2023 ANNUAL MONITORING REPORT
LAKE ST. PETER WASTE DISPOSAL SITE
ENVIRONMENTAL COMPLIANCE APPROVAL
NO. A361116

Prepared for:

The Corporation of the Municipality of Hastings Highlands
33011 Highway No. 62
P.O. Box 130
Maynooth, ON K0L 2S0

Prepared by:

BluMetric Environmental Inc.
4 Cataraqui Street
The Woolen Mill, The Tower
Kingston, ON K7K 1Z7

Project Number: 230225-04
25 March 2024

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(Provided On USB Drive for Hard Copy)

1 Introduction

BluMetric Environmental Inc. (BluMetric®) was retained by the Corporation of the Municipality of Hastings Highlands (MHHs or Municipality) to conduct the 2023 environmental monitoring and sampling program and prepare the 2023 Annual Report. This report provides a summary and analysis of environmental monitoring activities at the Lake St. Peter Waste Disposal Site (WDS), in Maynooth, Ontario. The WDS, as shown in Figure 01 is herein after referred to as "the Site".

This report is prepared in accordance with Condition 6 of the Environmental Compliance Approval (ECA) A361116 for the Site, dated October 25, 2021, a copy of which is included in **Appendix A**. The report covers all work and activities carried out for the period from January 1, 2023 to December 31, 2023.

The intent of this report is to be consistent with the general requirements of the Ontario Ministry of Environment, Conservation and Parks (MECP) document titled; *Monitoring and Reporting for Waste Disposal Sites (WDS), Groundwater and Surface Water: Technical Guidance Document (MOE November 2010)*, referred to as the "WDS Technical Guidance". The Monitoring and Screening Checklist from the WDS Technical Guidance has been completed and is included as **Appendix B** of this report. The screening checklist was completed with the Operational Status set as "open" as the Site operated throughout 2023.

1.1 Location

The WDS is located on the west side of Route 127, approximately 1.5 km from the intersection of Route 127 and Fosters Road and the community of Lake St. Peter (Figure 01). The civic address is 2825 Highway 127, Lake St. Peter, Ontario and is located approximately 13 km north of Maynooth, Ontario. The total site area mentioned on the ECA is 17 hectares (ha) located on Part of Lots 10 and 11, Concessions 12 and 13 (formerly McClure Township), now part of the Municipality of Hastings Highlands. The facility layout, road network, and site features are shown on Figure 02.

The Site is approved as a 2.2-hectare (ha) waste disposal site and transfer site within a total site area of 17- ha, however the portion of the Site property owned by the Municipality only covers 1.6 ha. The Crown owns the land surrounding the 1.6 ha area. There is currently no buffer or additional lands designated as a Contaminant Attenuation Zone (CAZ) within the total 17 ha WDS area. The Municipality has submitted a request to the Ministry of Natural Resources and Forestry (MNRF) to add additional buffer and CAZ lands to the Site. The MNRF is currently processing the request. The proposed CAZ and total Site area boundaries are shown on Figure 02.

1.2 Ownership and Key Personnel

The facility is operated by the MHHs, with the municipal office located in Maynooth, Ontario. In May of 2018, the MNRF, on behalf of the Crown, advised that their records show the Municipality holds a land patent for 1.6 ha (PINS 400010001 and 400010002), dated November 6, 1986. In addition, the Municipality owns a right of way which divides the 1.6 ha into two separate parcels. The 1.6 ha of landfilling area is depicted on Figure 02. As mentioned above, the MNRF is in the process of transferring ownership and easement rights to the Municipality for the required buffer and CAZ lands.

The facility's operational representative is responsible for all activities on-site. The Site contact is David Stewart and the Competent Environmental Practitioner (CEP) for both groundwater and surface water is Mark Somers, M.Eng., P.Eng., of BluMetric. Mr. Somers is a Professional Engineer as designated by Professional Engineers Ontario (PEO).

Contact information is outlined in Table 1.

Table 1: Contact Information

	Name	Address	Phone Number	Email and Phone Number
Site Owner / Contact	The Corporation of the Municipality of Hastings Highlands CAO – David Stewart	P.O. Box 130 33011 Highway No. 62 Maynooth, ON K0L 2S0	(613) 338-2811 ext. 289	dstewart@hastingshighlands.ca
CEP	Mark Somers, M.Eng., P.Eng., BluMetric Environmental	1682 Woodward Dr, Ottawa, ON K2C 3R8	(877) 487-8436 ext. 246	msomers@blumetric.ca

1.3 Description and Development of the WDS

The Site is approved for a 2.2 ha landfilling and transfer area within a total area of 17 ha, however only 1.6 ha is currently owned by the municipality. In addition to domestic waste, the Lake St. Peter WDS includes recycling bins for metal, plastic, paper, and cardboard products, as well as segregated areas for scrap metal, tires, and brush. The Ontario Electronic Stewardship (OES) has approved the Lake St. Peter WDS for the collection of Waste Electrical and Electronic Equipment (WEEE) wastes. Regulations came into effect in 2020 with respect to this material, now referred to as Electrical and Electronic Equipment (EEE). This regulation with respect to EEE falls under the Resource Recovery and Circular Economy Act, 2016, and the regulation was filed on September 21, 2020. Historically, domestic wastes were disposed of in trenches; however, the Site is currently using an area-fill method of operation.

A Development and Operations (D&O) Plan for the Site was prepared and finalized in September 2020. The D&O Plan was approved under the amended ECA (October 25, 2021).

1.4 Monitoring and Reporting Program and Objectives and Requirements

The objectives of the monitoring and reporting program are to identify and mitigate impacts to the environment caused by the municipal solid WDS and WTS. The monitoring and reporting program has been developed with these objectives in mind. In addition, the monitoring and reporting program are designed to adhere to the MECP's Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water-Technical Guidance Document (November 2010) and the ECA for the Site.

2 Physical Setting

2.1 Geology and Hydrogeology

2.1.1 Surficial Geology

The surficial geology of the area is glaciofluvial outwash deposits such as gravel and sand (MNDM, 1991). The immediate area of the Site is characterized by generally sandy overburden with a thickness ranging from 1 to 40 metres (m). Monitoring well borehole logs for the nine monitoring wells on-site confirm that the overburden is a sand and gravel unit to depths of over 9 m below ground surface (m bgs). Three new wells were drilled at the Site in 2023 to depths between 7.89 m bgs and 9.14 m bgs through sand and gravel units. The monitoring well logs are provided in **Appendix C.**

Well records for five private wells located within 1.5 km of the Site were obtained from the MECP website. The well records indicate the overburden ranges from approximately 10 m bgs to 40 m bgs and generally consists of sand and gravel, with numerous boulders at some locations. All well records indicate wells are screened in granite bedrock at depths from 10 m bgs to 122 m bgs.

2.1.2 Overburden Hydrogeology

In October 2019, slug tests were conducted on monitoring wells LSP4-19 and LSP5-19, and the results were analyzed using the Hvorslev method. The hydraulic conductivity for the sand unit at monitoring well LSP4-19 was calculated to be 5.57×10^{-4} and 5.09×10^{-5} m/s. The hydraulic conductivity in the sand and gravel unit at monitoring well LSP5-19 was calculated to be 5.26×10^{-4} m/s.

2.1.3 Bedrock Geology

Bedrock in the area is classified as undifferentiated igneous and metamorphic rock, such as gneisses or granite, exposed at surface or covered by a discontinuous thin layer of drift (MNDM, 1991). Bedrock outcrops are visible in the vicinity of the Site.

2.2 Surface Water Features

Papineau Creek and a small lake along its route are located approximately 500 m northeast of the WDS, and Lake St. Peter is located approximately 900 m southeast of the WDS. A review of topographical mapping indicates that all surface water eventually flows east towards Papineau Creek and Lake St. Peter (the largest surface water feature in the area). The surface topography on Site generally slopes towards the east, with the northern portion of the Site sloping North and the southern portion of the Site sloping south. A small creek is located immediately north of the Site and flows east towards Papineau Creek. The existing site topography and surface water flow directions are provided on Figure 03.

3 Monitoring Program

3.1 Site Inspections and Operations Monitoring

Site visits to the Lake St. Peter WDS were made in the spring on May 4, 2023, and June 1, 2023, and in the fall on October 17, 2023 and November 14, 2023. During the spring site visit, it was noted that the active waste cell had not yet been covered and air blown plastic waste was observed around the site and in the surface water monitoring locations. The fall site visit reported overflowing segregated scrap piles for the metals and the bulky items. Select photographs taken during the Site visits are provided at the end of the report, following the tables and figures. Field inspection forms for the spring and fall 2023 inspections are provided in **Appendix D (D1)**.

3.2 Monitoring Locations, Frequency and Monitoring Parameters

3.2.1 Groundwater Monitoring

There are currently six groundwater monitoring wells located at the Site. Three of the monitoring wells (LSP1-03, LSP2-03, LSP3-03) have been part of the annual monitoring program since 2003. Two wells, LSP4-19 and LSP5-19 were installed on July 16, 2019, and three new wells, LSP6-23, LSP7-23 and LSP8-23, were installed on September 21, 2023. LSP6-23 and LSP7-23 assist in determining the required buffer and CAZ for the Site, and with the purchasing or leasing requirements for the land areas from the Crown (MNRF). A sixth groundwater monitoring location, in the form of a drive-point well (LSP-DP-1-21) was installed in 2021 at the request of the MECP Technical Surface Water Reviewer. The purpose of this drive-point well is to monitor potential impacts to the creek located northeast of the WDS. Schedule B of ECA No. classified LSP-DP-1-21 as a surface water monitoring location. During the 2021 and 2022 monitoring programs, LSP-DP-1-21 was treated as a groundwater monitoring location rather than a surface water location. To be consistent with historic reporting, LSP-DP-1-21 has been included as a groundwater monitoring location below and as a surface water monitoring location in Section 3.2.2.

Each well is screened in a water-bearing medium-grained brown sand and gravel unit, except for LSP5-19 which is predominantly screened in coarser gravel. No overburden unit was observed during the drive-point installation; however, it is assumed to be a sand and gravel unit as there was some resistance and location adjustments were required. The location and descriptions of the groundwater monitoring wells, along with the coordinates, and screened interval are provided in Table 2, while the monitoring well logs are provided in **Appendix C.**

Table 2: Groundwater Monitoring Well Details

Sample Location	Northing	Easting	Screened Interval (mbgs)	Location Description
LSP1-03	5022641	731481	5.18 to 8.23	Within the approved waste footprint near the east boundary, south of the approximate buried waste outline, site leachate well
LSP2-03	5022752	731383	4.57 to 7.62	Within the approved waste footprint near the north boundary, north of the approximate buried waste outline, site background well
LSP3-03	5022671	731462	4.57 to 7.62	Within the approved waste footprint near the east boundary, 28 m north of LSP1-03, site leachate well
LSP4-19	5022665	731554	5.94 to 9.00	67 m east of the approved waste footprint, 30 m north of the access road
LSP5-19	5022610	731498	4.88 to 7.92	Within the approved waste footprint near the southern point, 10 m south of access road
LSP-DP-1-21	5022790	731475	1.04 to 1.84	5 m north of the northeast corner of approved waste footprint
LSP6-23	5022808	731621	4.25 to 7.31	165 m east of the approved waste footprint along the eastern CAZ boundary
LSP7-23	5022709	731657	5.30 to 8.38	175 m east of the approved waste footprint, 105 m south of LSP6-23 along the eastern CAZ boundary

LSP8-23	5022717	731451	6.15 to 9.14	Within the approved waste footprint near the east boundary, 45 m north of LSP3-03, site leachate well

Note: UTM Zone 17, NAD 83

Groundwater samples were collected during the spring and fall 2023 sampling events and analyzed to characterize the groundwater quality at the Site. Historically, the semi-annual groundwater sampling was conducted voluntarily, however it is now stipulated in Schedule B of the Amended ECA (October 2021). Table 3 lists the groundwater quality monitoring parameters that were analyzed.

Table 3: Groundwater Quality Monitoring Parameters

Category	Parameters
Organic Parameters	Dissolved Organic Carbon (DOC), Volatile Organic Compounds (VOCs)
Inorganic Parameters	Nitrate, Ammonia, Chloride, Major Ions (Sodium, Calcium, Magnesium, Sulphate, Alkalinity)
Soluble Metals	Iron, Boron, Barium, Manganese
Physical/Chemical Parameters	pH, Conductivity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS)

In 2021, the MECP requested additional analysis of VOCs outside of Schedule B of the Amended ECA. If no VOCs were evident, then sampling of VOCs every five years would be acceptable. During the spring 2023 sampling event, VOCs were inadvertently analyzed despite the five-year frequency permitted by the MECP. We will revert to the approved frequency next year and the next VOC samples will be collected in 2027.

Field measurements of groundwater pH, temperature, and conductivity were collected at the time of sampling.

During the spring and fall site visits, the groundwater monitoring wells were inspected and any repairs such as new locks, labels or well caps, were made as necessary. Watertight casings and seals remain in place at all wells to ensure that surface water or foreign materials cannot enter groundwater monitoring wells. All groundwater

monitoring wells are fitted with a vermin-proof cap to meet the requirements of Ontario Regulation 903 and are locked to provide protection against vandalism.

3.2.1.1 Groundwater Elevations

During each monitoring event, groundwater elevations were collected from the monitoring wells. Groundwater level measurements were collected using an electronic water level meter prior to purging/sampling activity. Groundwater elevation data are summarized in Table 4.

Table 4: Groundwater Elevation Data

Groundwater Monitoring Wells	Top of PVC Elevation (masl)	Water Level 4-May-23 (mbtpvc)[1]	Water Level 17-Oct-23 (mbtpvc)	Groundwater Elevation 4-May-23 (masl)	Groundwater Elevation 17-Oct-23 (masl)
LSP1-03	412.63	4.56	6.19	408.07	406.45
LSP2-03	412.73	3.55	4.9	409.18	407.83
LSP3-03	412.53	4.41	6.03	408.12	406.505
LSP4-19	412.55	5.51	6.51	407.04	406.04
LSP5-19	412.76	4.71	6.35	408.05	406.41
LSP6-23	406.53	-	1.08	-	405.45
LSP7-23	408.93	-	3.23	-	405.7
LSP8-23	413.68	-	6.95	-	406.74
LSP-DP-1-21	407.38	0.42	0.96	406.96	406.42

Note:

[1] mbtpvc = metres below top of PVC

3.2.1.2 Groundwater Gradients and Flow Direction

During the spring, groundwater flow at the Site generally flows east-northeast toward Papineau Creek/Lake St. Peter. Based on the May 4, 2023 groundwater elevation data, the hydraulic gradient for the groundwater flow ranges from approximately 0.015 m/m in the northern section of the site to approximately 0.013 m/m in the southern section.

Similar to the spring, the groundwater in the fall generally flows east-northeast. Data from the October 17, 2023 event indicates that the groundwater flow has a hydraulic gradient that ranges from approximately 0.016 m/m in the northern part of the Site, to approximately 0.0057 m/m in the southern part, and to approximately 0.0041 m/m in the eastern section of the site. Note that water elevations measured at LSP-DP-1-21 in the spring and fall were not considered while drawing the groundwater contour lines for the site as they did not appear to represent typical groundwater levels. The groundwater elevations and calculated equipotential lines for the spring and fall are provided on Figures 04 and 05.

3.2.2 Surface Water Monitoring

Surface water sampling was conducted during the spring and fall sampling events on May 4, 2023 and October 17, 2023. The surface water sampling locations are shown on Figure 02 and the coordinates are included in Table 5. Surface water samples were analyzed for the parameters listed in Table 6. Photographs are provided at the end of the text following the Tables and Figures.

Table 5: Surface-Water Monitoring Locations

Location	Northing	Easting	Location Description
LSP-SW1	5022757	731357	Upstream, background location located along the northern property boundary
LSP-SW2	5022809	731474	Downstream, located approximately 130m east-northeast of LSP-SW1
LSP-DP-1-21	5022790	731475	5 m north of the northeast corner of approved waste footprint

Note: UTM Zone 17, NAD 83

Table 6: Lake St. Peter Surface Water Quality Monitoring Parameters

Category	Parameters
Biological Parameters	BOD_5, COD
Organic Parameters	Phenols

Category	Parameters
Inorganic Parameters	Alkalinity, Chloride, Nitrite, Nitrate, Sulphate, Phosphorous (Total), Total Kjeldahl Nitrogen (TKN), Ammonia (N)-Total, Calcium, Aluminum (Dissolved), Arsenic, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Magnesium, Nickel, Potassium, Selenium, Silver, Sodium, Zinc, Lead, Barium, Beryllium, Molybdenum, Manganese, Mercury (Dissolved), Silicon, Strontium, Thallium, Titanium, Vanadium
Physical/Chemical Parameters	pH, Conductivity, TDS, TSS, Colour, Hardness ($CaCO_3$), Turbidity (NTU)

There were no changes to the surface water parameter list included in the Amended ECA. Schedule B of ECA No. A361116 classified LSP-DP-1-21 as a surface water monitoring location; however, during the 2021 and 2022 monitoring programs, LSP-DP-1-21 was not analysed for the surface water parameters listed in Table 6. Starting in 2023, LSP-DP-1-21 is analysed for the surface water parameters listed in Table 6 in accordance with the ECA, in addition to the groundwater parameters listed in Table 3 to allow for a historic comparison to previous results.

Surface velocity measurements were collected by timing the travel of a buoyant object over a known distance. The average of three measurements was recorded as surface velocity in metres per second (m/s). Table 7 summarizes the collected measurements and presents the calculated discharge for each location.

Table 7: Surface Water Sampling Observations

Date	Location	Discharge [1] (m^3/s)	Velocity & Channel Measurements [2]
4-May-23	LSP-SW1	0.014	Depth 0.10 m; width 0.95 m; velocity 0.15 m/s
	LSP-SW2	0.26	Depth 0.35 m; width 2.5 m; velocity 0.30 m/s
17-Oct-23	LSP-SW1	-	Dry
	LSP-SW2	-	Dry

Notes:

[1] Calculated assuming a simple channel with a rectangular cross section.

[2] All velocity and channel measurements collected at the point of sampling.

3.2.3 Landfill Gas Monitoring

The primary gas present at landfill sites is methane. Methane cannot cause an explosion unless it accumulates to a concentration above its lower explosive limit (LEL) in an enclosed area. The LEL for methane is 5% in air. The methane concentration limits, as per Regulation 232/98, are:

- Less than 2.5% methane gas (25,000 ppm, LEL=50%) in the subsurface at the property;
- Less than 1.0% methane gas (10,000 ppm, LEL=20%) in an on-site building, or its foundation; and
- Less than 0.05 % methane gas (500 ppm, LEL=1%) in a building, or its foundation, which is located off-site.

Routine landfill gas monitoring within any buildings or structures is required at the Site.

3.3 Monitoring Procedures and Methods

3.3.1 Groundwater Monitoring

Groundwater monitoring wells, including the drive-point well, were purged a minimum of three well volumes or until purged dry. In the case where a well was purged dry, samples were collected after sufficient water had returned for sampling purposes. Field temperature, pH, and conductivity measurements were recorded at the time of sampling using a YSI multi-meter. The instrument was calibrated as per the manufacturer's instructions prior to the Site visit. Samples were field filtered for dissolved organic carbon (DOC) and dissolved metals.

Samples were collected in laboratory-prepared and supplied bottles and submitted for analysis to AGAT Laboratories and Bureau Veritas (BV), in Kingston, Ontario. AGAT and BV are accredited members of the Canadian Association of Laboratory Accreditation (CALA). Groundwater samples were stored at approximately 4° Celsius during shipment to AGAT. Hold times for samples conformed to CCME Standards where applicable

(CCME, 1993). Chain of custody forms accompanied the samples from submittal to the laboratory until the chemical results were provided to BluMetric. Laboratory reports and COC forms are compiled in **Appendix D (D-2)**.

3.3.2 Surface Water Monitoring

Field parameters are recorded in the field at the time of the sampling. During both sampling events, temperature, pH, conductivity, and dissolved oxygen measurements were recorded using a YSI multi-meter which was calibrated as per the manufacturer's instructions prior to the Site visits.

Surface water samples were collected in laboratory-prepared and supplied bottles and submitted for analysis to AGAT Laboratories, Bureau Veritas, and Caduceon, in Kingston, Ontario for analysis. Surface water samples were stored at approximately 4° Celsius during shipment to AGAT. Hold times for samples conformed to CCME Standards where applicable (CCME, 1993). Chain of custody forms accompanied the samples from submittal to the laboratory until the chemical results were provided to BluMetric. Laboratory reports and chain of custody forms are compiled in **Appendix D (D-3)**.

3.3.3 Landfill Gas Monitoring

There are no sampling valves, ports, or vapour monitors on-site. Gas monitoring using a calibrated RKI Eagle gas monitor was collected from the on-site attendant's building and groundwater monitoring wells during the 2023 sampling events. Gas monitoring measurements were taken from the building by inserting the intake of the gas monitor through a small opening while the structure remained closed. Gas monitoring measurements from the groundwater monitoring wells were collected, prior to collecting groundwater levels or samples, by inserting the intake of the gas monitor in the monitoring well and creating a seal around the well opening and the gas intake.

3.3.4 Field QA/QC Program

The Quality Assurance/Quality Control (QA/QC) program for the Site included the collection of field duplicate samples to demonstrate that field sampling techniques utilized by BluMetric personnel are capable of yielding reproducible results. Field duplicates were collected concurrently with the original sample. Field duplicates were collected at a 10% frequency during the sampling program at the WDS.

Precision is a measure of the reproducibility of analytical results and can be expressed quantitatively by the relative percent difference (RPD) between the original sample(s) and their corresponding field blind duplicate sample(s). The RPD is defined by the following equation:

$$RPD = 2 \times \frac{|(S - D)|}{(S + D)} \times 100$$

Where S = concentration in the original sample
D = Concentration in the duplicate

An RPD is calculated where the average of the measured parameter concentrations of the original (S) and duplicate (D) samples are greater than 5X the laboratory readable detection limits (RDL), which represents the RPD qualification criteria. A lower level of precision is expected where the above criteria are not met. A high level of reproducibility with respect to sample results collected at the Site is indicated by an RPD value below 10% for electrical conductivity and 20% for metals and inorganics.

These criteria are used as a general guideline and correspond to those recommended within the O. Reg. 153/04 Analytical Protocol (MOE, 2011) and by the Ontario QA/QC Interpretation Guide – Environmental Services (Maxxam, 2015). An RPD below the recommended criteria is considered acceptable, indicating that the sampling methodology is capable of producing repeatable results.

One blind field duplicate per media was sampled and submitted for analyses per sampling event. The field duplicate bottles are filled simultaneously to the sample location selected for duplication. The laboratory prepared bottles (identified and duplicate) for each group of chemical parameters (e.g. metals, nutrients etc.) is first filled for the identified location and then the duplicate for that same group of chemical parameters is immediately filled. This continues until the two sample bottles for each group of parameters are filled.

4 Monitoring Results

4.1 Groundwater Quality

Groundwater quality has been compared to the Ontario Drinking Water Quality Standards (ODWQS), the calculated Reasonable Use Values (RUVs), and the Provincial Water Quality Objectives (PWQO).

Field Measurements

The summary of the field measurements of groundwater pH, temperature, and conductivity are presented in Table 8.

Table 8: Groundwater Quality Field Measurements

Groundwater Monitor	pH		Temperature (°C)		Conductivity (µS/cm)	
	4-May-23	17-Oct-23	4-May-23	17-Oct-23	4-May-23	17-Oct-23
LSP1-03	6.18	6.07	6.8	8.0	1215	1074
LSP2-03 (background)	6.02	6.14	6.9	7.5	49	47
LSP3-03	5.95	6.32	7.2	7.7	562	776
LSP4-19	6.17	5.61	6.6	6.4	226	606
LSP5-19	6.70	5.74	6.7	6.2	29	41
LSP6-23	-	6.62	-	7.0	-	142
LSP7-23	-	5.62	-	6.6	-	88
LSP8-23	-	6.22	-	8.2	-	928
LSP-DP-1-21	6.18	6.07	5.0	9.2	403	646

Ontario Drinking Water Quality Standards (ODWQS)

A summary of the 2023 groundwater parameters exceeding the ODWQS criteria is included in Table 9. The full laboratory results are presented in Table 16 and Table 17 at the end of the report.

Table 9: Groundwater Quality Parameters Exceeding ODWQS

Location	Parameters	2023 Sampling Event(s)
LSP1-03	VOC DOC TDS Iron Manganese	Spring Spring, Fall Spring Spring, Fall Spring, Fall
LSP2-03 (Background)	Alkalinity (below criteria) Manganese	Spring, Fall Spring
LSP3-03	DOC Iron Manganese	Spring, Fall Spring, Fall Spring, Fall
LSP4-19	DOC Manganese	Fall Spring, Fall
LSP5-19	Alkalinity (below criteria) pH (below criteria)	Spring, Fall Spring
LSP6-23	Manganese	Fall
LSP7-23	Alkalinity (below criteria) Manganese	Fall Fall
LSP8-23	DOC Iron Manganese	Fall Fall Fall
LSP-DP-1-21	DOC Iron Manganese	Spring, Fall Spring, Fall Spring, Fall

PWQO

At the request of the MECP, groundwater results were compared to the PWQO criteria. The only parameters that are tested at the Site and have surface water criteria under the PWQO are alkalinity, pH, dissolved aluminum, boron, iron, lead, and zinc.

The PWQO exceedances are summarized in Table 10 below. The full laboratory results are presented in Table 16 at the end of the report.

Table 10: Groundwater Quality Parameters Exceeding PWQO

Location	Parameters	2023 Sampling Event(s)
LSP1-03	Boron Iron	Spring, Fall Spring, Fall
LSP2-03 (Background)	None	
LSP3-03	Boron Iron	Fall Spring, Fall
LSP4-19	Boron	Spring, Fall
LSP5-19	pH (below criteria)	Spring
LSP6-23	None	
LSP7-23	None	
LSP8-23	Boron Iron	Fall Fall
LSP-DP-1-21	Boron Iron	Spring, Fall Spring, Fall

Reasonable Use Values (RUVs)

The water quality results for background groundwater monitoring well LSP2-03 from 2006 to 2023 were used to calculate Reasonable Use Value (RUV), as per the guidance offered by MECP Procedures B-7 and B-7-1 using the following equation.

Cm = Cb + x (Cr - Cb); Where

Cm is the maximum allowable concentration in groundwater beneath adjacent property (Reasonable Use Value);
Cb is the median background concentration before any effects from human activity;
Cr is the maximum concentration that should be present based on use (ODWQS); and
x is the constant that reduces the contamination to a level considered by the MECP to have only a negligible effect on the use of the water (0.25 for a health-related parameter and 0.5 for an aesthetic or physical parameter).

Table 11 summarizes the data that were used to calculate Cm values (RUV), for the parameters of interest.

Table 11: Reasonable Use Calculations

Parameter	Units	ODWQS		Historical Median	x	RUV
		Type	Cr	Cb		Cm
Alkalinity as CaCO3 (upper)	mg/L	OG	500	12	0.5	256
Chloride	mg/L	AO	250	0.5	0.5	125.3
DOC	mg/L	AO	5	4.3	0.5	4.3
Iron	mg/L	AO	0.30	0.113	0.5	0.21
Manganese	mg/L	AO	0.05	0.052	0.5	0.051
N-NO3 (Nitrate)	mg/L	MAC	10	0.025	0.25	2.5
Sodium	mg/L	AO	200	1.515	0.5	100.8
Sulphate	mg/L	AO	500	5.355	0.5	252.7
TDS	mg/L	AO	500	34	0.5	267

Note: The background water quality at LSP2-03 and the regional groundwater is generally below the lower criterion for alkalinity. Therefore, there is no lower RUV for alkalinity.

A comparison of the groundwater chemistry results against the RUVs is provided in Table 16, at the end of the report. Table 12 below summarizes the parameters that exceeded the RUVs in 2023. It should be noted that the RUVs are used to assess compliance at the property boundary but have been used as an assessment tool at all monitoring wells.

Table 12: Groundwater Quality Parameters Exceeding the RUVs

Location	Parameters	2023 Sampling Event(s)
LSP1-03	Chloride	Spring
	Alkalinity	Spring, Fall
	DOC	Spring, Fall
	TDS	Spring, Fall
	Iron	Spring, Fall
	Manganese	Spring, Fall
LSP2-03 (background)	Manganese	Spring

Location	Parameters	2023 Sampling Event(s)
LSP3-03	DOC TDS Iron Manganese	Spring, Fall Spring, Fall Spring, Fall Spring, Fall
LSP4-19	Nitrate DOC TDS Manganese	Spring, Fall Fall Fall Spring, Fall
LSP5-19	None	None
LSP6-23	Manganese	Fall
LSP7-23	Manganese	Fall
LSP8-23	Alkalinity DOC TDS Iron Manganese	Fall Fall Fall Fall Fall
LSP-DP-1-21	DOC TDS Iron Manganese	Spring, Fall Fall Spring, Fall Spring, Fall

4.2 Surface Water Quality

Surface water quality results for the spring and fall sampling events were compared to PWQO, and the Table A and Table B criteria of the WDS Technical Guidance. Table 13 below summarizes the criteria exceedances. The full laboratory results are presented in Table 18 at the end of the report.

Table 13: Surface Water Quality Parameter Exceedances

Location	Exceeded PWQO	Exceeded Table A	Exceeded Table B	2023 Sampling Event(s)
LSP-SW1	Aluminum (dissolved)	None	None	Spring
LSP-SW2	Aluminum (dissolved) Lead	None	None	Spring Spring

Note: Laboratory reporting detection limits for cadmium exceeds MECP Table B.

4.3 Landfill Gas Monitoring

Landfill gas readings collected during the 2023 spring and fall sampling events are presented in Table 14 below.

Table 14: 2023 Landfill Gas Field Data

Location	Description of Reading Location	Spring 2023 Reading (ppm)	Fall 2023 Reading (ppm)
Attendant's Building	Probe inserted through main door	15	0
LSP1-03	Well head	5	0
LSP2-03	Well head	0	10
LSP3-03	Well head	0	0
LSP4-19	Well head	0	0
LSP5-19	Well head	0	0
LSP6-23	Well head	-	35
LSP7-23	Well head	-	45
LSP8-23	Well head	-	17
LSP-DP-1-21	Well head	5	5

4.4 QA/QC Results

One groundwater duplicate sample and one surface water duplicate sample was collected during each sampling event in 2023. The consistency of the results was evaluated based on the relative percentage difference (RPD) of each field duplicate pair.

One parameter (total suspended solids) exceeded the recommended percentage difference in the groundwater duplicate samples collected during both spring and fall sampling events with RPDs of 45% and 37%, respectively. Similarly, one parameter (turbidity) exceeded the recommended percentage difference in the surface water duplicate sample collected in the spring with a RPD of 22%. The presence of sediment in the groundwater and surface water at the time of sampling made it difficult to collect homogeneous samples. These results are not expected to change the interpretation of the sampling results. The results for the duplicate pairs are presented in **Appendix D (D-4 and D-5)**.

5 Assessment, Interpretation and Discussion

5.1 Groundwater Assessment

The groundwater chemistry results for the nine monitoring wells sampled during the two monitoring events are summarized in Table 16 at the end of text. Parameters with concentrations that fell outside the RUVs, ODWQS, and/or PWQO criteria are highlighted.

The historical groundwater quality results from the Lake St Peter WDS are presented in **Appendix E (E-1 and E-2)**, and chemistry trend graphs for select parameters are provided following the tables, figures, and photographs, at the end of this report. Graphs demonstrate slightly higher concentrations of alkalinity, boron, chloride, and TDS relative to the 2022 sampling results in leachate well LSP1-03 and of barium in both leachate wells, LSP1-03 and LSP3-03. Seasonal fluctuations of manganese also appear to be a reoccurring trend at monitoring well LSP4-19 with higher concentrations observed in the fall. However, following the evident rise in concentrations between 2014 and 2017, all parameters appear to have stabilized and now fluctuate within their typical range. No apparent evidence of increasing or decreasing trends is shown in the graphs. Results at background well LSP2-03 remain constant with low concentrations for all parameters. Due to insufficient data, trends cannot be assessed at the monitoring wells installed in 2021 (LSP-DP-1-21) and in 2023 (LSP6-23, LSP7-23, and LSP8-23). It is anticipated that at least five years of semi-annual data will be required prior to analysing trends at these newer wells.

Monitoring well LSP2-03 is located north of the waste area just south of the northern property boundary and is considered the background well for the Site. All groundwater quality parameters met the ODWQS criteria during both spring and fall sampling events except for alkalinity and manganese which is consistent with historic results. The alkalinity results were below the lower limit of its ODWQS criteria, and the manganese results just slightly exceeded the allowable concentration. Manganese also exceeded the RUV criteria for the site. This well is considered to represent background conditions,

therefore low alkalinity and slightly elevated manganese are considered naturally occurring.

Monitoring well LSP3-03 is located downgradient of the waste area along the eastern property boundary and is considered to be a leachate well. The groundwater results reported exceedances to the RUV criteria and the ODWQS guideline in the spring and fall for DOC, TDS, iron, and manganese. Although manganese is naturally occurring at the site in low concentrations, the exceedances reported at this location are likely due to landfill impacts. A slight PWQO exceedance of boron was also reported at LSP-03 during the fall sampling event. In the fall of 2022, a sudden rise in chloride concentration was observed, and although the 2023 results were lower and comparable to some recent years the concentrations are still elevated compared to the historical fluctuations. Further monitoring will determine if this is the start of an increasing trend.

Monitoring well LSP1-03 is located downgradient of the waste area along the eastern property boundary, just south of LSP3-03, and is considered to be a leachate well. The groundwater quality was compared to the RUV criteria for the site, and five parameters exceeded during the spring and fall sampling events (alkalinity, DOC, TDS, iron, and manganese) and one parameter exceeded during the fall sampling event (chloride). The chemistry results from this well also exceeded the ODWQS guidelines for DOC, iron, and manganese during both 2023 sampling events, and TDS during the spring sampling event. PWQO exceedances were also reported in the spring and fall for iron and boron. These exceedances are likely due to landfill impacts. The iron and manganese concentrations appear to be on a slight decreasing trend, while DOC and TDS concentrations have stabilized and are fluctuating within their typical range. Chloride concentrations are elevated compared to the past two years of monitoring results. Further monitoring will determine if this is the start of an increasing trend.

An exceedance to the ODWQS guideline for benzene was also reported at monitoring well LSP1-03. Samples for the analysis of VOCs were inadvertently collected from LSP1-03 during the 2023 spring sampling event despite the 5-year sampling frequency permitted by the MECP. We will revert to the original frequency in 2024, i.e. the next VOC sampling event will occur in 2027. The 2023 VOC results are summarized in Table 17 at the end of the text, and the historical VOC results can be found in **Appendix E (E-2)**.

Monitoring well LSP5-19 is located near the southeastern corner of the property boundary. The groundwater results met all RUV criteria during both sampling events, which is generally consistent with the historical results. Except for alkalinity (spring and fall) and pH (spring), all groundwater quality parameters also met the ODWQS criteria during both spring and fall sampling events. Similarly, only pH (spring) exceeded the PWQO criteria. The alkalinity and pH results that did not meet the guideline were both below the lower limit of their respective ODWQS/PWQO criteria which is considered to be naturally occurring and is associated with background water quality. This well is not considered to be leachate-impacted.

Monitoring well LSP4-19 is located off-site to the east of LSP1-03 and LSP3-03 and is downgradient of the waste area. Like the two previous monitoring years, RUV exceedances for nitrate and manganese were reported during the spring and fall sampling events, as well as DOC and TDS in the fall. This location also had ODWQS exceedances for DOC in the fall and manganese in the spring and fall. A boron PWQO exceedance was also reported in both spring and fall sampling events. The nitrate concentrations reported in 2023 are lower than the 2022 results but still appear to be following an increasing trend, while manganese results are fluctuating at concentrations comparable to the ones reported in the leachate wells. Seasonal fluctuations of manganese also appear to be a reoccurring trend with higher concentrations observed in the fall. These elevated parameters are likely due to landfill impacts.

The LSP-DP-1-21 drive point well is located off-site, northeast of the waste area. The groundwater chemistry was compared to the RUV criteria for the site and exceedances were reported during the spring and fall sampling events for DOC, iron, and manganese, as well as TDS in the fall only. Exceedances to the ODWQS guideline were also reported during both sampling events for DOC, iron and manganese, while exceedances to the PWQO were reported during both sampling events for iron and boron. Results for all parameters appear to be fluctuating within their typical ranges, however trends regarding these exceedances cannot be properly established until five years of bi-annual monitoring data is acquired. Note that based on the screen elevation and the water levels collected, LSP-SP-1-21 is considered to be representative of groundwater-surface water interaction but not of groundwater quality, therefore the LSP-DP-1-21 results were not considered for compliance with Guideline B-7.

LSP8-23 is located within the Phase 1 footprint (Cell #11) near its eastern boundary and is the nearest downgradient well to the background location. This monitoring well was installed in September 2023 and is considered to be a leachate well. The fall 2023 sampling event was the first monitoring event for this location. The groundwater quality was compared to the RUV criteria for the site, and five parameters exceeded during the fall sampling event (alkalinity, DOC, TDS, iron, and manganese). The chemistry results also indicated exceedances to the ODWQS guidelines for DOC, iron and manganese and exceedances to the PWQO guideline iron and boron. The reported concentrations of DOC, iron and manganese at LSP8-23 appear to be elevated compared to the two other leachate wells on site, LSP1-03 and LSP3-03, while concentrations for the remaining parameters seem comparable to their historical fluctuations. Trends can not be established due to the lack of data. It is anticipated that at least five years of semi-annual data will be required prior to analysing trends.

LSP6-23 is located downgradient from the site along the eastern CAZ boundary near the northeast corner of the approved 17 ha waste site. This monitoring well was installed in September 2023 to assess Guideline B-7 compliance. The fall 2023 sampling event was the first monitoring event for this location. Manganese was the only parameter to exceed the calculated RUV for the site and the ODWQS guideline. No PWQO exceedances were reported. The concentration of manganese was higher than the

concentrations reported at the background monitoring well but lower than at the leachate affected wells. It is hard to determine if the manganese concentration reported is naturally occurring due to the lack of data. It is anticipated that at least five years of semi-annual data will be required prior to analysing trends.

LSP7-23 is located downgradient from the site south of LSP6-23 along the eastern CAZ boundary. This monitoring well was installed in September 2023 to assess Guideline B-7 compliance. The fall 2023 sampling event was the first monitoring event for this location. Similarly to LSP6-23, manganese was the only parameter to exceed the calculated RUV for the site. Manganese and alkalinity also exceeded their respective ODWQS guidelines, however low alkalinity is considered to be naturally occurring on the site. No PWQO exceedances were reported. Like LSP6-23, it is hard to determine if the manganese concentration reported is naturally occurring due to the lack of data. It is anticipated that at least five years of semi-annual data will be required prior to analysing trends.

Groundwater alkalinity concentrations at the Site are naturally low. The average concentration at the background location using data from 2006 to 2023 is 12.5 mg/L. PWQO criteria states that alkalinity cannot be decreased by more than 25% of the natural concentration. Impacts from the WDS have been observed to increase the alkalinity concentration at the Site, therefore the downgradient wells do not exceed the PWQO for this parameter.

Analytical results from groundwater monitoring wells have indicated Guideline B-7 compliance along the northern property boundary and southern property boundary. There are no western property boundary monitoring wells, but the western property boundary is assumed to be compliant with Guideline B-7 based on the inferred direction of groundwater flow to the east-northeast. The WDS is not compliant with Guideline B-7 along the eastern property boundary. The MNRF has agreed to and is processing additional buffer and CAZ land to the east and south of the Site. The proposed CAZ is shown on Figure 02. Sufficient natural attenuation is anticipated to occur for the Site to be compliant with Guideline B-7 along the new property boundaries. Two monitoring wells, LSP6-23 and LSP7-23 were installed along the eastern CAZ boundary in September

2023 to assess Guideline B-7 compliance, however there is insufficient data to determine site compliance on the eastern boundary as there is only one data set. Further monitoring is required at these locations to determine if sufficient natural attenuation can occur within the new proposed boundaries.

5.2 Surface Water Assessment

The surface water chemistry results for the two surface water locations sampled during the two monitoring events are summarized in Table 18 at the end of the report. Parameters with concentrations that fell outside the PWQO criteria and the MECP Table A and Table B are highlighted.

The historical surface water quality results from the Lake St Peter WDS are presented in **Appendix E (E-3)**, and chemistry trend graphs for select parameters are provided following the tables, figures, and photographs, at the end of this report.

Based on the local topography, surface water on site generally flows east towards Papineau Creek and Lake St. Peter. The surface water sampling location LSP-SW1, located along the northern property boundary, is upstream of LSP-SW2 which is located further east. Both surface water monitoring locations were dry at the time of the fall 2023 sampling event, therefore no samples were collected.

The graphs demonstrate historically higher concentrations of alkalinity, TDS, boron, chloride, iron and manganese downstream at LSP-SW2, compared to LSP-SW1. This may indicate that the landfill is impacting the small creek located immediately north of the Site running between the two surface water sampling locations. The other parameters reported at these locations show typical fluctuations with no evidence of increasing or decreasing trends.

The spring 2023 surface water results for the upstream location LSP-SW1 were compared to the PWQO and the MECP Table A and Table B standards. Dissolved aluminum was the only parameter to exceed the PWQO, and no MECP Table A and

Table B exceedances were reported. The dissolved aluminum present in the surface water is associated with background water quality of the area.

As for the downstream surface water location LSP-SW2, exceedances of the PWQO include dissolved aluminum and lead. No MECP Table A and Table B exceedances were reported. The dissolved aluminum in the surface water is associated with background water quality, however the lead exceedance is likely due to landfill impacts. No trends regarding the lead concentrations were observed.

Aluminum is naturally occurring at the site and considered to be representative of background water quality. The average concentration at the background location LSP-SW1 is 0.148 mg/L, which was calculated using data from 2019 to 2023. The PWQO criteria states that if natural background aluminum concentrations in water bodies exceed the PWQO value, no condition is permitted that would increase the aluminum concentration by more than 10% of the natural background level, which is calculated at 0.163 mg/L for the Lake St. Peter site. Limited impacts from the WDS have been observed at the downstream location LSP-SW2 as reported aluminum concentrations are stable or slightly lower than those reported upstream, therefore the downstream surface water monitoring location does not exceed the PWQO for this parameter.

5.3 Groundwater and Surface Water Interaction

In 2023, groundwater depths at the monitoring wells ranged from 0.42 to 6.95 m bgs. Based on site topography and groundwater elevations, groundwater discharge to surface water was determined to be possible to the east of the WDS. The creek located north of the WDS has shown elevated concentrations of leachate-related parameters when comparing the 2023 sampling results from the downstream location (LSP-SW2) to the upstream location (LSP-SW1).

As per the MECP's recommendation to monitor potential groundwater impacts to the creek, a drive-point well LSP-DP-1-21 was installed northeast of the property. In the correspondence from the MECP's Technical Surface Water Reviewer (July 2021), LSP-DP-1-21 is referred to as a groundwater monitoring well installed between the mound and SW2 to verify groundwater flow direction and assess landfill impacts to surface water. The samples from LSP-DP-1-21 have been analysed for the list of groundwater and surface water parameters in Table E-1 and Table E-2 of Schedule B of the ECA, and then compared to the PWQO standard to assess potential impacts.

Upon comparison of the historical data available (fall 2021 to fall 2023), groundwater interaction between LSP-DP-1-21 and LSP-SW2 was determined to be unlikely. PWQO exceedances at LSP-DP-1-21 during both spring and fall sampling events included DOC, boron, and iron, none of which were reported as exceedances at LSP-SW2. Although no other PWQO exceedances were present in LSP-DP-1-21, the concentrations for all analyzed parameters were significantly higher in the groundwater sample versus the surface water sample.

As recommended in the 2022 annual monitoring report, the elevation of both surface water monitoring locations was measured and compared to groundwater elevations during each semi-annual monitoring event to improve the assessment of potential groundwater and surface water interaction. Surface water elevations were only measured in the spring of 2023 since both monitoring locations were dry during the fall event. The elevation of the surface water at LSP-SW1 was measured to be 409.60 masl, compared to the groundwater elevation of 409.18 masl in downgradient monitoring well LSP2-03, the nearest well. The upstream surface water level is 0.42 m higher than the groundwater level. Similarly, SW2 was measured at 406.31 masl compared to a groundwater elevation of 406.96 in the upgradient drive point well, LSP-DP-1-21. The surface water level at the downstream location LSP-SW2 was 0.65 m below the groundwater level. These surface water elevations confirm the possibility of interaction, however the surface water concentrations recorded during the 2023 sampling event do not reflect groundwater discharge impacts and interaction was determined to be unlikely. However, groundwater interaction with surface water further downgradient of LSP-SW2 cannot be disproven.

5.4 Landfill Gas Assessment

The RKI Eagle gas monitoring results for 2023 (45 ppm or less) indicated that methane gas concentrations are well below the concentrations of concern (<10,000 ppm) for the subsurface, buildings and structures on-site.

5.5 Trigger Mechanisms and Contingency Plans

The Site Trigger Mechanisms and Contingency Plan for groundwater and surface water was approved by the MECP in the fall of 2021 and is referred in the amended ECA dated October 25, 2021. A copy of the approved Trigger Mechanisms and Contingency Plan is appended to this report as **Appendix F**.

The trigger assessment points for surface water are LSP-SW2 and LSP-DP-1-21, and the assessment criteria include alkalinity, boron, un-ionized ammonia, chloride, iron, manganese, and nitrate. The Contingency Plan is triggered if two or more of the trigger parameters exceed the trigger limit, which is equal to the PWQO or CCME CWQG, for an assessment point for two consecutive samples. The Contingency Plan was triggered at LSP-DP-1-21 during both spring and fall 2023 sampling events with trigger parameter exceedances of boron, iron, and manganese. The trigger exceedances activated Tier 1 of the Contingency Plan, and a toxicity sample was collected from the creek downstream of the assessment point on June 1, 2023, following the spring trigger and on November 14, 2023, following the fall trigger. The test results indicated the percent mortality for Daphnia Magna and Rainbow Trout were 0% for both sampling events. As a result, Tier 2 contingency action was not required in spring and in the fall. The toxicity laboratory results are included in **Appendix D (D-6)**.

The groundwater Trigger Mechanisms and Contingency plan was implemented on site following the installation of monitoring wells LSP6-23 and LSP7-23 in September 2023. The wells are located along the eastern CAZ limit and act as the assessment points for the Site Trigger Mechanisms and Contingency Plan. The assessment criteria include barium, DOC, TDS and chloride. The groundwater Contingency Plan is activated if one or more of the trigger parameters exceed the trigger limit, which is equal to the RUV, for

an assessment point for two consecutive samples. No exceedances were reported during the fall 2023 sampling event.

5.6 CAZ Assessment

BluMetric worked with the Municipality in 2020 to confirm the boundaries for a CAZ around the Site and to prepare a D&O Plan. Detailed discussion on the CAZ assessment was provided in the 2020 monitoring report for the Site. In summary, it was concluded that an area extending 140 m east (downgradient) of the Site is required for natural attenuation. The Municipality made a request to the MNRF to purchase additional buffer and CAZ lands to own the total Site area of 17 ha of the WDS; this process is ongoing. The proposed CAZ and total Site area boundaries are shown on Figure 02.

These boundaries are vital with respect to the Site's compliance issues (e.g. Guideline B-7). Monitoring wells LSP6-23 and LSP7-23 were installed along the eastern limit of the CAZ in September 2023 to confirm site compliance. These monitoring wells are also used as the assessment point for the groundwater Site Trigger Mechanisms and Contingency Plan.

As part of the CAZ assessment work and in historic monitoring reports, BluMetric has considered LSP1-03 and LSP3-03 as leachate wells. These wells are installed near the southeast corner of the approximate waste footprint. A third leachate well, LSP8-23, was installed in September 2023 within the Phase 1 footprint near its eastern boundary, as required by the amended ECA. We recommend these three wells continue to be used as the primary leachate wells in 2024.

6 Site Operations

The Lake St. Peter WDS currently collects waste in covered waste bins (8 cubic yard). The waste is periodically transferred to the active waste area and covered. The Site has segregated areas for scrap metal, tires, large bulky items (couches and mattresses), electronic waste and a recycling transfer station (8 cubic yard bin) for household blue box recyclable containers (aluminum cans, metal cans, plastic bottles) and fibre (paper and cardboard). The Municipality implemented a clear-bag policy in October 2014 to facilitate increased waste diversion in an effort to extend the operational life of their municipal landfill sites. This bylaw was revised in 2018. The clear-bag policy applies to both recyclable and household waste, with non-compliant bags to be refused unless residents remove recyclables from the bag.

6.1 Annual Waste Summary

Although access to the Site is controlled via a locked security steel gate, some residents deposit garbage at the disposal site outside of the landfill's normal operating hours. This contribution is collected by site personnel, recorded, and included in the total waste volumes identified for the Site.

Estimated volumes for the Site are based on Contractors' tonnages and estimations based on the number of bags deposited at the Site. An average of 15 kg per bag, provided by the Municipality, is used in the waste calculations. The quantities below include recyclables and waste from both the residential and commercial sources within the municipality.

The waste report for 2023 indicates that approximately 34.6 tonnes of recyclables (R) and 249.4 tonnes of waste (W) were deposited in the Lake St. Peter WDS. Based on these reported quantities, the mass of recyclables collected in 2023 was 0.5% lower than what was collected in 2022, while the quantity of waste received at the Site was 1.8% lower than what was received in 2022. Based on those numbers, 12.2% of the total

waste was recycled in 2023, marginally higher than the 12.0% calculated in 2022. The quarterly breakdown is shown below in Table 15.

Table 15: Annual Recycling and Wastes Tonnages

Q1		Q2		Q3		Q4		Total Annual	
R	**W**	**R**	**W**	**R**	**W**	**R**	**W**	**R**	**W**
2022									
6.83	45.0	8.3	59.7	12.8	97.3	6.8	52.0	**34.8**	**254.0**
2023									
6.7	38.9	10.8	54.5	11.34	99.9	5.8	56.0	**34.6**	**249.4**

In addition, segregated materials were collected at each of the nine WDSs/WTSs in Hastings Highlands. The 2023 breakdown of theses wastes at the Lake St. Peter site was:

- Scrap metal – 0 tonnes;
- Bulky wastes – 0 tonnes;
- Leaf and yard waste – 670 truck/trailer loads;
- Electrical and Electronic Equipment – 3.74 tonnes;
- Household batteries – 0 tonnes; and
- 19 tires.

There were no documented complaints for rejected waste, or emergency situations at the Lake St Peter WDS in 2023.

6.2 Site Capacity and Life Expectancy

The Lake St Peter WDS has a total area of 17 hectares (ha), of which 2.2 ha is designated as approved landfilling area. The final volumetric capacity of the Site, excluding final cover, is 73,383 m^3.

The last five annual monitoring reports for the Site have recorded annual waste generation rates of 214.3 (2019), 263.6 (2020), 293.5 (2021), 254.04 (2022) and 249.39 (2023) tonnes; resulting in an average waste generation rate of 255 tonnes per year. The 255 tonnes are estimated to equate to 510 m^3 of compacted waste per year (no soil

cover), assuming a compaction density of 500 kg/m^3. Clean fill which is to be applied as daily cover between waste layers is estimated at 25% of the waste volume. Therefore, the total average annual fill rate is expected to be approximately 637 m^3 per year.

A topographic survey was completed at the site on June 30, 2023, and determined the net cut for the Phase 1 footprint design contours to be 2,897 m^3. Considering the estimated net fill volume for Phase 2 of 71,763 m3 as stated in the 2020 D&O Plan, the remaining capacity for the Site was calculated to be 68,866 m^3.

According to the 2023 waste data obtained from the MHH, it is estimated that 156 tonnes, or 312 m^3, of waste (residential and commercial) was deposited at the Site in the months following the 2023 topographic survey, from July 1st, 2023, to December 31st 3023. Taking soil cover into consideration, this volume is estimated at 390 m^3.

The Fill Beyond Approved Limits (FBAL) waste placed outside of the approved waste footprint to the north of Cell #2 was also excavated on September 18, 2023, as required by the amended ECA and placed within the Phase 1 footprint. The quantity of waste excavated was not captured in the June 2023 survey, but it was estimated in the field to be around 300 m^3, which was factored into the remaining capacity and life expectancy calculations. The site will be resurveyed in 2024 to provide updated volumes reflective of the FBAL excavation.

The remaining volumetric capacity and life expectancy for the Lake St. Peter WDS was calculated as follows:

Net fill available on June 30, 2023:	68,866 m^3
Waste and cover deposited from July 1 to Dec 31, 2023:	390 m^3
FBAL waste deposited on September 18, 2023:	300 m^3
Remaining Capacity (2023):	68,176 m^3
Average annual fill rate:	637 m^3/year
Life Expectancy:	**107 years**

Based on the remaining volumetric capacity at the Site, the life expectancy is 107 years. The life expectancy can vary due to limited environmental attenuation as well as changes in fill rates due to events such as floods, fires, or other natural disasters.

The remaining capacity and estimated life expectancy are slight overestimates as the two 300 mm layers of intermediate soil cover required over Phase 1 and Phase 2 as per the ECA were not considered.

According to the volumes captured during the 2023 topographical survey and the quantity of waste deposited at the Site in the following months, it is currently estimated that the Phase 1 footprint has surpassed its capacity by 3,587 m^3. The development of Phase 2 is required in 2024. As stated in the 2020 D&O Plan, a large portion of the Phase 1 footprint along the eastern boundary (shown on Figure 2) is forested and should be cleared to allow distribution of the waste over the entire Phase 1 area. This should be done in preparation for the development of Phase 2. As per the ECA, the waste contours of the Phase 1 footprint should be leveled to an elevation of 414.5 masl. A 300 mm layer of clean fill should then be applied over the leveled area as intermediate cover prior to the development of Phase 2. Refer to the 2020 D&O Plan for the Phase 2 – Level 1 landfilling approach.

7 Summary Statements, Conclusions, and Recommendations

The following recommendations are based on the results of the 2023 monitoring program:

7.1 Site Operations

- A D&O Plan for the Site was prepared and finalized in September 2020. The D&O Plan was approved under the amended ECA (October 25, 2021).

- There were no records of public concerns/complaints and emergency situations occurrences in 2023 at the Lake St Peter WDS. Should they occur in the future, the complaint and the Municipality's response is to be documented.
- It is recommended that periodic inspections be performed and documented by the Municipality to ensure proper burning practices are being followed.
- It is recommended that waste transferred to the Site continues to be accounted for and documented by tracking the number of loads of waste and/or bags deposited at the Site. Detailed descriptions and quantities of rejected waste should continue to be documented.
- Public education with respect to waste reduction and recycling should be an ongoing effort by the Municipality.

7.2 Groundwater

- Groundwater monitoring should continue on a semi-annual basis for the Lake St. Peter WDS (spring and fall) for the parameters identified in Table 3, or Table E-2 of the Amended ECA.
- VOC sampling was inadvertently conducted at LSP1-03 during the 2023 spring sampling event despite the 5-year sampling frequency permitted by the MECP. We will revert to the original frequency and the next VOC sampling event will occur in 2027.
- Graphs demonstrate slightly higher concentrations of alkalinity, boron, chloride and TDS relative to the 2022 sampling results in leachate well LSP1-03 and of barium in both leachate wells, LSP1-03 and LSP3-03. Seasonal fluctuations of manganese also appear to be a reoccurring trend at monitoring well LSP4-19 with higher concentrations observed in the fall. However, following the evident rise in concentrations between 2014 and 2017, all parameters appear to have stabilized and fluctuate within their typical range. No apparent evidence of increasing or decreasing trends is shown in the graphs. Results at background well LSP2-03 remain constant with low concentrations for all parameters.

- There is insufficient data to assess trends at the monitoring wells installed in 2021 (LSP-DP-1-21) and 2023 (LSP6-23, LSP7-23 and LSP8-23). It is anticipated that at least five years of semi-annual data will be required prior to analysing trends at these newer wells.
- Analytical results from groundwater monitoring wells have indicated Guideline B-7 compliance along the northern property boundary and southern property boundary. There are no western property boundary monitoring wells, but the western property boundary is assumed to be compliant with Guideline B-7 based on the inferred direction of groundwater flow to the east. The WDS is not compliant with Guideline B-7 along the eastern property boundary. The MNRF has agreed to and is processing additional buffer and CAZ land to the east and south of the Site. Sufficient natural attenuation is anticipated to occur for the Site to be compliant with Guideline B-7 along the new property boundaries.
- Two monitoring wells, LSP6-23 and LSP7-23 were installed along the eastern CAZ boundary in September 2023 to assess Guideline B-7 compliance, however there is insufficient data to determine site compliance on the eastern boundary as there is only one data set. Further monitoring is required at these locations to determine if sufficient natural attenuation can occur within the new proposed boundaries.
- A leachate well, LSP8-23, was installed in the Phase 1 footprint in September 2023. Sampling of the new leachate well is to follow the sampling program identified in Schedule B of the amended ECA.
- The groundwater Trigger Mechanisms and Contingency plan was was approved by the MECP in October 2021 and implemented on site following the installation of monitoring wells LSP6-23 and LSP7-23 in September 2023. The wells located along the eastern CAZ limit act as the assessment points for the Site Trigger Mechanisms and Contingency Plan. No exceedances of the trigger parameters were reported during the fall event.

7.3 Surface Water

- Surface water monitoring should continue on a semi-annual basis for the Lake St. Peter WDS (spring and fall), for the parameters identified in Table 6, or Table E-1 of the Amended ECA.
- LSP-DP-1-21 is analysed for surface water parameters in addition to groundwater parameters as required by the ECA.
- The graphs demonstrate historically higher concentrations of alkalinity, TDS, boron, chloride, iron, and manganese downstream at LSP-SW2, compared to LSP-SW1. This may indicate that the landfill is impacting the small creek located immediately north of the Site running between the two surface water sampling locations. The other parameters reported at these locations show typical fluctuations with no evidence of increasing or decreasing trends.
- The Site Trigger Mechanisms and Contingency Plan for surface water was approved by the MECP in October 2021. The surface water Contingency Plan was triggered during the 2023 spring and fall sampling events at LSP-DP-1-21. Tier 1 contingency sampling was conducted following both sampling events. Based on the results of tier 1, tier 2 contingency sampling was not required.

7.4 Groundwater and Surface Water Interaction

- As per the MECP's recommendation to monitor potential groundwater impacts to the creek, a drive-point well LSP-DP-1-21 was installed northeast of the property between the mound and SW2 to verify groundwater flow direction and assess landfill impacts to the surface water.
- As recommended in the 2022 annual monitoring report, the elevation of both surface water monitoring locations was measured and compared to groundwater elevations during each semi-annual monitoring event to improve the assessment of potential groundwater and surface water interaction.
- Groundwater interaction between LSP-DP-1-21 and LSP-SW2 was determined to be unlikely. The surface water concentrations recorded during 2023 do not reflect groundwater discharge impacts.

7.5 Landfill Gas

- The RKI Eagle gas monitoring results for 2023 (0 to 45 ppm) indicated methane gas concentrations are well below the concentrations of concern as identified above for the subsurface, buildings and structures on-site.
- Landfill gas should continue to be monitored during the semi-annual monitoring events.

7.6 CAZ Assessment

- BluMetric worked with the Municipality in 2020 to confirm the boundaries for a CAZ around the Site and to prepare a D&O Plan. It was concluded that an area extending 140 m east (downgradient) of the Site is required for natural attenuation.
- The Municipality made a request to the MNRF to purchase additional buffer and CAZ lands to own the total Site area of 17 ha of the WDS. This process is ongoing.

7.7 Site Capacity and Life Expectancy

- The remaining capacity of the site is 68,176 m^3, which gives an estimated volumetric life expectancy of 107 years. This was calculated using the June 2023 topographical survey data and a 5-year average annual fill rate of 637 m^3/year including interim cover, which was assumed to be 25% of the deposited waste.
- The estimated life expectancy is an overestimate as it does not consider the two 300 mm layers of intermediate soil cover required over Phase 1 and Phase 2 as per the ECA.
- The ability of the Site to act as a natural attenuation site may limit the volumetric capacity of the Site. Future monitoring will determine if the leachate plume has reached the proposed east CAZ boundaries at LSP6-23 and LSP7-23.

- Following the June 2023 topographical survey and the quantity of waste deposited at the Site in the following months, it is currently estimated that the Phase 1 area has surpassed its capacity by 3,587 m^3. The development of Phase 2 is required in 2024.
- As stated in the 2020 D&O Plan, a large portion of the Phase 1 footprint along the eastern boundary is forested and should be cleared to allow distribution of the waste over the entire Phase 1 area. This should be done in preparation for the development of Phase 2.
- The Fill Beyond Approved Limits (FBAL) waste placed outside of the approved waste footprint to the north of Cell #2 was excavated on September 18, 2023, as required by the amended ECA and placed within the Phase 1 footprint. The quantity of waste excavated was not captured in the June 2023 survey, but a field estimate of 300 m^3 was factored into the remaining capacity and life expectancy calculations. The site will be resurveyed in 2024 to provide updated volumes reflective of the FBAL excavation.

8 Limiting Conditions

The conclusions presented in this report represent our professional opinion and are based upon the work described in this report and any limiting conditions in the terms of reference, scope of work, or conditions noted herein.

The findings presented in this report are based on conditions observed at the specified dates and locations, the analysis of samples for the specified parameters, and information obtained for this project. Unless otherwise stated, the findings cannot be extended to previous or future Site conditions, locations that were not investigated directly, or types of analysis not performed.

BluMetric Environmental Inc. makes no warranty as to the accuracy or completeness of the information provided by others, or of conclusions and recommendations predicated on the accuracy of that information.

This report has been prepared for The Corporation of the Municipality of Hastings Highlands. Any use a third party makes of this report, any reliance on the report, or decisions based upon the report, are the responsibility of those third parties unless authorization is received from BluMetric Environmental Inc. in writing. BluMetric Environmental Inc. accepts no responsibility for any loss or damages suffered by any unauthorized third party as a result of decisions made or actions taken based on this report.

Respectfully submitted,
BluMetric Environmental Inc.

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Senior Engineer

9 References

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Tables

Table 16: 2023 Groundwater Chemistry Results						Location	LSP-DP1-21	LSP-DP1-21	LSP1-03	LSP1-03	LSP2-03	LSP2-03
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP-DP1-21	LSP-DP1-21	LSP1-03	LSP1-03	LSP2-03	LSP-QAQC-GW1
						Sample Date	2023-May-04	2023-Oct-17	2023-May-04	2023-Oct-17	2023-May-04	2023-May-04
Anions						Detection Limit						
Chloride	mg/L	125.25	250	-	-	0.1	5.47	27	128	72	0.42	0.41
Nitrate as N	mg/L	2.51875	10	-	-	0.05	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Sulphate	mg/L	252.6775	500	-	-	0.1	37.1	29	5.09	4.3	3.49	3.5
Cations												
Calcium (diss)	mg/L	-	-	-	-	0.2	-	58	-	92	-	-
Magnesium (diss)	mg/L	-	-	-	-	0.05	5.77	9.7	9.3	9.5	0.78	0.87
Potassium (diss)	mg/L	-	-	-	-	0.5	14.6	-	25.9	-	0.94	0.84
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	12.9	17	77.8	40	1.71	1.49
General Chemistry												
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	146	220	398	330	14	13
Ammonia as N	mg/L	-	-	-	-	0.02	4.95	7.8	15.4	20	<0.02	<0.02
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	9.7	13	23.8	19	2.9	2.6
Electrical Conductivity	uS/cm	-	-	-	-	1	370	580	1160	900	41	42
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		6.75	7.11	6.71	7.36	6.66	6.59
Total Dissolved Solids	mg/L	267	500	-	-	10	216	315	566	420	38	42
Total Suspended Solids	mg/L	-	-	-	-	10	336	150	756	490	487	769
Metals												
Barium (diss)	mg/L	-	1	-	-	0.002	0.298	0.49	0.607	0.56	0.01	0.01
Boron (diss)	mg/L	-	5	-	0.2	0.01	0.259	0.42	0.648	0.66	<0.01	<0.01
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	**12.7**	**47**	**75.4**	**64**	0.131	0.127
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	6.52	11	2.67	2.2	0.052	0.052

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

Table 16: 2023 Groundwater Chemistry Results						Location	LSP2-03	LSP3-03	LSP3-03	LSP4-19	LSP4-19	LSP5-19
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP2-03	LSP3-03	LSP3-03	LSP4-19	LSP4-19	LSP5-19
						Sample Date	2023-Oct-17	2023-May-04	2023-Oct-17	2023-May-04	2023-Oct-17	2023-May-04
Anions						Detection Limit						
Chloride	mg/L	125.25	250	-	-	0.1	<1	74	77	14.4	43	0.25
Nitrate as N	mg/L	2.51875	10	-	-	0.05	<0.1	<0.05	<0.1	4.96	4.62	<0.05
Sulphate	mg/L	252.6775	500	-	-	0.1	2.4	14.4	2.4	11.7	10	2.34
Cations												
Calcium (diss)	mg/L	-	-	-	-	0.2	3.4	-	47	-	54	-
Magnesium (diss)	mg/L	-	-	-	-	0.05	0.84	3.97	5.4	2.36	8.1	0.23
Potassium (diss)	mg/L	-	-	-	-	0.5	-	13.2	-	7.61	-	<0.5
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	1.7	34.8	50	14.9	33	0.89
General Chemistry												
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	13	141	170	55	190	5
Ammonia as N	mg/L	-	-	-	-	0.02	<0.05	0.84	7.4	0.1	4.9	<0.02
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	3.5	6.9	16	3.3	8.2	2.8
Electrical Conductivity	uS/cm	-	-	-	-	1	35	556	620	223	600	19
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		6.66	6.56	7.15	6.56	7.78	**6.21**
Total Dissolved Solids	mg/L	267	500	-	-	10	50	286	330	140	335	33
Total Suspended Solids	mg/L	-	-	-	-	10	400	331	140	14200	42000	1830
Metals												
Barium (diss)	mg/L	-	1	-	-	0.002	0.013	0.253	0.39	0.097	0.17	0.007
Boron (diss)	mg/L	-	5	-	0.2	0.01	<0.01	0.135	0.23	0.217	0.55	<0.01
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	0.12	**0.83**	**38**	0.032	<0.1	0.024
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	0.048	1.79	1	1.56	8.7	0.005

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

Table 16: 2023 Groundwater Chemistry Results						Location	LSP5-19	LSP6-23	LSP7-23	LSP8-23	LSP8-23
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP5-19	LSP6-23	LSP7-23	LSP8-23	LSP-QAQC-GW1
						Sample Date	2023-Oct-17	2023-Oct-17	2023-Oct-17	2023-Oct-17	2023-Oct-17
Anions						Detection Limit					
Chloride	mg/L	125.25	250	-	-	0.1	3.4	1.8	7.1	50	45
Nitrate as N	mg/L	2.51875	10	-	-	0.05	0.1	<0.1	0.13	<0.1	<0.1
Sulphate	mg/L	252.6775	500	-	-	0.1	2.7	8.2	4.1	12	11
Cations											
Calcium (diss)	mg/L	-	-	-	-	0.2	2.9	16	5.4	56	56
Magnesium (diss)	mg/L	-	-	-	-	0.05	0.49	3.8	1	9.2	9.3
Potassium (diss)	mg/L	-	-	-	-	0.5	-	-	-	-	-
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	1.9	5.5	5	44	44
General Chemistry											
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	7.9	56	17	260	270
Ammonia as N	mg/L	-	-	-	-	0.02	<0.05	0.073	0.057	12	12
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	1.5	2	1.4	37	36
Electrical Conductivity	uS/cm	-	-	-	-	1	29	140	76	690	680
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		6.75	7.72	6.93	7.04	6.76
Total Dissolved Solids	mg/L	267	500	-	-	10	40	210	110	395	355
Total Suspended Solids	mg/L	-	-	-	-	10	6800	19000	15000	5500	8000
Metals											
Barium (diss)	mg/L	-	1	-	-	0.002	0.01	0.012	0.014	0.47	0.47
Boron (diss)	mg/L	-	5	-	0.2	0.01	<0.01	0.031	<0.01	0.26	0.27
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	<0.1	<0.1	<0.1	**92**	**93**
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	0.0021	0.49	0.24	4.8	4.9

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

Table 17 - Groundwater VOCs Chemistry - Lake St Peter					Location	LSP1-03
Parameter	Units	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP1-03
					Sample Date	2023-May-04
VOCs					**Detection Limit**	
1,1,1,2-Tetrachloroethane	mg/L	-	-	0.02	0.0002	<0.0002
1,1,1-Trichloroethane	mg/L	-	-	0.01	0.0006	<0.0006
1,1,2,2-Tetrachloroethane	mg/L	-	-	0.07	0.0002	<0.0002
1,1,2-Trichloroethane	mg/L	-	-	0.8	0.0004	<0.0004
1,1-Dichloroethane	mg/L	-	-	0.2	0.0006	<0.0006
1,1-Dichloroethylene	mg/L	0.014	-	0.04	0.0006	<0.0006
1,2-Dichlorobenzene	mg/L	0.003	0.0025	-	0.0002	<0.0002
1,2-Dichloroethane	mg/L	0.005	-	0.1	0.0004	<0.0004
1,2-Dichloropropane	mg/L	-	-	0.0007	0.0004	<0.0004
1,3-Dichlorobenzene	mg/L	-	0.0025	-	0.0002	<0.0002
1,4-Dichlorobenzene	mg/L	0.001	0.004	-	0.0002	0.00098
Acetone	mg/L	-	-	-	0.002	<0.002
Benzene	mg/L	0.001	-	0.1	0.0004	0.00193
Bromodichloromethane	mg/L	-	-	0.2	0.0004	<0.0004
Bromoform	mg/L	-	-	0.06	0.0002	<0.0002
Bromomethane	mg/L	-	-	0.0009	0.0004	<0.0004
Carbon Tetrachloride	mg/L	0.002	-	-	0.0004	<0.0004
Chlorobenzene	mg/L	-	0.015	-	0.0002	0.00068
Chloroform	mg/L	-	-	-	0.0004	<0.0004
cis-1,2-Dichloroethylene	mg/L	-	-	-	0.0004	<0.0004
Dibromochloromethane	mg/L	-	-	-	0.0002	<0.0002
Dichlorodifluoromethane	mg/L	-	-	-	0.0008	<0.0008
Ethylbenzene	mg/L	0.0016	-	0.008	0.0002	<0.0002
Ethylene Dibromide	mg/L	-	-	0.005	0.0002	<0.0002
m & p-Xylene	mg/L	-	-	-	0.0004	<0.0004
Methylene Chloride	mg/L	-	-	0.1	0.0006	<0.0006
Methyl Ethyl Ketone	mg/L	-	-	0.4	0.002	<0.002
Methyl Isobutyl Ketone	mg/L	-	-	-	0.002	<0.002
Methyl tertiary-butyl ether (M	mg/L	0.015	-	0.2	0.0004	<0.0004
n-Hexane	mg/L	-	-	-	0.0004	<0.0004
o-Xylene	mg/L	-	-	0.04	0.0002	<0.0002
Styrene	mg/L	-	-	0.004	0.0002	<0.0002
Tetrachloroethylene	mg/L	0.01	-	0.05	0.0004	<0.0004
Toluene	mg/L	0.024	-	0.0008	0.0004	<0.0004
trans-1,2-Dichloroethylene	mg/L	-	-	-	0.0004	<0.0004
Trichloroethylene	mg/L	0.005	-	0.02	0.0004	<0.0004
Trichlorofluoromethane	mg/L	-	-	-	0.0008	<0.0008
Vinyl Chloride	mg/L	0.001	-	0.6	0.00034	<0.00034
Xylene Mixture	mg/L	0.02	-	-	0.0002	<0.0002

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

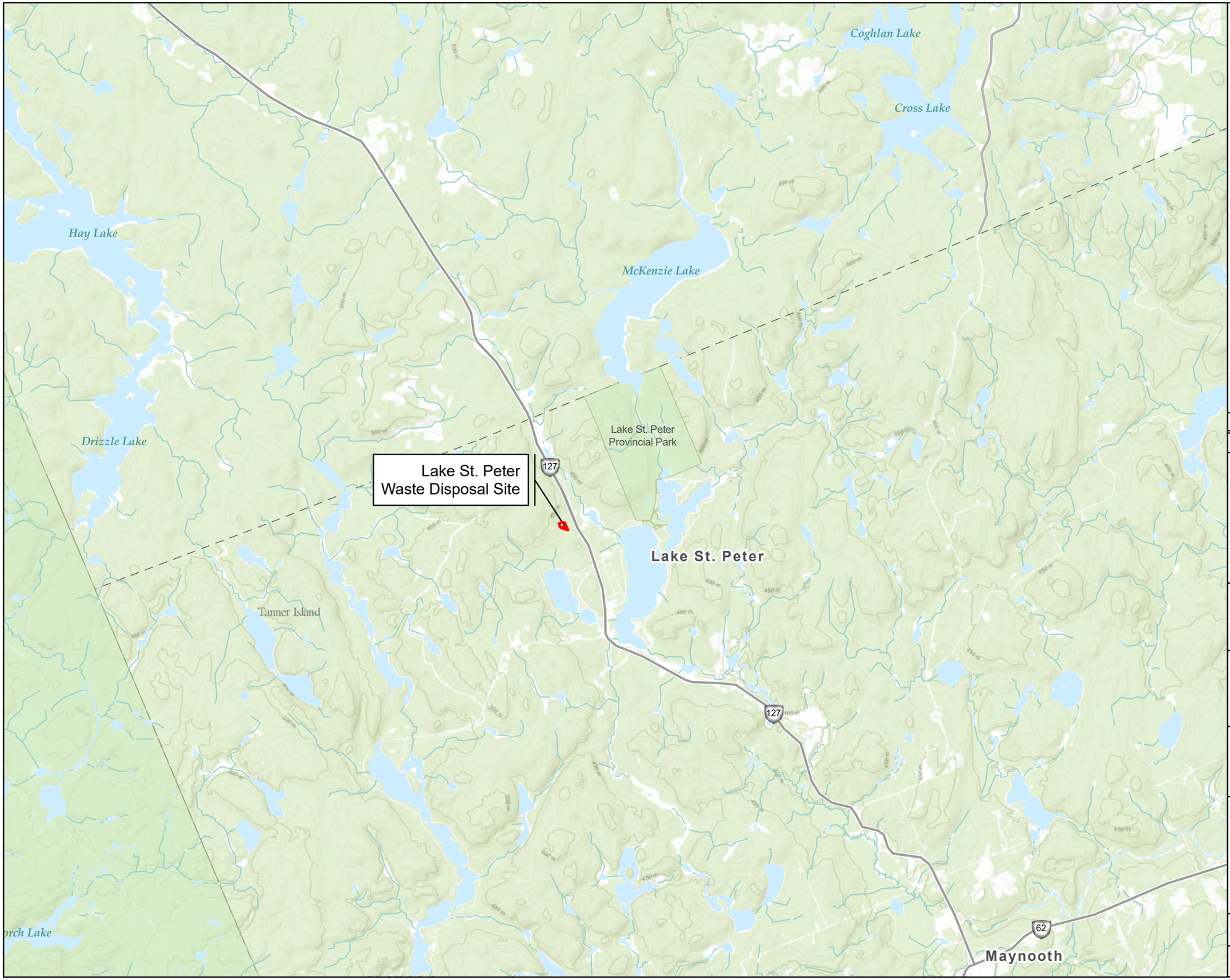
Table 18 - 2023 Surface Water Chemistry - Lake St Peter						Location	LSP-SW1	LSP-SW2	LSP-SW2
Parameter	Units	PWQO-GENERAL	PWQO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	LSP-SW1	LSP-SW2	LSP-QAQC-SW1
						Sample Date	2023-May-04	2023-May-04	2023-May-04
Anions						Detection Limit			
Chloride	mg/L	-	-	180	128	0.1	0.29	0.58	0.6
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	<0.05	0.1	0.1
Nitrite as N	mg/L	-	-	-	-	0.01	<0.05	<0.05	<0.05
Sulphate	mg/L	-	-	100	-	0.1	2.52	4.86	4.98
Cations									
Calcium (tot)	mg/L	-	-	-	-	0.2	2.05	3.66	4.24
Magnesium (tot)	mg/L	-	-	-	-	0.05	0.54	0.84	0.83
Potassium (tot)	mg/L	-	-	-	-	0.2	0.86	1.22	1.36
Sodium (tot)	mg/L	-	-	-	-	0.1	1.03	1.78	1.83
General Chemistry									
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	5	7	9	10
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	<0.02	<0.02
Biochemical Oxygen Demand	mg/L	-	-	-	-	2			
Chemical Oxygen Demand	mg/L	-	-	-	-	4	21	16	16
Colour	TCU	-	-	-	-	2.5	30	34.9	34.7
Electrical Conductivity	uS/cm	-	-	-	-	2	24	40	41
pH	pH units	6.5 - 8.5	-	6 - 9	-		6.86	6.69	6.71
Phenols-4AAP	mg/L	-	-	-	-	0.001	<0.001	<0.001	<0.001
Total Dissolved Solids	mg/L	-	-	-	-	10	12	38	34
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.17	0.26	0.22
Total Phosphorus	mg/L	0.03	-	-	-	0.02	<0.02	<0.02	<0.02
Total Suspended Solids	mg/L	-	-	-	-	10	<10	<10	<10
Turbidity	NTU	-	-	-	-	0.1	0.8	9.6	7.7
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	<0.000002	<0.000002	<0.000002
Metals									
Aluminum (diss, PWQO)	mg/L	-	Calculated	-	-	0.004	0.15	0.117	0.124
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	<0.003	<0.003	<0.003
Barium (tot)	mg/L	-	-	2.3	-	0.002	0.012	0.013	0.014
Beryllium (tot)	mg/L	Calculated	-	-	-	0.0004	<0.001	<0.001	<0.001
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	<0.01	0.023	0.026
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	<0.0001	<0.0001	<0.0001
Chromium (tot)	mg/L	-	-	0.064	-	0.003	<0.003	<0.003	<0.003
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	<0.0005	<0.0005	<0.0005
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	0.001	0.001	0.001
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.07	0.266	0.262
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	<0.001	<0.001	0.002
Manganese (tot)	mg/L	-	-	-	-	0.002	0.004	0.028	0.025
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	<0.0001	<0.0001	<0.0001
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-
Molybdenum (tot)	mg/L	-	0.04	-	-	0.0005	<0.002	<0.002	<0.002
Nickel (tot)	mg/L	0.025	-	-	-	0.001	0.003	<0.003	<0.003
Selenium (tot)	mg/L	0.1	-	-	-	0.002	<0.002	<0.002	<0.002
Silicon (tot)	mg/L	-	-	-	-	0.05	3.39	3.73	3.9
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.0001	<0.0001	<0.0001
Strontium (tot)	mg/L	-	-	-	-	0.001	0.016	0.021	0.023
Thallium (tot)	mg/L	-	0.0003	-	-	0.00005	<0.0003	<0.0003	<0.0003
Titanium (tot)	mg/L	-	-	-	-	0.005	<0.01	<0.01	<0.01
Vanadium (tot)	mg/L	-	0.006	-	-	0.0005	<0.002	<0.002	<0.002
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	<0.02	<0.02	<0.02

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim
Concentration exceeds MECP-GD-TA	MECP Guidance Document Table A
Concentration exceeds MECP-GD-TB	MECP Guidance Document Table B

*Please double check with Factsheet for all calculated criteria/guidelines.

Figures



LEGEND

Property Boundary (As surveyed by P.A. Miller, 2012)

REV.	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES

N W E S

0 1,000 2,000 Meters

CLIENT

Municipality of Hastings Highlands

PROJECT

Lake St. Peter Waste Disposal Site

TITLE

Site Location Map

BluMetric Environmental

The Tower - The Woolen Mill,
4 Cataraqui St.,
Kingston, Ontario K7K 1Z7
TEL: (613) 531-2725
FAX: (613) 531-1852
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT #	DATE		
230225-4	December 21, 2023		
DRAWN	CHECKED	FIG NO.	REV
ZS	TH	01	0

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LEGEND

- Monitoring Well Location
- Drive-point Well Location
- Surface Water Location
- Phase 1 Footprint
- Approved Waste Footprint (2.2 ha)
- Lands Owned by Municipality (1.6 ha)
- Approved 17 ha Waste Site
- Proposed Contaminant Attenuation Zone (12.4 ha)
- Road Allowance Between Concessions
- No Future Waste to be Placed

NOTES:
Road Allowance Area within Waste Footprint (0.24 ha); within total Site Area (0.69 ha).

REV.	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES

DO NOT SCALE DRAWING.
THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

N W E S

0 10 20 40 60 80 Meters

1:2,500

CLIENT

Municipality of Hastings Highlands

PROJECT

Lake St. Peter Waste Disposal Site

TITLE

Site Plan

BluMetric Environmental

The Tower - The Woolen Mill,
4 Cataraqui St.,
Kingston, Ontario K7K 1Z7
TEL: (613) 531-2725
FAX: (613) 531-1852
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT #	DATE
230225-4	February 26, 2024

DRAWN	CHECKED	FIG NO.	REV
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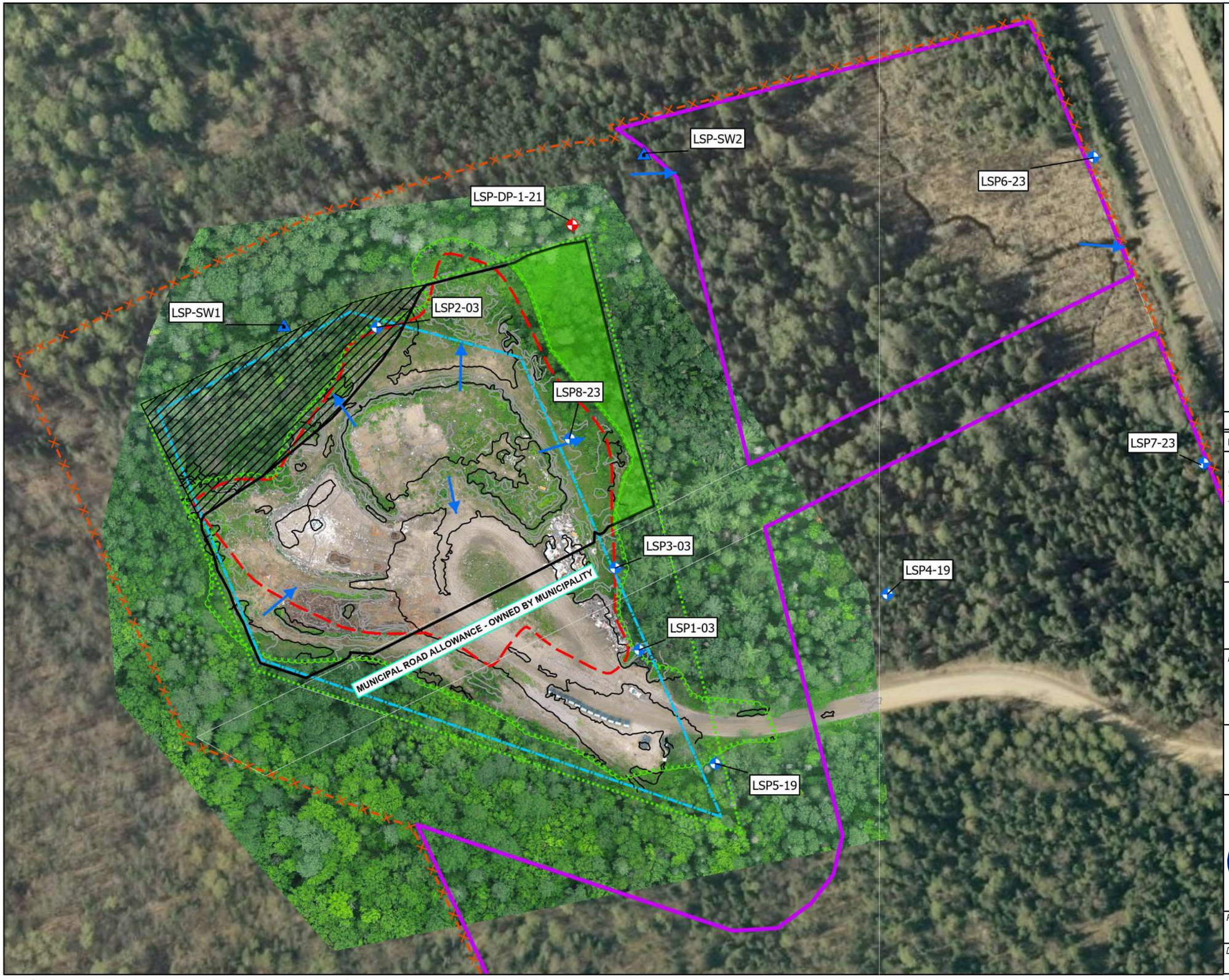

LEGEND

- Monitoring Well Location
- Drive-point Well Location
- Surface Water Location
- Surface Water Flow Direction
- Approximate Location of Buried Waste (1.11 ha) (Cambium, 2014)
- Treeline
- Proposed Contaminant Attenuation Zone (12.4 ha)
- Approved 17 ha Waste Site
- Lands Owned by Municipality (1.6 ha)
- Approved Waste Footprint (2.2 ha)
- Phase One Cell Boundary
- No Future Waste to be Placed
- Road Allowance Between Concessions
- Forested Area to be Cleared
- Topographic Contour (0.5 masl) (June 30, 2023)
- Topographic Contour (1.0 masl) (June 30, 2023)

REV.	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES

DO NOT SCALE DRAWING.
THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

N W E S

0 20 40 Meters

CLIENT

Municipality of Hastings Highlands

PROJECT

Lake St. Peter Waste Disposal Site

TITLE

Site Topography and Surface Water Flow Direction

BluMetric Environmental

The Tower - The Woolen Mill,
4 Cataraqui St.,
Kingston, Ontario K7K 1Z7
TEL: (613) 531-2725
FAX: (613) 531-1852
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT #	DATE
230225-4	February 26, 2024

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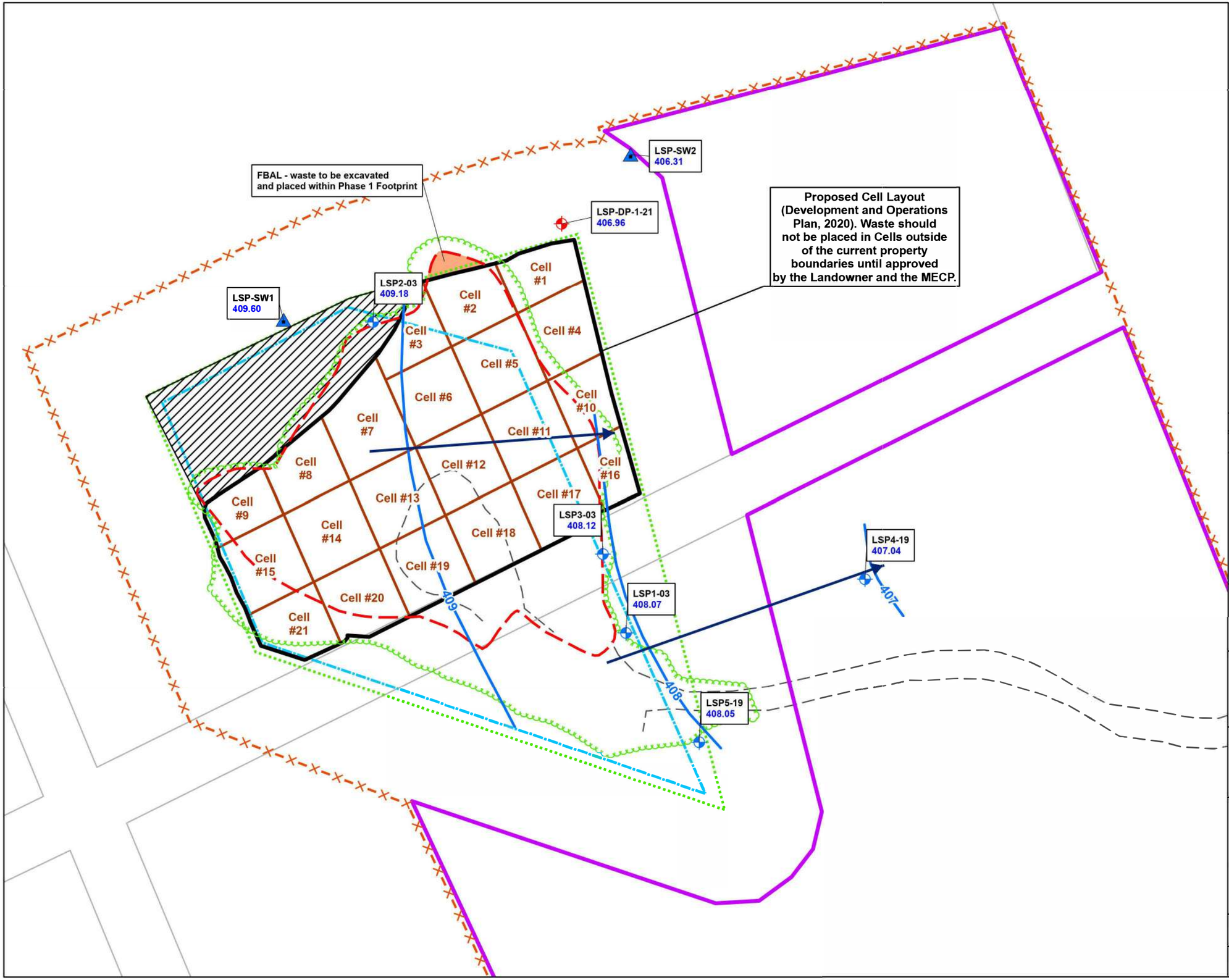


LEGEND

- Monitoring Well Location
- Drive-point Well Location
- Surface Water Location
- Inferred Groundwater Flow Direction
- Lands Owned by Municipality (1.6 ha)
- Approved Waste Footprint (2.2 ha)
- No Future Waste to be Placed
- Proposed Contaminant Attenuation Zone (12.4 ha)
- Road Allowance Between Concessions
- Phase 1 Footprint
- Groundwater Contour (1.0 m)
- Road
- Approved 17 ha Waste Site
- Approximate Location of Buried Waste (1.11 ha) (Cambium, 2014)
- Treeline
- FBAL
- 408.56 Groundwater and Surface Water Elevations (masl) (Spring, 2023)

REV.	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES

THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

N W E S

0 20 40 Meters

CLIENT

Municipality of Hastings Highlands

PROJECT

Lake St. Peter Waste Disposal Site

TITLE

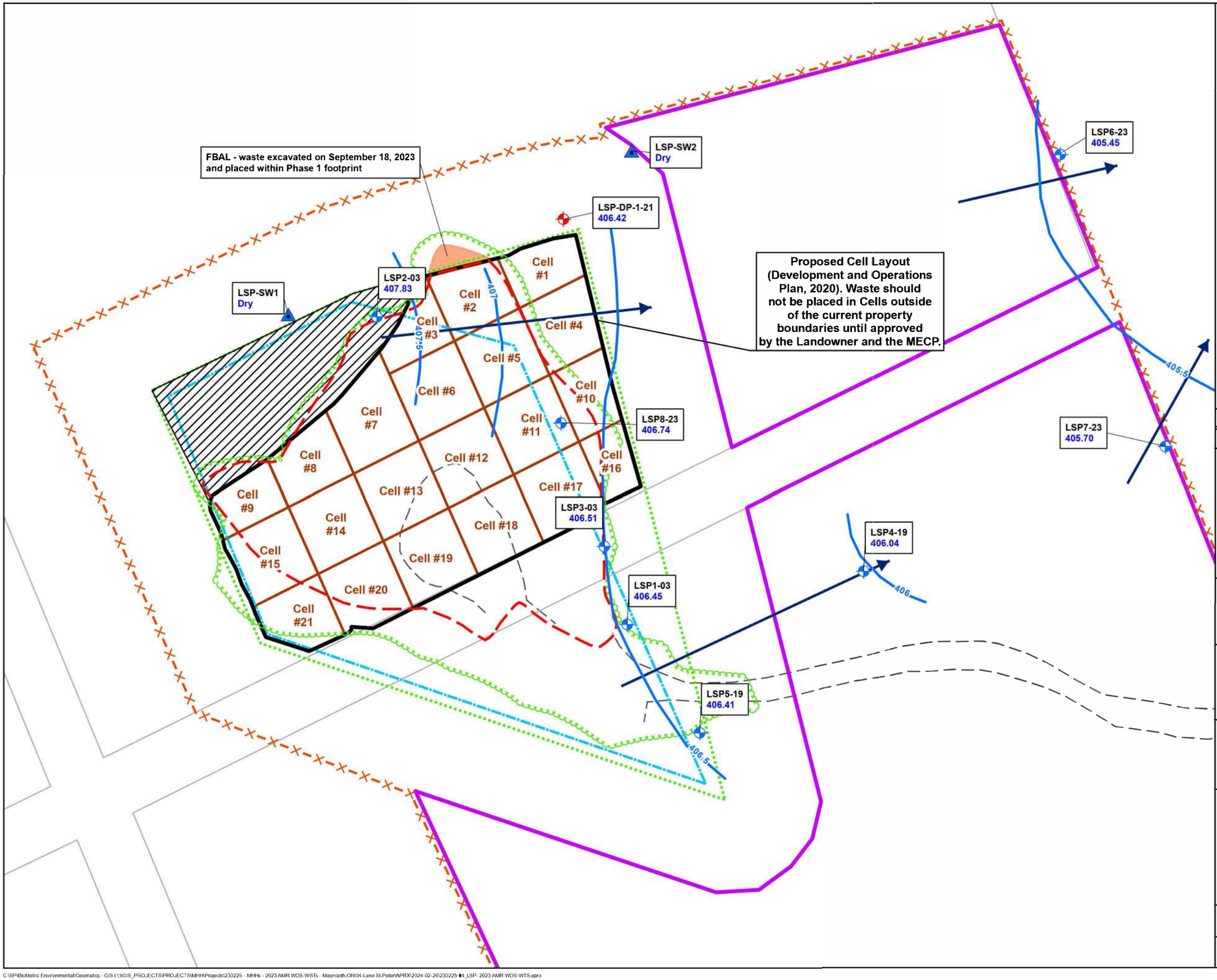
Groundwater Elevations and Contours - Spring 2023

BluMetric Environmental

The Tower - The Woolen Mill,
4 Cataraqui St.,
Kingston, Ontario K7K 1Z7
TEL: (613) 531-2725
FAX: (613) 531-1852
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT #	DATE
230225-4	February 26, 2024

DRAWN	CHECKED	FIG NO.	REV
ZS	TH	04	0



LEGEND

- Monitoring Well Location
- Drive-point Well Location
- Surface Water Location
- Inferred Groundwater Flow Direction
- Lands Owned by Municipality (1.6 ha)
- Approved Waste Footprint (2.2 ha)
- Phase 1 Footprint
- No Future Waste to be Placed
- Proposed Contaminant Attenuation Zone (12.4 ha)
- Road Allowance Between Concessions
- Groundwater Contour (0.5 m)
- Road
- Approved 17 ha Waste Site
- Treeline
- Approximate Location of Buried Waste (1.11 ha) (Cambium, 2014)
- FBAL

408.56 Groundwater and Surface Water Elevations (masl) (Fall, 2023)

REV.	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES

THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

N W E S

0 20 40 Meters

CLIENT

Municipality of Hastings Highlands

PROJECT

Lake St. Peter Waste Disposal Site

TITLE

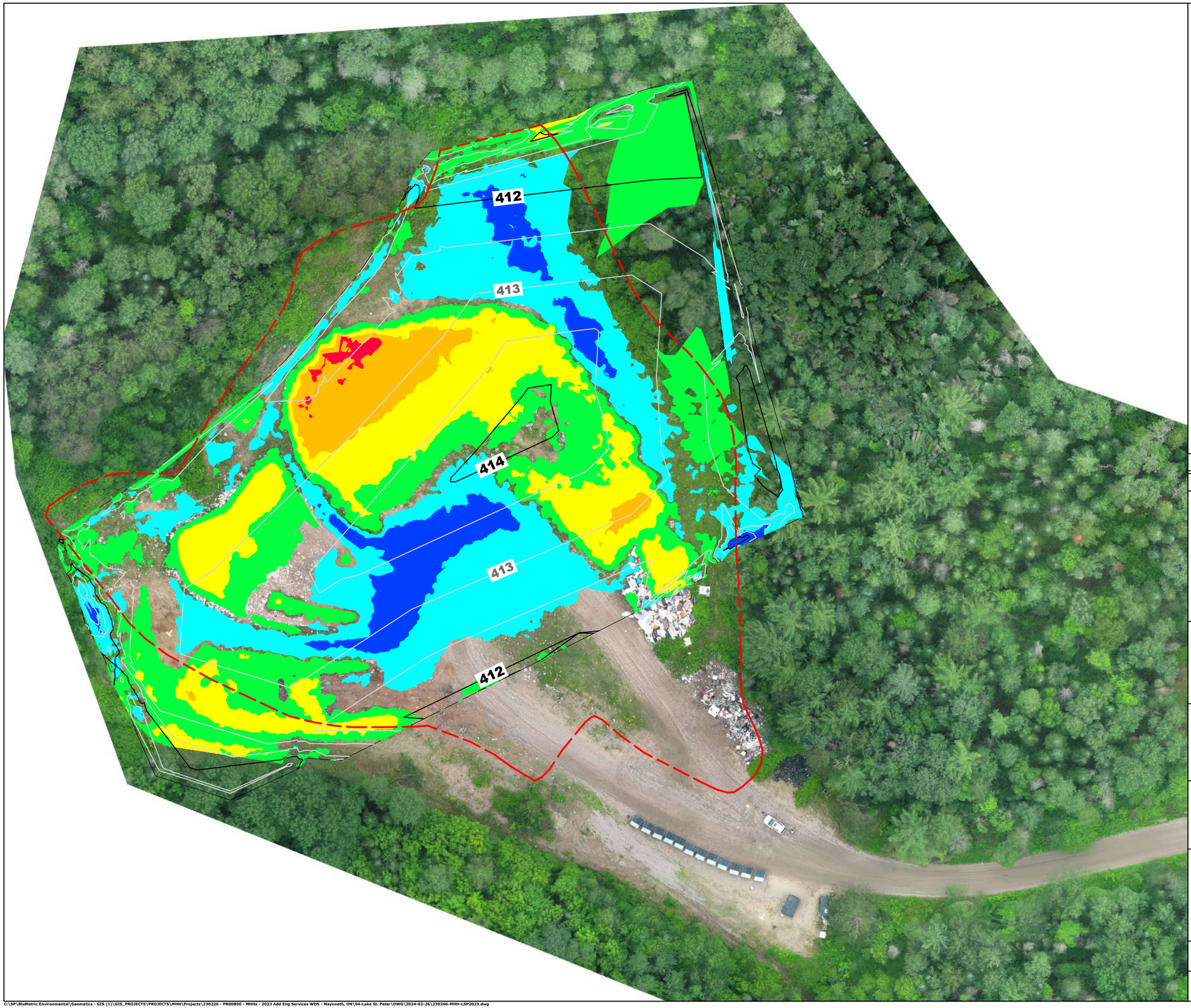
Groundwater Elevations and Contours - Fall 2023

The Tower - The Woolen Mill,
4 Cataraqui St.,
Kingston, Ontario K7K 1Z7
TEL: (613) 531-2725
FAX: (613) 531-1852
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT #	DATE
230225-4	February 26, 2024

DRAWN	CHECKED	FIG NO.	REV
ZS	TH	05	0

C:\SP\BluMetric Environmental\Geomatics - GIS (1)\GIS_PROJECTS\PROJECTS\MHH\Projects\230225 - MHHs - 2023 AMR WDS-WSTs - Maynooth,ON\04-Lake St.Peter\APRX\2024-02-26\230225-04_LSP- 2023 AMR WDS-WTS.aprx



LEGEND

- 412 - Phase 1 Design Contours (0.5m)

Approximate Location of Buried Waste (1.11 ha) (Cambium, 2014)

Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	−4.00	−3.00	
2	−3.00	−2.00	
3	−2.00	−1.00	
4	−1.00	−0.25	
5	0.25	1.00	
6	1.00	2.00	
7	2.00	3.00	

Volumes Table – 2023 to Phase 1 Design Contours	
Cut	5330 Cu. M
Fill	2433 Cu. M
Net Cut	2897 Cu. M

REV.	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES

DO NOT SCALE DRAWING.
THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

0 15 30 Metres
1:750

N W E S

CLIENT

Municipality of Hastings Highlands

PROJECT

Lake St. Peter Waste Disposal Site

TITLE

Remaining Fill Capacity
30 June, 2023

BluMetric™ Environmental
4 Cataraqui Street, The Tower - The Woolen Mill
Kingston, Ontario, K7K 1Z7
TEL: (613) 531-2725
FAX: (613) 531-1852
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT #	DATE
230225-04	February 26, 2024

DRAWN	CHECKED	DWG NO.	REV
GM	CM	06	0

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Site Photographs

Photo 1: Front signage – May 4, 2023

Photo 2: Front gate – May 4, 2023

Photo 3: Waste & recycling collection bins – May 4, 2023

Photo 4: Scrap metal – May 4, 2023

Photo 5: LSP-SW1 monitoring location – May 4, 2023

Photo 6: LSP-SW2 monitoring location – May 4, 2023

Photo 7: Segregated tires – May 4, 2023

Photo 8: Segregated bulky waste – May 4, 2023

Photo 9: Front signage – October 17, 2023

Photo 10: Front gate – October 17, 2023

Photo 11: Waste & recycling collection bins – October 17, 2023

Photo 12: Scrap metal – October 17, 2023

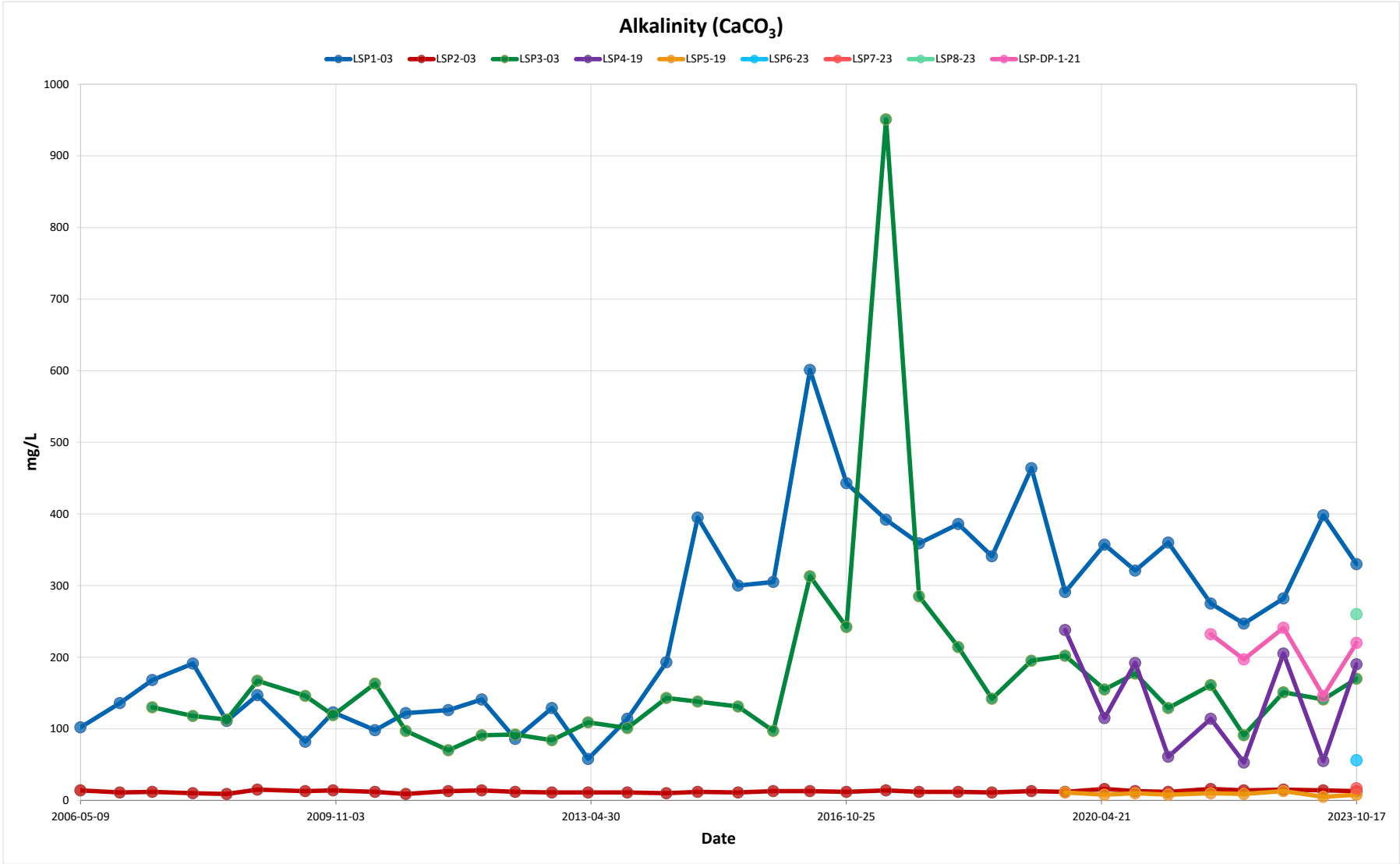
Photo 13: LSP-SW1 monitoring location – October 17, 2023

Photo 14: LSP-SW2 monitoring location – October 17, 2023

Photo 15: Segregated tires – October 17, 2023

Photo 16: Segregated bulky waste – October 17, 2023

Chemistry Trend Graphs

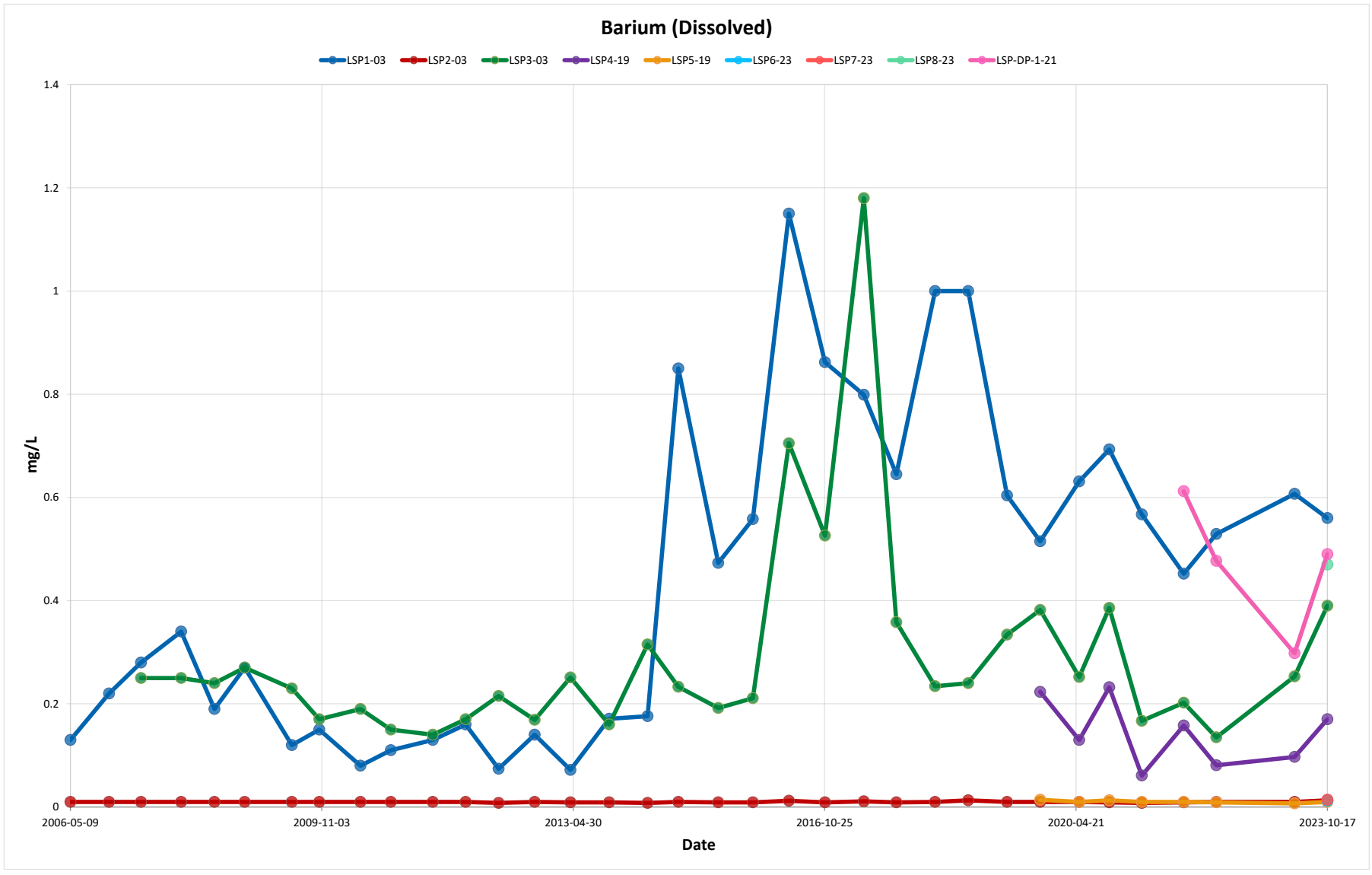


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **230225**
Date: **February 22, 2024**

Graph 1
Alkalinity in Groundwater

Created by: JL
Checked by: CM

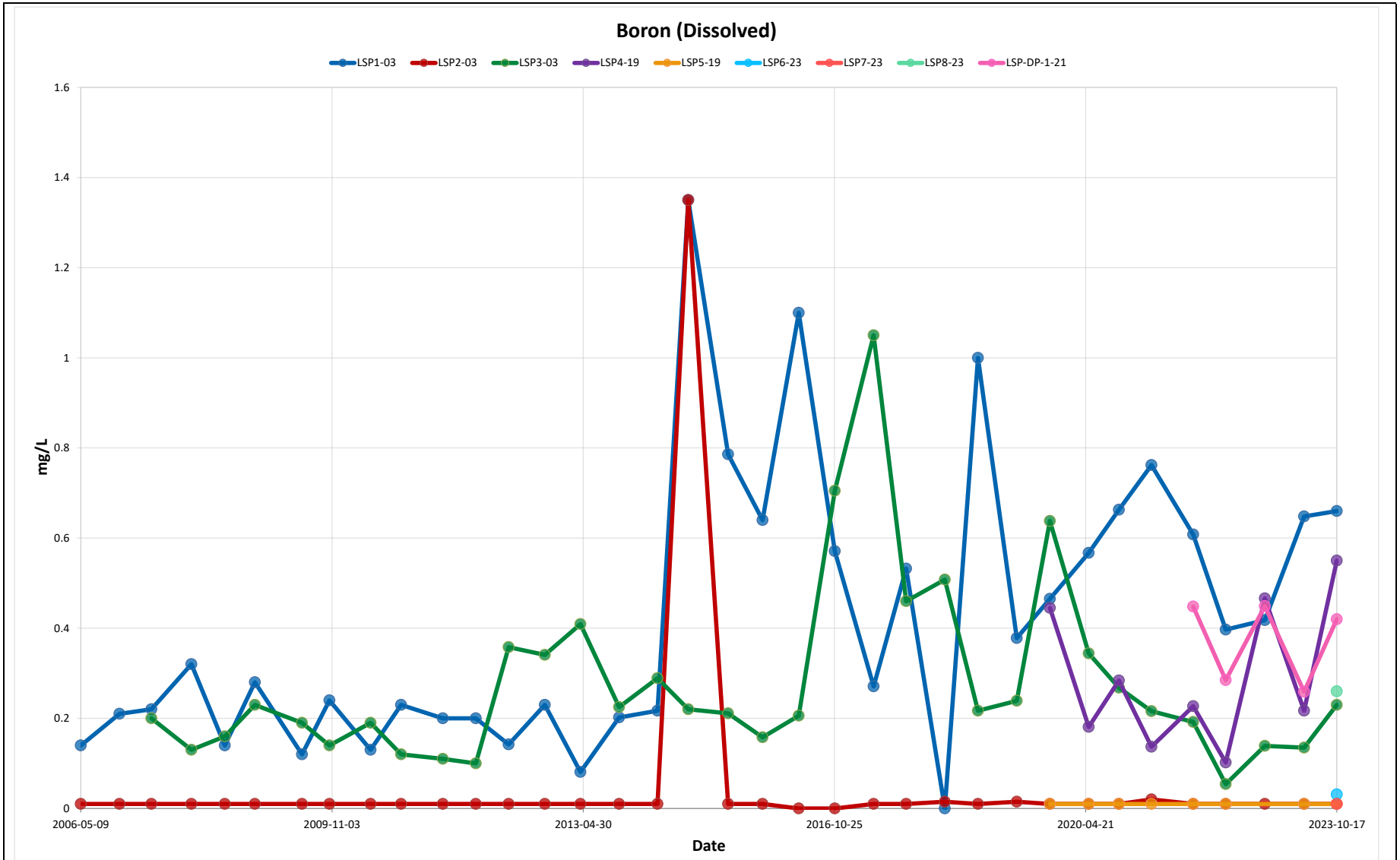


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **230225**
Date: **February 22, 2024**

Graph 2
Dissolved Barium in Groundwater

Created by: JL
Checked by: CM

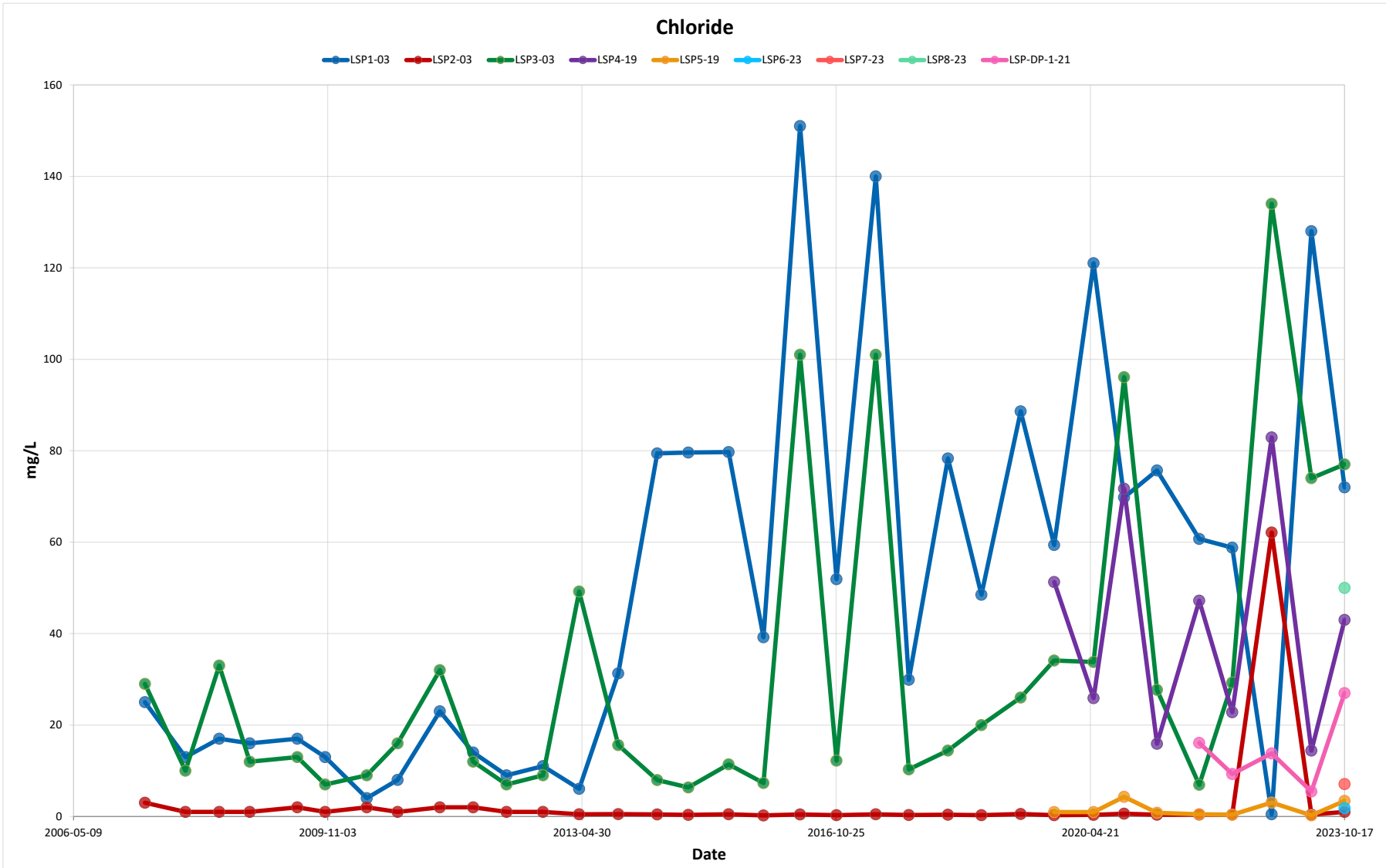


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **230225**
Date: **February 22, 2024**

Graph 3
Dissolved Boron in Groundwater

Created by: JL
Checked by: CM

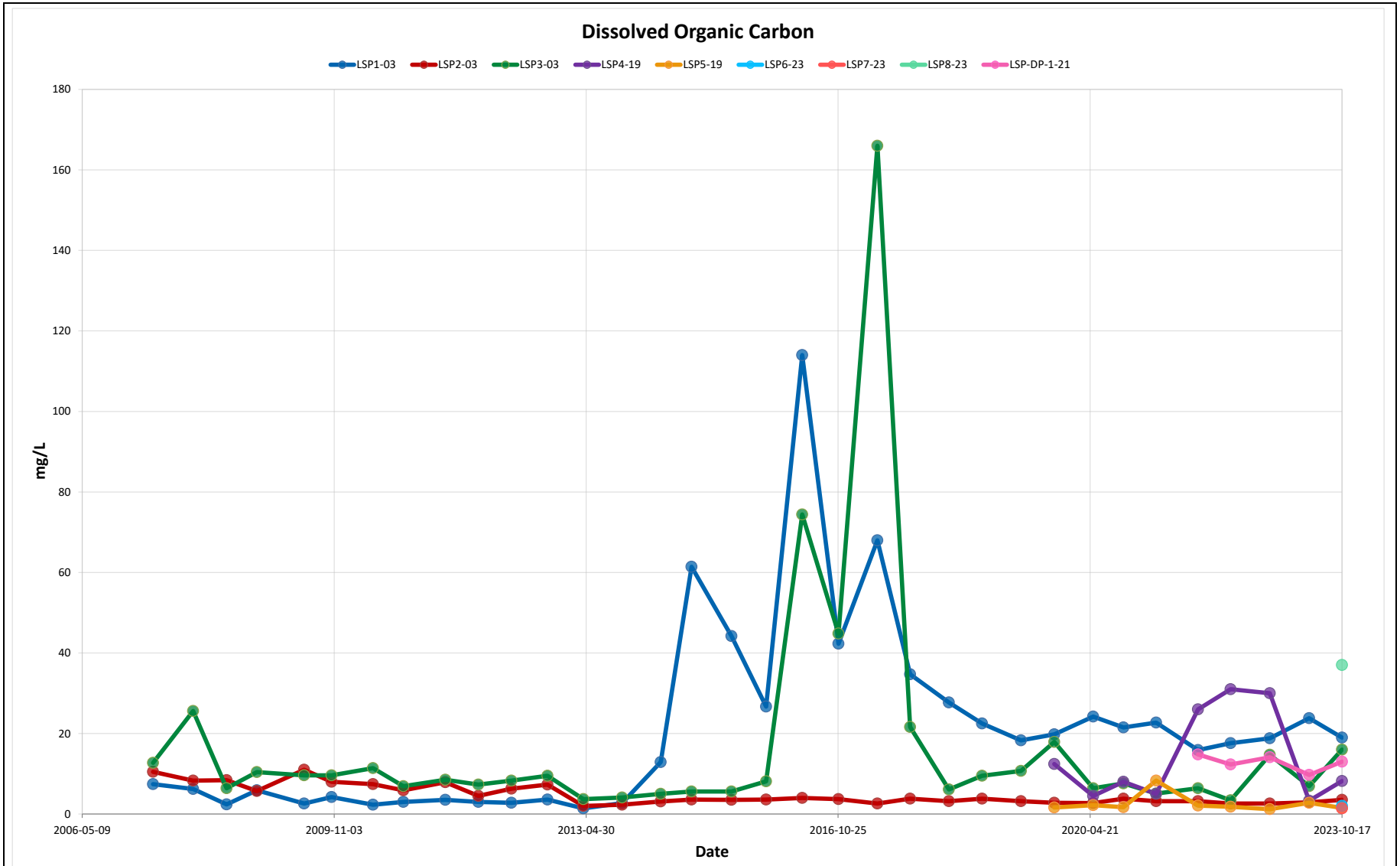


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **230225**
Date: **February 22, 2024**

Graph 4
Chloride in Groundwater

Created by: JL
Checked by: CM

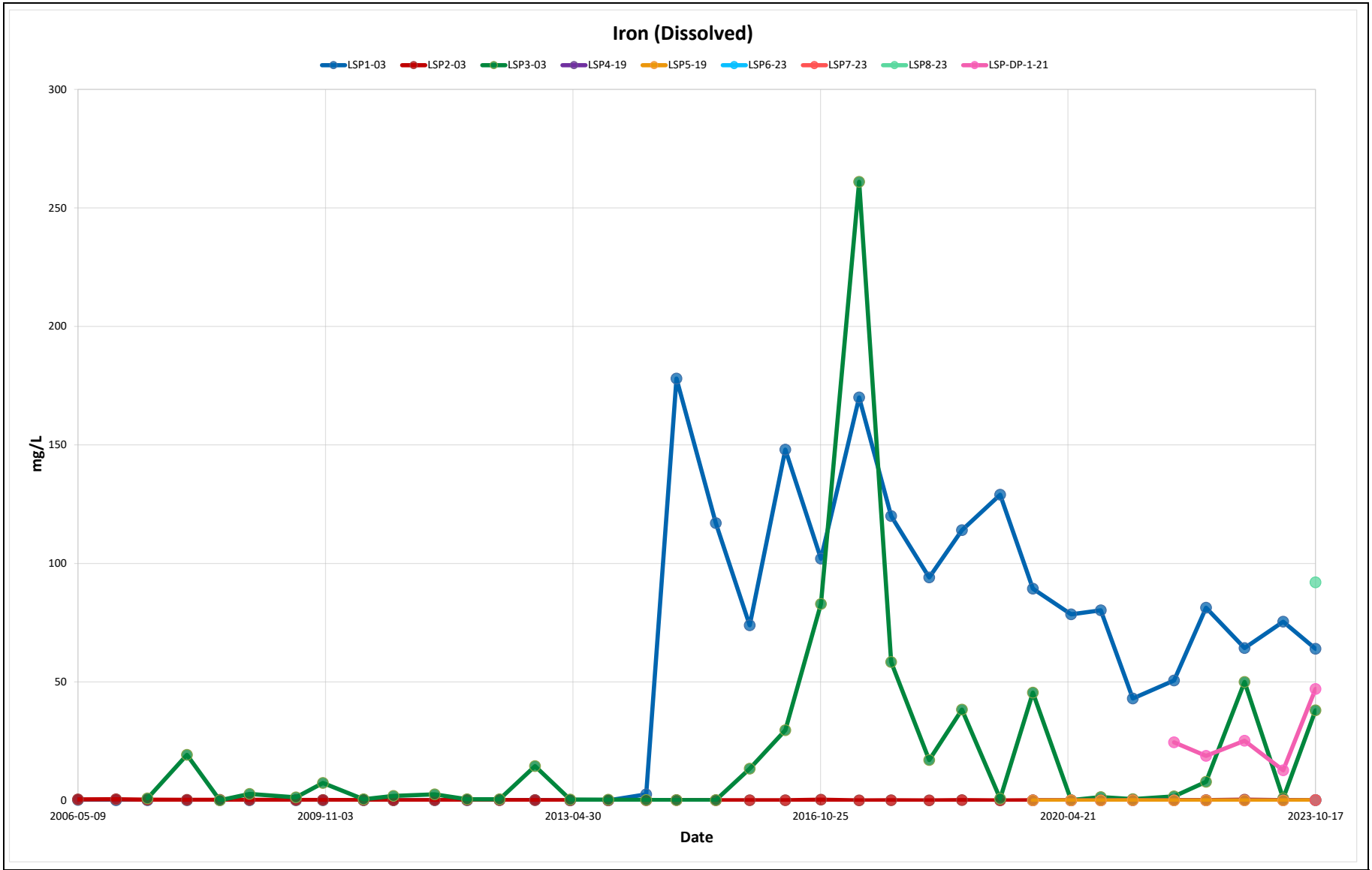


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **230225**
Date: **February 22, 2024**

Graph 5
Dissolved Organic Carbon in Groundwater

Created by: JL
Checked by: CM

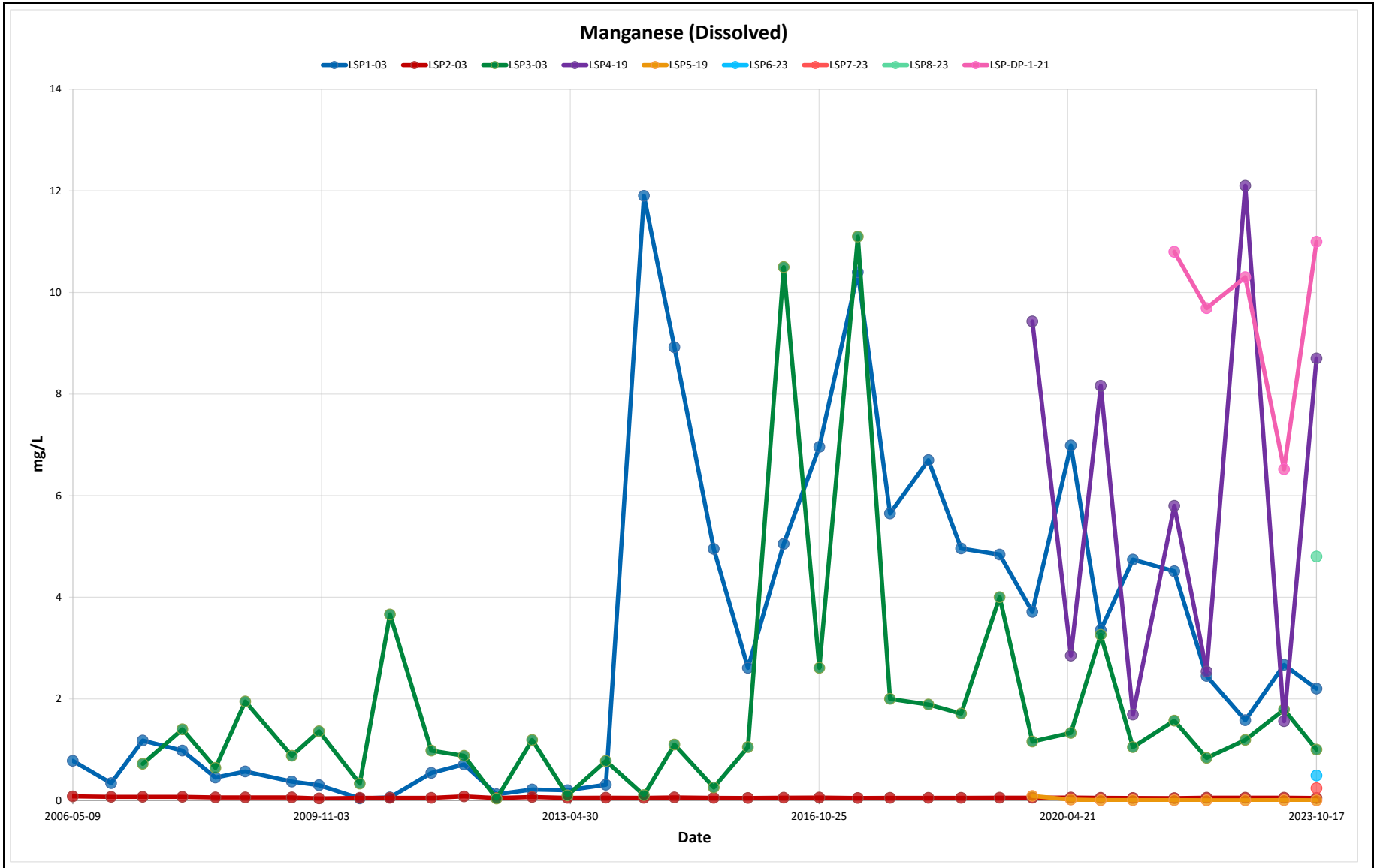


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225
Date: February 22, 2024

Graph 6
Dissolved Iron in Groundwater

Created by: JL
Checked by: CM

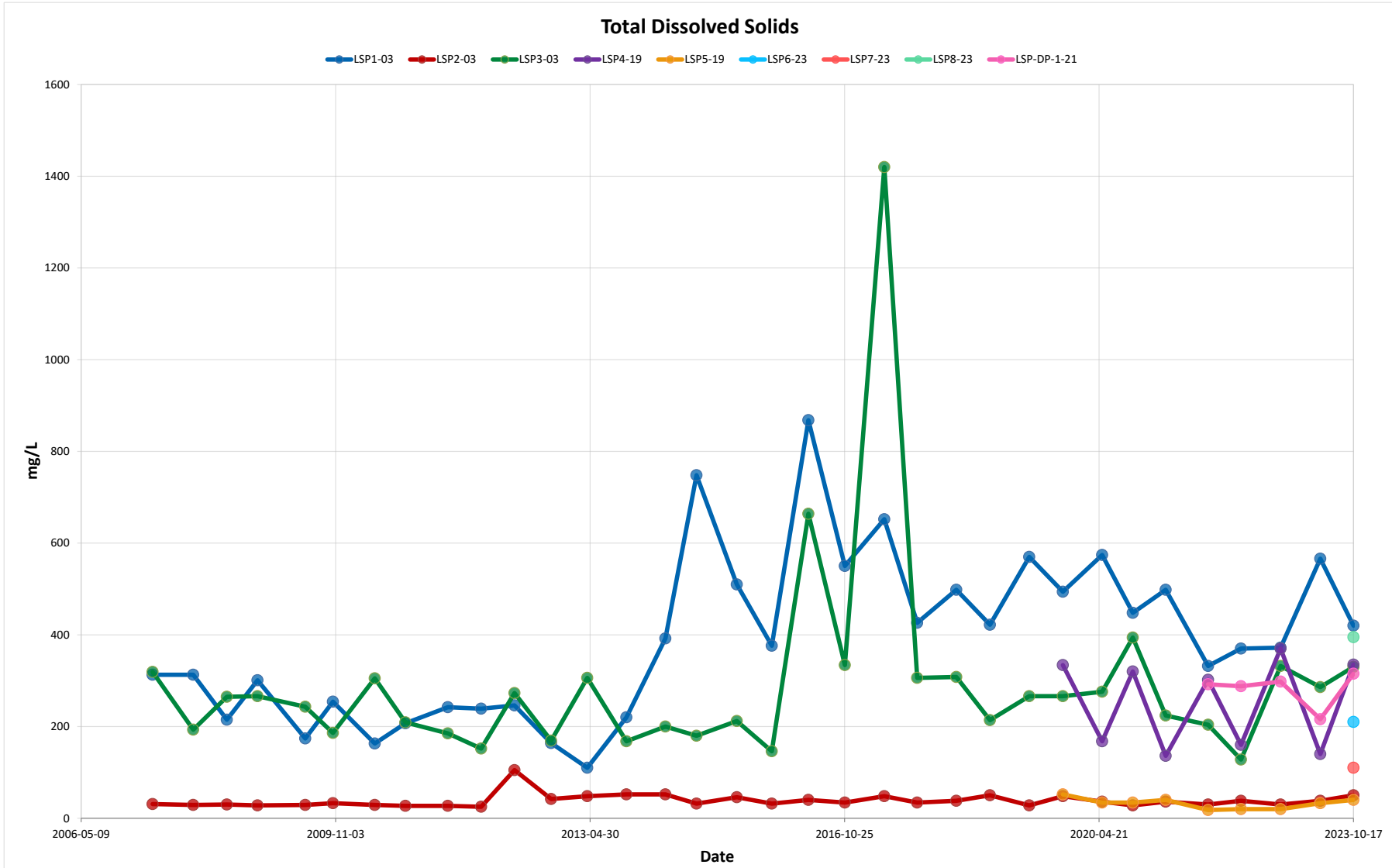


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **230225**
Date: **February 22, 2024**

Graph 7
Dissolved Manganese in Groundwater

Created by: JL
Checked by: CM

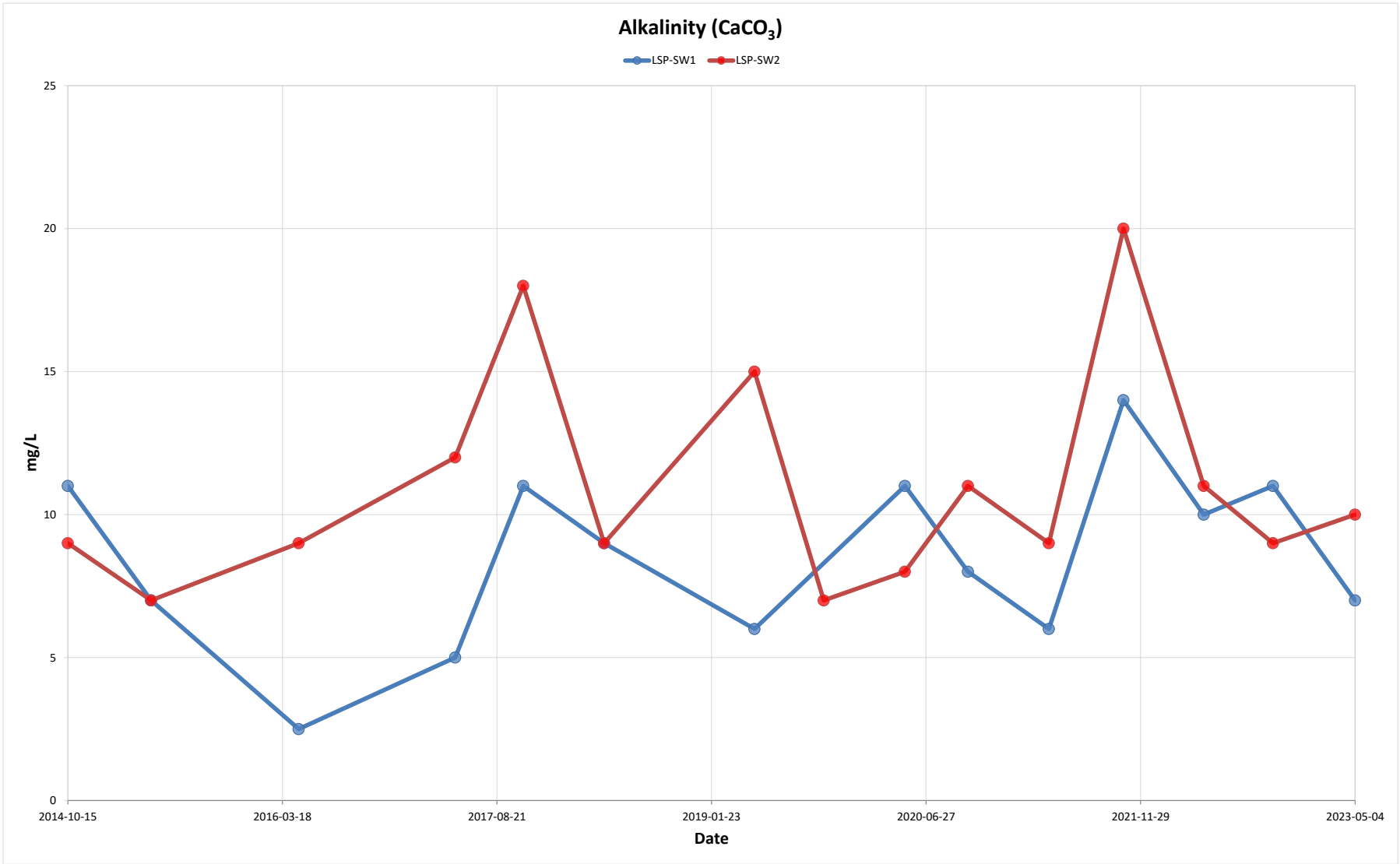


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **230225**
Date: **February 22, 2024**

Graph 8
Total Dissolved Solids in Groundwater

Created by: JL
Checked by: CM

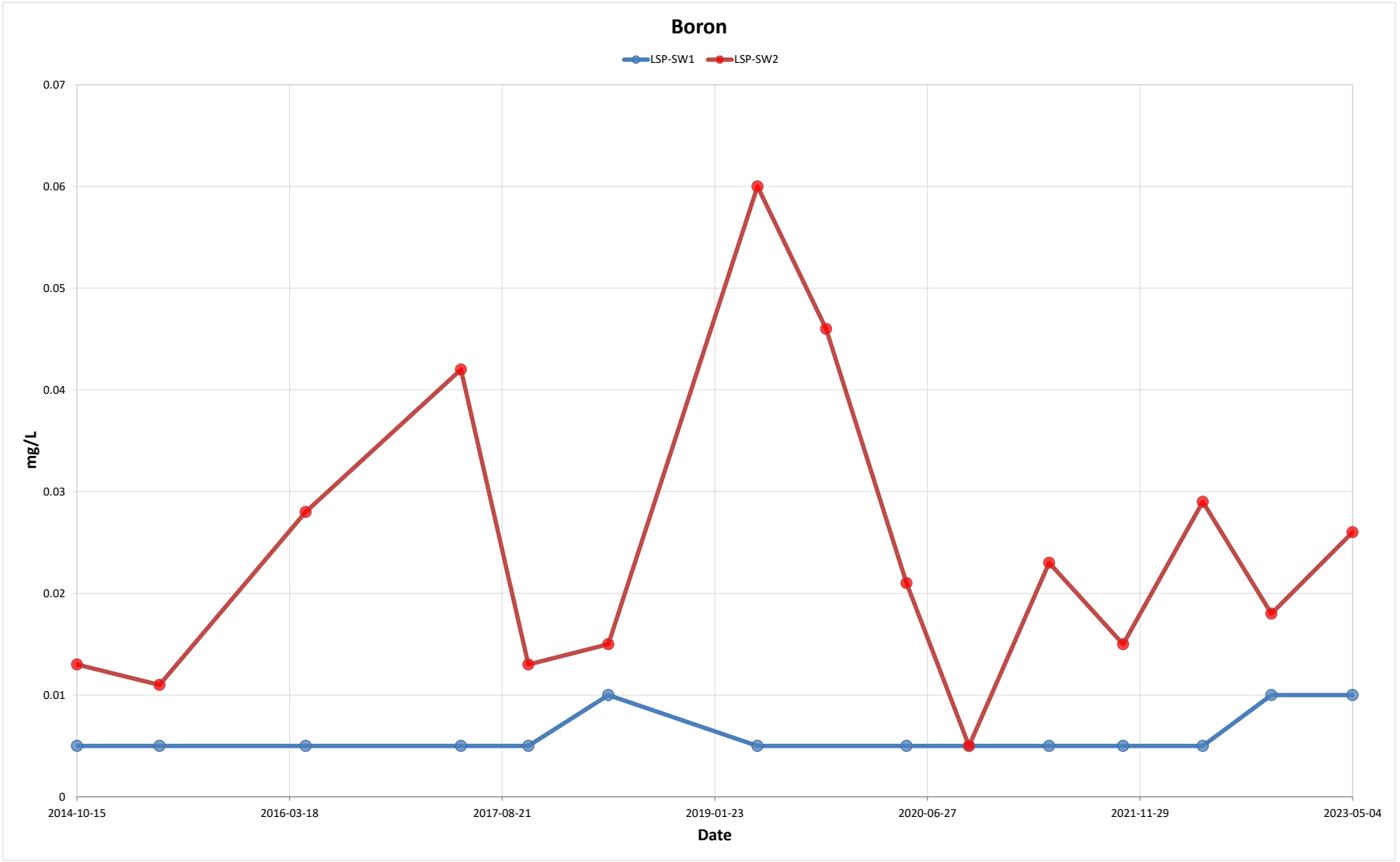


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **220308**
Date: **February 19, 2024**

Graph 9
Alkalinity in Surface Water

Created by: JL
Checked by: CM

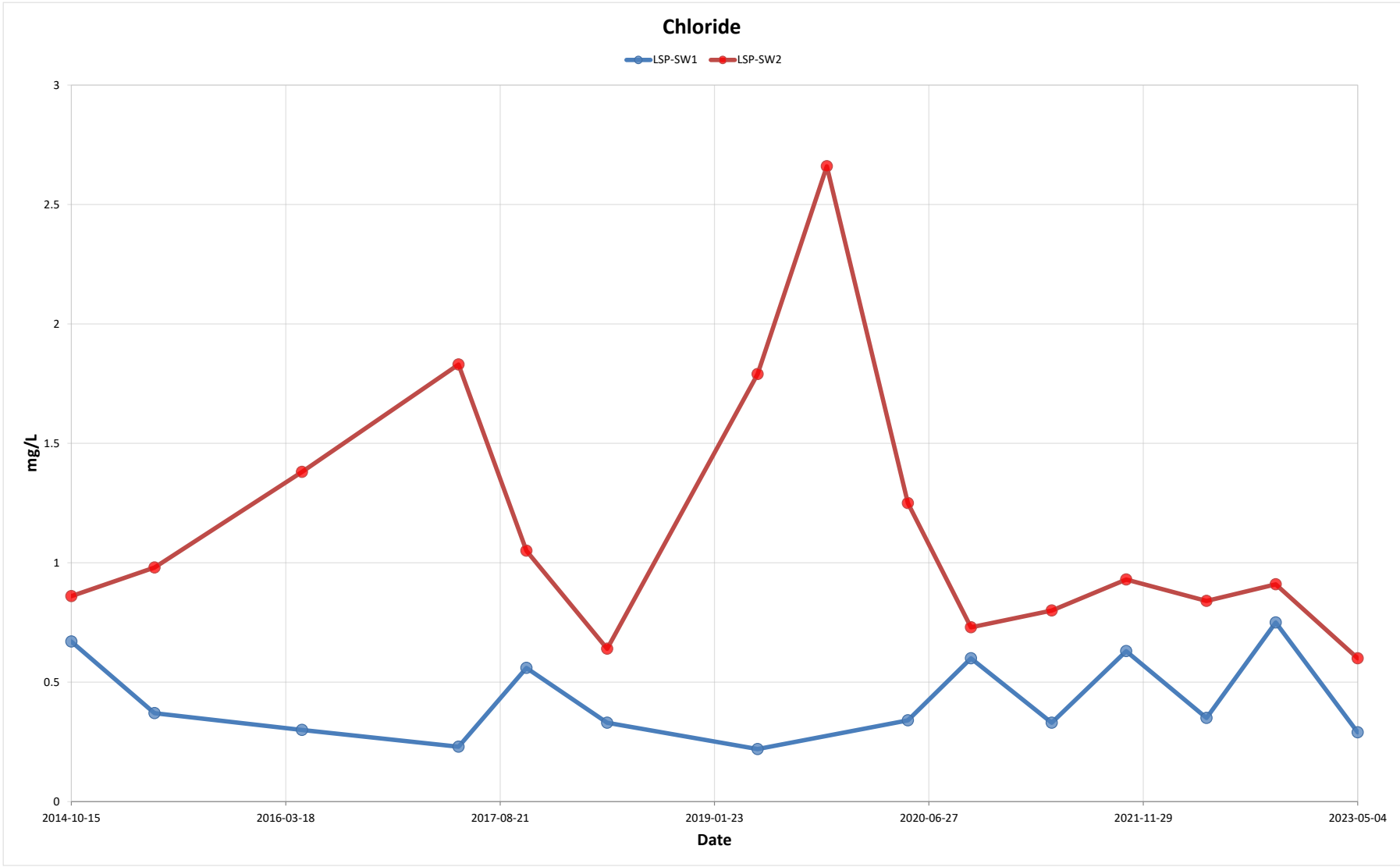


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **220308**
Date: **February 19, 2024**

Graph 10
Boron in Surface Water

Created by: JL
Checked by: CM

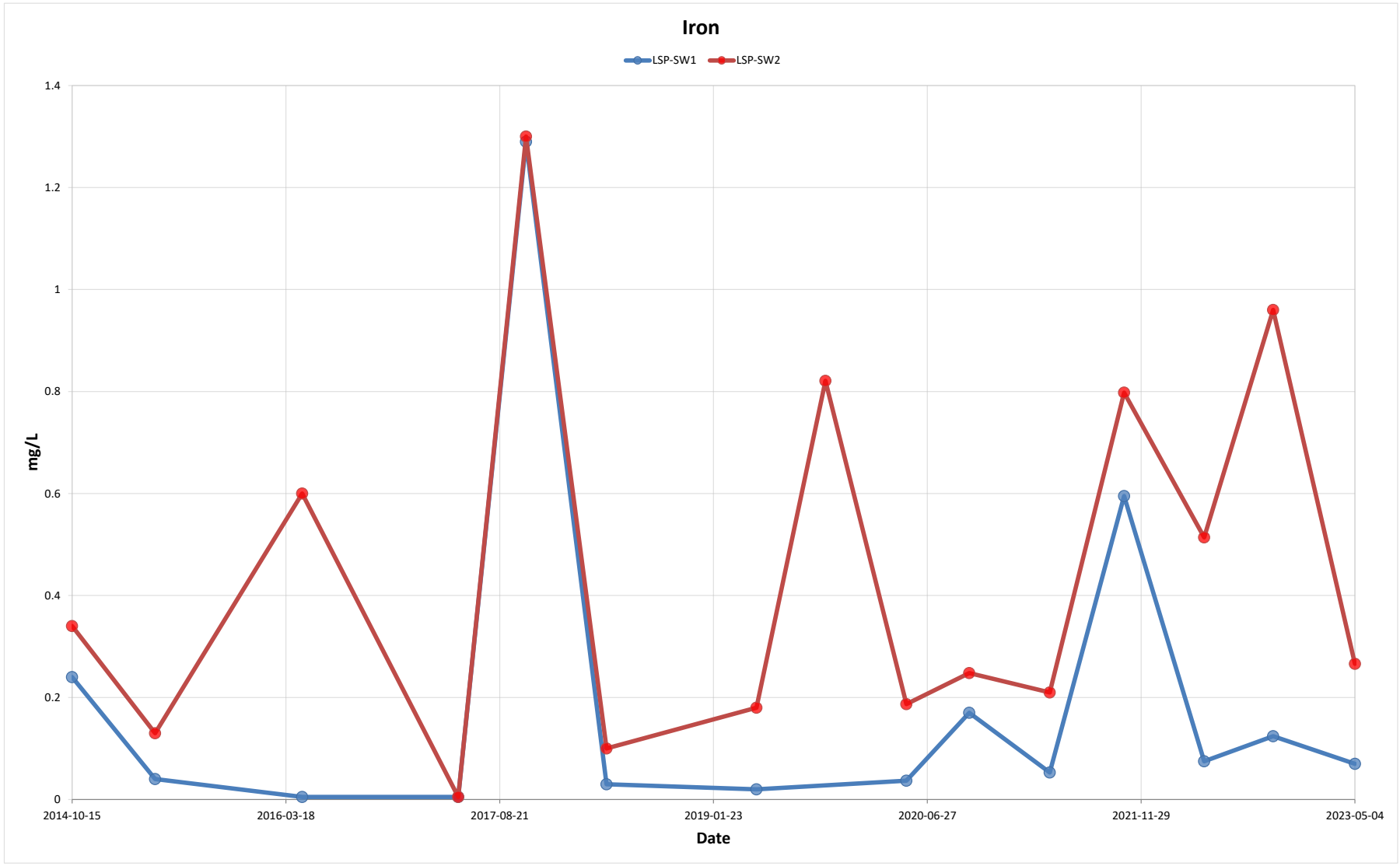


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **220308**
Date: **February 19, 2024**

Graph 11
Chloride in Surface Water

Created by: JL
Checked by: CM

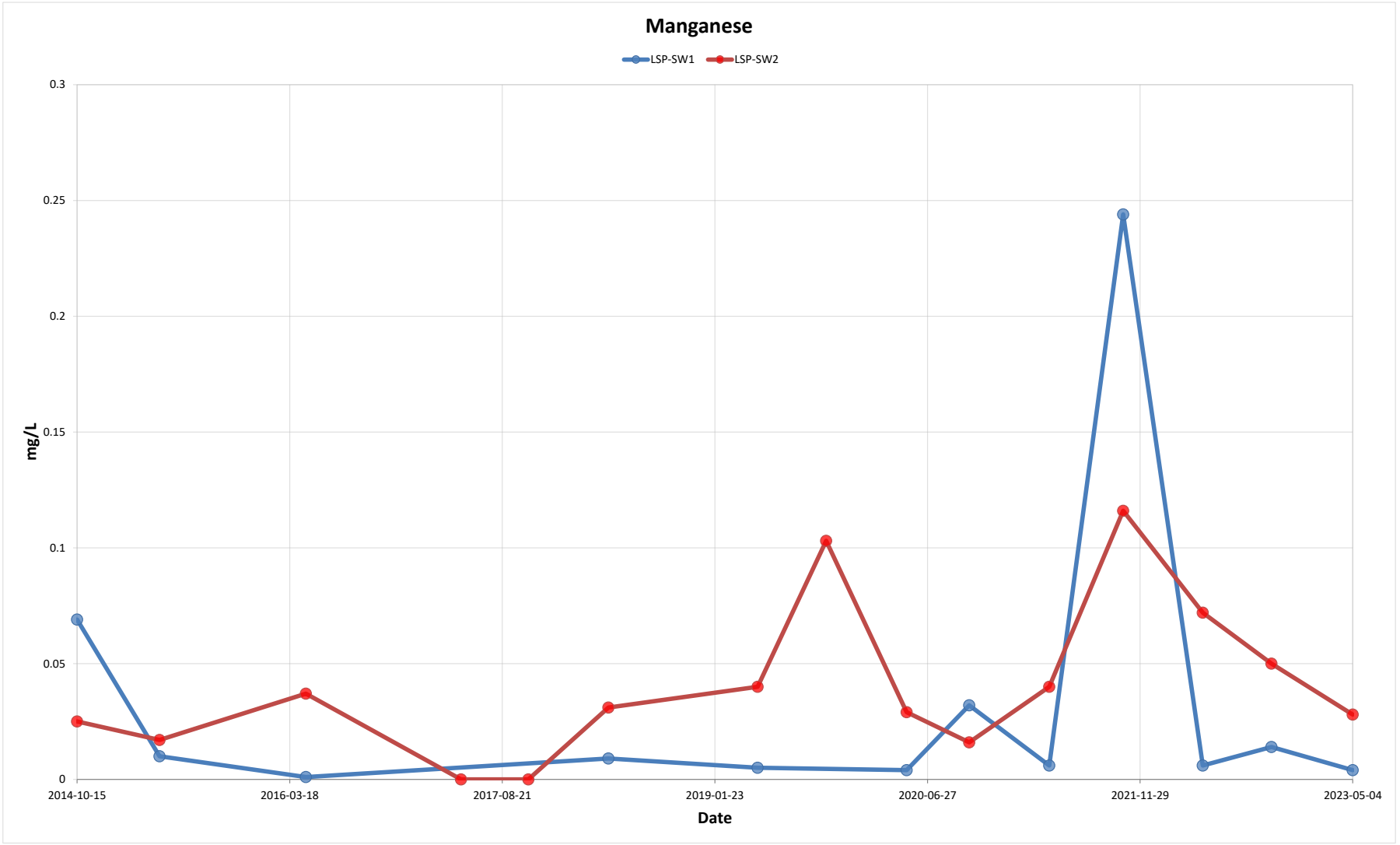


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **220308**
Date: **February 19, 2024**

Graph 12
Iron in Surface Water

Created by: JL
Checked by: CM

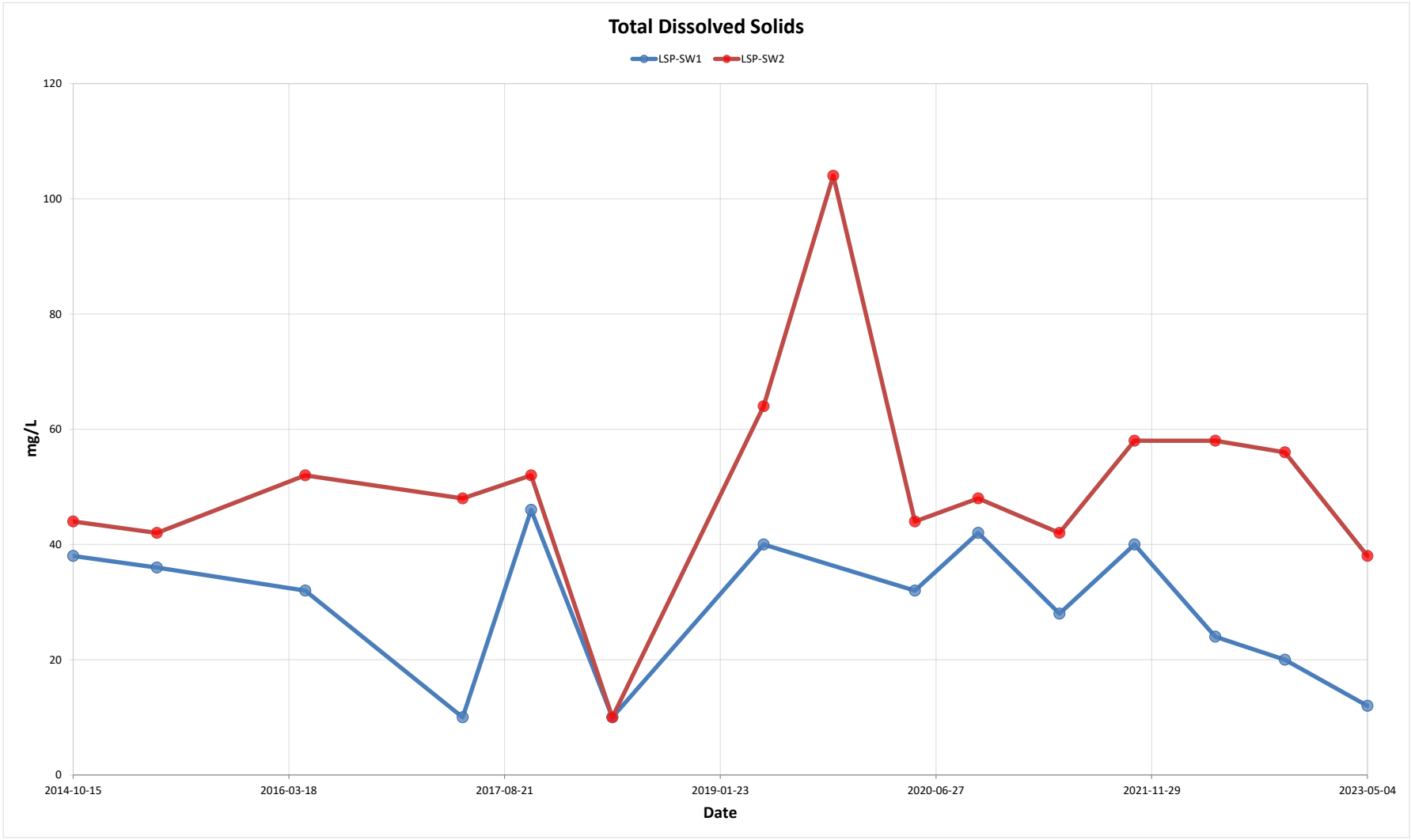


Lake St Peter WDS
Municipality of Hasting's Highlands

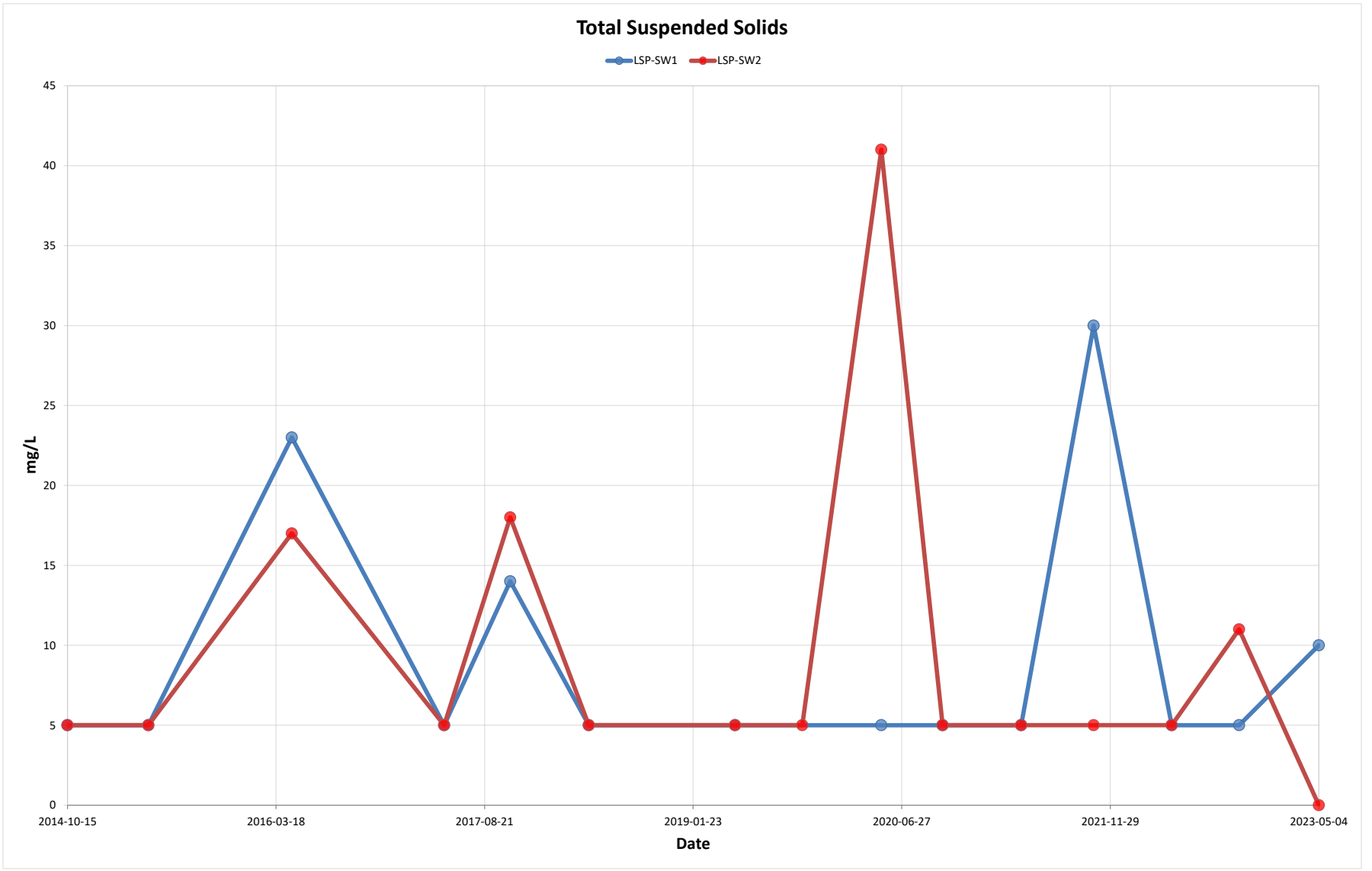
BluMetric Proj No: **220308**
Date: **February 19, 2024**

Graph 13
Manganese in Surface Water

Created by: JL
Checked by: CM



Lake St Peter WDS **Municipality of Hasting's Highlands**	**Graph 14** **Total Dissolved Solids in Surface Water**
BluMetric Proj No: 220308 **Date:** February 19, 2024	**Created by: JL** **Checked by: CM**

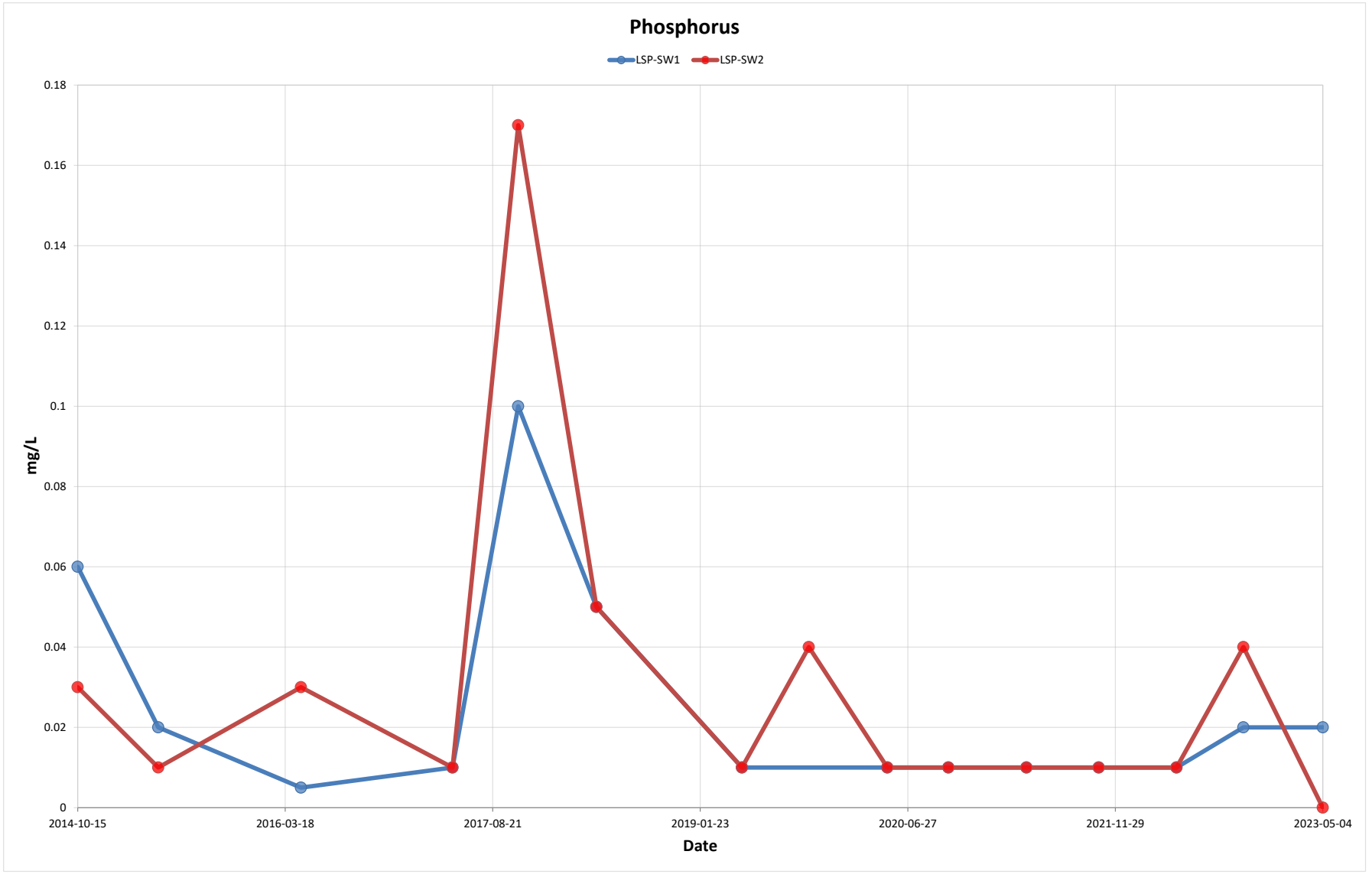


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **220308**
Date: **February 19, 2024**

Graph 15
Total Suspended Solids in Surface Water

Created by: JL
Checked by: CM

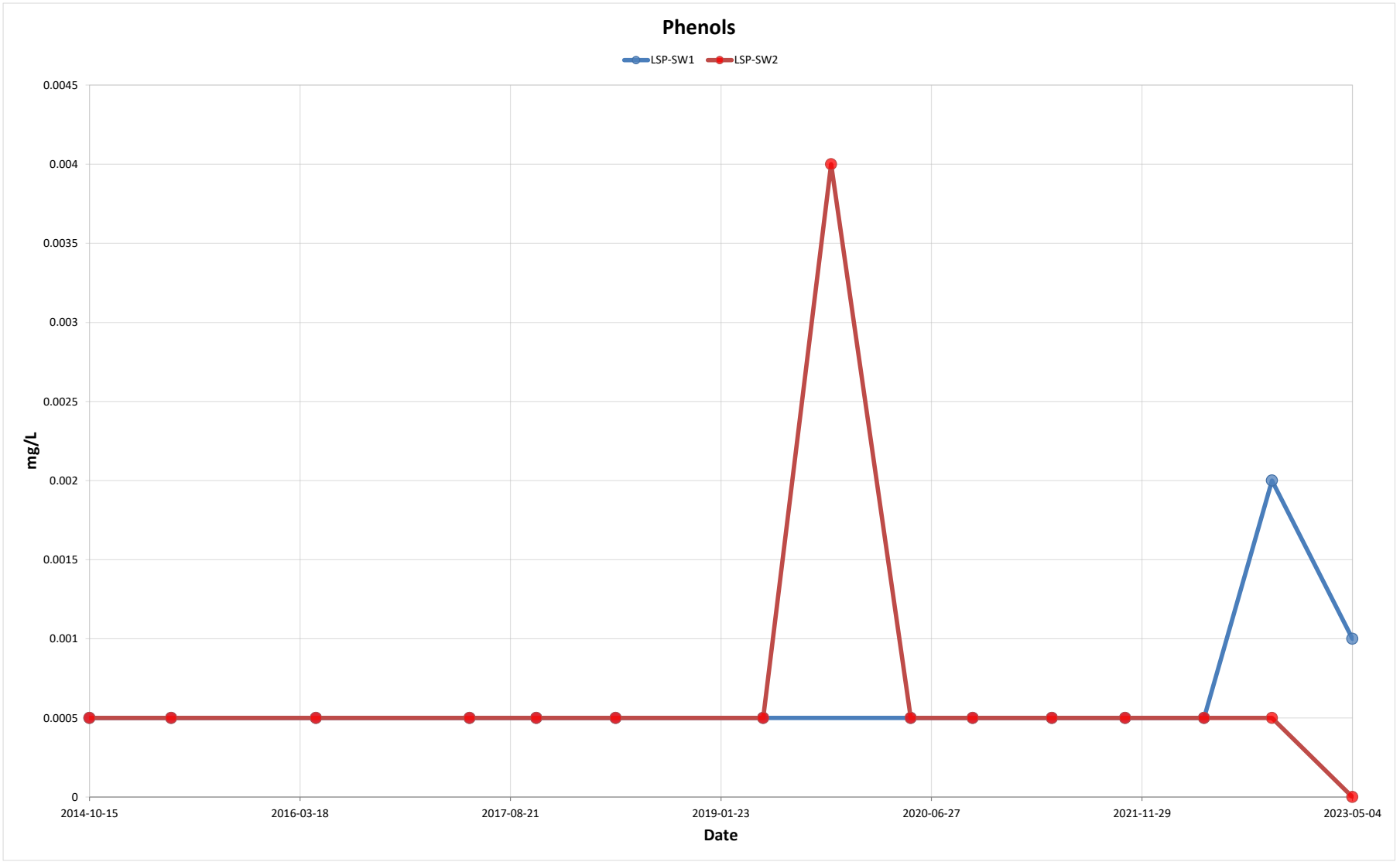


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **220308**
Date: **February 19, 2024**

Graph 16
Phosphorus in Surface Water

Created by: JL
Checked by: CM

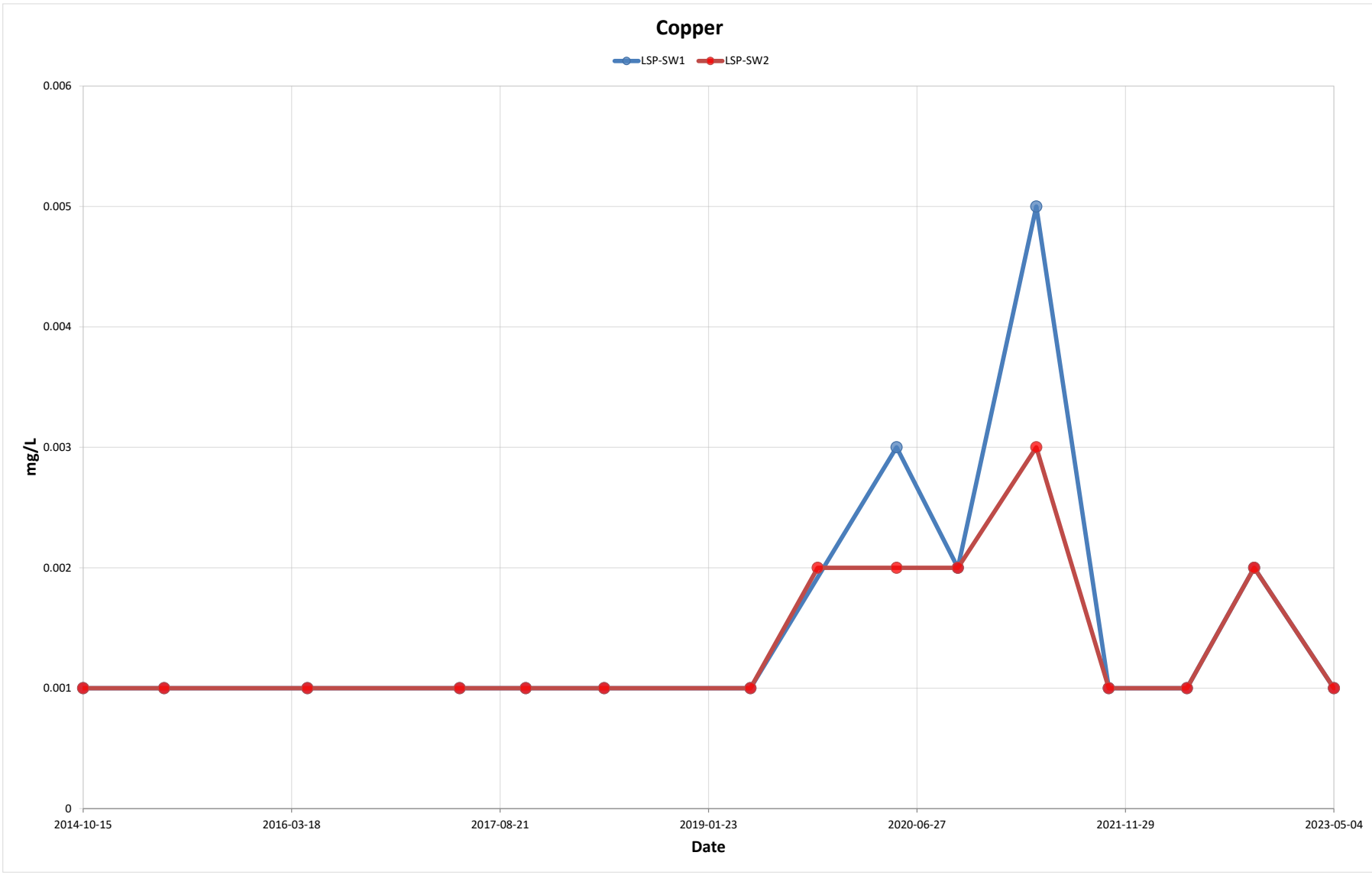


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **220308**
Date: **February 19, 2024**

Graph 17
Phenols in Surface Water

Created by: JL
Checked by: CM

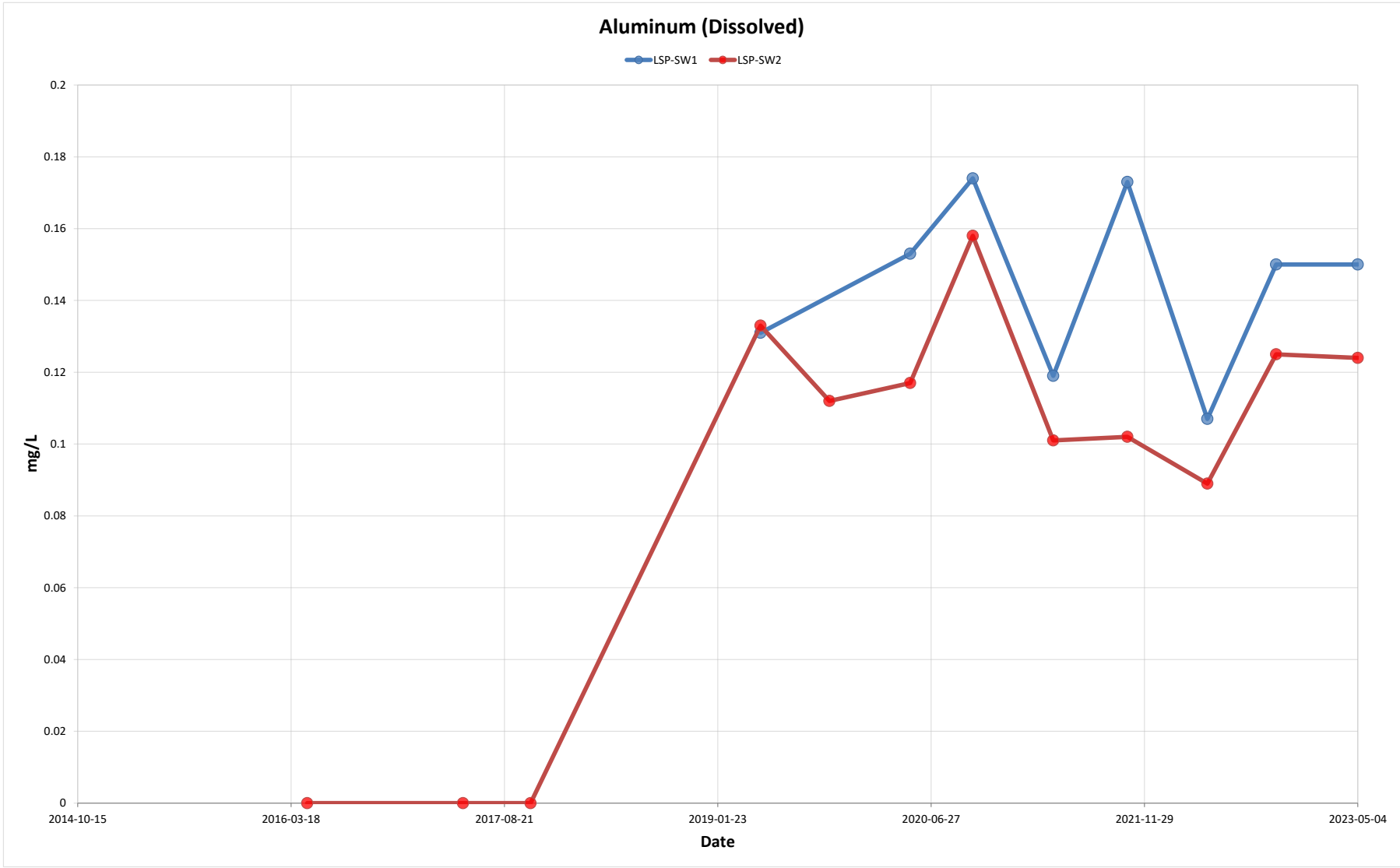


Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **220308**
Date: **February 19, 2024**

Graph 18
Copper in Surface Water

Created by: JL
Checked by: CM



Lake St Peter WDS
Municipality of Hasting's Highlands

BluMetric Proj No: **220308**
Date: **February 19, 2024**

Graph 19
Dissolved Aluminum in Surface Water

Created by: JL
Checked by: CM

Appendix A

A-1 Environmental Compliance Approval

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A361116
Issue Date: October 25, 2021

The Corporation of the Municipality of Hastings Highlands
33011 Highway 62
Post Office Box, No. 130
Maynooth, Ontario
K0L 2S0

Site Location: Lake St. Peter Waste Disposal Site
2825 Highway 127
Hastings Highlands Municipality, County of Hastings

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the use and operation of 2.2 hectare of waste disposal/transfer site within a total site area of 17 hectares for accepting the following wastes:

Municipal non-hazardous from domestic sources, IC & I, leaf and yard waste, wood waste, tires, scrap metal, bulky items (furniture), Blue Box Materials and waste electrical and electronics equipment (WEEE).

For the purpose of this environmental compliance approval, the following definitions apply:

"Approval" means this entire Environmental Compliance Approval and any Schedules attached to it;

"Adverse Effect" as defined in the EPA;

"Contaminant Attenuation Zone" or "CAZ" means a three-dimensional zone that,

a. is located on land adjacent to a landfilling site,
b. is in the subsurface or extends into the subsurface, and
c. is used or is intended to be used for the attenuation of contaminants from the landfilling site to levels that will not have an unacceptable impact beyond the boundary of the zone;

"Contaminating Life Span" means contaminating life span as defined in Ontario Regulation 232/98;

"Director" means any *Ministry* employee appointed in writing by the Minister pursuant to section 5 of the *Act* as a Director for the purposes of Part V of the *Act* .

"District Manager" means the District Manager of the local district office of the *Ministry* in which the *Site* is geographically located.

"EPA or Act" means the Environmental Protection Act, R.S.O. 1990, c.E.19;

"HHW" means household hazardous or special waste;
"Leaf and Yard Waste" includes waste consisting of natural Christmas trees and other plant materials but not tree limbs or other woody materials in excess of seven (7) centimetres in diameter;

"Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

"NMA" means the Nutrient Management Act, 2002, S.O. 2002, c. 4, as amended.

"Ontario Drinking Water Quality Standards" means Ontario Regulation 169/03 (Ontario Drinking Water Quality Standards) as amended;

"Owner" means any person that is responsible for the establishment or operation of the *Site* being approved by this *Approval,* and includes The Corporation of the Municipality of Hastings Highlands and its successors and assigns;

"OWRA" means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;

"PA" means the *Pesticides Act* , R.S.O. 1990, c. P-11, as amended;

"Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to Section 5 of the *OWRA,* Section 5 of the *EPA,* Section 17 of the *PA,* Section 4 of the *NMA,* or Section 8 of the *SDWA;*

"Reg. 347" means Regulation 347, R.R.O. 1990, made under the EPA, as amended;

"Regional Director" means the Regional Director of the local Regional Office of the Ministry in which the Site is located;

"Regulation 903" means Regulation 903, R.R.O. 1990, made under the *OWRA,* as amended;

"Site" means the entire Lake St. Peter waste disposal site, including the buffer lands, and contaminant attenuation zone at located on Part Lot 10, Concession 12 &13, former Township of McClure, County of Hastings, Ontario.

"*SDWA* " means the Safe Drinking Water Act, 2002, S.O. 2002, c. 32, as amended.

"Trained Personnel" means personnel knowledgeable in the following through instruction and/or practice:

a. relevant waste management legislation, regulations and guidelines;

b. major environmental concerns pertaining to the waste to be handled;

c. occupational health and safety concerns pertaining to the processes and wastes to be handled;

d. management procedures including the use and operation of equipment for the processes and wastes to be handled;

e. emergency response procedures;

f. specific written procedures for the control of nuisance conditions;

g. specific written procedures for refusal of unacceptable waste loads; and

h. the requirements of this *Approval.*

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL

Compliance

(1) The *Owner* and *Operator* shall ensure compliance with all the conditions of this *Approval* and shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of this *Approval* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Any person authorized to carry out work on or operate any aspect of the *Site* shall comply with the conditions of this *Approval.*

In Accordance

(3) 3.1 Except as otherwise provided for in this Approval, the Site shall be designed, developed, built, operated, and maintained in accordance with the documents listed in *Schedule "A"* of this Approval.

3.2 (1) Construction and installation of the aspects of the Site described in the most recent application in *Schedule "A* " must be completed within 5 years of the later of:

(a) the date this Approval is issued; or
(b) if there is a hearing or other litigation in respect of the issuance of this

Approval, the date that this hearing or litigation is disposed of, including all appeals.

(2) This Approval ceases to apply in respect of the aspects of the Site noted above that have not been constructed or installed before the later of the dates identified in Condition 3.2(1) above.

Interpretation

(4) Where there is a conflict between a provision of any document listed in *Schedule "A "* in this *Approval,* and the conditions of this *Approval,* the conditions in this *Approval* shall take precedence.

(5) Where there is a conflict between the application and a provision in any document listed in *Schedule "A"* , the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the *Ministry* approved the amendment.

(6) Where there is a conflict between any two documents listed in *Schedule "A "*, the document bearing the most recent date shall take precedence.

(7) The conditions of this *Approval* are severable. If any condition of this *Approval,* or the application of any condition of this *Approval* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Approval* shall not be affected thereby.

Other Legal Obligations

(8) The issuance of, and compliance with, this *Approval* does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or
(b) limit in any way the authority of the *Ministry* to require certain steps be taken or to require the *Owner* and *Operator* to furnish any further information related to compliance with this *Approval.*

Adverse Effect

(9) The *Owner* and *Operator* shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the *Site,* including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

(10) Despite an *Owner, Operator* or any other person fulfilling any obligations imposed by this *Approval* the person remains responsible for any contravention of any other

condition of this *Approval* or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

Change of Ownership

(11) The *Owner* shall notify the *Director,* in writing, and forward a copy of the notification to the *District Manager,* within 30 days of the occurrence of any changes in the following information:

(a) the ownership of the *Site;*
(b) the *Operator* of the *Site;*
(c) the address of the *Owner or Operator;* and
(d) the partners, where the *Owner or Operator* is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act* , R. S. O. 1990, c. B.17, shall be included in the notification.

(12) No portion of this *Site* shall be transferred or encumbered prior to or after closing of the *Site* unless the *Director* is notified in advance and sufficient financial assurance is deposited with the *Ministry* to ensure that these conditions will be carried out.

(13) In the event of any change in ownership of the *Site,* other than change to a successor municipality, the *Owner* shall notify the successor of and provide the successor with a copy of this *Approval,* and the *Owner* shall provide a copy of the notification to the *District Manager* and the *Director.*

Registration on Title Requirement

(14) Prior to dealing with the property in any way, the *Owner* shall provide a copy of this *Approval* and any amendments, to any person who will acquire an interest in the property as a result of the dealing.

(15) (a) If the *Site* is patented, the *Owner* shall, within three (3) years of receiving the patent for the land occupying the waste disposal site, submit to the *Director* a completed Certificate of Requirement which shall include:

(i) a plan of survey prepared, signed and sealed by an Ontario Land Surveyor, which shows the area of the *Site* where waste has been or is to be deposited at the *Site;*
(ii) proof of ownership of the *Site;*
(iii) a letter signed by a member of the Law Society of Upper Canada or other qualified legal practitioner acceptable to the *Director,* verifying the legal description provided in the Certificate of Requirement;
(iv) the legal abstract of the property; and
(v) any supporting documents including a registerable description of the *Site.*

(b) Within fifteen (15) calendar days of receiving a Certificate of Requirement authorized by the *Director,* the *Owner* shall:

(i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
(ii) submit to the *Director* and the District Manager, written verification that the Certificate of Requirement has been registered on title.

Registration on Title Requirement - Contaminant Attenuation Zone (CAZ)

(16) Within four (4) years from the date of this *Approval* , the Owner shall complete acquiring the ground water easement to the proposed contaminant attenuation zone and buffer lands.

(17) The *Owner* must continue to own the property rights to the Contaminant Attenuation Zone for all of the *contaminating life span* of the *Site.*

(18) The ownership of the property rights must include the right to:

(a) discharge contaminants from the operations at the Site into the Contaminant Attenuation Zone;
(b) enter into the Contaminant Attenuation Zone and onto the surface above the Contaminant Attenuation Zone for purposes of testing, monitoring, intercepting contaminants and carrying out remedial work;
(c) install, operate and maintain works, for the purposes mentioned in clause (b), in the Contaminant Attenuation Zone, including on the surface above the Contaminant Attenuation Zone; and
(d) prevent the owner(s) of the land(s) in which the Contaminant Attenuation Zone is located from paving, erecting a structure or making any use of land(s) above or in the vicinity of the contaminant attenuation zone that would interfere with the functioning of the Contaminant Attenuation Zone or with the exercise of any of the rights mentioned in this subsection.

(19) The *Owner* shall notify the *Director* in writing within thirty (30) days after any change in his, her or its ownership of the property rights in the Contaminant Attenuation Zone.

(20) The *Owner* shall ensure that the written easement agreement, specified in Condition (16) includes an agreement of the property owner(s) of the land(s) required for the Contaminant Attenuation Zone, to register a Certificate of Requirement on title to the land(s) to be used as the Contaminant Attenuation Zone.

(21) Within thirty (30) calendar days from the date of establishing a Contaminant Attenuation Zone (overburden and/or bedrock aquifers) in either fee simple or by way of a groundwater easement, the *Owner* shall submit to the *Director* a completed

Certificate of Requirement which shall include:

(a) If rights are obtained in fee simple, the *Owner* shall provide:

(i) documentation evidencing ownership of the CAZ obtained in compliance with *O.Reg. 232/98,* as amended;
(ii) a completed Certificate of Requirement and supporting documents containing a registerable description of the CAZ; and
(iii) a letter signed by a member of the Law Society of Upper Canada; or other qualified legal practitioner acceptable to the *Director,* verifying the legal description of the CAZ.

(b) Within fifteen (15) calendar days of receiving a Certificate of Requirement signed or authorized by the *Director,* the Owner shall:

(i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property; and
(ii) submit to the *Director* and the *District Manager,* written verification that the Certificate of Requirement has been registered on title.

(c) If rights are obtained by way of a groundwater easement, the Applicant shall:

(i) provide a copy of the easement;
(ii) provide a plan of survey signed and sealed by an Ontario Land Surveyor for the CAZ;
(ii) submit proof of registration on title of the groundwater easement to the *Director;*

(d) The *Owner* shall not amend or remove or consent to the removal of the easement or CAZ from title without the prior written consent of the *Director.*

Inspections by the Ministry

(22) No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA,* the *EPA,* the *PA,* the *SDWA* or the *NMA,* of any place to which this *Approval* relates, and without limiting the foregoing:

(a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Approval* are kept;
(b) to have access to, inspect, and copy any records required to be kept by the conditions of this *Approval;*
(c) to inspect the *Site,* related equipment and appurtenances;
(d) to inspect the practices, procedures, or operations required by the conditions of this *Approval;* and
(e) to sample and monitor for the purposes of assessing compliance with the terms

and conditions of this *Approval* or the *EPA,* the *OWRA,* the *PA,* the *SDWA* or the *NMA.*

Information and Record Retention

(23) (a) Except as authorized in writing by the *Director,* all records required by this *Approval* shall be retained at the *Site* for a minimum of two (2) years from their date of creation.

(b) The *Owner* shall retain all documentation listed in Schedule "A" for as long as this *Approval* is valid.

(c) All monthly summary reports of waste records collected are to be kept at the *Site* until they are included in the Annual Report.

(d) The *Owner* shall retain employee *training* records as long as the employee is working at the *Site.*

(e) The *Owner* shall make all of the above documents available for inspection upon request of *Ministry* staff.

(24) The receipt of any information by the *Ministry* or the failure of the *Ministry* to prosecute any person or to require any person to take any action under this *Approval* or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

(a) an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any term or condition of this *Approval* or any statute, regulation or other legal requirement; or

(b) acceptance by the *Ministry* of the information's completeness or accuracy.

(25) The *Owner* shall ensure that a copy of this *Approval,* in its entirety and including all its Notices of Amendment, and documentation listed in Schedule "A", are retained at the *Site* at all times.

(26) Any information related to this *Approval* and contained in *Ministry* files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, RSO 1990, CF-31.

2. SITE OPERATION

Operation

(1) The *Site* shall be operated and maintained at all times including management and disposal of all waste, in accordance with the *EPA, Reg.347,* and the conditions of this *Approval.* At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

Signs

(2) A sign shall be installed and maintained at the main entrance/exit to the *Site* which legibly display the following information:

(a) the name of the *Site* and *Owner;*
(b) the number of the *Approval;*
(c) the name of the *Operator;*
(d) the normal hours of operation;
(e) the allowable and prohibited waste types;
(f) the telephone number to which complaints may be directed;
(g) a warning against unauthorized access;
(h) a twenty-four (24) hour emergency telephone number (if different from above); and
(i) a warning against dumping outside the *Site.*

(3) The *Owner* shall install and maintain signs to direct vehicles to working face and waste recycling and transfer areas.

(4) The *Owner* shall provide signs at recycling and transfer area informing users what materials are acceptable and directing users to appropriate storage areas.

Vermin, Vectors, Dust, Litter, Odour, Noise and Traffic

(5) The *Site* shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

Burning Waste Prohibited

(6) (a) Burning of waste at the *Site* is prohibited.

(b) Notwithstanding Condition 2 (6) (a) above, burning of segregated, clean wood and brush at the landfill may be carried out in strict compliance with the Ministry of the Environment Document titled "Guideline C-7, Burning at Landfill Sites" dated April 1994.

Site Access

(7) Waste shall only be accepted during the following time periods:

Winter (Thanksgiving Day to Victoria Day)

Thursday	:	12:00 p.m. - 5:00 p.m.
Saturday & Sunday	:	12:00 p.m. - 5:00 p.m.

Summer (Victoria Day to Thanksgiving Day)

Thursday	:	12:00 p.m. - 5:00 p.m.

Saturday	:	07:00 a.m. - 12:00 p.m.
Sunday	:	02:00 p.m. - 7:00 p.m.

(8) On-site equipment used for daily site preparation and closing activities may be operated one (1) hour before and one (1) hour after the hours of operation approved by this *Approval*. Notwithstanding Condition 2(7), waste/recyclables materials present on Site can be removed for processing/disposal by a registered/licensed waste hauler from Monday to Friday, from 7 a.m. to 5 p.m.

(9) With the prior written approval from the *District Manager,* the time periods may be extended to accommodate seasonal or unusual quantities of waste.

Site Security

(10) No waste shall be received, landfilled or removed from the *Site* unless a site supervisor or an attendant is present and supervises the operations during operating hours. The *Site* shall be closed when a site attendant is not present to supervise landfilling operations.

(11) The *Site* shall be operated and maintained in a safe and secure manner. During non-operating hours, the *Site* entrance and exit gates shall be locked and the *Site* shall be secured against access by unauthorized persons.

(12) The Owner shall ensure that:

(a) access to the Site is restricted by fencing; and
(b) fencing and lockable gate are kept in good repair.

Operations - Transfer Station

13. The transfer station shall be designed, built, used and maintained in accordance with Item 5 of *Schedule "A"*.

14. The transfer station shall only accept municipal waste and recyclable materials generated within the boundaries of the municipal boundaries of the Town of Hastings Highlands.

15. All wastes and recyclable materials shall be managed and disposed in accordance with the Act and Reg. 347.

16. The Owner shall post a sign in a prominent location at the Site entrance which clearly states:

(a) the hours of operation of the transfer station;
(b) the types of waste which are accepted at the transfer station;

(c) the area serviced by the transfer station;
(d) Waste Management System requirements for commercial haulers;
(e) the Environmental Compliance Approval number of the Site;
(f) the Owner's name; and
(g) staff contact name and telephone number to call in the event of an emergency.

17. (a) The Owner shall ensure that a trained employee(s) is/are on duty at all times when the Site is open to ensure proper supervision of all activities; and
(b) Prior to being accepted at the Site, all incoming waste and recyclable materials shall be inspected by the trained employee and shall only be permitted to enter the Site if the Site is approved to accept that type of waste.

18. (a) The combined total amount of waste (excluding tires) and recyclable materials stored at the transfer station at any one time shall not exceed 100 tonnes per day.
(b) The total amount of tires stored at the transfer station at any one time shall not exceed 100 tire units.

(19) The *Owner* shall ensure that:

(a) all bins and waste storage areas are clearly labelled;
(b) all lids or doors on bins shall be kept closed during non-operating hours and during high wind events; and
(c) if necessary to prevent litter, waste storage areas shall be covered during high winds events.
(d) Tires shall be stockpiled in the following manner:

(i) individual stockpiles shall not exceed a volume of 300 m^3;
(ii) stockpiles shall be located a minimum of 15 metres from the property line and/or any buildings;
(iii) stockpiles shall be separated from each other and from other waste piles by a minimum of 6 metres; and
(iv) an area around stockpiles of no less than 4.5 metres shall be kept free of vegetation.

(20) The *Owner* shall transfer waste and recyclable materials from the *Site* as follows:

(a) recyclable materials shall be transferred off-site once their storage bins are full or when the maximum capacities listed in Condition 19 (a) or (b) have been reached.;
(b) scrap metal shall be transferred off-site at least twice a year;
(c) tires shall be transferred off-site as soon as a load for the contractor hired by the *Owner* has accumulated or as soon as the accumulated volume exceeds the storage capacity of its bunker; and
(d) immediately, in the event that waste is creating an odour or vector problem.

(21) The *Owner* shall notify the appropriate contractors that waste and recyclable wastes that are to be transferred off-site are ready for removal. Appropriate notice time, as determined by the contract shall be accommodated in the notification procedure.

(22) Collection, storage and transfer of Waste Electrical and Electronic Equipment shall be in accordance with the documents in the *Schedule "A"* . If there is any discrepancy between the guideline titled "Collection Site Organizing & Operating Waste Electrical and Electronic Equipment (WEEE) Guidebook" dated November 2012 as amended prepared by Ontario Electronic Stewardship and the documents in *Schedule "A"* , the guideline shall take precedence.

(23) The amount of *Leaf and Yard Waste* received at the *Site* shall not exceed 39 cubic meters per day between May and June and 16 cubic meter per day for rest of the year.

(24) Sealable and lockable bins shall be used to collect inadvertently left hazardous household or special waste (HHW). The storage and transfer of HHW shall be in such a way to protection health and safety of the public and the environment.

(25) The Owner shall conduct regular inspections, on a weekly basis at a minimum, to ensure that all equipment and facilities at the transfer station are operating in a manner that will not negatively impact the environment. Any deficiencies detected shall be promptly corrected. A written record shall be maintained at the transfer station which includes the following information:

(a) name and signature of trained employee(s) conducting the inspection;
(b) date and time of the inspection; and
(c) list of all deficiencies observed and description of remedial action(s) taken to correct observed deficiency including the date and time of the action(s).

26. The Owner shall maintain a log book at the transfer station which records the following information:

(a) date of record;
(b) quantities (m^3) and destination of each type of waste, including recyclable material, shipped from the transfer station; and
(c) complaints received, if any, including the nature of the complaint, time of complaint and action(s) taken to remediate the problem.

27. (a) The Owner shall submit, for approval by the Director, a detailed written Closure Plan six (6) months prior to the closure of the transfer station. This plan shall include, as a minimum, a description of the work that will be completed to facilitate closure of the transfer station and a schedule for the completion of that work; and

(b) Within ten (10) days following closure of the transfer station, the Owner shall notify the Director, in writing, that the transfer station is closed and that the Closure Plan has been implemented.

3. EMPLOYEE TRAINING

(1) A training plan for all employees that operate any aspect of the *Site* shall be developed and implemented by the *Owner* or the *Operator.* Only *Trained Personnel* shall operate any aspect of the *Site* or carry out any activity required under this *Approval* .

4. COMPLAINTS RESPONSE PROCEDURE

(1) If at any time the *Owner* receives complaints regarding the operation of the *Site,* the *Owner* shall respond to these complaints according to the following procedure:

(a) The *Owner* shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;
(b) The *Owner,* upon notification of the complaint, shall initiate appropriate steps to determine possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and
(c) The *Owner* shall complete and retain on-site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

5. EMERGENCY RESPONSE

(1) All Spills as defined in the *EPA* shall be immediately reported to the **Ministry's Spills Action Centre at 1-800-268-6060** and shall be recorded in the log book as to the nature of the emergency situation, and the action taken for clean-up, correction and prevention of future occurrences.

(2) In addition, the *Owner* shall submit, to the *District Manager* a written report within three (3) business days of the emergency situation, outlining the nature of the incident, remedial measures taken, handling of waste generated as a result of the emergency situation and the measures taken to prevent future occurrences at the *Site.*

(3) All wastes resulting from an emergency situation shall be managed and disposed of in accordance with *Reg. 347.*

(4) All equipment and materials required to handle the emergency situations shall be:

(a) kept on hand at all times that waste landfilling and/or handling is undertaken at the *Site;* and
(b) adequately maintained and kept in good repair.

(5) The *Owner* shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

6. INSPECTIONS, RECORD KEEPING AND REPORTING

Daily Log Book

(1) A daily log shall be maintained in written or electronic format and shall include the following information:
(a) the type, date and time of arrival, hauler, and quantity (tonnes) of all waste and cover material received at the *Site;*
(b) the area of the *Site* in which waste disposal operations are taking place;
(c) a record of litter collection activities and the application of any dust suppressants;
(d) a record of the daily inspections; and
(e) a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service.

(2) Any information requested, by the *Director* or a *Provincial Officer,* concerning the *Site* and its operation under this *Approval,* including but not limited to any records required to be kept by this *Approval* shall be provided to the *Ministry,* upon request.

Daily Inspections and Log Book

(3) An inspection of the entire *Site* and all equipment on the *Site* shall be conducted each day the *Site* is in operation to ensure that: the *Site* is secure; that the operation of the *Site* is not causing any nuisances; that the operation of the *Site* is not causing any adverse effects on the environment and that the *Site* is being operated in compliance with this *Approval.* Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the *Site* if needed**.**

(4) A record of the inspections shall be kept in a daily log book that includes:

(a) the name and signature of person that conducted the inspection;
(b) the date and time of the inspection;
(c) the list of any deficiencies discovered;
(d) the recommendations for remedial action; and
(e) the date, time and description of actions taken.

(5) A record shall be kept in the daily log book of all refusals of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

Annual Report

(6) A written report on the development, operation and monitoring of the *Site,* shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the *District Manager,* by March 31st of the year following the period being reported upon.

(7) The Annual Report shall include but not be limited to the following information:

(a) the results and an interpretive analysis of the results of all leachate, groundwater surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;
(b) an assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the *Site,* and the adequacy of and need to implement the contingency plans;
(c) site plans showing the existing contours of the *Site;* areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final cover, vegetative cover, and any intermediate cover application; facilities existing, added or removed during the reporting period; and site preparations and facilities planned for installation during the next reporting period;
(d) calculations of the volume of waste, weekly and intermediate cover, and final cover deposited or placed at the *Site* during the reporting period and a calculation of the total volume of *Site* capacity used during the reporting period;
(e) a calculation of the remaining capacity of the *Site* and an estimate of the remaining *Site* life;
(f) a summary of the weekly, maximum daily and total annual quantity (tonnes) of waste received at the *Site;*
(g) a summary of any complaints received and the responses made;
(h) a discussion of any operational problems encountered at the *Site* and corrective action taken;
(i) any changes to the Design and Operations Report and the Closure Plan that have been approved by the *Director* since the last *Annual Report;*
(j) a report on the status of all monitoring wells and a statement as to compliance with *Ontario Regulation 903;* and
(k) any other information with respect to the *Site* which the *District Manager* may require from time to time.

7. LANDFILL DESIGN AND DEVELOPMENT

Approved Waste Types

(1) Only municipal waste as defined under *Reg.* 347 being solid non-hazardous shall be accepted at the *Site* for landfilling.

(2) The *Owner* shall develop and implement a program to inspect waste to ensure that the waste received at the *Site* is of a type approved for acceptance under this *Approval.*

(3) The *Owner* shall ensure that all loads of waste are properly inspected by *Trained personnel* prior to acceptance at the *Site* and that the waste vehicles are directed to the appropriate areas for disposal or transfer of the waste. The *Owner* shall notify the *District Manager,* in writing, of load rejections at the *Site* within one (1) business day from their occurrence.

Capacity

(4) The calculated theoretical maximum volumetric capacity of the *Site,* consisting of the waste, daily cover and intermediate cover, but excluding the final cover is ***73,383*** cubic metres.

(5) This approval is for the design, operation and use of 73,383 cubic meters of the calculated theoretical maximum volumetric capacity of the *Site* as described in Item 1 of Schedule "A". This does not include the historical waste volume deposited below ground at the site.

(6) Within 2 years from the date of issuance of the Approval, the waste deposited outside the approved site boundary in the Phase I waste footprint area as shown on Figure 4 of the Design and Operations Plan, enclosed as Item 5 in *Schedule "A"* , shall be excavated and deposited within the Phase I approved fill area. The waste deposited outside the Phase 1 footprint area but within the site boundary can remain in-place.

Service Area

(7) Only waste that is generated within the geographical boundaries of the Municipality of the Hastings and Highland shall be accepted at the *Site.*

Cover

(8) Cover material shall be applied as follows:

(a) Weekly Cover - Weather permitting, deposited waste shall be covered every week in a manner acceptable to the *District Manager* so that no waste is exposed

to the atmosphere;

(b) Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 millimetre of soil cover or an approved thickness of alternative cover material shall be placed; and

(c) Final Cover - In areas where landfilling has been completed to final contours, a minimum 600 millimetre thick layer of soil of medium permeability and 150 millimetres of top soil (vegetative cover) shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours.

8. LANDFILL MONITORING

Landfill Gas

(1) The *Owner* shall ensure that any buildings or structures at the *Site* contain adequate ventilation systems to relieve any possible landfill gas accumulation to prevent methane concentration reaching the levels within its explosive range. Routine monitoring for explosive methane gas levels shall be conducted in all buildings or structures at the *Site,* especially enclosed structures which at times are occupied by people.

(2) The *Owner* shall construct at least two (2) dedicated landfill gas monitors at locations acceptable to the *District Manager* within 2 years of the anticipated closure of the Phase1 area and the landfill gas monitoring shall occur concurrently with the groundwater monitoring as outlined in Table E-2, *Schedule B* .

(3) The Owner shall ensure that all on-Site enclosed buildings are equipped with appropriate dedicated gas monitoring devices.

Leachate Monitoring

(4) The Owner shall construct one (1) dedicated leachate monitor within Phase 1 footprint area at location acceptable to the *District Manager* within *two years* of the issuance of the Approval.

(5) The leachate level and sampling and chemical testing shall occur concurrently with the groundwater monitoring as outlined in Table E-2, *of Schedule B* .

Surface Water and Groundwater

(6) The *Owner* shall monitor surface water and ground water in accordance with the monitoring program outlined in Table E-1: Annual (Spring & Fall) Surface Water Monitoring and Analysis and Table E-2: Annual (Spring & Fall) Groundwater Monitoring and Analysis, enclosed in *Schedule "B".*

(7) In addition to the groundwater chemical quality program specified in Condition 8 (6), the groundwater and leachate samples shall be tested for volatile organic compounds (VOCs) once per year in the Spring monitoring event. A depth to water level shall be recorded prior to sample collection at groundwater and leachate monitoring wells.

Groundwater Wells and Monitors

(8) The *Owner* shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.

(9) Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and the wells shall be properly re-secured.

(10) Any groundwater monitoring well included in the on-going monitoring program that is damaged shall be assessed, repaired, replaced or decommissioned by the *Owner,* as required.

(a) The *Owner* shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.

(b) All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the *Director* for abandonment, shall be decommissioned by the *Owner,* as required, in accordance with *O.Reg. 903,* to prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the Annual Report for the period during which the well was decommissioned.

Trigger Mechanisms and Contingency Plans

(11) (a) Trigger mechanisms shall be in accordance with Trigger Mechanisms Contingency Plan provided in Appendix H of the Design and Operations Plan, enclosed as Item 5 in *Schedule "A"* .

(b) Contingency plan in the event of a confirmed exceedance of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate shall be in accordance with Item 5 of *Schedule "A".*

(12) In the event of a confirmed exceedance of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate, the *Owner* shall immediately notify the *District Manager,* and an investigation into the cause and the need for implementation of remedial or contingency actions shall be carried out by the *Owner* in accordance with the approved trigger mechanisms and associated contingency plans.

(13) If monitoring results, investigative activities and/or trigger mechanisms indicate the need to implement contingency measures, the *Owner* shall ensure that the following steps are taken:

(a) The *Owner* shall notify the *District Manager,* in writing of the need to implement contingency measures, no later than 30 days after confirmation of the exceedances;
(b) Detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures shall be prepared and submitted by the *Owner* to the *Director* for approval; and
(c) The contingency measures shall be implemented by the *Owner* upon approval by the *Director* .

(14) The *Owner* shall ensure that any proposed changes to the site-specific trigger levels for leachate impacts to the surface water or groundwater, are approved in advance by the *Director* via an amendment to this *Approval.*

Changes to the Monitoring Plan

(15) The *Owner* may request to make changes to the monitoring program to the *District Manager* in accordance with the recommendations of the annual report. The *Owner* shall make clear reference to the proposed changes in a separate letter that shall accompany the annual report.

(16) Within thirty (30) days of receiving the written correspondence from the *District Manager* confirming that the *District Manager* is in agreement with the proposed changes to the environmental monitoring program, the *Owner* shall forward a letter identifying the proposed changes and a copy of the correspondences from the *District Manager* and all other correspondences and responses related to the changes to the monitoring program, to the *Director* requesting the *Approval* be amended to approve the proposed changes to the environmental monitoring plan prior to implementation.

(17) In the event any other changes to the environmental monitoring program are proposed outside of the recommendation of the annual report, the *Owner* shall follow current *Ministry* procedures for seeking approval for amending the *Approval.*

Compliance

(18) The *Site* shall be operated in such a way as to ensure compliance with the following:

(a) Reasonable Use Guideline B-7 for the protection of the groundwater at the *Site;* and
(b) Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives,* as amended from time to time or limits set by the *Regional*

Director, for the protection of the surface water at and off the *Site.*

9. CLOSURE PLAN

(1) At least 3 years prior to the anticipated date of closure of this *Site,* the *Owner* shall submit to the *Director* for approval, with copies to the *District Manager,* a detailed *Site* closure plan pertaining to the termination of landfilling operations at this *Site,* post-closure inspection, maintenance and monitoring, and end use. The plan shall include but not be limited to the following information:

(a) a plan showing *Site* appearance after closure;
(b) a description of the proposed end use of the *Site;*
(c) a description of the procedures for closure of the *Site,* including:
(i) advance notification of the public of the landfill closure;
(ii) posting of a sign at the *Site* entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
(iii) completion, inspection and maintenance of the final cover and landscaping;
(iv) *Site* security;
(v) removal of unnecessary landfill-related structures, buildings and facilities;
(vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas; and
(vii) a schedule indicating the time-period for implementing sub-conditions (i) to (vi) above;
(d) descriptions of the procedures for post-closure care of the *Site,* including:
(i) operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
(ii) record keeping and reporting; and
(iii) complaint contact and response procedures;
(e) an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas; and
(f) an updated estimate of the *contaminating life span* of the *Site,* based on the results of the monitoring programs to date.

(2) The *Site* shall be closed in accordance with the closure plan as approved by the *Director.*

Schedule "A"

1. Application for a Certificate of Approval for a Waste Disposal Site (Landfill) dated November 1, 1984 signed by Donald C. Bloom, Clerk-Treasurer and modified by correspondence of January 20, 1986, D. C. Bloom to Paul Moore, Ministry of the Environment.

2. Site Plan entitled “Drawing No. 1(A)” and conveyed to D. Graham, Ministry of the Environment, by correspondence of December 17, 1984 from D.C. Bloom, Clerk-Treasurer.

3. Application for Approval dated May 8, 2000, and supporting information and documentation prepared by Mr. Donald C. Bloom, Clerk-Treasurer of the Corporation of United Townships of Bangor, Wicklow and McClure, including letter dated May 26, 2000 with site plan.

4. Letter from the Corporation of the Municipality of Hastings Highlands, dated February 4, 2002, signed by Glenn Kargus, Manager of Transportation Services.

5. Environmental Compliance Approval Application dated September 25, 2020 and signed David Stewart, CAO, including the attached supporting documentation “Development and Operations Plan, Lake St. Peter Waste Disposal Site, Environmental Compliance Approval No.: A361116, BluMatric Environmental Inc., September 2020.

6. Email dated July 2, 2021, EA Amendment #1, letter dated June 30, 2021, prepared by BluMetric.

7. Email Response dated October 15, 2021, and supporting documentation prepared by BluMetric dated October 14, 2021, including an updated monitoring program.

Schedule "B"

Table E-1: Annual (Spring & Fall) Surface Water Monitoring and Analysis

Monitoring Locations	Category	Parameters
LSP-SW1, LSPSW2, LSP-DP1-21	Biological Parameters	Biological Oxygen Demand (BOD_5), Chemical Oxygen Demand (COD)
	Organic Parameters	Phenols
	Inorganic Parameters	Alkalinity, Chloride, Nitrite, Nitrate, Sulphate, Phosphorous (Total), Total Kjeldahl Nitrogen (TKN), Ammonia (N)-Total, Calcium, Aluminum (Dissolved), Arsenic, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Magnesium, Nickel, Potassium, Selenium, Silver, Sodium, Zinc, Lead, Barium, Beryllium, Molybdenum, Manganese, Mercury (dissolved), Silicon, Strontium, Thallium, Titanium, Vanadium
	Physical/Chemical Parameters	pH, Conductivity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Colour, Hardness ($CaCO_3$), Turbidity (NTU)

Table E-2: Annual (Spring & Fall) Groundwater Monitoring and Analysis

Monitoring Locations	Category	Parameters
LSP1-03, LSP2-03, LSP3-03, LSP4-19, LSP5-19	Organic Parameters	Dissolved Organic Carbon (DOC)
	Inorganic Parameters	Nitrate, Ammonia, Chloride, Major Ions (Sodium, Calcium, Magnesium, Sulphate, Alkalinity)
	Dissolved Metals	Iron, Boron, Barium, Manganese
Future Leachate Well (In Phase 1 Area)	Physical/Chemical Parameters	pH, Conductivity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS)

The reasons for the imposition of these terms and conditions are as follows:

1. *The reason for Conditions 1(1), (2), (4), (5), (6), (7), (8), (9), (10), (19) & (24) is to clarify the legal rights and responsibilities of the Owner and Operator under this Approval.*

2. *The reasons for Condition 1(3), 2(12), 2 (13), and 7 (8) are to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*

3. *The reasons for Condition 1(11) are to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.*

4. *The reasons for Condition 1(12) are to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Approval.*

5. *The reason for Condition 1(13) is to ensure that the successor is aware of its legal responsibilities.*

6. *The reasons for Conditions 1(14), (15), (16), (17), (18), (20) & (21) are that the Part II.1 Director is an individual with authority pursuant to Section 197 of the Environmental Protection Act to require registration on title and provide any person with an interest in property before dealing with the property in any way to give a copy of the Approval to any person who will acquire an interest in the property as a result of the dealing.*

7. *The reason for Condition 1(22) is to ensure that appropriate Ministry staff has ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Approval. This Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Act, the OWRA, the PA, the NMA and the SDWA.*

8. *The reason for Condition 1 (23), 1(25), 2 (25), and 2(26) is to ensure that accurate waste records and approval documents are maintained to ensure compliance with the conditions in this Approval, the EPA and its regulations.*

9. *Condition 1 (26) has been included to clarify what information may be subject to the Freedom of Information Act.*

10. *The reasons for Conditions 2(1), 2 (3), 2(5), 2(19), 2(20), 2 (21), and 6(3) are to ensure that the Site is operated, inspected and maintained in an environmentally acceptable*

manner and does not result in a hazard or nuisance to the natural environment or any person.

11. *The reason for Condition 2(15) is to ensure that waste is transported to and from the Site in accordance with Reg. 347.*

12. *The reason for Conditions 2 (2), 2(4), and 2(16) is to ensure that users of the Site are fully aware of important information and restrictions related to Site operations and access under this Approval.*

13. *The reasons for Condition 2(6) (a), and (b) are open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance effects, and the potential fire hazard and to make sure burning of brush and wood are carried out in accordance with Ministry guidelines.*

14. *The reasons for Condition 2(7), 2(8), and 2(9) are to specify the hours of operation for the landfill site and a mechanism for amendment of the hours of operation, as required.*

15. *The reasons for Condition 2(10), 2(11), 2(17), 2(18), 3(1) are to ensure that the Site is supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.*

16. *The reasons for Conditions 2(13), 2(18), 2(22) and 2(23) are to specify the approved areas from which waste may be accepted at the Site and the types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.*

17. *The reason for Conditions 2(19), 2(20) and 2(24) is to ensure the waste storage and diversion is done in a manner and duration which does not result in a nuisance or a hazard to the health and safety of the environment or people and restrictions related to Site operations and access under this ECA.*

18. *The reason for Condition 3(1) is to ensure that the Site is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.*

18. *The reason for Condition 4(1) is to ensure that any complaints regarding landfill operations at this Site are responded to in a timely and efficient manner.*

19. *Conditions 5(1) through 5(5) are included to ensure that emergency situations are handled in a manner to minimize the likelihood of an adverse effect and to ensure public health and safety and environmental protection.*

20. The reason for Conditions 6(1) and 6(2) is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the EPA and its regulations.

21. The reason for Conditions 6(4) and 6(5) is to ensure that detailed records of Site inspections are recorded and maintained for inspection and information purposes.

22. The reasons for Conditions 6(6) and 6(7) are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.

23. The reason for Conditions 7(1) to 7(7) inclusive is to specify the approved areas from which waste may be accepted at the Site and the types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.

24. The reasons for Condition 7(8) are to ensure that weekly and intermediate cover are used to control potential nuisance effects, to facilitate vehicle access on the Site, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the Site.

25. The reasons for Condition 8(1), 8(2) and 8(3) are to ensure that off-site migration of landfill gas is monitored and all buildings at the Site are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the Site.

26. Conditions 8(4) to 8(7) and 8(18) are included to specify the leachate, groundwater and surface water monitoring requirements for monitoring leachate, groundwater and surface water quality and to require the Owner to demonstrate that the Site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.

27. Conditions 8(8) to 8(10) are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.

28. Conditions 8(11) to 8(14) are added to ensure the Owner has a plan with an organized set of procedures for identifying and responding to potential issues relating to groundwater and surface water contamination at the Site's compliance point.

29. *The reasons for Conditions 8(15) to 8(17) are included to streamline the approval of the changes to the monitoring plan.*

30. *The reasons for Condition 9(1), 9(2) and 2(27) are to ensure that final closure of the Site is completed in an aesthetically pleasing manner, in accordance with Ministry standards, and to ensure the long-term protection of the health and safety of the public and the environment.*

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A361116 issued on April 3, 1986

In accordance with Section 139 of the *Environmental Protection Act,* you may by written notice served upon me and the Ontario Land Tribunal within 15 days after receipt of this notice, require a hearing by the Tribunal. Section 142 of the *Environmental Protection Act* provides that the notice requiring the hearing ("the Notice") shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the *Environmental Protection Act,* a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

Registrar*
Ontario Land Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5
OLT.Registrar@ontario.ca

and

The Director appointed for the purposes of Part II.1 of the *Environmental Protection Act*
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Ontario Land Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349 or 1 (866) 448-2248, or www.oltt.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the *Environmental Protection Act.*

DATED AT TORONTO this 25th day of October, 2021

Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

AQ/
c: Area Manager, MECP Belleville
c: District Manager, MECP Kingston - District
Iris O'Connor, BlueMetric Environmental Inc.

Appendix B

Monitoring and Screening Checklist (MECP/MOE)

Appendix D-Monitoring and Screening Checklist
General Information and Instructions

General Information: The checklist is to be completed, and submitted with the Monitoring Report.
Instructions: A complete checklist consists of:
(a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
(b) completed contact information for the Competent Environmental Practitioner (CEP)
(c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

Definition of Groundwater CEP:
For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:
(a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
(b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..
Definition of Surface water CEP:
A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

Monitoring Report and Site Information	
Waste Disposal Site Name	Lake St. Peter Waste Disposal Site
Location (e.g. street address, lot, concession)	2825 Hwy. 127
GPS Location (taken within the property boundary at front gate/ front entry)	731681 m E, 5022608 m N
Municipality	Municipality of Hasting Highlands (formerly McClure)
Client and/or Site Owner	The Corporation of the Municipality of Hasting Highlands
Monitoring Period (Year)	2023
This Monitoring Report is being submitted under the following:	
Environmental Compliance Approval Number:	A 361116
Director's Order No.:	
Provincial Officer's Order No.:	
Other:	

Report Submission Frequency	◉ **Annual** ○ **Other**	Required to be submitted to MECP, on March 31st following reporting year.	
The site is: **(Operation Status)**	◉ **Open** ○ **Inactive** ○ **Closed**		
Does your Site have a Total Approved Capacity?	◉ **Yes** ○ **No**		
If yes, please specify Total Approved Capacity	73,383	*Units*	Cubic Metres
Does your Site have a Maximum Approved Fill Rate?	○ **Yes** ◉ **No**		
If yes, please specify Maximum Approved Fill Rate		*Units*	
Total Waste Received within Monitoring Period (Year)	623	*Units*	Cubic Metres
Total Waste Received within Monitoring Period (Year) *Methodology*	Estimated		
Estimated Remaining Capacity	68,866	*Units*	Cubic Metres
Estimated Remaining Capacity *Methodology*	Aerial Photogrammetry		
Estimated Remaining Capacity *Date Last Determined*	31-12-2023		
Non-Hazardous Approved Waste Types	☒ Domestic ☒ Industrial, Commercial & Institutional (IC&I) ☐ Source Separated Organics (Green Bin) ☒ Tires	☒ Contaminated Soil ☒ Wood Waste ☒ Blue Box Material ☐ Processed Organics ☒ Leaf and Yard Waste	☐ Food Processing/Preparation Operations Waste ☐ Hauled Sewage Other:
Subject Waste Approved Waste Classes: Hazardous & Liquid Industrial *(separate waste classes by comma)*			
Year Site Opened *(enter the Calendar Year only)*		**Current ECA Issue Date**	10/25/2021
Is your Site required to submit Financial Assurance?		○ **Yes** ◉ **No**	
Describe how your Landfill is designed.		◉ Natural Attenuation only ○ Fully engineered Facility ○ Partially engineered Facility	
Does your Site have an approved Contaminant Attenuation Zone?		○ **Yes** ◉ **No**	

If closed, specify C of A, control or authorizing document closure date:	

Has the nature of the operations at the site changed during this monitoring period?	○ **Yes** ◉ **No**
If yes, provide details:	
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i.e. exceeded the LEL for methane)	○ Yes ◉ No

Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	◉ **Yes** ○ **No**	All wells in good condition. Two additional groundwater monitoring wells were installed in September 2023 along the eastern limit of the proposed CAZ to assess compliance and to be used as the groundwater trigger assessment point. One additional leachate well was installed in the Phase 1 footprint area in September 2023.
2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document (s):	◉ **Yes** ○ **No** ○ **Not Applicable**	If no, list exceptions below or attach information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**

3) a) Is landfill gas being monitored or controlled at the site?	◉ **Yes** ○ **No**	
If yes to 3(a), please answer the next two questions below.		
b) Have any measurements been taken since the last reporting period that indicate landfill gas is present in the subsurface at levels exceeding criteria established for the site?	○ **Yes** ◉ **No**	
c) Has the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	◉ **Yes** ○ **No** ○ **Not Applicable**	If no, list exceptions below or attach additional information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**

4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ○ **No**	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.	○ **Yes** ◉ **No**	Land transaction process is ongoing.	
6) The site meets compliance and assessment criteria.	○ **Yes** ◉ **No**	The site is not in compliance with Guideline B-7 along the eastern property boundary.	
7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	◉ **Yes** ○ **No**	Typical fluctuations.	
1) Is one or more of the following risk reduction practices in place at the site: ***(a)*** **There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/ treatment; or** ***(b)*** **There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or** ***(c)*** **The site meets the following two conditions (typically achieved after 15 years or longer of site operation):** ***i.*** **The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and** ***ii.*** **Seasonal and annual water levels and water quality fluctuations are well understood.**	○ **Yes** ◉ **No**	**Note which practice(s):**	☐ **(a)** ☐ **(b)** ☐ **(c)**
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	○ **Yes** ◉ **No** ○ **Not Applicable**	The groundwater trigger assessment plan was implemented during the fall event following the installation of both wells along the eastern CAZ boundary acting as the assessment points . No exceedances of the trigger parameters were reported.	

Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

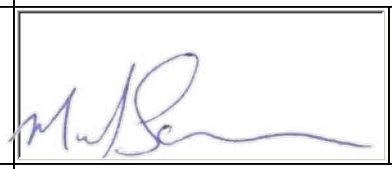
I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

◉ **No changes to the monitoring program are recommended** ○ **The following change(s) to the monitoring program is/are recommended:**	
◉ **No Changes to site design and operation are recommended** ○ **The following change(s) to the site design and operation is/ are recommended:**	

Name:	Mark Somers, M.Eng., P.Eng.		
Seal:			
Signature:		**Date:**	25-Mar-2024
CEP Contact Information:	Mark Somers, M.Eng., P.Eng.		
Company:	BluMetric Environmental Inc.		
Address:	1682 Woodward Dr, Ottawa, ON		
Telephone No.:	877-487-8436 x246	Fax No. :	
E-mail Address:	msomers@blumetric.ca		
Co-signers for additional expertise provided:			
Signature:		**Date:**	
Signature:		**Date:**	

Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s)	Unnamed Lake, Boulter Lake, Lake St. Peter
Distance(s)	Approximately 500 m to the northeast, 900 m to the south, 900 m to the southeast.

Based on all available information and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	(●) Yes ( ) No	
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):	(●) Yes ( ) No ( ) **Not applicable (No C of A, authorizing / control document applies)**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.	○ **Yes** ◉ **No** ○ **Not Applicable**	
b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:	○ **Yes** ○ **No** ◉ **Not Applicable**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**

4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ○ **No**	

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):	○ **Yes** ◉ **No**

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below or provide details in an attachment:

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
Dissolved Aluminum (SW1)	0.075 mg/L (PWQO)	0.15 mg/L, 200% above PWQO
Dissolved Aluminum (SW2)	0.075 mg/L (PWQO)	0.124 mg/L, 165.33% above PWQO
Lead (SW2)	0.001 mg/L (PWQO)	0.002 mg/L, 200% above PWQO
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	◉ **Yes** ○ **No**	No MECP Table A and Table B exceedances were reported in 2023. Dissolved aluminum is considered to be naturally occurring at the site, therefore the only PWQO exceedance that is likely due to landfill impacts is lead at SW2.

7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.	(●) **Yes** ( ) **No**	Stable, typical fluctuations.
8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):	(●) Yes ( ) No ( ) Not Known ( ) Not Applicable	Groundwater samples are compared against the PWQO criteria and some exceedances are present. However, groundwater and surface water interaction was determined to be unlikely. The surface water concentrations recorded during 2023 do not reflect groundwater discharge.
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	(●) **Yes** ( ) **No** ( ) **Not Applicable**	Toxicity sampling was carried out in the spring and the fall of 2023 following three trigger exceedances for two consecutive sampling periods at LSP-DP-1-21. The test results indicated the percent mortality for Daphnia Magna and Rainbow Trout to be 0 % for both sampling events.

Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

◉ **No Changes to the monitoring program are recommended** ○ **The following change(s) to the monitoring program is/are recommended:**	
◉ **No changes to the site design and operation are recommended** ○ **The following change(s) to the site design and operation is/are recommended:**	

CEP Signature	
Relevant Discipline	Senior Environmental Engineer
Date:	25-Mar-2024
CEP Contact Information:	Mark Somers, M.Eng., P.Eng.
Company:	BluMetric Environmental Inc.
Address:	1682 Woodward Dr, Ottawa, ON
Telephone No.:	877-487-8436 x246
Fax No. :	
E-mail Address:	msomers@blumetric.ca

Save As		**Print Form**

Appendix C

Monitoring Well Logs

Project No: KB1946-4

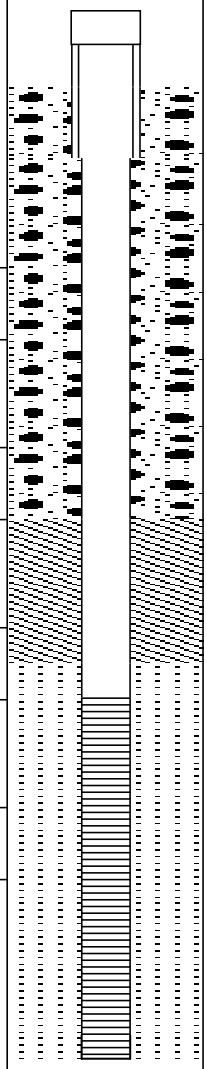
Project: Lake St. Peter WDS

Client: Municipality of Hastings Highlands

Site Coordinates: Zone 17 T North 5022641, East 731481

Log of Borehole: LSP1-03

Field Personnel: B. M.

SUBSURFACE PROFILE				SAMPLE				WELL INSTALLATION	
Depth (ft / m)	Elevation	Symbol	Description	Number	Type	SPT N-Value	Recovery	Well Construction	Comments
0 / 0	98.87		Ground Surface						Steel locking protective cover and casing Stick-up: 0.65m
0 / 0			Brown SAND, trace gravel, dry.						
3 / 1									51mm (2") I.D. Sch. 40 PVC pipe
6 / 2				SS1	SS	27	14"		Native backfill
10 / 3	95.82		Brown SAND, moist.	SS2	SS	13	15"		
13 / 4	94.30		Brown SAND, wet.	SS3	SS	14			3/8" Bentonite holeplug #3 Silica sand pack
19 / 6	92.77		Brown SAND, saturated.	SS4	SS	9	16"		
23 / 7									10' Slot 10 PVC screen (2")
26 / 8	90.64		End of Borehole						

Drill Method: 8" Hollow Stem Auger

Hole Size: 8" (205mm)

Drill Date: July 24/03

Datum: Elevation TPVC - 99.519 m

Checked by:

Sheet: 1 of 1

Project No: KB1946-4

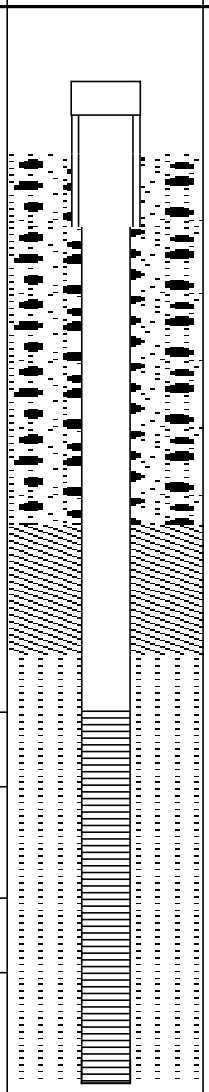
Project: Lake St. Peter WDS

Client: Municipality of Hastings Highlands

Site Coordinates: Zone 17 T North 5022752, East 731383

Log of Borehole: LSP2-03

Field Personnel: B. M.

SUBSURFACE PROFILE				SAMPLE				WELL INSTALLATION	
Depth (ft / m)	Elevation	Symbol	Description	Number	Type	SPT N-Value	Recovery	Well Construction	Comments
0 / 0	98.89		Ground Surface						Steel locking protective cover and casing Stick-up: 0.65m
0 – 10 / 0 – 3	95.84		Brown SAND, trace gravel, dry.						51mm (2") I.D. Sch. 40 PVC pipe Native backfill
10 – 13 / 3 – 4	94.92		Brown SAND, wet.						3/8" Bentonite holeplug
13 – 15 / 4	94.31		Brown SAND with Gravel and Cobbles, wet.						#3 Silica sand pack
15 – 20 / 4 – 6	92.79		Brown SAND and GRAVEL, saturated.	SS1	SS	24	12"		
20 – 25 / 6 – 7	91.27		Brown, SAND, saturated.	SS2	SS	25	24"		10' Slot 10 PVC screen (2")
25 / 7			End of Borehole						

Drill Method: 8" Hollow Stem Auger

Hole Size: 8" (205mm)

Drill Date: July 24/03

Datum: Elevation TPVC - 99.535 m

Checked by:

Sheet: 1 of 1

Project No: KB1946-4

Project: Lake St. Peter WDS

Client: Municipality of Hastings Highlands

Site Coordinates: Zone 17 T North 5022671, East 731462

Log of Borehole: LSP3-03

Field Personnel: B. M.

SUBSURFACE PROFILE				SAMPLE				WELL INSTALLATION	
Depth (ft / m)	Elevation	Symbol	Description	Number	Type	SPT N-Value	Recovery	Well Construction	Comments
0 / 0	98.73		Ground Surface						Steel locking protective cover and casing Stick-up: 0.72m
0 – 3 / 0 – 1			Brown SAND, trace gravel, dry.						51mm (2") I.D. Sch. 40 PVC pipe Native backfill
10 / 3	95.68		Brown SAND, moist.	SS1	SS	14	15"		
15 / 4	94.16		Brown SAND, saturated.	SS2	SS	10			3/8" Bentonite holeplug #3 Silica sand pack
20 / 6	92.63		Brown SAND, saturated.						10' Slot 10 PVC screen (2")
25 / 7	91.11		End of Borehole						

Drill Method: 8" Hollow Stem Auger

Hole Size: 8" (205mm)

Drill Date: July 24/03

Datum: Elevation TPVC - 99.447 m

Checked by:

Sheet: 1 of 1

Well ID: LSP4-19

Project No.: 190495-02
Client: Municipality of Hastings Highlands
Report: 2019 Monitoring Well Installations
Site Address: Lake St. Peter W.D.S.
2825 Hwy 127, Maynooth, Ontario

Elevation Ground: *411.76 m*
TOP: *412.55 m*

UTM NAD83 (Zone 18T): 5022665 N
731554 E

Depth (m)	Description	Depth (m) / Elev. (m.a.s.l.)	Notes
	Ground Surface	0.00 / 411.76	4 in. sq. steel monument with lock PVC Stickup = 0.79m
0–2	**Sand and Gravel** Light brown, dry.		backfilled with drill cuttings
2		2.13 / 409.63	
2–9	**Sand** Light brown to grey brown, dry. - trace gravel, light brown grey, dry. - 5.64m wet. - saturated.		bentonite gravel seal 3.05 x 50mm slot 10 PVC screen within No. 2 silica sand pack
9		9.14 / 402.62	native soil collaspe
9	End of well at 9.14 m		
	Well Completion Details: Screened interval from 5.94 m to 9.00 m below surface Elevation at top of pipe (TOP) = 412.55 m		

SUBSURFACE PROFILE | SAMPLE | WELL COMPLETION

Sample ID | Type | Blow Counts | Recovery (%) | Lab Analysis | Headspace Vapour Level (ppm) 10 100 1000 10000 | Construction

Drill Date: 2019 July 16
Drilled By: Canadian Environmental Drilling
Drilling Method: Hollow Stem Auger
Hole Diameter: 0.2 m (OD)
Datum: LSP-BM2 413.57 m
Logged By: B.M.
Checked By: I.O'C.

Notes: AUGER SAMPLE

Sheet 1 of 1

BH MW OB LOGV1.0 190495-02 LAKE ST. PETER.GPJ WESA TEMPLATE V1.2.GDT 20-3-5

Well ID: LSP5-19

Project No.: 190495-02
Client: Municipality of Hastings Highlands
Report: 2019 Monitoring Well Installations
Site Address: Lake St. Peter W.D.S.
2825 Hwy 127, Maynooth, Ontario

Elevation Ground: *412.02 m*
TOP: *412.76 m*
MOECC Well Tag: A259053
UTM NAD83 (Zone 18T): 5022610 N
731498 E

Depth (m)	Symbol	Description	Depth (m) / Elev. (m.a.s.l.)	Sample ID	Type	Blow Counts	Recovery (%)	Lab Analysis	Headspace Vapour Level (ppm) 10 100 1000 10000	Construction	Notes
											4 in. sq. steel monument with lock PVC Stickup = 0.79m
0		Ground Surface	0.00 412.02								
		Sand and Gravel Light brown, dry, coarser 2.13m.									backfilled with drill cuttings
1											
2											bentonite gravel seal
3		- brown, dry									
4											
		- coarser gravel 5.18m, wet.									
5											
6											3.05m x 50mm slot 10 PVC screen within No. 2 silica sand pack
7			7.62 404.40								
		Sand Brown, some coarse gravel and cobbles.									
8		Auger refusal	8.23 403.79								native soil collaspe
		End of well at 8.23 m									
		Well Completion Details: Screened interval from 4.88 m to 7.92 m below surface Elevation at top of pipe (TOP) = 412.76 m									
9											

Drill Date: 2019 July 16
Drilled By: Canadian Environmental Drilling
Drilling Method: Hollow Stem Auger
Hole Diameter: 0.2 m (OD)
Datum: LSP-BM2 413.57 m
Logged By: B.M.
Checked By: I.O'C.

Notes: AUGER SAMPLE

Sheet 1 of 1

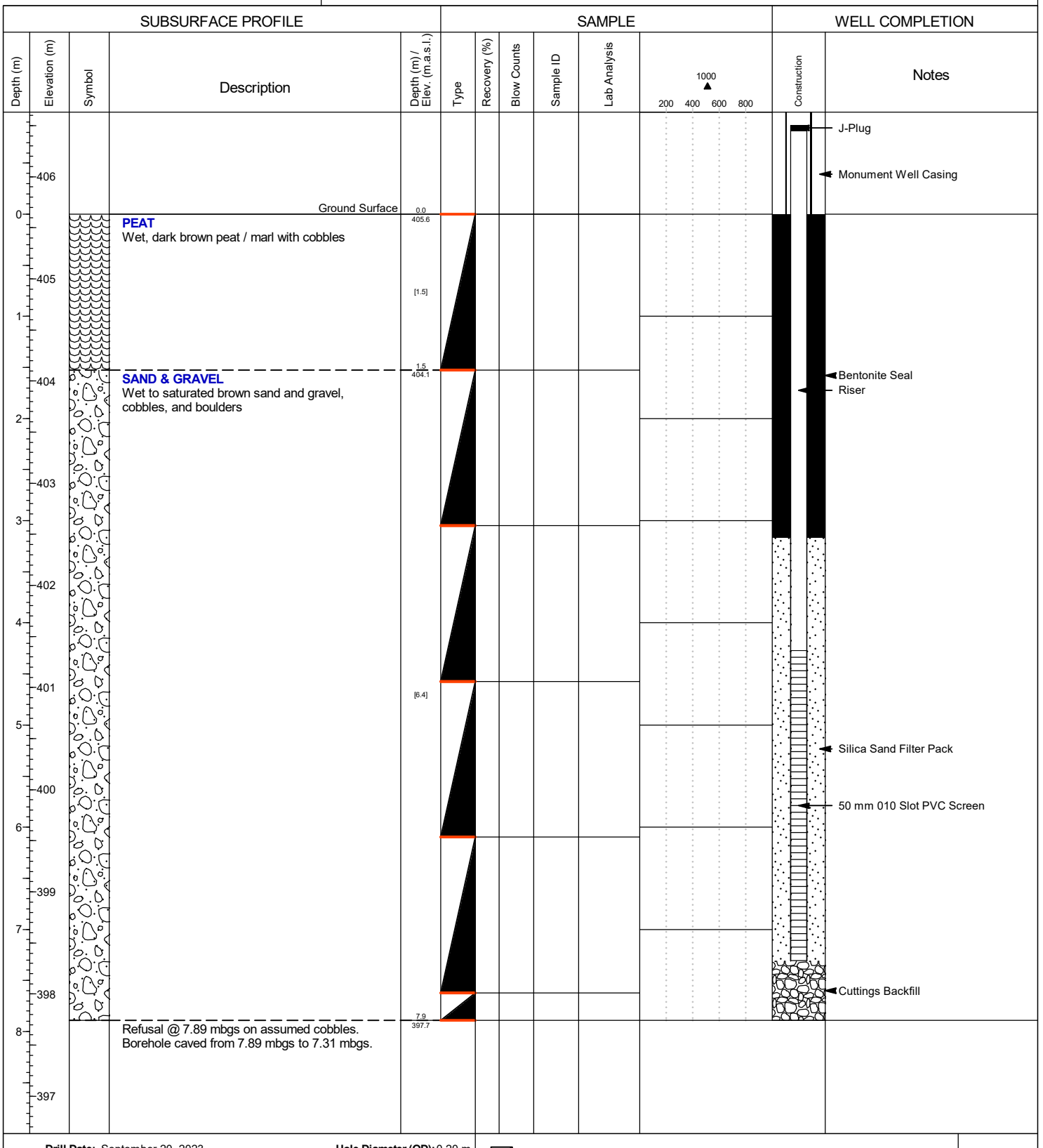
BH MW OB LOGV1.0 190495-02 LAKE ST. PETER.GPJ WESA TEMPLATE V1.2.GDT 20-3-5

Monitoring Well ID: LSP6-23

Project No.: 230226
Client: MHH
Report: Lake St. Peter WDS
Site Address: Lake St. Peter
Ontario

Elevation Ground: *405.63 m*
TOP: *406.53 m*

UTM NAD 83 (Zone 17): 5022808.037 N
731621.085 E



Drill Date: September 20, 2023
Drilled By: Canadian Environmental
Drilling Method: Hollow Stem Auger

Hole Diameter (OD): 0.20 m
Logged By: BM
Checked By: CM

AUGER SAMPLE
Perched Groundwater Strike / Unstabilized Groundwater Level
True Groundwater Strike / Stabilized Groundwater Level

BH MW OB LOG 230226 - LSP UPDATED.GPJ BLUMETRIC STANDARD.GDT 2/1/24

Monitoring Well ID: LSP7-23

Project No.: 230226
Client: MHH
Report: Lake St. Peter WDS
Site Address: Lake St. Peter
Ontario

Elevation Ground: *408.10 m*
TOP: *408.93 m*

UTM NAD 83 (Zone 17): 5022708.627 N
731657.332 E

SUBSURFACE PROFILE | SAMPLE | WELL COMPLETION

Depth (m)	Elevation (m)	Description	Depth (m) / Elev. (m.a.s.l.)
0	409	Ground Surface	0.0
	408	**SAND & GRAVEL** Dry, brown sand and gravel	408.1
1	407		[1.5]
			1.5 / 406.6
2	406	**SAND & GRAVEL** Moist to wet, orange / brown sand and gravel	
3	405		
4	404		[4.6]
5	403		
6	402		6.1 / 402.0
		SAND & GRAVEL Brown sand and gravel	
7	401		[2.3]
8	400		8.4 / 399.7
		Refusal @ 8.38 mbgs at assumed cobbles/boulders. Target depth achieved.	
9	399		

Sample columns: Type | Recovery (%) | Blow Counts | Sample ID | Lab Analysis | 1000 (200 400 600 800)

Well completion: Construction | Notes

- J-Plug
- Monument Well Casing
- Native Backfill
- Riser
- Bentonite Seal
- Silica Sand Filter Pack
- 50 mm 010 Slot PVC Screen

Drill Date: September 20, 2023
Drilled By: Canadian Environmental
Drilling Method: Hollow Stem Auger
Hole Diameter (OD): 0.20 m
Logged By: BM
Checked By: CM

AUGER SAMPLE
Perched Groundwater Strike / Unstabilized Groundwater Level
True Groundwater Strike / Stabilized Groundwater Level

Sheet 1 of 1

BH MW OB LOG 230226 - LSP UPDATED.GPJ BLUMETRIC STANDARD.GDT 2/1/24

Monitoring Well ID: LSP8-23

Project No.: 230226
Client: MHH
Report: Lake St. Peter WDS
Site Address: Lake St. Peter
Ontario

Elevation Ground: *412.59 m*
TOP: *413.68 m*

UTM NAD 83 (Zone 17): 5022716.692 N
731450.743 E

Depth (m)	Elevation (m)	Description	Depth (m) / Elev. (m.a.s.l.)
		Ground Surface	0.0
0	412	**WASTE MATERIAL** Dry to moist, brown / black sand and gravel mixed with garbage - plastics, fabric, metal	412.6 [1.5]
1	411		1.5
		SAND & GRAVEL Moist to wet, brown sand and gravel with cobbles	411.1
2	410		
3	409		
4	408		
5	407		[7.6]
6	406		
7	405	Saturated	
8	404		
9	403		9.1 403.4
		EOH @ 9.14 mbgs. Target depth achieved in saturated conditions. MOE Tag # A361478	

SAMPLE: Type | Recovery (%) | Blow Counts | Sample ID | Lab Analysis | 1000 (200 400 600 800)

WELL COMPLETION: Construction | Notes

- J-Plug
- Monument Well Casing
- Cave/Native Backfill
- Riser
- Bentonite Seal
- Silica Sand Filter Pack
- 50 mm 010 Slot PVC Screen

Drill Date: September 21, 2023
Drilled By: Canadian Environmental
Drilling Method: Hollow Stem Auger
Hole Diameter (OD): 0.20 m
Logged By: BM
Checked By: CM

AUGER SAMPLE
Perched Groundwater Strike / Unstabilized Groundwater Level
True Groundwater Strike / Stabilized Groundwater Level

Appendix D

D-1 Field Inspection Forms

SMALL LANDFILL
OPERATION AND INSPECTION FORM

BluMetric Environmental

Site Name: Lake St. Peter WDS, MHHs	Date: 230225-04	Weather Conditions:
Project #: May 4, 2023	BluMetric Staff: BM/MD	Overcast 7°c

Photographs of each item below should be collected during site visits.

OVERALL INSPECTION AND OPERATION REVIEW

❑	Signage in good condition	Yes ✓	No _
❑	ECA and emergency numbers on signage	Yes ✓	No _
❑	Hour of operation observed	Yes ✓	No _
❑	Site open under normal operating hours	Yes ✓	No _
❑	Perimeter fencing and gate in good condition	Yes ✓	No _
❑	Gate locked if closed	Yes ✓	No _

DESIGNATED WASTE AREA

❑	Working active/trench area (moderate size, daily cover, compacted)	Yes _	No ✓
❑	Designated waste areas are properly signed and easily accessed by public	Yes ✓	No _

RECYCLING OPERATION (if applicable)

Spring cover / cells not complete yet

❑	Proper signage and bins present	Yes ✓	No _
❑	Clearly signed	Yes ✓	No _
❑	Overall neat in appearance	Yes ✓	No _

Large open area of garbage

SEGREGATED SCRAP PILES (metal, tires, brush, etc.)

Blown plastics around site and in SW location

❑	Metals neat and appropriate size	Yes ✓	No _
❑	Tires neat and appropriate size	Yes ✓	No _
❑	Bulky Items neat and appropriate size	Yes ✓	No _
❑	Brush pile neat and appropriate size	Yes ✓	No _
❑	Construction debris neat and appropriate size	Yes _	No _

NA ✓

MONITORING WELL CONDITION

❑	Casing conditions (frost heave, lock, cap)	Yes ✓	No _
❑	Monitor condition (capped, vented)	Yes ✓	No _
❑	Wells clearly labeled (re-label as required)	Yes ✓	No _
❑	Well clearly visible (clear brush if necessary)	Yes ✓	No _

LANDFILL GAS MONITORING

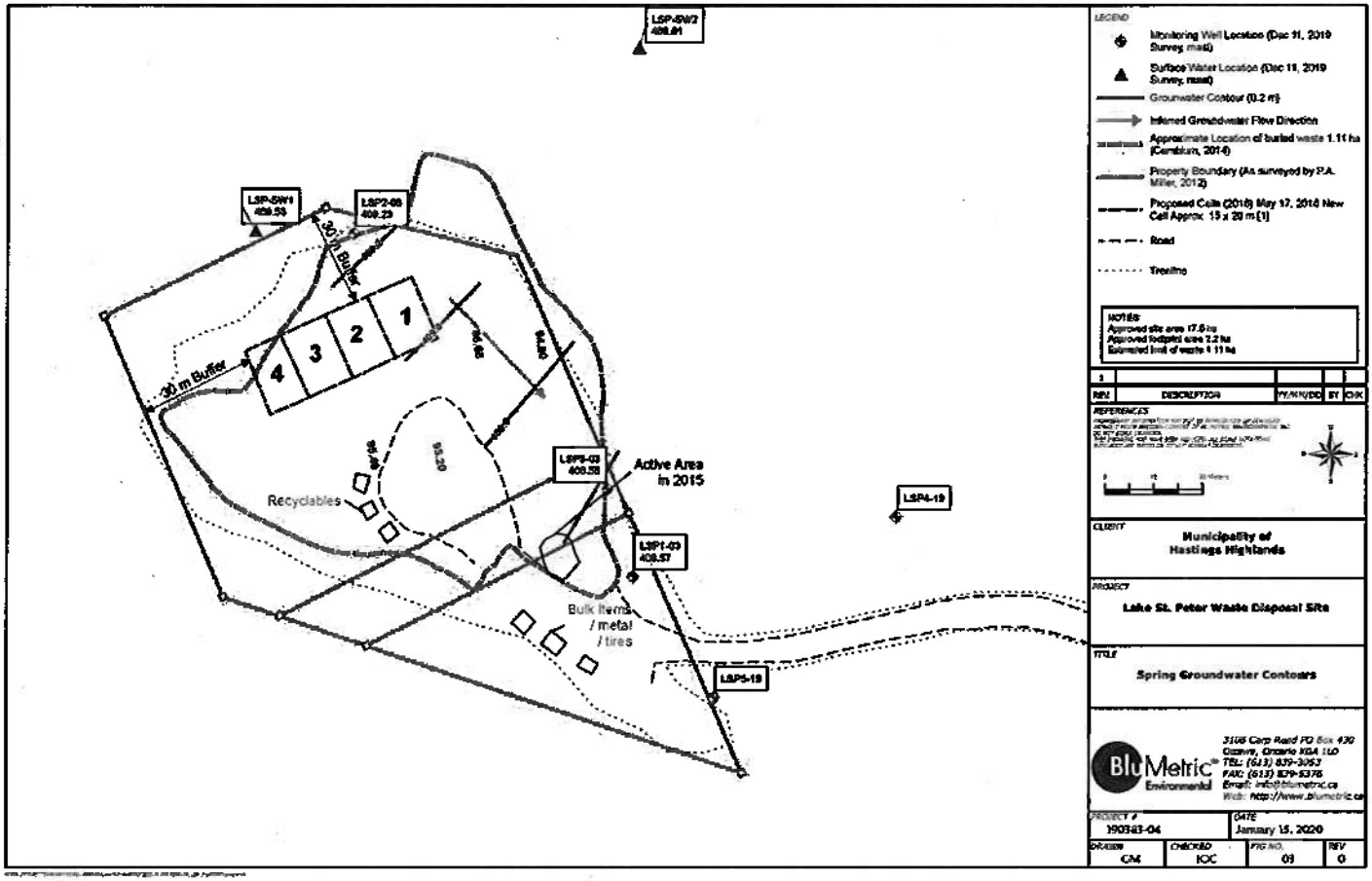
Attendant Building 15ppm

❑	Conducted at structures	Yes ✓	No _
❑	Conducted at monitoring wells	Yes ✓	No _

REPAIRS: Provide details of repairs made or materials required for repairs upon next site visit:

OBSERVATIONS OF PHYSICAL ENVIRONMENT: Please comment on any changes to the local environment (e.g. settling or slumping of waste/cover, new or altered drainage, presence of seeps, changes in vegetation cover, etc.)

This form is intended as a general reminder of information that should recorded during monitoring activities. The above information is a minimum guide. Any information deemed important should be recorded in the field notes for each site.



Identify any changes to site layout on drawing and/or comment:

This form is intended as a general reminder of information that should recorded during monitoring activities. The above information is a minimum guide. Any information deemed important should be recorded in the field notes for each site.

SMALL LANDFILL
OPERATION AND INSPECTION FORM

BluMetric™ Environmental

Site Name: Lake St. Peter WDS, MHHs	Date: Oct 17 2023	Weather Conditions:
Project #: 230225-04	BluMetric Staff: BM/MD	Sunny/1°C

Photographs of each item below should be collected during site visits.

OVERALL INSPECTION AND OPERATION REVIEW

- ❑ Signage in good condition — Yes ✓ No _
- ❑ ECA and emergency numbers on signage — Yes ✓ No _
- ❑ Hour of operation observed — Yes ✓ No _
- ❑ Site open under normal operating hours — Yes ✓ No _
- ❑ Perimeter fencing and gate in good condition — Yes ✓ No _
- ❑ Gate locked if closed — Yes ✓ No _

DESIGNATED WASTE AREA

- ❑ Working active/trench area (moderate size, daily cover, compacted) — Yes _ No ✓
- ❑ Designated waste areas are properly signed and easily accessed by public — Yes ✓ No _

RECYCLING OPERATION (if applicable)

- ❑ Proper signage and bins present — Yes ✓ No _
- ❑ Clearly signed — Yes ✓ No _
- ❑ Overall neat in appearance — Yes ✓ No _

SEGREGATED SCRAP PILES (metal, tires, brush, etc.)

- ❑ Metals neat and appropriate size — Yes _ No ✓ overflowing
- ❑ Tires neat and appropriate size — Yes ✓ No _
- ❑ Bulky Items neat and appropriate size — Yes _ No ✓ overflowing
- ❑ Brush pile neat and appropriate size — Yes ✓ No _
- ❑ Construction debris neat and appropriate size — Yes _ No _ NA

MONITORING WELL CONDITION

- ❑ Casing conditions (frost heave, lock, cap) — Yes ✓ No _
- ❑ Monitor condition (capped, vented) — Yes ✓ No _
- ❑ Wells clearly labeled (re-label as required) — Yes ✓ No _
- ❑ Well clearly visible (clear brush if necessary) — Yes ✓ No _

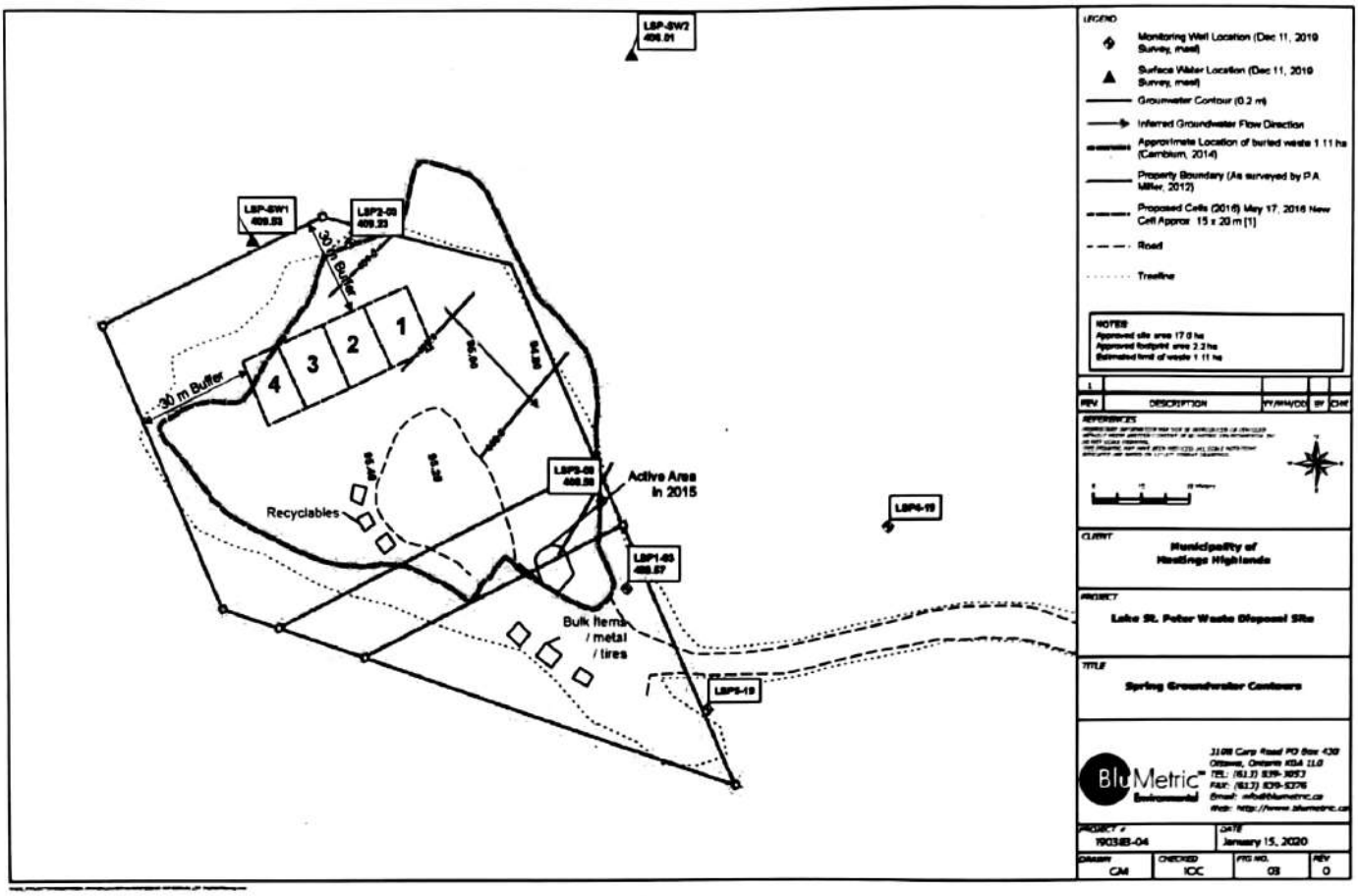
LANDFILL GAS MONITORING

- ❑ Conducted at structures — Yes ✓ No _ 0 ppm
- ❑ Conducted at monitoring wells — Yes ✓ No _

REPAIRS: Provide details of repairs made or materials required for repairs upon next site visit:

OBSERVATIONS OF PHYSICAL ENVIRONMENT: Please comment on any changes to the local environment (e.g. settling or slumping of waste/cover, new or altered drainage, presence of seeps, changes in vegetation cover, etc.)

This form is intended as a general reminder of information that should recorded during monitoring activities. The above information is a minimum guide. Any information deemed important should be recorded in the field notes for each site.



Identify any changes to site layout on drawing and/or comment:

Recently excavated material should be sloped and capped.

This form is intended as a general reminder of information that should recorded during monitoring activities. The above information is a minimum guide. Any information deemed important should be recorded in the field notes for each site.

Appendix D

D-2 Groundwater Laboratory Reports

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.
4 Cataraqui Street
Kingston, ON K7K1Z7
(613) 531-2725
ATTENTION TO: Carolyn Miller
PROJECT: 230225-04
AGAT WORK ORDER: 23P021642
TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist
WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer
DATE REPORTED: May 18, 2023
PAGES (INCLUDING COVER): 12
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23P021642

PROJECT: 230225-04

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2023-05-05

DATE REPORTED: 2023-05-18

		SAMPLE DESCRIPTION:		LSP1-03
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2023-05-04 13:40
Parameter	Unit	G / S	RDL	4968611
Dichlorodifluoromethane	µg/L		0.80	<0.80
Vinyl Chloride	µg/L		0.34	<0.34
Bromomethane	µg/L		0.40	<0.40
Trichlorofluoromethane	µg/L		0.80	<0.80
Acetone	µg/L		2.0	<2.0
1,1-Dichloroethylene	µg/L		0.60	<0.60
Methylene Chloride	µg/L		0.60	<0.60
trans- 1,2-Dichloroethylene	µg/L		0.40	<0.40
Methyl tert-butyl ether	µg/L		0.40	<0.40
1,1-Dichloroethane	µg/L		0.60	<0.60
Methyl Ethyl Ketone	µg/L		2.0	<2.0
cis- 1,2-Dichloroethylene	µg/L		0.40	<0.40
Chloroform	µg/L		0.40	<0.40
1,2-Dichloroethane	µg/L		0.40	<0.40
1,1,1-Trichloroethane	µg/L		0.60	<0.60
Carbon Tetrachloride	µg/L		0.40	<0.40
Benzene	µg/L		0.40	1.93
1,2-Dichloropropane	µg/L		0.40	<0.40
Trichloroethylene	µg/L		0.40	<0.40
Bromodichloromethane	µg/L		0.40	<0.40
Methyl Isobutyl Ketone	µg/L		2.0	<2.0
1,1,2-Trichloroethane	µg/L		0.40	<0.40
Toluene	µg/L		0.40	<0.40
Dibromochloromethane	µg/L		0.20	<0.20
Ethylene Dibromide	µg/L		0.20	<0.20
Tetrachloroethylene	µg/L		0.40	<0.40
1,1,1,2-Tetrachloroethane	µg/L		0.20	<0.20
Chlorobenzene	µg/L		0.20	0.68
Ethylbenzene	µg/L		0.20	<0.20

Certified By: N Popnikolof

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Certificate of Analysis

AGAT WORK ORDER: 23P021642

PROJECT: 230225-04

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2023-05-05

DATE REPORTED: 2023-05-18

			SAMPLE DESCRIPTION:	LSP1-03
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2023-05-04 13:40
Parameter	**Unit**	**G / S**	**RDL**	**4968611**
m & p-Xylene	µg/L		0.40	<0.40
Bromoform	µg/L		0.20	<0.20
Styrene	µg/L		0.20	<0.20
1,1,2,2-Tetrachloroethane	µg/L		0.20	<0.20
o-Xylene	µg/L		0.20	<0.20
1,3-Dichlorobenzene	µg/L		0.20	<0.20
1,4-Dichlorobenzene	µg/L		0.20	0.98
1,2-Dichlorobenzene	µg/L		0.20	<0.20
1,3-Dichloropropene	µg/L		0.30	<0.30
Xylenes (Total)	µg/L		0.20	<0.20
n-Hexane	µg/L		0.40	<0.40
Surrogate	**Unit**	**Acceptable Limits**		
Toluene-d8	% Recovery	50-140		108
4-Bromofluorobenzene	% Recovery	50-140		97

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4968611 Dilution factor=2
The sample was diluted because it was foamy. The reporting detection limit has been corrected for the dilution factor used.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

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AGAT WORK ORDER: 23P021642

PROJECT: 230225-04

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

Groundwater Parameters

DATE RECEIVED: 2023-05-05

DATE REPORTED: 2023-05-18

		SAMPLE DESCRIPTION:		LSP1-03		LSP2-03	LSP3-03	LSP4-19	LSP5-19		LSP-DP1-21
		SAMPLE TYPE:		Water		Water	Water	Water	Water		Water
		DATE SAMPLED:		2023-05-04 13:40		2023-05-04 14:12	2023-05-04 13:47	2023-05-04 13:20	2023-05-04 13:30		2023-05-04 14:41
Parameter	Unit	G / S	RDL	4968611	RDL	4968612	4968618	4968619	4968620	RDL	4968621
pH	pH Units		NA	6.71	NA	6.66	6.56	6.56	6.21	NA	6.75
Alkalinity (as CaCO3)	mg/L		5	398	5	14	141	55	5	5	146
Electrical Conductivity	µS/cm		2	1160	2	41	556	223	19	2	370
Total Dissolved Solids	mg/L		10	566	10	38	286	140	33	10	216
Total Suspended Solids	mg/L		10	756	10	487	331	14200	1830	10	336
Chloride	mg/L		0.12	128	0.10	0.42	74.0	14.4	0.25	0.10	5.47
Nitrate as N	mg/L		0.05	<0.05	0.05	<0.05	<0.05	4.96	<0.05	0.05	<0.05
Sulphate	mg/L		0.10	5.09	0.10	3.49	14.4	11.7	2.34	0.10	37.1
Ammonia as N	mg/L		0.06	15.4	0.02	<0.02	0.84	0.10	<0.02	0.03	4.95
Dissolved Organic Carbon	mg/L		0.5	23.8	0.5	2.9	6.9	3.3	2.8	0.5	9.7
Dissolved Magnesium	mg/L		0.05	9.30	0.05	0.78	3.97	2.36	0.23	0.05	5.77
Dissolved Potassium	mg/L		0.50	25.9	0.50	0.94	13.2	7.61	<0.50	0.50	14.6
Dissolved Sodium	mg/L		0.05	77.8	0.05	1.71	34.8	14.9	0.89	0.05	12.9
Dissolved Barium	mg/L		0.002	0.607	0.002	0.010	0.253	0.097	0.007	0.002	0.298
Dissolved Boron	mg/L		0.010	0.648	0.010	<0.010	0.135	0.217	<0.010	0.010	0.259
Dissolved Iron	mg/L		0.10	75.4	0.010	0.131	0.830	0.032	0.024	0.010	12.7
Dissolved Manganese	mg/L		0.002	2.67	0.002	0.052	1.79	1.56	0.005	0.002	6.52

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Certificate of Analysis

AGAT WORK ORDER: 23P021642

PROJECT: 230225-04

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

Groundwater Parameters

DATE RECEIVED: 2023-05-05 **DATE REPORTED: 2023-05-18**

			SAMPLE DESCRIPTION:	LSP-QAQC-GW1
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2023-05-04 14:12
Parameter	Unit	G / S	RDL	4968622
pH	pH Units		NA	6.59
Alkalinity (as CaCO3)	mg/L		5	13
Electrical Conductivity	µS/cm		2	42
Total Dissolved Solids	mg/L		10	42
Total Suspended Solids	mg/L		10	769
Chloride	mg/L		0.10	0.41
Nitrate as N	mg/L		0.05	<0.05
Sulphate	mg/L		0.10	3.50
Ammonia as N	mg/L		0.02	<0.02
Dissolved Organic Carbon	mg/L		0.5	2.6
Dissolved Magnesium	mg/L		0.05	0.87
Dissolved Potassium	mg/L		0.50	0.84
Dissolved Sodium	mg/L		0.05	1.49
Dissolved Barium	mg/L		0.002	0.010
Dissolved Boron	mg/L		0.010	<0.010
Dissolved Iron	mg/L		0.010	0.127
Dissolved Manganese	mg/L		0.002	0.052

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4968611-4968622 Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

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Quality Assurance

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23P021642

PROJECT: 230225-04

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

Trace Organics Analysis

RPT Date: May 18, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - VOCs (Water)															
Dichlorodifluoromethane	4967351		<0.40	<0.40	NA	< 0.40	76%	50%	140%	115%	50%	140%	89%	50%	140%
Vinyl Chloride	4967351		<0.17	<0.17	NA	< 0.17	102%	50%	140%	113%	50%	140%	106%	50%	140%
Bromomethane	4967351		<0.20	<0.20	NA	< 0.20	102%	50%	140%	94%	50%	140%	87%	50%	140%
Trichlorofluoromethane	4967351		<0.40	<0.40	NA	< 0.40	98%	50%	140%	105%	50%	140%	117%	50%	140%
Acetone	4967351		<1.0	<1.0	NA	< 1.0	82%	50%	140%	85%	50%	140%	94%	50%	140%
1,1-Dichloroethylene	4967351		<0.30	<0.30	NA	< 0.30	99%	50%	140%	80%	60%	130%	104%	50%	140%
Methylene Chloride	4967351		<0.30	<0.30	NA	< 0.30	115%	50%	140%	105%	60%	130%	99%	50%	140%
trans- 1,2-Dichloroethylene	4967351		<0.20	<0.20	NA	< 0.20	113%	50%	140%	96%	60%	130%	102%	50%	140%
Methyl tert-butyl ether	4967351		<0.20	<0.20	NA	< 0.20	81%	50%	140%	107%	60%	130%	95%	50%	140%
1,1-Dichloroethane	4967351		<0.30	<0.30	NA	< 0.30	105%	50%	140%	86%	60%	130%	103%	50%	140%
Methyl Ethyl Ketone	4967351		<1.0	<1.0	NA	< 1.0	96%	50%	140%	108%	50%	140%	87%	50%	140%
cis- 1,2-Dichloroethylene	4967351		<0.20	<0.20	NA	< 0.20	107%	50%	140%	94%	60%	130%	102%	50%	140%
Chloroform	4967351		<0.20	<0.20	NA	< 0.20	101%	50%	140%	82%	60%	130%	115%	50%	140%
1,2-Dichloroethane	4967351		<0.20	<0.20	NA	< 0.20	105%	50%	140%	84%	60%	130%	115%	50%	140%
1,1,1-Trichloroethane	4967351		<0.30	<0.30	NA	< 0.30	104%	50%	140%	95%	60%	130%	110%	50%	140%
Carbon Tetrachloride	4967351		<0.20	<0.20	NA	< 0.20	106%	50%	140%	102%	60%	130%	97%	50%	140%
Benzene	4967351		0.57	0.56	NA	< 0.20	104%	50%	140%	108%	60%	130%	94%	50%	140%
1,2-Dichloropropane	4967351		<0.20	<0.20	NA	< 0.20	114%	50%	140%	94%	60%	130%	105%	50%	140%
Trichloroethylene	4967351		<0.20	<0.20	NA	< 0.20	102%	50%	140%	102%	60%	130%	105%	50%	140%
Bromodichloromethane	4967351		<0.20	<0.20	NA	< 0.20	106%	50%	140%	98%	60%	130%	119%	50%	140%
Methyl Isobutyl Ketone	4967351		<1.0	<1.0	NA	< 1.0	84%	50%	140%	115%	50%	140%	109%	50%	140%
1,1,2-Trichloroethane	4967351		<0.20	<0.20	NA	< 0.20	118%	50%	140%	108%	60%	130%	113%	50%	140%
Toluene	4967351		1.06	1.02	3.8%	< 0.20	115%	50%	140%	101%	60%	130%	95%	50%	140%
Dibromochloromethane	4967351		<0.10	<0.10	NA	< 0.10	107%	50%	140%	97%	60%	130%	112%	50%	140%
Ethylene Dibromide	4967351		<0.10	<0.10	NA	< 0.10	101%	50%	140%	94%	60%	130%	107%	50%	140%
Tetrachloroethylene	4967351		<0.20	<0.20	NA	< 0.20	97%	50%	140%	83%	60%	130%	107%	50%	140%
1,1,1,2-Tetrachloroethane	4967351		<0.10	<0.10	NA	< 0.10	103%	50%	140%	94%	60%	130%	115%	50%	140%
Chlorobenzene	4967351		<0.10	<0.10	NA	< 0.10	108%	50%	140%	92%	60%	130%	119%	50%	140%
Ethylbenzene	4967351		0.27	0.26	NA	< 0.10	103%	50%	140%	87%	60%	130%	101%	50%	140%
m & p-Xylene	4967351		0.27	0.26	NA	< 0.20	101%	50%	140%	88%	60%	130%	103%	50%	140%
Bromoform	4967351		<0.10	<0.10	NA	< 0.10	112%	50%	140%	99%	60%	130%	103%	50%	140%
Styrene	4967351		<0.10	<0.10	NA	< 0.10	101%	50%	140%	88%	60%	130%	106%	50%	140%
1,1,2,2-Tetrachloroethane	4967351		<0.10	<0.10	NA	< 0.10	114%	50%	140%	110%	60%	130%	97%	50%	140%
o-Xylene	4967351		<0.10	<0.10	NA	< 0.10	103%	50%	140%	89%	60%	130%	116%	50%	140%
1,3-Dichlorobenzene	4967351		<0.10	<0.10	NA	< 0.10	105%	50%	140%	90%	60%	130%	109%	50%	140%
1,4-Dichlorobenzene	4967351		<0.10	<0.10	NA	< 0.10	99%	50%	140%	89%	60%	130%	111%	50%	140%
1,2-Dichlorobenzene	4967351		<0.10	<0.10	NA	< 0.10	104%	50%	140%	91%	60%	130%	108%	50%	140%
n-Hexane	4967351		<0.20	<0.20	NA	< 0.20	94%	50%	140%	95%	60%	130%	109%	50%	140%

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Quality Assurance

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23P021642

PROJECT: 230225-04

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: May 18, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

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Quality Assurance

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.
AGAT WORK ORDER: 23P021642
PROJECT: 230225-04
ATTENTION TO: Carolyn Miller
SAMPLING SITE:Lake St. Peter
SAMPLED BY:

Water Analysis

RPT Date: May 18, 2023

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Groundwater Parameters															
pH	4968094		7.66	7.70	0.5%	NA	100%	90%	110%						
Alkalinity (as CaCO3)	4968094		398	403	1.2%	< 5	103%	80%	120%						
Electrical Conductivity	4968094		1260	1260	0.0%	< 2	106%	90%	110%						
Total Dissolved Solids	4968480		846	820	3.1%	< 10	96%	80%	120%						
Total Suspended Solids	4965528		<10	<10	NA	< 10	98%	80%	120%						
Chloride	4968611	4968611	128	129	0.8%	< 0.10	97%	70%	130%	102%	80%	120%	NA	70%	130%
Nitrate as N	4968611	4968611	<0.05	<0.05	NA	< 0.05	100%	70%	130%	99%	80%	120%	100%	70%	130%
Sulphate	4968611	4968611	5.09	5.00	1.8%	< 0.10	100%	70%	130%	99%	80%	120%	100%	70%	130%
Ammonia as N	4968480		<0.02	<0.02	NA	< 0.02	114%	70%	130%	104%	80%	120%	87%	70%	130%
Dissolved Organic Carbon	4965463		0.7	0.6	NA	< 0.5	103%	90%	110%	101%	90%	110%	95%	80%	120%
Dissolved Magnesium	4968446		64.4	74.2	14.1%	< 0.05	96%	70%	130%	100%	80%	120%	118%	70%	130%
Dissolved Potassium	4968446		7.94	8.18	3.0%	< 0.50	112%	70%	130%	118%	80%	120%	101%	70%	130%
Dissolved Sodium	4968446		77.5	87.1	11.7%	< 0.05	98%	70%	130%	115%	80%	120%	120%	70%	130%
Dissolved Barium	4968446		0.394	0.410	4.0%	< 0.002	100%	70%	130%	100%	80%	120%	108%	70%	130%
Dissolved Boron	4968446		0.117	0.132	12.0%	< 0.010	100%	70%	130%	114%	80%	120%	109%	70%	130%
Dissolved Iron	4968446		0.530	0.616	15.0%	< 0.010	101%	70%	130%	101%	80%	120%	106%	70%	130%
Dissolved Manganese	4968446		0.067	0.074	9.9%	< 0.002	100%	70%	130%	96%	80%	120%	104%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Groundwater Parameters															
pH	4968622	4968622	6.59	6.58	0.2%	NA	100%	90%	110%						
Alkalinity (as CaCO3)	4968622	4968622	13	13	NA	< 5	101%	80%	120%						
Electrical Conductivity	4968622	4968622	42	41	2.4%	< 2	110%	90%	110%						
Ammonia as N	4968612	4968612	<0.02	<0.02	NA	< 0.02	97%	70%	130%	102%	80%	120%	96%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

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Method Summary

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23P021642

PROJECT: 230225-04

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Dichlorodifluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23P021642

PROJECT: 230225-04

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Chlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23P021642

PROJECT: 230225-04

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Alkalinity (as CaCO3)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Dissolved Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
Dissolved Magnesium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Dissolved Potassium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Sodium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Iron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Manganese	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: BluMetric
Contact: Carolyn Miller
Address: 4 Cataraqui St
Kingston, ON, K7K 1Z7
Phone: 613-328-0243 Fax:
Reports to be sent to:
1. Email: cmiller@blumetric.ca
2. Email: cbandler@blumetric.ca

Project Information:

Project: 230225-04
Site Location: Lake St.Peter
Sampled By:
AGAT Quote #: 740802 PO: 230225-04
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email: ap@blumetric.ca

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Excess Soils R406
Table ____ *Indicate One*
☐ Regulation 558
☐ CCME

☐ Sewer Use ☐ Sanitary ☐ Storm
____ *Region*
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☒ No

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Laboratory Use Only

Work Order #: 23P021642
Cooler Quantity: 1
Arrival Temperatures: 6.2 | 5.7 | 5.8
7.9 | 8.0 | 8.1
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes: Ice.

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered (Metals, Hg, CrVI, DOC) Y/N	O. Reg 153: Metals & Inorganics	Metals - ☐CrVI, ☐Hg, ☐HWSB	BTEX, F1-F4 PHCs Analyze F4G if required ☐Yes ☐No	PAHs	PCBs	VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐M&I ☐VOCs ☐ABNs ☐B(a)P ☐PCBs	Excess Soils SPLP Rainwater Leach: SPLP: ☐Metals ☐VOCs ☐SVOCs	Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	O. Reg 406: 93-262 Groundwater	91-214 VOCs						Potentially Hazardous or High Concentration (Y/N)
LSP1-03	May 4/23	13:40 AM/PM	7	GW		Y											☑	☑						
LSP2-03	May 4/23	14:12 AM/PM	4	GW	Field filter: DOC, Metals	Y											☑							
LSP3-03	May 4/23	13:47 AM/PM	4	GW		Y											☑							
LSP4-19	May 4/23	13:20 AM/PM	4	GW		Y											☑							
LSP5-19	May 4/23	13:30 AM/PM	4	GW		Y											☑							
LSP-DP1-21	May 4/23	14:41 AM/PM	4	GW		Y											☑							
LSP-QAQC-GW1	May 4/23	14:12 AM/PM	4	GW		Y											☑							
		AM/PM																						
		AM/PM																						
		AM/PM																						
		AM/PM																						

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Brad McCallum / Brad McCallum	May 5/23	9:30 AM	Karly Jones	May 5/23	930
	May 5/23	1600	Aniqa Tahir	06/05/2023	1023 am

Page 1 of 1
N°:

Your Project #: 230225-04
Site Location: Lake St. Peter
Your C.O.C. #: 782139

Attention: Cecilia Bandler

BluMetric Environmental Inc
The Tower - The Woolen Mill
4 Cataraqui St
Kingston, ON
CANADA K7K 1Z7

Report Date: 2023/11/02
Report #: R7891373
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W5792
Received: 2023/10/19, 10:38

Sample Matrix: Water
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	10	N/A	2023/10/25	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	10	N/A	2023/10/24	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	10	N/A	2023/10/25	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	10	N/A	2023/10/24	CAM SOP-00446	SM 23 5310 B m
Dissolved Metals by ICPMS	8	N/A	2023/10/26	CAM SOP-00447	EPA 6020B m
Dissolved Metals by ICPMS	2	N/A	2023/11/01	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	10	N/A	2023/10/24	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	8	N/A	2023/10/24	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Nitrate & Nitrite as Nitrogen in Water (2)	2	N/A	2023/10/25	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	10	2023/10/21	2023/10/25	CAM SOP-00413	SM 4500H+ B m
Sulphate by Automated Turbidimetry	10	N/A	2023/10/24	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	2	2023/10/24	2023/10/25	CAM SOP-00428	SM 23 2540C m
Total Dissolved Solids	8	2023/10/25	2023/10/26	CAM SOP-00428	SM 23 2540C m
Total Suspended Solids	8	2023/10/24	2023/10/25	CAM SOP-00428	SM 23 2540D m
Total Suspended Solids	2	2023/10/25	2023/10/26	CAM SOP-00428	SM 23 2540D m

Remarks:

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, MELCCFP, 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.

Your Project #: 230225-04
Site Location: Lake St. Peter
Your C.O.C. #: 782139

Attention: Cecilia Bandler

BluMetric Environmental Inc
The Tower - The Woolen Mill
4 Cataraqui St
Kingston, ON
CANADA K7K 1Z7

Report Date: 2023/11/02
Report #: R7891373
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W5792

Received: 2023/10/19, 10:38

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) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.

(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bureauveritas.com
Phone# (519)652-9444

==========

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

Bureau Veritas 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 Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3W5792
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XIM422		XIM423	XIM424			XIM425		
Sampling Date		2023/10/17 09:40		2023/10/17 10:15	2023/10/17 09:50			2023/10/17 09:15		
COC Number		782139		782139	782139			782139		
	UNITS	LSP1-03	QC Batch	LSP2-03	LSP3-03	RDL	QC Batch	LSP4-19	RDL	QC Batch
Inorganics										
Total Ammonia-N	mg/L	20	9001398	ND	7.4	0.050	9001398	4.9	0.050	9001398
Conductivity	umho/cm	900	8997978	35	620	1.0	8998021	600	1.0	8998021
Total Dissolved Solids	mg/L	420	9002041	50	330	10	9002041	335	10	9003218
Dissolved Organic Carbon	mg/L	19	8999550	3.5	16	0.4	8999550	8.2	0.4	8999550
pH	pH	7.36	8997977	6.66	7.15		8998020	7.78		8998020
Total Suspended Solids	mg/L	490	9000296	400	140	10	9000296	42000	100	9004459
Dissolved Sulphate (SO4)	mg/L	4.3	8997926	2.4	2.4	1.0	8997920	10	1.0	8997920
Alkalinity (Total as CaCO3)	mg/L	330	8997974	13	170	1.0	8998017	190	1.0	8998017
Dissolved Chloride (Cl-)	mg/L	72	8997922	ND	77	1.0	8997913	43	1.0	8997913
Nitrate (N)	mg/L	ND	8998023	ND	ND	0.10	8997678	4.62	0.10	8997678

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas ID		XIM425			XIM426			XIM427		XIM428		
Sampling Date		2023/10/17 09:15			2023/10/17 09:30			2023/10/17 10:35		2023/10/17 08:30		
COC Number		782139			782139			782139		782139		
	UNITS	LSP4-19 Lab-Dup	RDL	QC Batch	LSP5-19	RDL	QC Batch	LSP-DP1-21	RDL	LSP6-23	RDL	QC Batch
Inorganics												
Total Ammonia-N	mg/L				ND	0.050	9001398	7.8	0.050	0.073	0.050	9001398
Conductivity	umho/cm				29	1.0	8998021	580	1.0	140	1.0	8998021
Total Dissolved Solids	mg/L				40	10	9002041	315	10	210	10	9002041
Dissolved Organic Carbon	mg/L	8.2	0.4	8999550	1.5	0.4	8999550	13	0.4	2.0	0.4	8999550
pH	pH				6.75		8998020	7.11		7.72		8998020
Total Suspended Solids	mg/L				6800	50	9000296	150	10	19000	200	9000296
Dissolved Sulphate (SO4)	mg/L				2.7	1.0	8997731	29	1.0	8.2	1.0	8997920
Alkalinity (Total as CaCO3)	mg/L				7.9	1.0	8998017	220	1.0	56	1.0	8998017
Dissolved Chloride (Cl-)	mg/L				3.4	1.0	8997726	27	1.0	1.8	1.0	8997913
Nitrate (N)	mg/L				0.10	0.10	8997678	ND	0.10	ND	0.10	8997678

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3W5792
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XIM429			XIM430			XIM431		
Sampling Date		2023/10/17 08:45			2023/10/17 10:00			2023/10/17 10:00		
COC Number		782139			782139			782139		
	UNITS	LSP7-23	RDL	QC Batch	LSP8-23	RDL	QC Batch	LSP-QAQC-GW1	RDL	QC Batch
Inorganics										
Total Ammonia-N	mg/L	0.057	0.050	9001398	12	0.050	9001398	12	0.050	9001398
Conductivity	umho/cm	76	1.0	8998021	690	1.0	8997978	680	1.0	8998021
Total Dissolved Solids	mg/L	110	10	9002041	395	10	9002041	355	10	9003218
Dissolved Organic Carbon	mg/L	1.4	0.4	8999550	37	0.4	8999550	36	0.4	8999550
pH	pH	6.93		8998020	7.04		8997977	6.76		8998020
Total Suspended Solids	mg/L	15000	200	9000296	5500	50	9000296	8000	100	9004459
Dissolved Sulphate (SO4)	mg/L	4.1	1.0	8997920	12	1.0	8997920	11	1.0	8997731
Alkalinity (Total as CaCO3)	mg/L	17	1.0	8998017	260	1.0	8997974	270	1.0	8998017
Dissolved Chloride (Cl-)	mg/L	7.1	1.0	8997913	50	1.0	8997913	45	1.0	8997726
Nitrate (N)	mg/L	0.13	0.10	8997678	ND	0.10	8998023	ND	0.10	8997678

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

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Bureau Veritas Job #: C3W5792
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XIM422	XIM423	XIM424	XIM425	XIM426		XIM427		
Sampling Date		2023/10/17 09:40	2023/10/17 10:15	2023/10/17 09:50	2023/10/17 09:15	2023/10/17 09:30		2023/10/17 10:35		
COC Number		782139	782139	782139	782139	782139		782139		
	UNITS	LSP1-03	LSP2-03	LSP3-03	LSP4-19	LSP5-19	RDL	LSP-DP1-21	RDL	QC Batch
Metals										
Dissolved Barium (Ba)	ug/L	560	13	390	170	10	2.0	490	2.0	8997066
Dissolved Boron (B)	ug/L	660	ND	230	550	ND	10	420	10	8997066
Dissolved Calcium (Ca)	ug/L	92000	3400	47000	54000	2900	200	58000	200	8997066
Dissolved Iron (Fe)	ug/L	64000	120	38000	ND	ND	100	47000	100	8997066
Dissolved Magnesium (Mg)	ug/L	9500	840	5400	8100	490	50	9700	50	8997066
Dissolved Manganese (Mn)	ug/L	2200	48	1000	8700	2.1	2.0	11000	10	8997066
Dissolved Sodium (Na)	ug/L	40000	1700	50000	33000	1900	100	17000	100	8997066

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas ID		XIM428	XIM429		XIM430	XIM431		
Sampling Date		2023/10/17 08:30	2023/10/17 08:45		2023/10/17 10:00	2023/10/17 10:00		
COC Number		782139	782139		782139	782139		
	UNITS	LSP6-23	LSP7-23	QC Batch	LSP8-23	LSP-QAQC-GW1	RDL	QC Batch
Metals								
Dissolved Barium (Ba)	ug/L	12	14	8997066	470	470	2.0	9015963
Dissolved Boron (B)	ug/L	31	ND	8997066	260	270	10	9015963
Dissolved Calcium (Ca)	ug/L	16000	5400	8997066	56000	56000	200	9015963
Dissolved Iron (Fe)	ug/L	ND	ND	8997066	92000	93000	100	9015963
Dissolved Magnesium (Mg)	ug/L	3800	1000	8997066	9200	9300	50	9015963
Dissolved Manganese (Mn)	ug/L	490	240	8997066	4800	4900	2.0	9015963
Dissolved Sodium (Na)	ug/L	5500	5000	8997066	44000	44000	100	9015963

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3W5792
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

TEST SUMMARY

Bureau Veritas ID: XIM422
Sample ID: LSP1-03
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8997974	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8997922	N/A	2023/10/24	Massarat Jan
Conductivity	AT	8997978	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999550	N/A	2023/10/24	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9001398	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8998023	N/A	2023/10/25	Chandra Nandlal
pH	AT	8997977	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997926	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

Bureau Veritas ID: XIM423
Sample ID: LSP2-03
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8998017	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Conductivity	AT	8998021	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999550	N/A	2023/10/24	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9001398	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8997678	N/A	2023/10/24	Chandra Nandlal
pH	AT	8998020	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

Bureau Veritas ID: XIM424
Sample ID: LSP3-03
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8998017	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Conductivity	AT	8998021	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999550	N/A	2023/10/24	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9001398	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8997678	N/A	2023/10/24	Chandra Nandlal
pH	AT	8998020	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh

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Bureau Veritas Job #: C3W5792
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

TEST SUMMARY

Bureau Veritas ID: XIM424
Sample ID: LSP3-03
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

Bureau Veritas ID: XIM425
Sample ID: LSP4-19
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8998017	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Conductivity	AT	8998021	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999550	N/A	2023/10/24	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9001398	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8997678	N/A	2023/10/24	Chandra Nandlal
pH	AT	8998020	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9003218	2023/10/24	2023/10/25	Shaneil Hall
Total Suspended Solids	BAL	9004459	2023/10/25	2023/10/26	Shaneil Hall

Bureau Veritas ID: XIM425 Dup
Sample ID: LSP4-19
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999550	N/A	2023/10/24	Gyulshen Idriz

Bureau Veritas ID: XIM426
Sample ID: LSP5-19
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8998017	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8997726	N/A	2023/10/24	Alina Dobreanu
Conductivity	AT	8998021	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999550	N/A	2023/10/24	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9001398	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8997678	N/A	2023/10/24	Chandra Nandlal
pH	AT	8998020	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997731	N/A	2023/10/24	Alina Dobreanu
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

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Bureau Veritas Job #: C3W5792
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

TEST SUMMARY

Bureau Veritas ID: XIM427
Sample ID: LSP-DP1-21
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8998017	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Conductivity	AT	8998021	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999550	N/A	2023/10/24	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9001398	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8997678	N/A	2023/10/24	Chandra Nandlal
pH	AT	8998020	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

Bureau Veritas ID: XIM428
Sample ID: LSP6-23
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8998017	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Conductivity	AT	8998021	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999550	N/A	2023/10/24	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9001398	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8997678	N/A	2023/10/24	Chandra Nandlal
pH	AT	8998020	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

Bureau Veritas ID: XIM429
Sample ID: LSP7-23
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8998017	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Conductivity	AT	8998021	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999550	N/A	2023/10/24	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	8997066	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9001398	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8997678	N/A	2023/10/24	Chandra Nandlal
pH	AT	8998020	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh

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Bureau Veritas Job #: C3W5792
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

TEST SUMMARY

Bureau Veritas ID: XIM429
Sample ID: LSP7-23
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

Bureau Veritas ID: XIM430
Sample ID: LSP8-23
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8997974	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8997913	N/A	2023/10/24	Massarat Jan
Conductivity	AT	8997978	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999550	N/A	2023/10/24	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9015963	N/A	2023/11/01	Indira HarryPaul
Total Ammonia-N	LACH/NH4	9001398	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8998023	N/A	2023/10/25	Chandra Nandlal
pH	AT	8997977	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997920	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9002041	2023/10/25	2023/10/26	Razieh Tabesh
Total Suspended Solids	BAL	9000296	2023/10/24	2023/10/25	Razieh Tabesh

Bureau Veritas ID: XIM431
Sample ID: LSP-QAQC-GW1
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8998017	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8997726	N/A	2023/10/24	Alina Dobreanu
Conductivity	AT	8998021	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8999550	N/A	2023/10/24	Gyulshen Idriz
Dissolved Metals by ICPMS	ICP/MS	9015963	N/A	2023/11/01	Indira HarryPaul
Total Ammonia-N	LACH/NH4	9001398	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8997678	N/A	2023/10/24	Chandra Nandlal
pH	AT	8998020	2023/10/21	2023/10/25	Nachiketa Gohil
Sulphate by Automated Turbidimetry	KONE	8997731	N/A	2023/10/24	Alina Dobreanu
Total Dissolved Solids	BAL	9003218	2023/10/24	2023/10/25	Shaneil Hall
Total Suspended Solids	BAL	9004459	2023/10/25	2023/10/26	Shaneil Hall

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C

TDS Analysis: Analysis was performed past sample holding time. This may increase the variability associated with these results.
TSS Analysis: Analysis was performed past sample holding time. This may increase the variability associated with these results.

Sample XIM425 [LSP4-19] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Sample XIM426 [LSP5-19] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Sample XIM428 [LSP6-23] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Sample XIM429 [LSP7-23] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Sample XIM430 [LSP8-23] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Sample XIM431 [LSP-QAQC-GW1] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Results relate only to the items tested.

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Bureau Veritas Job #: C3W5792
Report Date: 2023/11/02

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8997066	Dissolved Barium (Ba)	2023/10/26	NC	80 - 120	104	80 - 120	ND, RDL=2.0	ug/L		
8997066	Dissolved Boron (B)	2023/10/26	102	80 - 120	97	80 - 120	ND, RDL=10	ug/L		
8997066	Dissolved Calcium (Ca)	2023/10/26	NC	80 - 120	106	80 - 120	ND, RDL=200	ug/L		
8997066	Dissolved Iron (Fe)	2023/10/26	NC (1)	80 - 120	104	80 - 120	ND, RDL=100	ug/L		
8997066	Dissolved Magnesium (Mg)	2023/10/26	100	80 - 120	106	80 - 120	ND, RDL=50	ug/L		
8997066	Dissolved Manganese (Mn)	2023/10/26	NC	80 - 120	101	80 - 120	ND, RDL=2.0	ug/L		
8997066	Dissolved Sodium (Na)	2023/10/26	NC	80 - 120	106	80 - 120	ND, RDL=100	ug/L		
8997678	Nitrate (N)	2023/10/24	99	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	NC	20
8997726	Dissolved Chloride (Cl-)	2023/10/24	NC	80 - 120	94	80 - 120	ND, RDL=1.0	mg/L	1.4	20
8997731	Dissolved Sulphate (SO4)	2023/10/24	NC	75 - 125	93	80 - 120	ND, RDL=1.0	mg/L	0.39	20
8997913	Dissolved Chloride (Cl-)	2023/10/24	94	80 - 120	101	80 - 120	ND, RDL=1.0	mg/L	NC	20
8997920	Dissolved Sulphate (SO4)	2023/10/24	96	75 - 125	102	80 - 120	ND, RDL=1.0	mg/L	0.55	20
8997922	Dissolved Chloride (Cl-)	2023/10/24	NC	80 - 120	98	80 - 120	ND, RDL=1.0	mg/L	0.34	20
8997926	Dissolved Sulphate (SO4)	2023/10/24	NC	75 - 125	101	80 - 120	ND, RDL=1.0	mg/L	0.23	20
8997974	Alkalinity (Total as CaCO3)	2023/10/25			97	85 - 115	ND, RDL=1.0	mg/L	2.1	20
8997977	pH	2023/10/25			102	98 - 103			0.34	N/A
8997978	Conductivity	2023/10/25			101	85 - 115	ND, RDL=1.0	umho/cm	0.29	10
8998017	Alkalinity (Total as CaCO3)	2023/10/25			96	85 - 115	ND, RDL=1.0	mg/L	0.22	20
8998020	pH	2023/10/25			102	98 - 103			0.54	N/A
8998021	Conductivity	2023/10/25			101	85 - 115	ND, RDL=1.0	umho/cm	0	10
8998023	Nitrate (N)	2023/10/25	98	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	NC	20
8999550	Dissolved Organic Carbon	2023/10/24	93	80 - 120	98	80 - 120	ND, RDL=0.4	mg/L	0.17	20
9000296	Total Suspended Solids	2023/10/25			95	85 - 115	ND, RDL=10	mg/L	NC	20
9001398	Total Ammonia-N	2023/10/24	101	75 - 125	103	80 - 120	ND, RDL=0.050	mg/L	6.8	20
9002041	Total Dissolved Solids	2023/10/26			102	90 - 110	ND, RDL=10	mg/L	0	20
9003218	Total Dissolved Solids	2023/10/25			95	90 - 110	ND, RDL=10	mg/L	1.3	20
9004459	Total Suspended Solids	2023/10/26			96	85 - 115	ND, RDL=10	mg/L	10	20
9015963	Dissolved Barium (Ba)	2023/11/01	89	80 - 120	93	80 - 120	ND, RDL=2.0	ug/L		
9015963	Dissolved Boron (B)	2023/11/01	88	80 - 120	92	80 - 120	ND, RDL=10	ug/L		
9015963	Dissolved Calcium (Ca)	2023/11/01	NC	80 - 120	97	80 - 120	ND, RDL=200	ug/L	1.8	20
9015963	Dissolved Iron (Fe)	2023/11/01	93	80 - 120	96	80 - 120	ND, RDL=100	ug/L		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9015963	Dissolved Magnesium (Mg)	2023/11/01	NC	80 - 120	96	80 - 120	ND, RDL=50	ug/L	0.52	20
9015963	Dissolved Manganese (Mn)	2023/11/01	91	80 - 120	94	80 - 120	ND, RDL=2.0	ug/L		
9015963	Dissolved Sodium (Na)	2023/11/01	NC	80 - 120	96	80 - 120	ND, RDL=100	ug/L		

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.

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.

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) The recovery in the matrix spike was not calculated (NC). Because of the high concentration of this analyte in the parent sample, the relative difference between the spiked and unspiked concentrations is not sufficiently significant to permit a reliable recovery calculation.

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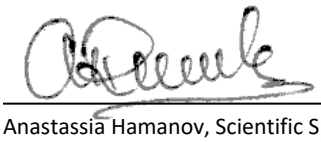
Bureau Veritas Job #: C3W5792
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

VALIDATION SIGNATURE PAGE

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



Anastassia Hamanov, Scientific Specialist

Bureau Veritas 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 Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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Custody Tracking Form

T782139

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form has a barcode or a Bureau Veritas eCOC confirmation number in the top right hand side. This number links your electronic submission to your samples. This form should be placed in the cooler with your samples.

First Sample: LSP1-03
Last Sample: LSP-QAQC-GW1
Sample Count: 10

Relinquished By				Received By			
Brad M'Callum	Brad M'Call	Date	2023/10/18	RAVNEET KAUR BRAR	Ravneet	Date	2023/10/19
		Time (24 HR)	0800			Time (24 HR)	10:38
Print	Sign	Date	YYYY/MM/DD	Print	Sign	Date	YYYY/MM/DD
		Time (24 HR)	HH:MM			Time (24 HR)	HH:MM
Print	Sign	Date	YYYY/MM/DD	Print	Sign	Date	YYYY/MM/DD
		Time (24 HR)	HH:MM			Time (24 HR)	HH:MM

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print): Brad M'Callum / Matt DeGeer

# of Coolers/Pkgs: 2 | 1

Rush ☐ Immediate Test ☐ Food Residue ☐

Micro ☐ Food Chemistry ☐

*** LABORATORY USE ONLY ***

Received At

Labeled By

Verified By

Lab Comments:

19-Oct-23 10:38
Christine Gripton
C3W5792

IDK ENV-1492

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	4	4	5
Drinking Water Metals Preservation Check Done (Circle)				YES	NO

COR FCD-00383/4

Page 1 of 1

Appendix D

D-3 Surface Water Laboratory Reports

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.
4 Cataraqui Street
Kingston, ON K7K1Z7
(613) 531-2725
ATTENTION TO: Carolyn Miller
PROJECT: 230225-04
AGAT WORK ORDER: 23P021636
WATER ANALYSIS REVIEWED BY: Chuandi Zhang, Lab Team Lead
DATE REPORTED: May 26, 2023
PAGES (INCLUDING COVER): 8
VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

VERSION 2:V2 issued 2023-05-26. Total Phenols data removed by client request. Supersedes previous version. (LB)

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23P021636

PROJECT: 230225-04

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

Surface Water Parameters

DATE RECEIVED: 2023-05-05

DATE REPORTED: 2023-05-26

		SAMPLE DESCRIPTION:		LSP-SW1	LSP-SW2		LSP-DP1-21		LSP-QAQC-SW1
		SAMPLE TYPE:		Water	Water		Water		Water
		DATE SAMPLED:		2023-05-04 14:54	2023-05-04 14:27		2023-05-04 14:41		2023-05-04 14:27
Parameter	Unit	G / S	RDL	4968484	4968485	RDL	4968486	RDL	4968487
BOD (5)	mg/L		2	<2	<2	2	3	2	<2
BOD setup				2023/05/06	2023/05/06		2023/05/06		2023/05/06
pH	pH Units		NA	6.86	6.69	NA	6.88	NA	6.71
Alkalinity (as CaCO3)	mg/L		5	7	9	5	150	5	10
Electrical Conductivity	µS/cm		2	24	40	2	375	2	41
Hardness (as CaCO3) (Calculated)	mg/L		0.5	7.3	12.6	0.5	117	0.5	14.0
Total Dissolved Solids	mg/L		10	12	38	10	216	10	34
Total Suspended Solids	mg/L		10	<10	<10	10	177	10	<10
Chloride	mg/L		0.10	0.29	0.58	0.10	5.34	0.10	0.60
Nitrate as N	mg/L		0.05	<0.05	0.10	0.05	<0.05	0.05	0.10
Nitrite as N	mg/L		0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Sulphate	mg/L		0.10	2.52	4.86	0.10	32.1	0.10	4.98
Ammonia as N	mg/L		0.02	<0.02	<0.02	0.03	4.96	0.02	<0.02
Ammonia-Un-ionized (Calculated)	mg/L		0.000002	<0.000002	<0.000002	0.000002	0.000083	0.000002	<0.000002
Total Kjeldahl Nitrogen	mg/L		0.10	0.17	0.26	0.10	6.28	0.10	0.22
Total Phosphorus	mg/L		0.02	<0.02	<0.02	0.02	0.05	0.02	<0.02
Chemical Oxygen Demand	mg/L		5	21	16	5	66	5	16
True Colour	TCU		2.50	30.0	34.9	2.50	75.4	2.50	34.7
Total Calcium	mg/L		0.20	2.05	3.66	0.20	35.2	0.20	4.24
Total Magnesium	mg/L		0.10	0.54	0.84	0.10	7.12	0.10	0.83
Total Potassium	mg/L		0.50	0.86	1.22	0.50	15.5	0.50	1.36
Total Sodium	mg/L		0.10	1.03	1.78	0.10	12.6	0.10	1.83
Aluminum-dissolved	mg/L		0.004	0.150	0.117	0.004	0.006	0.004	0.124
Total Arsenic	mg/L		0.003	<0.003	<0.003	0.003	0.025	0.003	<0.003
Total Barium	mg/L		0.002	0.012	0.013	0.002	0.325	0.002	0.014
Total Beryllium	mg/L		0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Total Boron	mg/L		0.010	<0.010	0.023	0.010	0.262	0.010	0.026
Total Cadmium	mg/L		0.0001	<0.0001	<0.0001	0.0001	0.0009	0.0001	<0.0001
Total Chromium	mg/L		0.003	<0.003	<0.003	0.003	0.028	0.003	<0.003

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23P021636

PROJECT: 230225-04

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

Surface Water Parameters

DATE RECEIVED: 2023-05-05

DATE REPORTED: 2023-05-26

	SAMPLE DESCRIPTION:		LSP-SW1	LSP-SW2		LSP-DP1-21		LSP-QAQC-SW1
	SAMPLE TYPE:		Water	Water		Water		Water
	DATE SAMPLED:		2023-05-04 14:54	2023-05-04 14:27		2023-05-04 14:41		2023-05-04 14:27
Parameter	Unit	G / S	RDL	4968484	4968485	RDL	4968486	RDL	4968487
Total Cobalt	mg/L		0.0005	<0.0005	<0.0005	0.0005	0.0968	0.0005	<0.0005
Total Copper	mg/L		0.001	0.001	0.001	0.001	0.081	0.001	0.001
Total Iron	mg/L		0.010	0.070	0.266	0.010	41.0	0.010	0.262
Total Lead	mg/L		0.001	<0.001	<0.001	0.001	0.068	0.001	0.002
Total Manganese	mg/L		0.002	0.004	0.028	0.002	6.84	0.002	0.025
Dissolved Mercury	mg/L		0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Total Molybdenum	mg/L		0.002	<0.002	<0.002	0.002	0.011	0.002	<0.002
Total Nickel	mg/L		0.003	0.003	<0.003	0.003	0.125	0.003	<0.003
Total Selenium	mg/L		0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Total Silicon	mg/L		0.18	3.39	3.73	0.18	10.5	0.18	3.90
Total Silver	mg/L		0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Total Strontium	mg/L		0.005	0.016	0.021	0.005	0.239	0.005	0.023
Total Thallium	mg/L		0.0003	<0.0003	<0.0003	0.0003	<0.0003	0.0003	<0.0003
Total Titanium	mg/L		0.010	<0.010	<0.010	0.010	0.246	0.010	<0.010
Total Vanadium	mg/L		0.002	<0.002	<0.002	0.002	0.019	0.002	<0.002
Total Zinc	mg/L		0.020	<0.020	<0.020	0.020	4.18	0.020	<0.020
Turbidity	NTU		0.5	0.8	9.6	0.5	82.2	0.5	7.7

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4968484-4968487 Dilution required, RDL has been increased accordingly.
Un-ionized Ammonia detection limit is a calculated RDL. The calculation of Un-ionized Ammonia is based on the field temperature and pH. Values are reported as calculated.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.
AGAT WORK ORDER: 23P021636

PROJECT: 230225-04
ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter
SAMPLED BY:

Water Analysis

RPT Date: May 26, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Surface Water Parameters															
BOD (5)	4968447		<2	<2	NA	< 2	101%	75%	125%						
pH	4968094		7.66	7.70	0.5%	NA	100%	90%	110%						
Alkalinity (as CaCO3)	4968094		398	403	1.2%	< 5	103%	80%	120%						
Electrical Conductivity	4968094		1260	1260	0.0%	< 2	106%	90%	110%						
Total Dissolved Solids	4968484	4968484	12	14	NA	< 10	100%	80%	120%						
Total Suspended Solids	4972322		<10	<10	NA	< 10	98%	80%	120%						
Chloride	4968088		76.1	76.2	0.1%	< 0.10	98%	70%	130%	103%	80%	120%	105%	70%	130%
Nitrate as N	4968088		2.60	2.61	0.4%	< 0.05	98%	70%	130%	97%	80%	120%	98%	70%	130%
Nitrite as N	4968088		<0.05	<0.05	NA	< 0.05	98%	70%	130%	97%	80%	120%	100%	70%	130%
Sulphate	4968088		344	343	0.3%	< 0.10	99%	70%	130%	101%	80%	120%	NA	70%	130%
Ammonia as N	4968480		<0.02	<0.02	NA	< 0.02	114%	70%	130%	104%	80%	120%	87%	70%	130%
Total Kjeldahl Nitrogen	4968484	4968484	0.17	0.16	NA	< 0.10	101%	70%	130%	98%	80%	120%	97%	70%	130%
Total Phosphorus	4968519		0.02	<0.02	NA	< 0.02	94%	70%	130%	98%	80%	120%	97%	70%	130%
Chemical Oxygen Demand	4968519		22	21	NA	< 5	112%	80%	120%	104%	90%	110%	97%	70%	130%
True Colour	4968521		18.6	18.1	2.7%	< 2.5	108%	90%	110%						
Total Calcium	4968484	4968484	2.05	2.16	5.2%	< 0.20	105%	70%	130%	102%	80%	120%	105%	70%	130%
Total Magnesium	4968484	4968484	0.54	0.50	7.7%	< 0.10	102%	70%	130%	103%	80%	120%	102%	70%	130%
Total Potassium	4968484	4968484	0.86	0.81	NA	< 0.50	100%	70%	130%	100%	80%	120%	100%	70%	130%
Total Sodium	4968484	4968484	1.03	0.99	4.0%	< 0.10	108%	70%	130%	104%	80%	120%	102%	70%	130%
Aluminum-dissolved	4980304		0.017	0.017	NA	< 0.004	92%	70%	130%	110%	80%	120%	124%	70%	130%
Total Arsenic	4968484	4968484	<0.003	<0.003	NA	< 0.003	98%	70%	130%	103%	80%	120%	98%	70%	130%
Total Barium	4968484	4968484	0.012	0.011	8.7%	< 0.002	96%	70%	130%	97%	80%	120%	95%	70%	130%
Total Beryllium	4968484	4968484	<0.001	<0.001	NA	< 0.001	105%	70%	130%	104%	80%	120%	103%	70%	130%
Total Boron	4968484	4968484	<0.010	<0.010	NA	< 0.010	104%	70%	130%	104%	80%	120%	103%	70%	130%
Total Cadmium	4968484	4968484	<0.0001	<0.0001	NA	< 0.0001	100%	70%	130%	98%	80%	120%	98%	70%	130%
Total Chromium	4968484	4968484	<0.003	<0.003	NA	< 0.003	98%	70%	130%	101%	80%	120%	100%	70%	130%
Total Cobalt	4968484	4968484	<0.0005	<0.0005	NA	< 0.0005	98%	70%	130%	96%	80%	120%	100%	70%	130%
Total Copper	4968484	4968484	0.001	0.001	NA	< 0.001	98%	70%	130%	100%	80%	120%	97%	70%	130%
Total Iron	4968484	4968484	0.070	0.066	5.9%	< 0.010	103%	70%	130%	119%	80%	120%	104%	70%	130%
Total Lead	4968484	4968484	<0.001	<0.001	NA	< 0.001	97%	70%	130%	96%	80%	120%	96%	70%	130%
Total Manganese	4968484	4968484	0.004	0.004	NA	< 0.002	102%	70%	130%	102%	80%	120%	104%	70%	130%
Dissolved Mercury	4968484	4968484	<0.0001	<0.0001	NA	< 0.0001	101%	70%	130%	104%	80%	120%	93%	70%	130%
Total Molybdenum	4968484	4968484	<0.002	<0.002	NA	< 0.002	103%	70%	130%	101%	80%	120%	105%	70%	130%
Total Nickel	4968484	4968484	0.003	<0.003	NA	< 0.003	98%	70%	130%	92%	80%	120%	103%	70%	130%
Total Selenium	4968484	4968484	<0.002	<0.002	NA	< 0.002	101%	70%	130%	102%	80%	120%	102%	70%	130%
Total Silicon	4968484	4968484	3.39	3.32	2.1%	< 0.05	98%	70%	130%	98%	80%	120%	99%	70%	130%
Total Silver	4968484	4968484	<0.0001	<0.0001	NA	< 0.0001	99%	70%	130%	95%	80%	120%	96%	70%	130%
Total Strontium	4968484	4968484	0.016	0.011	NA	< 0.005	106%	70%	130%	100%	80%	120%	103%	70%	130%
Total Thallium	4968484	4968484	<0.0003	<0.0003	NA	< 0.0003	96%	70%	130%	98%	80%	120%	98%	70%	130%

AGAT Laboratories
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CANADA L4Z 1Y2
TEL (905)712-5100
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http://www.agatlabs.com

Quality Assurance

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.
AGAT WORK ORDER: 23P021636
PROJECT: 230225-04
ATTENTION TO: Carolyn Miller
SAMPLING SITE:Lake St. Peter
SAMPLED BY:

Water Analysis (Continued)

RPT Date: May 26, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Titanium	4968484	4968484	<0.010	<0.010	NA	< 0.010	109%	70%	130%	103%	80%	120%	100%	70%	130%
Total Vanadium	4968484	4968484	<0.002	<0.002	NA	< 0.002	100%	70%	130%	99%	80%	120%	101%	70%	130%
Total Zinc	4968484	4968484	<0.020	<0.020	NA	< 0.020	100%	70%	130%	99%	80%	120%	101%	70%	130%
Turbidity	4968480		14.5	14.0	3.5%	< 0.5	90%	80%	120%						

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By:

AGAT Laboratories

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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Method Summary

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23P021636

PROJECT: 230225-04

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
BOD (5)	INOR-93-6006	Modified from SM 5210 B	DO METER
BOD setup			
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Alkalinity (as CaCO3)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Ammonia-Un-ionized (Calculated)		MOE REFERENCE, PWQOs Tab 2	CALCULATION
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Chemical Oxygen Demand	INOR-93-6042	modified from SM 5220 A and SM 5220 D	SPECTROPHOTOMETER
True Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Total Calcium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Magnesium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Potassium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Sodium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories

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Method Summary

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23P021636

PROJECT: 230225-04

ATTENTION TO: Carolyn Miller

SAMPLING SITE:Lake St. Peter

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Dissolved Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silicon	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Thallium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 23P021636

Cooler Quantity: 1 large

Arrival Temperatures: 5.2 | 5.7 | 5.6
4.8 | 4.6 | 5.0

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: ICE

Report Information:

Company: BluMetric
Contact: Carolyn Miller
Address: 4 Cataraqui St
Kingston, ON, K7K 1Z7
Phone: 613-328-0243 Fax:
Reports to be sent to:
1. Email: cmiller@blumetric.ca
2. Email: cbandler@blumetric.ca

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Excess Soils R406
Table (Indicate One)

☐ Regulation 558

☐ CCME

☐ Sewer Use ☐ Sanitary ☐ Storm
(Region)

☑ Prov. Water Quality Objectives (PWQO)

☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☒ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 230225-04
Site Location: Lake St.Peter
Sampled By:
AGAT Quote #: 740802 PO: 230225-04
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email: ap@blumetric.ca

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC Y/N	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs	O. Reg 153: Analyze F4G if required ☐ Yes ☐ No	O. Reg 153: PAHs	O. Reg 153: PCBs	O. Reg 153: VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	93-263 Surface water	121-405 BOD		Field Temp		Field pH		Potentially Hazardous or High Concentration (Y/N)
LSP-SW1	May 4/23	14:54 PM	11	SW		N												☑	☑		6.6		6.24		
LSP-SW2	May 4/23	14:27 PM	11	SW	Lab filter: Diss. Hg & Al	N												☑	☑		6.4		6.08		
LSP-DP1-21	May 4/23	14:41 PM	11	SW		N												☑	☑		5.0		6.18		
LSP-QAQC-SW1	May 4/23	14:27 PM	11	SW		N												☑	☑		6.4		6.08		
		AM PM																							
		AM PM																							
		AM PM																							
		AM PM																							
		AM PM																							
		AM PM																							
		AM PM																							

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Brad M'Callum / Brad M'Callum	May 5, 2023	9:30	Karly Sears	May 5/23	930.
	May 5/23	1600	Aniqa Tahir	06/05/2023	10:23am

Page 1 of 1

N°:

Your P.O. #: 230301-00
Site#: 700
Your C.O.C. #: 930470-07-01

Attention: Cecilia Bandler

BluMetric Environmental Inc
The Tower - The Woolen Mill
4 Cataraqui St
Kingston, ON
CANADA K7K 1Z7

Report Date: 2023/05/15
Report #: R7629534
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3D0944
Received: 2023/05/09, 09:08

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Phenols (4AAP)	4	N/A	2023/05/11	CAM SOP-00444	OMOE E3179 m

Remarks:

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.

Your P.O. #: 230301-00
Site#: 700
Your C.O.C. #: 930470-07-01

Attention: Cecilia Bandler

BluMetric Environmental Inc
The Tower - The Woolen Mill
4 Cataraqui St
Kingston, ON
CANADA K7K 1Z7

Report Date: 2023/05/15
Report #: R7629534
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3D0944
Received: 2023/05/09, 09:08

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bureauveritas.com
Phone# (519)652-9444

==========

Bureau Veritas 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 Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3D0944
Report Date: 2023/05/15

BluMetric Environmental Inc
Your P.O. #: 230301-00
Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VTJ590	VTJ591	VTJ592	VTJ593		
Sampling Date		2023/05/04 14:54	2023/05/04 14:27	2023/05/04 14:41	2023/05/04 14:27		
COC Number		930470-07-01	930470-07-01	930470-07-01	930470-07-01		
	UNITS	LSP-SW1	LSP-SW2	LSP-DP1-21	LSP-QAQC-SW1	RDL	QC Batch
Inorganics							
Phenols-4AAP	mg/L	ND	ND	ND	ND	0.0010	8660578

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3D0944
Report Date: 2023/05/15

BluMetric Environmental Inc
Your P.O. #: 230301-00
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: VTJ590
Sample ID: LSP-SW1
Matrix: Water

Collected: 2023/05/04
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8660578	N/A	2023/05/11	Mandeep Kaur

Bureau Veritas ID: VTJ591
Sample ID: LSP-SW2
Matrix: Water

Collected: 2023/05/04
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8660578	N/A	2023/05/11	Mandeep Kaur

Bureau Veritas ID: VTJ592
Sample ID: LSP-DP1-21
Matrix: Water

Collected: 2023/05/04
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8660578	N/A	2023/05/11	Mandeep Kaur

Bureau Veritas ID: VTJ593
Sample ID: LSP-QAQC-SW1
Matrix: Water

Collected: 2023/05/04
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8660578	N/A	2023/05/11	Mandeep Kaur

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.0°C

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C3D0944
Report Date: 2023/05/15

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc
Your P.O. #: 230301-00
Sampler Initials: BM

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8660578	Phenols-4AAP	2023/05/11	100	80 - 120	97	80 - 120	ND, RDL=0.0010	mg/L	5.7	20

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.

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.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

VALIDATION SIGNATURE PAGE

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

Cristina Carriere, Senior Scientific Specialist

Bureau Veritas 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 Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

IMMEDIATE

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

Page 1 of 1

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#1192 BluMetric Environmental Inc	Company Name:	#5638 BluMetric Environmental Inc	Quotation #:	C30114	Bureau Veritas Job #:	Bottle Order #:
Attention:	Accounts Payable	Attention:	Cecilia Bandler	P.O. #:	230301-00		930470
Address:	1682 Woodward Drive	Address:	The Tower - The Woolen Mill 4 Cataraqui St	Project:		COC #:	Project Manager:
	Ottawa ON K2C 3R8		Kingston ON K7K 1Z7	Project Name:		C#930470-07-01	Christine Gripton
Tel:	(613) 839-3053 Fax: (613) 839-5376	Tel:	(613) 531-2725 Fax:	Site #:	700		
Email:	ap@blumetric.ca	Email:	cbandler@blumetric.ca	Sampled By:	BM/MD		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- ☐ Table 1 ☐ Res/Park ☐ Medium/Fine
- ☐ Table 2 ☐ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other ☐ For RSC
- ☐ Table ___

Other Regulations
- ☐ CCME ☐ Sanitary Sewer Bylaw
- ☐ Reg 558 ☐ Storm Sewer Bylaw
- ☐ MISA Municipality ___
- ☐ PWQO ☐ Reg 406 Table ___
- ☐ Other ___

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ___

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☒
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Phenols (4AAP)									# of Bottles	Comments
1		LSP-SW1	May 4/23	14:54	SW	N	✓									1	
2		LSP-SW2	May 4/23	14:27	SW	N	✓									1	
3		LSP-DP1-21	May 4/23	14:41	GW	N	✓									1	
4		LSP-QARC-SW1	May 4/23	14:27	SW	N	✓									1	
5																	
6																	
7																	
8																	
9																	
10																	

09-May-23 09:08
Christine Gripton
C3D0944

AK0 ENV-1231

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Brad M'Call / Brad M'Call	2023/05/08	9:00		23/05/09	0948	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	8.1 9.7	Present		
		Intact		✓

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

Bureau Veritas Canada (2019) Inc.

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Canadian owned.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 23-010844 - Rev. 0

Report To:
Blumetric Environmental
3108 Carp Rd
PO Box 430
Carp, ON K0A 1L0

CADUCEON Environmental Laboratories
285 Dalton Ave
Kingston, ON K7K 6Z1

Attention: Cecilia Bandler

DATE RECEIVED: 2023-May-05
DATE REPORTED: 2023-May-19
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: Lake St. Peter: 230225-04
P.O. NUMBER: 230301-00

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Phenols (Liquid)	3	KINGSTON	JMACINNES	2023-May-18	PHEN-01	MECP E3179

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

			Client I.D.	LSP-SW1	LSP-SW2	LSP-QAQC-SW1
			Sample I.D.	23-010844-1	23-010844-2	23-010844-3
			Date Collected	2023-05-04	2023-05-04	2023-05-04
Parameter	**Units**	**R.L.**		-	-	-
Phenolics	mg/L	0.001		<0.001	<0.001	<0.001

Richard Lecompte
Laboratory Supervisor

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Canadian owned.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 23-010847 - Rev. 0

Report To:
Blumetric Environmental
3108 Carp Rd
PO Box 430
Carp, ON K0A 1L0

CADUCEON Environmental Laboratories
285 Dalton Ave
Kingston, ON K7K 6Z1

Attention: Cecilia Bandler

DATE RECEIVED:	2023-May-05	CUSTOMER PROJECT:	Lake St. Peter: 230225-04
DATE REPORTED:	2023-May-19	P.O. NUMBER:	230301-00
SAMPLE MATRIX:	Ground Water		

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Phenols (Liquid)	1	KINGSTON	JMACINNES	2023-May-18	PHEN-01	MECP E3179

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

			Client I.D.	LSP-DPI-21
			Sample I.D.	23-010847-1
			Date Collected	2023-05-04
Parameter	**Units**	**R.L.**		-
Phenolics	mg/L	0.001		<0.001

Richard Lecompte
Laboratory Supervisor

Your Project #: 230225-04
Site Location: Lake St. Peter
Your C.O.C. #: 786143

Attention: Cecilia Bandler

BluMetric Environmental Inc
The Tower - The Woolen Mill
4 Cataraqui St
Kingston, ON
CANADA K7K 1Z7

Report Date: 2023/10/31
Report #: R7888330
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W5487
Received: 2023/10/19, 10:40

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dissolved Aluminum (0.2 u, clay free)	1	N/A	2023/10/25	CAM SOP-00447	EPA 6020B m
Alkalinity	1	N/A	2023/10/21	CAM SOP-00448	SM 23 2320 B m
Biochemical Oxygen Demand (BOD)	1	2023/10/20	2023/10/25	CAM SOP-00427	SM 23 5210B m
Chloride by Automated Colourimetry	1	N/A	2023/10/21	CAM SOP-00463	SM 23 4500-Cl E m
Chemical Oxygen Demand	1	N/A	2023/10/26	CAM SOP-00416	SM 23 5220 D m
Colour	1	N/A	2023/10/23	CAM SOP-00412	SM 23 2120C m
Conductivity	1	N/A	2023/10/21	CAM SOP-00414	SM 23 2510 m
Hardness (calculated as CaCO3)	1	N/A	2023/10/25	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Mercury in Water by CVAA	1	2023/10/24	2023/10/24	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	1	2023/10/24	2023/10/24	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	1	N/A	2023/10/24	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	1	N/A	2023/10/22	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	1	2023/10/20	2023/10/21	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2023/10/23	CAM SOP-00444	OMOE E3179 m
Field Measured pH (2)	1	N/A	2023/10/19		Field pH Meter
Sulphate by Automated Turbidimetry	1	N/A	2023/10/21	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	1	2023/10/26	2023/10/27	CAM SOP-00428	SM 23 2540C m
Field Temperature (2)	1	N/A	2023/10/19		Field Thermometer
Total Kjeldahl Nitrogen in Water	1	2023/10/23	2023/10/25	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2023/10/23	2023/10/24	CAM SOP-00407	SM 23 4500-P I
Total Suspended Solids	1	2023/10/28	2023/10/31	CAM SOP-00428	SM 23 2540D m
Turbidity	1	N/A	2023/10/20	CAM SOP-00417	SM 23 2130 B m
Un-ionized Ammonia (3)	1	2023/10/19	2023/10/24	Auto Calc.	PWQO

Remarks:

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, MELCCFP, 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

Your Project #: 230225-04
Site Location: Lake St. Peter
Your C.O.C. #: 786143

Attention: Cecilia Bandler

BluMetric Environmental Inc
The Tower - The Woolen Mill
4 Cataraqui St
Kingston, ON
CANADA K7K 1Z7

Report Date: 2023/10/31
Report #: R7888330
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W5487
Received: 2023/10/19, 10:40

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.

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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) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bureauveritas.com
Phone# (519)652-9444

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas 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 Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3W5487
Report Date: 2023/10/31

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XIK715		
Sampling Date		2023/10/17 10:35		
COC Number		786143		
	UNITS	LSP-DP1-21	RDL	QC Batch
Calculated Parameters				
Hardness (CaCO3)	mg/L	190	1.0	8991798
Total Un-ionized Ammonia	mg/L	0.0020	0.00061	8992185
Field Measurements				
Field Temperature	Celsius	9.2	N/A	ONSITE
Field Measured pH	pH	6.1		ONSITE
Inorganics				
Total Ammonia-N	mg/L	7.5	0.050	9001398
Total BOD	mg/L	23	2	8994131
Total Chemical Oxygen Demand (COD)	mg/L	88	4.0	9000886
Colour	TCU	580	20	8993311
Conductivity	umho/cm	600	1.0	8995950
Total Dissolved Solids	mg/L	330	10	9007416
Total Kjeldahl Nitrogen (TKN)	mg/L	8.0	1.0	9000766
pH	pH	6.85		8995961
Phenols-4AAP	mg/L	ND	0.0010	8995795
Total Phosphorus	mg/L	0.19	0.020	9000390
Total Suspended Solids	mg/L	200	10	9013734
Dissolved Sulphate (SO4)	mg/L	22	1.0	8997040
Turbidity	NTU	96	0.1	8996682
Alkalinity (Total as CaCO3)	mg/L	240	1.0	8995928
Dissolved Chloride (Cl-)	mg/L	24	1.0	8997038
Nitrite (N)	mg/L	ND	0.010	8996036
Nitrate (N)	mg/L	ND	0.10	8996036
Nitrate + Nitrite (N)	mg/L	ND	0.10	8996036

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

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Bureau Veritas Job #: C3W5487
Report Date: 2023/10/31

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XIK715		
Sampling Date		2023/10/17 10:35		
COC Number		786143		
	UNITS	LSP-DP1-21	RDL	QC Batch
Metals				
Dissolved (0.2u) Aluminum (Al)	ug/L	5	5	8997024
Dissolved Mercury (Hg)	ug/L	ND	0.10	9002508
Total Arsenic (As)	ug/L	61	1.0	9001317
Total Barium (Ba)	ug/L	500	2.0	9001317
Total Beryllium (Be)	ug/L	ND	0.40	9001317
Total Boron (B)	ug/L	450	10	9001317
Total Cadmium (Cd)	ug/L	0.43	0.090	9001317
Total Calcium (Ca)	ug/L	60000	200	9001317
Total Chromium (Cr)	ug/L	94	5.0	9001317
Total Cobalt (Co)	ug/L	340	0.50	9001317
Total Copper (Cu)	ug/L	120	0.90	9001317
Total Iron (Fe)	ug/L	160000	500	9001317
Total Lead (Pb)	ug/L	35	0.50	9001317
Total Magnesium (Mg)	ug/L	10000	50	9001317
Total Manganese (Mn)	ug/L	11000	10	9001317
Total Molybdenum (Mo)	ug/L	29	0.50	9001317
Total Nickel (Ni)	ug/L	270	1.0	9001317
Total Potassium (K)	ug/L	21000	200	9001317
Total Selenium (Se)	ug/L	ND	2.0	9001317
Total Silicon (Si)	ug/L	8100	50	9001317
Total Silver (Ag)	ug/L	0.18	0.090	9001317
Total Sodium (Na)	ug/L	18000	100	9001317
Total Strontium (Sr)	ug/L	340	1.0	9001317
Total Thallium (Tl)	ug/L	0.069	0.050	9001317
Total Titanium (Ti)	ug/L	86	5.0	9001317
Total Vanadium (V)	ug/L	10	0.50	9001317
Total Zinc (Zn)	ug/L	4700	5.0	9001317

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

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Bureau Veritas Job #: C3W5487
Report Date: 2023/10/31

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

TEST SUMMARY

Bureau Veritas ID: XIK715
Sample ID: LSP-DP1-21
Matrix: Water

Collected: 2023/10/17
Shipped:
Received: 2023/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	8997024	N/A	2023/10/25	Azita Fazaeli
Alkalinity	AT	8995928	N/A	2023/10/21	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	8994131	2023/10/20	2023/10/25	Nusrat Naz
Chloride by Automated Colourimetry	KONE	8997038	N/A	2023/10/21	Massarat Jan
Chemical Oxygen Demand	SPEC	9000886	N/A	2023/10/26	Nimarta Singh
Colour	SPEC	8993311	N/A	2023/10/23	Viorica Rotaru
Conductivity	AT	8995950	N/A	2023/10/21	Nachiketa Gohil
Hardness (calculated as CaCO3)		8991798	N/A	2023/10/25	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9002508	2023/10/24	2023/10/24	Gagandeep Rai
Total Metals Analysis by ICPMS	ICP/MS	9001317	2023/10/24	2023/10/24	Indira HarryPaul
Total Ammonia-N	LACH/NH4	9001398	N/A	2023/10/24	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8996036	N/A	2023/10/22	Chandra Nandlal
pH	AT	8995961	2023/10/20	2023/10/21	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	8995795	N/A	2023/10/23	Chloe Pollock
Field Measured pH	PH	ONSITE	N/A	2023/10/19	Pardeep Purewal
Sulphate by Automated Turbidimetry	KONE	8997040	N/A	2023/10/21	Massarat Jan
Total Dissolved Solids	BAL	9007416	2023/10/26	2023/10/27	Darshan Patel
Field Measured pH	PH	ONSITE	N/A	2023/10/19	Pardeep Purewal
Total Kjeldahl Nitrogen in Water	SKAL	9000766	2023/10/23	2023/10/25	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9000390	2023/10/23	2023/10/24	Sachi Patel
Total Suspended Solids	BAL	9013734	2023/10/28	2023/10/31	Razieh Tabesh
Turbidity	AT	8996682	N/A	2023/10/20	Leily Karimi
Un-ionized Ammonia	CALC/NH3	8992185	2023/10/24	2023/10/24	Automated Statchk

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C

Sample XIK715 [LSP-DP1-21] : TDS Analysis: Analysis was performed past sample holding time. This may increase the variability associated with these results.
TSS Analysis: Analysis was performed past sample holding time. This may increase the variability associated with these results.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8993311	Colour	2023/10/23			99	80 - 120	ND,RDL=2	TCU	NC	25		
8994131	Total BOD	2023/10/25					ND,RDL=2	mg/L	9.5	30	94	80 - 120
8995795	Phenols-4AAP	2023/10/20	102	80 - 120	100	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
8995928	Alkalinity (Total as CaCO3)	2023/10/21			SAU	85 - 115	ND, RDL=1.0	mg/L	0.36	20		
8995950	Conductivity	2023/10/21			100	85 - 115	ND, RDL=1.0	umho/cm	0	10		
8995961	pH	2023/10/21			102	98 - 103			0.62	N/A		
8996036	Nitrate (N)	2023/10/22	102	80 - 120	102	80 - 120	ND, RDL=0.10	mg/L	0.78	20		
8996036	Nitrite (N)	2023/10/22	106	80 - 120	107	80 - 120	ND, RDL=0.010	mg/L	NC	20		
8996682	Turbidity	2023/10/20			101	80 - 120	ND, RDL=0.1	NTU	2.8	20		
8997024	Dissolved (0.2u) Aluminum (Al)	2023/10/25	101	80 - 120	103	80 - 120	ND,RDL=5	ug/L	1.1	20		
8997038	Dissolved Chloride (Cl-)	2023/10/21	NC	80 - 120	106	80 - 120	ND, RDL=1.0	mg/L	1.1	20		
8997040	Dissolved Sulphate (SO4)	2023/10/21	NC	75 - 125	104	80 - 120	ND, RDL=1.0	mg/L	0.35	20		
9000390	Total Phosphorus	2023/10/24	109	80 - 120	105	80 - 120	ND, RDL=0.020	mg/L	2.9	20	104	80 - 120
9000766	Total Kjeldahl Nitrogen (TKN)	2023/10/24	105	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	13	20	104	80 - 120
9000886	Total Chemical Oxygen Demand (COD)	2023/10/25	NC	80 - 120	99	80 - 120	ND, RDL=4.0	mg/L	17	20		
9001317	Total Arsenic (As)	2023/10/24	100	80 - 120	98	80 - 120	ND, RDL=1.0	ug/L	NC	20		
9001317	Total Barium (Ba)	2023/10/24	98	80 - 120	99	80 - 120	ND, RDL=2.0	ug/L				
9001317	Total Beryllium (Be)	2023/10/24	105	80 - 120	107	80 - 120	ND, RDL=0.40	ug/L	NC	20		
9001317	Total Boron (B)	2023/10/24	101	80 - 120	105	80 - 120	ND, RDL=10	ug/L	7.8	20		
9001317	Total Cadmium (Cd)	2023/10/24	101	80 - 120	99	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9001317	Total Calcium (Ca)	2023/10/24	NC	80 - 120	99	80 - 120	ND, RDL=200	ug/L				
9001317	Total Chromium (Cr)	2023/10/24	96	80 - 120	95	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9001317	Total Cobalt (Co)	2023/10/24	101	80 - 120	101	80 - 120	ND, RDL=0.50	ug/L	5.3	20		
9001317	Total Copper (Cu)	2023/10/24	103	80 - 120	101	80 - 120	ND, RDL=0.90	ug/L	0.28	20		
9001317	Total Iron (Fe)	2023/10/24	NC	80 - 120	99	80 - 120	ND, RDL=100	ug/L	8.4	20		
9001317	Total Lead (Pb)	2023/10/24	98	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	7.8	20		
9001317	Total Magnesium (Mg)	2023/10/24	94	80 - 120	98	80 - 120	ND, RDL=50	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9001317	Total Manganese (Mn)	2023/10/24	98	80 - 120	96	80 - 120	ND, RDL=2.0	ug/L				
9001317	Total Molybdenum (Mo)	2023/10/24	105	80 - 120	103	80 - 120	ND, RDL=0.50	ug/L	7.3	20		
9001317	Total Nickel (Ni)	2023/10/24	98	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L	9.1	20		
9001317	Total Potassium (K)	2023/10/24	102	80 - 120	99	80 - 120	ND, RDL=200	ug/L				
9001317	Total Selenium (Se)	2023/10/24	101	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L	NC	20		
9001317	Total Silicon (Si)	2023/10/24	110	80 - 120	101	80 - 120	ND, RDL=50	ug/L				
9001317	Total Silver (Ag)	2023/10/24	102	80 - 120	101	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9001317	Total Sodium (Na)	2023/10/24	97	80 - 120	97	80 - 120	ND, RDL=100	ug/L				
9001317	Total Strontium (Sr)	2023/10/24	98	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L				
9001317	Total Thallium (Tl)	2023/10/24	101	80 - 120	100	80 - 120	ND, RDL=0.050	ug/L	NC	20		
9001317	Total Titanium (Ti)	2023/10/24	NC	80 - 120	99	80 - 120	ND, RDL=5.0	ug/L				
9001317	Total Vanadium (V)	2023/10/24	98	80 - 120	95	80 - 120	ND, RDL=0.50	ug/L	8.7	20		
9001317	Total Zinc (Zn)	2023/10/24	100	80 - 120	99	80 - 120	ND, RDL=5.0	ug/L	1.1	20		
9001398	Total Ammonia-N	2023/10/24	101	75 - 125	103	80 - 120	ND, RDL=0.050	mg/L	6.8	20		
9002508	Dissolved Mercury (Hg)	2023/10/24	101	75 - 125	102	80 - 120	ND, RDL=0.10	ug/L	NC	20		
9007416	Total Dissolved Solids	2023/10/27			98	90 - 110	ND, RDL=10	mg/L	1.7	20		
9013734	Total Suspended Solids	2023/10/31			99	85 - 115	ND, RDL=10	mg/L	NC	20		

N/A = Not Applicable

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

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

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

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

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

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).

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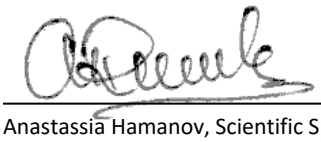
Bureau Veritas Job #: C3W5487
Report Date: 2023/10/31

BluMetric Environmental Inc
Client Project #: 230225-04
Site Location: Lake St. Peter
Sampler Initials: CM

VALIDATION SIGNATURE PAGE

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



Anastassia Hamanov, Scientific Specialist

Christine Gripton, Senior Project Manager

Bureau Veritas 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 Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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Custody Tracking Form

T782138

T786143

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form has a barcode or a Bureau Veritas eCOC confirmation number in the top right hand side. This number links your electronic submission to your samples. This form should be placed in the cooler with your samples.

First Sample: LSP-SW1
Last Sample: LSP-QAQC-SW1
Sample Count: 4

Relinquished By				Received By			
Brad McCallum	Brad McCallum	Date	2023/10/18	RAVNEET KAUR BHAR	Ravneet	Date	2023/10/19
		Time (24 HR)	08:00			Time (24 HR)	10:40
Print	Sign	Date	YYYY/MM/DD	Print	Sign	Date	YYYY/MM/DD
		Time (24 HR)	HH:MM			Time (24 HR)	HH:MM
Print	Sign	Date	YYYY/MM/DD	Print	Sign	Date	YYYY/MM/DD
		Time (24 HR)	HH:MM			Time (24 HR)	HH:MM

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Triage Information

Sampled By (Print): Brad McCallum / Matt DeGeer

# of Coolers/Pkgs: 1

Rush ☐ Immediate ☐ Food Residue ☐

Micro ☐ Food Chemistry ☐

*** LABORATORY USE ONLY ***

Received At

Labeled By

Verified By

Lab Comments:

19-Oct-23 10:40
Christine Gripton
C3W5487
ANA ENV 1565

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	0	3	3
Drinking Water Metals Preservation Check Done (Circle)				YES	NO

COR FCD-00383/4

Page 1 of 1

Appendix D

D-4 Groundwater QA/QC

2023 Groundwater Sampling Quality Assurance and Quality Control
(Spring)

Sample Description		RDL	LSP2-03	LSP-QAQC-GW1	Relative Percent Difference
Date Sampled			2023-May-04	2023-May-04	
Parameter	Unit				
Chloride	mg/L	0.1	0.42	0.41	NA
Nitrate as N	mg/L	0.05	<0.05	<0.05	
Sulphate	mg/L	0.1	3.49	3.5	0%
Magnesium (diss)	mg/L	0.05	0.78	0.87	11%
Potassium (diss)	mg/L	0.5	0.94	0.84	NA
Sodium (diss)	mg/L	0.05	1.71	1.49	14%
Alkalinity (as CaCO3)	mg/L	1	14	13	7%
Ammonia as N	mg/L	0.02	<0.02	<0.02	
Dissolved Organic Carbon	mg/L	0.4	2.9	2.6	NA
Electrical Conductivity	uS/cm	1	41	42	2%
pH	mg/L		6.66	6.59	1%
Total Dissolved Solids	mg/L	10	38	42	NA
Total Suspended Solids	mg/L	10	487	769	45%
Barium (diss)	mg/L	0.002	0.01	0.01	NA
Boron (diss)	mg/L	0.01	<0.01	<0.01	
Iron (diss)	mg/L	0.01	0.131	0.127	3%
Manganese (diss)	mg/L	0.002	0.052	0.052	0%

-LEGEND-

Grey shading indicates the maximum RPD calculated when no value exceeds high level of reproducibility.

Yellow shading indicates RPD value is above the percentage for a high level of reproducibility:

10% for electrical conductivity

20% for metals and inorganics

30% for BTEX and PHC.

2023 Groundwater Sampling Quality Assurance and Quality Control
(Fall)

Sample Description		RDL	LSP8-23	LSP-QAQC-GW1	Relative Percent Difference
Date Sampled			2023-Oct-17	2023-Oct-17	
Parameter	Unit				
Chloride	mg/L	0.1	50	45	11%
Nitrate as N	mg/L	0.05	<0.1	<0.1	
Sulphate	mg/L	0.1	12	11	9%
Calcium (diss)	mg/L	0.2	56	56	0%
Magnesium (diss)	mg/L	0.05	9.2	9.3	1%
Sodium (diss)	mg/L	0.05	44	44	0%
Alkalinity (as CaCO3)	mg/L	1	260	270	4%
Ammonia as N	mg/L	0.02	12	12	0%
Dissolved Organic Carbon	mg/L	0.4	37	36	3%
Electrical Conductivity	mg/L	1	690	680	1%
pH	mg/L		7.04	6.76	4%
Total Dissolved Solids	mg/L	10	395	355	11%
Total Suspended Solids	mg/L	10	5500	8000	37%
Barium (diss)	mg/L	0.002	0.47	0.47	0%
Boron (diss)	mg/L	0.01	0.26	0.27	4%
Iron (diss)	mg/L	0.01	92	93	1%
Manganese (diss)	mg/L	0.002	4.8	4.9	2%

-LEGEND-
Grey shading indicates the maximum RPD calculated when no value exceeds high level of reproducibility.
Yellow shading indicates RPD value is above the percentage for a high level of reproducibility:
10% for electrical conductivity
20% for metals and inorganics
30% for BTEX and PHC.

Appendix D

D-5 Surface Water QA/QC

2023 Surface Water Sampling Quality Assurance and Quality Control
(Spring)

Sample Description		RDL	LSP-SW2	LSP-QAQC-SW1	Relative Percent Difference
Date Sampled			2023-May-04	2023-May-04	
Parameter	Unit				
Chloride	mg/L	0.1	0.58	0.6	NA
Nitrate as N	mg/L	0.05	0.1	0.1	NA
Nitrite as N	mg/L	0.01	<0.05	<0.05	
Sulphate	mg/L	0.1	4.86	4.98	2%
Calcium (tot)	mg/L	0.2	3.66	4.24	15%
Magnesium (tot)	mg/L	0.05	0.84	0.83	1%
Potassium (tot)	mg/L	0.2	1.22	1.36	NA
Sodium (tot)	mg/L	0.1	1.78	1.83	3%
Alkalinity (as CaCO3)	mg/L	5	9	10	NA
Ammonia as N	mg/L	0.02	<0.02	<0.02	
Chemical Oxygen Demand	mg/L	4	16	16	NA
Colour	TCU	2.5	34.9	34.7	1%
Electrical Conductivity	uS/cm	2	40	41	2%
pH			6.69	6.71	0%
Phenols-4AAP	mg/L	0.001	<0.001	<0.001	
Total Dissolved Solids	mg/L	10	38	34	NA
Total Hardness (as CaCO3)	mg/L	0.5	12.6	14	11%
Total Kjeldahl Nitrogen	mg/L	0.1	0.26	0.22	NA
Total Phosphorus	mg/L	0.02	<0.02	<0.02	
Total Suspended Solids	mg/L	10	<10	<10	
Turbidity	NTU	0.1	9.6	7.7	22%
Unionized Ammonia (Calc)	mg/L	0.000002	<0.000002	<0.000002	
Aluminum (diss, PWQO)	mg/L	0.004	0.117	0.124	6%
Arsenic (tot)	mg/L	0.001	<0.003	<0.003	
Barium (tot)	mg/L	0.002	0.013	0.014	NA
Beryllium (tot)	mg/L	0.0004	<0.001	<0.001	
Boron (tot)	mg/L	0.01	0.023	0.026	NA
Cadmium (tot)	mg/L	0.00009	<0.0001	<0.0001	
Chromium (tot)	mg/L	0.003	<0.003	<0.003	
Cobalt (tot)	mg/L	0.0005	<0.0005	<0.0005	
Copper (tot)	mg/L	0.0009	0.001	0.001	NA
Iron (tot)	mg/L	0.01	0.266	0.262	2%
Lead (tot)	mg/L	0.0005	<0.001	0.002	
Manganese (tot)	mg/L	0.002	0.028	0.025	11%
Mercury (diss)	mg/L	0.0001	<0.0001	<0.0001	
Molybdenum (tot)	mg/L	0.0005	<0.002	<0.002	
Nickel (tot)	mg/L	0.001	<0.003	<0.003	
Selenium (tot)	mg/L	0.002	<0.002	<0.002	
Silicon (tot)	mg/L	0.05	3.73	3.9	4%
Silver (tot)	mg/L	0.00009	<0.0001	<0.0001	
Strontium (tot)	mg/L	0.001	0.021	0.023	9%
Thallium (tot)	mg/L	0.00005	<0.0003	<0.0003	
Titanium (tot)	mg/L	0.005	<0.01	<0.01	
Vanadium (tot)	mg/L	0.0005	<0.002	<0.002	
Zinc (tot)	mg/L	0.005	<0.02	<0.02	

-LEGEND-
Grey shading indicates the maximum RPD calculated when no value exceeds high level of reproducibility.
Yellow shading indicates RPD value is above the percentage for a high level of reproducibility:
10% for electrical conductivity
20% for metals and inorganics
30% for BTEX and PHC.

Appendix D

D-6 Surface Water Toxicity Reports

NAUTILUS ENVIRONMENTAL

Certificate of Analysis

ACUTE LETHALITY BIOASSAY REPORT
(Single-Concentration Test)

CLIENT:
BluMetric Environmental Inc, 4 Cataraqui St, Kingston, ON K2K 1Z7

TEST RESULTS:

Sample Name[1]	Sample Number	Date Collected	Date Received	Date Tested	Test Species[2]	Percent Mortality[3]	Method Deviations
LSP Hwy127 Culvert	8602-0022303	01-Jun-23	02-Jun-23	05-Jun-23 02-Jun-23	RBT DM	0% 0%	None None

1 - Results relate only to the sample tested. Tested as received from client.
2 - Test Type and Species RBT = Rainbow Trout 96-hour 100% Effluent Concentration Acute Lethality Test
DM = *Daphnia magna* 48-hour 100% Effluent Concentration Acute Lethality Test
3 - Most regulations regard ≤50% mortality to be a "pass". Check your applicable regulatory requirements.

TEST PROTOCOLS:

Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Environmental Technology Centre, Ottawa, Ontario, Report EPS 1/RM/13 Second Edition - December 2000, including May 2007 and February 2016 Amendments. (Nautilus Test Method RT-SC-R1.7)

Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*", Environmental Technology Centre, Ottawa, Ontario, Report EPS 1/RM/14 Second Edition - December 2000, including February 2016 Amendment. (Nautilus Test Method DM-SC-R1.7)

REFERENCE/HEALTH DATA:

Trout
Date Reference Test Initiated: 05-May-23 **Reference Chemical:** Phenol **Fish Lot #:** LF120423
96-Hour LC50: 7.58 mg/L **95% Confidence Limits:** 6.65 mg/L; 8.64 mg/L
Historic Geometric Mean LC50: 8.94 mg/L **Historic Warning Limits (± 2 SD):** 6.69 mg/L; 11.95 mg/L

Daphnia magna
Date Reference Test Initiated: 29-May-23 **Reference Chemical:** Zinc
48-Hour LC50: 1.00 mg/L **95% Confidence Limits:** 0.80 mg/L; 1.26 mg/L
Historic Geometric Mean LC50: 1.00 mg/L **Historic Warning Limits (± 2 SD):** 0.39 mg/L; 2.60 mg/L

TEST RESULTS APPROVED BY:

Date: June 16, 2023

C. D'Andrea

Carol D'Andrea
Laboratory Supervisor

Y:\bioassays\2023\8000\8602-002\8602-0022303 TD

704 Mara Street Point Edward, ON N7V 1X4
519-339-8787

NAUTILUS ENVIRONMENTAL RAINBOW TROUT TOXICITY TEST BENCH SHEET

Sample Information 9002-002	Sar	Method: Composite (Grab) Other	**Test Information**	Type: Single Concentration	LC50 TIE Screen
Account ~~8130-00~~ VB	Sample Number 9002-0022303		Date/Time Started	05-06-23 / 1145	Analyst Starting Test VB
Client BluMetric	Sample Name LSP Hwy127 Culvert		Date/Time Ended	09/06/23 / 1115	Fish Lot # T2 LF 120423
Person Collecting Sample NA	Temperature Upon Receipt 27.5 °C		Test Volume	35 L Per Vessel	Number of Fish Per Vessel 10
Date/Time Collected	01-06-23 / 1130		Pre-Aeration	No (Yes)	Pre-Aeration Duration 30 min
Date/Time Received in Lab	02-06-23 / 1015		Rate of Aeration During Test	6.5 ±0.26 ml/min·L⁻¹	Dilution Water dechlor
Sample Description	clear dark yellow	Sample Type Description surface water	Sample Point Description: MISA (Other):		Sample pH Adjustment (No) Yes
					Storage Temperature 4 ± 2 °C

Initial Sample Measurements Before Aeration - Cond.: 144 µmhos D.O: 8.7 mg/L 89 % Temp: 15.4 °C pH: 7.0 Air Flow Meter Reading: 0.225 L/min.
Instrument Identification- M/P #: 7/6 M/P #: 7/5 M/P #: 13/91 Meter #: 7

TOXICANT	CONC %	TOTAL NUMBER DEAD # OF HOURS FROM START OF TEST					Initial Measurements After Pre-Aeration					Meter/Probe			Initials	Final Measurements					Meter/Probe		Initials
		—	24	48	72	96	Time	Cond (umhos)	D.O. (mg/L)/%	°C	pH (units)	Cond	D.O/ Temp	pH		Date	Time	°C	D.O. (mg/L)/%	pH (units)	D.O./ Temp	pH	
Control			0	0	0	0	1145	233	9.9	100	15.2 VB	7.8	7/8	7/5	13/91	VB	09/06/23	1115	16	8.6	89	7.8	7/5	13/91	SO
1	100		0	0	0	0	"	140	8.9	91	16 ~~15.7~~ VB	7.0	"	"	"	VB	↓	↓	15	8.5	87	7.3	↓	↓	↓
Time Initials			0950 ET	0915 SO	0855 SO	1115 SO	Number of Control Fish Showing Atypical Behaviour: <24h: — 24h: 0 48h: 0 72h: 0 96h: 0																		

Percent Mortality	0 %	**LENGTH (mm)**		**WEIGHT (g)**	Initials: VB	**Holding Mortalities 7-days Preceding Test**	Number of Fish in Batch at Day (-)7 ~~331~~ 330 SO
LC50 (Lower; Upper Limit)	—	Mean (SD)	52.5 (5.0)	Mean (SD)	1.25 (0.39)	Number Dead (recorded daily for 7 days)	Total Number Dead for 7 days Preceding Test
Method	—	Min/Max	46 / 59	Min/Max	0.71 / 1.77	0 + 0 + 0 + 0 + 0 + 0 + 0	= 0
Verified By (initials)	GD	Sample Size	10	Loading Density	0.36 g/L	7-Day Holding Mortality ([total number dead/number of fish in batch] x 100)	0

Observations and notes:

Nautilus *Daphnia magna* Toxicity Test Bench Sheet

Sample Information		Test Information			
Sample Method: Composite (Grab) Other		Test Type: (Single Concentration) LC50 TIE Screen			
Account Number 8602-002	Sample # 8602-0022303	Date Started/Time 02.06.23	1120:00	Analyst Starting Test KK	
Client B/a Metric	Sample Name LSP HWY 27 Culvert	Date Ended/Time 04.06.23	1120:00	#Neonates/Vessel 10	
Person Collecting Sample N/A	Temperature Upon Receipt 27.5 °C	Test Volume 250 mL/Vessel		mL Solution/Daphnid 25 mL	
Date/Time Sampled	01.06.23 1130	Pre-aeration (no) yes		Pre-aeration Duration — min	
Date/Time Received	02.06.23 1010:15	Pre-aeration Rate — ±2 mL/min L⁻¹		Sample Hardness Adjustment (no) yes	
Sample Description	clear dark yellow	Dilution H_2O # DW2345		Sample pH Adjustment (no) yes	
Sample Type Description	water, surface water	Sample Point Description: MISA (other)		Storage Temperature None °C	
LC50 Randomization Template: —		Test Row(s): 10			

Initial Sample Measurements: pH 6.6 Meter/Probe # ~~14~~ 14/90 Dissolved O_2 7.7 mg/L 87 % Conductivity 141 µmhos Meter/Probe # 5/6 Temperature 21 °C Meter/Probe # 6/4

Instrument Identification:

Concentration (% Volume)	pH			Dissolved Oxygen					Cond. (µmhos)	Hard. (mg/L)	Temperature (°C)		
	Initial	Final	Final M/P	Initial (mg/L)	Initial (%)	Final (mg/L)	Final (%)	Final M/P	Initial	Initial	Initial	Final	Final M/P
Control	8.0	8.0	14/90	8.3	95	8.9	100	6/4	608	198	21	21	6/4
100%	6.6	8.0	↓	7.7	87	8.8	98	↓	141	37	21	21	↓
Initials	KL	B		KL	B				KL	CF	KK	B	

BROOD CULTURE HEALTH INFORMATION

Brood Culture #	83^{E}_{B}	82^{C}_{B}			
Culture age (days)	17 →				
Days to 1st Brood (≤12)	8 →				
Average # of Neonates/Brood (≥15)	20 →				
Previous 7 Days Mortality in Culture (≤25%)	0 →				

NEONATE SOURCE AND OBSERVATIONS OF NUMBER IMMOBILE AND DEAD

	Control				100%												Init
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
Brood culture #	83^{E}_{B} →		82^{E}_{B}		83^{E}_{B} →		82^{E}_{B}										KK
24-Hr. # Immobile	0	0	0		0	0	0										KK
48-Hr. # Immobile	0	0	0		0	0	0										
48-Hr. # Dead	0	0	0		0	0	0										B
Total # Immobile	0				0												
Total # Dead	0				0												

Percent Mortality 0 % Standard Deviation of Control Survival 0 Standard Deviation of Test Survival 0 Verified By (Initials) KK Notes

NAUTILUS ENVIRONMENTAL
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 253348
Sample Number : 80395

SAMPLE IDENTIFICATION

Company :	Bureau Veritas Laboratories		
Location :	Mississauga ON	Sampling Date :	2023-11-15
Job Number :	C3AB262	Sampling Time :	08:10
Substance :	LSP-CULVERT	Date Received :	2023-11-17
Sampling Method :	Not provided	Time Received :	14:20
Sampled By :	B. McCallum	Temperature at Receipt :	16 °C
Sample Description :	Clear, brown.	Date Tested :	2023-11-18

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna* . Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	7.8 days
Organism Batch :	Dm23-22	Average Brood Size :	39.0
Culture Mortality :	1.3% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Duration of Pre-Aeration :	0 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride		
Date Tested :	2023-11-21	LC50 :	6.7 g/L
Organism Batch :	Dm23-22	95% Confidence Limits :	6.4 - 7.0 g/L
Analyst(s) :	MEP, FM	Historical Mean LC50 :	6.3 g/L
Statistical Method :	Spearman-Kärber	Warning Limits (± 2SD) :	5.7 - 7.1 g/L

COMMENTS

- All test validity criteria as specified in the test method were satisfied.

Approved By : _____

Project Manager

Work Order : 253348
Sample Number : 80395

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Chemistry (100%) :	6.6	8.3	118	21	99	80 mg/L

0 HOURS

Date & Time : 2023-11-18 15:15
Analyst(s) : SSF (AJS)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*	Hardness
100	A	0	0	6.6	8.3	118	21	99	80
100	B	0	0	6.6	8.3	118	21	99	80
100	C	0	0	6.6	8.3	118	21	99	80
Control	A	0	0	8.3	8.5	461	21	100	150
Control	B	0	0	8.3	8.5	461	21	100	150
Control	C	0	0	8.3	8.5	461	21	100	150

Notes:

24 HOURS

Date & Time : 2023-11-19 15:15
Analyst(s) : JW

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	22
100	B	–	0	–	–	–	22
100	C	–	0	–	–	–	22
Control	A	–	0	–	–	–	22
Control	B	–	0	–	–	–	22
Control	C	–	0	–	–	–	22

Notes:

48 HOURS

Date & Time : 2023-11-20 15:15
Analyst(s) : FM (SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	7.7	8.1	129	21
100	B	0	0	7.7	8.0	129	21
100	C	0	0	7.7	8.0	129	21
Control	A	0	0	8.3	8.1	475	21
Control	B	0	0	8.3	8.1	476	21
Control	C	0	0	8.3	8.1	476	21

Notes:

Number immobile does not include number dead.

"–" = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : JCS
Date : 2023-11-23

NAUTILUS ENVIRONMENTAL
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 253348
Sample Number : 80395

SAMPLE IDENTIFICATION

Company :	Bureau Veritas Laboratories		
Location :	Mississauga ON	Sampling Date :	2023-11-15
Job Number :	C3AB262	Sampling Time :	08:10
Substance :	LSP-CULVERT	Date Received :	2023-11-17
Sampling Method :	Not provided	Time Received :	14:20
Sampled By :	B. McCallum	Temperature at Receipt :	16 °C
Sample Description :	Clear, brown.	Date Tested :	2023-11-18

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Mean Fork Length :	37.5 mm
Organism Batch :	T23-25	Range of Fork Lengths :	35 - 41 mm
Control Sample Size :	10	Mean Wet Weight :	0.4 g
Cumulative stock tank mortality rate :	0% (previous 7 days)	Organism Loading Rate :	0.2 g/L
Control organisms showing stress :	0 (at test completion)		

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	20
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Duration of Pre-Aeration :	30 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride		
Organism Batch :	T23-25	LC50 :	3370 mg/L
Date Tested :	2023-11-15	95% Confidence Limits :	3197 - 3551 mg/L
Analyst(s) :	AJS, PG	Historical Mean LC50 :	3509 mg/L
Statistical Method :	Spearman-Kärber	Warning Limits (± 2SD) :	2938 - 4189 mg/L

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Approved By : _____

Project Manager

Work Order : 253348
Sample Number : 80395

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)[3]
Initial Water Chemistry (100%) :	6.6	8.3	118	16	89
After 30 min pre-aeration :	6.6	8.5	116	16	91

0 HOURS

Date & Time 2023-11-18 9:30
Analyst(s) : AJS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation[3]
100%	0	0	6.6	8.5	116	16	91
Control	0	0	8.2	9.7	739	14	100

Notes:

24 HOURS

Date & Time 2023-11-19 9:30
Analyst(s) : AJS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15
Control	0	0	–	–	–	15

Notes:

48 HOURS

Date & Time 2023-11-20 9:30
Analyst(s) : PG

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15
Control	0	0	–	–	–	15

Notes:

72 HOURS

Date & Time 2023-11-21 9:30
Analyst(s) : DT (NM)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	16
Control	0	0	–	–	–	16

Notes:

96 HOURS

Date & Time 2023-11-22 9:30
Analyst(s) : DT (NM)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.4	8.8	119	16
Control	0	0	8.2	8.4	670	16

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
[3] adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2023-11-22

CHAIN OF CUSTODY RECORD

NAUTILUS ENVIRONMENTAL

Nautilus Work Order No: 253348

Shipping Address: Nautilus Environmental Guelph.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: C3AB262

Field Sampler Name (print): BluMetric - Brad McCallum

Signature:

Affiliation:

Sample Storage (prior to shipping):

Custody Relinquished by:

Date/Time Shipped:

Client: Bureau Veritas
6740 Campobello Rd., Mississauga
L5N 2L8

Phone: (905) 817-5700

Fax:

Contact: Christine Gripton christine.gripton@bureauveritas.com

Sample Identification					Analyses Requested										Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	Nautilus Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	RISS Data Entry	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2023-11-15	08:10	LSP-CULVERT	80395	16	✔		✔										1 x 20L

For Lab Use Only

Received By: SU/DT

Date: 2023-11-17

Time: 14:20

Storage Location:

Storage Temp.(°C)

Please list any special requests or instructions:

Appendix E

Historical Groundwater and Surface Water Chemistry

Appendix E

E-1 Historical Groundwater Chemistry

E-1 Historical Groundwater Chemistry - Lake St Peter						Location	LSP-DP1-21	LSP-DP1-21	LSP-DP1-21	LSP-DP1-21	LSP-DP1-21	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP-DP1-21	LSP-DP1-21	LSP-DPI-21	LSP-DP1-21	LSP-DP1-21	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03
						Sample Date	2021-Oct-19	2022-May-02	2022-Oct-17	2023-May-04	2023-Oct-17	2006-May-09	2006-Nov-21	2007-May-02	2007-Nov-21	2008-May-08	2008-Oct-08	2009-Jun-04	2009-Oct-21	2010-May-18
Anions						Detection Limit														
Chloride	mg/L	125.25	250	-	-	0.1	16.1	9.31	13.8	5.47	27	-	-	25	13	17	16	17	13	4
Nitrate as N	mg/L	2.51875	10	-	-	0.05	<0.05	<0.05	0.12	<0.05	<0.1	4.11	1.76	0.28	4.69	4.66	6	1.57	6.4	1.74
Sulphate	mg/L	252.6775	500	-	-	0.1	36.9	35.2	34.3	37.1	29	12	28	30	18	8	36	16	26	14
Cations																				
Calcium (diss)	mg/L	-	-	-	-	0.05	50.3	44.3	53	-	58	34	40	54	52	37	53	28	42	30
Magnesium (diss)	mg/L	-	-	-	-	0.05	10	8.61	9.12	5.77	9.7	6	6	8	7	5	7	3	5	3
Potassium (diss)	mg/L	-	-	-	-	0.5	-	-	20.2	14.6	-	18	23	22	27	20	22	13	17	11
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	20.1	17.8	19.1	12.9	17	10	15	19	15	11	15	11	13	8
General Chemistry																				
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	232	197	241	146	220	102	136	168	191	111	147	82	123	98
Ammonia as N	mg/L	-	-	-	-	0.02	7.12	6.27	6.12	4.95	7.8	-	-	0.24	1.42	0.58	0.69	0.16	0.46	<0.02
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	59	53	16	-	-	-	-	<5	<5	<5	20	5	23	5
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	14.8	12.3	14.1	9.7	13	-	-	7.4	6.2	2.4	5.9	2.6	4.2	2.3
Electrical Conductivity	uS/cm	-	-	-	-	1	567	515	611	370	580	317	399	482	481	331	463	268	391	251
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		6.97	6.73	6.87	6.75	7.11	7.06	6.59	6.72	6.78	7.07	6.82	6.6	6.88	6.84
Total Dissolved Solids	mg/L	267	500	-	-	5	292	288	298	216	315	-	-	313	313	215	301	174	254	163
Total Suspended Solids	mg/L	-	-	-	-	10	2080	932	-	336	150	-	-	-	-	-	-	-	-	-
Metals																				
Aluminum (diss)	mg/L	-	0.1	-	Calculated	0.004	-	-	0.048	-	-	0.05	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium (diss)	mg/L	-	1	-	-	0.002	0.612	0.477	-	0.298	0.49	0.13	0.22	0.28	0.34	0.19	0.27	0.12	0.15	0.08
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (diss)	mg/L	-	5	-	0.2	0.01	0.448	0.285	0.449	0.259	0.42	0.14	0.21	0.22	0.32	0.14	0.28	0.12	0.24	0.13
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
Chromium (diss)	mg/L	-	0.05	-	-	0.001	-	-	-	-	-	0.001	0.002	0.002	0.003	0.002	0.001	0.001	0.002	<0.001
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	-	-	-	-	-	0.0023	0.003	0.0029	0.0045	0.0011	0.0029	0.0007	0.0011	0.0002
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	0.003	0.002	0.006	0.004	0.003	0.003	0.002	0.003	0.002
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	24.5	18.8	25.2	12.7	47	0.18	0.03	0.08	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	-	-	<0.0005	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	10.8	9.69	10.3	6.52	11	0.78	0.34	1.18	0.98	0.45	0.57	0.37	0.3	0.04
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	-	-	-	6.1	6.8	6	7	7.3	7.1	5.9	6.6	4.9
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium (diss)	mg/L	-	-	-	-	0.001	-	-	0.357	-	-	0.172	0.221	0.221	0.253	0.194	0.211	0.16	0.213	0.162
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	-	-	-	0.0001	0.0002	0.0004	0.0004	0.0002	0.0002	0.0001	0.0002	<0.0001
Titanium (diss)	mg/L	-	-	-	-	0.01	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	-	-	-	0.002	0.002	0.002	0.005	0.002	0.001	0.001	0.003	<0.001
Zinc (diss)	mg/L	-	5	-	0.02	0.005	-	-	0.05	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

*Please double check with Factsheet for all Calculated criteria/guidelines.

E-1 Historical Groundwater Chemistry - Lake St Peter						Location	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03
						Sample Date	2010-Oct-19	2011-May-19	2011-Nov-02	2012-Apr-17	2012-Oct-17	2013-Apr-16	2013-Oct-29	2014-May-12	2014-Oct-15	2015-May-05	2015-Oct-27	2016-Apr-27	2016-Oct-27	2017-May-12	2017-Oct-24	2018-May-08
Anions						**Detection Limit**																
Chloride	mg/L	125.25	250	-	-	0.1	8	23	14	9	11	6.06	31.3	79.4	79.6	79.7	39.2	151	51.9	140	29.9	78.3
Nitrate as N	mg/L	2.51875	10	-	-	0.05	2.6	2.61	4.66	4.6	3.1	1.47	0.44	<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.1	<0.25
Sulphate	mg/L	252.6775	500	-	-	0.1	22	14	10	7	13	7.81	23.6	35.4	0.58	5.13	27.8	4.21	5.84	4.42	17.6	14.7
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05	40	41	49	19.7	38.6	22.3	45.1	66.6	97.4	64.7	72.9	132	90.3	84.6	74.7	80
Magnesium (diss)	mg/L	-	-	-	-	0.05	4	4	5	3.53	4.71	2.02	4.45	8.12	12	8.07	7.73	20.5	11.4	12.9	8.7	10.1
Potassium (diss)	mg/L	-	-	-	-	0.5	11	12	14	7.39	13	8.24	11.7	14.9	41.4	26.6	37.6	56.9	38.1	-	-	-
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	9	14	12	7.03	10.7	5.34	18.1	45.3	62.1	48.6	34.4	126	49	74	33.3	44.2
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	122	126	141	86	129	58	114	193	395	300	305	601	443	392	359	386
Ammonia as N	mg/L	-	-	-	-	0.02	0.09	0.35	0.72	0.04	0.03	0.25	<0.02	0.69	14.7	11.6	15.9	31.8	19.3	15	15.4	13.5
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	5	13	12	26	17	<5	12	31	173	112	81	266	97	148	79	62
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	3	3.5	3	2.8	3.6	1.4	2.7	12.9	61.4	44.2	26.7	114	42.3	68	34.7	27.7
Electrical Conductivity	uS/cm	-	-	-	-	1	319	372	368	282	344	167	364	681	1040	858	790	1500	1070	1300	718	913
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		6.64	7.09	6.51	7.2	**6.3**	7.45	7.16	7.09	7.17	6.64	7.26	7.64	7.44	7.48	6.91	6.81
Total Dissolved Solids	mg/L	267	500	-	-	5	207	242	239	246	164	110	220	392	748	510	376	868	550	652	426	498
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	384	353	355
Metals																						
Aluminum (diss)	mg/L	-	0.1	-	Calculated	0.004	0.01	<0.01	<0.01	0.007	0.005	0.011	0.021	0.007	0.106	0.111	0.088	0.137	0.085	-	-	-
Barium (diss)	mg/L	-	1	-	-	0.002	0.11	0.13	0.16	0.074	0.14	0.072	0.171	0.176	0.85	0.473	0.558	1.15	0.862	0.799	0.645	1
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Boron (diss)	mg/L	-	5	-	0.2	0.01	0.23	0.2	0.2	0.142	0.23	0.081	0.202	0.217	1.35	0.786	0.64	1.1	0.571	0.271	0.532	0
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	-	-	-
Chromium (diss)	mg/L	-	0.05	-	-	0.001	<0.001	0.002	0.001	<0.001	<0.001	<0.003	<0.003	<0.003	0.004	<0.003	0.003	0.009	0.006	-	-	-
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	0.0002	0.0007	0.0023	<0.0005	0.0022	<0.001	0.002	0.015	0.105	0.089	0.036	0.067	0.042	-	-	-
Copper (diss)	mg/L	-	1	-	Calculated	0.001	0.002	0.002	0.002	0.001	0.0021	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	<0.03	<0.03	<0.03	<0.1	<0.1	<0.01	<0.01	**2.54**	**178**	**117**	**73.9**	**148**	**102**	**170**	**120**	**94.1**
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	0.06	0.54	0.71	0.12	0.214	0.201	0.309	11.9	8.92	4.95	2.61	5.05	6.96	10.4	5.65	6.7
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.002	<0.002	<0.002	0.008	0.002	0.005	0.007	0.002	-	-	-
Nickel (diss)	mg/L	-	-	0.025	-	0.005	<0.005	<0.005	<0.005	0.001	0.002	<0.003	<0.003	<0.003	0.005	0.006	0.006	0.009	0.006	-	-	-
Silicon (diss)	mg/L	-	-	-	-	0.1	5.5	5.7	5.5	4.59	6.02	6.32	6.6	5.39	10.5	11.9	10	11.1	9.98	-	-	-
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-
Strontium (diss)	mg/L	-	-	-	-	0.001	0.206	0.199	0.201	0.138	0.187	0.103	0.233	0.331	0.551	0.359	0.315	0.601	0.402	-	-	-
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	<0.0001	0.0001	0.0002	<0.0001	<0.0001	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	-	-	-
Titanium (diss)	mg/L	-	-	-	-	0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.002	<0.002	<0.002	0.004	0.002	0.002	0.004	0.003	-	-	-
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	<0.001	0.002	0.002	0.0016	0.0011	<0.002	<0.002	<0.002	0.011	0.006	0.008	0.013	0.011	-	-	-
Zinc (diss)	mg/L	-	5	-	0.02	0.005	<0.01	<0.01	<0.01	<0.005	<0.005	<0.005	0.038	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

*Please double check with Factsheet for all Calculated criteria/guidelines.

E-1 Historical Groundwater Chemistry - Lake St Peter						Location	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP2-03
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP1-03	LSP1-03	LSP-QAQC GW-S19	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP1-03	LSP-QAQC GW-F21	LSP1-03	LSP-QAQC GW-S22	LSP1-03	LSP1-03	LSP1-03	LSP2-03
						Sample Date	2018-Oct-23	2019-May-08	2019-May-08	2019-Oct-23	2020-May-07	2020-Oct-07	2021-Apr-21	2021-Oct-19	2021-Oct-19	2022-May-02	2022-May-02	2022-Oct-17	2023-May-04	2023-Oct-17	2006-May-09
Anions						Detection Limit															
Chloride	mg/L	125.25	250	-	-	0.1	48.5	88.6	86.5	59.4	121	69.8	75.7	60.7	60.6	58.8	57.2	0.5	128	72	-
Nitrate as N	mg/L	2.51875	10	-	-	0.05	<0.25	<0.25	<0.25	<1	<0.25	0.55	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1
Sulphate	mg/L	252.6775	500	-	-	0.1	6.91	14.5	14.3	34.9	16.6	9.98	7.84	8.85	8.4	6.08	6.12	4.01	5.09	4.3	8
Cations																					
Calcium (diss)	mg/L	-	-	-	-	0.05	79.5	83.7	86.3	66.8	95.5	98.1	98.1	67.8	65	70.3	70.5	66.3	-	92	5
Magnesium (diss)	mg/L	-	-	-	-	0.05	8	8.79	8.97	6.59	11.5	9.29	11.5	6.52	6.2	5.91	5.92	5.48	9.3	9.5	1
Potassium (diss)	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	17.9	25.9	-	1
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	29.8	39.2	40.6	29.7	52.3	37.2	49.4	35.5	34.3	25.1	25.4	21.2	77.8	40	<2
General Chemistry																					
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	341	464	387	291	357	321	360	275	255	247	254	282	398	330	14
Ammonia as N	mg/L	-	-	-	-	0.02	13.8	7.8	9	13.7	12.6	16.7	15	12.4	11.6	11.5	11.4	12.2	15.4	20	-
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	<5	7	8	8	3	<6	8	8	-	-	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	59	67	78	54	79	55	58	57	58	61	64	66	-	-	-
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	22.5	18.3	23.3	19.8	24.2	21.5	22.7	15.9	16.1	17.6	18.3	18.8	23.8	19	-
Electrical Conductivity	uS/cm	-	-	-	-	1	896	1060	1030	873	1340	812	941	725	714	703	702	782	1160	900	51
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		6.85	6.6	6.63	7.15	**6.36**	7.14	6.77	6.89	6.77	6.63	6.6	6.74	6.71	7.36	6.55
Total Dissolved Solids	mg/L	267	500	-	-	5	422	570	612	494	574	448	498	332	358	370	352	372	566	420	-
Total Suspended Solids	mg/L	-	-	-	-	10	382	343	325	552	235	334	290	271	420	460	550	-	756	490	-
Metals																					
Aluminum (diss)	mg/L	-	0.1	-	Calculated	0.004	-	-	-	-	-	-	-	-	-	-	-	0.065	-	-	0.16
Barium (diss)	mg/L	-	1	-	-	0.002	1	0.604	0.629	0.515	0.631	0.693	0.567	0.452	0.452	0.529	0.55	-	0.607	0.56	0.01
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001
Boron (diss)	mg/L	-	5	-	0.2	0.01	1	0.378	0.376	0.465	0.567	0.663	0.762	0.608	0.61	0.397	0.406	0.418	0.648	0.66	<0.01
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001
Chromium (diss)	mg/L	-	0.05	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0022
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	**114**	**129**	**127**	**89.3**	**78.5**	**80.2**	**43**	**50.6**	**51.1**	**81.3**	**75.3**	**64.3**	**75.4**	**64**	**0.42**
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	-	-	-	-	-	-	-	-	-	-	-	<0.0005	-	-	<0.001
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	4.96	4.84	5.13	3.71	6.99	3.35	4.74	4.51	4.68	2.45	2.5	1.58	2.67	2.2	0.08
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.4
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001
Strontium (diss)	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	0.257	-	-	0.033
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001
Titanium (diss)	mg/L	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001
Zinc (diss)	mg/L	-	5	-	0.02	0.005	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	<0.01

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

*Please double check with Factsheet for all Calculated criteria/guidelines.

E-1 Historical Groundwater Chemistry - Lake St Peter						Location	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03
						Sample Date	2006-Nov-21	2007-May-02	2007-Nov-21	2008-May-08	2008-Oct-08	2009-Jun-04	2009-Oct-21	2010-May-18	2010-Oct-19	2011-May-19	2011-Nov-02	2012-Apr-17	2012-Oct-17	2013-Apr-16	2013-Oct-29	2014-May-12
Anions						Detection Limit																
Chloride	mg/L	125.25	250	-	-	0.1	-	3	1	<1	<1	2	1	2	<1	2	2	<1	<1	0.48	0.51	0.44
Nitrate as N	mg/L	2.51875	10	-	-	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.15	0.16	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05
Sulphate	mg/L	252.6775	500	-	-	0.1	21	8	8	8	7	8	7	7	6	7	6	5	5	5.43	5.66	5.92
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05	4	5	3	6	4	4	4	4	3	4	4	4.28	3.65	3.77	3.93	3.91
Magnesium (diss)	mg/L	-	-	-	-	0.05	1	1	<1	2	1	1	1	<1	<1	<1	<1	0.962	1.01	1.02	1.11	1.03
Potassium (diss)	mg/L	-	-	-	-	0.5	1	1	<1	1	<1	1	1	<1	<1	<1	<1	0.839	0.92	0.92	1.07	1.02
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	<2	<2	<2	3	<2	3	<2	<2	<2	<2	<2	1.6	1.73	1.62	1.7	1.74
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	11	12	10	9	15	13	14	12	9	13	14	12	11	11	11	10
Ammonia as N	mg/L	-	-	-	-	0.02	-	0.1	<0.02	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.01	0.17	<0.02	0.04
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	8	10	16	13	30	26	15	10	23	18	35	27	<5	19	5
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	-	10.5	8.3	8.4	5.7	11	8	7.4	5.9	7.9	4.5	6.3	7.3	2	2.3	3.1
Electrical Conductivity	uS/cm	-	-	-	-	1	46	47	44	46	43	45	50	44	42	42	38	46	39	39	40	40
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		**6.34**	**6.23**	6.52	6.76	6.5	**6.4**	6.62	6.77	**6.38**	6.65	**6**	6.6	**5.8**	6.83	6.87	6.66
Total Dissolved Solids	mg/L	267	500	-	-	5	-	31	29	30	28	29	33	29	27	27	25	105	42	48	52	52
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																						
Aluminum (diss)	mg/L	-	0.1	-	Calculated	0.004	0.1	0.06	0.05	0.07	0.08	0.06	0.09	0.05	0.05	0.05	0.1	0.047	0.062	0.057	0.064	0.051
Barium (diss)	mg/L	-	1	-	-	0.002	0.01	0.01	0.01	0.01	0.01	0.01	0.01	<0.01	<0.01	<0.01	0.01	0.008	0.01	0.009	0.009	0.008
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
Boron (diss)	mg/L	-	5	-	0.2	0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002
Chromium (diss)	mg/L	-	0.05	-	-	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	0.0018	0.0018	0.0021	0.0014	0.0015	0.0018	0.002	0.0018	0.0019	0.0017	0.0023	0.0017	0.0019	0.002	0.002	0.002
Copper (diss)	mg/L	-	1	-	Calculated	0.001	0.002	0.003	0.001	0.002	0.002	0.003	0.002	0.001	0.001	0.002	0.002	0.0012	0.0017	<0.003	<0.003	<0.003
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	**0.48**	**0.32**	0.23	0.26	0.24	0.15	0.18	0.13	0.07	0.09	0.17	<0.1	0.125	0.07	0.077	0.047
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.002	<0.002	<0.002
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	0.07	0.07	0.07	0.06	0.06	0.06	0.04	0.05	0.05	0.05	0.08	0.047	0.067	0.051	0.054	0.05
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005	<0.002	<0.002	<0.002
Nickel (diss)	mg/L	-	-	0.025	-	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.003	<0.003	<0.003
Silicon (diss)	mg/L	-	-	-	-	0.1	6.3	6.7	6	6.7	7.1	6.5	6.7	5.6	6.1	6	5.4	5.87	7	6.21	5.96	6.02
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002
Strontium (diss)	mg/L	-	-	-	-	0.001	0.027	0.029	0.026	0.026	0.024	0.031	0.026	0.026	0.026	0.025	0.02	0.024	0.025	0.025	0.028	0.025
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.006	<0.006	<0.006
Titanium (diss)	mg/L	-	-	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.002	<0.002	<0.002
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0005	<0.0005	<0.002	<0.002	<0.002
Zinc (diss)	mg/L	-	5	-	0.02	0.005	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.005	<0.005	0.066	<0.005

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

*Please double check with Factsheet for all Calculated criteria/guidelines.

E-1 Historical Groundwater Chemistry - Lake St Peter						Location	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP3-03	LSP2-03
						Sample Date	2014-Oct-15	2015-May-05	2015-Oct-27	2016-Apr-27	2016-Oct-27	2017-May-12	2017-Oct-24	2018-May-08	2018-Oct-23	2019-May-08	2019-Oct-23	2020-May-07	2020-Oct-07	2021-Apr-21	2021-Oct-19	2022-May-02
Anions						Detection Limit																
Chloride	mg/L	125.25	250	-	-	0.1	0.36	0.48	0.24	0.45	0.3	0.5	0.31	0.4	0.3	0.54	0.3	0.35	0.6	0.39	0.43	0.41
Nitrate as N	mg/L	2.51875	10	-	-	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	252.6775	500	-	-	0.1	5.77	5.72	4.97	5.21	4.91	5.28	4.93	5.48	5.28	4.41	4.83	4.26	3.9	4.05	4.05	3.86
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05	3.59	3.75	3.61	3.66	3.64	3.43	3.65	3.57	3.43	3.39	3.36	3.53	3.97	3.45	3.26	3.34
Magnesium (diss)	mg/L	-	-	-	-	0.05	0.98	1.04	1.03	1.06	0.92	0.91	1	0.95	0.9	0.9	0.9	0.89	0.92	0.93	0.84	0.88
Potassium (diss)	mg/L	-	-	-	-	0.5	0.89	1.03	0.98	1.03	0.88	-	-	-	-	-	-	-	-	-	-	-
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	1.61	1.67	1.75	1.64	1.44	1.53	1.62	1.53	1.54	1.48	1.49	1.44	1.5	1.55	1.47	1.45
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	12	11	13	13	12	14	12	12	11	13	12	16	13	12	16	14
Ammonia as N	mg/L	-	-	-	-	0.02	0.15	<0.02	<0.02	0.04	0.19	<0.02	1.12	<0.02	<0.02	<0.2	0.04	0.02	<0.02	<0.02	0.08	<0.02
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	<5	<5	<5	<2	<2	<2	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	12	12	15	10	12	13	<5	<5	<5	9	<5	<5	21	<5	<5	10
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	3.6	3.5	3.6	4	3.7	2.6	3.8	3.2	3.8	3.2	2.8	2.7	3.8	3.2	3.2	2.6
Electrical Conductivity	uS/cm	-	-	-	-	1	46	40	40	41	39	45	35	39	41	42	82	47	34	38	37	39
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		7.3	6.81	6.52	6.72	**6.49**	6.64	**6.46**	**6.23**	**6.44**	**6.32**	6.53	**6.31**	**6.45**	**6.46**	6.6	**6.38**
Total Dissolved Solids	mg/L	267	500	-	-	5	32	46	32	40	34	48	34	38	50	28	48	36	28	36	30	38
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	-	208	353	356	883	114	334	266	493	351	279	278
Metals																						
Aluminum (diss)	mg/L	-	0.1	-	Calculated	0.004	0.05	0.057	0.059	0.065	0.051	-	-	-	-	-	-	-	-	-	-	-
Barium (diss)	mg/L	-	1	-	-	0.002	0.01	0.009	0.009	0.012	0.009	0.011	0.009	0.01	0.013	0.01	0.01	0.01	0.009	0.008	0.009	0.01
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-
Boron (diss)	mg/L	-	5	-	0.2	0.01	1.35	<0.01	<0.01	0	0	<0.01	<0.01	0.015	<0.01	0.015	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	<0.002	<0.002	<0.002	<0.002	<0.001	-	-	-	-	-	-	-	-	-	-	-
Chromium (diss)	mg/L	-	0.05	-	-	0.001	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	0.002	0.002	0.002	0.001	0.003	-	-	-	-	-	-	-	-	-	-	-
Copper (diss)	mg/L	-	1	-	Calculated	0.001	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	0.121	0.077	0.06	0.053	**0.329**	0.018	0.035	0.014	0.088	0.02	0.057	<0.01	0.095	0.142	0.118	0.108
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	0.059	0.051	0.046	0.053	0.055	0.048	0.051	0.049	0.051	0.052	0.053	0.057	0.05	0.046	0.045	0.052
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-
Nickel (diss)	mg/L	-	-	0.025	-	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-
Silicon (diss)	mg/L	-	-	-	-	0.1	6.1	6.15	5.95	6.49	6.17	-	-	-	-	-	-	-	-	-	-	-
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-
Strontium (diss)	mg/L	-	-	-	-	0.001	0.026	0.025	0.025	0.026	0.025	-	-	-	-	-	-	-	-	-	-	-
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	<0.006	<0.006	<0.006	<0.006	<0.006	-	-	-	-	-	-	-	-	-	-	-
Titanium (diss)	mg/L	-	-	-	-	0.01	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-
Zinc (diss)	mg/L	-	5	-	0.02	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-	-	-

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

*Please double check with Factsheet for all Calculated criteria/guidelines.

E-1 Historical Groundwater Chemistry - Lake St Peter						Location	LSP2-03	LSP2-03	LSP2-03	LSP2-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP2-03	LSP2-03	LSP-QAQC-GW1	LSP2-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03
						Sample Date	2022-Oct-17	2023-May-04	2023-May-04	2023-Oct-17	2007-May-02	2007-Nov-21	2008-May-08	2008-Oct-08	2009-Jun-04	2009-Oct-21	2010-May-18	2010-Oct-19	2011-May-19	2011-Nov-02	2012-Apr-17
Anions						**Detection Limit**															
Chloride	mg/L	125.25	250	-	-	0.1	62.1	0.42	0.41	<1	29	10	33	12	13	7	9	16	32	12	7
Nitrate as N	mg/L	2.51875	10	-	-	0.05	<0.05	<0.05	<0.05	<0.1	3.17	<0.1	0.93	0.23	<0.1	0.57	2.08	0.27	<0.1	<0.01	0.3
Sulphate	mg/L	252.6775	500	-	-	0.1	1.89	3.49	3.5	2.4	46	15	26	20	21	11	47	37	13	11	46
Cations																					
Calcium (diss)	mg/L	-	-	-	-	0.05	3.85	-	-	3.4	47	26	41	37	38	29	58	37	28	22	24.8
Magnesium (diss)	mg/L	-	-	-	-	0.05	0.97	0.78	0.87	0.84	8	4	6	9	6	4	11	4	4	3	5.39
Potassium (diss)	mg/L	-	-	-	-	0.5	1.09	0.94	0.84	-	30	15	25	22	24	16	19	14	10	11	10.5
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	1.47	1.71	1.49	1.7	15	11	14	14	11	8	7	7	6	10	7.96
General Chemistry																					
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	15	14	13	13	130	118	113	167	146	119	163	97	70	91	92
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	<0.02	<0.02	<0.05	1.18	3.09	0.45	1	1	1.87	0.37	1.46	0.79	2.27	0.03
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	9	-	-	-	21	51	17	30	28	27	25	20	23	22	23
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	2.6	2.9	2.6	3.5	12.7	25.6	6.4	10.4	9.6	9.6	11.4	6.9	8.5	7.3	8.3
Electrical Conductivity	uS/cm	-	-	-	-	1	39	41	42	35	490	297	408	409	374	286	469	321	285	234	335
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		**6.48**	6.66	6.59	6.66	6.59	6.74	7.12	6.87	6.7	6.69	6.91	6.55	7	**6.32**	6.7
Total Dissolved Solids	mg/L	267	500	-	-	5	30	38	42	50	319	193	265	266	243	186	305	209	185	152	273
Total Suspended Solids	mg/L	-	-	-	-	10	-	487	769	400	-	-	-	-	-	-	-	-	-	-	-
Metals																					
Aluminum (diss)	mg/L	-	0.1	-	Calculated	0.004	0.077	-	-	-	0.03	0.02	0.02	0.02	0.01	0.02	0.01	0.01	<0.01	<0.01	0.011
Barium (diss)	mg/L	-	1	-	-	0.002	-	0.01	0.01	0.013	0.25	0.25	0.24	0.27	0.23	0.17	0.19	0.15	0.14	0.17	0.215
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005
Boron (diss)	mg/L	-	5	-	0.2	0.01	0.01	<0.01	<0.01	<0.01	0.2	0.13	0.16	0.23	0.19	0.14	0.19	0.12	0.11	0.1	0.358
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (diss)	mg/L	-	0.05	-	-	0.001	-	-	-	-	0.002	0.002	0.003	0.001	0.001	0.001	<0.001	<0.001	0.001	0.001	<0.001
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	-	-	-	-	0.0138	0.0475	0.0066	0.0285	0.011	0.0541	0.0063	0.0563	0.0456	0.0219	0.0036
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	0.006	0.002	0.004	0.005	0.004	0.004	0.004	0.004	0.002	0.002	0.0021
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	0.271	0.131	0.127	0.12	**0.86**	**19.2**	0.06	**2.72**	**1.29**	**7.38**	**0.49**	**1.91**	**2.58**	**0.46**	**0.458**
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	<0.0005	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	0.054	0.052	0.052	0.048	0.72	1.4	0.64	1.95	0.88	1.36	0.33	3.66	0.98	0.88	0.036
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	-	-	<0.005	<0.005	<0.005	0.006	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.002
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	-	-	6.9	7.2	6.8	7	5.7	7.3	4.4	6.2	5.6	6.3	5.1
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium (diss)	mg/L	-	-	-	-	0.001	0.026	-	-	-	0.171	0.11	0.155	0.155	0.184	0.15	0.235	0.154	0.118	0.099	0.157
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	-	-	0.0006	<0.0001	0.0003	0.0001	0.0003	0.0002	0.0001	0.0002	0.0001	<0.0001	<0.0001
Titanium (diss)	mg/L	-	-	-	-	0.01	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	-	-	0.002	0.004	0.003	0.002	0.002	0.002	<0.001	<0.001	<0.001	0.001	0.0012
Zinc (diss)	mg/L	-	5	-	0.02	0.005	<0.005	-	-	-	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

*Please double check with Factsheet for all Calculated criteria/guidelines.

E-1 Historical Groundwater Chemistry - Lake St Peter						Location	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03
						Sample Date	2012-Oct-17	2013-Apr-16	2013-Oct-29	2014-May-12	2014-Oct-15	2015-May-05	2015-Oct-27	2016-Apr-27	2016-Oct-27	2017-May-12	2017-Oct-24	2018-May-08	2018-Oct-23	2019-May-08	2019-Oct-23	2020-May-07
Anions						Detection Limit																
Chloride	mg/L	125.25	250	-	-	0.1	9	49.2	15.6	7.96	6.36	11.4	7.32	101	12.2	101	10.3	14.4	20	26	34.1	33.8
Nitrate as N	mg/L	2.51875	10	-	-	0.05	<0.0001	1.86	0.76	0.44	0.63	0.15	<0.05	<0.25	<0.05	<0.5	<0.1	10.2	<0.05	<0.05	<0.05	0.07
Sulphate	mg/L	252.6775	500	-	-	0.1	24	46.5	17.4	24.3	16.3	23.8	18.6	101	30.9	38.3	32.7	24.5	11.9	19.5	25.5	28.7
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05	14.6	64.9	29.8	43.1	38.9	45.2	27.3	104	69.5	200	76.4	69.5	44.2	67	48.9	60.2
Magnesium (diss)	mg/L	-	-	-	-	0.05	3.56	12.8	6.65	7.47	7.3	6.7	3.88	17.7	6.41	28.8	6.17	6.13	3.43	6.24	5.53	5.94
Potassium (diss)	mg/L	-	-	-	-	0.5	9.13	13.2	8.66	22	14.3	15.4	10.5	24.8	17.8	-	-	-	-	-	-	-
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	8.49	13	15	8.94	7.31	5.5	8.7	69.4	17.5	127	11.1	13.6	7.57	10.8	23.1	12.8
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	84	109	101	143	138	131	97	313	242	951	285	214	142	195	202	155
Ammonia as N	mg/L	-	-	-	-	0.02	1.44	0.08	0.63	0.09	0.99	0.36	1.74	0.87	11	11	14	5	5	1.3	10.7	0.1
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	<5	<5	<5
Chemical Oxygen Demand	mg/L	-	-	-	-	5	39	<5	21	<5	12	6	27	159	90	371	54	25	32	29	56	12
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	9.5	3.7	4.1	5	5.6	5.6	8.1	74.4	44.8	166	21.6	6.1	9.5	10.7	17.9	6.4
Electrical Conductivity	uS/cm	-	-	-	-	1	263	473	288	361	342	345	260	995	588	2180	562	532	402	513	615	564
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		**6.1**	7.4	7.1	7.01	7.44	7.02	6.94	7.06	7.57	7.32	7.09	7.44	6.77	6.5	7.28	**6.3**
Total Dissolved Solids	mg/L	267	500	-	-	5	169	306	168	200	180	212	146	664	334	1420	306	308	214	266	266	276
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	-	-	-	-	-	188	893	278	455	91	1670	55
Metals																						
Aluminum (diss)	mg/L	-	0.1	-	Calculated	0.004	0.021	0.015	0.008	0.01	0.01	0.01	0.014	0.102	0.092	-	-	-	-	-	-	-
Barium (diss)	mg/L	-	1	-	-	0.002	0.169	0.251	0.16	0.315	0.233	0.192	0.211	0.705	0.526	1.18	0.358	0.234	0.24	0.334	0.382	0.252
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-
Boron (diss)	mg/L	-	5	-	0.2	0.01	0.341	0.409	0.225	0.289	0.22	0.211	0.158	0.206	0.705	1.05	0.46	0.508	0.217	0.239	0.638	0.344
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	-	-	-	-	-	-	-
Chromium (diss)	mg/L	-	0.05	-	-	0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.006	0.003	-	-	-	-	-	-	-
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	0.0376	0.005	0.014	0.003	0.008	0.006	0.032	0.587	0.087	-	-	-	-	-	-	-
Copper (diss)	mg/L	-	1	-	Calculated	0.001	0.0016	<0.003	<0.003	<0.003	0.004	0.003	<0.003	0.029	0.007	-	-	-	-	-	-	-
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	**14.5**	**0.377**	**0.323**	0.167	0.099	0.089	**13.4**	**29.6**	**82.9**	**261**	**58.4**	**17**	**38.3**	**0.72**	**45.5**	0.133
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	1.19	0.099	0.778	0.103	1.1	0.255	1.05	10.5	2.61	11.1	2	1.89	1.71	4	1.16	1.33
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	<0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	-	-	-	-	-	-	-
Nickel (diss)	mg/L	-	-	0.025	-	0.005	0.004	0.009	0.004	<0.003	<0.003	<0.003	<0.003	**0.027**	0.007	-	-	-	-	-	-	-
Silicon (diss)	mg/L	-	-	-	-	0.1	7.1	6.4	5.65	5.04	5.37	4.66	6.16	7.57	5.81	-	-	-	-	-	-	-
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-
Strontium (diss)	mg/L	-	-	-	-	0.001	0.127	0.242	0.131	0.197	0.177	0.183	0.133	0.518	0.37	-	-	-	-	-	-	-
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	<0.0001	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	-	-	-	-	-	-	-
Titanium (diss)	mg/L	-	-	-	-	0.01	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	0.003	-	-	-	-	-	-	-
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.006	-	-	-	-	-	-	-
Zinc (diss)	mg/L	-	5	-	0.02	0.005	<0.005	<0.005	0.023	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	-	-	-	-	-	-	-

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

*Please double check with Factsheet for all Calculated criteria/guidelines.

E-1 Historical Groundwater Chemistry - Lake St Peter						Location	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP4-19	LSP4-19	LSP4-19	LSP4-19	LSP4-19	LSP4-19
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP3-03	LSP3-03	LSP-QAQC GW-S21	LSP2-03	LSP3-03	LSP3-03	LSP3-03	LSP3-03	LSP4-19	LSP-QAQC GW-F19	LSP4-19	LSP4-19-QAQC GW	LSP4-19	LSP-QAQC GW-F20
						Sample Date	2020-Oct-07	2021-Apr-21	2021-Apr-21	2021-Oct-19	2022-May-02	2022-Oct-17	2023-May-04	2023-Oct-17	2019-Oct-23	2019-Oct-23	2020-May-07	2020-May-07	2020-Oct-07	2020-Oct-07
Anions						Detection Limit														
Chloride	mg/L	125.25	250	-	-	0.1	96.1	27.7	27.9	6.94	29.3	134	74	77	51.3	50.8	25.9	26.1	71.7	70.5
Nitrate as N	mg/L	2.51875	10	-	-	0.05	0.39	0.11	0.11	<0.05	<0.05	<0.05	<0.05	<0.1	2	2.09	1.83	1.86	1.6	1.68
Sulphate	mg/L	252.6775	500	-	-	0.1	16	14.3	14.4	19	12.8	4.1	14.4	2.4	17.2	17.3	10.7	10.7	11.7	11.4
Cations																				
Calcium (diss)	mg/L	-	-	-	-	0.05	67	43.6	43.6	46.6	29.6	37.6	-	47	52.7	52.3	20	19.8	47.2	45.9
Magnesium (diss)	mg/L	-	-	-	-	0.05	6.32	4.22	4.26	3.9	2.22	3.16	3.97	5.4	7.91	8.02	2.84	2.82	6.74	6.63
Potassium (diss)	mg/L	-	-	-	-	0.5	-	-	-	-	-	13.8	13.2	-	-	-	-	-	-	-
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	26.2	13.6	13.5	12	15.4	83	34.8	50	38.8	38.6	16.8	16.6	27	26.8
General Chemistry																				
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	177	129	128	161	91	151	141	170	238	233	115	94	192	180
Ammonia as N	mg/L	-	-	-	-	0.02	6.15	0.38	0.43	2.79	0.52	4.78	0.84	7.4	3.73	3.68	1.24	1.28	3.21	3.21
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	3	3	2	4	-	-	-	-	<5	<5	<5	<5	<2	<2
Chemical Oxygen Demand	mg/L	-	-	-	-	5	27	<5	<5	8	10	31	-	-	43	32	26	31	40	41
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	7.6	5.1	5	6.4	3.4	14.7	6.9	16	12.4	12.2	4.5	4.8	8	8.2
Electrical Conductivity	uS/cm	-	-	-	-	1	628	366	368	359	305	775	556	620	722	706	381	380	582	562
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		7.07	6.61	6.58	6.88	6.53	6.76	6.56	7.15	7.23	7.34	**6.37**	**6.44**	7.1	7.13
Total Dissolved Solids	mg/L	267	500	-	-	5	394	224	210	204	128	332	286	330	334	338	168	174	320	320
Total Suspended Solids	mg/L	-	-	-	-	10	57	18	30	26	59	-	331	140	25300	23600	31800	35300	30400	23300
Metals																				
Aluminum (diss)	mg/L	-	0.1	-	Calculated	0.004	-	-	-	-	-	0.055	-	-	-	-	-	-	-	-
Barium (diss)	mg/L	-	1	-	-	0.002	0.386	0.167	0.165	0.202	0.135	-	0.253	0.39	0.223	0.22	0.13	0.129	0.232	0.233
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (diss)	mg/L	-	5	-	0.2	0.01	0.268	0.216	0.212	0.192	0.054	0.139	0.135	0.23	0.445	0.471	0.181	0.163	0.284	0.284
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (diss)	mg/L	-	0.05	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	**1.39**	**0.542**	**0.572**	**1.69**	**7.83**	**50**	**0.83**	**38**	<0.01	<0.01	<0.01	<0.01	0.011	0.016
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	-	-	-	-	-	<0.0005	-	-	-	-	-	-	-	-
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	3.26	1.05	1.08	1.57	0.835	1.19	1.79	1	9.43	9.48	2.85	2.77	8.16	8.08
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (diss)	mg/L	-	-	-	-	0.001	-	-	-	-	-	0.19	-	-	-	-	-	-	-	-
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (diss)	mg/L	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (diss)	mg/L	-	5	-	0.02	0.005	-	-	-	-	-	<0.005	-	-	-	-	-	-	-	-

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

*Please double check with Factsheet for all Calculated criteria/guidelines.

E-1 Historical Groundwater Chemistry - Lake St Peter						Location	LSP4-19	LSP4-19	LSP4-19	LSP4-19	LSP4-19	LSP4-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP4-19	LSP4-19	LSP4-19	LSP4-19	LSP4-19	LSP4-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19	LSP5-19
						Sample Date	2021-Apr-21	2021-Oct-19	2022-May-02	2022-Oct-17	2023-May-04	2023-Oct-17	2019-Oct-23	2020-May-07	2020-Oct-07	2021-Apr-21	2021-Oct-19	2022-May-02	2022-Oct-17	LSP-QAQC-GW1-F22	2023-May-04
Anions						Detection Limit															
Chloride	mg/L	125.25	250	-	-	0.1	15.9	47.2	22.8	82.9	14.4	43	0.96	0.96	4.31	0.8	0.5	0.39	3.06	2.52	0.25
Nitrate as N	mg/L	2.51875	10	-	-	0.05	3.02	5.36	6.21	7.58	4.96	4.62	0.07	0.06	0.11	0.13	0.08	0.1	0.19	0.2	<0.05
Sulphate	mg/L	252.6775	500	-	-	0.1	8.66	12	7.24	16	11.7	10	5.58	4.12	3.98	3.91	3.79	3.74	3.99	4	2.34
Cations																					
Calcium (diss)	mg/L	-	-	-	-	0.05	16.5	35.5	20.1	73	-	54	2.11	1.96	3.28	2.5	2.27	2.5	4.44	4.46	-
Magnesium (diss)	mg/L	-	-	-	-	0.05	2.74	5.28	3.06	10.3	2.36	8.1	0.53	0.33	0.58	0.45	0.38	0.44	0.81	0.8	0.23
Potassium (diss)	mg/L	-	-	-	-	0.5	-	-	-	24.1	7.61	-	-	-	-	-	-	-	0.91	0.93	<0.5
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	13.4	22.7	12.7	36	14.9	33	2.76	1.95	2.76	2.09	1.58	1.51	2.67	2.59	0.89
General Chemistry																					
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	61	114	53	205	55	190	11	8	10	8	10	9	13	17	5
Ammonia as N	mg/L	-	-	-	-	0.02	0.52	1.7	0.74	4.21	0.1	4.9	0.02	0.03	0.03	<0.02	0.11	<0.02	<0.02	<0.02	<0.02
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<2	3	-	-	-	-	<5	<5	<2	7	<2	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	<5	26	31	30	-	-	36	23	31	<5	10	8	15	15	-
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	4.1	6.7	3.2	9.8	3.3	8.2	1.6	2.2	1.7	8.3	2.1	1.8	1.2	1.2	2.8
Electrical Conductivity	uS/cm	-	-	-	-	1	219	445	249	764	223	600	76	34	41	30	27	35	46	50	19
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		6.75	6.72	6.56	6.61	6.56	7.78	**6.46**	**6.21**	**6.36**	**6.43**	**6.46**	**6.31**	6.56	6.83	**6.21**
Total Dissolved Solids	mg/L	267	500	-	-	5	136	302	160	370	140	335	52	34	34	40	18	20	20	38	33
Total Suspended Solids	mg/L	-	-	-	-	10	33300	18900	24100	-	14200	42000	11700	6950	6580	4320	2760	1840	-	-	1830
Metals																					
Aluminum (diss)	mg/L	-	0.1	-	Calculated	0.004	-	-	-	0.035	-	-	-	-	-	-	-	-	0.031	0.031	-
Barium (diss)	mg/L	-	1	-	-	0.002	0.061	0.158	0.081	-	0.097	0.17	0.014	0.01	0.013	0.01	0.01	0.009	-	-	0.007
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (diss)	mg/L	-	5	-	0.2	0.01	0.137	0.227	0.102	0.466	0.217	0.55	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.013	0.011	<0.01
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (diss)	mg/L	-	0.05	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	0.035	0.03	<0.01	0.033	0.032	<0.1	0.026	<0.01	0.027	0.033	0.016	<0.01	0.021	0.018	0.024
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	-	-	-	<0.0005	-	-	-	-	-	-	-	-	<0.0005	<0.0005	-
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	1.69	5.8	2.54	12.1	1.56	8.7	0.088	0.016	0.006	0.005	0.004	<0.002	0.003	0.002	0.005
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (diss)	mg/L	-	-	-	-	0.001	-	-	-	0.974	-	-	-	-	-	-	-	-	0.036	0.038	-
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (diss)	mg/L	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (diss)	mg/L	-	5	-	0.02	0.005	-	-	-	<0.005	-	-	-	-	-	-	-	-	<0.005	<0.005	-

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

*Please double check with Factsheet for all Calculated criteria/guidelines.

E-1 Historical Groundwater Chemistry - Lake St Peter						Location	LSP5-19	LSP6-23	LSP7-23	LSP8-23	LSP8-23
Parameter	Units	RUV-LSP	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP5-19	LSP6-23	LSP7-23	LSP8-23	LSP-QAQC-GW1
						Sample Date	2023-Oct-17	2023-Oct-17	2023-Oct-17	2023-Oct-17	2023-Oct-17
Anions						Detection Limit					
Chloride	mg/L	125.25	250	-	-	0.1	3.4	1.8	7.1	50	45
Nitrate as N	mg/L	2.51875	10	-	-	0.05	0.1	<0.1	0.13	<0.1	<0.1
Sulphate	mg/L	252.6775	500	-	-	0.1	2.7	8.2	4.1	12	11
Cations											
Calcium (diss)	mg/L	-	-	-	-	0.05	2.9	16	5.4	56	56
Magnesium (diss)	mg/L	-	-	-	-	0.05	0.49	3.8	1	9.2	9.3
Potassium (diss)	mg/L	-	-	-	-	0.5	-	-	-	-	-
Sodium (diss)	mg/L	100.7575	200	-	-	0.05	1.9	5.5	5	44	44
General Chemistry											
Alkalinity (as CaCO3)	mg/L	256	30 - 500	See Factsheet	-	1	7.9	56	17	260	270
Ammonia as N	mg/L	-	-	-	-	0.02	<0.05	0.073	0.057	12	12
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	-	-	-
Dissolved Organic Carbon	mg/L	4.325	5	-	-	0.4	1.5	2	1.4	37	36
Electrical Conductivity	uS/cm	-	-	-	-	1	29	140	76	690	680
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		6.75	7.72	6.93	7.04	6.76
Total Dissolved Solids	mg/L	267	500	-	-	5	40	210	110	395	355
Total Suspended Solids	mg/L	-	-	-	-	10	6800	19000	15000	5500	8000
Metals											
Aluminum (diss)	mg/L	-	0.1	-	Calculated	0.004	-	-	-	-	-
Barium (diss)	mg/L	-	1	-	-	0.002	0.01	0.012	0.014	0.47	0.47
Beryllium (diss)	mg/L	-	-	Calculated	-	0.001	-	-	-	-	-
Boron (diss)	mg/L	-	5	-	0.2	0.01	<0.01	0.031	<0.01	0.26	0.27
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.0001	-	-	-	-	-
Chromium (diss)	mg/L	-	0.05	-	-	0.001	-	-	-	-	-
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0002	-	-	-	-	-
Copper (diss)	mg/L	-	1	-	Calculated	0.001	-	-	-	-	-
Iron (diss)	mg/L	0.2065	0.3	0.3	-	0.01	<0.1	<0.1	<0.1	92	93
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	-	-	-	-	-
Manganese (diss)	mg/L	0.051	0.05	-	-	0.002	0.0021	0.49	0.24	4.8	4.9
Molybdenum (diss)	mg/L	-	-	-	0.04	0.005	-	-	-	-	-
Nickel (diss)	mg/L	-	-	0.025	-	0.005	-	-	-	-	-
Silicon (diss)	mg/L	-	-	-	-	0.1	-	-	-	-	-
Silver (diss)	mg/L	-	-	0.0001	-	0.0001	-	-	-	-	-
Strontium (diss)	mg/L	-	-	-	-	0.001	-	-	-	-	-
Thallium (diss)	mg/L	-	-	-	0.0003	0.0001	-	-	-	-	-
Titanium (diss)	mg/L	-	-	-	-	0.01	-	-	-	-	-
Vanadium (diss)	mg/L	-	-	-	0.006	0.001	-	-	-	-	-
Zinc (diss)	mg/L	-	5	-	0.02	0.005	-	-	-	-	-

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds RUV-LSP	Reasonable Use Values Lake St Peter
Concentration exceeds ODWQS	Ontario Drinking Water Quality Standards
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

*Please double check with Factsheet for all Calculated criteria/guidelines.

Appendix E

E-2 Historical Groundwater VOC Chemistry

E-2 Historical Groundwater VOCs Chemistry - Lake St Peter					Location	LSP1-03	LSP1-03	LSP1-03	LSP1-03
Parameter	Units	ODWQS-ALL-MERGED	PWQO-GENERAL	PWQO-INTERIM	Sample ID	LSP1-03	AQC GW-F21 (LS	LSP1-03	LSP1-03
					Sample Date	2021-Oct-19	2021-Oct-19	2022-Oct-17	2023-May-04
VOCs					**Detection Limit**				
1,1,1,2-Tetrachloroethane	mg/L	-	-	0.02	0.0001	<0.0001	<0.0001	<0.0001	<0.0002
1,1,1-Trichloroethane	mg/L	-	-	0.01	0.0003	<0.0003	<0.0003	<0.0003	<0.0006
1,1,2,2-Tetrachloroethane	mg/L	-	-	0.07	0.0001	<0.0001	<0.0001	<0.0001	<0.0002
1,1,2-Trichloroethane	mg/L	-	-	0.8	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
1,1-Dichloroethane	mg/L	-	-	0.2	0.0003	<0.0003	<0.0003	<0.0003	<0.0006
1,1-Dichloroethylene	mg/L	0.014	-	0.04	0.0002	<0.0002	<0.0002	<0.0002	<0.0006
1,2,4-Trichlorobenzene	mg/L	-	0.0005	-	0.0003	<0.0003	<0.0003	<0.0003	-
1,2-Dichlorobenzene	mg/L	0.003	0.0025	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0002
1,2-Dichloroethane	mg/L	0.005	-	0.1	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
1,2-Dichloropropane	mg/L	-	-	0.0007	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
1,3-Dichlorobenzene	mg/L	-	0.0025	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0002
1,3-Dichloropropene (Cis + Tra	mg/L	-	-	-	0.0003	<0.0003	<0.0003	<0.0003	-
1,4-Dichlorobenzene	mg/L	0.001	0.004	-	0.0001	<0.0001	<0.0001	<0.0001	0.00098
2-Hexanone	mg/L	-	-	-	0.001	<0.001	<0.001	<0.001	-
Acetone	mg/L	-	-	-	0.001	<0.001	<0.001	<0.001	<0.002
Benzene	mg/L	0.001	-	0.1	0.0002	0.00184	0.00156	<0.0002	0.00193
Bromodichloromethane	mg/L	-	-	0.2	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
Bromoform	mg/L	-	-	0.06	0.0001	<0.0001	<0.0001	<0.0001	<0.0002
Bromomethane	mg/L	-	-	0.0009	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
Carbon Tetrachloride	mg/L	0.002	-	-	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
Chlorobenzene	mg/L	-	0.015	-	0.0001	<0.0001	<0.0001	<0.0001	0.00068
Chloroethane	mg/L	-	-	-	0.0002	0.00516	0.00479	<0.0002	-
Chloroform	mg/L	-	-	-	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
Chloromethane	mg/L	-	-	0.7	0.0002	<0.0004	<0.0004	<0.0002	-
cis-1,2-Dichloroethylene	mg/L	-	-	-	0.0002	0.00083	0.00064	<0.0002	<0.0004
cis-1,3-Dichloropropene	mg/L	-	-	-	0.0002	<0.0002	<0.0002	<0.0002	-
Dibromochloromethane	mg/L	-	-	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0002
Dichlorodifluoromethane	mg/L	-	-	-	0.0002	<0.0002	<0.0002	<0.0004	<0.0008
Ethylbenzene	mg/L	0.0016	-	0.008	0.0001	0.00041	0.00033	<0.0001	<0.0002
Ethylene Dibromide	mg/L	-	-	0.005	0.0001	<0.0001	<0.0001	<0.0001	<0.0002
m & p-Xylene	mg/L	-	-	-	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
Methylene Chloride	mg/L	-	-	0.1	0.0003	<0.0003	<0.0003	<0.0003	<0.0006
Methyl Ethyl Ketone	mg/L	-	-	0.4	0.001	<0.001	<0.001	<0.001	<0.002
Methyl Isobutyl Ketone	mg/L	-	-	-	0.001	<0.001	<0.001	<0.001	<0.002
Methyl tertiary-butyl ether (M	mg/L	0.015	-	0.2	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
n-Hexane	mg/L	-	-	-	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
o-Xylene	mg/L	-	-	0.04	0.0001	0.00022	0.0002	<0.0001	<0.0002
Styrene	mg/L	-	-	0.004	0.0001	<0.0001	<0.0001	<0.0001	<0.0002
Tetrachloroethylene	mg/L	0.01	-	0.05	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
Toluene	mg/L	0.024	-	0.0008	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
trans-1,2-Dichloroethylene	mg/L	-	-	-	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
trans-1,3-Dichloropropene	mg/L	-	-	-	0.0003	<0.0003	<0.0003	<0.0003	-
Trichloroethylene	mg/L	0.005	-	0.02	0.0002	<0.0002	<0.0002	<0.0002	<0.0004
Trichlorofluoromethane	mg/L	-	-	-	0.0004	<0.0004	<0.0004	<0.0004	<0.0008
Vinyl Chloride	mg/L	0.001	-	0.6	0.00017	<0.00017	<0.00017	<0.00017	<0.00034
Xylene Mixture	mg/L	0.02	-	-	0.0002	0.00022	0.0002	<0.0002	<0.0002

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds ODWQS-ALL-MERGED	Ontario Drinking Water Quality Standards All Types Merged
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim

Appendix E

E-3 Historical Surface Water Chemistry

E-3 Historical Surface Water Chemistry - Lake St Peter WDS						Location	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1
Parameter	Units	PWQO-GENERAL	PWQO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1	LSP-SW1-QAQC	LSP-SW1	LSP-QAQC SW-F20	LSP-SW1	LSP-SW1	LSP-QAQC-SW-F21	LSP-SW1	LSP-SW1
						Sample Date	2014-Oct-15	2015-May-05	2016-Apr-27	2017-May-12	2017-Oct-24	2018-May-08	2019-May-08	2020-May-07	2020-May-07	2020-Oct-07	2020-Oct-07	2021-Apr-21	2021-Oct-19	2021-Oct-19	2022-May-02	2022-Oct-17
Anions						Detection Limit																
Chloride	mg/L	-	-	180	128	0.1	0.67	0.37	0.3	0.23	0.56	0.33	0.22	0.27	0.34	0.59	0.6	0.33	0.55	0.63	0.35	0.74
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	0.08	<0.05
Nitrite as N	mg/L	-	-	-	-	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	-	-	100	-	0.1	2.22	-	3.34	3.07	0.85	3.06	2.86	3.18	3.24	1.44	1.43	2.97	0.59	0.61	2.83	3.34
Cations																						
Calcium (tot)	mg/L	-	-	-	-	0.05	2.78	2.5	1.6	1.74	3.09	2.19	1.7	2.01	2.01	2.34	2.37	2.38	3.07	3.22	2.35	2.98
Magnesium (tot)	mg/L	-	-	-	-	0.05	0.73	0.69	0.4	0.4	0.85	0.58	0.43	0.49	0.57	0.58	0.58	0.63	0.88	0.81	0.62	0.83
Potassium (tot)	mg/L	-	-	-	-	0.05	1.09	0.93	0.6	0.68	1.33	0.89	0.66	0.94	0.81	0.9	0.91	1.12	1.19	1.18	<1.15	1.35
Sodium (tot)	mg/L	-	-	-	-	0.05	1.57	1.44	0.8	0.86	1.52	1.01	0.88	1.03	1.07	1.41	1.41	1.36	1.43	1.51	1.27	1.79
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	5	11	7	<5	5	11	9	6	6	11	8	8	6	14	14	10	11
Ammonia as N	mg/L	-	-	-	-	0.02	0.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.11	<0.02	<0.02
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<5	<5	<5	<5	<5	<5	<5	<5	<5	<2	<2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	-	-	-	-	4	20	7	17	9	29	<5	<5	6	<5	24	<5	<5	12	17	<5	12
Colour	TCU	-	-	-	-	2.5	-	-	-	29	51	42	7	26	29	48	50	27	34	35	24.9	44
Electrical Conductivity	uS/cm	-	-	-	-	2	37	27	20	23	42	25	21	29	30	24	24	25	30	30	30	35
pH	pH units	6.5 - 8.5	-	6 - 9	-		7.13	6.68	6.56	6.87	6.48	6.27	6.11	6.4	7.43	6.7	6.42	6.61	6.5	6.48	6.79	6.74
Phenols	mg/L	0.001	-	0.04	0.004	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Phenols-4AAP	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	-	-	-	10	38	36	32	<20	46	<20	40	32	28	42	32	28	32	40	24	18
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.62	0.36	1.11	0.24	0.68	0.34	<0.1	0.25	0.24	0.36	0.34	0.35	0.16	0.12	0.14	0.22
Total Nitrogen (Calculated)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22
Total Phosphorus	mg/L	0.03	-	-	-	0.01	0.06	0.02	<0.01	0.01	0.1	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Total Suspended Solids	mg/L	-	-	-	-	10	<10	<10	23	<10	14	<10	<10	<10	<10	<10	<10	<10	30	22	<10	<10
Turbidity	NTU	-	-	-	-	0.1	-	-	-	<0.05	1.1	1.1	2.1	10.5	0.9	1.2	<0.5	0.7	1.2	1.1	<0.5	<0.5
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	0.0000176	0.0003141	0.0000031	0.000011	0.0000517	0.0000046	0.000015	0.0000013	0.0000013	0.0000123	0.0000123	-	-	-	-	<0.000002
Metals																						
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	0.131	0.145	0.153	0.174	0.173	0.119	0.173	0.169	0.107	0.15
Aluminum (diss, PWQO)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.185	0.139	0.127	0.149	0.171	0.121	-	0.158	0.168	0.23	0.235	0.123	0.388	0.317	-	0.206
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium (tot)	mg/L	-	-	2.3	-	0.002	0.015	0.012	0.009	0.012	0.023	0.01	0.012	0.009	0.008	0.011	0.012	0.01	0.015	0.015	0.01	0.012
Beryllium (tot)	mg/L	Calculated	-	-	-	0.0004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (tot)	mg/L	-	-	0.064	-	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	0.0007	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0017	0.0014	<0.0005	<0.0005
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	<0.002	<0.002	<0.002	<0.002	<0.002	0.001	<0.002	0.003	<0.002	0.002	0.002	0.005	<0.002	<0.002	<0.002	0.002
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.24	0.04	<0.01	<0.01	1.29	0.03	0.02	0.037	0.034	0.167	0.17	0.053	0.595	0.417	0.075	0.124
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (tot)	mg/L	-	-	-	-	0.002	0.069	0.01	<0.002	-	-	0.009	0.005	0.003	0.004	0.031	0.032	0.006	0.244	0.172	0.006	0.012
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (tot)	mg/L	-	0.04	-	-	0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (tot)	mg/L	0.025	-	-	-	0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Selenium (tot)	mg/L	0.1	-	-	-	0.002	-	-	-	<0.004	<0.004	<0.004	0.006	0.004	<0.004	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002
Silicon (tot)	mg/L	-	-	-	-	0.05	5.5	5.07	2.78	3.81	5.54	3.69	3.76	4.05	3.73	5.63	5.64	4.67	5.64	5.67	5.03	5.61
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium (tot)	mg/L	-	-	-	-	0.001	0.021	0.017	0.011	0.012	0.022	0.015	0.013	0.014	0.012	0.015	0.015	0.016	0.021	0.021	0.019	0.02
Thallium (tot)	mg/L	-	0.0003	-	-	0.00005	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Titanium (tot)	mg/L	-	-	-	-	0.002	0.003	<0.002	<0.002	<0.002	0.01	<0.002	<0.002	0.008	<0.002	0.003	0.003	<0.002	0.011	<0.01	<0.01	<0.01
Vanadium (tot)	mg/L	-	0.006	-	-	0.0005	<0.002	<0.002	<0.002	0.003	0.002	<0.002	0.009	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.016	<0.005	<0.005	<0.005	<0.005	0.021	<0.005	<0.02	<0.02	<0.02	<0.02

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim
Concentration exceeds MECP-GD-TA	MECP Guidance Document Table A
Concentration exceeds MECP-GD-TB	MECP Guidance Document Table B

*Please double check with Factsheet for all calculated criteria/guidelines.

E-3 Historical Surface Water Chemistry - Lake St Peter WDS						Location	LSP-SW1	LSP-SW1	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2
Parameter	Units	PWQO-GENERAL	PWQO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	LSP-QAQC-SW-F22	LSP-SW1	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2-QAQC	LSP-SW2	LSP-SW2-QAQC	LSP-SW2	LSP-SW2-QAQC	LSP-SW2	LSP-SW2	LSP-SW2-QAQC	LSP-SW2	LSP-SW2	LSP-SW2
						Sample Date	2022-Oct-17	2023-May-04	2014-Oct-15	2015-May-05	2016-Apr-27	2016-Apr-27	2017-May-12	2017-May-12	2017-Oct-24	2017-Oct-24	2018-May-08	2019-May-08	2019-May-08	2019-Oct-23	2020-May-07	2020-Oct-07
Anions						Detection Limit																
Chloride	mg/L	-	-	180	128	0.1	0.75	0.29	0.86	0.98	1.31	1.38	1.72	1.83	1.05	1.01	0.64	1.79	0.36	2.66	1.25	0.73
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	<0.05	<0.05	<0.05	0.07	0.17	0.17	0.34	0.35	0.06	<0.05	0.18	0.36	<0.05	0.26	0.14	<0.05
Nitrite as N	mg/L	-	-	-	-	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	-	-	100	-	0.1	3.32	2.52	3.72	-	11.3	11.6	12.1	13.2	2.46	2.35	4.87	11.9	2.77	33.4	7.8	1.81
Cations																						
Calcium (tot)	mg/L	-	-	-	-	0.05	3.02	2.05	3.6	3.38	4.36	4.44	5.11	5.47	4.14	4.25	3.04	5.63	1.64	9.39	4.27	3.4
Magnesium (tot)	mg/L	-	-	-	-	0.05	0.8	0.54	0.87	0.9	0.95	0.96	1.11	1.15	1.15	1.17	0.77	1.28	0.42	2.4	1.09	0.77
Potassium (tot)	mg/L	-	-	-	-	0.05	1.26	0.86	1.12	1.1	1.39	1.41	1.8	1.93	1.38	1.49	1.16	2.04	0.61	1.7	1.43	0.97
Sodium (tot)	mg/L	-	-	-	-	0.05	1.79	1.03	1.97	2.39	2.78	2.83	3.08	3.41	2.4	2.34	1.64	3.19	0.85	3.72	2.35	1.82
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	5	9	7	9	7	9	9	11	12	18	16	9	15	5	7	8	11
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	<0.02	0.15	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.02	0.06	0.03	<0.02	0.11	0.03	<0.02
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<2		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<2
Chemical Oxygen Demand	mg/L	-	-	-	-	4	21	21	23	6	18	18	16	13	56	59	<5	7	<5	26	13	33
Colour	TCU	-	-	-	-	2.5	45.8	30	-	-	-	-	40	40	70	73	38	10	7	39	33	68
Electrical Conductivity	uS/cm	-	-	-	-	2	34	24	40	41	53	54	71	77	43	41	36	71	20	106	59	31
pH	pH units	6.5 - 8.5	-	6 - 9	-		6.5	6.86	7.1	6.8	6.95	6.99	7.28	7.28	6.67	6.56	6.2	6.37	6.06	6.43	6.4	6.72
Phenols	mg/L	0.001	-	0.04	0.004	0.001	0.002	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001
Phenols-4AAP	mg/L	-	-	-	-	0.001	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	-	-	-	10	20	12	44	42	52	50	42	48	52	52	<20	64	46	104	44	48
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.29	0.17	0.58	0.31	0.35	0.38	0.34	0.28	1.62	1.69	0.43	<0.1	<0.1	0.52	0.29	0.37
Total Nitrogen (Calculated)	mg/L	-	-	-	-	0.05	0.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus	mg/L	0.03	-	-	-	0.01	0.02	<0.02	0.03	0.01	0.03	<0.01	0.01	0.01	0.17	0.17	0.05	<0.02	<0.02	0.04	<0.02	<0.02
Total Suspended Solids	mg/L	-	-	-	-	10	<10	<10	<10	<10	14	17	<10	<10	<10	18	<10	<10	<10	<10	41	<10
Turbidity	NTU	-	-	-	-	0.1	<0.5	0.8	-	-	-	-	<0.05	<0.05	4.6	9.9	1.2	2.8	<0.5	26.2	1	1.4
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	<0.000002	<0.000002	0.0000208	0.0002728	0.0000051	0.0000051	0.000018	0.000018	0.0000529	0.0000529	0.0000092	0.0000219	-	0.0000217	0.000011	0.0000124
Metals																						
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	0.129	-	-	-	-	-	-	-	-	-	-	0.11	0.133	0.112	0.117	0.158
Aluminum (diss, PWQO)	mg/L	-	Calculated	-	-	0.004	-	0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.199	-	0.157	0.103	0.103	0.104	0.126	0.124	0.131	0.15	0.093	-	-	-	0.171	0.203
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	<0.003	<0.003	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium (tot)	mg/L	-	-	2.3	-	0.002	0.011	0.012	0.015	0.01	0.014	0.016	0.02	0.02	0.031	0.02	0.01	0.021	0.012	0.036	0.013	0.012
Beryllium (tot)	mg/L	Calculated	-	-	-	0.0004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.001	<0.001
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	<0.01	<0.01	0.013	0.011	0.025	0.028	0.042	0.039	0.013	0.013	0.015	0.06	<0.01	0.046	0.021	<0.01
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (tot)	mg/L	-	-	0.064	-	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	0.005
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	0.002	0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.001	<0.002	<0.002	0.002	0.002	0.002
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.11	0.07	0.34	0.13	0.38	0.6	<0.01	<0.01	1.3	1.28	0.1	0.18	0.02	0.821	0.187	0.248
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese (tot)	mg/L	-	-	-	-	0.002	0.014	0.004	0.025	0.017	0.026	0.037	-	-	-	-	0.031	0.04	0.004	0.103	0.029	0.016
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	<0.0001	<0.0001	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (tot)	mg/L	-	0.04	-	-	0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (tot)	mg/L	0.025	-	-	-	0.001	0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Selenium (tot)	mg/L	0.1	-	-	-	0.002	<0.002	<0.002	-	-	-	-	<0.004	<0.004	<0.004	<0.004	<0.004	0.005	0.005	<0.004	<0.004	<0.004
Silicon (tot)	mg/L	-	-	-	-	0.05	6.28	3.39	5.47	4.47	3.69	4.08	4.48	4.36	5.92	5.78	3.77	4.49	3.78	5.62	3.76	6.18
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium (tot)	mg/L	-	-	-	-	0.001	0.022	0.016	0.024	0.019	0.026	0.029	0.033	0.033	0.03	0.029	0.022	0.039	0.014	0.066	0.022	0.021
Thallium (tot)	mg/L	-	0.0003	-	-	0.00005	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Titanium (tot)	mg/L	-	-	-	-	0.002	<0.01	<0.01	0.002	<0.002	0.002	0.004	<0.002	<0.002	0.005	0.005	<0.002	<0.002	<0.002	<0.002	0.008	0.003
Vanadium (tot)	mg/L	-	0.006	-	-	0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.002	<0.002	<0.002	<0.002	0.008	0.007	<0.002	<0.002	<0.002
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	<0.02	<0.02	<0.005	<0.005	0.005	0.006	0.008	0.008	0.011	0.006	0.005	0.007	<0.005	0.006	<0.005	0.006

-LEGEND-

Detection Limit	DL: May vary between sample locations and events
DL exceeds criteria	
Concentration exceeds PWQO-GENERAL	Provincial Water Quality Objectives General
Concentration exceeds PWQO-INTERIM	Provincial Water Quality Objectives Interim
Concentration exceeds MECP-GD-TA	MECP Guidance Document Table A
Concentration exceeds MECP-GD-TB	MECP Guidance Document Table B

*Please double check with Factsheet for all calculated criteria/guidelines.

E-3 Historical Surface Water Chemistry - Lake St Peter WDS						Location	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2	LSP-SW2
Parameter	Units	PWQO-GENERAL	PWQO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	LSP-SW2	LSP-QAQC SW-S21	LSP-SW2	LSP-SW2	QC SW-S22 (LS	LSP-SW2	LSP-SW2	LSP-QAQC-SW2
						Sample Date	2021-Apr-21	2021-Apr-21	2021-Oct-19	2022-May-02	2022-May-02	2022-Oct-17	2023-May-04	2023-May-04
Anions						Detection Limit								
Chloride	mg/L	-	-	180	128	0.1	0.8	0.75	0.93	0.84	0.82	0.91	0.58	0.6
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	0.17	0.16	<0.05	0.15	0.16	<0.05	0.1	0.1
Nitrite as N	mg/L	-	-	-	-	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	-	-	100	-	0.1	5.85	5.57	1.93	5.76	5.74	5.78	4.86	4.98
Cations														
Calcium (tot)	mg/L	-	-	-	-	0.05	4.21	4.06	5.44	4.56	4.27	4.43	3.66	4.24
Magnesium (tot)	mg/L	-	-	-	-	0.05	1.12	1.01	1.26	1.06	1.14	1.12	0.84	0.83
Potassium (tot)	mg/L	-	-	-	-	0.05	1.34	1.37	1.72	1.82	1.34	1.12	1.22	1.36
Sodium (tot)	mg/L	-	-	-	-	0.05	2.41	2.41	2.49	2.52	2.24	2.16	1.78	1.83
General Chemistry														
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	5	9	9	20	10	11	9	9	10
Ammonia as N	mg/L	-	-	-	-	0.02	0.04	0.04	0.08	<0.02	<0.02	0.05	<0.02	<0.02
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<2	<2	<2	<2	<2	3		
Chemical Oxygen Demand	mg/L	-	-	-	-	4	<5	<5	18	<5	14	26	16	16
Colour	TCU	-	-	-	-	2.5	32	32	45	26.4	26.6	60.2	34.9	34.7
Electrical Conductivity	uS/cm	-	-	-	-	2	42	40	48	49	49	41	40	41
pH	pH units	6.5 - 8.5	-	6 - 9	-		6.65	6.67	6.65	6.43	6.42	6.56	6.69	6.71
Phenols	mg/L	0.001	-	0.04	0.004	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-
Phenols-4AAP	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	<0.001	<0.001
Total Dissolved Solids	mg/L	-	-	-	-	10	24	42	58	10	58	56	38	34
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.34	0.36	0.21	0.29	0.3	0.6	0.26	0.22
Total Nitrogen (Calculated)	mg/L	-	-	-	-	0.05	-	-	-	-	-	0.6	-	-
Total Phosphorus	mg/L	0.03	-	-	-	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02
Total Suspended Solids	mg/L	-	-	-	-	10	<10	<10	<10	<10	<10	11	<10	<10
Turbidity	NTU	-	-	-	-	0.1	2	1	2.2	1.5	0.8	11.9	9.6	7.7
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	-	-	-	-	-	0.000008	<0.000002	<0.000002
Metals														
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	0.091	0.101	0.102	0.089	0.072	0.125	-	-
Aluminum (diss, PWQO)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	0.117	0.124
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.138	0.099	0.15	-	-	0.609	-	-
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium (tot)	mg/L	-	-	2.3	-	0.002	0.011	0.011	0.015	0.015	0.014	0.018	0.013	0.014
Beryllium (tot)	mg/L	Calculated	-	-	-	0.0004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	0.023	0.023	0.015	0.028	0.029	0.018	0.023	0.026
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (tot)	mg/L	-	-	0.064	-	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	<0.002	0.003	<0.002	<0.002	<0.002	0.002	0.001	0.001
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.21	0.138	0.798	0.484	0.514	0.96	0.266	0.262
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Manganese (tot)	mg/L	-	-	-	-	0.002	0.04	0.035	0.116	0.061	0.072	0.05	0.028	0.025
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-
Molybdenum (tot)	mg/L	-	0.04	-	-	0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (tot)	mg/L	0.025	-	-	-	0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Selenium (tot)	mg/L	0.1	-	-	-	0.002	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Silicon (tot)	mg/L	-	-	-	-	0.05	5.33	4.96	6.77	4.7	4.59	7.32	3.73	3.9
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium (tot)	mg/L	-	-	-	-	0.001	0.027	0.027	0.038	0.028	0.025	0.028	0.021	0.023
Thallium (tot)	mg/L	-	0.0003	-	-	0.00005	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Titanium (tot)	mg/L	-	-	-	-	0.002	0.002	<0.002	<0.01	<0.01	<0.01	0.018	<0.01	<0.01
Vanadium (tot)	mg/L	-	0.006	-	-	0.0005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	<0.005	<0.005	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

-LEGEND-

Detection Limit — DL: May vary between sample locations and events

DL exceeds criteria

Concentration exceeds PWQO-GENERAL — Provincial Water Quality Objectives General

Concentration exceeds PWQO-INTERIM — Provincial Water Quality Objectives Interim

Concentration exceeds MECP-GD-TA — MECP Guidance Document Table A

Concentration exceeds MECP-GD-TB — MECP Guidance Document Table B

*Please double check with Factsheet for all calculated criteria/guidelines.

Appendix F

Trigger Mechanisms and Contingency Plan

LAKE ST. PETER WASTE DISPOSAL SITE
SURFACE WATER TRIGGER MECHANISM AND CONTINGENCY PLAN
(FINAL 2021-06-07)

OBJECTIVE AND BACKGROUND

The objective of the surface water trigger mechanisms and contingency plan for the Lake St. Peter Waste Disposal Site (WDS) is to identify leachate impacted surface water and/or the migration of leachate impacted groundwater with the potential to discharge to surface water and cause exceedances of the Provincial Water Quality Objectives (PWQO)/Canadian Water Quality Objectives (CWQO), and ensure timely action to prevent and mitigate adverse impacts to the environment.

East at Creek

Assessment Points- SW2, DP1-21 (to be installed in the summer of 2021)
Trigger Parameters-Listed in Table Below
Frequency-Sampling twice per year (Spring and Fall)
Contingency Plan is activated if two or more trigger location parameter concentrations exceed the PWQO/CCME concentrations at one assessment point for two consecutive sampling events for alkalinity, boron, chloride, iron, manganese, nitrate, or un-ionized ammonia. Other leachate indicator parameters consisting of ammonia, barium, calcium, COD, conductivity, magnesium, TDS, sodium, and sulphate have not been included at this time.

The trigger parameter concentrations are as follows:

Trigger Parameter	PWQO Concentration mg/L	Trigger
Alkalinity	<3.1	When two leachate indicator parameters PWQO/CCME concentrations are exceeded at trigger location for two (2) consecutive sampling periods.
Boron	0.20	
Un-ionized Ammonia	0.20	
Trigger Parameter	**CCME (CWQG) Concentrations mg/L**	
Chloride	120	
Iron	0.3	
Manganese	0.26	
Nitrate	13	

CONTINGENCY PLAN – SURFACE WATER

Tier 1: If two or more of the trigger parameter concentrations exceed PWQO/CCME (CWQG) at one assessment point during two consecutive sampling events.

1. Toxicity test (Single Concentration – Acute Lethality) samples will be collected from the creek downstream of SW2 and DP1-21 prior to the wetland discharging under Highway 127. If the toxicity test passes then no additional mitigation measures will be required. If the toxicity test fails then Tier 2 actions will be implemented:

Tier 2: If the Tier 1 toxicity sampling results fail then the following measures will be implemented:

1. Collect a repeat toxicity sample to confirm the results within two weeks of receiving the failed laboratory report.
2. Carry out surface water sampling at sampling location SW2 and groundwater sampling at potential additional future drive-point piezometer DP1-21 within one month of receiving the failed toxicity test. The analyses is to include the full suite of surface water parameters (Schedule 5, Column 3 O.Reg.232/98) and assess data (compared to PWQO/CWQG) to determine if results are in keeping with historic data and/or if there appears to be significant potential leachate impacts occurring.

Tier 3: If the Tier 2 re-sampling shows significant potential leachate impacts are occurring to surface water, then the following measures will be implemented depending on the nature of the trigger activation:

1. Install additional drive-point piezometers along/in the creek bed to determine if, or where groundwater is discharging to the creek.

Tier 4: If additional actions indicate a continuing issue resulting in impacts or potential significant impacts to the environment, then a mitigation/remediation measures plan will be developed in consultation with MECP and implemented to minimize further impact. These measures could be aimed at intercepting or diverting the impacted groundwater before it reaches a receptor or isolating downgradient receptors from impacted surface water. The specifics of the plan will be dependent on the nature of the impact.

LAKE ST. PETER WASTE DISPOSAL SITE
GROUNDWATER TRIGGER MECHANISMS AND CONTINGENCY PLAN
(FINAL 2021-02-21)

OBJECTIVE AND BACKGROUND

The objective of the groundwater trigger mechanism and contingency plan for the Lake St. Peter Waste Disposal Site (WDS) is to identify migration of leachate impacted groundwater to adjacent groundwater receptors and ensure timely action to prevent and mitigate any adverse impacts to the environment.

East of the Site

Assessment Points- Future monitoring well near East CAZ
Trigger Parameters-Barium, Chloride, DOC, TDS
Frequency-Sampling twice per year (Spring and Fall)
Contingency Plan is activated if two trigger parameter concentration is exceeded at one assessment point for two consecutive sampling events. The trigger parameter concentrations are as follows:

Trigger Parameter	RUV/RUG Concentration mg/L	Trigger
Barium	0.26	When two leachate indicator parameter concentration at an individual trigger location well is exceeded for two consecutive sampling periods.
DOC	5.1	
TDS	266.3	
Trigger Parameter	**75% of RUV/RUG Concentration mg/L**	
Chloride	125.8	

Note: RUV/RUGs are calculated based on LSP2-03 as background (cross-gradient well).

CONTINGENCY PLAN – GROUNDWATER

Tier 1: If one or more triggers are exceeded at one assessment point during two consecutive sampling events, repeat sampling will be conducted within one (1) month to confirm or refute the results at that location.

Tier 2: If Tier 1 re-sampling results confirm exceedances then the following measures will be implemented depending on the nature of the trigger activation:

1. Discuss the Tier 1 sample results with the MECP. Agree on additional sampling and analyses requirements which may include the following:
    a. Increase monitoring frequency to twice monthly, for six months, if exceedances continue. Revert back to typical annual monitoring sampling frequency if there are two consecutive sampling results that do not show exceedances.

Tier 3: If the increased sampling and/or studies in Tier 2 indicate a continuing issue resulting in impacts or potential significant impacts to the environment, then a mitigation/remediation measures plan will be developed and implemented to minimize further impact. These measures would be aimed at intercepting or diverting the impacted groundwater before it reaches a receptor. The specifics of the plan will be dependent on the nature of the impact.

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