						-1	1	-1	-1	-1	-3
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	-1	-1	-3
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

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	0.11	0.45	0.11	0.43	0.13	0.23	0.11	0.34	0.17	0.27	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	0	1	1	1	0	1	1	1	7
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				1	1	1	0	1	1	1	6
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						1	-1	1	1	1	3
Row 6: Compare to Event 6:							-1	1	-1	1	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

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	
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	39	110	42	100	41	69	43	99	57	91	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	1	1	1	1	1	1	1	1	9
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				1	-1	1	1	1	1	1	5
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						1	1	1	1	1	5
Row 6: Compare to Event 6:							-1	1	-1	1	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

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 Value	Total No. of Sampling Events: 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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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	0.0025	0.0025	0.0051	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0058	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		0	1	0	0	0	0	0	0	1	2
Row 2: Compare to Event 2:			1	0	0	0	0	0	0	1	2
Row 3: Compare to Event 3:				-1	-1	-1	-1	-1	-1	1	-5
Row 4: Compare to Event 4:					0	0	0	0	0	1	1
Row 5: Compare to Event 5:						0	0	0	0	1	1
Row 6: Compare to Event 6:							0	0	0	1	1
Row 7: Compare to Event 7:								0	0	1	1
Row 8: Compare to Event 8:									0	1	1
Row 9: Compare to Event 9:										1	1

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 Value	Total No. of Sampling Events						
	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
Anthracene	0.000027	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
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 = **-9**

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							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

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	0.000038	0.000017	0.000012	0.000005	0.00001	0.000005	0.000015	0.000005	0.000005	0.000005	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				-1	-1	-1	1	-1	-1	-1	-5
Row 4: Compare to Event 4:					1	0	1	0	0	0	2
Row 5: Compare to Event 5:						-1	1	-1	-1	-1	-3
Row 6: Compare to Event 6:							1	0	0	0	1
Row 7: Compare to Event 7:								-1	-1	-1	-3
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 = **-25**

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							
± 12							
± 13							
± 14							
± 15							
± 16							
± 17							
± 18							
± 19							
± 20							
± 21							
± 22							
± 23							
± 24	Not Physically possible						
± 25							X
± 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: 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	0.000027	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	0.000005	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
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 = **-9**

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							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

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
Boron	0.025	0.059	0.025	0.062	0.025	0.025	0.025	0.081	0.025	0.093	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	0	1	0	0	0	1	0	1	4
Row 2: Compare to Event 2:			-1	1	-1	-1	-1	1	-1	1	-2
Row 3: Compare to Event 3:				1	0	0	0	1	0	1	3
Row 4: Compare to Event 4:					-1	-1	-1	1	-1	1	-2
Row 5: Compare to Event 5:						0	0	1	0	1	2
Row 6: Compare to Event 6:							0	1	0	1	2
Row 7: Compare to Event 7:								1	0	1	2
Row 8: Compare to Event 8:									-1	1	0
Row 9: Compare to Event 9:										1	1

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 = **10**

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							X
± 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
Cadmium	0.000015	0.000011	0.00001	0.000005	0.000015	0.000005	0.000014	0.000016	0.000005	0.000005	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	-1	-1	0	-1	-1	1	-1	-1	-6
Row 2: Compare to Event 2:			-1	-1	1	-1	1	1	-1	-1	-2
Row 3: Compare to Event 3:				-1	1	-1	1	1	-1	-1	-1
Row 4: Compare to Event 4:					1	0	1	1	0	0	3
Row 5: Compare to Event 5:						-1	-1	1	-1	-1	-3
Row 6: Compare to Event 6:							1	1	0	0	2
Row 7: Compare to Event 7:								1	-1	-1	-1
Row 8: Compare to Event 8:									-1	-1	-2
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 = **-10**

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							X
± 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
Strontium	0.16	0.5	0.16	0.35	0.14	0.3	0.15	0.43	0.18	0.34	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	0	1	-1	1	-1	1	1	1	4
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				1	-1	1	-1	1	1	1	3
Row 4: Compare to Event 4:					-1	-1	-1	1	-1	-1	-4
Row 5: Compare to Event 5:						1	1	1	1	1	5
Row 6: Compare to Event 6:							-1	1	-1	1	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

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 Value	Total No. of Sampling Events						
	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:	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	0.41	0.11	0.048	0.095	0.045	0.076	0.049	0.11	0.054	0.1	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	0	-1	-1	-7
Row 3: Compare to Event 3:				1	-1	1	1	1	1	1	5
Row 4: Compare to Event 4:					-1	-1	-1	1	-1	1	-2
Row 5: Compare to Event 5:						1	1	1	1	1	5
Row 6: Compare to Event 6:							-1	1	-1	1	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

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 Value	Total No. of Sampling Events						
	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
Zinc	0.0025	0.0025	0.0025	0.0025	0.0064	0.0025	0.0025	0.0025	0.0025	0.0025	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
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	-1	-1	-5
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
Boron	0.025	0.43	0.025	0.11	0.025	0.025	0.025	0.55	0.025	0.053	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	0	1	0	0	0	1	0	1	4
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	1	-1	-1	-6
Row 3: Compare to Event 3:				1	0	0	0	1	0	1	3
Row 4: Compare to Event 4:					-1	-1	-1	1	-1	-1	-4
Row 5: Compare to Event 5:						0	0	1	0	1	2
Row 6: Compare to Event 6:							0	1	0	1	2
Row 7: Compare to Event 7:								1	0	1	2
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

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 Value	Total No. of Sampling Events						
	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	
	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: 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	0.000026	0.000027	0.000027	0.000024	0.00015	0.000021	0.000027	0.000087	0.000027	0.000024	
	8-Dec-16	3-Aug-16	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-09	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	1	-1	1	-1	1	1	1	-1	3
Row 2: Compare to Event 2:			0	-1	1	-1	0	1	0	-1	-1
Row 3: Compare to Event 3:				-1	1	-1	0	1	0	-1	-1
Row 4: Compare to Event 4:					1	-1	1	1	1	0	3
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	1	1	1	4
Row 7: Compare to Event 7:								1	0	-1	0
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										-1	-1

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 Value	Total No. of Sampling Events						
	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: 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	0.061	0.94	0.049	0.32	0.05	0.12	0.039	1.2	0.058	0.16	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	-1	1	1
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	1	-1	-1	-6
Row 3: Compare to Event 3:				1	1	1	-1	1	1	1	5
Row 4: Compare to Event 4:					-1	-1	-1	1	-1	-1	-4
Row 5: Compare to Event 5:						1	-1	1	1	1	3
Row 6: Compare to Event 6:							-1	1	-1	1	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

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	
	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:	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	8.5	230	8.3	71	6.5	16	7.5	330	7.5	38	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	-1	1	1
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	1	-1	-1	-6
Row 3: Compare to Event 3:				1	-1	1	-1	1	-1	1	1
Row 4: Compare to Event 4:					-1	-1	-1	1	-1	-1	-4
Row 5: Compare to Event 5:						1	1	1	1	1	5
Row 6: Compare to Event 6:							-1	1	-1	1	0
Row 7: Compare to Event 7:								1	0	1	2
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										1	1

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 Value	Total No. of Sampling Events						
	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	
	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: 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	0.0025	0.0025	0.0025	0.006	0.16	0.0025	0.005	0.0069	0.0025	0.0069	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		0	0	1	1	0	1	1	0	1	5
Row 2: Compare to Event 2:			0	1	1	0	1	1	0	1	5
Row 3: Compare to Event 3:				1	1	0	1	1	0	1	5
Row 4: Compare to Event 4:					1	-1	-1	1	-1	1	0
Row 5: Compare to Event 5:						-1	-1	-1	-1	-1	-5
Row 6: Compare to Event 6:							1	1	0	1	3
Row 7: Compare to Event 7:								1	-1	1	1
Row 8: Compare to Event 8:									-1	0	-1
Row 9: Compare to Event 9:										1	1

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 = **14**

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							X
± 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
Boron	0.52	3.6	0.34	3.5	0.42	3.1	0.36	3.2	3.6	2.9	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	1	1	3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	0	-1	-7
Row 3: Compare to Event 3:				1	1	1	1	1	1	1	7
Row 4: Compare to Event 4:					-1	-1	-1	-1	1	-1	-4
Row 5: Compare to Event 5:						1	-1	1	1	1	3
Row 6: Compare to Event 6:							-1	1	1	-1	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									1	-1	0
Row 9: Compare to Event 9:										-1	-1

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	
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
Cadmium	0.000025	0.00005	0.00002	0.00005	0.000024	0.00005	0.000021	0.00011	0.00005	0.00005	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	1	1	3
Row 2: Compare to Event 2:			-1	0	-1	0	-1	1	0	0	-2
Row 3: Compare to Event 3:				1	1	1	1	1	1	1	7
Row 4: Compare to Event 4:					-1	0	-1	1	0	0	-1
Row 5: Compare to Event 5:						1	-1	1	1	1	3
Row 6: Compare to Event 6:							-1	1	0	0	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
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 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							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

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
Strontium	1	6.1	0.63	5.9	0.73	5	0.34	5.5	5.6	4.8	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	1	1	3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				1	1	1	-1	1	1	1	5
Row 4: Compare to Event 4:					-1	-1	-1	-1	-1	-1	-6
Row 5: Compare to Event 5:						1	-1	1	1	1	3
Row 6: Compare to Event 6:							-1	1	1	-1	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									1	-1	0
Row 9: Compare to Event 9:										-1	-1

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:	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	290	2000	210	1900	250	1700	250	2100	2100	1900	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	1	1	3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	1	1	-1	-4
Row 3: Compare to Event 3:				1	1	1	1	1	1	1	7
Row 4: Compare to Event 4:					-1	-1	-1	1	1	0	-1
Row 5: Compare to Event 5:						1	0	1	1	1	4
Row 6: Compare to Event 6:							-1	1	1	1	2
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									0	-1	-1
Row 9: Compare to Event 9:										-1	-1

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 = **12**

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							X
± 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: 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	0.0025	0.025	0.0025	0.025	0.0025	0.025	0.0025	0.025	0.025	0.025	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	0	1	0	1	0	1	1	1	6
Row 2: Compare to Event 2:			-1	0	-1	0	-1	0	0	0	-3
Row 3: Compare to Event 3:				1	0	1	0	1	1	1	5
Row 4: Compare to Event 4:					-1	0	-1	0	0	0	-2
Row 5: Compare to Event 5:						1	0	1	1	1	4
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								1	1	1	3
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 = **12**

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							X
± 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	0.46	3.6	0.21	2.8	0.26	3	0.18	3.2	2.6	2.5	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	1	1	3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				1	1	1	-1	1	1	1	5
Row 4: Compare to Event 4:					-1	1	-1	1	-1	-1	-2
Row 5: Compare to Event 5:						1	-1	1	1	1	3
Row 6: Compare to Event 6:							-1	1	-1	-1	-2
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										-1	-1

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: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Cadmium	0.000029	0.00005	0.000018	0.00005	0.000021	0.00005	0.000021	0.00013	0.00005	0.00005	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	1	1	3
Row 2: Compare to Event 2:			-1	0	-1	0	-1	1	0	0	-2
Row 3: Compare to Event 3:				1	1	1	1	1	1	1	7
Row 4: Compare to Event 4:					-1	0	-1	1	0	0	-1
Row 5: Compare to Event 5:						1	0	1	1	1	4
Row 6: Compare to Event 6:							-1	1	0	0	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
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 = **12**

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							X
± 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
Strontium	0.89	6.1	0.45	5	0.5	5	0.66	5.6	4.5	4.1	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	1	1	3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 3: Compare to Event 3:				1	1	1	1	1	1	1	7
Row 4: Compare to Event 4:					-1	0	-1	1	-1	-1	-3
Row 5: Compare to Event 5:						1	1	1	1	1	5
Row 6: Compare to Event 6:							-1	1	-1	-1	-2
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
Row 9: Compare to Event 9:										-1	-1

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 Value	Total No. of Sampling Events						
	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
Sulphate	270	2000	150	1700	180	1700	120	2100	1700	1700	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	1	1	3
Row 2: Compare to Event 2:			-1	-1	-1	-1	-1	1	-1	-1	-6
Row 3: Compare to Event 3:				1	1	1	-1	1	1	1	5
Row 4: Compare to Event 4:					-1	0	-1	1	0	0	-1
Row 5: Compare to Event 5:						1	-1	1	1	1	3
Row 6: Compare to Event 6:							-1	1	0	0	0
Row 7: Compare to Event 7:								1	1	1	3
Row 8: Compare to Event 8:									-1	-1	-2
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 Value	Total No. of Sampling Events						
	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: Narrows										
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Sum Rows
Zinc	0.015	0.025	0.0058	0.025	0.0088	0.025	0.0072	0.025	0.025	0.025	
	8-Dec-16	3-Aug-17	18-Dec-17	25-Jul-18	23-Nov-18	29-Jul-19	13-Dec-19	21-Jul-20	1-Dec-20	13-Jul-21	
Row 1: Compare to Event 1:		1	-1	1	-1	1	-1	1	1	1	3
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	1	1	1	7
Row 4: Compare to Event 4:					-1	0	-1	0	0	0	-2
Row 5: Compare to Event 5:						1	-1	1	1	1	3
Row 6: Compare to Event 6:							-1	0	0	0	-1
Row 7: Compare to Event 7:								1	1	1	3
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 = **10**

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							X
± 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