



**2023 ANNUAL MONITORING REPORT
NORTH BAPTISTE WASTE TRANSFER STATION
ENVIRONMENTAL COMPLIANCE APPROVAL
NO. A361603**

Prepared for:

The Corporation of the Municipality of Hastings Highlands

P.O. Box 130
33011 Highway No. 62
Maynooth, ON K0L 2S0

Prepared by:

BluMetric Environmental Inc.

4 Cataraqui Street
The Woolen Mill, The Tower
Kingston, ON K7K 1Z7

Project Number: 230225-08

25 March 2024

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Executive Summary

BluMetric Environmental Inc. (BluMetric®) is pleased to provide a summary of the 2023 environmental monitoring at the North Baptiste Waste Transfer Station (WTS), herein referred to as “the Site”, in Maynooth, Ontario. This summary is presented as a plain language summary to be used in addition to the final report titled “2023 Annual Monitoring Report North Baptiste Waste Transfer Station, Environmental Compliance Approval No. A361603” (BluMetric, 2024).

It should be noted that this summary provides an overview of the main findings of the report to which it pertains. This summary does not provide a comprehensive report, and its review should not be considered a substitute for reading the report in its entirety.

Summary Statements, Conclusions, and Recommendations

Site visits were made on May 3, August 9, and October 19, 2023. Generally, the WTS was observed to be in good condition at the time of all site visits.

Site Operations

The Site currently collects waste in covered waste bins, which is picked-up and transferred to another WDS. The Site has segregated collection areas for scrap metal, tires, large bulk items, electronic waste, and a recycling transfer station for household blue box recyclable containers and paper fibres. Based on the assumed recycling values for the entire year, it is estimated that a total of 52% of residential waste was recycled in 2023. There were no documented complaints, rejected waste, or emergency situations reported for the Site in 2023.

Vegetation was observed to be well established on the cap. Site operations should continue in accordance with the ECA issued in January 2020.

Groundwater

The ECA was revised in January 2020 (No. A361603) and now requires monitoring of groundwater quality conditions. Groundwater samples were successfully collected in May and October 2023 from the five groundwater monitoring wells located at the Site.

The groundwater elevation data suggests groundwater is flowing radially away from the landfill with the primary groundwater flow direction to the southeast. Groundwater results have been compared to the Ontario Drinking Water Standards, Objectives and Guidelines (ODWSOG), Reasonable Use Criteria/Reasonable Use Values (RUC/RUV), and Provincial Water Quality Objectives (PWQO) criteria. A summary of exceedances is provided within the report.

Groundwater quality in 2023 was generally within historical ranges for the Site. Monitoring wells NB-MW3, NB-MW4, and NB-MW5 are considered impacted by leachate. Groundwater at the Site is expected to discharge to surface at or before the property line and therefore it is expected that groundwater downgradient from the WDS property boundary is not being impacted by leachate and is compliant with Guideline B-7-1.

Groundwater sampling should be conducted at all monitoring locations as per the ECA issued in January 2020. Select metals were recommended for removal in 2019 but since no agreement has been received from the MECP, they have continued to be sample as part of the groundwater monitoring program. Upon MECP approval, these parameters should be removed from the groundwater suite of parameters.

In response to the MECP's SW Technical review recommendation that a leachate indicator well be installed, BluMetric recommends that NB-MW3 continue to be used as the leachate well for the east and NB-MW5R be used as the leachate well for the south.

Surface Water

There are eight surface water monitoring locations at the Site to characterize surface water flow and quality. Surface water samples were successfully collected in May 2023 at all monitoring locations; however, the August and October sampling was limited due to insufficient water. The background sample (MCG-A) and the small ponded area at the toe (MCG-B) were not collected in the summer and fall due to dry conditions.

Surface water results have been compared to PWQO, and Table A and Table B criteria from the WDS Technical Guidance (MOE, 2010). A summary of exceedances is provided within the report.

Monitoring locations MCG-B, MCG-C, and MCG-D indicate impacts to the east and south of the Site, while MCG-H may also be demonstrating impacts.

Surface water sampling should continue at all established monitoring locations, and should be conducted in the spring, summer, and fall of each year, following a storm event if possible (precipitation greater than 10 mm over 24 hours).

Toxicity Surface Water

Toxicity samples were collected from MCG-C and MCG-H during the spring and fall sampling events for single-concentration acute lethality testing of *Daphnia magna* (48 hour) and rainbow trout (96 hour). The single concentration test is typically reported as a “pass” or “fail” test, with 50% mortality being the passing limit. The results from the toxicity testing at both locations indicated that the percent mortality for *Daphnia magna* and Rainbow Trout were 0%.

Trigger Mechanisms and Contingency Plan

Trigger assessment points for surface water are toxicity sampling results at MCG-C and MCG-H. As discussed above all toxicity testing in 2023 passed, therefore additional sampling was not required.

The Contingency Plan was triggered at NB-MW5R (south assessment point) during the spring 2023 sampling event with trigger parameter exceedances of alkalinity, chloride, and TDS. The trigger exceedances activated Tier 1 of the Contingency Plan which involves a repeat sampling event within one month to confirm or refute the results at that location. Tier 1 sampling resulted in TDS and manganese exceedances only, thus not activating Tier 2 sampling.

Landfill Gas

Results in 2023 (0 to 5 ppm) indicate gas concentrations on the Site are currently not a hazard concern; concentrations are less than 1.0% methane gas (10,000 ppm, LEL-20%) in an on-site building, or its foundation. Gas concentrations should continue to be monitored during semi-annual sampling events.

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1 Introduction

This report provides a summary and analysis of environmental monitoring activities at the North Baptiste Waste Transfer Station (WTS), in Maynooth, Ontario. The WTS, as shown in Figure 01 is herein after referred to as “the Site”. The Corporation of the Municipality of Hastings Highlands (MHHs or Municipality) retained BluMetric Environmental Inc. (BluMetric®) to conduct the 2023 environmental monitoring and sampling program and prepare the 2023 Annual Report.

This report is being prepared for the Corporation of the Municipality of Hastings Highlands (the Municipality). The Municipality owns and operates the Site, and it is operated under Environmental Compliance Approval (ECA) A361603 which is included in **Appendix A**. The report covers all work and activities conducted for the period from January 1, 2023, to December 31, 2023.

The most recent MECP Groundwater Technical Review was on the 2018 Annual Monitoring Report and the most recent MECP Surface Technical Review was received on the 2020 Annual Monitoring Report, which was received on June 4, 2021.

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 WDS is closed however the WTS operated throughout 2023.

1.1 Location

The WTS is located on the south side of North Baptiste Lake Road, approximately 1.5 km from the intersection with Highway 62 and just north of Hickey Settlement (Figure 01). The civic address is 353 North Baptiste Lake Road, Maynooth, Ontario and is located approximately 9 km south of Maynooth. The total site area is 3.207 hectares (ha) (rounded to 3.2 ha in the remainder of this report) located on Part of Lot 3, Concessions 10 (formerly Herschel Township), now part of the Municipality of Hastings Highlands. The WTS facility layout, road network, and site features are shown on Figure 02.

The Site includes a former WDS, which was closed and capped in August 2018. The former WDS has a 0.69 ha approved footprint, with an actual final footprint area of 0.51 ha. There are buffer lands surrounding the former footprint. The final Closure Plan for the WDS and conversion of the Site to a WTS was approved in 2017. The North Baptiste WDS had been in operation since at least 1968.

1.2 Ownership and Key Personnel

The facility is operated by the MHHs, with the Municipal office located in Maynooth, Ontario. The Municipality owns the 3.2 ha site on which the WTS and former waste site is situated.

The facility's operational representative is responsible for all activities on-site. The Competent Environmental Practitioner (CEP) for both groundwater and surface water is S'rana Scholes, P.Eng., of BluMetric. Ms. Scholes is a Professional Engineer as designated by Professional Engineers Ontario (PEO).

Table 1: Contact Information

	Name	Address	Phone Number	Email
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	Senior Environmental Engineer, BluMetric – S’rana Scholes, P.Eng.	209 Frederick street, Kitchener, ON, N2H 2M7	(877) 487-8436 ext. 218	sscholes@blumetric.ca

1.3 Description and Development of the WDS

In addition to domestic waste bins, North Baptiste WTS includes recycling bins for metal, plastic, paper/cardboard products, as well as segregated areas for scrap metal, and tires. Brush is no longer accepted at the Site. The Ontario Electronic Stewardship (OES) has approved the North Baptiste WTS 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). The regulation with respect to EEE falls under the Resource Recovery and Circular Economy Act, 2016, and the regulation was filed on September 21, 2020.

1.4 Monitoring and Reporting Program 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. 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 WDS-Technical Guidance (November 2010) document and the ECA for the Site. The amended ECA (January 2020) stipulates under Schedule B the requirements for groundwater monitoring on a semi-annual basis and surface water monitoring each spring, summer and fall.

2 Physical Setting

2.1 Geology And Hydrogeology

2.1.1 Surficial Geology

The surficial geology of the area consists of glacialfluvial 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 5.5 to 36 metres (m).

Figure 3 illustrates the locations of all private wells within 1.5 km of the Site. The well record for a nearby well located within 500 m west of the Site indicates that overburden consists of gravel with boulders to a depth of 17 m below ground surface (mbgs). Additional well records from the nearby wells indicate the maximum depth of overburden is 36 mbgs.

Monitoring wells on the North Baptiste property were originally drilled and installed in 1996 as part of the Site Development Plan, Capacity and Operations Report (Greer Galloway, 1996). Each monitoring well was drilled until assumed bedrock refusal. Monitor depths range from 5.49 mbgs (NB-MW4) to 9.45 mbgs (NB-MW5) and each well screens a water-bearing overburden till unit. Monitoring wells NB-MW2 and NB-MW5 were re-drilled and re-instrumented in 2016 and are denoted as NB-MW2R and NB-MW5R. The locations of the Site monitoring wells are depicted on Figure 04 – Groundwater & Surface Water Monitoring Well Locations. The monitoring well logs are included in **Appendix C**.

2.1.2 Bedrock Geology

Bedrock in the area is classified as clastic metasedimentary rocks (e.g. conglomerate, limestone, siltstone) or a tectonite unit. The tectonite unit rocks consist of tectonites, straight gneisses, porphyroclastic gneisses, unsubdivided gneisses in major deformation zones, mylonites, and protomylonites (MNDM, 1991). The above mentioned well records indicate the bedrock in the vicinity of the Site is granite.

2.1.3 Surface Water Features

The Site is upgradient and adjacent to the north side of a small, unnamed lake. The lake is surrounded by a large marsh area which lies immediately to the east and south of the Site. A small creek located just to the east of the Site flows southward from North Baptiste Lake Road and into the wetland area. These features and the topographic contours can be seen on Figures 01 and 03.

Selby Creek is located 0.8 km east and southeast of the Site. It flows from the northeast towards the outlet from the marsh surrounding the Site. After this confluence, it continues to flow eastward for approximately 2.3 km to O'Shaughnessy Lake.

De-icing activities along North Baptiste Lake Road and Highway 62 may be impacting surface water in the vicinity of the Site. This is further discussed in Section 5.2.

3 Description of Monitoring Program

3.1 Site Inspections and Operations Monitoring

In 2023, site visits and inspections occurred on May 3, June 1, August 9, and October 19. The inspection checklists are included in **Appendix D, Item D-1**.

The WTS was observed to generally be in good condition at the time of all site visits in 2023 (e.g., signage, tidiness, etc.). Vegetation growth on the cap has established and is growing well.

During the spring, summer and fall inspections, the following notable conditions were observed:

- The recycling operation was not open during the spring inspection.
- The bulk waste pile was observed to be at capacity during the summer and fall inspections.

- Observations indicated there is likely a blockage due to offsite beaver activity downstream of the WTS as flooding was observed during the spring, summer, and fall inspections.
- Tall vegetation concealed part of the entrance sign during the summer inspection.

3.2 Monitoring Locations, Frequency and Monitoring Parameters

3.2.1 Groundwater Monitoring

There are currently five groundwater monitoring wells located at the Site. The groundwater samples were collected and analyzed to characterize groundwater quality. The monitoring requirements for the North Baptiste WDS/WTS are defined in Schedule B of the Site ECA with modifications to the program recommended and/or approved by the MECP from time to time. The locations and descriptions of the groundwater monitoring wells are provided in Table 2.

Table 2: Groundwater Monitor Well Details

Groundwater Monitor Name	Northing (m)	Easting (m)	Relative Location
NB-MW1	5,006,444	269,950	Background well, 60 m north and west of the disposal area
NB-MW2R	5,006,470	270,038	Downgradient, 75 m northeast of the disposal area
NB-MW3	5,006,410	270,053	Downgradient, 15 m east of the disposal Area/ leachate well for the east
NB-MW4	5,006,373	270,049	Downgradient, 20 m southeast of the disposal area
NB-MW5R	5,006,338	270,011	Downgradient, 20 m south of the disposal area/ leachate well for the south

Notes: UTM Zone 18 NAD 83 coordinates-Data based on 2016 geodetic survey

Groundwater samples were collected on May 3, 2023, and October 19, 2023. The laboratory reports and chain of custody records are included in **Appendix D, Item D-2**. Table 3 lists the groundwater quality monitoring parameters.

Table 3: Groundwater Quality Monitoring Parameters

Category	Parameters
Organic Parameters	Chemical Oxygen Demand (COD), Phenols
Inorganic Parameter	Alkalinity, Chloride, Hardness (Total), Nitrite, Nitrate, Sulphate, Phosphorous (total), Total Kjeldahl Nitrogen (TKN), Ammonia (N)-Total, Dissolved Organic Carbon (DOC) Metals: Aluminum, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Strontium, Thallium, Titanium, Vanadium, Sodium, Zinc, Lead
Physical/Chemical Parameters	pH, Conductivity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Turbidity

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

During the fall monitoring event, the conditions of groundwater monitoring wells were inspected. Any repairs, such as new locks, labels or well caps, were made as necessary on the replacement wells drilled in 2016. Watertight casings and seals remain in place at these two monitors to ensure that surface water and foreign materials cannot enter groundwater monitoring wells. These new groundwater monitoring wells are fitted with a vermin proof cap to meet the requirements of Ontario Regulation 903. They are locked to provide protection against vandalism and are in line with industry best practices. The remaining 1996 monitoring wells were installed without steel casing protection (MW1, MW3, MW4). These wells are very difficult to access with heavy equipment as they are in the marshy area east of the Site. As such, they have not been upgraded. These wells are unlikely to be damaged by equipment or encountered by the public.

3.2.1.1 Groundwater Gradients and Flow Direction

During each monitoring event, groundwater elevations were collected from each of the five monitoring wells using a Solinst electronic water level meter prior to purging/sampling activity. Groundwater elevation data is summarized in Table 4.

Table 4: Groundwater Elevation Data

Well ID	Casing Depth (MBTOC)	Elevation (MASL)*	Water Level	Water Level	Elevation	Elevation
			3-May-23	19-Oct-23	3-May-	19-Oct-
			(MTPVC)	(MTPVC)	(MASL)	(MASL)
NB-MW1	7.66	402.06	4.42	5.67	397.64	396.39
NB-MW2R	4.60	395.10	0.83	0.96	394.27	394.14
NB-MW3	5.24	394.66	0.59	0.73	394.07	393.93
NB-MW4	6.14	395.04	0.85	0.93	394.19	394.11
NB-MW5R	5.90	395.33	0.76	1.06	394.57	394.27

Notes: * Elevation data is based on 2016 geodetic survey

MBTOC - Metres below top of casing

MASL - Metres above sea level

MTPVC – Metres above top of PVC

3.2.1.2 Groundwater Flow Direction

The groundwater elevation data suggests groundwater is flowing radially away from the landfill with the primary groundwater flow direction to the east – southeast towards NB-MW3 and NB-MW4, as seen in Figure 05 and Figure 06. There was minimal change in the water level observed in the eastern and southern wells near the adjacent wetland between the spring and fall monitoring events while the groundwater elevation at the upgradient background well NB-MW1 dropped approximately 1.2 metres from the spring to the fall monitoring event.

3.2.2 Surface Water Monitoring

Surface water sampling was conducted on May 3, August 9, and October 19, 2023. The eight current surface water sampling stations and one former sampling location are shown on Figure 04 and are described in Table 5. The monitoring requirements for the surface water monitoring at the North Baptiste WDS/WTS are defined in Schedule B of the Site ECA with modifications to the program recommended and/or approved by the MECP from time to time.

A modification to the surface water monitoring plan that was incorporated in 2022 is the location of the background sample. MCG-A2 replaced MCG-A as the background location following MECP review in 2019 and is currently listed in the ECA as the background sampling location. However, MECP correspondence from June 2021 indicated that based on a review of results, MCG-A was more representative of the surface water conditions entering the landfill area and that MCG-A2 could be removed from the surface water monitoring program. MCG-A was sampled as the background sampling location in 2023.

In 2022, sample location MCG-E moved from its original location on the west side of Highway 62, to the east side of Highway 62 where it could be accessed from a public road without crossing private property.

Samples could not be collected from several locations during the 2023 monitoring period due to dry conditions. MCG-A and MCG-B could not be sampled during the summer or fall events.

Table 5: Surface Water Monitor Locations

Surface Water Location Name	Northing (m)	Easting (m)	Relative Location
Current Surface Water Monitoring Locations			
MCG-A	5,006,619	270,040	Background sample, north of the WDS.
MCG-B	5,006,394	270,048	Ponded water at toe area of the landfill, downstream of the WDS (east).
MCG-C	5,006,273	270,050	Downstream of the WDS in the wetland area to the south.
MCG-D	5,006,215	270,055	Downstream of the WDS in the wetland area to the south.
MCG-E	5,006,098	271,790	Selby Creek downstream from the WDS, east of Highway 62.
MCG-F	5,006,816	271,070	Selby Creek prior to confluence with drainage from wetland/pond adjacent to the WDS.
MCG-G	5,006,074	270,077	Background sample south of the WDS.
MCG-H	5,006,311	270,140	Location in creek before entering small lake/pond in the wetland.

Surface Water Location Name	Northing (m)	Easting (m)	Relative Location
Former Background Surface Water Monitoring Location			
MCG-A2	5,006,672	270,014	Removed from sampling program, replaced by MCG-A in spring 2022.

Notes: UTM Zone 18 NAD 83 coordinates

As discussed in previous reports, MCG-F is thought to be the best upstream sample location on the creek east of the Site (BluMetric, 2021). De-icing activities along North Baptiste Lake Road may be impacting this upstream location. De-icing may also be impacting the downstream location MCG-E located just east of Highway 62.

Surface water temperature, pH, conductivity, and dissolved oxygen field measurements were recorded at the time of sampling. Surface water samples were analyzed for the parameters listed in Schedule B of the ECA and are shown in Table 6.

Table 6: Surface Water Quality Monitoring Parameters

Category	Parameters
Biological Parameters	Biochemical Oxygen Demand (BOD5)
Organic Parameters	Phenols
Inorganic Parameters	Alkalinity, Chloride, Nitrite, Nitrate, Sulphate, Phosphorous (total), TKN Ammonia (N)-Total, Un-ionized Ammonia, Hardness, Calcium. Metals (Total): Aluminum, Arsenic, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Manganese ¹ , Magnesium, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Zinc, Lead.
Physical/Chemical Parameters	pH, Colour, Conductivity, TDS, Total Suspended Solids (TSS), Turbidity

Notes:

1 – Manganese was added to the list of parameters based on the MECP review of the 2020 Annual Monitoring Report, received on June 4, 2021.

Surface flow measurements were collected by using a Global Flow Probe for open channel flow. The flow velocity in meters per second (m/s) was recorded along with the width and depth of flow. Table 7 summarizes the calculated flow measurements and water clarity observations for each location.

Table 7: Surface Water Sampling Locations and Observations

Date	Location	Field Observations
3 May 2023	MCG-A	Flow = 0.018 m ³ /s. Water was clear with a light brown colour. Garbage noted at and around location. Sample collected.
	MCG-B	Ponded water at landfill toe with no visible flow. Water was clear with a light brown colour and red precipitate that settled. Sample collected.
	MCG-C	Flooded area due to beaver activity, no direct flow channel, no flow observed. Water was clear with a brown /orange colour. Sample collected and 2 pails for toxicity.
	MCG-D	Large, flooded area, no direct flow path. Water was clear with a light brown colour. Sample collected.
	MCG-E	Flow = 0.882 m ³ /s. Water was clear with a brown colour and suspended material. Sample collected.
	MCG-F	Flow = 0.139 m ³ /s. Water was clear with a brown colour and suspended matter. Garbage noted in creek upstream. Sample collected.
	MCG-G	Flow = 0.028 m ³ /s. Water was clear with a light brown colour and suspended matter. Sample collected.
	MCG-H	Flooded area due to beaver activity, no observed flow. Water was clear with a light brown colour. Sample collected and 2 pails for toxicity.
9 August 2023	MCG-A	Location dry. No sample collected.
	MCG-B	Location overgrown. No sample collected.
	MCG-C	Wet marsh. Water had organics present. Sample collected.
	MCG-D	Stagnant marsh. Water had high organics present. Sample collected.
	MCG-E	Flow = 0.02 m ³ /s. Water was clear with a grey colour and no odour. Sample collected.
	MCG-F	Flow was visible, below detection limit of the flow meter. Water was clear with a rust-coloured stain and no odour. Sample collected.
	MCG-G	Flow = 0.005 m ³ /s. Water was clear with no odour. Sample collected.
	MCG-H	Wide stagnant water body. Water was murky. Sample collected.
19 October 2023	MCG-A	Location dry. No sample collected.
	MCG-B	Saturated ground surface with no depth. No sample collected.
	MCG-C	Large area of ponded swamp water. No flow observed. Water was yellow/brown in colour with organics present. Sample collected. Sample collected and 1 pail for toxicity.
	MCG-D	No flow, standing water in swamp. Water was clear with a yellow/brown colour and high organics present. Sample collected.

Date	Location	Field Observations
	MCG-E	Flow = 0.054 m ³ /s. Water was clear. Sample collected.
	MCG-F	Flow = 0.010 m ³ /s. Water was clear with a light brown colour. Sample collected.
	MCG-G	Flow = 0.007 m ³ /s. Water was clear. Sample collected.
	MCG-H	Large, flooded area with no observed flow. Water was clear with a yellow/brown colour. Sample collected and 1 pail for toxicity.

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. Regulation 232/98 methane concentration limits 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.

An RKI Eagle gas monitor with methane detection was used to monitor landfill gas at the Site during the semi-annual monitoring events. Routine landfill gas monitoring within any buildings or structures on site and NB-MW1 is required at the Site based on the Site Closure Plan (BluMetric, 2018). Voluntary gas monitoring is completed in the remaining monitoring wells during the semi-annual monitoring events.

3.3 Monitoring Procedures and Methods

3.3.1 Groundwater Monitoring

Groundwater monitors were purged a minimum of three borehole volumes or until the monitor purged dry. In the case where a monitor 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 and/or checked for pH and conductivity. Samples were field filtered for DOC and metals analyses. Samples were collected in laboratory prepared and supplied bottles and submitted to AGAT Laboratories in Kingston, Ontario for analyses.

Groundwater samples were stored at approximately 4° Celsius during shipment to AGAT for chemical analyses. Holding times for samples conformed to Canadian Council of Ministers of the Environment (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, Item D-2**.

3.3.2 Surface Water Monitoring

Field parameters are recorded at the time of sampling. These include temperature, pH, conductivity, and dissolved oxygen measurements. During sampling events, the field parameters were measured using a YSI Multi-parameter system calibrated as per the manufacturer's instructions. Surface water samples were filtered by the laboratory for mercury and dissolved aluminum sample analysis.

Spring surface water samples were collected in laboratory prepared and supplied bottles, and submitted to AGAT Laboratories in Kingston, Ontario, for analyses as well as Bureau Veritas and Caduceon for Phenol analysis. Summer and fall surface water samples were collected in laboratory prepared and supplied bottles, and submitted to Bureau Veritas in Kingston, Ontario.

Surface water samples were stored at approximately 4° Celsius during shipment to the laboratories. Holding times for samples conformed to CCME Standards where applicable (CCME, 1993). Chain of Custody forms accompanied the samples from submittal to the laboratories until the chemical results were provided to BluMetric. Laboratory reports and chain of custody forms are compiled in **Appendix D, Item D-3**.

Attempts were made to sample after rain events. However, the timing of surface water sampling in 2023 did not always coincide within 24 hours of a 10 mm precipitation event for the summer and fall sampling events. The spring sampling event occurred on May 3 and was preceded by 21.1 mm of rain between May 1 and May 2. The summer sampling event occurred on August 9 and preceded by 7.7 mm of rain between August 7 and 8. The fall sampling event occurred on October 19 with 0 mm of rain between October 16 to 18. Recorded precipitation and temperature values at Environment Canada's Bancroft, Ontario Weather Station for the rain events are presented in **Appendix E**.

Supplemental monitoring of surface water for toxicity at MCG-B and MCG-C was recommended by the MECP (2010, 2012). In 2017, the MECP recommended that toxicity sampling be completed during the fall sampling event in lieu of the spring event when water is diluted. However, BluMetric indicated that locations are typically dry or too low to sample during the fall event. Therefore, toxicity sampling is carried out in the spring, and again in the fall if sufficient water is present. In addition, historic toxicity sampling location MCG-B has been changed to MCG-H, since MCG-B is a ponded location with no connection to the nearby surface waters.

Toxicity samples were collected from MCG-C and MCG-H during the spring and fall sampling events. The surface water toxicity samples were submitted to Nautilus Environmental for single- concentration acute lethality testing of *Daphnia magna* (48 hour) and rainbow trout (96 hour). Toxicity laboratory reports are compiled in **Appendix D, Item D-4**.

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 all groundwater monitoring wells during both sampling events in 2023.

Gas monitoring measurements from the attendant's building are collected by inserting the intake of the gas monitoring equipment through a small hole or gap within the structures while these structures remain closed. Gas monitoring measurements from the groundwater monitoring wells are collected, prior to collecting groundwater levels or samples, by inserting the intake of the gas monitoring equipment under the cap of the monitoring well before removing the cap and by keeping the best seal possible around the cap and gas equipment 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 can yield 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 reportable 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, 20% for metals and inorganics, and 30% for BTEX and PHC. 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 can produce repeatable results.

All equipment for field parameter testing and gas monitoring are calibrated in the field during each sampling event, or by the supplier.

One blind field duplicate per media was collected during each site visit and submitted for analysis. The field duplicate bottles were filled simultaneously with the actual sample bottles for a given location. The laboratory prepared bottles (identified and duplicate) for each group of chemical parameters (e.g. metals, nutrients, etc.) was first filled for the identified location and then the duplicate for that same group of chemical parameters was immediately filled. This continued until the two sample bottles for each group of parameters were filled.

4 Monitoring Results

4.1 Groundwater Quality

The 2023 field measurements indicated conductivity ranging from 107 $\mu\text{S}/\text{cm}$ at NB-MW2R (upgradient) to 763 $\mu\text{S}/\text{cm}$ at NB-MW3 (downgradient) in the spring, and from 105 $\mu\text{S}/\text{cm}$ at NB-MW2R to 865 $\mu\text{S}/\text{cm}$ at NB-MW3 in the fall. The field pH values for the spring ranged from 5.62 at NB-MW1 to 7.93 at NB-MW4 (downgradient). The field pH values for fall ranged from 6.02 at NB-MW4 to 7.56 at NB-MW5R. Historic groundwater data up to and including 2023 is provided in **Appendix F, Item F-1**.

Ontario Drinking Water Standards and Operational Guidelines (ODWSOG)

The summary of the 2023 groundwater parameters with results that fall below or are exceeding the ODWSOG criteria are summarized in Table 8. The full laboratory results are presented in Table 13 at the end of the text.

Table 8: Groundwater Quality Results Below or Exceeding ODWSOG

Groundwater Monitoring Location	Parameter	Sampling Event(s)
NB-MW1 (Background)	Alkalinity	May, October
	Turbidity	May, October
NB-MW2R	Turbidity	May, October
NB-MW3 (Leachate well for east)	Total Dissolved Solids	May, October
	Turbidity	May
	Manganese	October
NB-MW4	Turbidity	May, October
NB-MW5R (Leachate well for south)	Turbidity	May, June, October
	Manganese	May, June, October

Note: Background alkalinity for the region are typically below criteria.

Reasonable Use Values (RUVs)

The water quality results for background groundwater monitoring well NB-MW1 from 2006 to 2023 were used to calculate Reasonable Use Values (RUV), as per the guidance offered by MECP Procedures B-7 and B-7-1 using the following equation.

$$C_m = C_b + x (C_r - C_b)$$

where:

C_m : is the maximum allowable concentration in groundwater beneath adjacent property (RUV);

C_b : is the median background concentration before any effects from human activity;

C_r : is the maximum concentration that should be present based on use (ODWSOG); 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 9 summarizes the data that were used to calculate Cm values (RUV), for the landfill leachate indicator parameters:

Table 9: Reasonable Use Calculations

Parameter	Cb (mg/L)	Cr (mg/L)	x	Cm (mg/L)
Sodium	20.8	200	0.5	110.4
Aluminum	0.01	0.1	0.5	0.1
Boron	0.01	5	0.25	1.3
Copper	0.001	1	0.5	0.5
Iron	0.0085	0.3	0.5	0.2
Manganese	0.002	0.05	0.5	0.0
Nitrate	0.34	10	0.25	2.8

Parameters that exceed the RUVs are shown in the following Table 10.

Table 10: Groundwater Quality Results Exceeding RUV Criteria

Groundwater Monitoring Location	Parameter	Sampling Event(s)
NB-MW3	Manganese	October
NB-MW5R	Manganese	May, June, October

Provincial Water Quality Objectives (PWQO)

The groundwater results have been compared to the PWQO criteria due to the potential for groundwater to discharge to surface water at the Site. The full results are also presented in Table 13 at the end of the text. When comparing groundwater results to PWQO criteria, the following exceedances are identified:

- NB-MW1 – Total phosphorus (spring, fall), copper (fall), and zinc (fall),
- NB-MW2R – Total phosphorus (spring, fall),
- NB-MW3 – Total phosphorus (spring, fall), and cobalt (fall),
- NB-MW4 – Total phosphorus (spring, fall),
- NB-MW5 – Total phosphorus (spring, fall).

Groundwater alkalinity concentrations at the Site are naturally low. The background well (NB-MW1) mean concentration (2006-2023 data) is 24.1 mg/L. PWQO criteria states that alkalinity cannot decrease by more than 25%. Impacts from the WDS are observed to increase the alkalinity at the Site, therefore, the downgradient wells do not exceed the PWQO for this parameter.

4.2 Surface Water Quality

Surface water quality results were compared to PWQO, and Table A and Table B criteria from the WDS Technical Guidance (MOE, 2010). Table 11 summarizes the parameters that exceeded the criteria. Some surface water sampling locations were dry for the summer and fall monitoring events (MCG-A and MCG-B). The full results are presented in Table 14 at the end of the text. Historic surface water data up to an including 2023 is provided in **Appendix F, Item F-2**.

Results for field parameters indicated that the conductivity ranged from 22 µS/cm (MCG-A) to 672 µS/cm (MCG-B) in the spring, from 55 µS/cm (MCG-G) to 404 µS/cm (MCG-C) in the summer, and from 52 µS/cm (MCG-G) to 514 µS/cm (MCG-C) in the fall. DO ranged from 3.30 mg/L (MCG-H) to 5.71 mg/L (MCG-E) in the spring, from 3.21 mg/L (MCG-D) to 5.39 (MCG-E) in the summer, and from 1.20 mg/L (MCG-C) to 6.07 mg/L (MCG-E) in the fall. The pH ranged from 6.40 (MCG-D) to 6.80 (MCG-E) in the spring, from 5.60 (MCG-D) to 6.64 (MCG-G) in the summer, and from 5.72 (MCG-F) to 6.97 (MCG-E) in the fall.

Table 11: Surface Water Quality Parameters Below or Exceeding Criteria

Surface Water Monitoring Location	Parameter	Criteria Exceeded	Sampling Event(s)
MCG-A (Background)	Aluminum (dissolved)	PWQO	May
	Cadmium*	PWQO	May
MCG-B	Total Phosphorus	PWQO	May
	Cadmium*	PWQO	May
	Iron	PWQO, Table A	May
	Zinc	PWQO, Table B	May

Surface Water Monitoring Location	Parameter	Criteria Exceeded	Sampling Event(s)
MCG-C	Aluminum (dissolved)	PWQO	May
	Boron	PWQO	October
	Cadmium*	PWQO	May, August, October
	Iron	PWQO	May, August, October
MCG-D	pH (below criteria)	PWQO	May
	Total Phosphorus	PWQO	August, October
	Aluminum (dissolved)	PWQO	August, October
	Cadmium*	PWQO	May, August, October
	Cobalt	PWQO	August, October
	Iron	PWQO, Table A	August, October
MCG-E (Creek- Downstream)	Aluminum (dissolved)	PWQO	May
	Cadmium*	PWQO	May, August, October
	Iron	PWQO, Table A	August
	Lead	PWQO	May
MCG-F (Creek- Upstream)	Cadmium*	PWQO	May, August, October
	Iron	PWQO, Table A (summer only)	August, October
MCG-G (Background - west)	Total Phosphorus	PWQO	August
	Cadmium* ²	PWQO, Table B (spring only)	May, August, October
	Iron	PWQO Table A (summer only)	May, August, October
MCG-H	Aluminum	PWQO	May
	Total Phosphorus	PWQO	August
	Cadmium*	PWQO	May, August, October
	Iron	PWQO, Table A	August

Note: Background pH for the region is typically below criteria.

*The detection limit for cadmium exceeds the PWQO criteria.

² Cadmium did not exceed the detection limit during the spring sample event for MCG-G.

Surface water alkalinity concentrations at the Site are naturally low. The background monitoring location (MCG-A) mean concentration (2006-2022 data) is 18.36 mg/L. PWQO criteria states that alkalinity cannot be decreased by more than 25% (13.77 mg/L). Alkalinity concentrations at most sample locations during the May sampling event were below 13.77 mg/L, with the only two locations not below the criteria being MCG-B and MCG-C.

All toxicity samples collected in 2023 passed for single-concentration acute lethality testing of *Daphnia magna* (48 hour) and rainbow trout (96 hour).

4.3 Landfill Gas Results

An RKI Eagle gas monitor with methane detection was used to monitor landfill gas at the Site. Gas readings collected on May 3, 2023, were 0 ppm at the Attendant's Building and 0 ppm at all monitoring wells, NB-MW1, NB-MW2R, NB-MW3, NB-MW4, and NB-MW5R.

Gas readings collected on October 19, 2023, were 0 ppm at the Attendant's Building, 0 ppm at NB-MW1, 5 ppm at NB-MW2R and 0 ppm at NB-MW3, NB-MW4, and NB-MW5.

4.4 QA/QC Results

One duplicate sample per sample matrix was collected during each sampling event in 2023, totalling two groundwater duplicates and three surface water duplicates. The consistency of the results was evaluated based on the relative percentage difference (RPD) of each field duplicate pair and is presented in **Appendix D, Item D-5**. Any exceedances of the recommended percentage difference (10% for electrical conductivity and 20% for metals and inorganics) are highlighted in the evaluation tables.

Exceedances of the RPD guidance criteria are as follows:

- Groundwater: No exceedances in the spring in the duplicate collected at NB-MW4 and total dissolved solids (RPD of 32%) in the fall in the duplicate collected at NB-MW4.
- Surface water: Hardness (RPD 25%), calcium (RPD 33%) and manganese (RPD 40%) in the spring duplicate collected at MCG-E, no exceedances in the summer in the duplicate collected at MCG-E and total dissolved solids (RPD of 20%) in the fall in the duplicate collected at MCG-E.

The five RPD values in exceedances of the guideline criterion represent less than 1% of all analyzed parameters during the 2023 monitoring period. Therefore, the results of the 2023 QA/QC program are considered acceptable with a high degree of reproducibility.

5 Monitoring Results

5.1 Groundwater Assessment

Landfill leachate indicator parameters at the Site are considered to include alkalinity (upper limit only), sulphate, and metals (sodium, aluminum, copper, manganese, nitrate, boron, iron, and zinc). Previously, parameters such as total phosphorus had been identified as leachate indicators for the Site. Since this parameter shows exceedances at the background location, and can be typically high in wetland areas, it is no longer considered a key leachate indicator.

The 2023 groundwater quality results for the North Baptiste WDS are summarized in Tables 13 (end of text). Parameters with concentrations that fell outside the RUVs, ODWSOG, and/or PWQO criteria are flagged. Historical groundwater chemistry results are provided in **Appendix F, Item F-1**. Chemistry trend graphs for select parameters are provided following the tables, figures, and photographs at the end of this report. Groundwater quality in 2023 was generally within historical ranges for the Site.

Monitoring well NB-MW1 is located just north of the WDS property boundary and is the upgradient background monitoring location. The alkalinity concentrations at NB-MW1 are typically below the ODWSOG (lower limit) and are representative of background conditions. These results continued in 2023. The turbidity concentrations were above the ODWSOG in this reference location, which is consistent with recent turbidity results (monitoring of turbidity was initiated in 2019). Monitoring between 2014 and 2020 had indicated potential impacts in NB-MW1 due to road de-icing salts, however, a general decreasing trend in parameters associated with road salt (sodium, chloride, and conductivity) is observed between 2020 and 2022 with a slight increase observed in 2023. No other apparent trends are observed at NB-MW1 with parameters concentrations remaining within the historical range of results.

All downgradient monitoring wells, including NB-MW5R, are located within the waste site boundary at least 30 m from the property line. Like NB-MW1, NB-MW2R also had alkalinity concentrations below the ODWSOG and elevated turbidity. The remaining downgradient monitoring wells (NB-MW3, NB-MW4, and NB-MW5R) had elevated concentrations of alkalinity relative to the upgradient background location. The elevated alkalinity concentrations indicate that the three downgradient wells are impacted by the WDS, however all alkalinity results remain below the RUV. The turbidity concentrations were above ODWSOG for nearly all samples in 2023, however, most were below the turbidity recorded at background location NB-MW1 with the exception of NB-MW5R in the spring of 2023.

The trend graphs show that chloride, conductivity, and sodium concentrations at NB-MW1 (background and north) have shown an increasing trend over the years, most notably from 2014 to 2020. These concentrations began to decrease from 2020 to 2022 but a slight increase was observed in 2023. These impacts may be attributed to de-icing of the nearby North Baptiste Road. An additional decreasing trend in nitrate concentration is apparent since 2017, following an increasing trend that was observed between 2010 and 2017.

Similar to NB-MW1, an increasing trend of chloride, sodium, and conductivity was apparent at NB-MW2 between 2010 and 2019. These concentrations have generally continued to decrease between 2019 and 2023. In addition, concentrations of iron, manganese, nitrate, and sulphate have generally been on a decreasing trend.

The trend graphs clearly show that concentrations of chemical parameters for alkalinity, chloride, boron, cobalt, conductivity, sodium, sulphate, and TDS are typically greatest at NB-MW3 (east). Boron, sodium, and nitrate are showing a downward trend at this location while chloride, conductivity, and TDS are showing an upward trend. No apparent trends are observed for the remaining monitoring parameters.

Concentrations at NB-MW4 and NB-MW5R (and previously NB-MW5) have generally appeared to be relatively consistent with the exception of manganese and aluminum concentrations at NB-MW5R which have been sporadic since 2016. A general spike in concentrations of alkalinity, aluminum, boron, cobalt, conductivity, iron, and TDS at NB-MW5R was observed in 2016, however, all concentrations have since decreased to within the historical ranges of results.

Now that vegetation is being established on the closed waste mound, monitoring of these trends from 2020 to 2025 will determine if there are any downward trends associated with the capping of the waste mound.

A comparison of groundwater quality results to PWQO has been requested by the MECP because of the potential for groundwater to discharge to surface. This comparison is provided in Table 13 (end of text). Total phosphorous exceeded PWQO in all groundwater samples collected in 2023, consistent with 2021 and 2022 results. Concentrations of total phosphorus ranged from 0.17 mg/L to 6.06 mg/L. The lowest concentrations of total phosphorus were recorded at NB-MW3, the location considered most impacted by leachate. This indicates that elevated total phosphorus at the remaining groundwater monitoring locations may be attributed to the surrounding wetland areas, rather than the waste mound. Total phosphorus at the background location ranged from 1.15 to 1.4 mg/L and at impacted well MW2R it ranged from 0.31 to 2.3 mg/L.

It was previously noted that groundwater in the vicinity of the waste mound (NB-MW3, NB-MW4 and NB-MW5R) is considered impacted by leachate. Therefore, groundwater that discharges to surface has the potential to adversely impact surface water in the vicinity of the WDS. A review of surface water data is presented in Section 5.2 and identifies PWQO exceedances immediately downgradient of the WDS. Therefore, close monitoring of NB-MW3, NB-MW4, and NB-MW5R should continue to identify if concentrations are starting to show an increasing trend.

Groundwater at the Site is expected to discharge to surface at or before the property line and therefore it is expected that groundwater downgradient from the WDS property boundary is not being impacted by leachate and is compliant with Guideline B-7.

The MECP Surface Water Technical Reviews of the 2018 and 2020 Annual Monitoring Reports suggested that a leachate indicator well be installed and that leachate indicators from this well be used to eliminate parameters from the monitoring program. Since the exact location of historic trenching is unknown, and due to the “radial” flow away from the Site, it would be difficult to determine where to put a leachate well and have it be indicative of leachate flowing in all directions. In 2020, BluMetric recommended in lieu of adding a leachate well through the closed and capped mound, that NB-MW3 continue to be used as the leachate indicator well (BluMetric, 2021). To address the radial flow away from the Site, the use of NB-MW3 and NB-MW5R as leachate wells for the east and south, respectively, should be considered.

In response to the MECP’s SW Technical review to reduce the parameters tested at the Site, it was recommended (in 2019) that Arsenic, Magnesium, Mercury, Nickel, and Silver be eliminated from the parameter list. No concurrence was received from the MECP; therefore, these parameters have continued to be monitored, and will continue to be in 2024.

5.2 Surface Water Assessment

Surface water quality in 2023 was within historical ranges for the Site (**Appendix F, Item F-2**). All surface water locations are shown on Figure 05.

Surface water monitoring locations MCG-A, MCG-F, and MCG-G represent background surface water conditions for the North Baptiste WDS and nearby Selby Creek. Location MCG-A is located upstream of the WDS in the ditch that flows from the north and enters the wetland area surrounding the landfill on the east. It should be noted that only under wet conditions does this location have a noticeable flow and direct flow path.

Monitoring location MCG-G is located upstream from the WDS in a creek that flows from the west and enters the wetland area on the south side of the landfill. Monitoring locations MCG-B, MCG-C and MCG-D are in the wetland area around the toe of the WDS, and do not have noticeable flow or direct channels.

Location MCG-F (upstream) is located along Selby Creek east of the WDS, but prior to the confluence with the tributary that leaves the marsh adjacent to the WDS. Monitoring location MCG-E is located along Selby Creek (downstream). This location is after the confluence with the tributary that leaves the marsh adjacent to the WDS and is located to the east side of Highway 62.

Background surface water monitoring location MCG-A was only sampled during the spring event due to dry conditions during the summer and fall sampling events. MCG-A exceeded the PWQO for aluminum. Historically, parameters such as aluminum, cobalt, copper, iron, lead, total phosphorus, and zinc exceeded the PWQOs, while pH was sporadically reported below the lower PWQO criterion. This location replaced MCG-A2 in 2022 as a background location for the downgradient wetland stream to the east of the mound.

Select surface water parameter trend graphs following the text shows an overall stable trend in alkalinity, conductivity, sulphate, and TDS at MCG-A. Of these four parameters, TDS concentrations have the most variability but overall do not show an increasing or decreasing trend.

MCG-B is located in a depression at the toe of the waste mound. The select surface water parameter trend graphs show that alkalinity, conductivity, sulphate, and TDS are within the historical range of results with no apparent trend in water quality. Large fluctuations for values of alkalinity and TDS are apparent at this sample location.

Western background location MCG-G is located on the west and south side of the Site and slightly upgradient of the waste mound. Select trend graphs for this location show a stable trend for alkalinity, conductivity, and sulphate, while TDS is showing a slightly increasing trend.

MCG-C is located directly south of the waste mound. Select trend graphs for this location show a slight increasing trend for alkalinity. Sulphate concentrations at this location have been on a decline since 2012 when the two highest concentrations were recorded. TDS and conductivity continue to remain within the historical range of results with no apparent trend in water quality.

MCG-D is located directly south of the waste mound and south of MCG-C. Select trend graphs for this location show a general decreasing trend for alkalinity with generally stable results for conductivity and TDS. Large fluctuations in sulphate concentration are apparent at this location, however, results remain within the historical range of results with no apparent trend in water quality.

MCG-H is located down gradient of MCG-A and MCG-B where the stream from MCG-A enters the wetland. The select surface water parameter trend graphs show a stable trend for conductivity and sulphate concentrations, and a slight increasing trend in TDS. While alkalinity concentrations generally remain stable, a slight increase in concentrations was observed in 2023.

MCG-F is located on Selby Creek upstream of the Site. Select trend graphs for this location (Creek) show a generally stable trend for sulphate, an increasing trend for alkalinity, and a decreasing trend for conductivity and TDS since peak concentrations were recorded in 2015.

MCG-E is located approximately 1.6 km downstream of the WTS and approximately 950 m downstream of the wetland. Select trend graphs for this location (Creek) show a stable trend for alkalinity, sulphate, and TDS with a slight increasing trend for conductivity.

A review of surface water quality at monitoring locations MCG-B and MCG-C indicates impacts from landfill leachate migration. These impacts are indicated by the parameters exceeding PWQO and other surface water criteria identified in Table 11, as well as elevated concentrations of alkalinity, conductivity, and sulphate compared to the background location MCG-A

MCG-G had exceedances for concentrations of iron during the spring, summer and fall sampling events in 2023. The concentrations at MCG-G are generally comparable to concentrations at the background locations MCG-A and MCG-F. Concentrations at MCG-G are not indicative of impacts and the location is considered to be the western background location. Although there are metals exceedances at MCG-D, concentrations of other leachate indicator parameters such as alkalinity, chloride, conductivity, hardness, nitrate, sodium, and sulphate are all comparable or slightly elevated compared to background concentrations at MCG-G. However, based on the elevated concentrations of cobalt and iron, MCG-D is deemed impacted. MCG-H also had exceedances for iron during the summer sampling event in 2023. This exceedance is comparable to concentrations at MCG-G; however, elevated concentrations of some parameters may indicate there are impacts occurring at MCG-H.

5.2.1 Surface Water Quality Comparison for Creek

A comparison of surface water chemistry at location MCG-F (upstream of the confluence of Selby Creek with the tributary leaving the WDS) to MCG-E (downstream of the confluence of Selby Creek with the tributary leaving the WDS) for the 2023 results was completed for all chemical parameters tested, and the comparison table is provided in **Appendix G**. The average concentration for the monitoring period for each location was calculated, and then the percent difference was determined. The chemistry results for 2023 show relatively consistent results for each parameter. Thus, the comparison of the average values was used. Looking at leachate indicator parameters, the 2023 results demonstrate that downstream concentrations are elevated for several parameters (e.g., hardness, ammonia, TKN, turbidity, aluminum, cobalt, iron, and manganese) relative to the average upstream results. However, a number of parameter concentrations (e.g., alkalinity, sodium, sulphate and nitrate) at the upstream location were elevated relative to the downstream location. The remaining leachate indicator parameters (copper, boron and zinc) were non-detectable at both the upstream and downstream locations.

The select trend graphs at the end of the text show that alkalinity concentrations downstream (MCG-E) tend to be elevated relative to the upstream location (MCG-F), however, is not always the case. The upstream location (MCG-F) reached a historic high in fall 2021 sampling event, however, has since returned to within the historical range of results. The trend graphs for conductivity and sulphate are showing a slight increasing trend for the downstream location whereas the upstream location is showing a slight decreasing trend. The sulphate concentration for nearly all sampling events has been greater at the downstream location compared to the upstream location, however, there is no apparent trend in the comparison of conductivity results between the two locations. The concentrations for TDS at both locations remain within the historical range of results with no apparent trend in water quality. Similar to the comparison of conductivity between the two locations, there is no apparent trend among the two locations for the concentrations of TDS with nearly half of the sampling events having higher TDS concentrations at the upstream sample location.

It is also noted that the upstream water source is likely from an igneous rock formation, while downstream groundwater maybe from a clastic metasedimentary rocks (e.g., limestone). The WDS and northern portion of Hershel Township has been mapped as igneous bedrock while the lower half is mapped as metasedimentary rocks (MNDM, 1991). The impact from de-icing chemicals also complicates the comparisons.

5.2.2 Toxicity Assessment of Surface Water Quality

Toxicity samples were collected from MCG-C and MCG-H during the spring and fall sampling events for single-concentration acute lethality testing of *Daphnia magna* (48 hour) and rainbow trout (96 hour). The single concentration test is typically reported as a “pass” or “fail” test, with 50% mortality being the passing limit.

The results from the toxicity testing at both locations and for the spring and fall sampling events indicated that the percent mortality for *Daphnia magna* and Rainbow Trout was 0%, with all results classified as a “pass”. The toxicity laboratory results are included in **Appendix D, Item D-4**.

5.3 Landfill Gas Assessment

The RKI Eagle gas monitoring results for 2023 were all 0 ppm in the spring and ranged from 0 to 5 ppm in the fall. Gas measurements were collected from the Attendant's building and all well heads. These results indicate methane gas concentrations are well below concentrations of concern, 10,000 ppm for the subsurface, buildings and structures on-site.

5.4 Trigger Mechanisms and Contingency Plan

The Trigger Mechanisms and Contingency Plan was finalized in January 2020 in consultation with the MECP and is appended in **Appendix H**. Trigger assessment points for surface water are toxicity sampling results at MCG-C and MCG-H. Toxicity testing includes a 48-hour *Daphnia magna* single concentration test and a 96-hour Rainbow Trout single concentration test with 50% mortality being the passing limit. The surface water toxicity results in 2023 did not trigger the Tier 1 Contingency Plan response for surface water.

In addition to the surface water trigger assessment points, groundwater trigger mechanisms have been developed for groundwater monitoring wells NB-MW3 (east) and NB-MW5R (south). Groundwater sampling is conducted on a semi-annual basis with assessment criteria of alkalinity, chloride, iron, manganese, sodium, and TDS. The Contingency Plan is triggered if three or more of the trigger parameters exceed the 75th percentile of the historical data for the assessment point for one discreet sample.

The Contingency Plan was triggered at NB-MW5R (south assessment point) during the spring 2023 sampling event with trigger parameter exceedances of alkalinity, chloride, and TDS. The trigger exceedances activated Tier 1 of the Contingency Plan which involves a repeat sampling event within one month to confirm or refute the results at that location. Tier 1 sampling resulted in TDS and manganese exceedances only, thus not activating Tier 2 sampling.

6 On-Site Operations

The North Baptiste WTS currently collects waste in covered waste bins (8 cubic yard). The waste is periodically picked up and transferred to one of the other WDSs operated by the MHHs. The Site has segregated collection 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 which was updated in May 2018, to facilitate increased waste diversion to extend the operational life of their municipal landfill sites. 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.

Signage at the WDS entrance displays the Site operating hours, tipping fees and any restrictions. Access to the landfill site is controlled via a locked and secured gate at the entrance. Figure 02 illustrates the aerial view of the Site after much of the capping material had been placed on the mound and geotextile and granular had been placed for the WTS area.

No visible signs of erosion were observed during the 2023 site inspections. The bulk waste pile was observed to be at capacity during the summer and fall inspections.

6.1 Annual Waste Summary

Although access to the landfill site is controlled via a locked steel security gate, residents sometimes deposit garbage near the disposal site entrance outside of the landfill's normal operating hours. The Municipality takes steps to deter these occurrences. This contribution is collected by site personnel, recorded and included in the total waste volumes identified for the Site.

The quarterly breakdown for recyclables (R) and waste (W) for 2022 and 2023, excluding the segregated materials discussed in Section 6.2.1, are shown below in Table 12. Based on the assumed recycling values for the entire year, it is estimated a total of 52% of residential waste was recycled in 2023.

The 2023 numbers indicate that recycling quantities have increased while waste quantities have decreased at the North Baptiste Lake WTS from 2022 quantities by 460.5% and 11.5%, respectively. The waste calculations are based on bag counts at the waste sites. There were 11,293 bags deposited at the North Baptiste WDS in 2023 and an assumed 15 kg/bag (MHH’s) was used in the tonnage calculations.

Table 12: Annual Recycling and Waste Tonnages

Q1		Q2		Q3		Q4		Totals	
2023									
R	W	R	W	R	W	R	W	R	W
33.0	35.6	46.2	41.6	75.6	52.5	34.6	39.8	189.5	169.4
2022									
R	W	R	W	R	W	R	W	R	W
6.7	38.1	8.9	42.9	10.8	67.5	7.4	42.9	33.8	191.4

6.2 Summary of Segregated Materials Removed

In addition, segregated materials were collected at the nine waste disposal/transfer sites in the MHHs. The breakdown of these waste in 2023 at the North Baptiste WTS was:

- Scrap metal – 7.92 tonnes;
- Bulky waste – 0 tonne;
- Electronic waste – 2.68 tonnes;
- Household batteries – 0 tonne;
- 28 tires.

6.3 Annual Complaints, Rejected Wastes & Emergencies Summary

There were no documented complaints, rejected waste, or emergency situations reported for the Site in 2023.

7 Summary Statements, Conclusions and Recommendations

The following summary statements, conclusions, and recommendations are based on the observations and results from the 2023 monitoring program:

7.1 Site Operations

- As can be seen in Figure 02, the WTS provides recycling and waste bins to the north of the Site in an orderly and accessible layout for public use.
- Materials such as metals and bulky items should be scheduled for pick-up prior to exceeding the barriers defining their drop-off location.
- Final topsoil and seeding of the former WDS mound was completed in 2018, the cap and vegetation was noted to be in good condition during each of the site visits in 2023.
- The covered waste bins should reduce wind-blown litter at the Site, however, any debris that is blown around the Site should be picked up on a regular basis as described in the new ECA (January 2020) which details pick-ups for along North Baptiste Road as well as the Site.
- Waste transferred to the Site should continue to be accounted for and documented by tracking the number of bags or truck/vehicles loads of waste deposited at the Site.
- Records of public concerns and/or complaints regarding the North Baptiste WTS and responses from the Municipality should continue to be collected and documented.
- Public education with respect to waste reduction and recycling should be an on-going effort by the Municipality.

7.2 Groundwater

- The groundwater elevation data suggests groundwater is flowing radially away from the landfill with the primary groundwater flow direction to the southeast.
- Monitoring wells NB-MW3, NB-MW4, and NB-MW5R are considered impacted by leachate.
- Groundwater at the Site is expected to discharge to surface at or before the property line and therefore it is expected that groundwater downgradient from the WDS property boundary is not being impacted by leachate and is in compliance with Guideline B-7-1.
- In response to the MECP's SW Technical review to reduce the parameters tested at the Site, it was recommended in 2019 that Arsenic, Magnesium, Mercury, Molybdenum, Nickel, Silicon, and Silver be eliminated from the parameter list. No concurrence was received from the MECP therefore these parameters have continued to be analyzed and will be analyzed again in 2024.
- The attached trend graphs show a general increasing trend in chloride, sodium, and conductivity at NB-MW1 and NB-MW2R between 2010 and 2020, potentially associated with road de-icing activity, however, have generally shown a decreasing trend between 2020 and 2022 but a slight increase was observed in 2023. In addition, nitrate has generally shown a decreasing trend at NB-MW1 as well as decreasing trends of iron, manganese, nitrate, and sulphate at NB-MW2R. Concentrations at NB-MW3 are generally the highest observed at the WDS with concentrations of boron, sodium, and nitrate showing a decreasing trend while chloride, conductivity, and TDS are showing an increasing trend. Concentrations at NB-MW4 and NB-MW5R have generally appeared to be relatively consistent except for manganese and aluminum at NB-MW5R which have been sporadic since 2016.
- It is recommended that a discussion be held between the MECP groundwater and surface water reviewers, along with the Municipality and BluMetric to discuss the use of NB-MW3 (east) and NB-MW5R (south) as the leachate wells and the potential for the installation of a leachate indicator well.

7.3 Surface Water

- A review of surface water quality at monitoring locations MCG-B, MCG-C, and MCG-D indicate impacts to the immediate east and south of the WDS are occurring.
- Trends in surface water quality are displayed on the attached trend graphs. In general, parameters remain stable with no instances of decreasing trends and some increasing trends. Minor increasing trends are apparent in alkalinity at MCG-C, in conductivity at MCG-E, and in TDS at MCG-G and MCG-H.
- In response to the MECP's SW Technical review to reduce the parameters tested at the Site, it is recommended that Arsenic, Magnesium, Mercury, Nickel, and Silver be eliminated from the surface water suite of parameters. No concurrence was received from the MECP therefore these parameters have continued to be sampled and will continue to be sampled in 2024.
- The MECP Surface Water Technical Reviews of the 2018 and 2020 Annual Monitoring Reports suggests that a leachate indicator well be installed and that leachate indicators from this well be used to eliminate parameters from the monitoring program. A recommendation is provided in the groundwater recommendations.

7.4 Landfill Gas

- Gas concentrations should continue to be monitored during semi-annual sampling at the Attendant's building and from all monitoring wells; and
- Results in 2023 (0 to 5 ppm) indicate gas concentrations on the Site are currently not a hazard concern; concentrations are significantly less than 1.0% methane gas (10,000 ppm, LEL-20%) in an on-site building, or its foundation.

7.5 Trigger Mechanisms and Contingency Plan

- The Trigger Mechanisms and Contingency Plan for surface water and groundwater was finalized in January 2020.
- The Contingency Plan was triggered during the spring sampling event at the southern groundwater assessment point, NB-MW5R. Tier 1 contingency sampling was conducted which did not require escalation to Tier 2 contingency sampling.
- The surface water toxicity results in 2023 did not trigger the Tier 1 Contingency Plan response for surface water.

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 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,
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Tables

Table 13: 2023 Groundwater Chemistry Results						Location														
Parameter	Units	RUV-NB	ODWQS	PWQO-GENERAL	PWQO-INTERIM	Sample ID	NB-MW1	NB-MW1	NB-MW2R	NB-MW2R	NB-MW3	NB-MW3	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW5R	NB-MW5R	NB-MW5R	
						Sample Date	2023-May-03	2023-Oct-19	2023-May-03	2023-Oct-19	2023-May-03	2023-Oct-19	2023-May-03	2023-Oct-19	2023-May-03	2023-Oct-19	2023-May-03	2023-Oct-19	2023-May-03	2023-Jun-01
						Detection Limit														
Anions																				
Chloride	mg/L	-	250	-	-	0.1	48.1	31	6.67	4.1	141	110	30.4	30.4	26	26	25.9	23	20	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	0.19	-	0.11	-	<0.1	-	-	<0.1	<0.1	-	<0.1	<0.1	
Nitrate as N	mg/L	2.755	10	-	-	0.05	0.21	0.19	0.11	0.11	0.14	<0.1	<0.05	<0.05	<0.1	<0.1	<0.05	<0.1	<0.1	
Nitrite as N	mg/L	-	1	-	-	0.01	<0.05	<0.01	<0.05	<0.01	<0.05	<0.01	<0.05	<0.05	<0.01	<0.01	<0.05	<0.01	<0.01	
Sulphate	mg/L	-	500	-	-	0.1	5.99	6.8	6.93	5.6	23.2	8.8	22.4	22.4	20	20	20.9	20	13	
Cations																				
Calcium (diss)	mg/L	-	-	-	-	0.05	11.6	9.5	7.61	7.6	72.3	76	33	33.6	35	35	19.8	20	23	
Magnesium (diss)	mg/L	-	-	-	-	0.05	2.15	1.7	3.31	3.1	27.2	29	6.76	6.66	6.9	7.1	6.34	6.2	6.9	
Potassium (diss)	mg/L	-	-	-	-	0.2	1.89	1.7	1.74	1.6	5.76	5.6	3.24	3.17	3.2	3.3	2.51	2.2	2.6	
Sodium (diss)	mg/L	110.4	200	-	-	0.05	27.4	24	4.55	4.4	35.5	38	5.77	5.94	6.6	6.9	4.8	4.8	5.9	
General Chemistry																				
Alkalinity (as CaCO3)	mg/L	-	30 - 500	See Factsheet	-	1	29	24	33	32	135	130	68	67	61	61	43	35	37	
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	<0.05	<0.02	<0.05	<0.02	<0.05	<0.02	<0.02	<0.05	<0.05	<0.02	0.059	<0.05	
Chemical Oxygen Demand	mg/L	-	-	-	-	4	<5	6.2	<5	<4	<5	6.6	<5	<5	<4	<4	<5	<4	4.9	
Dissolved Organic Carbon	mg/L	-	5	-	-	0.4	1.4	1.2	0.7	1.2	1.7	1.7	0.6	<0.5	0.6	0.7	1.1	0.7	1.1	
Electrical Conductivity	uS/cm	-	-	-	-	1	229	190	100	92	776	860	277	275	270	270	210	200	210	
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		7.05	7.21	7.34	7.61	7.61	7.39	7.87	7.83	8.03	8.03	7.58	7.6	7.68	
Phenols-4AAP	mg/L	-	-	-	-	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011	<0.001	<0.001	<0.001	
Total Dissolved Solids	mg/L	-	500	-	-	10	144	130	78	70	594	585	192	188	160	220	158	170	170	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	<0.1	<0.1	<0.1	<0.1	0.16	0.18	<0.1	<0.1	0.14	<0.1	0.21	<0.1	<0.1	
Total Phosphorus	mg/L	-	-	0.03	-	0.02	1.15	1.4	0.31	2.3	0.19	0.17	0.5	0.57	2.5	2.6	6.06	1.8	2.1	
Total Suspended Solids	mg/L	-	-	-	-	10	414	860	776	1000	295	190	278	296	910	900	1780	1800	1900	
Turbidity	NTU	-	5	-	-	0.1	258	140	77.1	27	18.5	2.3	49.5	52.8	14	15	1050	180	210	
Metals																				
Aluminum (diss)	mg/L	0.055	0.1	-	Calculated	0.004	<0.004	<0.0049	<0.004	0.013	<0.004	<0.0049	<0.004	<0.004	0.005	<0.0049	0.01	0.005	<0.0049	
Arsenic (diss)	mg/L	-	0.01	-	0.005	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	
Barium (diss)	mg/L	-	1	-	-	0.002	0.014	0.011	0.003	0.0032	0.067	0.084	0.012	0.011	0.013	0.013	0.014	0.016	0.017	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.0004	<0.0005	<0.0004	<0.0005	<0.0004	<0.0005	<0.0004	<0.0005	<0.0005	<0.0004	<0.0004	<0.0005	<0.0004	<0.0004	
Boron (diss)	mg/L	1.2575	5	-	0.2	0.01	<0.01	<0.01	<0.01	<0.01	0.145	0.15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.00009	<0.0001	<0.00009	<0.0001	<0.00009	<0.0001	<0.00009	<0.0001	<0.0001	<0.00009	<0.00009	<0.0001	<0.00009	<0.00009	
Chromium (diss)	mg/L	-	0.05	-	-	0.002	<0.002	<0.005	<0.002	<0.005	<0.002	<0.005	<0.002	<0.002	<0.005	<0.005	<0.002	<0.005	<0.005	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0043	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Copper (diss)	mg/L	0.5005	1	-	Calculated	0.0009	<0.001	0.0054	<0.001	<0.0009	<0.001	0.0011	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.0009	
Iron (diss)	mg/L	0.15425	0.3	0.3	-	0.01	0.012	<0.1	<0.01	<0.1	0.016	<0.1	<0.01	<0.01	<0.1	<0.1	0.03	<0.1	<0.1	
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Manganese (diss)	mg/L	0.026	0.05	-	-	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.067	<0.002	<0.002	0.0031	0.0032	0.071	0.19	0.16	
Mercury (diss)	mg/L	-	0.001	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	
Molybdenum (diss)	mg/L	-	-	-	0.04	0.0005	<0.002	<0.0005	<0.002	<0.0005	<0.002	<0.0005	<0.002	<0.002	0.0021	0.002	<0.002	0.0022	0.0022	
Nickel (diss)	mg/L	-	-	0.025	-	0.001	0.001	<0.001	<0.001	<0.001	0.003	0.0054	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium (diss)	mg/L	-	0.05	0.1	-	0.001	<0.001	<0.002	0.002	<0.002	<0.001	<0.002	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.002	
Silicon (diss)	mg/L	-	-	-	-	0.05	8.55	10	11.6	13	15.9	16	9.09	8.94	10	10	8.75	7.9	9.8	
Silver (diss)	mg/L	-	-	0.0001	-	0.00009	<0.0001	<0.00009	<0.0001	<0.00009	<0.0001	<0.00009	<0.0001	<0.0001	<0.00009	<0.00009	<0.0001	<0.00009	<0.00009	
Strontium (diss)	mg/L	-	-	-	-	0.001	0.125	0.085	0.044	0.047	0.558	0.68	0.097	0.097	0.099	0.1	0.099	0.11	0.1	
Thallium (diss)	mg/L	-	-	-	0.0003	0.00005	<0.0003	<0.00005	<0.0003	<0.00005	<0.0003	<0.00005	<0.0003	<0.0003	<0.00005	<0.00005	<0.0003	<0.00005	<0.00005	
Titanium (diss)	mg/L	-	-	-	-	0.002	<0.002	<0.005	<0.002	<0.005	<0.002	<0.005	<0.002	<0.002	<0.005	<0.005	<0.002	<0.005	<0.005	
Vanadium (diss)	mg/L	-	-	-	0.006	0.0005	<0.002	0.00054	0.004	0.004	<0.002	0.00083	<0.002	<0.002	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	
Zinc (diss)	mg/L	-	5	-	0.02	0.005	0.019	0.03	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Zirconium (diss)	mg/L	-	-	-	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	

-LEGEND-
Detection Limit DL: May vary between sample locations and events
DL exceeds criteria
Concentration exceeds RUV-NB Reasonable Use Values North Baptiste
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 14: 2023 Surface Water Chemistry Results						Location	MCG-A	MCG-B	MCG-C	MCG-C	MCG-C	MCG-D	MCG-D	MCG-D	MCG-E	MCG-E	MCG-E	MCG-E
Parameter	Units	PWQO-GENERAL	PWQO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-A	MCG-B	MCG-C	MCG-C	MCG-C	MCG-D	MCG-D	MCG-D	MCG-E	MCG-E	MCG-E	MCG-E
						Sample Date	2023-May-03	2023-May-03	2023-May-03	2023-Aug-09	2023-Oct-19	2023-May-03	2023-Aug-09	2023-Oct-19	2023-May-03	NB-QAQC-SW1 (MCG-E)	2023-May-03	2023-Aug-09
						Detection Limit												
Anions																		
Chloride	mg/L	-	-	180	128	0.1	1.3	9.78	4.92	28	58	0.67	<20	1	20.4	20.5	53	54
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	<0.1	<0.1	-	<0.1	<0.1	-	-	0.17	0.17
Nitrate as N	mg/L	-	-	-	-	0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.05	<0.1	<0.1	0.05	<0.05	0.17	0.17
Nitrite as N	mg/L	-	-	-	-	0.01	<0.05	<0.05	<0.05	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.01	<0.01
Sulphate	mg/L	-	-	100	-	0.1	2.49	50.2	15.3	2.9	10	4.73	<20	9.3	3.77	3.67	6.1	6.2
Cations																		
Calcium (tot)	mg/L	-	-	-	-	0.2	1.53	88.4	13.3	51	54	1.98	8	6.1	3.21	4.46	12	12
Magnesium (tot)	mg/L	-	-	-	-	0.05	0.24	11.6	4.58	13	14	0.68	2.1	1.7	0.73	0.73	2.1	2.1
Potassium (tot)	mg/L	-	-	-	-	0.2	<0.5	13.3	2.9	4	14	<0.5	1.2	0.89	0.71	0.67	1.1	1.1
Sodium (tot)	mg/L	-	-	-	-	0.1	1.43	13.4	7.82	21	35	1.35	2.3	3.2	15.3	13.1	36	36
General Chemistry																		
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	7	279	40	180	170	<5	30	16	11	10	30	30
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	0.03	<0.02	<0.05	<0.05	<0.02	0.072	<0.05	<0.02	<0.02	<0.05	<0.05
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<2	<2	<2	4	<2	<2	12	3	<2	<2	<2	<2
Colour	TCU	-	-	-	-	2	9	27.8	174	98	83	102	150	96	47.9	49.4	46	47
Electrical Conductivity	uS/cm	-	-	-	-	1	25	622	136	420	540	32	66	67	105	105	270	260
pH	pH units	6.5 - 8.5	-	6 - 9	-		6.92	7.61	7.24	7.6	7.93	6.26	6.58	7.02	6.84	6.84	7.33	7.42
Phenols	mg/L	0.001	-	0.04	0.004	0.001	<0.001	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Dissolved Solids	mg/L	-	-	-	-	10	36	384	134	250	270	68	70	115	88	86	140	130
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	4.8	269	52.1	180	190	7.7	29	24	11	14.1	40	39
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	<0.1	0.33	0.84	0.77	0.91	0.38	1.1	0.97	0.2	0.21	0.29	0.23
Total Phosphorus	mg/L	0.03	-	-	-	0.02	<0.02	0.05	<0.02	0.026	0.025	0.03	0.2	0.097	<0.02	<0.02	<0.02	<0.02
Total Suspended Solids	mg/L	-	-	-	-	10	<10	<10	<10	12	18	<10	47	40	<10	<10	<10	<10
Turbidity	NTU	-	-	-	-	0.1	0.7	9.9	0.9	0.8	0.5	0.6	5.1	1.6	1.4	1.3	2.6	2.7
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	<0.000002	0.000035	<0.000002	<0.00061	<0.00061	<0.000002	<0.00061	<0.00061	<0.000002	<0.000002	<0.00061	<0.00061
Metals																		
Aluminum (diss, PWQO)	mg/L	-	Calculated	-	-	0.004	0.095	<0.004	0.099	<0.005	0.008	0.187	0.098	0.098	0.08	0.079	0.036	0.039
Aluminum (tot)	mg/L	-	-	-	-	0.0049	-	-	-	0.014	0.024	-	0.2	0.26	-	-	0.092	0.087
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	<0.003	<0.003	<0.003	<0.001	<0.001	<0.003	<0.001	<0.001	<0.003	<0.003	<0.001	<0.001
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	0.013	0.184	0.181	0.19	0.22	0.014	<0.01	<0.01	<0.01	0.012	<0.01	<0.01
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	<0.0001	<0.00009	<0.00009	<0.0001	<0.0001	<0.00009	<0.00009
Chromium (tot)	mg/L	-	-	0.064	-	0.003	<0.003	<0.003	<0.003	<0.005	<0.005	<0.003	<0.005	<0.005	<0.003	<0.003	<0.005	<0.005
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0028	0.0015	<0.0005	<0.0005	<0.0005	<0.0005
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	0.001	<0.001	<0.001	<0.0009	<0.0009	0.001	<0.0009	0.0013	<0.001	0.001	<0.0009	<0.0009
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.085	2.31	0.551	0.74	0.39	0.271	4.1	1.7	0.25	0.243	1.1	1.1
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	0.00074	0.00081	0.002	<0.001	<0.0005	<0.0005
Manganese (tot)	mg/L	-	-	-	-	0.002	0.003	0.385	0.02	0.64	0.17	0.014	1.2	0.47	0.015	0.01	0.036	0.035
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	<0.0001	<0.0001	<0.0001	-	-	<0.0001	-	-	<0.0001	<0.0001	-	-
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-	-	<0.0001	<0.0001
Nickel (tot)	mg/L	0.025	-	-	-	0.001	0.005	<0.003	<0.003	<0.001	0.0014	<0.003	<0.001	<0.001	<0.003	<0.003	<0.001	<0.001
Selenium (tot)	mg/L	0.1	-	-	-	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
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	<0.0001	<0.00009	<0.00009	<0.0001	<0.0001	<0.00009	<0.00009
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	<0.02	0.057	<0.02	<0.005	<0.005	<0.02	<0.005	0.0082	<0.02	<0.02	<0.005	<0.005

-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

Table 14: 2023 Surface Water Chemistry Results						Location	MCG-E	MCG-E	MCG-F	MCG-F	MCG-F	MCG-G	MCG-G	MCG-G	MCG-H	MCG-H	MCG-H
Parameter	Units	PWQO-GENERAL	PWQO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-E	NB-QAQC-SW1 (MCG-E)	MCG-F	MCG-F	MCG-F	MCG-G	MCG-G	MCG-G	MCG-H	MCG-H	MCG-H
						Sample Date	2023-Oct-19	2023-Oct-19	2023-May-03	2023-Aug-09	2023-Oct-19	2023-May-03	2023-Aug-09	2023-Oct-19	2023-May-03	2023-Aug-09	2023-Oct-19
						Detection Limit											
Anions																	
Chloride	mg/L	-	-	180	128	0.1	62	56	34.7	30	35	0.32	<1	<1	2.75	10	16
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	<0.1	<0.1	-	<0.1	<0.1	-	0.38	0.11	-	<0.1	<0.1
Nitrate as N	mg/L	-	-	-	-	0.05	<0.1	<0.1	<0.05	<0.1	<0.1	<0.05	0.38	0.11	<0.05	<0.1	<0.1
Nitrite as N	mg/L	-	-	-	-	0.01	<0.01	0.013	<0.05	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.01	<0.01
Sulphate	mg/L	-	-	100	-	0.1	9	8.5	3.33	2.6	3.9	2.92	1.5	1.3	2.78	1.7	2.9
Cations																	
Calcium (tot)	mg/L	-	-	-	-	0.2	13	12	3.2	7	5.6	2.82	7.6	5.1	4.4	9.6	22
Magnesium (tot)	mg/L	-	-	-	-	0.05	2.4	2.3	0.61	1.1	1.1	0.64	1.6	1.2	0.67	2.6	7
Potassium (tot)	mg/L	-	-	-	-	0.2	1.5	1.4	0.82	0.91	1.2	0.53	0.74	0.64	<0.5	0.83	6.4
Sodium (tot)	mg/L	-	-	-	-	0.1	41	41	20.4	24	25	0.62	1.4	1.5	2.74	4.8	12
General Chemistry																	
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	27	26	8	27	14	7	25	16	8	34	68
Ammonia as N	mg/L	-	-	-	-	0.02	<0.05	<0.05	<0.02	0.057	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.05
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	5	<2
Colour	TCU	-	-	-	-	2	25	24	37.8	61	32	50.1	63	39	33.5	90	160
Electrical Conductivity	uS/cm	-	-	-	-	1	290	290	143	170	180	27	56	42	40	89	250
pH	pH units	6.5 - 8.5	-	6 - 9	-		7.55	7.47	6.67	7.1	7.27	6.66	7.34	7.32	6.62	6.89	7.64
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
Total Dissolved Solids	mg/L	-	-	-	-	10	195	160	100	90	145	50	55	60	64	60	195
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	40	42	10.5	24	19	9.7	27	18	13.7	36	86
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.27	0.26	0.26	0.38	0.35	0.28	0.38	0.43	0.18	0.62	0.98
Total Phosphorus	mg/L	0.03	-	-	-	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.036	0.021	<0.02	0.057	<0.02
Total Suspended Solids	mg/L	-	-	-	-	10	<10	<10	<10	<10	<10	<10	13	<10	<10	39	<10
Turbidity	NTU	-	-	-	-	0.1	0.9	0.9	1.7	3.8	1.2	5.9	7.9	3.1	0.7	1.7	0.5
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	<0.00061	<0.00061	<0.000002	<0.00061	<0.00061	<0.000002	<0.00061	<0.00061	<0.000002	<0.00061	<0.00061
Metals																	
Aluminum (diss, PWQO)	mg/L	-	Calculated	-	-	0.004	0.014	0.013	0.065	0.039	0.025	0.073	0.048	0.033	0.077	0.031	0.015
Aluminum (tot)	mg/L	-	-	-	-	0.0049	0.025	0.023	-	0.069	0.046	-	0.23	0.065	-	0.081	0.017
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	<0.001	<0.001	<0.003	<0.001	<0.001	<0.003	<0.001	<0.001	<0.003	<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	0.012	0.02	0.01
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	<0.00009	<0.00009	<0.0001	<0.00009	<0.00009	0.0001	<0.00009	<0.00009	<0.0001	<0.00009	<0.00009
Chromium (tot)	mg/L	-	-	0.064	-	0.003	<0.005	<0.005	<0.003	<0.005	<0.005	<0.003	<0.005	<0.005	<0.003	<0.005	<0.005
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	<0.0005	<0.0005	<0.0005	0.00053	<0.0005	0.0005	0.00088	<0.0005	<0.0005	<0.0005	<0.0005
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	<0.0009	<0.0009	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.0009
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.25	0.24	0.3	2	0.58	0.755	2.5	0.92	0.079	1.3	0.16
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.001	<0.0005	<0.0005	<0.001	<0.0005	<0.0005
Manganese (tot)	mg/L	-	-	-	-	0.002	0.0069	0.0067	0.012	0.2	0.035	0.06	0.33	0.051	0.004	0.09	0.02
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001
Nickel (tot)	mg/L	0.025	-	-	-	0.001	<0.001	<0.001	<0.003	<0.001	<0.001	0.004	<0.001	<0.001	<0.003	<0.001	<0.001
Selenium (tot)	mg/L	0.1	-	-	-	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.00009	<0.00009	<0.0001	<0.00009	<0.00009	<0.0001	<0.00009	<0.00009	<0.0001	<0.00009	<0.00009
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	<0.005	<0.005	<0.02	<0.005	<0.005	<0.02	<0.005	<0.005	<0.02	<0.005	<0.005

-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

Figures

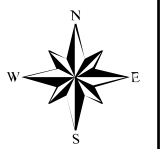
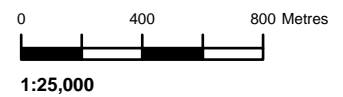


LEGEND
 Site Outline



1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK


REFERENCES
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CLIENT
 The Corporation of the Municipality of Hastings Highlands

PROJECT
 North Baptiste Lake - Waste Transfer Station

TITLE
 Site Location Map

 6-410 Falconbridge Rd.,
 Sudbury, Ontario, P3A 4S4
 Tel: 705-525-6075
 Fax: 705-525-6077
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 230225-08		DATE December 21, 2023	
DRAWN FM	CHECKED TH	FIG NO. 01	REV 0



LEGEND

- Surface Water
- Monitoring Wells
- Current WDS Property
- Original WDS Property
- North Buffer Zone
- Site Feature

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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0 25 50 Metres

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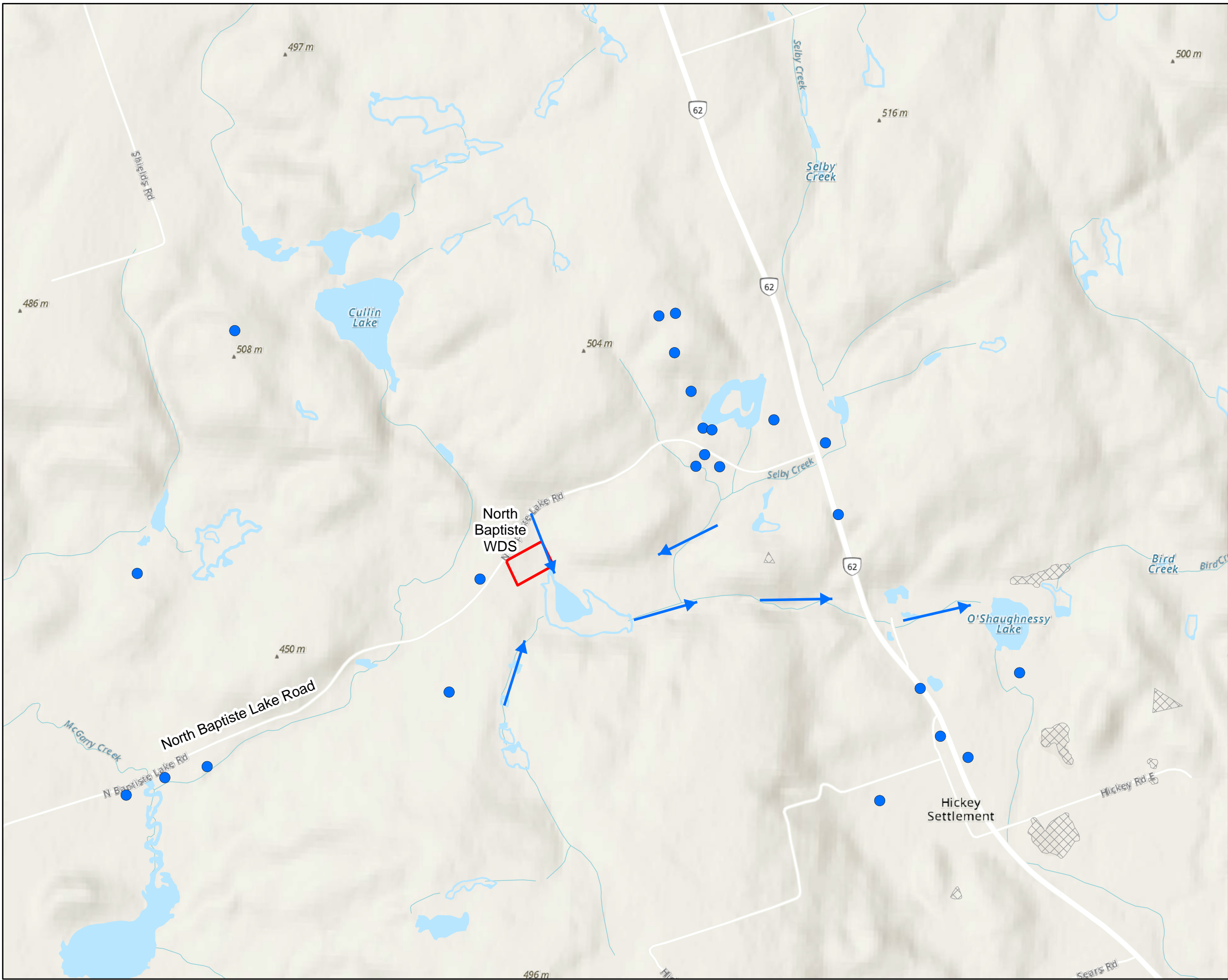
CLIENT
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PROJECT
 North Baptiste Lake - Waste Transfer Station

TITLE
 Site Plan

6-410 Falconbridge Rd., Sudbury, Ontario, P3A 4S4
 Tel: 705-525-6075 Fax: 705-525-6077
 Email: info@blumetric.ca Web: http://www.blumetric.ca

PROJECT # 230225-08	DATE February 20, 2024
DRAWN MB	CHECKED TH
FIG NO. 02	REV 0



LEGEND

- Private Wells within 1.5km of site
- ➔ Surface Water Flow Direction
- Waste Disposal Site
- Pit/Quarry

1				
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REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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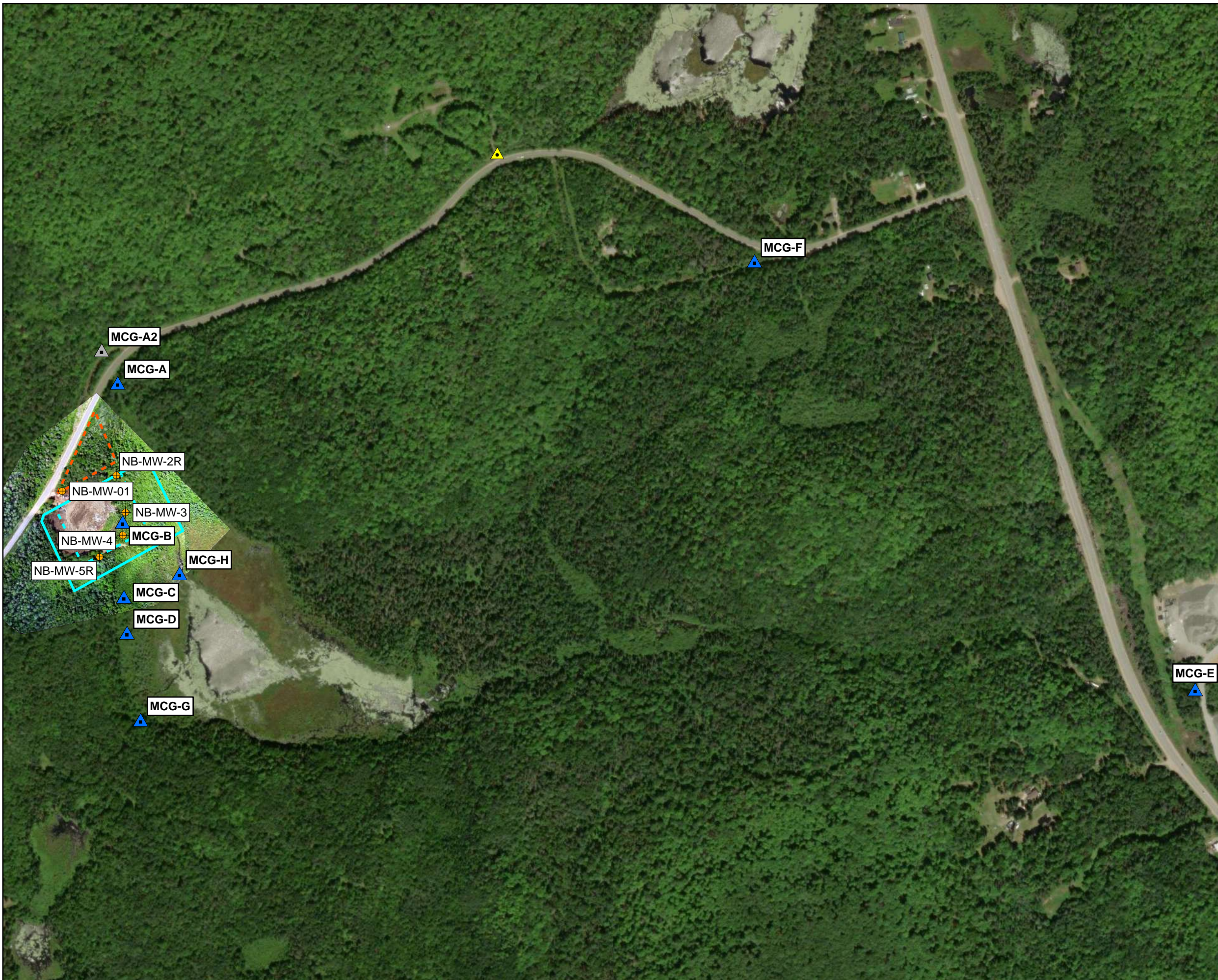
PROJECT
 North Baptiste Lake - Waste Transfer Station

TITLE
 Regional Surface Water Flow Pattern and Private Water Wells

6-410 Falconbridge Rd.,
 Sudbury, Ontario, P3A 4S4
 Tel: 705-525-6075
 Fax: 705-525-6077
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 230225-08	DATE December 21, 2023
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DRAWN FM	CHECKED TH	FIG NO. 03	REV 0
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LEGEND

- Monitoring Wells
- Potential Background Surface Water Sample Location
- Surface Water Sample Location
- Former Surface Water Sample Location
- Current WDS Property
- Original WDS Property
- North Buffer Zone

1				
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REV.	DESCRIPTION	YY/MM/DD	BY	CHK
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0 100 200 Metres
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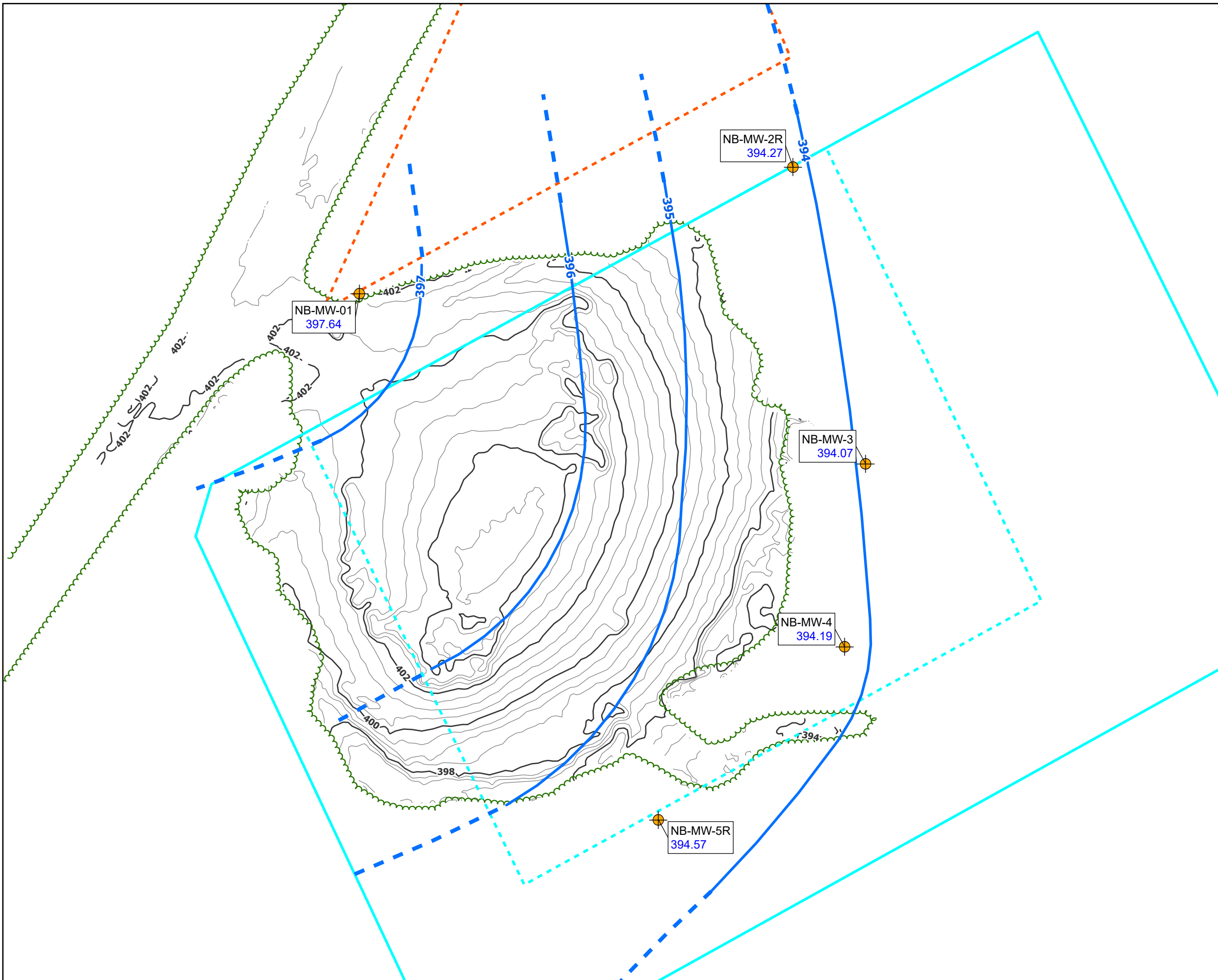
PROJECT
 North Baptiste Lake - Waste Transfer Station

TITLE
 Groundwater & Surface Water Monitoring Locations

6-410 Falconbridge Rd.,
 Sudbury, Ontario, P3A 4S4
 Tel: 705-525-6075
 Fax: 705-525-6077
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 230225-08	DATE December 21, 2023
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DRAWN FM	CHECKED TH	FIG NO. 04	REV 0
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LEGEND

- Monitoring Wells
- Current WDS Property
- Original WDS Property
- North Buffer Zone
- Treeline
- Elevation Contour (2.0 m asl)
- Elevation Contour (0.5 m asl)
- Groundwater Elevation Contour (Indicated)
- Groundwater Elevation Contour (Inferred)
- 397.94 Groundwater Elevation msl (Spring, 2023)

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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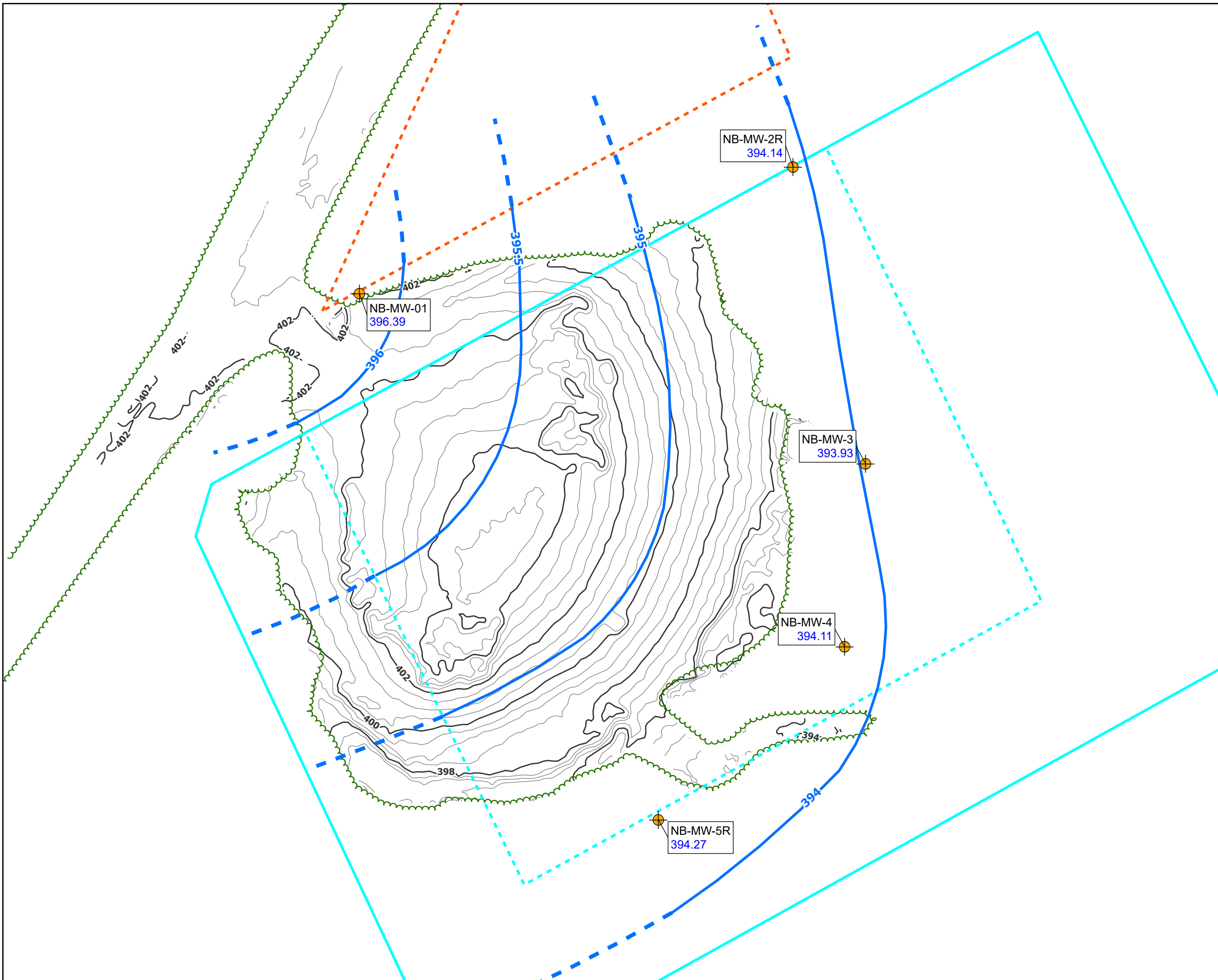
CLIENT
 The Corporation of the Municipality of Hastings Highlands

PROJECT
 North Baptiste Lake - Waste Transfer Station

TITLE
 Groundwater Flow Direction - Spring 2023

6-410 Falconbridge Rd.,
 Sudbury, Ontario, P3A 4S4
 Tel: 705-525-6075
 Fax: 705-525-6077
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 230225-08	DATE February 13, 2024
DRAWN MB	CHECKED LH
FIG NO. 05	REV 0



LEGEND

- Monitoring Wells
- Current WDS Property
- Original WDS Property
- North Buffer Zone
- Elevation Contour (0.5 m asl)
- Elevation Contour (2.0 m asl)
- Treeline
- Groundwater Elevation Contour (Indicated)
- Groundwater Elevation Contour (Inferred)
- 397.94 Groundwater Elevation masl (Fall, 2023)

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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1:750

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PROJECT
 North Baptiste Lake - Waste Transfer Station

TITLE
 Groundwater Flow Direction - Fall 2023

6-410 Falconbridge Rd.,
 Sudbury, Ontario, P3A 4S4
 Tel: 705-525-6075
 Fax: 705-525-6077
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 230225-08	DATE February 13, 2024		
DRAWN MB	CHECKED LH	FIG NO. 06	REV 0

Site Photographs



Photo 1: Front entrance signage – May 3, 2023



Photo 2: Front entrance with signage – May 3, 2023



Photo 3: Waste and recycling collection bins – May 3, 2023



Photo 4: Segregated waste piles – May 3, 2023



Photo 5: MCG-A monitoring location –
May 3, 2023



Photo 6: MCG-B monitoring location –
May 3, 2023



Photo 7: MCG-C monitoring location –
May 3, 2023



Photo 8: MCG-D monitoring location –
May 3, 2023



Photo 9: MCG-E monitoring location –
May 3, 2023



Photo 10: MCG-F monitoring location –
May 3, 2023



Photo 11: MCG-G monitoring location –
May 3, 2023



Photo 12: MCG-H monitoring location –
May 3, 2023



Photo 13: Front entrance signage – August 9, 2023



Photo 14: Waste observed outside gate – August 9, 2023



Photo 15: Bulk Waste Pile at capacity – August 9, 2023



Photo 16: Segregated Waste Piles – August 9, 2023



Photo 17: MCG-A monitoring location – August 9, 2023



Photo 18: MCG-B monitoring location – August 9, 2023



Photo 19: MCG-C monitoring location – August 9, 2023



Photo 20: MCG-D monitoring location – August 9, 2023



Photo 21: MCG-E monitoring location –
August 9, 2023



Photo 22: MCG-F monitoring location –
August 9, 2023



Photo 23: MCG-G monitoring location –
August 9, 2023



Photo 24: MCG-H monitoring location –
August 9, 2023



Photo 25: Front entrance signage – October 19, 2023



Photo 26: Front entrance and signage – October 19, 2023



Photo 27: Bulk waste pile – October 19, 2023



Photo 28: Vegetation growth on cap – October 19, 2023



Photo 29: MCG-A monitoring location –
October 19, 2023



Photo 30: MCG-B monitoring location –
October 19, 2023



Photo 31: MCG-C monitoring location –
October 19, 2023



Photo 32: MCG-D monitoring location –
October 19, 2023



Photo 33: MCG-E monitoring location –
October 18, 2022



Photo 34: MCG-F monitoring location –
October 19, 2023

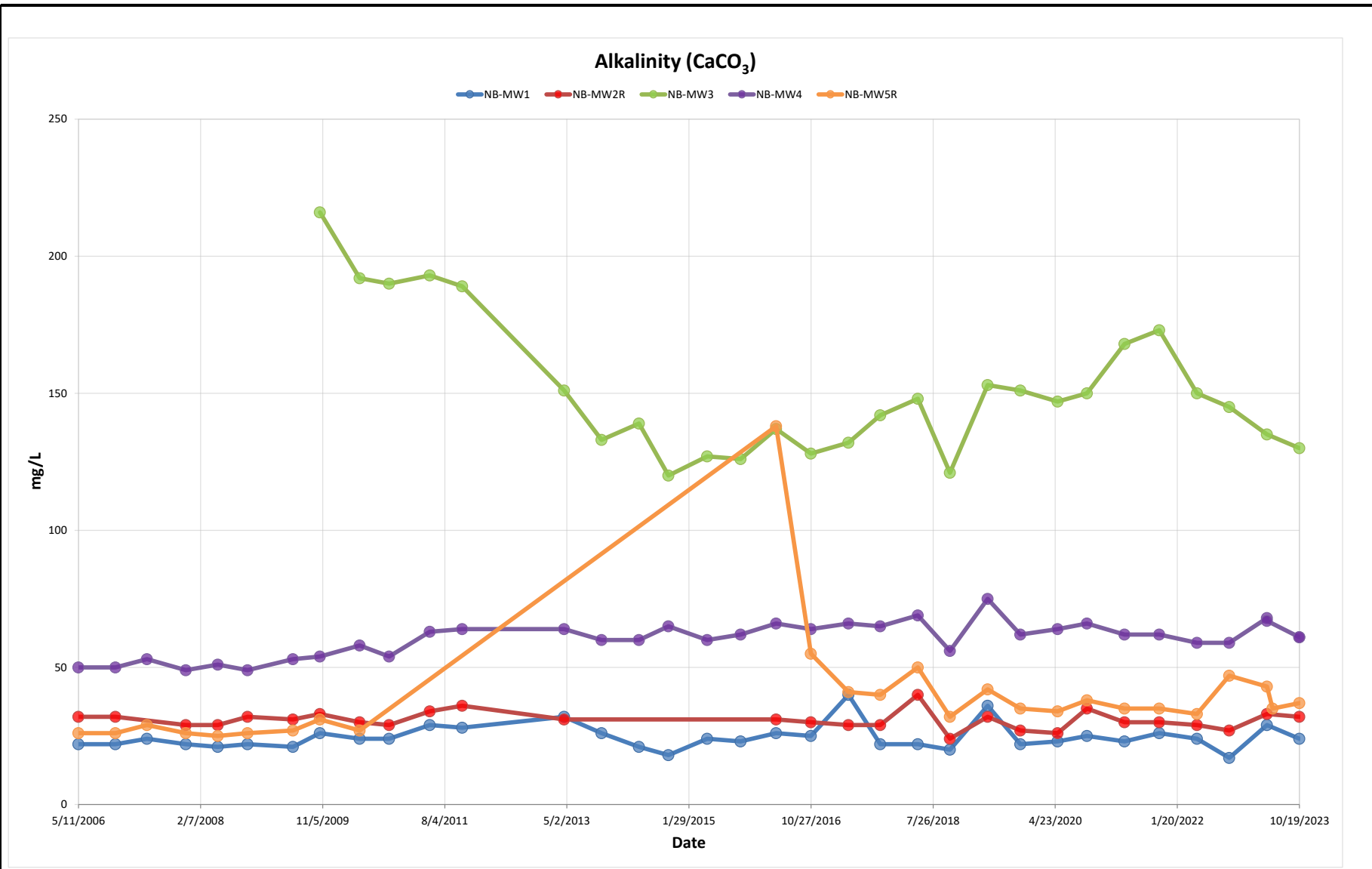


Photo 35: MCG-G monitoring location –
October 19, 2023



Photo 36: MCG-H monitoring location –
October 19, 2023

Chemistry Trend Graphs



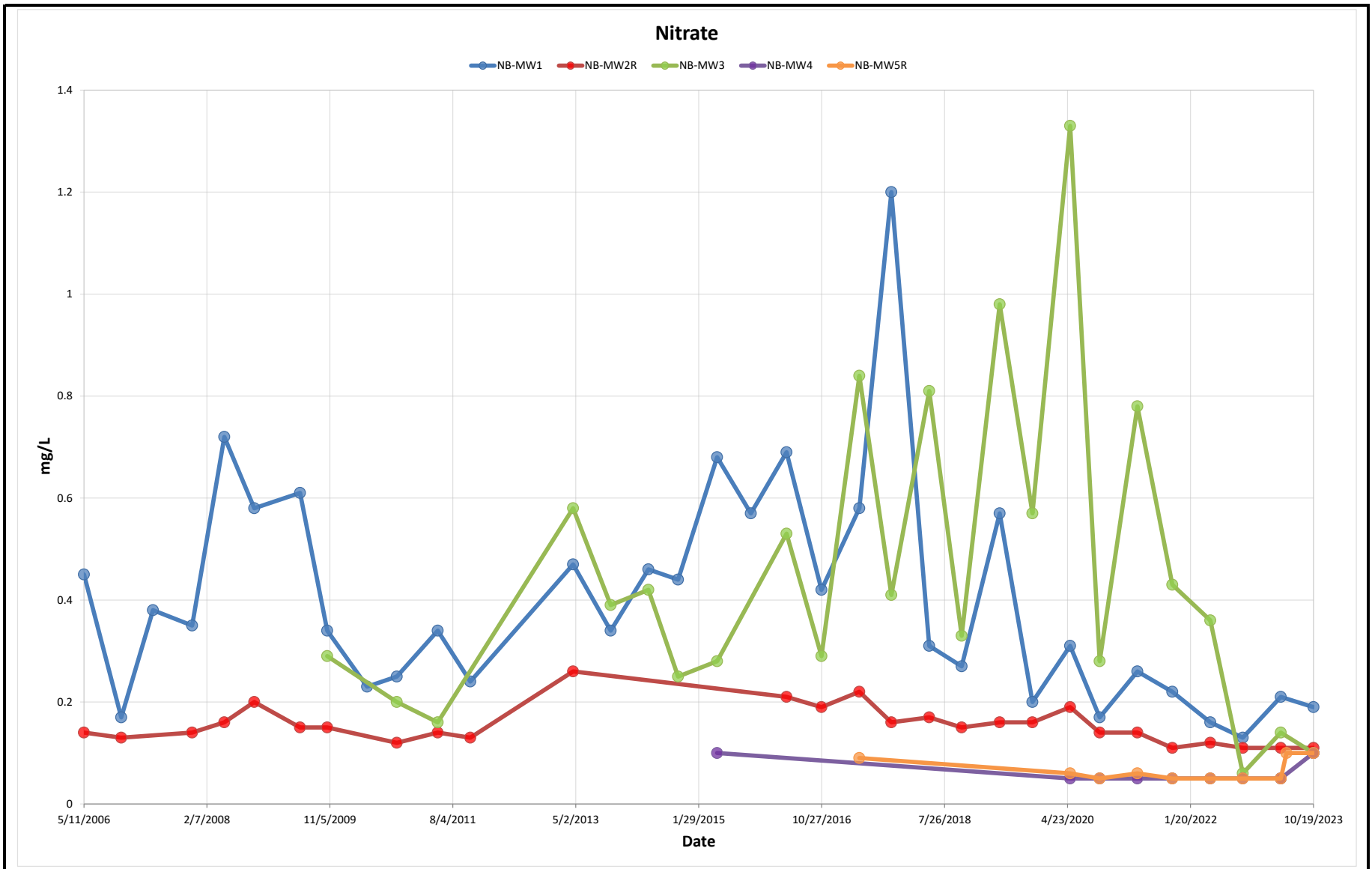
North Baptiste WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 1
Alkalinity in Groundwater

Created by: LH
Checked by: SS





North Baptiste WDS
Municipality of Hasting's Highlands

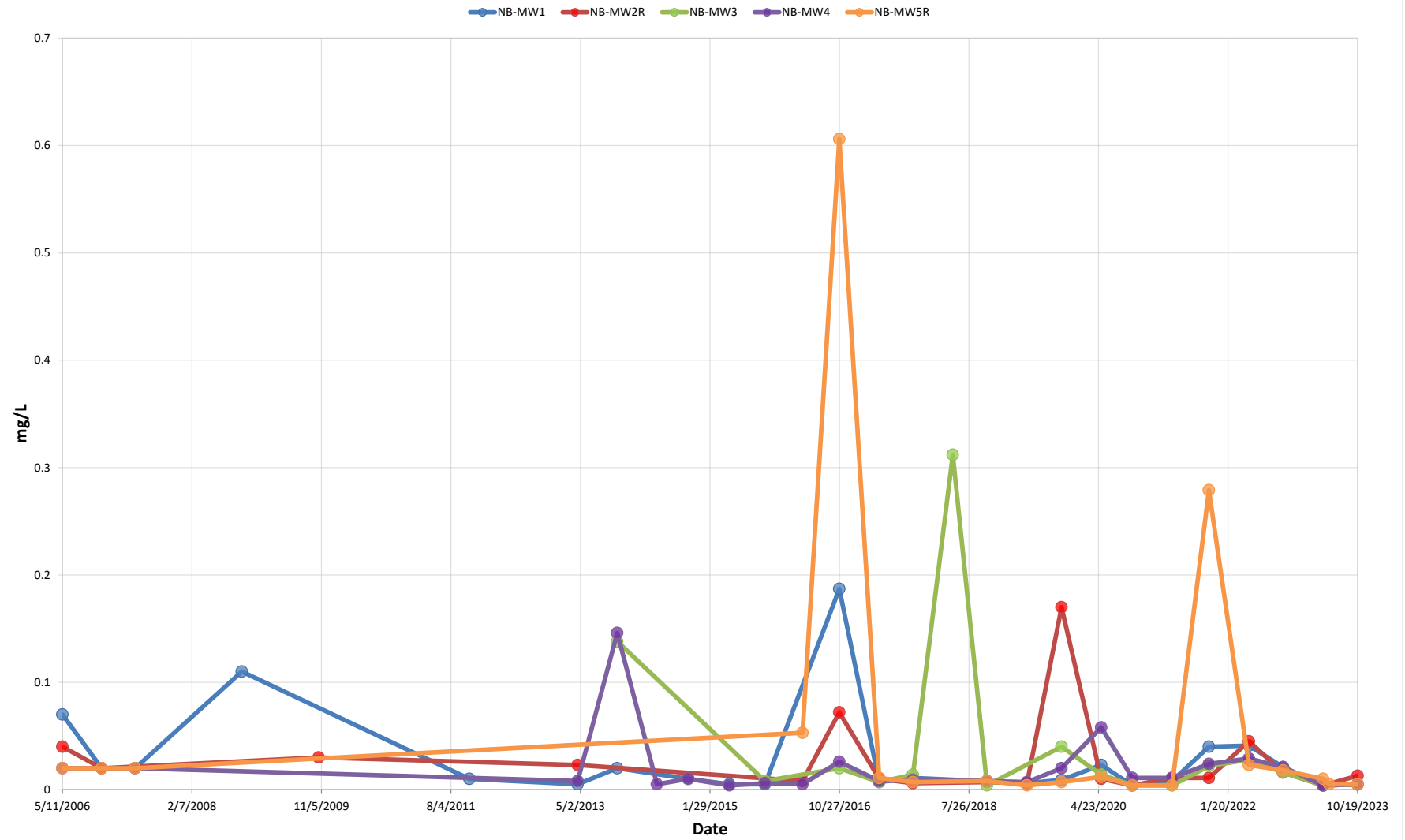
BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 2
Nitrate in Groundwater

Created by: LH
Checked by: SS



Aluminum (Dissolved)



North Baptiste WDS
Municipality of Hasting's Highlands

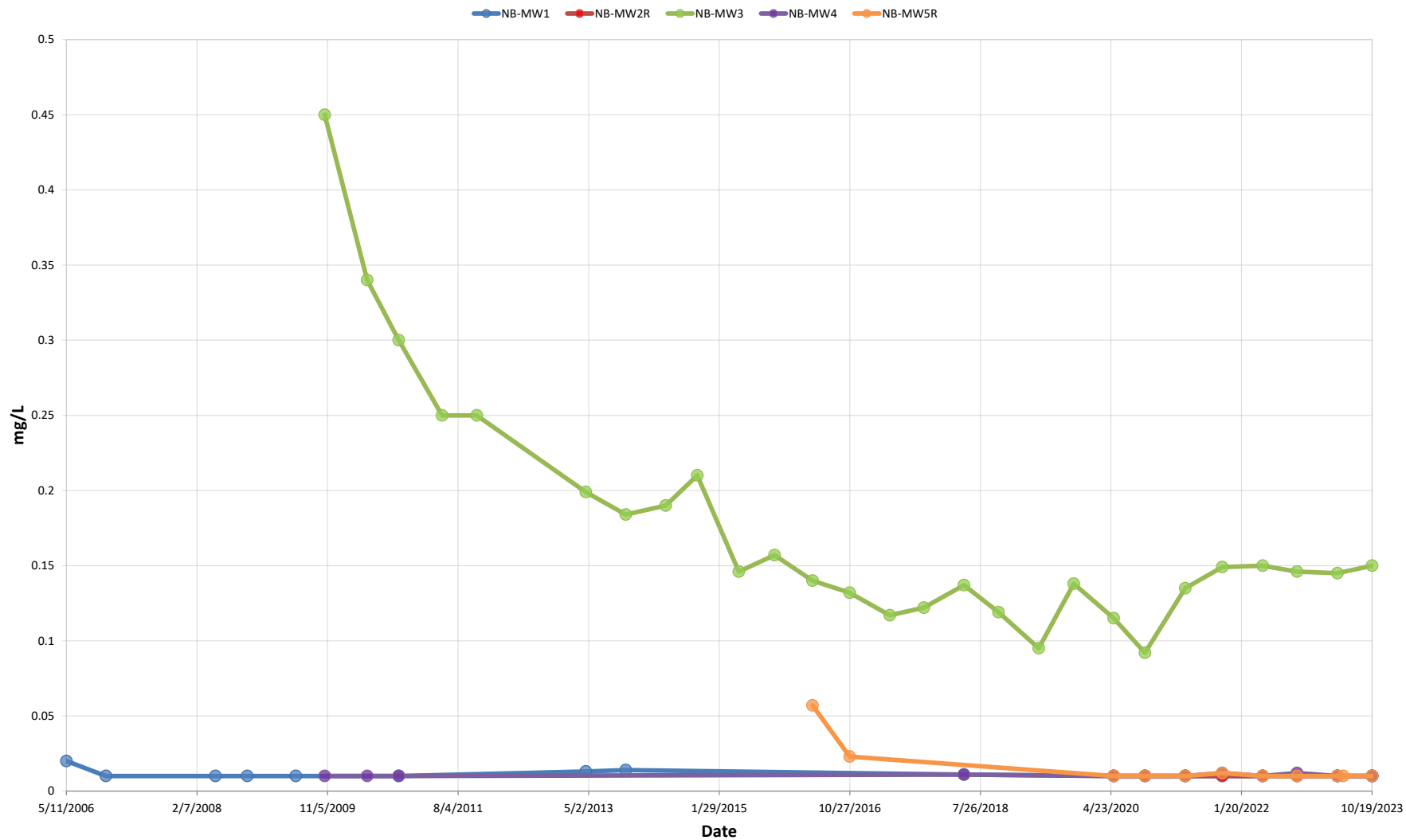
BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 3
Dissolved Aluminum in Groundwater

Created by: LH
Checked by: SS



Boron (Dissolved)



North Baptiste WDS
Municipality of Hasting's Highlands

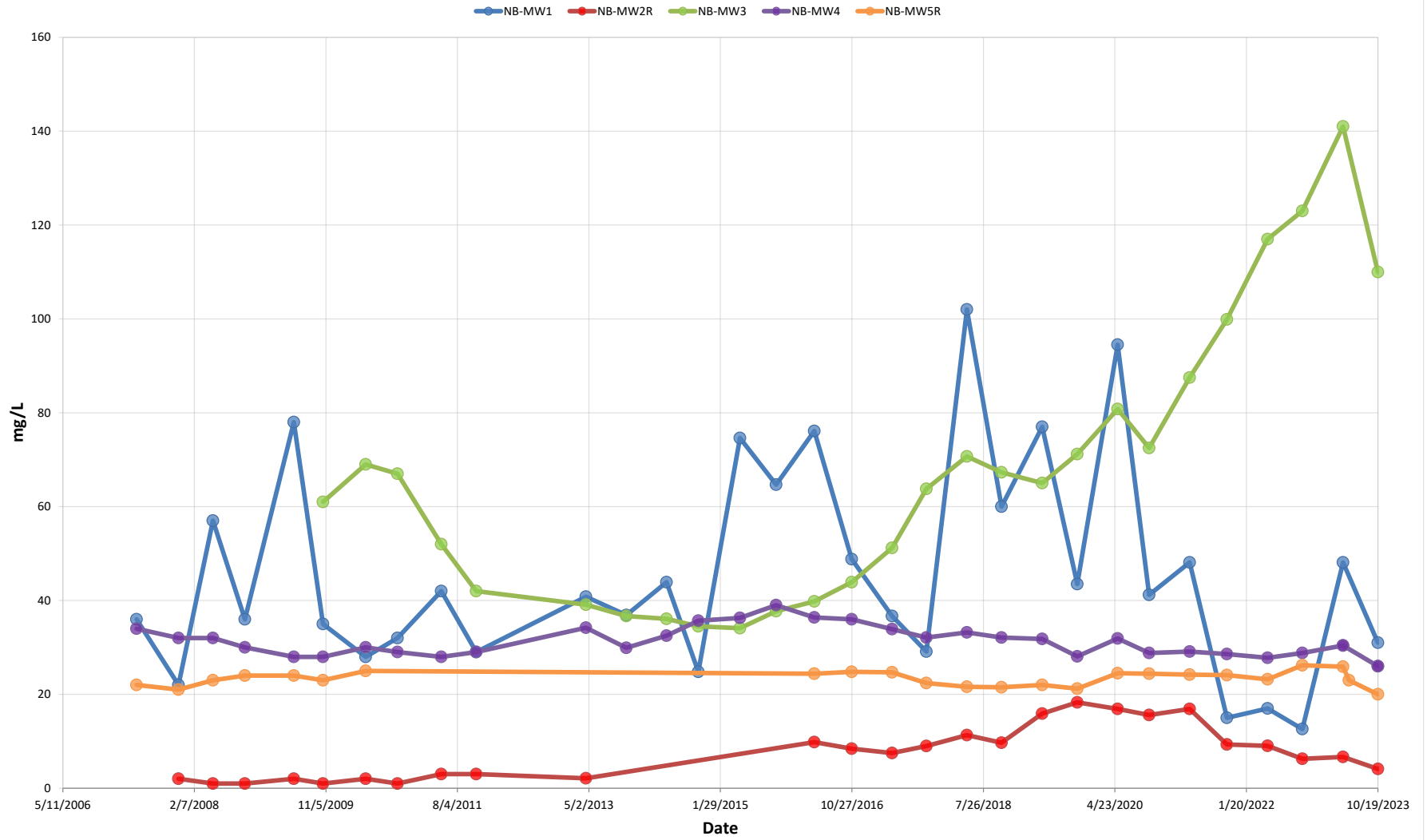
BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 4
Dissolved Boron in Groundwater

Created by: LH
Checked by: SS



Chloride



North Baptiste WDS
Municipality of Hasting's Highlands

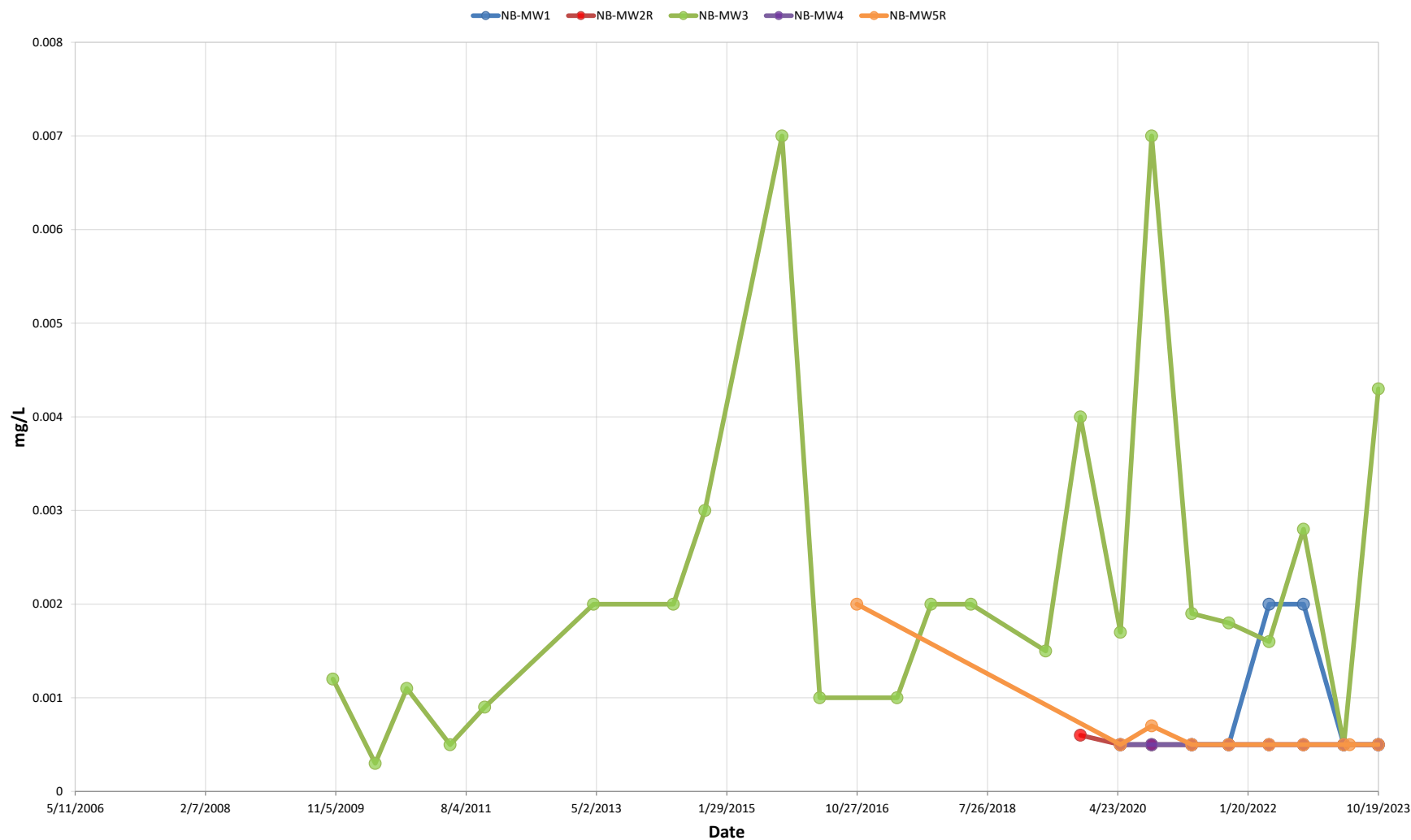
BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 5
Chloride in Groundwater

Created by: LH
Checked by: SS



Cobalt (Dissolved)



North Baptiste WDS
Municipality of Hasting's Highlands

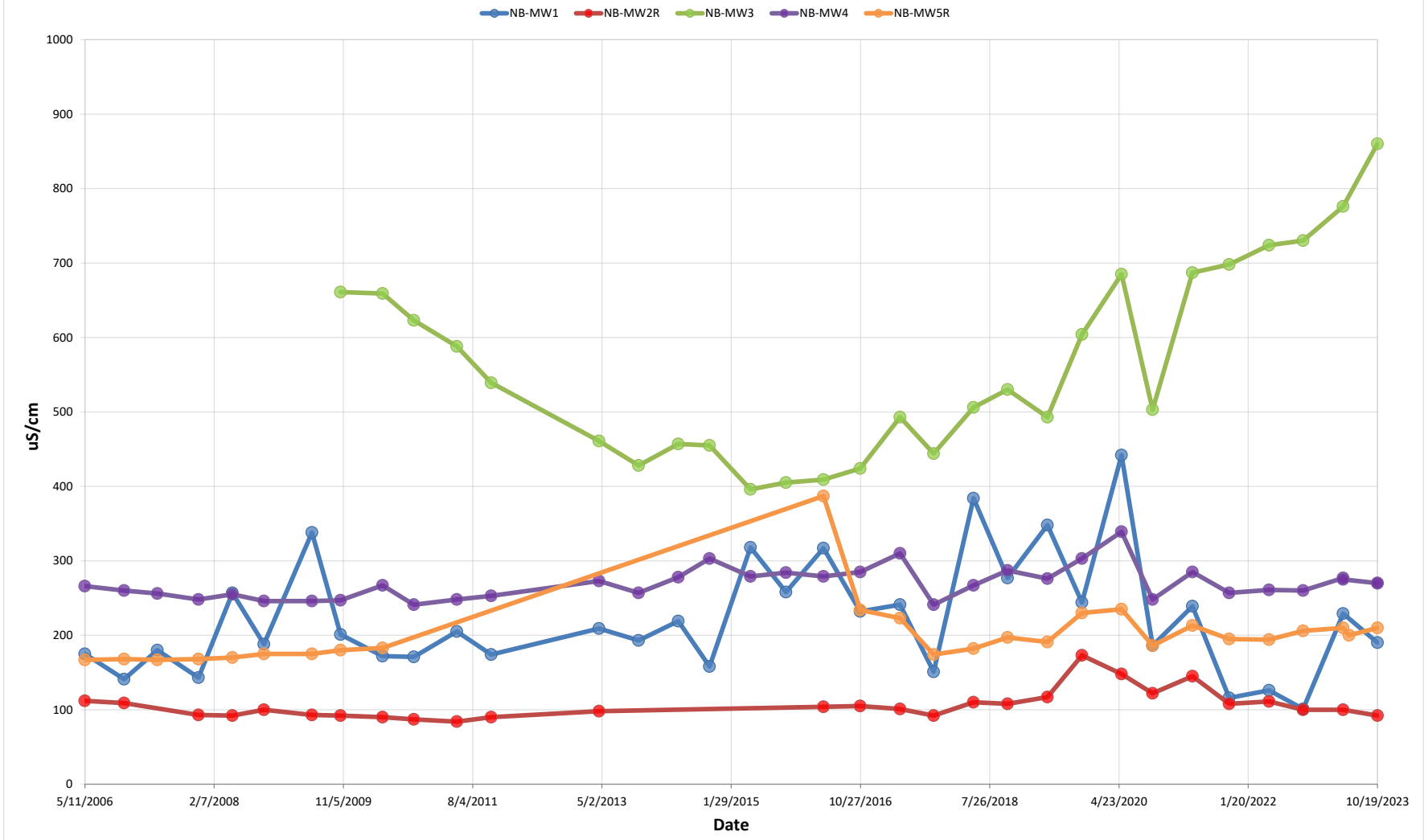
BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 6
Dissolved Cobalt in Groundwater

Created by: LH
Checked by: SS



Conductivity



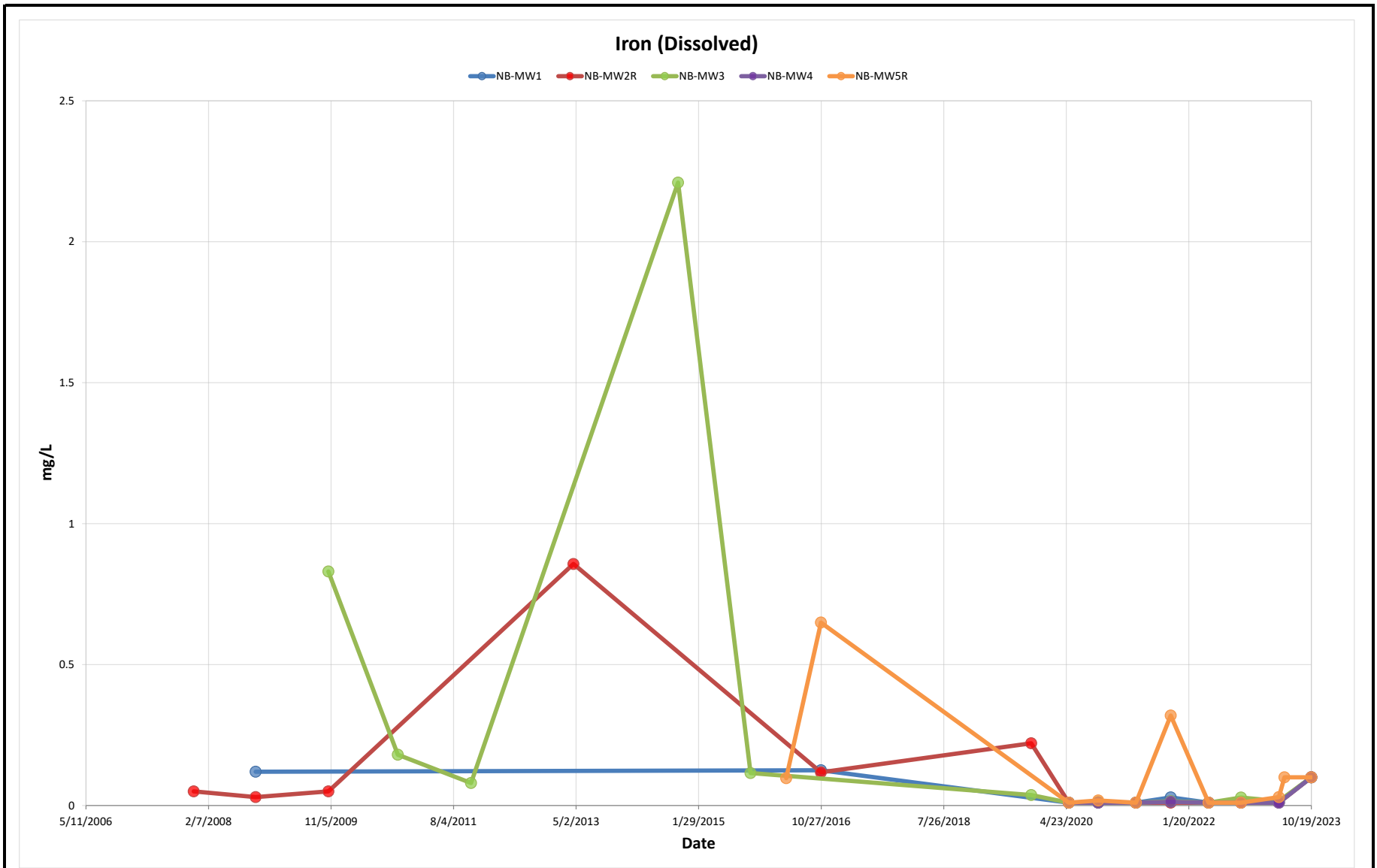
North Baptiste WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 7
Conductivity in Groundwater

Created by: LH
Checked by: SS





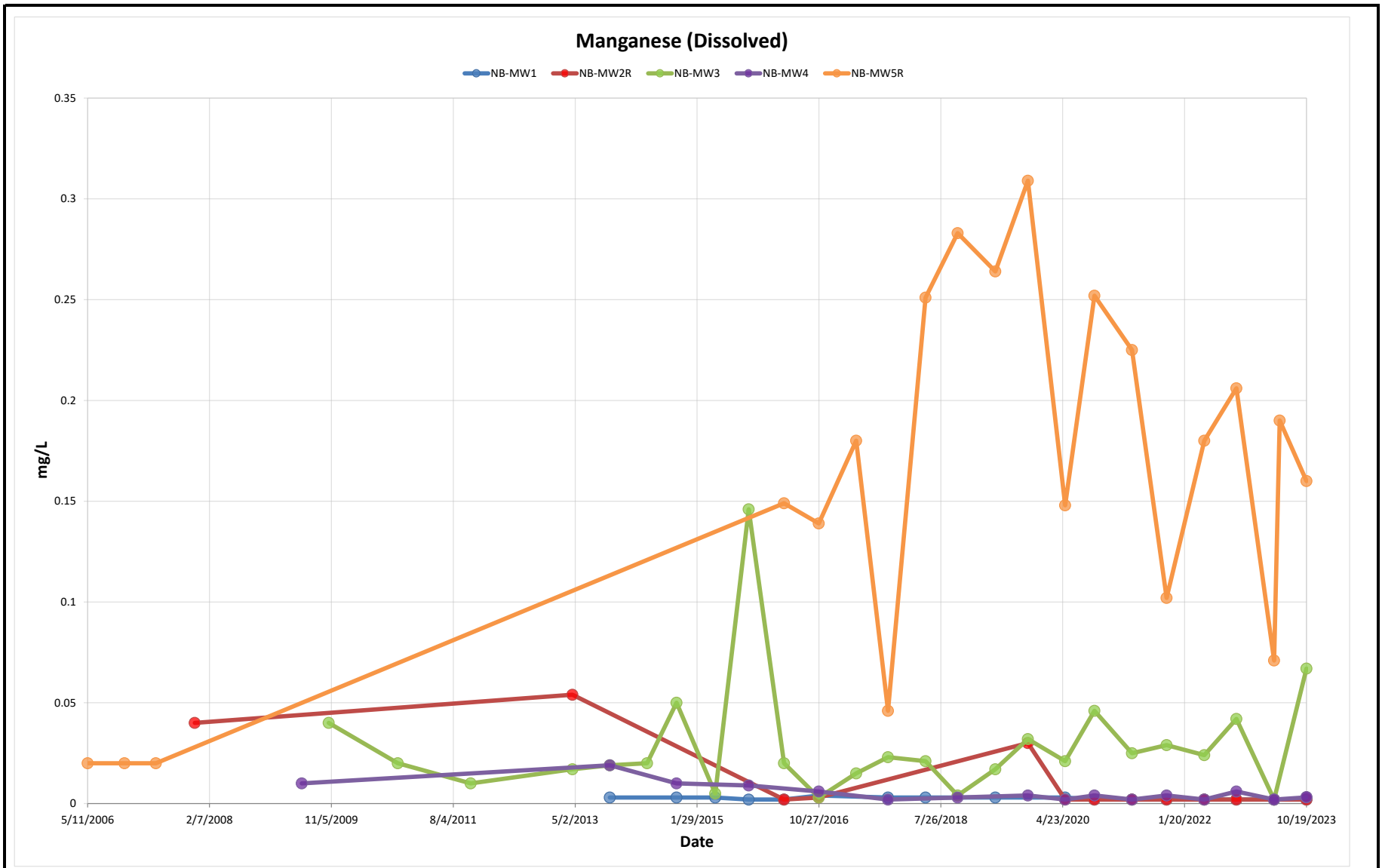
North Baptiste WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 8
Dissolved Iron in Groundwater

Created by: LH
Checked by: SS





North Baptiste WDS
Municipality of Hasting's Highlands

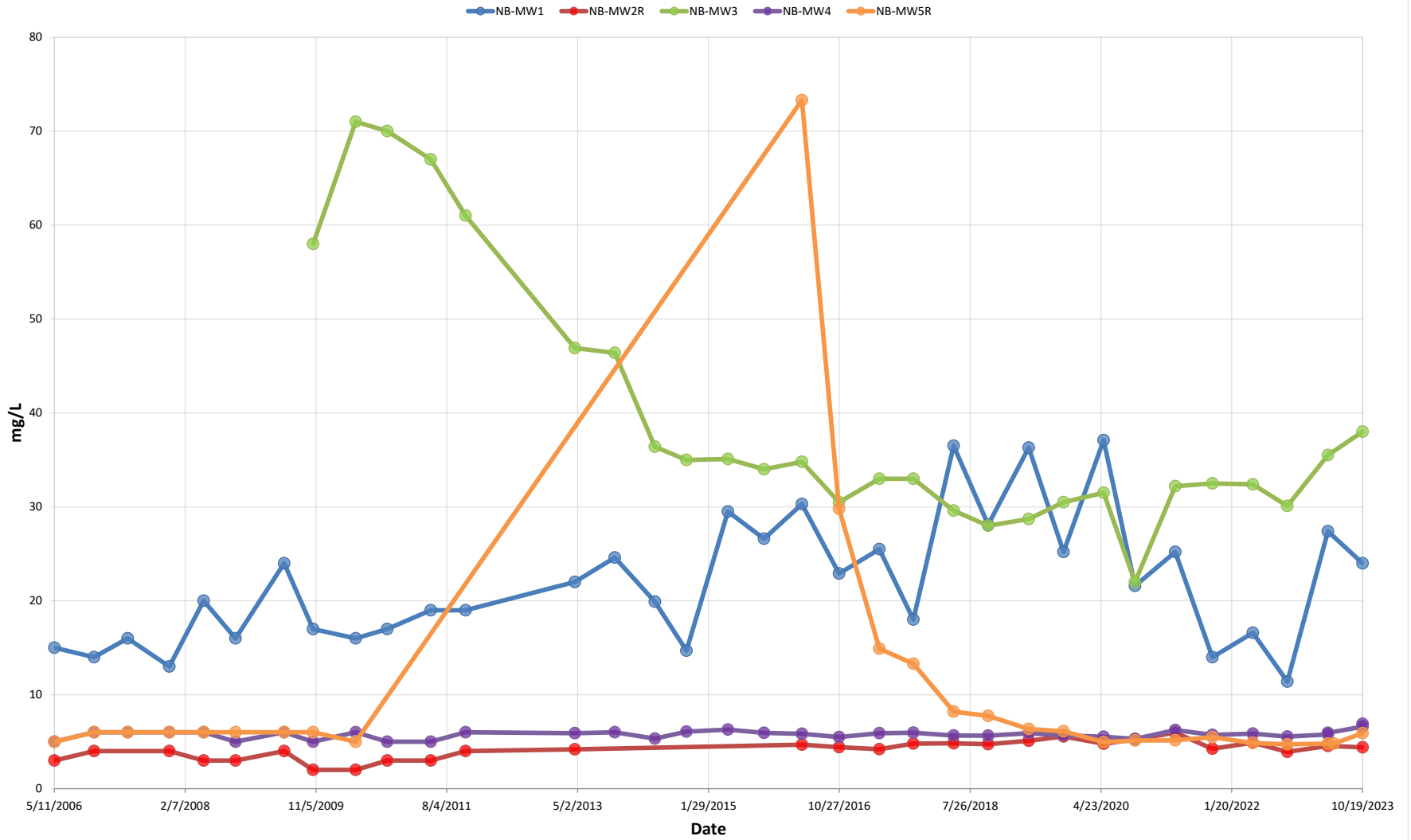
BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 9
Dissolved Manganese in Groundwater

Created by: LH
Checked by: SS



Sodium (Dissolved)



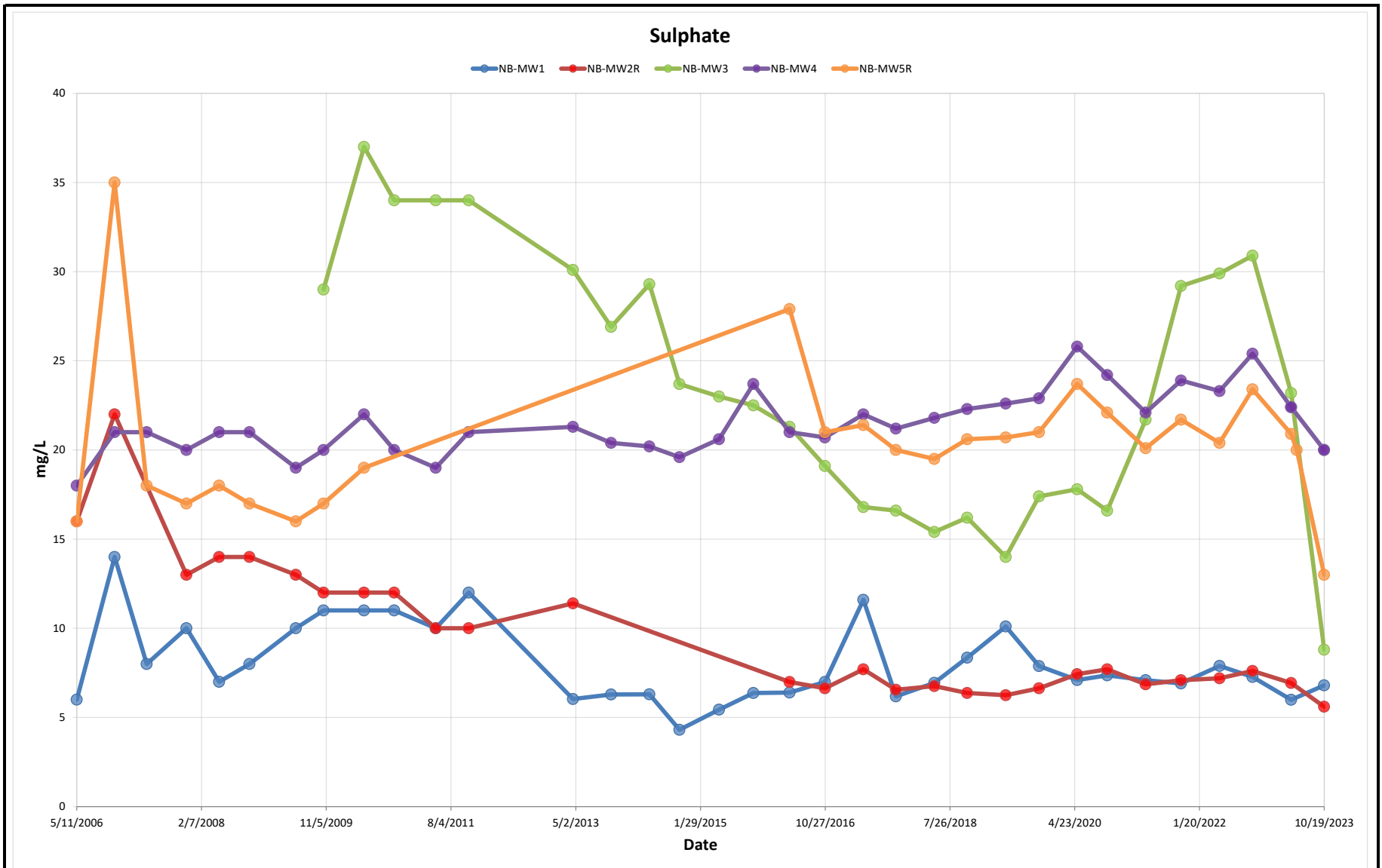
North Baptiste WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 10
Dissolved Sodium in Groundwater

Created by: LH
Checked by: SS





North Baptiste WDS
Municipality of Hasting's Highlands

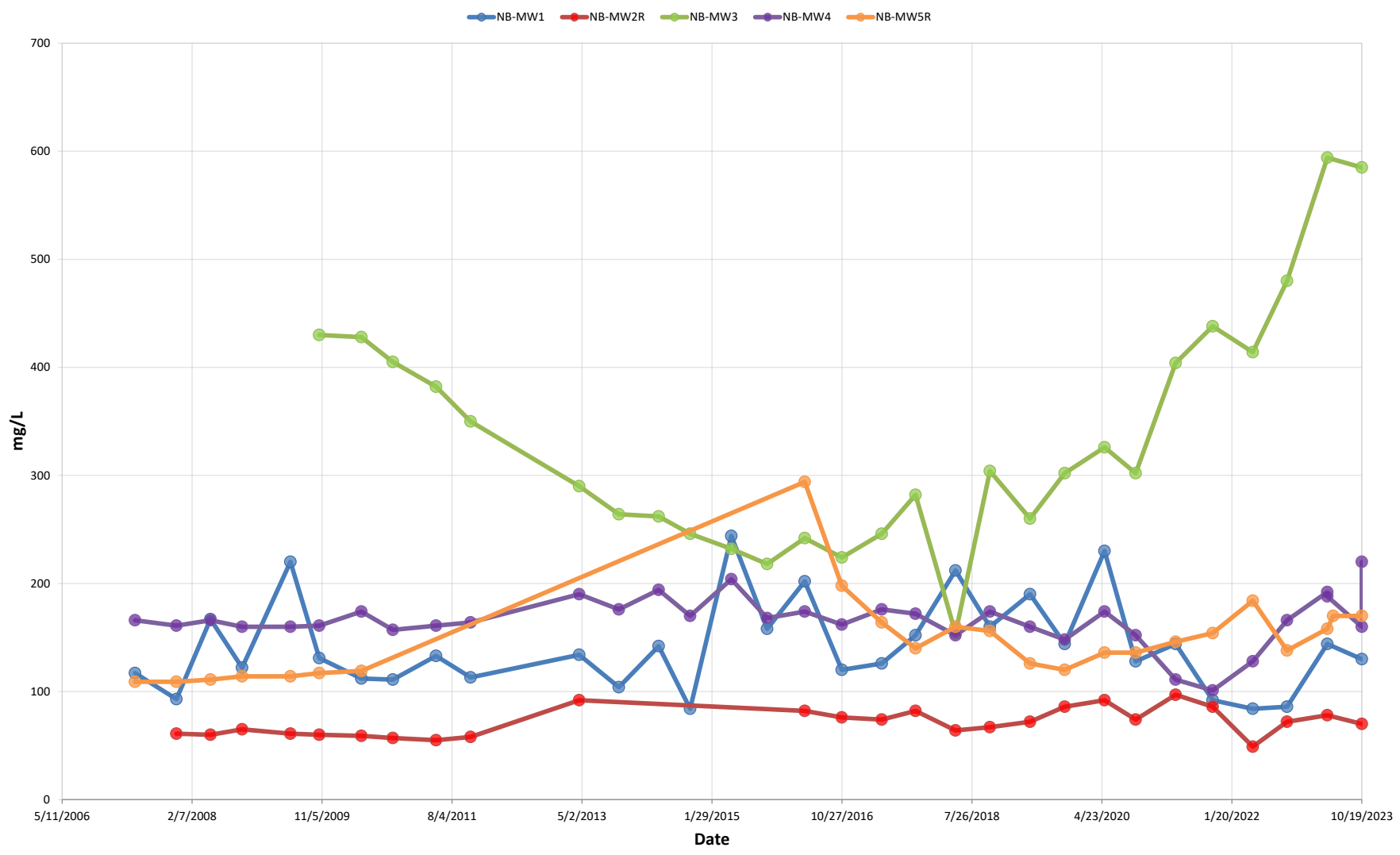
BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 11
Sulphate in Groundwater

Created by: LH
Checked by: SS



Total Dissolved Solids



North Baptiste WDS
Municipality of Hasting's Highlands

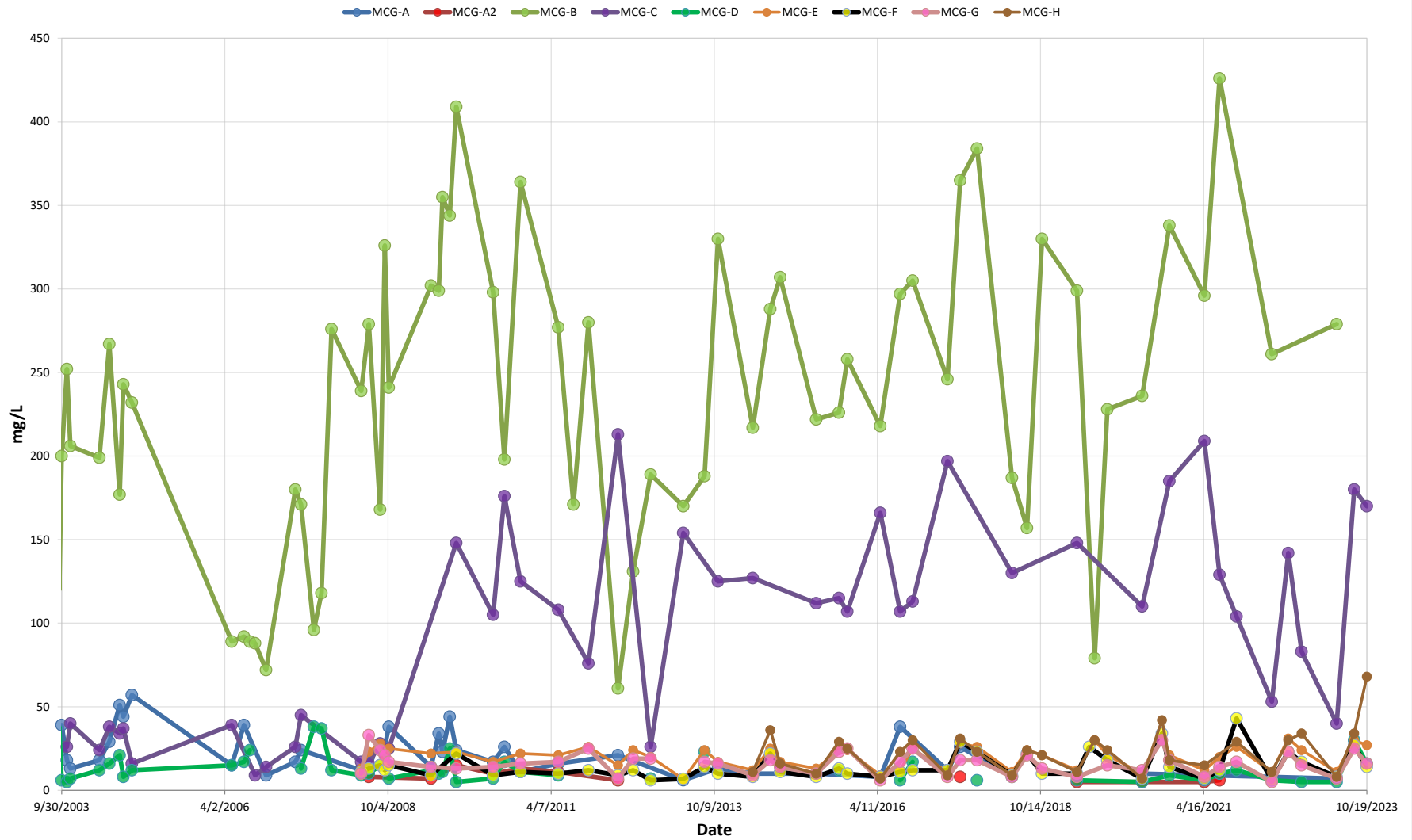
BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 12
Total Dissolved Solids in Groundwater

Created by: LH
Checked by: SS



Alkalinity (CaCO₃)



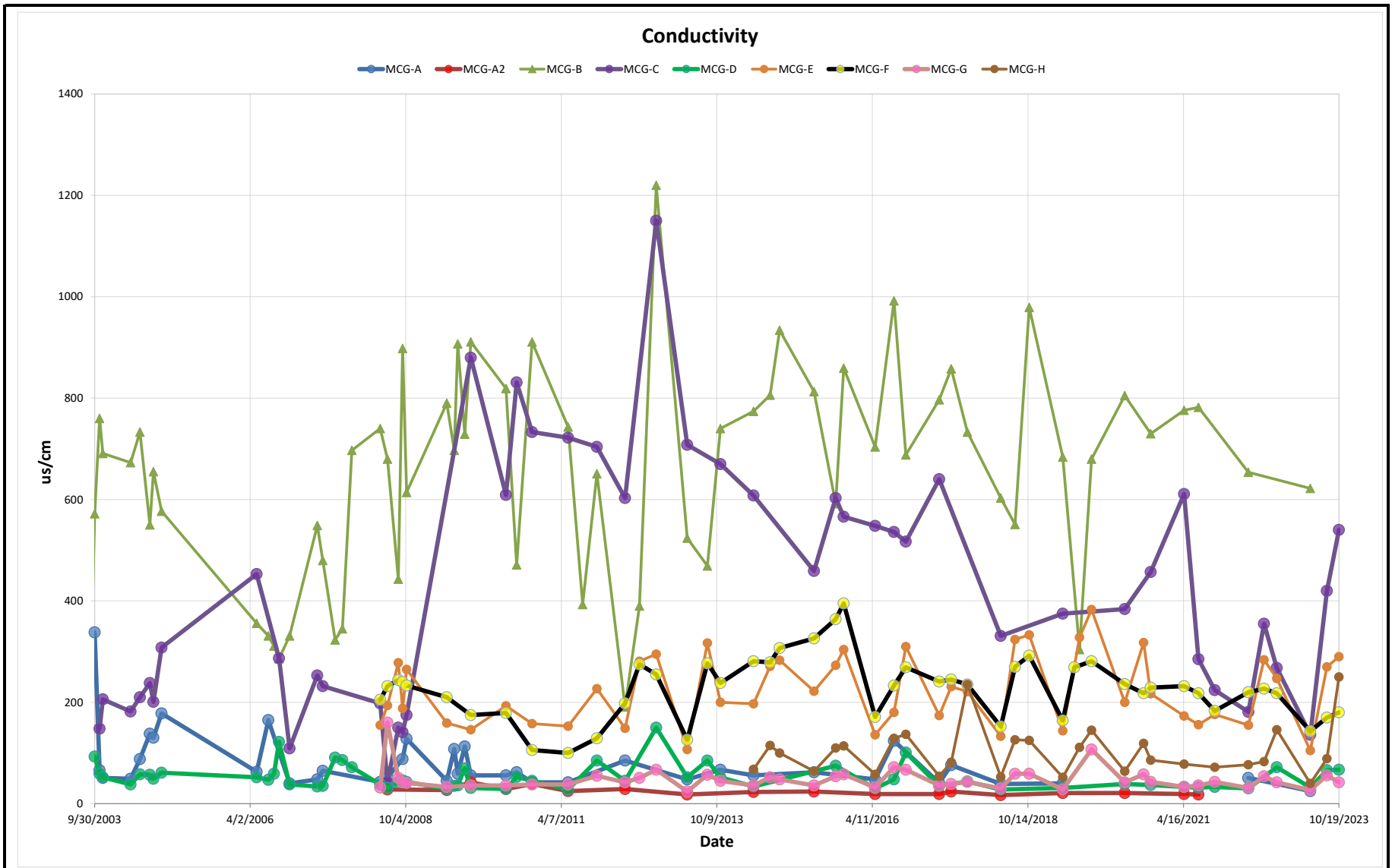
North Baptiste WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 13
Alkalinity in Surface Water

Created by: LH
Checked by: SS





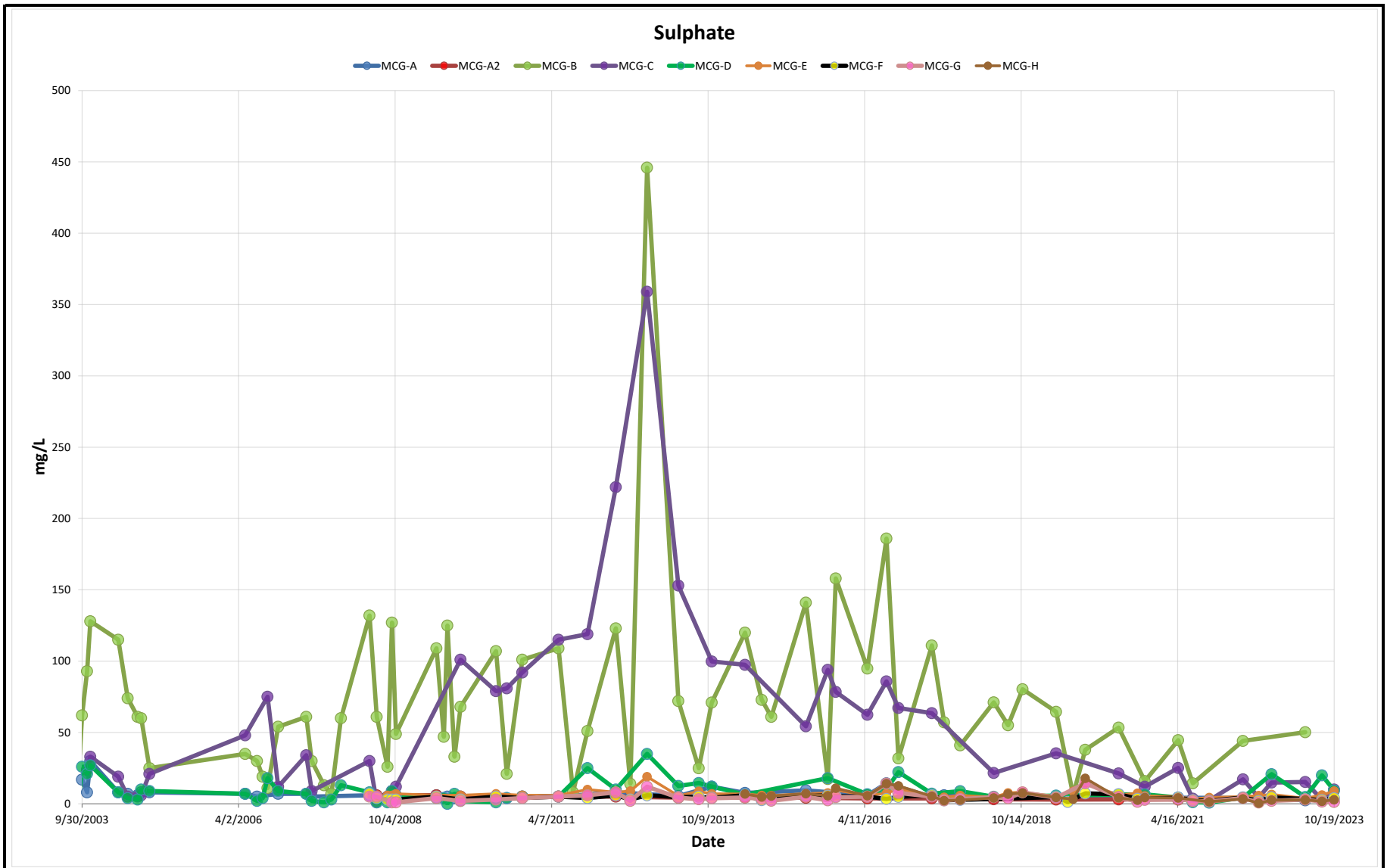
North Baptiste WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 14
Conductivity in Surface Water

Created by: LH
Checked by: SS





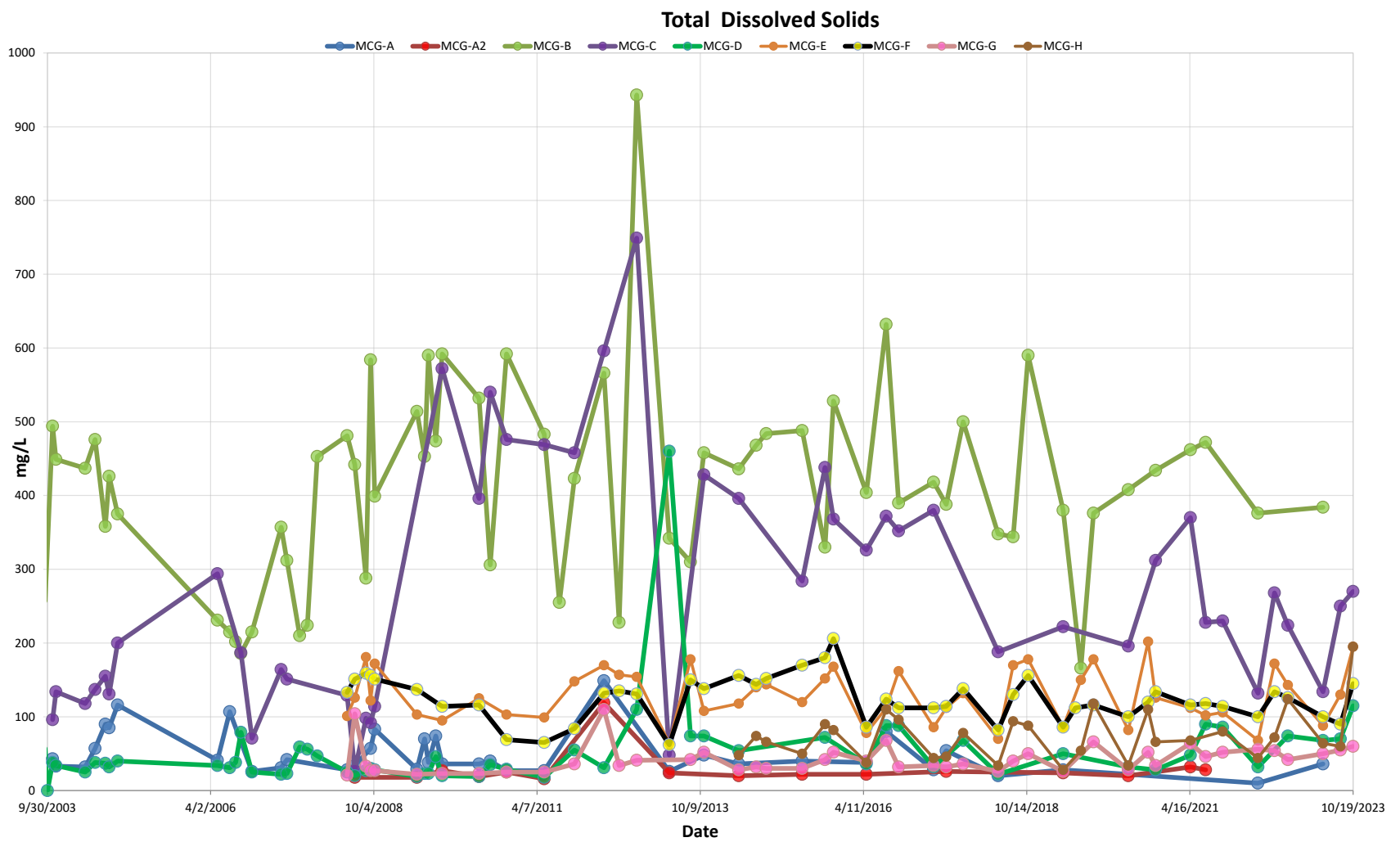
North Baptiste WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 15
Sulphate in Surface Water

Created by: LH
Checked by: SS





North Baptiste WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225-08
Date: February 14, 2024

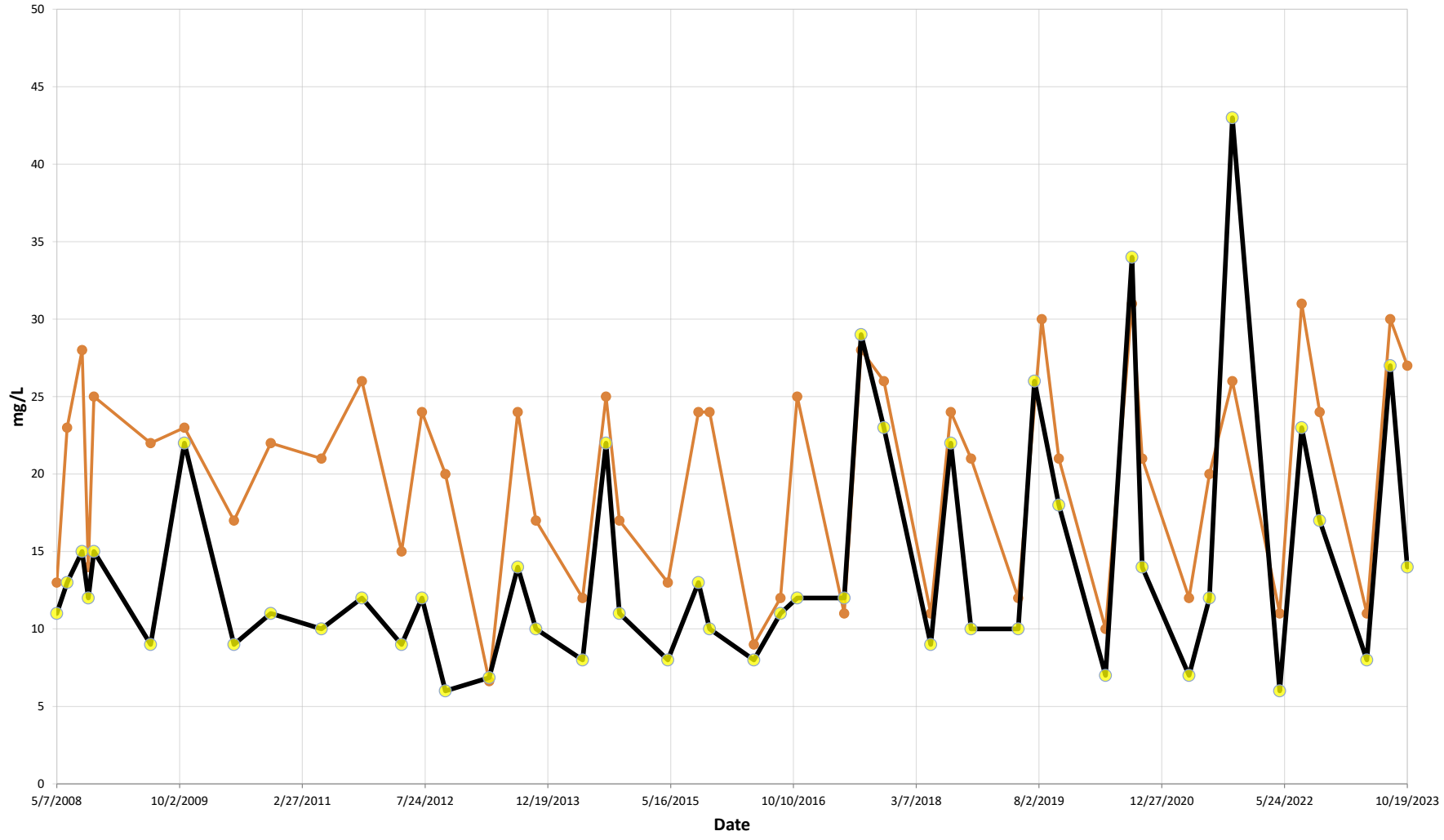
Graph 16
Total Dissolved Solids in Surface Water

Created by: LH
Checked by: SS



Alkalinity (CaCO₃)

MCG-E MCG-F



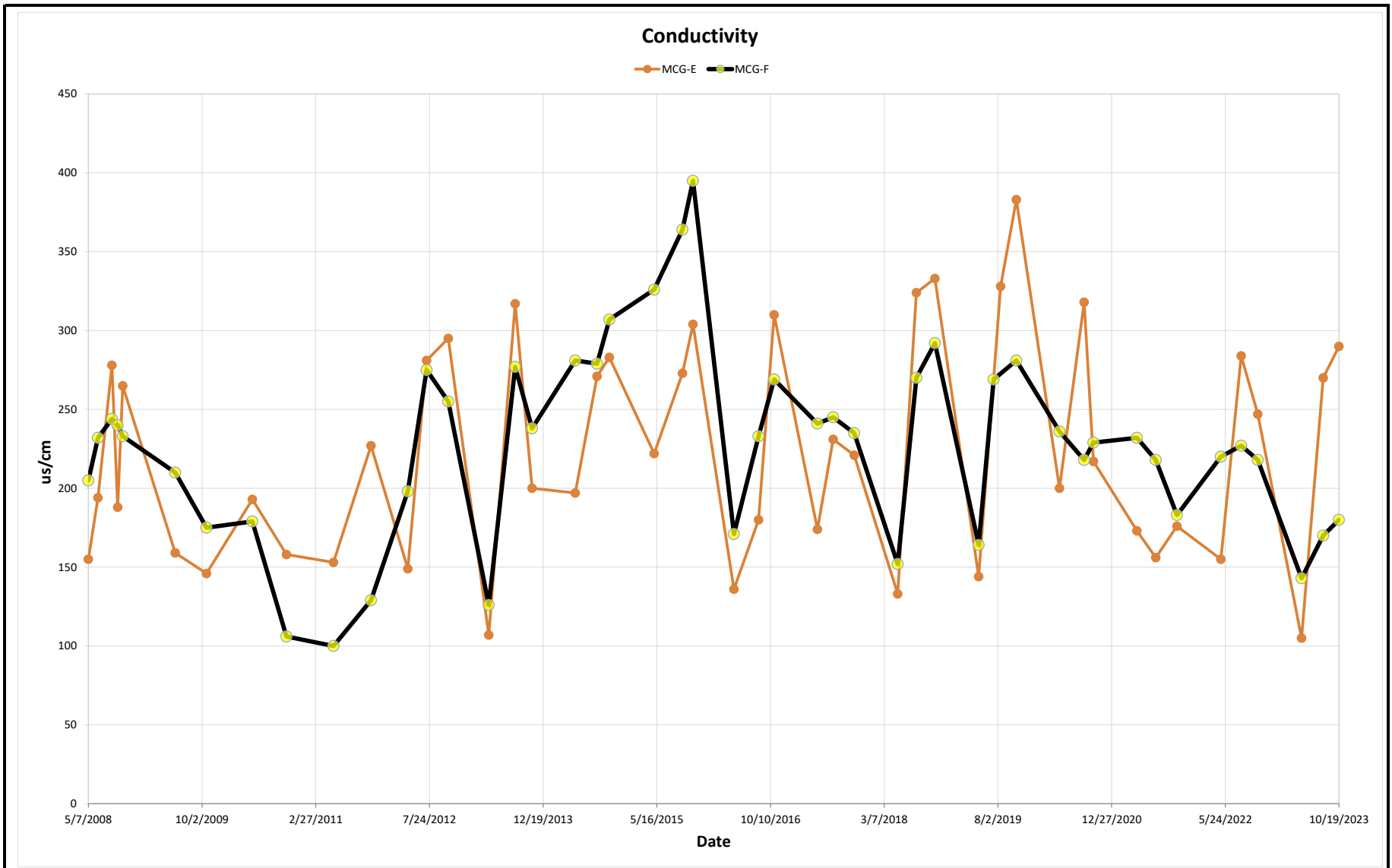
North Baptiste WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 17
Alkalinity in Selby Creek

Created by: LH
Checked by: SS





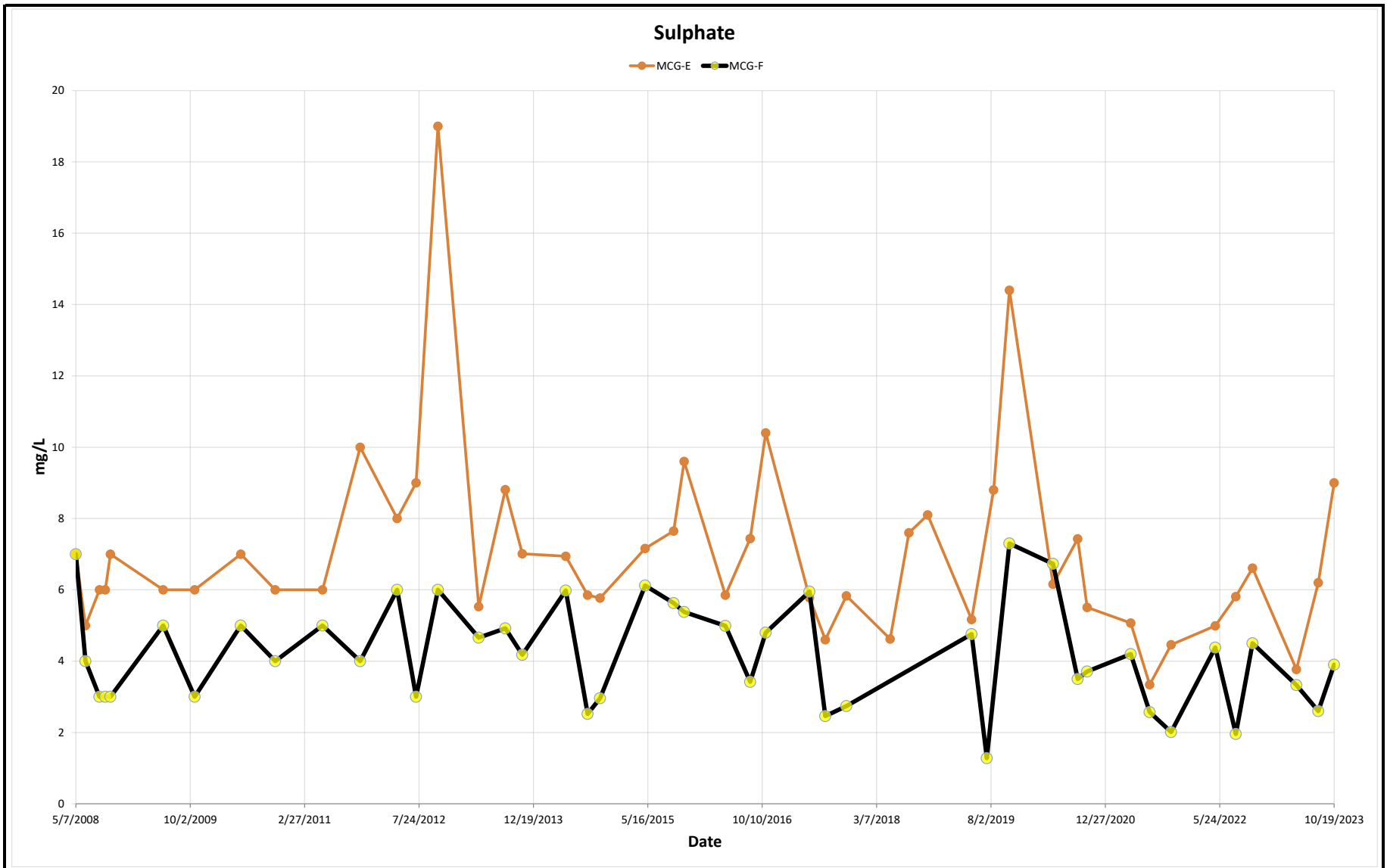
North Baptiste WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 18
Conductivity in Selby Creek

Created by: LH
Checked by: SS





North Baptiste WDS
Municipality of Hasting's Highlands

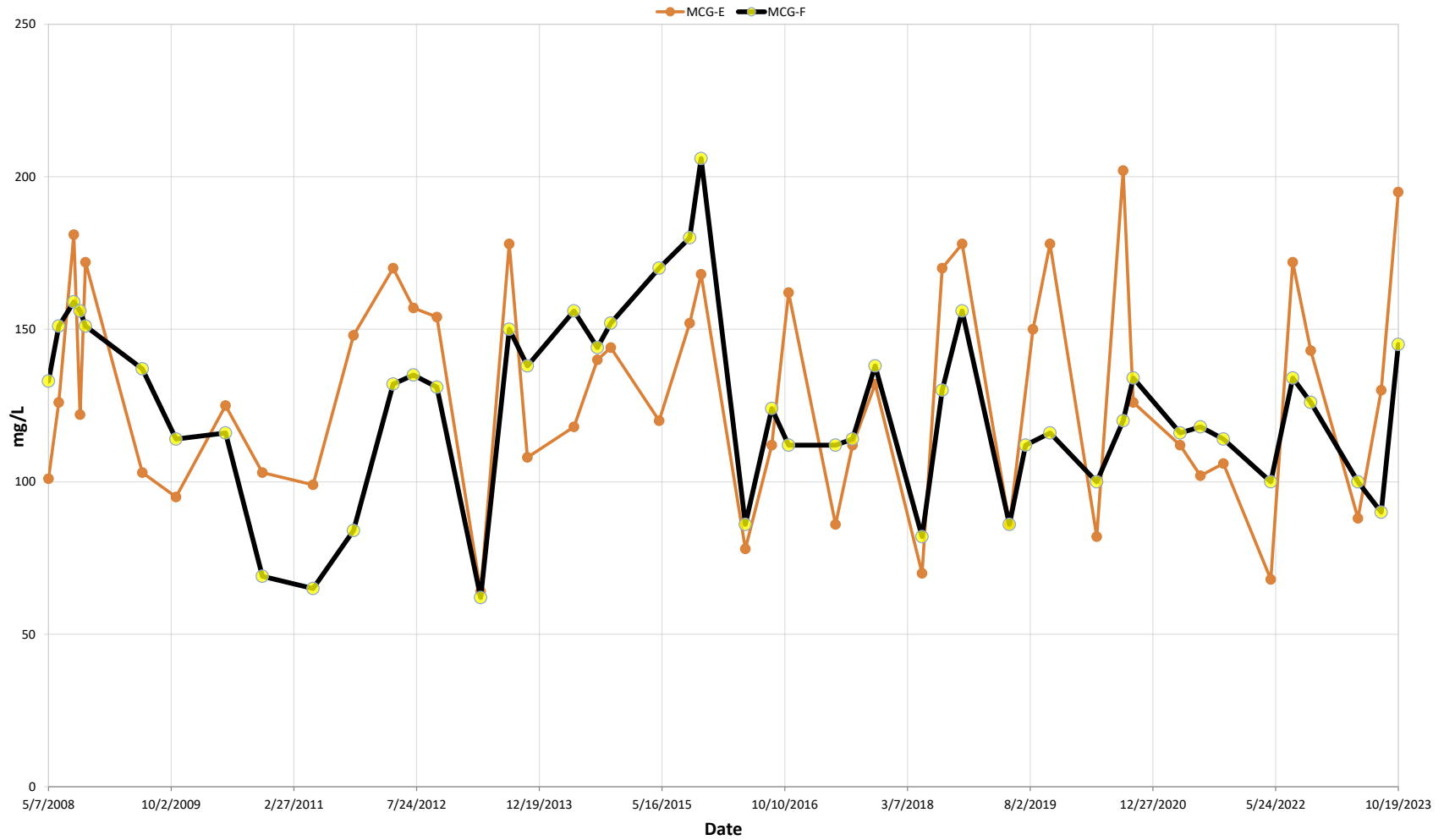
BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 19
Sulphate in Selby Creek

Created by: LH
Checked by: SS



Total Dissolved Solids



North Baptiste WDS
Municipality of Hasting's Highlands

BluMetric Proj No: 230225-08
Date: February 14, 2024

Graph 20
Total Dissolved Solids in Selby Creek

Created by: LH
Checked by: SS



Appendix A

Environmental Compliance Approval

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A361603

Issue Date: January 30, 2020

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

Site Location: North Baptiste Waste Transfer Site (formerly North Baptiste Waste Disposal Site)
353 North Baptiste Rd (Lot 3, Concession 10, former Herschel Township)
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:

for the use and operation of a waste transfer station on a 0.69 hectare closed landfill within a 3.207 hectare total Site area.

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

Definitions

- (a) "**Buffer**" means those lands between the limit of fill and the boundaries of the property owned by the *Owner*, that shall in no instance be less than 30 metres;
- (b) "**Director**" means the one or more persons who from time to time are so designated for the purpose of Part V of the Environmental Protection Act, R.S.O. 1990, as amended from time to time;
- (c) "**District Manager**" means the Manager of the Belleville District Office, Ministry of the Environment, Conservation and Parks;
- (d) "**ECA**" means this Environmental Compliance Approval No. A361603 as amended from time to time and all Schedules attached to and forming part of this *ECA*;
- (e) "**EPA**" means the Environmental Protection Act, R.S.O. 1990, as amended;

- (f) "**Limit of Fill**" means the area in which waste is approved for final disposal according to this *ECA*;
- (g) "**Ministry**" or "**MECP**" means the Ontario Ministry of the Environment, Conservation and Parks;
- (h) "**ODWS**" means the Ontario Drinking Water Standards, as amended from time to time;
- (i) "**Ontario Regulation 189**" means Ontario Regulation 189/94, Refrigerants, or as amended, made under the *EPA*; and
- (j) "**Ontario Regulation 347**" means Ontario Regulation 347 of Revised Regulations of Ontario, 1990 (General - Waste Management), made under the *EPA*, as amended.
- (k) "**Owner**" means The Corporation of the Municipality of Hastings Highlands, the party having charge, management or control of the *Site*, rather than the ownership of the *Site*;
- (l) "**OWRA**" means the Ontario Water Resources Act, R.S.O. 1990, c.0.40, as amended;
- (m) "**PWQO**" means the 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;
- (n) "**Regional Director**" means the Director, Eastern Region, Ministry of the Environment, Conservation and Parks;
- (o) "**RUP**" means the Reasonable Use Policy (Guideline B-7) of the Ministry of the Environment, Conservation and Parks;
- (p) "**Site**" means the property known as North Baptiste Waste Transfer Site (formerly North Baptiste Waste Disposal Site), 353 North Baptiste Rd (Lot 3, Concession 10, former Herschel Township) Hastings Highlands Municipality, County of Hastings, and described in this *ECA*.
- (q) "**white goods which contain refrigerants**" means white goods which contain, or may contain refrigerants, and which include, but is not restricted to, refrigerators, freezers and air-conditioning systems; and
- (r) "**Regulation 232**" means Ontario Regulation 232/98 (New Landfill Standards) made under the *EPA*, as amended from time to time.

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

TERMS AND CONDITIONS

General

1. This *ECA* supersedes and replaces Provisional Certificate Number A361603 issued on January 18, 2001;

and as amended.

2. Except as otherwise provided by these Conditions, the *Site* shall be designed, developed, used, maintained and operated, and all facilities, equipment and fixtures shall be built and or installed in accordance with the Application for a Certificate of Approval for a Waste Disposal Site dated October 27, 1996, and supporting documentation, and plans and specifications listed in Schedule "A".
 3. The requirements specified in this *ECA* are requirements under the *Act*. Issuance of this *ECA* in no way abrogates the *Owner's* legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.
 4. The requirements of this *ECA* are severable. If any requirements of this *ECA*, or the application of any requirement of this *ECA* to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this *ECA* shall not be affected in any way.
 5. The *Owner* must ensure compliance with all terms and conditions of this *ECA*. Any non-compliance constitutes a violation of the *Act* and is grounds for enforcement.
 6. (a) The *Owner* shall, forthwith upon request of the *Director, District Manager,* or Provincial Officer (as defined in the *Act*), furnish any information requested by such persons with respect to compliance with this *ECA*, including but not limited to, any records required to be kept under this *ECA*; and

(b) In the event the *Owner* provides the *Ministry* with information, records, documentation or notification in accordance with this *ECA* (for the purposes of this condition referred to as "Information"),
 - (i) the receipt of Information by the *Ministry*;
 - (ii) the acceptance by the *Ministry* of the Information's completeness or accuracy; or
 - (iii) the failure of the *Ministry* to prosecute the *Owner*, or to require the *Owner* to take any action, under this *ECA* or any statute or regulation in relation to the Information;shall not be construed as an approval, excuse or justification by the *Ministry* of any act of omission of the *Owner* relating to the Information, amounting to non-compliance with this *ECA* or any statute or regulation.
7. The *Owner* shall allow *Ministry* personnel, or a *Ministry* authorized representative(s), upon presentation of credentials, to:
 - (a) carry out any and all inspections authorized by Section 156, 157 or 158 of the Act, Section 15, 16 or 17 of the **Ontario Water Resources Act**, R.S.O. 1990, or Section 19 or 20 of the **Pesticides Act**, R.S.O. 1990, as amended from time to time, of any place to which this *ECA* relates; and,
 - (b) without restricting the generality of the foregoing, to:
 - (i) enter upon the premises where records required by the conditions of this *ECA* are kept;
 - (ii) have access to and copy, at reasonable times, any records required by the conditions of this *ECA*;
 - (iii) inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this *ECA*; and

- (iv) sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this *ECA*.
- 8. Where there is a conflict between a provision of any document referred to in Schedule “A”, and the conditions of this *ECA*, the conditions in this *ECA* shall take precedence. Where there is a conflict between the documents listed in Schedule “A”, the document bearing the most recent date shall prevail.
- 9. Any information relating to this *ECA* 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*, R.S.O. 1990, C. F-31.
- 10. All records and monitoring data required by the conditions of this *ECA* must be kept on the *Owner’s* premises for a minimum period of five (5) years from the date of their creation.

Certificate of Prohibition / Registration on Title

- 11. The *Owner* shall, if not previously completed:
 - (a) within sixty (60) calendar days issuance of this *ECA*, submit to the *Director* for the *Director’s* signature, two (2) copies of a completed Certificate of Prohibition containing a registerable description of the *Site*, in accordance with Form 1 of O. Reg. 14/92 (Document General - Form 4 - *Land Registration Reform Act*); and
 - (b) within ten (10) calendar days of receiving the Certificate of Prohibition signed by the *Director*, register the Certificate of Prohibition in the appropriate Land Registry Office on title to the *Site* and submit to the *Director* immediately following registration the duplicate registered copy.

Transferral or Encumbrance of Site

- 12. Pursuant to Section 197 of the *EPA*, neither the *Owner* nor any person having an interest in the *Site* shall deal with the *Site* in any way without first giving a copy of this *ECA* to each person acquiring an interest in the *Site* as a result of the dealing.
- 13. 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 in writing and is satisfied with the arrangements made to ensure that all terms and conditions of this *ECA* will be carried out and sufficient financial assurance (*EPA*, Part XII) is deposited with the *Ministry*, if requested by the *Director*, to ensure that these terms and conditions will be carried out.

Notification

- 14. The *Owner* shall ensure that all communications/correspondence made pursuant to this *ECA* No. A361603.
- 15. The *Owner* shall notify the *District Manager* in writing within thirty (30) days of becoming aware of any of the following changes:

- (i) change of *Owner /Operator* of the *Site* or both: and
- (ii) address of the new *Owner* or change of address.

Service Area and Landfill Waste

- 16. Wastes generated only from within the geographic boundaries of the Municipality of Hastings Highlands may be received for disposal at this *Site*. No waste shall be received for disposal at this *Site* from outside the approved service area.
- 17. The final approved volumetric capacity of the landfill at the *Site*, excluding final cover, is 12,040 cubic metres.
- 18. (a) No waste may be placed in the landfill at the *Site* and the landfill shall be closed as described in Condition 43; and
- (b) The *Site* shall be designed and operated as a waste transfer station with recycling operations as described in Conditions 19 and 20.

Recycling Operation

- 19. The operation of the *Site* for acceptance and storage of recyclable waste and subsequent transfer of such wastes by approved carriers for processing elsewhere shall be in accordance with the following:
 - (a) The *Owner* shall notify the *District Manager*, in writing, of any change in the operation or its termination within 30 days of the change occurring;
 - (b) The *Site* shall only accept recyclable material as identified in Table 3 of the Waste Transfer Station Design and Operations Plan, Item 19 of Schedule "A";
 - (c) Source separated waste materials shall be stored in covered containers and stored in a manner to prevent off-site impacts and which minimizes the impacts on the environment and the public;
 - (d) The *Operator* shall ensure that recycling operation is managed in a manner which minimizes the impacts of vermin, vectors, dust, odour, noise and traffic on the environment and the public;
 - (e) Except as otherwise specified by the *District Manager* in writing or in Table 3 of the Waste Transfer Station Design and Operations Plan, Item 19 of Schedule "A", wastes shall not be stored on *Site* for more than 8 weeks from the day of collection; and
 - (f) No wastes other than those listed in Condition 19 (b) and Condition 20 shall be collected and stored at the *Site* without an amendment to this *ECA*.

Waste Transfer Station

- 20. The *Owner* may accept, store and subsequently transfer waste at the *Site* in accordance with the following:
 - (a) The design, development, operation, and maintenance of the Waste Transfer Station at the *Site* shall be in accordance with the Waste Transfer Station Design and Operations Plan, as outlined in Item 19 of Schedule "A";
 - (b) The *Site* shall only accept, store and subsequently transfer waste as identified in Table 3 of the Waste Transfer Station Design and Operations Plan;
 - (c) The amount of waste that may be received at the *Site* shall not exceed the amounts identified in Table 3 of the Waste Transfer Station Design and Operations Plan, with a maximum of 6.0 metric

- tonnes per week and a total maximum of 200 metric tonnes of waste/recyclables per year; and
- (d) The *Owner* shall ensure that all waste is accepted, handled, and maintained in a manner which minimizes the impacts of vermin, vectors, dust, odour, noise and traffic on the environment and the public.

Operating Hours

21. The *Owner* shall set operational hours which provides an adequate level of service.
- (a) The hours of operation shall be any day of the week, during daylight hours. The *Owner* shall clearly post the hours of operation at the landfill gate.
- (b) The hours of operation may be changed with the approval of the *District Manager*, and provided that the hours are correctly posted at the landfill gate and that suitable public notice is given of any change. The *Director* shall be notified of the change with thirty days of such change.
22. No waste shall be received for disposal at the *Site* except during the hours of operation and under the supervision of an attendant.
23. The *Owner* shall ensure that during non-operating hours, the *Site* entrance and exit gates are locked or otherwise secured against access by unauthorized persons.
24. During non-operating hours, the *Owner* may conduct equipment maintenance, administrative functions and on-site activity other than waste disposal as required.

Signage and Security

25. A sign shall be posted at the entrance gate of the *Site* with the following information:
- (a) Name of the *Site* and *Owner*;
- (b) *ECA* Number for the *Site*;
- (c) Days and hours of operation;
- (d) Allowable and prohibited waste types;
- (e) Contact telephone number(s); and
- (f) Warning against unauthorized access and against dumping outside the *Site*.
26. The *Owner* shall ensure that:
- (a) access to the *Site* is restricted by fencing and/or natural features;
- (b) fencing and lockable gate are kept in good repair; and
- (c) the *Site* is screened from public view on all sides.

Burning At the Site

27. The *Owner* shall ensure that:
- (a) no waste other than segregated brush, lumber and clean wood is burned at this Site;
- (b) burning is conducted in accordance with the Ministry of Environment "*Guidance Manual for Landfill Sites Receiving Municipal Waste*", dated 1993;

- (c) access to the burning area by the public and other unauthorized personnel is prohibited when burning is carried out; and
- (d) no burning is to occur without the supervision of the attendant.

Nuisance Control

- 28. If at any time problems such as odours, dust, litter, noise, vectors, vermin, rodents, bears or other nuisances are found at the *Site*, the *Owner* shall take appropriate, immediate remedial action to eliminate the problem.
- 29. The *Owner* shall implement a litter control plan which shall include:
 - (a) taking all practical steps to prevent the escape of litter from the *Site*;
 - (b) litter pick-up at the *Site* during each operating day; and
 - (c) monthly litter pick-up along the access road in the vicinity of the *Site*.

Inspections

- 30. The *Owner* shall conduct regular inspections of the *Site* to ensure the landfill cap, all waste transfer operations, monitoring wells, and all aspects of the *Site* are maintained in a manner which minimizes the impacts on the environment and the public.

Staff Training

- 31. The *Owner* shall develop and maintain a training plan for current and new *Site* operations employees and shall ensure that all *Site* operations employees have been adequately trained and receive on-going training with respect to the following:
 - (a) terms, conditions and operating requirements of this *ECA*;
 - (b) the operation, inspection, and maintenance of the *Site* with respect to the approved design and operations documents;
 - (c) record keeping requirements;
 - (d) relevant waste management legislation and regulations;
 - (e) environmental concerns related to waste management at the *Site*;
 - (f) occupational health and safety concerns related to waste management at the *Site*; and
 - (g) emergency procedures and contingency plans in cases of fire, spills, off-site impacts and any other emergency situations.

Complaints

- 32. 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 each complaint on a formal complaint form entered in a log book. The information recorded shall include the nature of the complaint, the name, address and telephone number of the complainant and the time and date of the complaint;
 - (b) The *Owner*, upon notification of the complaint, shall initiate appropriate steps to determine all 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 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 reoccurrence of similar incidents.

Record Keeping

33. The *Owner* shall record the following information with respect to all wastes received at the Site:
- (a) date of record;
 - (b) number of deliveries and types of materials received;
 - (c) quantities and destinations of waste shipped from the *Site*;
 - (d) results of the inspection required under Condition 30; and
 - (e) any accidents, injuries, spills, leaks, other upsets or complaints received.

Spill Reporting

34. The *Owner* shall promptly take all necessary steps to contain and clean up any spills which result from the operation of the *Site*. All spills and upsets shall be immediately reported to the *Ministry* 's Spills Action Centre at (416) 325-3000 or 1-800-268-6060 and shall be recorded in a written log or an electronic file format, referred to in Condition 35 of this *ECA*, as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences.
35. Within three (3) days of any spill or incident that occurs at the *Site*, the *Owner* shall submit to the *District Manager* a written report outlining the nature of the incident, remedial measures taken and measures taken to prevent potential future occurrences.

Monitoring Plan

36. The *Owner* shall retain qualified professionals to conduct groundwater and surface water monitoring as per Schedule "B" , and as modified by the *District Manager*.
37. (a) All monitoring wells which form part of any monitoring program shall be protected from damage.
(b) Any groundwater monitoring wells that are damaged shall be repaired, replaced forthwith or properly abandoned.

Trigger Mechanisms and Contingency Plans

38. The *Owner* shall review all surface water and groundwater quality monitoring results to the trigger parameter concentrations outlined in the Trigger Mechanisms and Contingency Plan, identified as Item 20 in Schedule "A". If these trigger parameter concentrations are reached then the outlined contingencies within the Trigger Mechanisms and Contingency Plan shall be implemented.

Annual Report

39. No later than March 31 of each year, the *Owner* shall submit to the *District Manager* an Annual Report on

the development, operation and monitoring of the *Site* for the preceding calendar year.

40. The Annual Report shall, as a minimum, include the following elements:
- (a) Executive Summary
 - (b) Site Operations
 - i) A report on the types and volumes of waste that are received and transferred from the *Site*;
 - ii) A summary of complaints regarding *Site* operations and the *Owner's* response;
 - iii) An assessment as to whether or not the *Owner* is operating the *Site* in compliance with the Conditions of this *ECA*;
 - (c) Environmental Quality Monitoring
 - i) An analysis and interpretation of surface water and groundwater monitoring data;
 - ii) An assessment of surface water quality at the *Site* boundaries with respect to PWQO, and groundwater quality with respect to RUP; and
 - iii) An assessment of the adequacy of the natural attenuation of leachate generated by the *Site*.
 - (d) Recommendations
 - i) Recommendations on any proposed changes to surface water or groundwater monitoring programs or any repairs required to the monitoring well network.
 - ii) Recommendations on any proposed changes to the waste transfer operation.
 - iii) Recommendations on the requirement for any remedial works or contingency actions based on the monitoring results or *Site* operations.
41. The monitoring program may be altered by obtaining the written consent of the *District Manager* prior to these changes being made.
42. In the event that the results of the monitoring program are such that an off-site exceedance of the RUP, ODWS or PWQO can reasonably be predicted to occur, the *Owner* shall include in the annual report:
- a) the details of any such predicted off-site exceedance, including the assumptions upon which the prediction is based;
 - b) a discussion of the modifications, if any, to intended operations which would be necessary to prevent the predicted off-site exceedance;
 - c) a discussion of the modifications, if any, which should be made to the monitoring program; and
 - d) a discussion of other mitigation measures or contingency actions, if any, which may be necessary to prevent off-site impacts.

Site Closure

43. The landfill shall be closed in accordance with the Closure Plan Report and New Proposed Implementation Schedule of Items 17 and 18 of Schedule "A", respectively.
44. The *Owner* must submit, for approval by the *Director*, a written Closure Plan for the *Site* one (1) year prior to the closure of the waste transfer station at the *Site*. This plan must include, as a minimum, a description of the work that will be done to facilitate closure of the *Site*, monitoring and long term maintenance of the *Site*.
45. Within thirty (30) days after closure of the *Site*, the *Owner* must notify the *District Manager*, in writing,

that the *Site* has been closed in accordance with the approved Closure Plan.

Schedule "A"

This Schedule "A" forms part of Provisional Certificate of Approval No. A361603:

1. Application and supporting information for Approval of a Waste Disposal Site to amend a Certificate of Approval for a Waste Disposal Site, dated October 27, 1996 and signed by Mrs. E. Dafoe, Clerk-Treasurer, the Corporation of the Township of Herschel.
2. Letter from Mrs. Erma Dafoe, Clerk-Treasurer, Municipality of Herschel to MOE, dated October 27, 1996, Re: Township of Herschel, McGarry (North) Waste Disposal Site, Provisional Certificate of Approval No. A361603.
3. Document titled "The Corporation of the Township of Herschel, McGarry (North) Waste Disposal Site, Provisional Certificate of Approval No. A361603, Site Development Plan, Capacity and Operations Report", dated September 1996 and prepared by the Greer Galloway Group Inc. Engineers and Planners.
4. Memo from Myron Zurawsky MOE to Jim Mulder, MOE, dated January 29, 1997, Re: Baptiste Lake North Road Waste Disposal Site (a.k.a. "McGarry (North) Waste Disposal site"), Amendment to Provisional C/A #A361603, Herschel Twp., Lot 3, Concession 10.
5. Memo from Ross Cholmondeley, MOE to Jim Mulder, MOE, January 17, 1997, Re: McGarry (North) Waste Disposal Site, Site Development Plan, Capacity and Operations Report, Provisional Certificate of Approval No. A361603.
6. Fax Cover Sheet and its attachment from Jim Mulder, MOE to J. S. Rybak, the Greer Galloway Group Inc., dated September 18, 1997, Client/Matter: Twp. of Herschel, Baptiste and McGarry Landfill Site application.
7. Facsimile and its attachment from Mohsen Keyvani, MOE to Steve Clark, Greer Galloway Group Inc., dated February 7, 2000.
8. Facsimile and its attachment from Mohsen Keyvani, MOE to Erma Dafoe, Clerk-Treasurer, Municipality of Herschel, dated March 16, 2000.
9. Letter from Erma Dafoe, Clerk-Treasurer, Municipality of Herschel to Mohsen Keyvani, MOE, dated April 5, 2000, Re: Baptiste and McGarry Waste Disposal Site, Township of Herschel.
10. Letter from Steve Clark, Greer Galloway Group Inc. to Mohsen Keyvani, MOE, dated April 12, 2000, Re: Baptiste and McGarry Waste Disposal Sites, GGG Project No. 00-1-5313.
11. Letter from Mohsen Keyvani, MOE to Erma Dafoe, Clerk-Treasurer, Municipality of Herschel, dated May 3, 2000, Re: Amendment to Provisional Certificate of Approval, No. A361602, Baptiste Lake

South Road Landfill Site, Located at Lot 28, Concession 4, and No. A361603, McGarry Landfill Site, Located at Part of Lot 3, Concession 10, Township of Herschel, County of Hastings.

12. Letter and its attachment from Steve Clarke, Greer Galloway Group Inc. to Mohsen Keyvani, MOE, dated May 31, 2000, Re: Amendment to the Provisional Certificate of Approvals: No. A361602, Baptiste Lake South Road Landfill Site, Located at Lot 28, Concession 4, and No. A361603, McGarry Landfill Site, Located at Part of Lot 3, Concession 10; Township of Herschel, County of Hastings.
13. Memo from Dana Cruikshank, MOE to Mohsen Keyvani, MOE, dated July 26, 2000, Re: McGarry Waste Disposal Sites, Interim Review Surface Water Sampling, Provisional Certificate of Approval No. A361603.
14. Letter from Steve Clark, the Greer Galloway Group Inc. to Mohsen Keyvani, MOE, dated October 17, 2000, Re: Response to Draft Certificate of Approvals: No. A361602, Baptiste Lake South Road Landfill Site; No. A361603, McGarry Landfill Site; GG Project 00-1- 5313.
15. Letter from Steve Clark, Greer Galloway Group Inc. to Mohsen Keyvani, MOE, dated December 21, 2000, Re: No. 361602, Baptiste Lake South Road Landfill site; No. A361603, McGarry Landfill Site; GGG Project No. 00- 1-5313.
16. Facsimile copy of letter from Mrs. Erma Dafoe, Deputy Clerk-Treasurer for Hastings Highlands to Mohsen Keyvani, MOE, dated January 8, 2001, re: amalgamation of the Township of Herschel.
17. Report titled "North Baptiste Road Waste Disposal Site Closure Plan" prepared by BluMetric Environmental Inc. Signed and sealed on October 3, 2016.
18. Letter from Iris O'Connor, BluMetric Environmental Inc. to Ministry of the Environment and Climate Change. Subject: ECA Amendment A361603 - North Baptiste Waste Disposal Site, MOECC Reference Number 2473-AETQAK, and dated October 20, 2016.
19. Report titled "North Baptiste Lake Waste Transfer Station Design and Operations Plan" prepared by BluMetric Environmental Inc. Signed and sealed on October 3, 2016.
20. Trigger Mechanisms and Contingency Plan prepared by BluMetric Environmental Inc. January 28, 2020.
21. Closure Report for North Baptiste Waste Disposal Site (WDS), prepared by BluMetric Environmental Inc. December 11, 2018.

Schedule "B"

This Schedule "B" forms part of Provisional Certificate of Approval No. A361603:

Groundwater Monitoring:

Locations: NB-MW1, NB-MW2R, NB-MW3, NB-MW4, and NB-MW5R

Monitoring: Groundwater sampling and field measurements for groundwater elevation, pH, temperature, and conductivity.

Parameters: Alkalinity, Chloride, Nitrite, Nitrate, Sulphate, Phosphorous (total), Total Kjeldahl Nitrogen (TKN), Ammonia (N)-Total, Dissolved Organic Carbon (DOC), Calcium, Aluminum, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Silicon, Silver, Strontium, Thallium, Titanium, Vanadium, Sodium, Zinc, Lead, Chemical Oxygen Demand (COD), Phenols, pH, Conductivity, Total Dissolved Solids (TDS), TSS, Hardness, Turbidity, Selenium.

Frequency: Groundwater monitoring shall be conducted on a semi-annual basis.

Surface Water Monitoring:

Locations: MCG-A2, MCG-B, MCG-C, MCG-D, MCG-E, MCG-F, MCG-G, and MCG-H

Monitoring: Surface water sampling and field measurements for surface water flow measurements, temperature, pH, conductivity, and dissolved oxygen measurements.

Parameters: Alkalinity, Chloride, Nitrite, Nitrate, Sulphate, Phosphorous (total), Total Kjeldahl Nitrogen (TKN), Ammonia (N)-Total, Un-Ionized Ammonia, Hardness, Calcium, Aluminum, Arsenic, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Magnesium, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Zinc, Lead, Phenols, Biochemical Oxygen Demand (BOD5), pH, Conductivity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Colour, Turbidity.

Frequency: Sampling events shall be conducted each spring, summer, and fall.

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

- 1. The reason for Condition 1 is to clarify that all previous Certificates of Approval are null and void and that the Owner is obligated by the Terms and Conditions of this Certificate only.*
- 2. The reason for Condition 2 is to ensure that this Waste Disposal Site is operated in accordance with the application submitted by the Owner, and not in a manner which the Director has not been asked to consider.*
- 3. The reason for Conditions 3, 4, 5, 8, 9, 10, 13, 14 and 15 is to clarify the legal responsibilities and obligations imposed by this Provisional Certificate of Approval.*
- 4. The reason for Conditions 11 and 12 is to protect future occupants of the site and the environment from any hazards which might occur as a result of waste being disposed of on the site. This prohibition and potential hazard should be drawn to the attention of future owners and occupants by the Certificate being registered on title.*
- 5. The reason for Conditions 6 and 7 is to ensure that appropriate Ministry staff have ready access to the system in order to confirm that the system is being operated according to this Provisional Certificate of Approval. The condition is supplementary to the powers afforded a Provincial Officer pursuant to the Environmental Protection Act, the Ontario Water Resources Act, and the Pesticides Act, as amended.*
- 6. The reason for Conditions 16 is to specify the approved areas from which waste may be accepted at the site.*
- 7. Condition 17 is to state the approved maximum landfill capacity.*
- 8. The reason for Conditions 18, 43, 44, and 45 are to state that the landfill is closed and the manner in which it shall be closed as well to ensure that the waste transfer portion of the Site is closed in accordance with MOE standards and to protect the health and safety of the environment.*
- 9. The reason for Condition 19 is to ensure the Site's recycling depot is operated in a manner which promotes efficient separation of recyclable wastes.*
- 10. The reason for Condition 20 is to specify which waste and amounts that may be accepted at the waste transfer site, based on the application and the supporting documentation.*
- 11. The reason for Conditions 21 through 26 are to minimize the risk of unauthorized entry and to ensure the Site is only operated in the presence of trained personnel and to ensure proper management of waste.*
- 12. Conditions 27, 28, 29, and 30 are included to ensure that efficient and environmentally sound procedures are employed during the operation of the landfill site.*
- 13. Condition 31 is included to ensure that the Owner properly trained the staff operating the site to ensure that the operations are undertaken in accordance with the requirements of this Certificate.*

14. *The reason for Condition 32 is to ensure that complaints are properly and quickly resolved and that complaints and follow-up actions have been documented.*

15. *Condition 33 is included to ensure that the Owner accurately estimates the amount of waste brought to the Site so that compliance with this Certificate can be verified.*

16. *The reason for Conditions 34, and 35 is to ensure that staff are properly trained in the operation of the equipment used at the Site and emergency response procedures. This will minimize the possibility of spills occurring and will enable staff to deal promptly and effectively with any spills that do occur.*

17. *Conditions 36, 37, and 38 are included to require the Owner to undertake the monitoring activities in accordance with the methods acceptable to the Ministry, in order to demonstrate that the Site impacts on the natural environment are acceptable.*

18. *Conditions 39 through 42 are included to ensure that regular review of Site development, operations and monitoring is documented and any possible improvements to site design, operations or monitoring programs are identified.*

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A361603 issued on January 18, 2001

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review 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 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:

The Secretary*

The Director appointed for the purposes of Part II.1 of

Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

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 Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.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 30th day of January, 2020



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

CM/

c: Area Manager, MECP Belleville
c: District Manager, MECP Kingston - District
Iris O'Connor, BluMetric 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	North Baptiste
Location (e.g. street address, lot, concession)	Part of Lot 3, Concession 10
GPS Location (taken within the property boundary at front gate/ front entry)	Zone 18, 269934 E, 5006428 N
Municipality	Municipality of Hasting Highlands (formerly Twp. of Herschel)
Client and/or Site Owner	The Corporation of Hasting Highlands
Monitoring Period (Year)	2023
This Monitoring Report is being submitted under the following:	
Environmental Compliance Approval Number:	A361603
Director's Order No.:	
Provincial Officer's Order No.:	
Other:	

Report Submission Frequency	<input checked="" type="radio"/> Annual <input type="radio"/> Other	Submitted to the MECP by March 31st.	
The site is: (Operation Status)	<input type="radio"/> Open <input type="radio"/> Inactive <input checked="" type="radio"/> Closed		
Does your Site have a Total Approved Capacity?	<input checked="" type="radio"/> Yes <input type="radio"/> No		
If yes, please specify Total Approved Capacity	12,040	Units	Cubic Metres
Does your Site have a Maximum Approved Fill Rate?	<input type="radio"/> Yes <input checked="" type="radio"/> No		
If yes, please specify Maximum Approved Fill Rate		Units	
Total Waste Received within Monitoring Period (Year)	169.4	Units	Tonnes
Total Waste Received within Monitoring Period (Year) <i>Methodology</i>	Estimation		
Estimated Remaining Capacity	0	Units	Cubic Metres
Estimated Remaining Capacity <i>Methodology</i>			
Estimated Remaining Capacity <i>Date Last Determined</i>			
Non-Hazardous Approved Waste Types	<input checked="" type="checkbox"/> Domestic <input checked="" type="checkbox"/> Industrial, Commercial & Institutional (IC&I) <input checked="" type="checkbox"/> Source Separated Organics (Green Bin) <input checked="" type="checkbox"/> Tires	<input checked="" type="checkbox"/> Contaminated Soil <input checked="" type="checkbox"/> Wood Waste <input checked="" type="checkbox"/> Blue Box Material <input type="checkbox"/> Processed Organics <input type="checkbox"/> Leaf and Yard Waste	<input type="checkbox"/> Food Processing/Preparation Operations Waste <input type="checkbox"/> Hauled Sewage Other: <input type="text"/>
Subject Waste Approved Waste Classes: Hazardous & Liquid Industrial <i>(separate waste classes by comma)</i>			
Year Site Opened <i>(enter the Calendar Year <u>only</u>)</i>	1968	Current ECA Issue Date	30-Jan-2020
Is your Site required to submit Financial Assurance?	<input type="radio"/> Yes <input checked="" type="radio"/> No		
Describe how your Landfill is designed.	<input checked="" type="radio"/> Natural Attenuation only <input type="radio"/> Fully engineered Facility <input type="radio"/> Partially engineered Facility		
Does your Site have an approved Contaminant Attenuation Zone?	<input type="radio"/> Yes <input checked="" type="radio"/> No		

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

11-Dec-2018

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:

<p>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:</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	
<p>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):</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable</p>	<p>If no, list exceptions below or attach information.</p>

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?	<input checked="" type="radio"/> Yes <input type="radio"/> No
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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?	<input type="radio"/> Yes <input checked="" type="radio"/> No
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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:	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable	If no, list exceptions below or attach additional information.
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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):	<input checked="" type="radio"/> Yes <input type="radio"/> No	
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Sampling and Monitoring Program Results/WDS Conditions and Assessment:

<p>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.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Final Trigger Mechanisms and Contingency Plan put in place in 2020.</p>	
<p>6) The site meets compliance and assessment criteria.</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>NB-MW3 and NB-MW5R exceeded the RUV for manganese in 2023, however, both wells are not located at the property boundary.</p>	
<p>7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Groundwater results at the Site have generally either remained consistent or have decreased, with the exception of an increasing trend of chloride, conductivity, TDS, and sulphate at NB-MW3.</p>	
<p>1) Is one or more of the following risk reduction practices in place at the site:</p> <p>(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</p> <p>(b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or</p> <p>(c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation):</p> <p><i>i.</i> The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and</p> <p><i>ii.</i> Seasonal and annual water levels and water quality fluctuations are well understood.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Note which practice(s):</p>	<p><input type="checkbox"/> (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (c)</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable</p>	<p>The Contingency Plan was triggered during the spring 2023 sampling event at NB-MW5R. Tier 1 contingency sampling was completed shortly after the exceedance and the results did not require escalation to Tier 2 contingency sampling.</p>	

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:

<p><input type="radio"/> No changes to the monitoring program are recommended</p> <p><input checked="" type="radio"/> The following change(s) to the monitoring program is/are recommended:</p>	<p>The SW technical reviewer suggested that parameters could be removed from the analyses list. We have suggested that a select number of metals be removed as identified in this and previous reports. Waiting for confirmation from MECP.</p> <p>The SW Technical reviewer suggested that a leachate indicator well be installed. We have suggested that NB-MW3 continue to be used as the leachate well for the east and NB-MW5R be used as the leachate well for the south. Discussions to be held with the MECP.</p>
<p><input type="radio"/> No Changes to site design and operation are recommended</p> <p><input checked="" type="radio"/> The following change(s) to the site design and operation is/are recommended:</p>	<p>On-going maintenance of final cover and monitoring.</p>

Name:	S'rana Scholes, P.Eng.		
Seal:			
Signature:		Date:	25-Mar-2024
CEP Contact Information:			
Company:	BluMetric Environmental Inc.		
Address:	209 Frederick street, Kitchener, ON, N2H 2M7		
Telephone No.:	(877) 487-8436 ext. 218	Fax No. :	
E-mail Address:	sscholes@blumetric.ca		
Co-signers for additional expertise provided:			
Signature:		Date:	Select Date
Signature:		Date:	Select 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)	Wetland, Selby Creek, O'Shaughnessy Lake
Distance(s)	Eastern property boundary, 500 m, 2 km

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

Sampling and Monitoring Program Status:

<p>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:</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	
<p>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):</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No Not applicable (No C of A, authorizing / control document applies)</p>	<p>If no, specify below or provide details in an attachment.</p>

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
All locations	Surface water samples were not collected after a 10 mm storm event in the preceding 24 hours for the summer sampling event. 7 mm of rain preceded the sampling event.	9-Aug-2023
MCG-A and MCG-B	Dry in the summer and fall	09/08/23 and 19/10/23
All locations	Surface water samples were not collected after a 10 mm storm event in the preceding 24 hours for the summer sampling event. 0 mm of rain preceded the sampling event.	19-Oct-2023

<p>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.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable</p>	
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<p>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:</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable</p>	<p>If no, specify below or provide details in an attachment.</p>
--	---	--

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

<p>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):</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Not applicable</p>
--	---	-----------------------

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):	<input checked="" type="radio"/> Yes <input type="radio"/> 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
See attached document		

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)?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
--	--	--

<p>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.</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p>	<p>Parameter concentrations are generally within historical ranges.</p>
<p>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)):</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Not Known</p> <p><input type="radio"/> Not Applicable</p>	<p>All monitoring wells exceed the PWQO for Total phosphorus. NB-MW3, 4, and 5R should be closely monitored for increasing trends of leachate parameters.</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Not Applicable</p>	<p>See groundwater section</p>

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:

<p><input type="radio"/> No Changes to the monitoring program are recommended</p> <p><input checked="" type="radio"/> The following change(s) to the monitoring program is/are recommended:</p>	<p>The SW Technical reviewer suggested that a leachate indicator well be installed. We have suggested that NB-MW3 continue to be used as the leachate well for the east and NB-MW5R be used as the leachate well for the south. Discussions to be held with the MECP.</p>
<p><input checked="" type="radio"/> No changes to the site design and operation are recommended</p> <p><input type="radio"/> The following change(s) to the site design and operation is/are recommended:</p>	<p>On-going maintenance and monitoring.</p>

CEP Signature		
Relevant Discipline	Senior Environmental P.Eng. with 19 years experience assessing landfill SW at landfills. Hydrology a	
Date:	25-Mar-2024	
CEP Contact Information:		
Company:	BluMetric Environmental Inc.	
Address:	Unit 3B, 209 Frederick Street, Kitchener, ON, N2H 2M7	
Telephone No.:	877-487-8436 x218	
Fax No. :		
E-mail Address:	sscholes@blumetric.ca	
Save As		Print Form

Appendix C

Monitoring Well Logs

Well Log: Lithology & Construction

Well Ident NB
MW-1

Name

Drill. Method auger **Drill. Dates** Feb 2, 1996

X 1014 **Y** 1011 **Z** 99.72 **Meas. Pt. Elev.** 100.34

All measurements are in meters. Hole and casing diameters in inches.

Scales (1: xxx)

Water Level (m AMSL)
95.06

Vertical 50.0 **Horizontal**

Depth [m]	Hole	Annulus	Casing	Screen	Lithology	Elev. [m]
0.5		Bentonite seal 0.5			Possible granular fill? sample 1.0-1.2m	99.5
1						99
1.5						98.5
2						98
2.5		Native drill cuttings □			Br m-f sn, tr si, rare f (angular) clasts sample 1.8-2.0m sample 2.8-3.0m	97.5
3						97
3.5	4		2			96.5
4						96
4.5						85.5
5		Bentonite seal 4.66 5.26				95
5.5					Br m sa, sm si, tr gr (angular) clasts poss TILL, wet @ 5.03m sample 5.0-5.2	94.5
6		Sand				94
6.5						93.5
7						93
7.09		7.09	7.086	7.09		7.09
7.5	7.47				Refusal on presumed bedrock	7.47
8						92
8.5						91.5
						91

Well Log: Lithology & Construction

Well Ident **NB**
MW-2

Name

Drill. Method **auger**

Drill. Dates **February 2, 1996**

X **1104**

Y **1043**

Z **92.52**

Meas. Pt. Elev. **93.44**

All measurements are in meters. Hole and casing diameters in inches.

Scales (1:xxx)

Water Level (m AMSL)

92.38

Vertical

60.0

Horizontal

Depth [m]	Hole	Annulus	Casing	Screen	Lithology	Elev. [m]
		Bentonite seal				92
		0.5				
1		Native drill cuttings □			Muck, peat, organics, wet @ 0.6m	
		1.38				91
2		Bentonite seal	2			
		1.98				
				2.01		90
3		Sand			Grey-grn f-m sa, sm si, rare (angular) gravel clast sample 2.4-2.8m	
		3.81	3.506	3.51		89
4	4					
						88
5					Br si, tr m sa sample 4.5-4.75m	
						87
6					Br m-f sa, tr si poorly sorted occ. pebble sample 6.5-7.0m	
		Native drill cuttings □				86
7						
						85
8					Br m sa, sm si tr (angular) gravel dense, poss TILL, sample 8.4-8.5m	
						84
8	8.84	8.84				
						83
9					Refusal on presumed bedrock	
						83

Project No: 160238-08

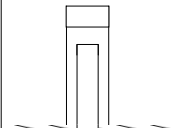
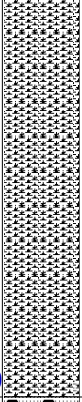
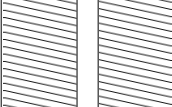
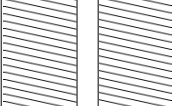
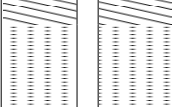
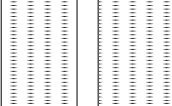
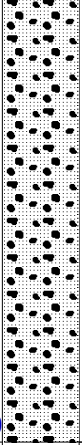
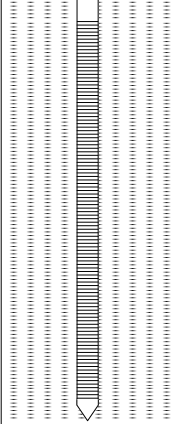
Log of Borehole: NB-MW2 R

Project: North Baptiste WDS

Client: Municipality of Hastings Highlands

Site Coordinates: Zone 18 T North 5006481 , East 270044

Field Personnel: B. M.

SUBSURFACE PROFILE				SAMPLE				WELL INSTALLATION	
Depth	Elevation	Symbol	Description	Number	Type	SPT N-Value	Recovery	Well Construction	Comments
ft m									
-1	394.32		Ground Surface						Steel locking protective cover and casing
			Black organic PEAT						PVC S/U - 0.75m
1									Bentonite Holeplug
3									51mm (2") I.D. Sch. 40 PVC pipe
5	392.79								#3 Silica sand pack
2			Brown, medium grain SAND with trace gravel. Wet to Saturated						10' Slot 10 PVC screen (2")
7									
9			MOE Well Tag A163243						
11	391.09		End of Borehole						

Drill Method: 8" Hollow Stem Auger

Ground Elevation: 394.316

Checked by:

Sheet: 1 of 1

Hole Size: 8" (205mm)

T.O.P.: 395.1 masl

Drill Date: January 6, 2016

Static WL:

Well Log: Lithology & Construction

Well Ident **NB**
MW-3

Name

Drill. Method

auger

Drill. Dates

February 2, 1996

X 1117

Y

980

Z

92.29

Meas. Pt. Elev.

93.12

All measurements are in meters. Elev and casing diameters in inches.

Scales (1: xxx)

Water Level (m AMSL)

92.28

Vertical

50.0

Horizontal

Depth [m]	Hole	Annulus	Casing	Screen	Lithology	Elev. [m]
0.5		Bentonite seal 0.3				92
1		Native drill cuttings □			Organic materials, wet @ 0.6m	91.5
1.5		1.7				91
2		Bentonite seal 2.34	2		Gr-grn f sa, sm si soft, sm organics uniform, sample 1.9-2.2m	90.5
2.5						90
3	4			2.64	Yellow-br f sa oxidized?, soft	89.5
3.5		Sand			Br m sa, occas pebble	89
4						88.5
4.5		4.14	4.14	4.14	Br f sa, sm si, loose occ (angular) pebble sample 4.0-4.25m	88
5		Native drill cuttings □			Br m sa, sm si, dr gr dense, poss TILL sample 4.9-5.2m	87.5
5.5	5.64	5.64				87
6					Refusal on presumed bedrock	86.5
6.5						86
7						85.5
7.5						85
8						84.5
8.5						84

Well Log: Lithology & Construction

Well Ident **NB**
MW-4

Name

Drill. Method

auger

Drill. Dates

February 2, 1996

X

1114

Y

943

Z

92.20

Meas. Pt. Elev.

92.95

All measurements are in meters. Hole and casing diameters in inches.

Scales (1: xxx)

Water Level (m AMSL)

92.15

Vertical

50.0

Horizontal

Depth [m]	Hole	Annulus	Casing	Screen	Lithology	Elev. [m]
0.5		Bentonite seal				92
		0.5				91.5
1					Organic materials, sandy, wet @ 0.6m	91
1.5						90.5
2		Native drill cuttings				90
					2.29	89.5
2.5	4		2			89
3						88.5
3.5		Bentonite seal				88
		3				88.5
4					Grey-green f sa, sm si loose, ooc pebble sample 2.4-2.75m	88
4.5						87.5
5		Sand				87
					4.57	86.5
5.5	5.40		5.444	5.44		86
		5.49				85.5
6					Br m sa, sm si fr gravel, dense poss TILL sample 4.75-5.0m	85
6.5						84.5
7					Refusal on presumed bedrock	84
					6.49	84
7.5						84.5
8						85
8.5						85.5

Well Log: Lithology & Construction

Well Ident **NB**
MW-5

Name

Drill. Method

auger

Drill. Dates

February 2, 1996

X

1078

Y

907

Z

93.17

Meas. Pt. Elev.

93.83

All measurements are in meters. Hole and casing diameters in inches.

Scales (1: xxx)

Water Level (m AMSL)

92.88

Vertical

60.0

Horizontal

Depth [m]	Hole	Annulus	Casing	Screen	Lithology	Elev. [m]
1		Bentonite seal 0.5			Yel-br m sa, tr si tr es (angular) gravel some organics, wet @ 1.2m sample 1.2-1.5m	93
2		Native drill cuttings □ 1.6				92
3		Bentonite seal 2.0	1.5	2.3	Br m - f sa & si v loose, occ (angular) pebble sample 2.75-3.0m	91
4		Sand			Br f - m sa, tr - sm gravel	90
5	4				Br m sa, sm si sm gravel or cobbles sample 4.2-4.6m	89
6			5.3	5.3	Br m sa, tr - sm gravel, hard	88
7		Native drill cuttings □			Br f sa, loose, occ pebble	87
8					Br c sa, with cobbles?	86
9					Br f sa, occ pebble dense, poss TILL sample 9.1-9.4m	85
10	9.451	9.45			Refusal on presumed bedrock	84
						83
						10.45

Project No: 160238-08

Log of Borehole: NB-MW5 R

Project: North Baptiste WDS

Client: Municipality of Hastings Highlands

Site Coordinates: Zone 18 T North 5006346 , East 270011

Field Personnel: B. M.

SUBSURFACE PROFILE				SAMPLE				WELL INSTALLATION	
Depth	Elevation	Symbol	Description	Number	Type	SPT N-Value	Recovery	Well Construction	Comments
-3									Steel locking protective cover and casing PVC S/U - 0.56m Bentonite Holeplug 51mm (2") I.D. Sch. 40 PVC pipe Flowing Silt and Sand with #3 Silica 10' Slot 10 PVC screen (2")
-1	394.46		Ground Surface						
1			NB-MW5 damaged by bears.						
3			Replacement Monitor Drilling Detail:						
5			Top section of PVC pipe removed.						
7	2		Centred augers over existing hole and overdrilled to depth.						
9			Replacement Monitor installed as detailed.						
11			Flowing sands and silts encountered which caved around screen zone. Some silica sand added.						
13	4								
15			MOE Well Tag A163242						
17									
19									
21	6								
23	387.73		End of Borehole						

Drill Method: 8" Hollow Stem Auger

Ground Elevation: 394.464

Checked by:

Sheet: 1 of 1

Hole Size: 8" (205mm)

T.O.P.: 395.331 masl

Drill Date: January 5-6, 2016

Static WL:

Appendix D

Field Data Forms, Laboratory Reports, and Chain of Custody Records

Appendix D

D-1 Operations & Inspection Forms

**SMALL LANDFILL
OPERATION AND INSPECTION FORM**



Site Name: North Baptiste WTS, MHHs	Date: May 3, 2023	Weather: RAIN 5 ^{oc}
Project #: 230225-08	BluMetric Staff: BM/MD	

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 Closed as per hours
- 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 NAV Transfer Station

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
- Tires neat and appropriate size Yes No
- Bulky Items neat and appropriate size Yes No
- Brush pile neat and appropriate size Yes No NA
- Construction Debris neat and appropriate size Yes No NA } Not allowed at this site

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
- 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 be 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.

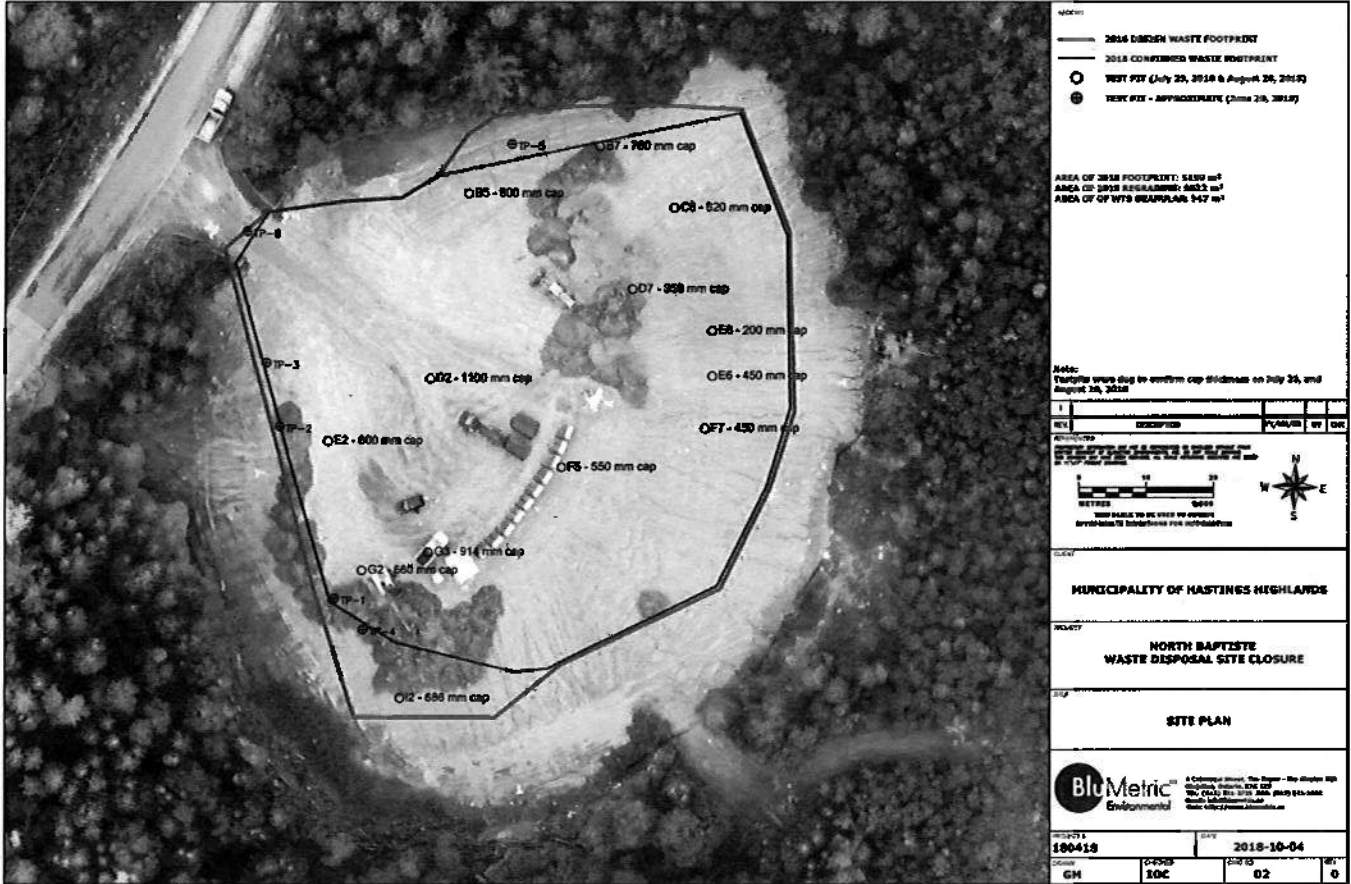
MOUND SURFACE CONDITIONS

- Any Signs of Erosion
- Vegetation Established Well
- Any Signs of Surface Cracking due to Gas
- Any Signs of Standing/Ponded Water
- Any Signs of Surface Water blockages
- Any Signs of Seeps

Yes _ No ✓
 Yes ✓ No _
 Yes _ No ✓
 Yes _ No ✓
 Yes ✓ No _
 Yes ✓ No _

Swamp area high - beaver dam downstream?

MCG-B captures a seep



Identify any remedial actions required:

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

This form is intended as a general reminder of information that should be 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**



Site Name: North Baptiste WTS, MHHS	Date: 09/08/23	Weather: sunny warm
Project #: 230225	BluMetric Staff: MD AM	

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

OVERALL INSPECTION AND OPERATION REVIEW

- | | | | |
|---|---|-----------------------------|------------------------|
| <input type="checkbox"/> Signage in good condition | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | long grass covers some |
| <input type="checkbox"/> ECA and emergency numbers on signage | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| <input type="checkbox"/> Hour of operation observed | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| <input type="checkbox"/> Site open under normal operating hours | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| <input type="checkbox"/> Perimeter fencing and gate in good condition | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| <input type="checkbox"/> Gate locked if closed | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |

DESIGNATED WASTE AREA

- | | | | |
|---|---|-----------------------------|-----|
| <input type="checkbox"/> Working active/trench area (moderate size, daily cover, compacted) | Yes <input type="checkbox"/> | No <input type="checkbox"/> | N/A |
| <input type="checkbox"/> Designated waste areas are properly signed and easily accessed by public | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |

RECYCLING OPERATION (if applicable)

- | | | |
|--|---|-----------------------------|
| <input type="checkbox"/> Proper signage and bins present | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |
| <input type="checkbox"/> Clearly signed | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |
| <input type="checkbox"/> Overall neat in appearance | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |

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

- | | | | |
|--|---|--|-------------|
| <input type="checkbox"/> Metals neat and appropriate size | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| <input type="checkbox"/> Tires neat and appropriate size | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| <input type="checkbox"/> Bulky Items neat and appropriate size | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> | overflowing |
| <input type="checkbox"/> Brush pile neat and appropriate size | Yes <input type="checkbox"/> | No <input type="checkbox"/> | N/A |
| <input type="checkbox"/> Construction Debris neat and appropriate size | Yes <input type="checkbox"/> | No <input type="checkbox"/> | N/A |

MONITORING WELL CONDITION

- | | | |
|--|------------------------------|-----------------------------|
| <input type="checkbox"/> Casing conditions (frost heave, lock, cap) | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| <input type="checkbox"/> Monitor condition (capped, vented) | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| <input type="checkbox"/> Wells clearly labeled (re-label as required) | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| <input type="checkbox"/> Well clearly visible (clear brush if necessary) | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

LANDFILL GAS MONITORING

- | | | |
|--|------------------------------|-----------------------------|
| <input type="checkbox"/> Conducted at structures | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| <input type="checkbox"/> Conducted at monitoring wells | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

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

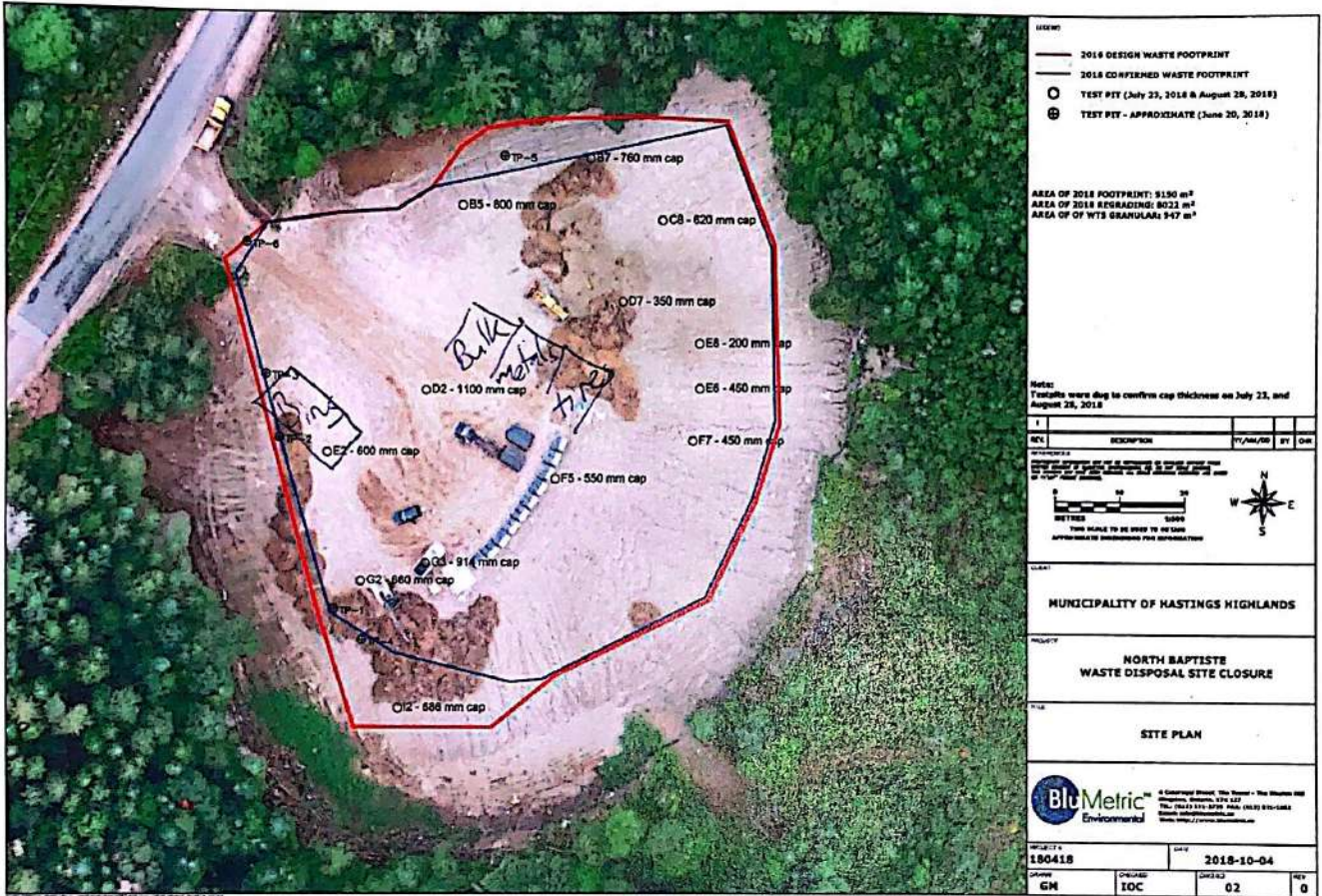
OBSERVATIONS OF PHYSICAL ENVIRONMENT: Please comment on any changes to the local environment (e.g. settling or slumping of waste/cover, new or altered drainage, presence of seeps, changes in vegetation cover, etc.)

This form is intended as a general reminder of information that should be 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.

MOUND SURFACE CONDITIONS

- Any Signs of Erosion Yes No
- Vegetation Established Well Yes No
- Any Signs of Surface Cracking due to Gas Yes No
- Any Signs of Standing/Ponded Water Yes No
- Any Signs of Surface Water blockages Yes No
- Any Signs of Seeps Yes No

No - possible MCG-B is seep



Identify any remedial actions required:

Clean up garbage @ front gate

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

Bulk, metals, and tires not shown on figure.
Three waste bins located along west entrance.

**SMALL LANDFILL
OPERATION AND INSPECTION FORM**



Site Name: North Baptiste WTS, MHHs	Date: Oct 19 2023	Weather: cloudy 10°C
Project #: 230225-08	BluMetric Staff: BM MD	

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 NA 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
- Tires neat and appropriate size Yes No overflowing
- Bulky Items neat and appropriate size Yes No overflowing
- Brush pile neat and appropriate size Yes No large NA
- 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 ppm
- Conducted at monitoring wells Yes No

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

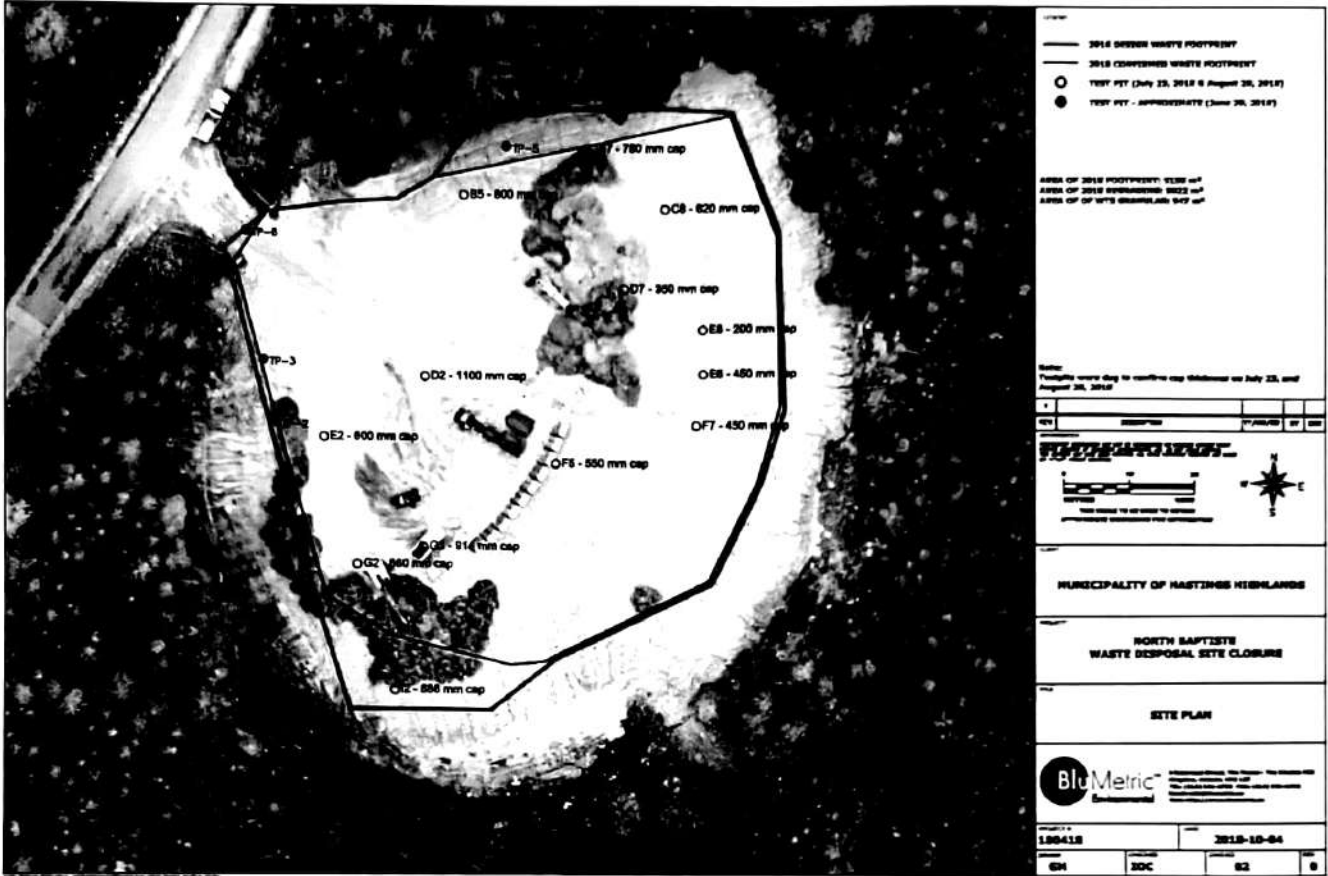
OBSERVATIONS OF PHYSICAL ENVIRONMENT: Please comment on any changes to the local environment (e.g. settling or slumping of waste/cover, new or altered drainage, presence of seeps, changes in vegetation cover, etc.)

This form is intended as a general reminder of information that should be 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.

MOUND SURFACE CONDITIONS

- | | | |
|---|---|--|
| <input type="checkbox"/> Any Signs of Erosion | Yes <u> </u> | No <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Vegetation Established Well | Yes <input checked="" type="checkbox"/> | No <u> </u> |
| <input type="checkbox"/> Any Signs of Surface Cracking due to Gas | Yes <u> </u> | No <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Any Signs of Standing/Ponded Water | Yes <u> </u> | No <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Any Signs of Surface Water blockages | Yes <input checked="" type="checkbox"/> | No <u> </u> |
| <input type="checkbox"/> Any Signs of Seeps | Yes <u> </u> | No <input checked="" type="checkbox"/> |

*Downstream of MCG-H
(Recess)*



Identify any remedial actions required:

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

This form is intended as a general reminder of information that should be 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

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

**4 Cataraqui Street
Kingston, ON K7K1Z7
(613) 531-2725**

ATTENTION TO: Carolyn Miller

PROJECT: 230225-08

AGAT WORK ORDER: 23T021599

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)

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.



Certificate of Analysis

AGAT WORK ORDER: 23T021599

PROJECT: 230225-08

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.

ATTENTION TO: Carolyn Miller

SAMPLING SITE: North Baptiste

SAMPLED BY:

Groundwater Parameters

DATE RECEIVED: 2023-05-05

DATE REPORTED: 2023-05-26

Parameter	Unit	SAMPLE DESCRIPTION:		NB MW1	NB MW2R	NB MW3	NB MW4	RDL	NB MW5R	RDL	NB-QAQC-GW1
		G / S	RDL	Water	Water	Water	Water		Water		Water
		DATE SAMPLED:		2023-05-03	2023-05-03	2023-05-03	2023-05-03	2023-05-03		2023-05-03	
				12:30	12:05	12:17	10:50	11:05		10:50	
				4965874	4965910	4965911	4965912	4965913		4965914	
pH	pH Units		NA	7.05	7.34	7.61	7.87	NA	7.58	NA	7.83
Alkalinity (as CaCO3)	mg/L		5	29	33	135	68	5	43	5	67
Electrical Conductivity	µS/cm		2	229	100	776	277	2	210	2	275
Hardness (as CaCO3) (Calculated)	mg/L		0.5	37.8	32.6	293	110	0.5	75.5	0.5	111
Total Dissolved Solids	mg/L		10	144	78	594	192	10	158	10	188
Total Suspended Solids	mg/L		10	414	776	295	278	10	1780	10	296
Chloride	mg/L		0.10	48.1	6.67	141	30.4	0.10	25.9	0.10	30.4
Nitrate as N	mg/L		0.05	0.21	0.11	0.14	<0.05	0.05	<0.05	0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Sulphate	mg/L		0.10	5.99	6.93	23.2	22.4	0.10	20.9	0.10	22.4
Turbidity	NTU		0.5	258	77.1	18.5	49.5	0.9	1050	0.5	52.8
Ammonia as N	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	<0.10	0.16	<0.10	0.10	0.21	0.10	<0.10
Total Phosphorus	mg/L		0.02	1.15	0.31	0.19	0.50	0.03	6.06	0.02	0.57
Chemical Oxygen Demand	mg/L		5	<5	<5	<5	<5	5	<5	5	<5
Dissolved Organic Carbon	mg/L		0.5	1.4	0.7	1.7	0.6	0.5	1.1	0.5	<0.5
Dissolved Calcium	mg/L		0.05	11.6	7.61	72.3	33.0	0.05	19.8	0.05	33.6
Dissolved Magnesium	mg/L		0.05	2.15	3.31	27.2	6.76	0.05	6.34	0.05	6.66
Dissolved Potassium	mg/L		0.50	1.89	1.74	5.76	3.24	0.50	2.51	0.50	3.17
Dissolved Sodium	mg/L		0.05	27.4	4.55	35.5	5.77	0.05	4.80	0.05	5.94
Dissolved Aluminum	mg/L		0.004	<0.004	<0.004	<0.004	<0.004	0.004	0.010	0.004	<0.004
Dissolved Arsenic	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Barium	mg/L		0.002	0.014	0.003	0.067	0.012	0.002	0.014	0.002	0.011
Dissolved Beryllium	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Boron	mg/L		0.010	<0.010	<0.010	0.145	<0.010	0.010	<0.010	0.010	<0.010
Dissolved Cadmium	mg/L		0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Chromium	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Cobalt	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Copper	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 23T021599

PROJECT: 230225-08

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.

SAMPLING SITE: North Baptiste

ATTENTION TO: Carolyn Miller

SAMPLED BY:

Groundwater Parameters

DATE RECEIVED: 2023-05-05

DATE REPORTED: 2023-05-26

Parameter	Unit	SAMPLE DESCRIPTION:		NB MW1	NB MW2R	NB MW3	NB MW4	RDL	NB MW5R	NB-QAQC-GW1	
		G / S	RDL	Water	Water	Water	Water		Water	Water	
		DATE SAMPLED:		2023-05-03	2023-05-03	2023-05-03	2023-05-03			2023-05-03	2023-05-03
				12:30	12:05	12:17	10:50			11:05	10:50
				4965874	4965910	4965911	4965912			4965913	4965914
Dissolved Lead	mg/L		0.0005	<0.0005	<0.0005	0.0009	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Iron	mg/L		0.010	0.012	<0.010	0.016	<0.010	0.010	0.030	0.010	<0.010
Dissolved Manganese	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.071	0.002	<0.002
Dissolved Mercury	mg/L		0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Molybdenum	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Nickel	mg/L		0.001	0.001	<0.001	0.003	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Selenium	mg/L		0.001	<0.001	0.002	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Silicon	mg/L		0.05	8.55	11.6	15.9	9.09	0.05	8.75	0.05	8.94
Dissolved Silver	mg/L		0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.125	0.044	0.558	0.097	0.005	0.099	0.005	0.097
Dissolved Thallium	mg/L		0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0003	<0.0003	0.0003	<0.0003
Dissolved Titanium	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Vanadium	mg/L		0.002	<0.002	0.004	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Zinc	mg/L		0.005	0.019	<0.005	<0.005	<0.005	0.005	<0.005	0.005	<0.005

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

4965874-4965914 Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Quality Assurance

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.
PROJECT: 230225-08
SAMPLING SITE: North Baptiste

AGAT WORK ORDER: 23T021599
ATTENTION TO: Carolyn Miller
SAMPLED BY:

Water Analysis

RPT Date: May 26, 2023			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	

Groundwater Parameters

pH	4968447		7.78	7.78	0.0%	NA	102%	90%	110%										
Alkalinity (as CaCO3)	4968447		327	327	0.0%	< 5	110%	80%	120%										
Electrical Conductivity	4968447		686	688	0.3%	< 2	102%	90%	110%										
Total Dissolved Solids	4966062		452	468	3.5%	< 10	102%	80%	120%										
Total Suspended Solids	4965528		<10	<10	NA	< 10	98%	80%	120%										
Chloride	4968526		168	169	0.6%	< 0.10	97%	70%	130%	103%	80%	120%	NA	70%	130%				
Nitrate as N	4968526		<0.05	<0.05	NA	< 0.05	98%	70%	130%	97%	80%	120%	95%	70%	130%				
Nitrite as N	4968526		<0.05	<0.05	NA	< 0.05	94%	70%	130%	97%	80%	120%	97%	70%	130%				
Sulphate	4968526		27.5	27.6	0.4%	< 0.10	101%	70%	130%	101%	80%	120%	97%	70%	130%				
Turbidity	4966069		227	237	4.3%	< 0.5	100%	80%	120%										
Ammonia as N	4964680		<0.02	<0.02	NA	< 0.02	107%	70%	130%	101%	80%	120%	97%	70%	130%				
Total Kjeldahl Nitrogen	4968686		0.31	0.32	NA	< 0.10	102%	70%	130%	100%	80%	120%	95%	70%	130%				
Total Phosphorus	4965874	4965874	1.15	1.15	0.0%	< 0.02	101%	70%	130%	100%	80%	120%	96%	70%	130%				
Chemical Oxygen Demand	4968519		22	21	NA	< 5	112%	80%	120%	104%	90%	110%	97%	70%	130%				
Dissolved Organic Carbon	4965874	4965874	1.4	1.3	NA	< 0.5	98%	90%	110%	95%	90%	110%	91%	80%	120%				
Dissolved Calcium	4965874	4965874	11.6	11.4	1.7%	< 0.05	100%	70%	130%	104%	80%	120%	99%	70%	130%				
Dissolved Magnesium	4965874	4965874	2.15	2.29	6.3%	< 0.05	100%	70%	130%	103%	80%	120%	105%	70%	130%				
Dissolved Potassium	4965874	4965874	1.89	1.81	NA	< 0.50	98%	70%	130%	101%	80%	120%	100%	70%	130%				
Dissolved Sodium	4965874	4965874	27.4	25.5	7.2%	< 0.05	96%	70%	130%	98%	80%	120%	102%	70%	130%				
Dissolved Aluminum	4965874	4965874	<0.004	0.005	NA	< 0.004	94%	70%	130%	103%	80%	120%	101%	70%	130%				
Dissolved Arsenic	4965874	4965874	<0.001	<0.001	NA	< 0.001	100%	70%	130%	104%	80%	120%	103%	70%	130%				
Dissolved Barium	4965874	4965874	0.014	0.014	0.0%	< 0.002	104%	70%	130%	105%	80%	120%	102%	70%	130%				
Dissolved Beryllium	4965874	4965874	<0.0005	<0.0005	NA	< 0.0005	97%	70%	130%	107%	80%	120%	105%	70%	130%				
Dissolved Boron	4965874	4965874	<0.010	<0.010	NA	< 0.010	101%	70%	130%	106%	80%	120%	106%	70%	130%				
Dissolved Cadmium	4965874	4965874	<0.0001	<0.0001	NA	< 0.0001	99%	70%	130%	97%	80%	120%	103%	70%	130%				
Dissolved Chromium	4965874	4965874	<0.002	<0.002	NA	< 0.002	94%	70%	130%	96%	80%	120%	96%	70%	130%				
Dissolved Cobalt	4965874	4965874	<0.0005	<0.0005	NA	< 0.0005	95%	70%	130%	95%	80%	120%	94%	70%	130%				
Dissolved Copper	4965874	4965874	<0.001	<0.001	NA	< 0.001	95%	70%	130%	96%	80%	120%	94%	70%	130%				
Dissolved Lead	4965874	4965874	<0.0005	<0.0005	NA	< 0.0005	98%	70%	130%	90%	80%	120%	87%	70%	130%				
Dissolved Iron	4965874	4965874	0.012	<0.010	NA	< 0.010	98%	70%	130%	99%	80%	120%	94%	70%	130%				
Dissolved Manganese	4965874	4965874	<0.002	<0.002	NA	< 0.002	91%	70%	130%	93%	80%	120%	92%	70%	130%				
Dissolved Mercury	4965874	4965874	<0.0001	<0.0001	NA	< 0.0001	103%	70%	130%	97%	80%	120%	101%	70%	130%				
Dissolved Molybdenum	4965874	4965874	<0.002	<0.002	NA	< 0.002	99%	70%	130%	100%	80%	120%	100%	70%	130%				
Dissolved Nickel	4965874	4965874	0.001	<0.001	NA	< 0.001	93%	70%	130%	96%	80%	120%	93%	70%	130%				
Dissolved Selenium	4965874	4965874	<0.001	<0.001	NA	< 0.001	101%	70%	130%	100%	80%	120%	109%	70%	130%				
Dissolved Silicon	4965954		4.61	4.58	0.7%	< 0.05	104%	70%	130%	106%	80%	120%	110%	70%	130%				
Dissolved Silver	4965874	4965874	<0.0001	<0.0001	NA	< 0.0001	94%	70%	130%	94%	80%	120%	92%	70%	130%				
Dissolved Strontium	4965874	4965874	0.125	0.121	3.3%	< 0.005	94%	70%	130%	94%	80%	120%	89%	70%	130%				
Dissolved Thallium	4965874	4965874	<0.0003	<0.0003	NA	< 0.0003	98%	70%	130%	97%	80%	120%	96%	70%	130%				

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Quality Assurance

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.
PROJECT: 230225-08
SAMPLING SITE: North Baptiste

AGAT WORK ORDER: 23T021599
ATTENTION TO: Carolyn Miller
SAMPLED BY:

Water Analysis (Continued)

RPT Date: May 26, 2023			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
Dissolved Titanium	4965874	4965874	<0.002	<0.002	NA	< 0.002	89%	70%	130%	89%	80%	120%	89%	70%	130%	
Dissolved Vanadium	4965874	4965874	<0.002	<0.002	NA	< 0.002	95%	70%	130%	98%	80%	120%	98%	70%	130%	
Dissolved Zinc	4965874	4965874	0.019	0.018	NA	< 0.005	100%	70%	130%	104%	80%	120%	113%	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	4965913	4965913	7.58	7.48	1.3%	NA	103%	90%	110%						
Alkalinity (as CaCO3)	4965913	4965913	43	41	2.7%	< 5	96%	80%	120%						
Electrical Conductivity	4965913	4965913	210	211	0.5%	< 2	108%	90%	110%						
Total Kjeldahl Nitrogen	4965910	4965910	<0.10	<0.10	NA	< 0.10	101%	70%	130%	99%	80%	120%	94%	70%	130%

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

Certified By: _____



Method Summary

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23T021599

PROJECT: 230225-08

ATTENTION TO: Carolyn Miller

SAMPLING SITE: North Baptiste

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 CaCO ₃)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
Hardness (as CaCO ₃) (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
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
Ammonia as N	INOR-93-6059	modified from SM 4500-NH ₃ H	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Phosphorus	INOR-93-6057	modified from LACHAT 10-115-01-3A	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	modified from SM 5220 A and SM 5220 D	SPECTROPHOTOMETER
Dissolved Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
Dissolved Calcium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
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 Aluminum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Arsenic	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 Beryllium	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 Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cobalt	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	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

Method Summary

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23T021599

PROJECT: 230225-08

ATTENTION TO: Carolyn Miller

SAMPLING SITE:North Baptiste

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Dissolved Molybdenum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Nickel	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Selenium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silicon	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Silver	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Strontium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Thallium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Titanium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Vanadium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zinc	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
web@earth.agatlabs.com

Laboratory Use Only

Work Order #: 23T021599
Cooler Quantity: 2 Large
Arrival Temperatures: 7.1 7.0 7.2
6.4 6.5 5.9
Custody Seal Intact: Yes No N/A
Notes: bagged in

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 Cataract St
Kingston, ON, K7K1Z7
Phone: 613-328-0243 Fax: _____
Reports to be sent to: cmiller@blumetric.ca
1. Email: _____
2. Email: cbandler@blumetric.ca

Regulatory Requirements:

(Please check all applicable boxes)

Regulation 153/04 Excess Soils R406 Sewer Use
 Sanitary Storm

Table Indicate One Ind/Com Res/Park Agriculture
Table Indicate One Regulation 558 Prov. Water Quality Objectives (PWQO)
Soil Texture (Check One) Coarse CCME Other ODWS
 Fine Indicate One

Project Information:

Project: 230225-08
Site Location: North Baptiste
Sampled By: _____
AGAT Quote #: 740804 PO: 230225-08
Please note: if quotation number is not provided, client will be billed full price for analysis.

Is this submission for a Record of Site Condition?

Yes No

Report Guideline on Certificate of Analysis

Yes No

Invoice Information:

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

Bill To Same: Yes No

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	Y/N	Field Filtered (Metals, Hg, Cr, DOC)	Metals & Inorganics	Metals: <input type="checkbox"/> Cr-VI, <input type="checkbox"/> Hg, <input type="checkbox"/> HWSB	BTEX, F1-F4 PHCs	Analyze F4G if required <input type="checkbox"/> Yes <input type="checkbox"/> No	PAHs	PCBs	VOC	Landfill Disposal Characterization TOL: <input type="checkbox"/> Metals <input type="checkbox"/> VOCs <input type="checkbox"/> PCBs	Excess Soils SPLP Rainwater Leach	Excess Soils Characterization Package pH, ICP/MS Metals, BTEX, F1-F4	Salt - EC/SAR	93-262 Groundwater	Potentially Hazardous or High Concentration (Y/N)
NB MW1	May 3/23	12:30 AM	10	GW		Y														
NB MW2R	May 3/23	12:05 AM	10	GW	Field Filter: Metals, DOC, Hg	Y														
NB MW3	May 3/23	12:17 AM	10	GW		Y														
NB MW4	May 3/23	10:50 AM	10	GW		Y														
NB MW5R	May 3/23	11:05 AM	10	GW		Y														
NB-QAQC-GW1	May 3/23	10:50 AM	10	GW		Y														

Samples Relinquished By (Print Name and Sign): <u>Brad McCallum / Brad McCall</u>	Date: <u>May 4, 2023</u>	Time: <u>8:00 AM</u>	Samples Received By (Print Name and Sign): <u>J. Reisman</u>	Date: <u>May 5</u>	Time: <u>8:40 AM</u>
Samples Relinquished By (Print Name and Sign):	Date:	Time:	Samples Received By (Print Name and Sign):	Date:	Time:
Samples Relinquished By (Print Name and Sign):	Date:	Time:	Samples Received By (Print Name and Sign):	Date:	Time:



Your P.O. #: 230301-00
 Site#: 200
 Your C.O.C. #: 930470-05-01

Attention: Cecilia Bandler

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

Report Date: 2023/05/16
 Report #: R7630629
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3D0978

Received: 2023/05/09, 09:08

Sample Matrix: Water
 # Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Phenols (4AAP)	6	N/A	2023/05/12	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. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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

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



Your P.O. #: 230301-00
Site#: 200
Your C.O.C. #: 930470-05-01

Attention: Cecilia Bandler

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

Report Date: 2023/05/16
Report #: R7630629
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3D0978

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

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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

Bureau Veritas Job #: C3D0978
Report Date: 2023/05/16

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

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VTJ819	VTJ820	VTJ821	VTJ822	VTJ823	VTJ824		
Sampling Date		2023/05/03 12:30	2023/05/03 12:05	2023/05/03 12:17	2023/05/03 10:50	2023/05/03 11:50	2023/05/03 10:50		
COC Number		930470-05-01	930470-05-01	930470-05-01	930470-05-01	930470-05-01	930470-05-01		
	UNITS	NB-MW1	NB-MW2R	NB-MW3	NB-MW4	NB-MW5R	NB-QAQC-GW1	RDL	QC Batch

Inorganics

Phenols-4AAP	mg/L	0.0010	ND	ND	ND	ND	ND	0.0010	8662652
--------------	------	--------	----	----	----	----	----	--------	---------

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

Bureau Veritas Job #: C3D0978
Report Date: 2023/05/16

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

TEST SUMMARY

Bureau Veritas ID: VTJ819
Sample ID: NB-MW1
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8662652	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ820
Sample ID: NB-MW2R
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8662652	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ821
Sample ID: NB-MW3
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8662652	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ822
Sample ID: NB-MW4
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8662652	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ823
Sample ID: NB-MW5R
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8662652	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ824
Sample ID: NB-QAQC-GW1
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8662652	N/A	2023/05/12	Mandeep Kaur



BUREAU
VERITAS

Bureau Veritas Job #: C3D0978
Report Date: 2023/05/16

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

GENERAL COMMENTS

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

Package 1	8.0°C
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Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C3D0978

Report Date: 2023/05/16

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc

Your P.O. #: 230301-00

Sampler Initials: BM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8662652	Phenols-4AAP	2023/05/12	103	80 - 120	101	80 - 120	ND, RDL=0.0010	mg/L	NC	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.

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).



BUREAU
VERITAS

Bureau Veritas Job #: C3D0978
Report Date: 2023/05/16

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

VALIDATION SIGNATURE PAGE

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

Cristina Carriere

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 Canada L5N 2L8 Tel: (905) 817-5700 Toll-free 800-563-6266 Fax: (905) 817-5777 www.bvna.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

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 Bandier	P.O. #: 230301-00 230301-00	Barcode: 930470				
Address: 1682 Woodward Drive	Address: The Tower - The Woolen Mill 4 Catarqui St	Project:	COC #:		Project Manager:		
Ottawa ON K2C 3R8	Kingston ON K7K 1Z7	Project Name:	Barcode: 0930470-05-01		Christine Gripton		
Tel: (613) 839-3053 Fax: (613) 839-5376	Tel: (613) 531-2725 Fax:	Site #: 200					
Email: ap@blumetric.ca	Email: cbandier@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						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Regulation 153 (2011)			Other Regulations			Special Instructions	Field Filtered (please circle): Metals / hg / Cr-VI	Pb	Cu	Zn	Mn	Fe	Ni	Cd	Hg	Cr-VI	As	Se	V	U	B	C	O	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg	Al	Si	P	S	Cl	F	I	Br	Li	Na	K	Ca	Mg

C.O.C.: -

REPORT No: 23-010841 - 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: Ground Water

CUSTOMER PROJECT: North Baptiste: 230225-08
 P.O. NUMBER: 230301-00

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Phenols (Liquid)	6	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 *

Parameter	Units	R.L.	Client I.D.	Sample I.D.	Date Collected	Units	R.L.
			NB-MW1	NB-MW2R	NB-MW3	NB-MW4	NB-MW5R
Phenolics	mg/L	0.001		23-010841-1	2023-05-03		
				23-010841-2	2023-05-03		
				23-010841-3	2023-05-03		
				23-010841-4	2023-05-03		
				23-010841-5	2023-05-03		

Parameter	Units	R.L.	Client I.D.	Sample I.D.	Date Collected	Units	R.L.
			NB-QAQC-GW1	23-010841-6	2023-05-03		
Phenolics	mg/L	0.001					



Richard Lecompte
 Laboratory Supervisor



Your Project #: 230225-08
 Site#: North Baptiste
 Site Location: North Baptiste
 Your C.O.C. #: 936822-01-01

Attention: Cecilia Bandler

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

Report Date: 2023/06/09
 Report #: R7664992
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3F8508

Received: 2023/06/02, 09:25

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2023/06/05	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	1	N/A	2023/06/07	CAM SOP-00463	SM 23 4500-Cl E m
Chemical Oxygen Demand	1	N/A	2023/06/07	CAM SOP-00416	SM 23 5220 D m
Conductivity	1	N/A	2023/06/05	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2023/06/06	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2023/06/07	CAM SOP 00102/00408/00447	SM 2340 B
Mercury in Water by CVAA	1	2023/06/06	2023/06/06	CAM SOP-00453	EPA 7470A m
Dissolved Metals by ICPMS	1	N/A	2023/06/06	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	1	N/A	2023/06/08	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	1	N/A	2023/06/05	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	1	2023/06/03	2023/06/05	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2023/06/06	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Turbidimetry	1	N/A	2023/06/07	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	1	2023/06/06	2023/06/07	CAM SOP-00428	SM 23 2540C m
Total Kjeldahl Nitrogen in Water	1	2023/06/06	2023/06/07	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2023/06/06	2023/06/08	CAM SOP-00407	SM 23 4500-P I
Total Suspended Solids	1	2023/06/05	2023/06/07	CAM SOP-00428	SM 23 2540D m
Turbidity	1	N/A	2023/06/03	CAM SOP-00417	SM 23 2130 B 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



Your Project #: 230225-08
Site#: North Baptiste
Site Location: North Baptiste
Your C.O.C. #: 936822-01-01

Attention: Cecilia Bandler

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

Report Date: 2023/06/09
Report #: R7664992
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3F8508

Received: 2023/06/02, 09:25

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.

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

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

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

- (1) 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

Bureau Veritas Job #: C3F8508
Report Date: 2023/06/09

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: BM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VZH954		
Sampling Date		2023/06/01 10:30		
COC Number		936822-01-01		
	UNITS	MW5R	RDL	QC Batch
Calculated Parameters				
Hardness (CaCO ₃)	mg/L	76	1.0	8700136
Inorganics				
Total Ammonia-N	mg/L	0.059	0.050	8709322
Total Chemical Oxygen Demand (COD)	mg/L	ND	4.0	8707738
Conductivity	umho/cm	200	1.0	8702620
Total Dissolved Solids	mg/L	170	10	8706010
Total Kjeldahl Nitrogen (TKN)	mg/L	ND	0.10	8707486
Dissolved Organic Carbon	mg/L	0.70	0.40	8704109
pH	pH	7.60		8702627
Phenols-4AAP	mg/L	ND	0.0010	8707968
Total Phosphorus	mg/L	1.8	0.020	8707766
Total Suspended Solids	mg/L	1800	17	8704329
Dissolved Sulphate (SO ₄)	mg/L	20	1.0	8702519
Turbidity	NTU	180	0.1	8703121
Alkalinity (Total as CaCO ₃)	mg/L	35	1.0	8702633
Dissolved Chloride (Cl ⁻)	mg/L	23	1.0	8702518
Nitrite (N)	mg/L	ND	0.010	8702510
Nitrate (N)	mg/L	ND	0.10	8702510
Nitrate + Nitrite (N)	mg/L	ND	0.10	8702510
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

Bureau Veritas Job #: C3F8508
Report Date: 2023/06/09

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: BM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		VZH954		
Sampling Date		2023/06/01 10:30		
COC Number		936822-01-01		
	UNITS	MW5R	RDL	QC Batch
Metals				
Mercury (Hg)	mg/L	ND	0.00010	8706295
Dissolved Aluminum (Al)	ug/L	5.0	4.9	8706294
Dissolved Arsenic (As)	ug/L	ND	1.0	8706294
Dissolved Barium (Ba)	ug/L	16	2.0	8706294
Dissolved Beryllium (Be)	ug/L	ND	0.40	8706294
Dissolved Boron (B)	ug/L	ND	10	8706294
Dissolved Cadmium (Cd)	ug/L	ND	0.090	8706294
Dissolved Calcium (Ca)	ug/L	20000	200	8706294
Dissolved Chromium (Cr)	ug/L	ND	5.0	8706294
Dissolved Cobalt (Co)	ug/L	ND	0.50	8706294
Dissolved Copper (Cu)	ug/L	ND	0.90	8706294
Dissolved Iron (Fe)	ug/L	ND	100	8706294
Dissolved Lead (Pb)	ug/L	ND	0.50	8706294
Dissolved Magnesium (Mg)	ug/L	6200	50	8706294
Dissolved Manganese (Mn)	ug/L	190	2.0	8706294
Dissolved Molybdenum (Mo)	ug/L	2.2	0.50	8706294
Dissolved Nickel (Ni)	ug/L	ND	1.0	8706294
Dissolved Potassium (K)	ug/L	2200	200	8706294
Dissolved Selenium (Se)	ug/L	ND	2.0	8706294
Dissolved Silicon (Si)	ug/L	7900	50	8706294
Dissolved Silver (Ag)	ug/L	ND	0.090	8706294
Dissolved Sodium (Na)	ug/L	4800	100	8706294
Dissolved Strontium (Sr)	ug/L	110	1.0	8706294
Dissolved Thallium (Tl)	ug/L	ND	0.050	8706294
Dissolved Titanium (Ti)	ug/L	ND	5.0	8706294
Dissolved Vanadium (V)	ug/L	ND	0.50	8706294
Dissolved Zinc (Zn)	ug/L	ND	5.0	8706294
Dissolved Zirconium (Zr)	ug/L	ND	1.0	8706294
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

Bureau Veritas Job #: C3F8508
Report Date: 2023/06/09

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: BM

TEST SUMMARY

Bureau Veritas ID: VZH954
Sample ID: MW5R
Matrix: Water

Collected: 2023/06/01
Shipped:
Received: 2023/06/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8702633	N/A	2023/06/05	Kien Tran
Chloride by Automated Colourimetry	KONE	8702518	N/A	2023/06/07	Massarat Jan
Chemical Oxygen Demand	SPEC	8707738	N/A	2023/06/07	Nimarta Singh
Conductivity	AT	8702620	N/A	2023/06/05	Kien Tran
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8704109	N/A	2023/06/06	Gyulshen Idriz
Hardness (calculated as CaCO3)		8700136	N/A	2023/06/07	Automated Statchk
Mercury in Water by CVAA	CV/AA	8706295	2023/06/06	2023/06/06	Japneet Gill
Dissolved Metals by ICPMS	ICP/MS	8706294	N/A	2023/06/06	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	8709322	N/A	2023/06/08	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8702510	N/A	2023/06/05	Viorica Rotaru
pH	AT	8702627	2023/06/03	2023/06/05	Kien Tran
Phenols (4AAP)	TECH/PHEN	8707968	N/A	2023/06/06	Mandeep Kaur
Sulphate by Automated Turbidimetry	KONE	8702519	N/A	2023/06/07	Massarat Jan
Total Dissolved Solids	BAL	8706010	2023/06/06	2023/06/07	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	8707486	2023/06/06	2023/06/07	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	8707766	2023/06/06	2023/06/08	Sachi Patel
Total Suspended Solids	BAL	8704329	2023/06/05	2023/06/07	Razieh Tabesh
Turbidity	AT	8703121	N/A	2023/06/03	Gurparteek KAUR



BUREAU
VERITAS

Bureau Veritas Job #: C3F8508
Report Date: 2023/06/09

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: BM

GENERAL COMMENTS

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

Package 1	8.3°C
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Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C3F8508

Report Date: 2023/06/09

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste

Sampler Initials: BM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8702510	Nitrate (N)	2023/06/05	111	80 - 120	105	80 - 120	ND, RDL=0.10	mg/L	4.6	20		
8702510	Nitrite (N)	2023/06/05	85	80 - 120	107	80 - 120	ND, RDL=0.010	mg/L	NC	20		
8702518	Dissolved Chloride (Cl-)	2023/06/07	93	80 - 120	98	80 - 120	ND, RDL=1.0	mg/L	NC	20		
8702519	Dissolved Sulphate (SO4)	2023/06/07	101	75 - 125	99	80 - 120	ND, RDL=1.0	mg/L	NC	20		
8702620	Conductivity	2023/06/05			101	85 - 115	ND, RDL=1.0	umho/cm	0	25		
8702627	pH	2023/06/05			102	98 - 103			0.19	N/A		
8702633	Alkalinity (Total as CaCO3)	2023/06/05			97	85 - 115	ND, RDL=1.0	mg/L	0.38	20		
8703121	Turbidity	2023/06/03			99	80 - 120	ND, RDL=0.1	NTU	0.18	20		
8704109	Dissolved Organic Carbon	2023/06/06	94	80 - 120	96	80 - 120	ND, RDL=0.40	mg/L	0.29	20		
8704329	Total Suspended Solids	2023/06/07			95	85 - 115	ND, RDL=10	mg/L	NC	20		
8706010	Total Dissolved Solids	2023/06/07			98	90 - 110	ND, RDL=10	mg/L	13	20		
8706294	Dissolved Aluminum (Al)	2023/06/06	100	80 - 120	106	80 - 120	ND, RDL=4.9	ug/L				
8706294	Dissolved Arsenic (As)	2023/06/06	98	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L	2.4	20		
8706294	Dissolved Barium (Ba)	2023/06/06	95	80 - 120	99	80 - 120	ND, RDL=2.0	ug/L	1.5	20		
8706294	Dissolved Beryllium (Be)	2023/06/06	95	80 - 120	98	80 - 120	ND, RDL=0.40	ug/L	NC	20		
8706294	Dissolved Boron (B)	2023/06/06	95	80 - 120	104	80 - 120	ND, RDL=10	ug/L	0.0035	20		
8706294	Dissolved Cadmium (Cd)	2023/06/06	98	80 - 120	97	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8706294	Dissolved Calcium (Ca)	2023/06/06	NC	80 - 120	104	80 - 120	ND, RDL=200	ug/L				
8706294	Dissolved Chromium (Cr)	2023/06/06	96	80 - 120	98	80 - 120	ND, RDL=5.0	ug/L	NC	20		
8706294	Dissolved Cobalt (Co)	2023/06/06	96	80 - 120	96	80 - 120	ND, RDL=0.50	ug/L	NC	20		
8706294	Dissolved Copper (Cu)	2023/06/06	95	80 - 120	100	80 - 120	ND, RDL=0.90	ug/L	NC	20		
8706294	Dissolved Iron (Fe)	2023/06/06	99	80 - 120	100	80 - 120	ND, RDL=100	ug/L				
8706294	Dissolved Lead (Pb)	2023/06/06	94	80 - 120	94	80 - 120	ND, RDL=0.50	ug/L	NC	20		
8706294	Dissolved Magnesium (Mg)	2023/06/06	NC	80 - 120	103	80 - 120	ND, RDL=50	ug/L				
8706294	Dissolved Manganese (Mn)	2023/06/06	97	80 - 120	98	80 - 120	ND, RDL=2.0	ug/L				
8706294	Dissolved Molybdenum (Mo)	2023/06/06	104	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	1.3	20		
8706294	Dissolved Nickel (Ni)	2023/06/06	93	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L	1.6	20		
8706294	Dissolved Potassium (K)	2023/06/06	98	80 - 120	105	80 - 120	ND, RDL=200	ug/L				



BUREAU
VERITAS

Bureau Veritas Job #: C3F8508

Report Date: 2023/06/09

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste

Sampler Initials: BM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8706294	Dissolved Selenium (Se)	2023/06/06	100	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L	NC	20		
8706294	Dissolved Silicon (Si)	2023/06/06	100	80 - 120	103	80 - 120	ND, RDL=50	ug/L				
8706294	Dissolved Silver (Ag)	2023/06/06	97	80 - 120	97	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8706294	Dissolved Sodium (Na)	2023/06/06	NC	80 - 120	106	80 - 120	180, RDL=100	ug/L	1.7	20		
8706294	Dissolved Strontium (Sr)	2023/06/06	NC	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L				
8706294	Dissolved Thallium (Tl)	2023/06/06	95	80 - 120	95	80 - 120	ND, RDL=0.050	ug/L	NC	20		
8706294	Dissolved Titanium (Ti)	2023/06/06	99	80 - 120	100	80 - 120	ND, RDL=5.0	ug/L				
8706294	Dissolved Vanadium (V)	2023/06/06	100	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	0.71	20		
8706294	Dissolved Zinc (Zn)	2023/06/06	95	80 - 120	95	80 - 120	ND, RDL=5.0	ug/L	NC	20		
8706294	Dissolved Zirconium (Zr)	2023/06/06	106	80 - 120	105	80 - 120	ND, RDL=1.0	ug/L				
8706295	Mercury (Hg)	2023/06/06	103	75 - 125	104	80 - 120	ND, RDL=0.00010	mg/L	NC	20		
8707486	Total Kjeldahl Nitrogen (TKN)	2023/06/07	103	80 - 120	104	80 - 120	ND, RDL=0.10	mg/L	7.4	20	105	80 - 120
8707738	Total Chemical Oxygen Demand (COD)	2023/06/06	102	80 - 120	102	80 - 120	ND, RDL=4.0	mg/L	17	20		
8707766	Total Phosphorus	2023/06/08	102	80 - 120	100	80 - 120	ND, RDL=0.020	mg/L	6.9	20	101	80 - 120
8707968	Phenols-4AAP	2023/06/06	104	80 - 120	101	80 - 120	ND, RDL=0.0010	mg/L	NC	20		



BUREAU
VERITAS

Bureau Veritas Job #: C3F8508

Report Date: 2023/06/09

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste

Sampler Initials: BM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8709322	Total Ammonia-N	2023/06/08	106	75 - 125	100	80 - 120	ND, RDL=0.050	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).



BUREAU
VERITAS

Bureau Veritas Job #: C3F8508
Report Date: 2023/06/09

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: BM

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 {0}, {1} responsible for {2} {3} laboratory operations.



Bureau Veritas
5740 Campocello Road, Mississauga, Ontario Canada L5N 2L6 Tel: (905) 817-5700 Toll-free: 800-563-6296 Fax: (905) 817-5777 www.bvna.com

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name: #1192 BluMetric Environmental Inc	Accounts Payable	Company Name: #5638 BluMetric Environmental Inc	Cecilia Bandler	Quotation #: C32548		Bureau Veritas Job #:	Bottle Order #:
Address: 1682 Woodward Drive	Ottawa ON K2C 3R8	Attention: Cecilia Bandler	The Tower - The Woolen Mill 4 Cataragui St	P.O. #: 230225-08			
Tel: (613) 839-3053	Fax: (613) 839-5376	Address: Kingston ON K7K 1Z7		Project Name: North Baptiste		COC #:	Project Manager:
Email: ap@blumetric.ca		Tel: (613) 929-1385	cbandler@blumetric.ca	Site #: BM / MW			Christine Gripton
			edms@blumetric.ca	Sampled By:		C#936822-01-01	

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects				
Regulation 153 (2011) <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agr/Other <input type="checkbox"/> For RSC <input type="checkbox"/> Table _____			Other Regulations <input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> MISA Municipality _____ <input type="checkbox"/> PWOO <input type="checkbox"/> Reg 405 Table _____ <input type="checkbox"/> Other _____			Special Instructions 			Field Filtered (please circle): Metals (Hg Cr VI) Groundwater - ODWS										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.	
Include Criteria on Certificate of Analysis (Y/N)? _____																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													# of Bottles	Comments		
	MW5R	Jun 1 2023	10:30	GW	Y	✓											8			
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

02-Jun-23 09:25
Christine Gripton

C3F8508
LIDV ENN/004

RELINQUISHED BY: (Signature/Print) Brad McNeil / Brad McNeil	Date: (YY/MM/DD) 2023/06/01	Time 15:00	RECEIVED BY: (Signature/Print) [Signature]	Date: (YY/MM/DD) 2023/06/02	Time 09:25	# jars used and not submitted	Time Sensitive	Temperature (°C) on Receipt 9/6/10	Laboratory Use Only	Custody Seal	Yes	No
										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



Your Project #: 230225-08
 Site Location: North Baptiste
 Your C.O.C. #: 781230

Attention: Cecilia Bandler

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

Report Date: 2023/11/02
 Report #: R7892011
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W8856

Received: 2023/10/21, 10:56

Sample Matrix: Water
 # Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	5	N/A	2023/10/25	CAM SOP-00448	SM 23 2320 B m
Alkalinity	1	N/A	2023/10/26	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	6	N/A	2023/10/27	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
Chemical Oxygen Demand	5	N/A	2023/10/27	CAM SOP-00416	SM 23 5220 D m
Conductivity	5	N/A	2023/10/25	CAM SOP-00414	SM 23 2510 m
Conductivity	1	N/A	2023/10/26	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	6	N/A	2023/10/28	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	2	N/A	2023/10/26	CAM SOP 00102/00408/00447	SM 2340 B
Hardness (calculated as CaCO3)	4	N/A	2023/10/27	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Mercury in Water by CVAA	6	2023/10/24	2023/10/24	CAM SOP-00453	EPA 7470A m
Dissolved Metals by ICPMS	1	N/A	2023/10/25	CAM SOP-00447	EPA 6020B m
Dissolved Metals by ICPMS	5	N/A	2023/10/26	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	4	N/A	2023/10/27	CAM SOP-00441	USGS I-2522-90 m
Total Ammonia-N	2	N/A	2023/10/29	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	1	N/A	2023/10/24	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Nitrate & Nitrite as Nitrogen in Water (2)	5	N/A	2023/10/25	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	5	2023/10/23	2023/10/25	CAM SOP-00413	SM 4500H+ B m
pH	1	2023/10/23	2023/10/26	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	6	N/A	2023/10/26	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Turbidimetry	6	N/A	2023/10/27	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	1	2023/10/27	2023/10/31	CAM SOP-00428	SM 23 2540C m
Total Dissolved Solids	1	2023/10/28	2023/10/31	CAM SOP-00428	SM 23 2540C m
Total Dissolved Solids	4	2023/10/30	2023/11/01	CAM SOP-00428	SM 23 2540C m
Total Kjeldahl Nitrogen in Water	6	2023/10/25	2023/10/26	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	4	2023/10/25	2023/10/26	CAM SOP-00407	SM 23 4500-P I
Total Phosphorus (Colourimetric)	2	2023/10/25	2023/10/27	CAM SOP-00407	SM 23 4500-P I
Total Suspended Solids	1	2023/10/27	2023/10/30	CAM SOP-00428	SM 23 2540D m



Your Project #: 230225-08
 Site Location: North Baptiste
 Your C.O.C. #: 781230

Attention: Cecilia Bandler

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

Report Date: 2023/11/02
 Report #: R7892011
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W8856

Received: 2023/10/21, 10:56

Sample Matrix: Water
 # Samples Received: 6

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Total Suspended Solids	5	2023/10/27	2023/11/02	CAM SOP-00428	SM 23 2540D m
Turbidity	6	N/A	2023/10/23	CAM SOP-00417	SM 23 2130 B 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.

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.

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

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

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

- (1) 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.



Your Project #: 230225-08
Site Location: North Baptiste
Your C.O.C. #: 781230

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 #: R7892011
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W8856

Received: 2023/10/21, 10:56

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

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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

Bureau Veritas Job #: C3W8856
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XJD723		XJD724			XJD725		
Sampling Date		2023/10/19 12:10		2023/10/19 12:00			2023/10/19 11:45		
COC Number		781230		781230			781230		
	UNITS	NB MW1	RDL	NB MW2R	RDL	QC Batch	NB MW3	RDL	QC Batch

Calculated Parameters									
Hardness (CaCO3)	mg/L	31	1.0	32	1.0	8997640	310	1.0	8997640
Inorganics									
Total Ammonia-N	mg/L	ND	0.050	ND	0.050	9004023	ND	0.050	9004018
Total Chemical Oxygen Demand (COD)	mg/L	6.2	4.0	ND	4.0	9005673	6.6	4.0	9005673
Conductivity	umho/cm	190	1.0	92	1.0	8999884	860	1.0	8999997
Total Dissolved Solids	mg/L	130	10	70	10	9013589	585	10	9008301
Total Kjeldahl Nitrogen (TKN)	mg/L	ND	0.10	ND	0.10	9006618	0.18	0.10	9006131
Dissolved Organic Carbon	mg/L	1.2	0.4	1.2	0.4	9003192	1.7	0.4	9003192
pH	pH	7.21		7.61		8999883	7.39		8999977
Phenols-4AAP	mg/L	ND	0.0010	ND	0.0010	9007776	ND	0.0010	9007776
Total Phosphorus	mg/L	1.4	0.020	2.3	0.020	9006644	0.17	0.020	9006644
Total Suspended Solids	mg/L	860	17	1000	20	9011629	190	10	9011629
Dissolved Sulphate (SO4)	mg/L	6.8	1.0	5.6	1.0	8999911	8.8	1.0	8999911
Turbidity	NTU	140	0.1	27	0.1	9000043	2.3	0.1	9000043
Alkalinity (Total as CaCO3)	mg/L	24	1.0	32	1.0	8999879	130	1.0	8999996
Dissolved Chloride (Cl-)	mg/L	31	1.0	4.1	1.0	8999889	110	1.0	8999889
Nitrite (N)	mg/L	ND	0.010	ND	0.010	8999841	ND	0.010	8999873
Nitrate (N)	mg/L	0.19	0.10	0.11	0.10	8999841	ND	0.10	8999873
Nitrate + Nitrite (N)	mg/L	0.19	0.10	0.11	0.10	8999841	ND	0.10	8999873

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

Bureau Veritas Job #: C3W8856
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XJD725			XJD726		XJD727		
Sampling Date		2023/10/19 11:45			2023/10/19 10:30		2023/10/19 10:45		
COC Number		781230			781230		781230		
	UNITS	NB MW3 Lab-Dup	RDL	QC Batch	NB MW4	RDL	NB MW5R	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L				110	1.0	86	1.0	8997640
Inorganics									
Total Ammonia-N	mg/L				ND	0.050	ND	0.050	9004018
Total Chemical Oxygen Demand (COD)	mg/L				ND	4.0	4.9	4.0	9005673
Conductivity	umho/cm	860	1.0	8999997	270	1.0	210	1.0	8999884
Total Dissolved Solids	mg/L				160	10	170	10	9013589
Total Kjeldahl Nitrogen (TKN)	mg/L				0.14	0.10	ND	0.10	9006131
Dissolved Organic Carbon	mg/L				0.6	0.4	1.1	0.4	9003192
pH	pH	7.41		8999977	8.03		7.68		8999883
Phenols-4AAP	mg/L				ND	0.0010	ND	0.0010	9007776
Total Phosphorus	mg/L				2.5	0.020	2.1	0.020	9006644
Total Suspended Solids	mg/L				910	10	1900	50	9011629
Dissolved Sulphate (SO4)	mg/L				20	1.0	13	1.0	8999911
Turbidity	NTU				14	0.1	210	0.1	9000043
Alkalinity (Total as CaCO3)	mg/L	130	1.0	8999996	61	1.0	37	1.0	8999879
Dissolved Chloride (Cl-)	mg/L				26	1.0	20	1.0	8999889
Nitrite (N)	mg/L				ND	0.010	ND	0.010	8999841
Nitrate (N)	mg/L				ND	0.10	ND	0.10	8999841
Nitrate + Nitrite (N)	mg/L				ND	0.10	ND	0.10	8999841
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.									



RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XJD728			XJD728		
Sampling Date		2023/10/19 10:30			2023/10/19 10:30		
COC Number		781230			781230		
	UNITS	NB-QAQC-GW1	RDL	QC Batch	NB-QAQC-GW1 Lab-Dup	RDL	QC Batch
Calculated Parameters							
Hardness (CaCO3)	mg/L	120	1.0	8997640			
Inorganics							
Total Ammonia-N	mg/L	ND	0.050	9004018			
Total Chemical Oxygen Demand (COD)	mg/L	ND	4.0	9005645			
Conductivity	umho/cm	270	1.0	8999884			
Total Dissolved Solids	mg/L	220	10	9008301			
Total Kjeldahl Nitrogen (TKN)	mg/L	ND	0.10	9006618			
Dissolved Organic Carbon	mg/L	0.7	0.4	9003192	0.7	0.4	9003192
pH	pH	8.03		8999883			
Phenols-4AAP	mg/L	0.0011	0.0010	9007776			
Total Phosphorus	mg/L	2.6	0.020	9006644	2.5	0.020	9006644
Total Suspended Solids	mg/L	900	10	9012166			
Dissolved Sulphate (SO4)	mg/L	20	1.0	8999911			
Turbidity	NTU	15	0.1	9000043			
Alkalinity (Total as CaCO3)	mg/L	61	1.0	8999879			
Dissolved Chloride (Cl-)	mg/L	26	1.0	8999889			
Nitrite (N)	mg/L	ND	0.010	8999841			
Nitrate (N)	mg/L	ND	0.10	8999841			
Nitrate + Nitrite (N)	mg/L	ND	0.10	8999841			
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

Bureau Veritas Job #: C3W8856
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XJD723		XJD724	XJD725		XJD726	XJD727		
Sampling Date		2023/10/19 12:10		2023/10/19 12:00	2023/10/19 11:45		2023/10/19 10:30	2023/10/19 10:45		
COC Number		781230		781230	781230		781230	781230		
	UNITS	NB MW1	QC Batch	NB MW2R	NB MW3	QC Batch	NB MW4	NB MW5R	RDL	QC Batch

Metals										
Dissolved Mercury (Hg)	ug/L	ND	9002508	ND	ND	9002508	ND	ND	0.10	9002508
Dissolved Aluminum (Al)	ug/L	ND	8999044	13	ND	8999811	5.0	ND	4.9	8999044
Dissolved Arsenic (As)	ug/L	ND	8999044	ND	ND	8999811	ND	ND	1.0	8999044
Dissolved Barium (Ba)	ug/L	11	8999044	3.2	84	8999811	13	17	2.0	8999044
Dissolved Beryllium (Be)	ug/L	ND	8999044	ND	ND	8999811	ND	ND	0.40	8999044
Dissolved Boron (B)	ug/L	ND	8999044	ND	150	8999811	ND	ND	10	8999044
Dissolved Cadmium (Cd)	ug/L	ND	8999044	ND	ND	8999811	ND	ND	0.090	8999044
Dissolved Calcium (Ca)	ug/L	9500	8999044	7600	76000	8999811	35000	23000	200	8999044
Dissolved Chromium (Cr)	ug/L	ND	8999044	ND	ND	8999811	ND	ND	5.0	8999044
Dissolved Cobalt (Co)	ug/L	ND	8999044	ND	4.3	8999811	ND	ND	0.50	8999044
Dissolved Copper (Cu)	ug/L	5.4	8999044	ND	1.1	8999811	ND	ND	0.90	8999044
Dissolved Iron (Fe)	ug/L	ND	8999044	ND	ND	8999811	ND	ND	100	8999044
Dissolved Lead (Pb)	ug/L	ND	8999044	ND	ND	8999811	ND	ND	0.50	8999044
Dissolved Magnesium (Mg)	ug/L	1700	8999044	3100	29000	8999811	6900	6900	50	8999044
Dissolved Manganese (Mn)	ug/L	ND	8999044	ND	67	8999811	3.1	160	2.0	8999044
Dissolved Molybdenum (Mo)	ug/L	ND	8999044	ND	ND	8999811	2.1	2.2	0.50	8999044
Dissolved Nickel (Ni)	ug/L	ND	8999044	ND	5.4	8999811	ND	ND	1.0	8999044
Dissolved Potassium (K)	ug/L	1700	8999044	1600	5600	8999811	3200	2600	200	8999044
Dissolved Selenium (Se)	ug/L	ND	8999044	ND	ND	8999811	ND	ND	2.0	8999044
Dissolved Silicon (Si)	ug/L	10000	8999044	13000	16000	8999811	10000	9800	50	8999044
Dissolved Silver (Ag)	ug/L	ND	8999044	ND	ND	8999811	ND	ND	0.090	8999044
Dissolved Sodium (Na)	ug/L	24000	8999044	4400	38000	8999811	6600	5900	100	8999044
Dissolved Strontium (Sr)	ug/L	85	8999044	47	680	8999811	99	100	1.0	8999044
Dissolved Thallium (Tl)	ug/L	ND	8999044	ND	ND	8999811	ND	ND	0.050	8999044
Dissolved Titanium (Ti)	ug/L	ND	8999044	ND	ND	8999811	ND	ND	5.0	8999044
Dissolved Vanadium (V)	ug/L	0.54	8999044	4.0	0.83	8999811	ND	ND	0.50	8999044
Dissolved Zinc (Zn)	ug/L	30	8999044	ND	ND	8999811	ND	ND	5.0	8999044

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

Bureau Veritas Job #: C3W8856
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XJD728		
Sampling Date		2023/10/19 10:30		
COC Number		781230		
	UNITS	NB-QAQC-GW1	RDL	QC Batch
Metals				
Dissolved Mercury (Hg)	ug/L	ND	0.10	9002508
Dissolved Aluminum (Al)	ug/L	ND	4.9	8999044
Dissolved Arsenic (As)	ug/L	ND	1.0	8999044
Dissolved Barium (Ba)	ug/L	13	2.0	8999044
Dissolved Beryllium (Be)	ug/L	ND	0.40	8999044
Dissolved Boron (B)	ug/L	ND	10	8999044
Dissolved Cadmium (Cd)	ug/L	ND	0.090	8999044
Dissolved Calcium (Ca)	ug/L	35000	200	8999044
Dissolved Chromium (Cr)	ug/L	ND	5.0	8999044
Dissolved Cobalt (Co)	ug/L	ND	0.50	8999044
Dissolved Copper (Cu)	ug/L	ND	0.90	8999044
Dissolved Iron (Fe)	ug/L	ND	100	8999044
Dissolved Lead (Pb)	ug/L	ND	0.50	8999044
Dissolved Magnesium (Mg)	ug/L	7100	50	8999044
Dissolved Manganese (Mn)	ug/L	3.2	2.0	8999044
Dissolved Molybdenum (Mo)	ug/L	2.0	0.50	8999044
Dissolved Nickel (Ni)	ug/L	ND	1.0	8999044
Dissolved Potassium (K)	ug/L	3300	200	8999044
Dissolved Selenium (Se)	ug/L	ND	2.0	8999044
Dissolved Silicon (Si)	ug/L	10000	50	8999044
Dissolved Silver (Ag)	ug/L	ND	0.090	8999044
Dissolved Sodium (Na)	ug/L	6900	100	8999044
Dissolved Strontium (Sr)	ug/L	100	1.0	8999044
Dissolved Thallium (Tl)	ug/L	ND	0.050	8999044
Dissolved Titanium (Ti)	ug/L	ND	5.0	8999044
Dissolved Vanadium (V)	ug/L	ND	0.50	8999044
Dissolved Zinc (Zn)	ug/L	ND	5.0	8999044
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

Bureau Veritas Job #: C3W8856
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste

TEST SUMMARY

Bureau Veritas ID: XJD723
Sample ID: NB MW1
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8999879	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8999889	N/A	2023/10/27	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9005673	N/A	2023/10/27	Nimarta Singh
Conductivity	AT	8999884	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9003192	N/A	2023/10/28	Gyulshen Idriz
Hardness (calculated as CaCO3)		8997640	N/A	2023/10/27	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9002508	2023/10/24	2023/10/24	Gagandeep Rai
Dissolved Metals by ICPMS	ICP/MS	8999044	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9004023	N/A	2023/10/29	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	8999841	N/A	2023/10/25	Chandra Nandlal
pH	AT	8999883	2023/10/23	2023/10/25	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9007776	N/A	2023/10/26	Chloe Pollock
Sulphate by Automated Turbidimetry	KONE	8999911	N/A	2023/10/27	Alina Dobreanu
Total Dissolved Solids	BAL	9013589	2023/10/30	2023/11/01	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9006618	2023/10/25	2023/10/26	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9006644	2023/10/25	2023/10/26	Sachi Patel
Total Suspended Solids	BAL	9011629	2023/10/27	2023/11/02	Tina Teng
Turbidity	AT	9000043	N/A	2023/10/23	Kien Tran

Bureau Veritas ID: XJD724
Sample ID: NB MW2R
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8999879	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8999889	N/A	2023/10/27	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9005673	N/A	2023/10/27	Nimarta Singh
Conductivity	AT	8999884	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9003192	N/A	2023/10/28	Gyulshen Idriz
Hardness (calculated as CaCO3)		8997640	N/A	2023/10/26	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9002508	2023/10/24	2023/10/24	Gagandeep Rai
Dissolved Metals by ICPMS	ICP/MS	8999811	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9004023	N/A	2023/10/29	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	8999841	N/A	2023/10/25	Chandra Nandlal
pH	AT	8999883	2023/10/23	2023/10/25	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9007776	N/A	2023/10/26	Chloe Pollock
Sulphate by Automated Turbidimetry	KONE	8999911	N/A	2023/10/27	Alina Dobreanu
Total Dissolved Solids	BAL	9013589	2023/10/30	2023/11/01	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9006618	2023/10/25	2023/10/26	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9006644	2023/10/25	2023/10/26	Sachi Patel
Total Suspended Solids	BAL	9011629	2023/10/27	2023/11/02	Tina Teng
Turbidity	AT	9000043	N/A	2023/10/23	Kien Tran



BUREAU
VERITAS

Bureau Veritas Job #: C3W8856
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste

TEST SUMMARY

Bureau Veritas ID: XJD725
Sample ID: NB MW3
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8999996	N/A	2023/10/26	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8999889	N/A	2023/10/27	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9005673	N/A	2023/10/27	Nimarta Singh
Conductivity	AT	8999997	N/A	2023/10/26	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9003192	N/A	2023/10/28	Gyulshen Idriz
Hardness (calculated as CaCO3)		8997640	N/A	2023/10/26	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9002508	2023/10/24	2023/10/24	Gagandeep Rai
Dissolved Metals by ICPMS	ICP/MS	8999811	N/A	2023/10/25	Nan Raykha
Total Ammonia-N	LACH/NH4	9004018	N/A	2023/10/27	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8999873	N/A	2023/10/24	Chandra Nandlal
pH	AT	8999977	2023/10/23	2023/10/26	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9007776	N/A	2023/10/26	Chloe Pollock
Sulphate by Automated Turbidimetry	KONE	8999911	N/A	2023/10/27	Alina Dobreanu
Total Dissolved Solids	BAL	9008301	2023/10/28	2023/10/31	Shaneil Hall
Total Kjeldahl Nitrogen in Water	SKAL	9006131	2023/10/25	2023/10/26	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9006644	2023/10/25	2023/10/27	Sachi Patel
Total Suspended Solids	BAL	9011629	2023/10/27	2023/11/02	Tina Teng
Turbidity	AT	9000043	N/A	2023/10/23	Kien Tran

Bureau Veritas ID: XJD725 Dup
Sample ID: NB MW3
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8999996	N/A	2023/10/26	Nachiketa Gohil
Conductivity	AT	8999997	N/A	2023/10/26	Nachiketa Gohil
pH	AT	8999977	2023/10/23	2023/10/26	Nachiketa Gohil

Bureau Veritas ID: XJD726
Sample ID: NB MW4
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8999879	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8999889	N/A	2023/10/27	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9005673	N/A	2023/10/27	Nimarta Singh
Conductivity	AT	8999884	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9003192	N/A	2023/10/28	Gyulshen Idriz
Hardness (calculated as CaCO3)		8997640	N/A	2023/10/27	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9002508	2023/10/24	2023/10/24	Gagandeep Rai
Dissolved Metals by ICPMS	ICP/MS	8999044	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9004018	N/A	2023/10/27	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8999841	N/A	2023/10/25	Chandra Nandlal
pH	AT	8999883	2023/10/23	2023/10/25	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9007776	N/A	2023/10/26	Chloe Pollock



BUREAU
VERITAS

Bureau Veritas Job #: C3W8856
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste

TEST SUMMARY

Bureau Veritas ID: XJD726
Sample ID: NB MW4
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphate by Automated Turbidimetry	KONE	8999911	N/A	2023/10/27	Alina Dobreanu
Total Dissolved Solids	BAL	9013589	2023/10/30	2023/11/01	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9006131	2023/10/25	2023/10/26	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9006644	2023/10/25	2023/10/27	Sachi Patel
Total Suspended Solids	BAL	9011629	2023/10/27	2023/11/02	Tina Teng
Turbidity	AT	9000043	N/A	2023/10/23	Kien Tran

Bureau Veritas ID: XJD727
Sample ID: NB MW5R
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8999879	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8999889	N/A	2023/10/27	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9005673	N/A	2023/10/27	Nimarta Singh
Conductivity	AT	8999884	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9003192	N/A	2023/10/28	Gyulshen Idriz
Hardness (calculated as CaCO3)		8997640	N/A	2023/10/27	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9002508	2023/10/24	2023/10/24	Gagandeep Rai
Dissolved Metals by ICPMS	ICP/MS	8999044	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9004018	N/A	2023/10/27	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8999841	N/A	2023/10/25	Chandra Nandlal
pH	AT	8999883	2023/10/23	2023/10/25	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9007776	N/A	2023/10/26	Chloe Pollock
Sulphate by Automated Turbidimetry	KONE	8999911	N/A	2023/10/27	Alina Dobreanu
Total Dissolved Solids	BAL	9013589	2023/10/30	2023/11/01	Razieh Tabesh
Total Kjeldahl Nitrogen in Water	SKAL	9006131	2023/10/25	2023/10/26	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9006644	2023/10/25	2023/10/26	Sachi Patel
Total Suspended Solids	BAL	9011629	2023/10/27	2023/11/02	Tina Teng
Turbidity	AT	9000043	N/A	2023/10/23	Kien Tran

Bureau Veritas ID: XJD728
Sample ID: NB-QAQC-GW1
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8999879	N/A	2023/10/25	Nachiketa Gohil
Chloride by Automated Colourimetry	KONE	8999889	N/A	2023/10/27	Alina Dobreanu
Chemical Oxygen Demand	SPEC	9005645	N/A	2023/10/26	Nimarta Singh
Conductivity	AT	8999884	N/A	2023/10/25	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9003192	N/A	2023/10/28	Gyulshen Idriz
Hardness (calculated as CaCO3)		8997640	N/A	2023/10/27	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9002508	2023/10/24	2023/10/24	Gagandeep Rai
Dissolved Metals by ICPMS	ICP/MS	8999044	N/A	2023/10/26	Nan Raykha
Total Ammonia-N	LACH/NH4	9004018	N/A	2023/10/27	Prabhjot Kaur



BUREAU
VERITAS

Bureau Veritas Job #: C3W8856
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste

TEST SUMMARY

Bureau Veritas ID: XJD728
Sample ID: NB-QAQC-GW1
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate & Nitrite as Nitrogen in Water	LACH	8999841	N/A	2023/10/25	Chandra Nandlal
pH	AT	8999883	2023/10/23	2023/10/25	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9007776	N/A	2023/10/26	Chloe Pollock
Sulphate by Automated Turbidimetry	KONE	8999911	N/A	2023/10/27	Alina Dobreanu
Total Dissolved Solids	BAL	9008301	2023/10/27	2023/10/31	Shaneil Hall
Total Kjeldahl Nitrogen in Water	SKAL	9006618	2023/10/25	2023/10/26	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9006644	2023/10/25	2023/10/26	Sachi Patel
Total Suspended Solids	BAL	9012166	2023/10/27	2023/10/30	Tina Teng
Turbidity	AT	9000043	N/A	2023/10/23	Kien Tran

Bureau Veritas ID: XJD728 Dup
Sample ID: NB-QAQC-GW1
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9003192	N/A	2023/10/28	Gyulshen Idriz
Total Phosphorus (Colourimetric)	SKAL/P	9006644	2023/10/25	2023/10/26	Sachi Patel



GENERAL COMMENTS

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

Package 1	4.3°C
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TDS Analysis: Analysis was performed past sample holding time. This may increase the variability associated with these results.

Sample XJD723 [NB MW1] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Sample XJD724 [NB MW2R] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Sample XJD725 [NB MW3] : TDS Analysis: Analysis was performed past sample holding time. This may increase the variability associated with these results.

Sample XJD727 [NB MW5R] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Sample XJD728 [NB-QAQC-GW1] : TSS/TDS 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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Bureau Veritas Job #: C3W8856

Report Date: 2023/11/02

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8999044	Dissolved Aluminum (Al)	2023/10/26	NC	80 - 120	104	80 - 120	ND, RDL=4.9	ug/L				
8999044	Dissolved Arsenic (As)	2023/10/26	102	80 - 120	101	80 - 120	ND, RDL=1.0	ug/L	NC	20		
8999044	Dissolved Barium (Ba)	2023/10/26	104	80 - 120	102	80 - 120	ND, RDL=2.0	ug/L	1.6	20		
8999044	Dissolved Beryllium (Be)	2023/10/26	105	80 - 120	107	80 - 120	ND, RDL=0.40	ug/L	NC	20		
8999044	Dissolved Boron (B)	2023/10/26	98	80 - 120	103	80 - 120	ND, RDL=10	ug/L	2.7	20		
8999044	Dissolved Cadmium (Cd)	2023/10/26	101	80 - 120	101	80 - 120	ND, RDL=0.090	ug/L	6.5	20		
8999044	Dissolved Calcium (Ca)	2023/10/26	NC	80 - 120	106	80 - 120	ND, RDL=200	ug/L				
8999044	Dissolved Chromium (Cr)	2023/10/26	106	80 - 120	104	80 - 120	ND, RDL=5.0	ug/L	NC	20		
8999044	Dissolved Cobalt (Co)	2023/10/26	99	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	1.6	20		
8999044	Dissolved Copper (Cu)	2023/10/26	110	80 - 120	105	80 - 120	ND, RDL=0.90	ug/L	2.4	20		
8999044	Dissolved Iron (Fe)	2023/10/26	103	80 - 120	104	80 - 120	ND, RDL=100	ug/L				
8999044	Dissolved Lead (Pb)	2023/10/26	98	80 - 120	103	80 - 120	ND, RDL=0.50	ug/L	NC	20		
8999044	Dissolved Magnesium (Mg)	2023/10/26	NC	80 - 120	105	80 - 120	ND, RDL=50	ug/L				
8999044	Dissolved Manganese (Mn)	2023/10/26	NC	80 - 120	102	80 - 120	ND, RDL=2.0	ug/L				
8999044	Dissolved Molybdenum (Mo)	2023/10/26	115	80 - 120	106	80 - 120	ND, RDL=0.50	ug/L	10	20		
8999044	Dissolved Nickel (Ni)	2023/10/26	96	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	6.2	20		
8999044	Dissolved Potassium (K)	2023/10/26	109	80 - 120	106	80 - 120	ND, RDL=200	ug/L				
8999044	Dissolved Selenium (Se)	2023/10/26	98	80 - 120	101	80 - 120	ND, RDL=2.0	ug/L	NC	20		
8999044	Dissolved Silicon (Si)	2023/10/26	121 (1)	80 - 120	108	80 - 120	ND, RDL=50	ug/L				
8999044	Dissolved Silver (Ag)	2023/10/26	100	80 - 120	104	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8999044	Dissolved Sodium (Na)	2023/10/26	NC	80 - 120	105	80 - 120	ND, RDL=100	ug/L				
8999044	Dissolved Strontium (Sr)	2023/10/26	NC	80 - 120	99	80 - 120	ND, RDL=1.0	ug/L				
8999044	Dissolved Thallium (Tl)	2023/10/26	99	80 - 120	102	80 - 120	ND, RDL=0.050	ug/L	NC	20		
8999044	Dissolved Titanium (Ti)	2023/10/26	116	80 - 120	106	80 - 120	ND, RDL=5.0	ug/L				
8999044	Dissolved Vanadium (V)	2023/10/26	107	80 - 120	101	80 - 120	ND, RDL=0.50	ug/L	NC	20		
8999044	Dissolved Zinc (Zn)	2023/10/26	95	80 - 120	101	80 - 120	ND, RDL=5.0	ug/L	2.2	20		
8999811	Dissolved Aluminum (Al)	2023/10/25	104	80 - 120	100	80 - 120	ND, RDL=4.9	ug/L				
8999811	Dissolved Arsenic (As)	2023/10/25	101	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L				
8999811	Dissolved Barium (Ba)	2023/10/25	99	80 - 120	102	80 - 120	ND, RDL=2.0	ug/L	0.63	20		



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VERITAS

Bureau Veritas Job #: C3W8856

Report Date: 2023/11/02

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8999811	Dissolved Beryllium (Be)	2023/10/25	101	80 - 120	103	80 - 120	ND, RDL=0.40	ug/L				
8999811	Dissolved Boron (B)	2023/10/25	NC	80 - 120	102	80 - 120	ND, RDL=10	ug/L	1.8	20		
8999811	Dissolved Cadmium (Cd)	2023/10/25	99	80 - 120	100	80 - 120	ND, RDL=0.090	ug/L				
8999811	Dissolved Calcium (Ca)	2023/10/25	NC	80 - 120	102	80 - 120	ND, RDL=200	ug/L	2.4	20		
8999811	Dissolved Chromium (Cr)	2023/10/25	100	80 - 120	103	80 - 120	ND, RDL=5.0	ug/L				
8999811	Dissolved Cobalt (Co)	2023/10/25	100	80 - 120	101	80 - 120	ND, RDL=0.50	ug/L				
8999811	Dissolved Copper (Cu)	2023/10/25	101	80 - 120	102	80 - 120	ND, RDL=0.90	ug/L				
8999811	Dissolved Iron (Fe)	2023/10/25	99	80 - 120	100	80 - 120	ND, RDL=100	ug/L	NC	20		
8999811	Dissolved Lead (Pb)	2023/10/25	97	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L				
8999811	Dissolved Magnesium (Mg)	2023/10/25	NC	80 - 120	100	80 - 120	ND, RDL=50	ug/L	2.6	20		
8999811	Dissolved Manganese (Mn)	2023/10/25	98	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L				
8999811	Dissolved Molybdenum (Mo)	2023/10/25	108	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L				
8999811	Dissolved Nickel (Ni)	2023/10/25	95	80 - 120	98	80 - 120	ND, RDL=1.0	ug/L				
8999811	Dissolved Potassium (K)	2023/10/25	NC	80 - 120	102	80 - 120	ND, RDL=200	ug/L				
8999811	Dissolved Selenium (Se)	2023/10/25	101	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L				
8999811	Dissolved Silicon (Si)	2023/10/25	104	80 - 120	103	80 - 120	ND, RDL=50	ug/L				
8999811	Dissolved Silver (Ag)	2023/10/25	92	80 - 120	99	80 - 120	ND, RDL=0.090	ug/L				
8999811	Dissolved Sodium (Na)	2023/10/25	NC	80 - 120	100	80 - 120	ND, RDL=100	ug/L	1.1	20		
8999811	Dissolved Strontium (Sr)	2023/10/25	NC	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L				
8999811	Dissolved Thallium (Tl)	2023/10/25	97	80 - 120	102	80 - 120	ND, RDL=0.050	ug/L				
8999811	Dissolved Titanium (Ti)	2023/10/25	106	80 - 120	105	80 - 120	ND, RDL=5.0	ug/L				
8999811	Dissolved Vanadium (V)	2023/10/25	102	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L				
8999811	Dissolved Zinc (Zn)	2023/10/25	98	80 - 120	101	80 - 120	ND, RDL=5.0	ug/L				
8999841	Nitrate (N)	2023/10/25	98	80 - 120	99	80 - 120	ND, RDL=0.10	mg/L	0.41	20		
8999841	Nitrite (N)	2023/10/25	105	80 - 120	107	80 - 120	ND, RDL=0.010	mg/L	NC	20		
8999873	Nitrate (N)	2023/10/24	102	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	0.44	20		
8999873	Nitrite (N)	2023/10/24	108	80 - 120	106	80 - 120	ND, RDL=0.010	mg/L				



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VERITAS

Bureau Veritas Job #: C3W8856

Report Date: 2023/11/02

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8999879	Alkalinity (Total as CaCO3)	2023/10/25			96	85 - 115	ND, RDL=1.0	mg/L	0.30	20		
8999883	pH	2023/10/25			102	98 - 103			0.11	N/A		
8999884	Conductivity	2023/10/25			102	85 - 115	ND, RDL=1.0	umho/cm	0.39	10		
8999889	Dissolved Chloride (Cl-)	2023/10/27	90	80 - 120	94	80 - 120	ND, RDL=1.0	mg/L	NC	20		
8999911	Dissolved Sulphate (SO4)	2023/10/27	87	75 - 125	97	80 - 120	ND, RDL=1.0	mg/L	15	20		
8999977	pH	2023/10/26			102	98 - 103			0.28	N/A		
8999996	Alkalinity (Total as CaCO3)	2023/10/26			97	85 - 115	ND, RDL=1.0	mg/L	0.00023	20		
8999997	Conductivity	2023/10/26			101	85 - 115	ND, RDL=1.0	umho/cm	0.12	10		
9000043	Turbidity	2023/10/23			102	80 - 120	ND, RDL=0.1	NTU	2.2	20		
9002508	Dissolved Mercury (Hg)	2023/10/24	101	75 - 125	102	80 - 120	ND, RDL=0.10	ug/L	NC	20		
9003192	Dissolved Organic Carbon	2023/10/28	91	80 - 120	93	80 - 120	ND, RDL=0.4	mg/L	3.3	20		
9004018	Total Ammonia-N	2023/10/27	100	75 - 125	101	80 - 120	ND, RDL=0.050	mg/L	NC	20		
9004023	Total Ammonia-N	2023/10/29	105	75 - 125	104	80 - 120	ND, RDL=0.050	mg/L	NC	20		
9005645	Total Chemical Oxygen Demand (COD)	2023/10/27	92	80 - 120	103	80 - 120	ND, RDL=4.0	mg/L	1.9	20		
9005673	Total Chemical Oxygen Demand (COD)	2023/10/27	96	80 - 120	98	80 - 120	ND, RDL=4.0	mg/L	0	20		
9006131	Total Kjeldahl Nitrogen (TKN)	2023/10/27	NC	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	1.3	20	100	80 - 120
9006618	Total Kjeldahl Nitrogen (TKN)	2023/10/26	112	80 - 120	99	80 - 120	ND, RDL=0.10	mg/L	3.9	20	102	80 - 120
9006644	Total Phosphorus	2023/10/26	99	80 - 120	102	80 - 120	ND, RDL=0.020	mg/L	1.9	20	101	80 - 120
9007776	Phenols-4AAP	2023/10/26	103	80 - 120	100	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
9008301	Total Dissolved Solids	2023/10/31			100	90 - 110	ND, RDL=10	mg/L	2.5	20		
9011629	Total Suspended Solids	2023/11/02			95	85 - 115	ND, RDL=10	mg/L	0	20		
9012166	Total Suspended Solids	2023/10/30			99	85 - 115	ND, RDL=10	mg/L	5.4	20		



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VERITAS

Bureau Veritas Job #: C3W8856

Report Date: 2023/11/02

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9013589	Total Dissolved Solids	2023/11/01			95	90 - 110	ND, RDL=10	mg/L	13	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).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU
VERITAS

Bureau Veritas Job #: C3W8856
Report Date: 2023/11/02

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste

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.



Custody Tracking Form



T781230

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: NB MW1
Last Sample: NB-QAQC-GW1
Sample Count: 6

Relinquished By				Received By			
Brad McCallum	<i>Brad McCallum</i>	Date	2023/10/20	AUSKERE SHERSTHA	<i>SA</i>	Date	2023/10/21
		Time (24 HR)	09:00			Time (24 HR)	10:56
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 McCallum / Matt DeGeer

of Coolers/Pkgs:

1

Rush

Immediate Test

Food Residue

Micro

Food Chemistry

*** LABORATORY USE ONLY ***

Received At

Lab Comments:

Labeled By

Verified By

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
<i>N</i>	<i>Y</i>	<i>Y</i>	<i>3</i>	<i>2</i>	<i>8</i>
Drinking Water Metals Preservation Check Done (Circle) YES NO					

21-Oct-23 10:56
Christine Gripton
C3W8856

JDK ENV-1571

COR FCD-00383/4

Page 1 of 1

Appendix D

D-3 Surface Water Laboratory Reports

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

4 Catarqui Street
Kingston, ON K7K1Z7
(613) 531-2725

ATTENTION TO: Carolyn Miller

PROJECT: 230225-08

AGAT WORK ORDER: 23T021608

WATER ANALYSIS REVIEWED BY: Chuandi Zhang, Lab Team Lead

DATE REPORTED: May 26, 2023

PAGES (INCLUDING COVER): 11

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)

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.



Certificate of Analysis

AGAT WORK ORDER: 23T021608

PROJECT: 230225-08

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.

ATTENTION TO: Carolyn Miller

SAMPLING SITE: North Baptiste

SAMPLED BY:

Surface Water Parameters

DATE RECEIVED: 2023-05-05

DATE REPORTED: 2023-05-26

Parameter	Unit	SAMPLE DESCRIPTION:		MCG-A	MCG-B	MCG-C	MCG-D	MCG-E	MCG-F	MCG-G	MCG-H
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-05-03 08:55	2023-05-03 11:55	2023-05-03 10:00	2023-05-03 10:12	2023-05-03 08:30	2023-05-03 08:45	2023-05-03 09:15	2023-05-03 11:45
		G / S	RDL	4965521	4965523	4965524	4965525	4965526	4965527	4965528	4965529
BOD (5)	mg/L		2	<2	<2	<2	<2	<2	<2	<2	<2
pH	pH Units	6.5-8.5	NA	6.92	7.61	7.24	6.26	6.84	6.67	6.66	6.62
Alkalinity (as CaCO3)	mg/L		5	7	279	40	<5	11	8	7	8
Electrical Conductivity	µS/cm		2	25	622	136	32	105	143	27	40
Hardness (as CaCO3) (Calculated)	mg/L		0.5	4.8	269	52.1	7.7	11.0	10.5	9.7	13.7
Total Dissolved Solids	mg/L		10	36	384	134	68	88	100	50	64
Total Suspended Solids	mg/L		10	<10	<10	<10	<10	<10	<10	<10	<10
Chloride	mg/L	0.10	1.30	9.78	4.92	0.67	20.4	34.7	0.32	2.75	
Turbidity	NTU	0.5	0.7	9.9	0.9	0.6	1.4	1.7	5.9	0.7	
Nitrate as N	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05
Nitrite as N	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	0.10	2.49	50.2	15.3	4.73	3.77	3.33	2.92	2.78	
Ammonia as N	mg/L		0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Ammonia-Un-ionized (Calculated)	mg/L	0.02	0.000002	<0.000002	0.000035	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	0.33	0.84	0.38	0.20	0.26	0.28	0.18
Total Phosphorus	mg/L	*	0.02	<0.02	0.05	<0.02	0.03	<0.02	<0.02	<0.02	<0.02
True Colour	TCU		2.5	9.0	27.8	174	102	47.9	37.8	50.1	33.5
Total Calcium	mg/L	0.20	1.53	88.4	13.3	1.98	3.21	3.20	2.82	4.40	
Total Magnesium	mg/L	0.10	0.24	11.6	4.58	0.68	0.73	0.61	0.64	0.67	
Total Potassium	mg/L	0.50	<0.50	13.3	2.90	<0.50	0.71	0.82	0.53	<0.50	
Total Sodium	mg/L	0.10	1.43	13.4	7.82	1.35	15.3	20.4	0.62	2.74	
Aluminum-dissolved	mg/L	*	0.004	0.095	<0.004	0.099	0.187	0.080	0.065	0.073	0.077
Total Arsenic	mg/L	0.1	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Total Boron	mg/L	0.2	0.010	0.013	0.184	0.181	0.014	<0.010	<0.010	<0.010	0.012
Total Cadmium	mg/L	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
Total Chromium	mg/L		0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Total Cobalt	mg/L	0.0009	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005
Total Copper	mg/L	0.005	0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Total Iron	mg/L	0.3	0.010	0.085	2.31	0.551	0.271	0.250	0.300	0.755	0.079

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 23T021608

PROJECT: 230225-08

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.

ATTENTION TO: Carolyn Miller

SAMPLING SITE: North Baptiste

SAMPLED BY:

Surface Water Parameters

DATE RECEIVED: 2023-05-05

DATE REPORTED: 2023-05-26

Parameter	Unit	SAMPLE DESCRIPTION:		MCG-A	MCG-B	MCG-C	MCG-D	MCG-E	MCG-F	MCG-G	MCG-H
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2023-05-03 08:55	2023-05-03 11:55	2023-05-03 10:00	2023-05-03 10:12	2023-05-03 08:30	2023-05-03 08:45	2023-05-03 09:15	2023-05-03 11:45
		G / S	RDL	4965521	4965523	4965524	4965525	4965526	4965527	4965528	4965529
Total Lead	mg/L	*	0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.001	<0.001
Total Manganese	mg/L		0.002	0.003	0.385	0.020	0.014	0.015	0.012	0.060	0.004
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Nickel	mg/L	0.025	0.003	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003
Total Selenium	mg/L	0.1	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Silver	mg/L	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Zinc	mg/L	0.030	0.020	<0.020	0.057	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 23T021608

PROJECT: 230225-08

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
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<http://www.agatlabs.com>

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

ATTENTION TO: Carolyn Miller

SAMPLING SITE: North Baptiste

SAMPLED BY:

Surface Water Parameters

DATE RECEIVED: 2023-05-05

DATE REPORTED: 2023-05-26

Parameter	Unit	MCG-QAQC-		
		G / S	RDL	4965530
BOD (5)	mg/L		2	<2
pH	pH Units	6.5-8.5	NA	6.84
Alkalinity (as CaCO3)	mg/L		5	10
Electrical Conductivity	µS/cm		2	105
Hardness (as CaCO3) (Calculated)	mg/L		0.5	14.1
Total Dissolved Solids	mg/L		10	86
Total Suspended Solids	mg/L		10	<10
Chloride	mg/L		0.10	20.5
Turbidity	NTU		0.5	1.3
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Sulphate	mg/L		0.10	3.67
Ammonia as N	mg/L		0.02	<0.02
Ammonia-Un-ionized (Calculated)	mg/L	0.02	0.000002	<0.000002
Total Kjeldahl Nitrogen	mg/L		0.10	0.21
Total Phosphorus	mg/L	*	0.02	<0.02
True Colour	TCU		2.5	49.4
Total Calcium	mg/L		0.20	4.46
Total Magnesium	mg/L		0.10	0.73
Total Potassium	mg/L		0.50	0.67
Total Sodium	mg/L		0.10	13.1
Aluminum-dissolved	mg/L	*	0.004	0.079
Total Arsenic	mg/L	0.1	0.003	<0.003
Total Boron	mg/L	0.2	0.010	0.012
Total Cadmium	mg/L	0.0002	0.0001	<0.0001
Total Chromium	mg/L		0.003	<0.003
Total Cobalt	mg/L	0.0009	0.0005	<0.0005
Total Copper	mg/L	0.005	0.001	0.001

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 23T021608

PROJECT: 230225-08

5835 COOPERS AVENUE
 MISSISSAUGA, ONTARIO
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CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

ATTENTION TO: Carolyn Miller

SAMPLING SITE: North Baptiste

SAMPLED BY:

Surface Water Parameters

DATE RECEIVED: 2023-05-05

DATE REPORTED: 2023-05-26

Parameter	Unit	G / S	RDL	MCG-QAQC-
				4965530
SAMPLE DESCRIPTION:		SW1		
SAMPLE TYPE:		Water		
DATE SAMPLED:		2023-05-03 08:30		
Total Iron	mg/L	0.3	0.010	0.243
Total Lead	mg/L	*	0.001	<0.001
Total Manganese	mg/L		0.002	0.010
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001
Total Nickel	mg/L	0.025	0.003	<0.003
Total Selenium	mg/L	0.1	0.002	<0.002
Total Silver	mg/L	0.0001	0.0001	<0.0001
Total Zinc	mg/L	0.030	0.020	<0.020

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
 Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

4965521-4965530 The calculation of Un-ionized Ammonia: was based on field measured parameters (pH and temperature); Value is reported as calculated.

Un-ionized Ammonia detection limit is a calculated RDL

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Exceedance Summary

AGAT WORK ORDER: 23T021608

PROJECT: 230225-08

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

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

ATTENTION TO: Carolyn Miller

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
4965521	MCG-A	ON PWQO	Surface Water Parameters	Field pH	pH Units	6.5-8.5	6.47
4965523	MCG-B	ON PWQO	Surface Water Parameters	Total Iron	mg/L	0.3	2.31
4965523	MCG-B	ON PWQO	Surface Water Parameters	Total Zinc	mg/L	0.030	0.057
4965524	MCG-C	ON PWQO	Surface Water Parameters	Total Iron	mg/L	0.3	0.551
4965525	MCG-D	ON PWQO	Surface Water Parameters	Field pH	pH Units	6.5-8.5	6.40
4965525	MCG-D	ON PWQO	Surface Water Parameters	pH	pH Units	6.5-8.5	6.26
4965528	MCG-G	ON PWQO	Surface Water Parameters	Total Iron	mg/L	0.3	0.755

Quality Assurance

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.
 PROJECT: 230225-08
 SAMPLING SITE: North Baptiste

AGAT WORK ORDER: 23T021608
 ATTENTION TO: Carolyn Miller
 SAMPLED BY:

Water Analysis																
RPT Date: May 26, 2023			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	

Surface Water Parameters

BOD (5)	4965525	4965525	<2	<2	NA	< 2	102%	75%	125%						
pH	4967311		7.90	7.93	0.4%	NA	100%	90%	110%						
Alkalinity (as CaCO3)	4967311		112	113	0.9%	< 5	100%	80%	120%						
Electrical Conductivity	4967311		2020	1980	2.0%	< 2	99%	90%	110%						
Total Dissolved Solids	4965523	4965523	384	388	1.0%	< 10	102%	80%	120%						
Total Suspended Solids	4965528	4965528	<10	<10	NA	< 10	98%	80%	120%						
Chloride	4965959		89.7	90.8	1.2%	< 0.10	95%	70%	130%	99%	80%	120%	102%	70%	130%
Turbidity	4966069		227	237	4.3%	< 0.5	100%	80%	120%						
Nitrate as N	4965959		<0.05	<0.05	NA	< 0.05	95%	70%	130%	97%	80%	120%	94%	70%	130%
Nitrite as N	4965959		<0.05	<0.05	NA	< 0.05	103%	70%	130%	110%	80%	120%	110%	70%	130%
Sulphate	4965959		26.8	27.7	3.3%	< 0.10	94%	70%	130%	97%	80%	120%	97%	70%	130%
Ammonia as N	4965579		<0.02	<0.02	NA	< 0.02	106%	70%	130%	103%	80%	120%	98%	70%	130%
Total Kjeldahl Nitrogen	4964678		<0.10	<0.10	NA	< 0.10	102%	70%	130%	97%	80%	120%	95%	70%	130%
Total Phosphorus	4965636		<0.02	0.02	NA	< 0.02	97%	70%	130%	103%	80%	120%	101%	70%	130%
True Colour	4965521	4965521	9.0	9.0	NA	< 2.5	94%	90%	110%						
Total Calcium	4965521	4965521	1.53	1.71	11.1%	< 0.20	92%	70%	130%	92%	80%	120%	90%	70%	130%
Total Magnesium	4965521	4965521	0.24	0.21	NA	< 0.10	85%	70%	130%	100%	80%	120%	84%	70%	130%
Total Potassium	4965521	4965521	<0.50	0.65	NA	< 0.50	98%	70%	130%	96%	80%	120%	110%	70%	130%
Total Sodium	4965521	4965521	1.43	1.69	16.7%	< 0.10	90%	70%	130%	103%	80%	120%	87%	70%	130%
Aluminum-dissolved	4965521	4965521	0.095	0.098	3.1%	< 0.004	97%	70%	130%	109%	80%	120%	113%	70%	130%
Total Arsenic	4965521	4965521	<0.003	<0.003	NA	< 0.003	96%	70%	130%	101%	80%	120%	104%	70%	130%
Total Boron	4965521	4965521	0.013	0.014	NA	< 0.010	102%	70%	130%	105%	80%	120%	111%	70%	130%
Total Cadmium	4965521	4965521	<0.0001	<0.0001	NA	< 0.0001	99%	70%	130%	98%	80%	120%	105%	70%	130%
Total Chromium	4965521	4965521	<0.003	<0.003	NA	< 0.003	101%	70%	130%	99%	80%	120%	101%	70%	130%
Total Cobalt	4965521	4965521	<0.0005	<0.0005	NA	< 0.0005	94%	70%	130%	103%	80%	120%	99%	70%	130%
Total Copper	4965521	4965521	0.001	<0.001	NA	< 0.001	97%	70%	130%	98%	80%	120%	94%	70%	130%
Total Iron	4965521	4965521	0.085	0.084	1.2%	< 0.010	96%	70%	130%	103%	80%	120%	102%	70%	130%
Total Lead	4965521	4965521	<0.001	<0.001	NA	< 0.001	108%	70%	130%	118%	80%	120%	105%	70%	130%
Total Manganese	4965521	4965521	0.003	0.005	NA	< 0.002	95%	70%	130%	99%	80%	120%	95%	70%	130%
Dissolved Mercury	4965874		<0.0001	<0.0001	NA	< 0.0001	103%	70%	130%	97%	80%	120%	101%	70%	130%
Total Nickel	4965521	4965521	0.005	<0.003	NA	< 0.003	91%	70%	130%	96%	80%	120%	98%	70%	130%
Total Selenium	4965521	4965521	<0.002	<0.002	NA	< 0.002	96%	70%	130%	93%	80%	120%	108%	70%	130%
Total Silver	4965521	4965521	<0.0001	0.0001	NA	< 0.0001	93%	70%	130%	93%	80%	120%	91%	70%	130%
Total Zinc	4965521	4965521	<0.020	<0.020	NA	< 0.020	106%	70%	130%	101%	80%	120%	122%	70%	130%

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

Quality Assurance

 CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.
 PROJECT: 230225-08
 SAMPLING SITE: North Baptiste

 AGAT WORK ORDER: 23T021608
 ATTENTION TO: Carolyn Miller
 SAMPLED BY:

Water Analysis (Continued)

RPT Date: May 26, 2023			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By: _____



Method Summary

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23T021608

PROJECT: 230225-08

ATTENTION TO: Carolyn Miller

SAMPLING SITE: North Baptiste

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
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
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
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
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 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
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 Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

Method Summary

CLIENT NAME: BLUMETRIC ENVIRONMENTAL INC.

AGAT WORK ORDER: 23T021608

PROJECT: 230225-08

ATTENTION TO: Carolyn Miller

SAMPLING SITE: North Baptiste

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	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



Your P.O. #: 230301-00
 Site#: 700
 Your C.O.C. #: 930470-06-01

Attention: Cecilia Bandler

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

Report Date: 2023/05/16
 Report #: R7630624
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3D0948

Received: 2023/05/09, 09:08

Sample Matrix: Water
 # Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Phenols (4AAP)	9	N/A	2023/05/12	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. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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

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



Your P.O. #: 230301-00
Site#: 700
Your C.O.C. #: 930470-06-01

Attention: Cecilia Bandler

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

Report Date: 2023/05/16
Report #: R7630624
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3D0948

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

Bureau Veritas Job #: C3D0948
Report Date: 2023/05/16

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

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VTJ623	VTJ624	VTJ624	VTJ625	VTJ626	VTJ627		
Sampling Date		2023/05/03 08:55	2023/05/03 11:55	2023/05/03 11:55	2023/05/03 10:00	2023/05/03 10:12	2023/05/03 08:30		
COC Number		930470-06-01	930470-06-01	930470-06-01	930470-06-01	930470-06-01	930470-06-01		
	UNITS	MCG-A	MCG-B	MCG-B Lab-Dup	MCG-C	MCG-D	MCG-E	RDL	QC Batch

Inorganics									
Phenols-4AAP	mg/L	ND	0.0012	ND	ND	ND	ND	0.0010	8661921

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 ID		VTJ628	VTJ629	VTJ630	VTJ631		
Sampling Date		2023/05/03 08:45	2023/05/03 09:15	2023/05/03 11:45	2023/05/03 08:30		
COC Number		930470-06-01	930470-06-01	930470-06-01	930470-06-01		
	UNITS	MCG-F	MCG-G	MCG-H	NB-QAQC-SW1	RDL	QC Batch

Inorganics							
Phenols-4AAP	mg/L	ND	ND	ND	ND	0.0010	8661921

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

Bureau Veritas Job #: C3D0948
Report Date: 2023/05/16

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

TEST SUMMARY

Bureau Veritas ID: VTJ623
Sample ID: MCG-A
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8661921	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ624
Sample ID: MCG-B
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8661921	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ624 Dup
Sample ID: MCG-B
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8661921	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ625
Sample ID: MCG-C
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8661921	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ626
Sample ID: MCG-D
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8661921	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ627
Sample ID: MCG-E
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8661921	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ628
Sample ID: MCG-F
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8661921	N/A	2023/05/12	Mandeep Kaur



BUREAU
VERITAS

Bureau Veritas Job #: C3D0948
Report Date: 2023/05/16

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

TEST SUMMARY

Bureau Veritas ID: VTJ629
Sample ID: MCG-G
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8661921	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ630
Sample ID: MCG-H
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8661921	N/A	2023/05/12	Mandeep Kaur

Bureau Veritas ID: VTJ631
Sample ID: NB-QAQC-SW1
Matrix: Water

Collected: 2023/05/03
Shipped:
Received: 2023/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	8661921	N/A	2023/05/12	Mandeep Kaur



BUREAU
VERITAS

Bureau Veritas Job #: C3D0948
Report Date: 2023/05/16

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

GENERAL COMMENTS

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

Package 1	8.0°C
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Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C3D0948

Report Date: 2023/05/16

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc

Your P.O. #: 230301-00

Sampler Initials: BM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8661921	Phenols-4AAP	2023/05/12	102	80 - 120	102	80 - 120	ND, RDL=0.0010	mg/L	18	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

Bureau Veritas Job #: C3D0948
Report Date: 2023/05/16

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



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.



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 #:	 930470		
Attention: Accounts Payable	Attention: Cecilia Bandler	P.O. #: 23025-05 230301-00	COC #:		Project Manager:		
Address: 1682 Woodward Drive	Address: The Tower - The Woolen Mill 4 Cataraqi St	Project:	 C#930470-06-01		Christine Gripton		
Ottawa ON K2C 3R8	Kingston ON K7K 1Z7	Project Name:	Site #:				
Tel: (613) 839-3053 Fax: (613) 839-5376	Tel: (613) 531-2725 Fax:	Site #:	Sampled By:				
Email: ap@blumetric.ca	Email: cbandler@blumetric.ca	Sampled By: 300 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) <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC <input type="checkbox"/> Table _____	Other Regulations <input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> MISA Municipality _____ <input type="checkbox"/> PWQO <input type="checkbox"/> Reg 406 Table _____ <input type="checkbox"/> Other _____	Special Instructions
--	--	-------------------------------------

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

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr / VI	Pretosis (AAAP)	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										# of Bottles	Comments		
1	MCG-A	23/05/03	8:55	SW	N	✓												1		
2	MCG-B	23/05/03	11:55	SW	N	✓													1	
3	MCG-C	23/05/03	10:00	SW	N	✓													1	
4	MCG-D	23/05/03	10:12	SW	N	✓													1	
5	MCG-E	23/05/03	8:30	SW	N	✓													1	
6	MCG-F	23/05/03	8:45	SW	N	✓													1	
7	MCG-G	23/05/03	9:15	SW	N	✓													1	
8	MCG-H	23/05/03	11:45	SW	N	✓													1	
9	NB-QAQC-SW	23/05/03	8:30	SW	N	✓													1	
10																				

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only		
<i>Broadbent / Broadbent</i>	2023/05/03	9:00	<i>AMC M... / ...</i>	2023/05/03	09:08		Time Sensitive	Temperature (°C) on Receipt	Custody Seal
								81917	Present
									Intact
									Yes
									No

* 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

C.O.C.: -

REPORT No: 23-010839 - Rev. 1

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-Jun-05
 SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: North Baptiste - 230225-08
 P.O. NUMBER: 230301-00

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Phenols (Liquid)	9	KINGSTON	JMACINNES	2023-May-31	PHEN-01	MECP E3179

R.L. = Reporting Limit

NC = Not Calculated

Test methods may be modified from specified reference method unless indicated by an *

Parameter	Units	R.L.	Client I.D.	Sample I.D.	Date Collected	Units	R.L.
			MCG-A	MCG-B	MCG-C	MCG-D	MCG-E
			23-010839-1	23-010839-2	23-010839-3	23-010839-4	23-010839-5
			2023-05-03	2023-05-03	2023-05-03	2023-05-03	2023-05-03
Phenolics	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Parameter	Units	R.L.	Client I.D.	Sample I.D.	Date Collected	Units	R.L.
			MCG-F	MCG-G	MCG-H	NB-QAQC-SW1	
			23-010839-6	23-010839-7	23-010839-8	23-010839-9	
			2023-05-03	2023-05-03	2023-05-03	2023-05-03	
Phenolics	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Revised to provide corrected results for phenolics



Michelle Dubien
 Laboratory Manager



Your Project #: 230225-08
 Site Location: North Baptiste SW
 Your C.O.C. #: 732528

Attention: Carolyn Miller

BluMetric Environmental Inc
 1682 Woodward Dr
 Ottawa, ON
 CANADA K2C 3R8

Report Date: 2023/08/17

Report #: R7768697

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C301547

Received: 2023/08/10, 09:18

Sample Matrix: Water
 # Samples Received: 7

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Dissolved Aluminum (0.2 u, clay free)	7	N/A	2023/08/15	CAM SOP-00447	EPA 6020B m
Alkalinity	6	N/A	2023/08/12	CAM SOP-00448	SM 23 2320 B m
Alkalinity	1	N/A	2023/08/13	CAM SOP-00448	SM 23 2320 B m
Biochemical Oxygen Demand (BOD)	7	2023/08/11	2023/08/16	CAM SOP-00427	SM 23 5210B m
Chloride by Automated Colourimetry	7	N/A	2023/08/11	CAM SOP-00463	SM 23 4500-Cl E m
Colour	7	N/A	2023/08/11	CAM SOP-00412	SM 23 2120C m
Conductivity	6	N/A	2023/08/12	CAM SOP-00414	SM 23 2510 m
Conductivity	1	N/A	2023/08/13	CAM SOP-00414	SM 23 2510 m
Hardness (calculated as CaCO3)	7	N/A	2023/08/15	CAM SOP 00102/00408/00447	SM 2340 B
Mercury in Water by CVAA	5	2023/08/14	2023/08/15	CAM SOP-00453	EPA 7470A m
Mercury in Water by CVAA	2	2023/08/15	2023/08/15	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	7	2023/08/14	2023/08/14	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	7	N/A	2023/08/15	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	7	N/A	2023/08/11	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	6	2023/08/11	2023/08/12	CAM SOP-00413	SM 4500H+ B m
pH	1	2023/08/11	2023/08/13	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	7	N/A	2023/08/11	CAM SOP-00444	OMOE E3179 m
Field Measured pH (2)	7	N/A	2023/08/10		Field pH Meter
Sulphate by Automated Turbidimetry	7	N/A	2023/08/11	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	7	2023/08/14	2023/08/15	CAM SOP-00428	SM 23 2540C m
Field Temperature (2)	7	N/A	2023/08/11		Field Thermometer
Total Kjeldahl Nitrogen in Water	7	2023/08/14	2023/08/14	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	7	2023/08/14	2023/08/16	CAM SOP-00407	SM 23 4500-P I
Total Suspended Solids	7	2023/08/14	2023/08/15	CAM SOP-00428	SM 23 2540D m
Turbidity	7	N/A	2023/08/12	CAM SOP-00417	SM 23 2130 B m
Un-ionized Ammonia (3)	1	2023/08/10	2023/08/15	Auto Calc.	PWQO
Un-ionized Ammonia (3)	6	2023/08/10	2023/08/16	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



Your Project #: 230225-08
Site Location: North Baptiste SW
Your C.O.C. #: 732528

Attention: Carolyn Miller

BluMetric Environmental Inc
1682 Woodward Dr
Ottawa, ON
CANADA K2C 3R8

Report Date: 2023/08/17
Report #: R7768697
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3O1547

Received: 2023/08/10, 09:18

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.

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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.

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

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

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

- (1) 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

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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

Bureau Veritas Job #: C301547
Report Date: 2023/08/17

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste SW
Sampler Initials: CM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		WQP928			WQP928			WQP929		
Sampling Date		2023/08/09 11:53			2023/08/09 11:53			2023/08/09 12:06		
COC Number		732528			732528			732528		
	UNITS	MCG-C	RDL	QC Batch	MCG-C Lab-Dup	RDL	QC Batch	MCG-D	RDL	QC Batch

Calculated Parameters										
Hardness (CaCO3)	mg/L	180	1.0	8845716				29	1.0	8845716
Total Un-ionized Ammonia	mg/L	<0.00061	0.00061	8844160				<0.00061	0.00061	8844160
Field Measurements										
Field Temperature	Celsius	16.6	N/A	ONSITE				16.8	N/A	ONSITE
Field Measured pH	pH	6.38		ONSITE				5.6		ONSITE
Inorganics										
Total Ammonia-N	mg/L	<0.050	0.050	8851688	<0.050	0.050	8851688	0.072	0.050	8851688
Total BOD	mg/L	4	2	8846124	4	2	8846124	12	2	8846124
Colour	TCU	98	2	8845470				150	4	8845470
Conductivity	umho/cm	420	1.0	8846880				66	1.0	8846880
Total Dissolved Solids	mg/L	250	10	8850392				70	10	8850392
Total Kjeldahl Nitrogen (TKN)	mg/L	0.77	0.10	8850671				1.1	0.10	8850671
pH	pH	7.60		8846861				6.58		8846861
Phenols-4AAP	mg/L	<0.0010	0.0010	8847824	<0.0010	0.0010	8847824	<0.0010	0.0010	8847824
Total Phosphorus	mg/L	0.026	0.020	8850656				0.20	0.020	8850656
Total Suspended Solids	mg/L	12	10	8850320				47	10	8850320
Dissolved Sulphate (SO4)	mg/L	2.9	1.0	8846325				<20 (1)	20	8846325
Turbidity	NTU	0.8	0.1	8846440				5.1	0.1	8846440
Alkalinity (Total as CaCO3)	mg/L	180	1.0	8846816				30	1.0	8846816
Dissolved Chloride (Cl-)	mg/L	28	1.0	8846320				<20 (1)	20	8846320
Nitrite (N)	mg/L	<0.010	0.010	8846514				<0.010	0.010	8846514
Nitrate (N)	mg/L	<0.10	0.10	8846514				<0.10	0.10	8846514
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	8846514				<0.10	0.10	8846514

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Lab-Dup = Laboratory Initiated Duplicate

N/A = Not Applicable

(1) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.



BUREAU
VERITAS

Bureau Veritas Job #: C3O1547
Report Date: 2023/08/17

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste SW
Sampler Initials: CM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		WQP930	WQP931		WQP932		WQP933		
Sampling Date		2023/08/09 09:48	2023/08/09 10:08		2023/08/09 10:41		2023/08/09 11:30		
COC Number		732528	732528		732528		732528		
	UNITS	MCG-E	MCG-F	QC Batch	MCG-G	QC Batch	MCG-H	RDL	QC Batch

Calculated Parameters									
Hardness (CaCO3)	mg/L	40	24	8845716	27	8845716	36	1.0	8843752
Total Un-ionized Ammonia	mg/L	<0.00061	<0.00061	8844160	<0.00061	8844160	<0.00061	0.00061	8844160
Field Measurements									
Field Temperature	Celsius	15	16.5	ONSITE	16.2	ONSITE	18.1	N/A	ONSITE
Field Measured pH	pH	6.55	6.14	ONSITE	6.64	ONSITE	5.86		ONSITE
Inorganics									
Total Ammonia-N	mg/L	<0.050	0.057	8851688	<0.050	8850911	<0.050	0.050	8851688
Total BOD	mg/L	<2	<2	8846124	<2	8846124	5	2	8846124
Colour	TCU	46	61	8845470	63	8845470	90	2	8845470
Conductivity	umho/cm	270	170	8846880	56	8846880	89	1.0	8846880
Total Dissolved Solids	mg/L	140	90	8850392	55	8850392	60	10	8850392
Total Kjeldahl Nitrogen (TKN)	mg/L	0.29	0.38	8850671	0.38	8850671	0.62	0.10	8850671
pH	pH	7.33	7.10	8846861	7.34	8846861	6.89		8846861
Phenols-4AAP	mg/L	<0.0010	<0.0010	8847824	<0.0010	8847824	<0.0010	0.0010	8847824
Total Phosphorus	mg/L	<0.020	<0.020	8850656	0.036	8850656	0.057	0.020	8850656
Total Suspended Solids	mg/L	<10	<10	8850320	13	8850320	39	10	8850320
Dissolved Sulphate (SO4)	mg/L	6.1	2.6	8846325	1.5	8846325	1.7	1.0	8846325
Turbidity	NTU	2.6	3.8	8846440	7.9	8846440	1.7	0.1	8846440
Alkalinity (Total as CaCO3)	mg/L	30	27	8846816	25	8846816	34	1.0	8846816
Dissolved Chloride (Cl-)	mg/L	53	30	8846320	<1.0	8846320	10	1.0	8846320
Nitrite (N)	mg/L	<0.010	<0.010	8846514	<0.010	8846514	<0.010	0.010	8846514
Nitrate (N)	mg/L	0.17	<0.10	8846514	0.38	8846514	<0.10	0.10	8846514
Nitrate + Nitrite (N)	mg/L	0.17	<0.10	8846514	0.38	8846514	<0.10	0.10	8846514

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



BUREAU
VERITAS

Bureau Veritas Job #: C3O1547
Report Date: 2023/08/17

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste SW
Sampler Initials: CM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		WQP934		
Sampling Date		2023/08/09 09:48		
COC Number		732528		
	UNITS	NB-QAQC-1	RDL	QC Batch
Calculated Parameters				
Hardness (CaCO3)	mg/L	39	1.0	8843752
Total Un-ionized Ammonia	mg/L	<0.00061	0.00061	8844160
Field Measurements				
Field Temperature	Celsius	15	N/A	ONSITE
Field Measured pH	pH	6.55		ONSITE
Inorganics				
Total Ammonia-N	mg/L	<0.050	0.050	8851688
Total BOD	mg/L	<2	2	8846124
Colour	TCU	47	2	8845470
Conductivity	umho/cm	260	1.0	8846880
Total Dissolved Solids	mg/L	130	10	8850392
Total Kjeldahl Nitrogen (TKN)	mg/L	0.23	0.10	8850671
pH	pH	7.42		8846861
Phenols-4AAP	mg/L	<0.0010	0.0010	8847824
Total Phosphorus	mg/L	<0.020	0.020	8850656
Total Suspended Solids	mg/L	<10	10	8850320
Dissolved Sulphate (SO4)	mg/L	6.2	1.0	8846325
Turbidity	NTU	2.7	0.1	8846440
Alkalinity (Total as CaCO3)	mg/L	30	1.0	8846816
Dissolved Chloride (Cl-)	mg/L	54	1.0	8846320
Nitrite (N)	mg/L	<0.010	0.010	8846514
Nitrate (N)	mg/L	0.17	0.10	8846514
Nitrate + Nitrite (N)	mg/L	0.17	0.10	8846514
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				



BUREAU
VERITAS

Bureau Veritas Job #: C3O1547
Report Date: 2023/08/17

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste SW
Sampler Initials: CM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		WQP928		WQP929		WQP930		
Sampling Date		2023/08/09 11:53		2023/08/09 12:06		2023/08/09 09:48		
COC Number		732528		732528		732528		
	UNITS	MCG-C	QC Batch	MCG-D	QC Batch	MCG-E	RDL	QC Batch
Metals								
Dissolved (0.2u) Aluminum (Al)	ug/L	<5	8844412	98	8844412	36	5	8844412
Mercury (Hg)	mg/L	<0.00010	8850972	<0.00010	8852826	<0.00010	0.00010	8850972
Total Aluminum (Al)	ug/L	14	8850464	200	8850464	92	4.9	8850464
Total Arsenic (As)	ug/L	<1.0	8850464	<1.0	8850464	<1.0	1.0	8850464
Total Boron (B)	ug/L	190	8850464	<10	8850464	<10	10	8850464
Total Cadmium (Cd)	ug/L	<0.090	8850464	<0.090	8850464	<0.090	0.090	8850464
Total Calcium (Ca)	ug/L	51000	8850464	8000	8850464	12000	200	8850464
Total Chromium (Cr)	ug/L	<5.0	8850464	<5.0	8850464	<5.0	5.0	8850464
Total Cobalt (Co)	ug/L	<0.50	8850464	2.8	8850464	<0.50	0.50	8850464
Total Copper (Cu)	ug/L	<0.90	8850464	<0.90	8850464	<0.90	0.90	8850464
Total Iron (Fe)	ug/L	740	8850464	4100	8850464	1100	100	8850464
Total Lead (Pb)	ug/L	<0.50	8850464	0.74	8850464	<0.50	0.50	8850464
Total Magnesium (Mg)	ug/L	13000	8850464	2100	8850464	2100	50	8850464
Total Manganese (Mn)	ug/L	640	8850464	1200	8850464	36	2.0	8850464
Total Nickel (Ni)	ug/L	<1.0	8850464	<1.0	8850464	<1.0	1.0	8850464
Total Potassium (K)	ug/L	4000	8850464	1200	8850464	1100	200	8850464
Total Selenium (Se)	ug/L	<2.0	8850464	<2.0	8850464	<2.0	2.0	8850464
Total Silver (Ag)	ug/L	<0.090	8850464	<0.090	8850464	<0.090	0.090	8850464
Total Sodium (Na)	ug/L	21000	8850464	2300	8850464	36000	100	8850464
Total Zinc (Zn)	ug/L	<5.0	8850464	<5.0	8850464	<5.0	5.0	8850464
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								



BUREAU
VERITAS

Bureau Veritas Job #: C3O1547
Report Date: 2023/08/17

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste SW
Sampler Initials: CM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		WQP930			WQP931		WQP932		
Sampling Date		2023/08/09 09:48			2023/08/09 10:08		2023/08/09 10:41		
COC Number		732528			732528		732528		
	UNITS	MCG-E Lab-Dup	RDL	QC Batch	MCG-F	QC Batch	MCG-G	RDL	QC Batch
Metals									
Dissolved (0.2u) Aluminum (Al)	ug/L				39	8844412	48	5	8844412
Mercury (Hg)	mg/L				<0.00010	8850939	<0.00010	0.00010	8850972
Total Aluminum (Al)	ug/L	93	4.9	8850464	69	8850464	230	4.9	8850464
Total Arsenic (As)	ug/L	<1.0	1.0	8850464	<1.0	8850464	<1.0	1.0	8850464
Total Boron (B)	ug/L	<10	10	8850464	<10	8850464	<10	10	8850464
Total Cadmium (Cd)	ug/L	<0.090	0.090	8850464	<0.090	8850464	<0.090	0.090	8850464
Total Calcium (Ca)	ug/L	12000	200	8850464	7000	8850464	7600	200	8850464
Total Chromium (Cr)	ug/L	<5.0	5.0	8850464	<5.0	8850464	<5.0	5.0	8850464
Total Cobalt (Co)	ug/L	<0.50	0.50	8850464	0.53	8850464	0.88	0.50	8850464
Total Copper (Cu)	ug/L	<0.90	0.90	8850464	<0.90	8850464	<0.90	0.90	8850464
Total Iron (Fe)	ug/L	1100	100	8850464	2000	8850464	2500	100	8850464
Total Lead (Pb)	ug/L	<0.50	0.50	8850464	<0.50	8850464	<0.50	0.50	8850464
Total Magnesium (Mg)	ug/L	2100	50	8850464	1100	8850464	1600	50	8850464
Total Manganese (Mn)	ug/L	35	2.0	8850464	200	8850464	330	2.0	8850464
Total Nickel (Ni)	ug/L	<1.0	1.0	8850464	<1.0	8850464	<1.0	1.0	8850464
Total Potassium (K)	ug/L	1100	200	8850464	910	8850464	740	200	8850464
Total Selenium (Se)	ug/L	<2.0	2.0	8850464	<2.0	8850464	<2.0	2.0	8850464
Total Silver (Ag)	ug/L	<0.090	0.090	8850464	<0.090	8850464	<0.090	0.090	8850464
Total Sodium (Na)	ug/L	36000	100	8850464	24000	8850464	1400	100	8850464
Total Zinc (Zn)	ug/L	<5.0	5.0	8850464	<5.0	8850464	<5.0	5.0	8850464
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate									



BUREAU
VERITAS

Bureau Veritas Job #: C3O1547
Report Date: 2023/08/17

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste SW
Sampler Initials: CM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		WQP933		WQP934		
Sampling Date		2023/08/09 11:30		2023/08/09 09:48		
COC Number		732528		732528		
	UNITS	MCG-H	QC Batch	NB-QAQC-1	RDL	QC Batch
Metals						
Dissolved (0.2u) Aluminum (Al)	ug/L	31	8844412	39	5	8844412
Mercury (Hg)	mg/L	<0.00010	8852826	<0.00010	0.00010	8850972
Total Aluminum (Al)	ug/L	81	8850464	87	4.9	8850464
Total Arsenic (As)	ug/L	<1.0	8850464	<1.0	1.0	8850464
Total Boron (B)	ug/L	20	8850464	<10	10	8850464
Total Cadmium (Cd)	ug/L	<0.090	8850464	<0.090	0.090	8850464
Total Calcium (Ca)	ug/L	9600	8850464	12000	200	8850464
Total Chromium (Cr)	ug/L	<5.0	8850464	<5.0	5.0	8850464
Total Cobalt (Co)	ug/L	<0.50	8850464	<0.50	0.50	8850464
Total Copper (Cu)	ug/L	<0.90	8850464	<0.90	0.90	8850464
Total Iron (Fe)	ug/L	1300	8850464	1100	100	8850464
Total Lead (Pb)	ug/L	<0.50	8850464	<0.50	0.50	8850464
Total Magnesium (Mg)	ug/L	2600	8850464	2100	50	8850464
Total Manganese (Mn)	ug/L	90	8850464	35	2.0	8850464
Total Nickel (Ni)	ug/L	<1.0	8850464	<1.0	1.0	8850464
Total Potassium (K)	ug/L	830	8850464	1100	200	8850464
Total Selenium (Se)	ug/L	<2.0	8850464	<2.0	2.0	8850464
Total Silver (Ag)	ug/L	<0.090	8850464	<0.090	0.090	8850464
Total Sodium (Na)	ug/L	4800	8850464	36000	100	8850464
Total Zinc (Zn)	ug/L	<5.0	8850464	<5.0	5.0	8850464
RDL = Reportable Detection Limit QC Batch = Quality Control Batch						



BUREAU
VERITAS

Bureau Veritas Job #: C3O1547
Report Date: 2023/08/17

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste SW
Sampler Initials: CM

GENERAL COMMENTS

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

Package 1	4.3°C
Package 2	6.7°C
Package 3	2.0°C

Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C3O1547

Report Date: 2023/08/17

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste SW

Sampler Initials: CM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8844412	Dissolved (0.2u) Aluminum (Al)	2023/08/15	107	80 - 120	99	80 - 120	<5	ug/L	NC	20		
8845470	Colour	2023/08/11			100	80 - 120	<2	TCU	NC	25		
8846124	Total BOD	2023/08/16					<2	mg/L	7.1	30	93	80 - 120
8846320	Dissolved Chloride (Cl-)	2023/08/11	NC	80 - 120	96	80 - 120	<1.0	mg/L	2.0	20		
8846325	Dissolved Sulphate (SO4)	2023/08/11	NC	75 - 125	100	80 - 120	<1.0	mg/L	1.2	20		
8846440	Turbidity	2023/08/12			100	80 - 120	<0.1	NTU	8.8	20		
8846514	Nitrate (N)	2023/08/11	98	80 - 120	98	80 - 120	<0.10	mg/L	NC	20		
8846514	Nitrite (N)	2023/08/11	103	80 - 120	102	80 - 120	<0.010	mg/L	NC	20		
8846816	Alkalinity (Total as CaCO3)	2023/08/12			96	85 - 115	<1.0	mg/L	0.0016	20		
8846861	pH	2023/08/12			102	98 - 103			0.027	N/A		
8846880	Conductivity	2023/08/12			101	85 - 115	<1.0	umho/cm	1.0	10		
8847824	Phenols-4AAP	2023/08/11	103	80 - 120	97	80 - 120	<0.0010	mg/L	NC	20		
8850320	Total Suspended Solids	2023/08/15			95	85 - 115	<10	mg/L	NC	20		
8850392	Total Dissolved Solids	2023/08/15			98	90 - 110	<10	mg/L	8.7	20		
8850464	Total Aluminum (Al)	2023/08/14	99	80 - 120	98	80 - 120	<4.9	ug/L	2.1	20		
8850464	Total Arsenic (As)	2023/08/14	101	80 - 120	99	80 - 120	<1.0	ug/L	NC	20		
8850464	Total Boron (B)	2023/08/14	101	80 - 120	101	80 - 120	<10	ug/L	NC	20		
8850464	Total Cadmium (Cd)	2023/08/14	98	80 - 120	96	80 - 120	<0.090	ug/L	NC	20		
8850464	Total Calcium (Ca)	2023/08/14	94	80 - 120	96	80 - 120	<200	ug/L	0.40	20		
8850464	Total Chromium (Cr)	2023/08/14	96	80 - 120	94	80 - 120	<5.0	ug/L	NC	20		
8850464	Total Cobalt (Co)	2023/08/14	95	80 - 120	93	80 - 120	<0.50	ug/L	NC	20		
8850464	Total Copper (Cu)	2023/08/14	97	80 - 120	97	80 - 120	<0.90	ug/L	NC	20		
8850464	Total Iron (Fe)	2023/08/14	96	80 - 120	94	80 - 120	<100	ug/L	0.92	20		
8850464	Total Lead (Pb)	2023/08/14	95	80 - 120	94	80 - 120	<0.50	ug/L	NC	20		
8850464	Total Magnesium (Mg)	2023/08/14	97	80 - 120	97	80 - 120	<50	ug/L	3.9	20		
8850464	Total Manganese (Mn)	2023/08/14	96	80 - 120	94	80 - 120	<2.0	ug/L	2.1	20		
8850464	Total Nickel (Ni)	2023/08/14	95	80 - 120	93	80 - 120	<1.0	ug/L	NC	20		
8850464	Total Potassium (K)	2023/08/14	97	80 - 120	96	80 - 120	<200	ug/L	0.65	20		
8850464	Total Selenium (Se)	2023/08/14	102	80 - 120	103	80 - 120	<2.0	ug/L	NC	20		
8850464	Total Silver (Ag)	2023/08/14	97	80 - 120	94	80 - 120	<0.090	ug/L	NC	20		



BUREAU
VERITAS

Bureau Veritas Job #: C3O1547

Report Date: 2023/08/17

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste SW

Sampler Initials: CM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8850464	Total Sodium (Na)	2023/08/14	NC	80 - 120	97	80 - 120	<100	ug/L	0.29	20		
8850464	Total Zinc (Zn)	2023/08/14	99	80 - 120	98	80 - 120	<5.0	ug/L	NC	20		
8850656	Total Phosphorus	2023/08/16	96	80 - 120	101	80 - 120	<0.020	mg/L	3.8	20	98	80 - 120
8850671	Total Kjeldahl Nitrogen (TKN)	2023/08/14	108	80 - 120	101	80 - 120	<0.10	mg/L	11	20	101	80 - 120
8850911	Total Ammonia-N	2023/08/15	102	75 - 125	102	80 - 120	<0.050	mg/L	0.98	20		
8850939	Mercury (Hg)	2023/08/15	103	75 - 125	105	80 - 120	<0.00010	mg/L	NC	20		
8850972	Mercury (Hg)	2023/08/15	103	75 - 125	108	80 - 120	<0.00010	mg/L	NC	20		
8851688	Total Ammonia-N	2023/08/15	99	75 - 125	96	80 - 120	<0.050	mg/L	NC	20		
8852826	Mercury (Hg)	2023/08/15	103	75 - 125	105	80 - 120	<0.00010	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).



BUREAU
VERITAS

Bureau Veritas Job #: C3O1547
Report Date: 2023/08/17

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste SW
Sampler Initials: CM

VALIDATION SIGNATURE PAGE

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

Christine Gripton, Senior Project Manager

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.



Your Project #: 230225-08
 Site Location: North Baptiste
 Your C.O.C. #: 781232

Attention: Cecilia Bandler

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

Report Date: 2023/11/14
 Report #: R7911254
 Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W8840

Received: 2023/10/21, 14:54

Sample Matrix: Water
 # Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dissolved Aluminum (0.2 u, clay free)	7	N/A	2023/10/25	CAM SOP-00447	EPA 6020B m
Alkalinity	7	N/A	2023/10/27	CAM SOP-00448	SM 23 2320 B m
Biochemical Oxygen Demand (BOD)	7	2023/10/23	2023/10/28	CAM SOP-00427	SM 23 5210B m
Chloride by Automated Colourimetry	1	N/A	2023/10/24	CAM SOP-00463	SM 23 4500-Cl E m
Chloride by Automated Colourimetry	6	N/A	2023/10/26	CAM SOP-00463	SM 23 4500-Cl E m
Colour	7	N/A	2023/10/25	CAM SOP-00412	SM 23 2120C m
Conductivity	7	N/A	2023/10/27	CAM SOP-00414	SM 23 2510 m
Hardness (calculated as CaCO3)	7	N/A	2023/10/26	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Mercury in Water by CVAA	7	2023/11/09	2023/11/09	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPLMS	7	2023/10/26	2023/10/27	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	2	N/A	2023/10/27	CAM SOP-00441	USGS I-2522-90 m
Total Ammonia-N	5	N/A	2023/10/29	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	5	N/A	2023/10/25	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Nitrate & Nitrite as Nitrogen in Water (1)	2	N/A	2023/10/26	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	1	2023/10/23	2023/10/27	CAM SOP-00413	SM 4500H+ B m
pH	6	2023/10/24	2023/10/27	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	7	N/A	2023/10/26	CAM SOP-00444	OMOE E3179 m
Field Measured pH (2)	7	N/A	2023/10/21		Field pH Meter
Sulphate by Automated Turbidimetry	1	N/A	2023/10/24	CAM SOP-00464	SM 23 4500-SO42- E m
Sulphate by Automated Turbidimetry	6	N/A	2023/10/26	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	1	2023/10/27	2023/10/28	CAM SOP-00428	SM 23 2540C m
Total Dissolved Solids	4	2023/10/27	2023/10/31	CAM SOP-00428	SM 23 2540C m
Total Dissolved Solids	1	2023/10/28	2023/10/31	CAM SOP-00428	SM 23 2540C m
Total Dissolved Solids	1	2023/10/30	2023/11/01	CAM SOP-00428	SM 23 2540C m
Field Temperature (2)	7	N/A	2023/10/24		Field Thermometer
Total Kjeldahl Nitrogen in Water	7	2023/10/24	2023/10/25	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	7	2023/10/24	2023/10/26	CAM SOP-00407	SM 23 4500-P I
Total Suspended Solids	5	2023/10/27	2023/10/30	CAM SOP-00428	SM 23 2540D m
Total Suspended Solids	2	2023/10/27	2023/11/02	CAM SOP-00428	SM 23 2540D m



Your Project #: 230225-08
 Site Location: North Baptiste
 Your C.O.C. #: 781232

Attention: Cecilia Bandler

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

Report Date: 2023/11/14
 Report #: R7911254
 Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W8840

Received: 2023/10/21, 14:54

Sample Matrix: Water
 # Samples Received: 7

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Turbidity	6	N/A	2023/10/24	CAM SOP-00417	SM 23 2130 B m
Turbidity	1	N/A	2023/10/25	CAM SOP-00417	SM 23 2130 B m
Un-ionized Ammonia (3)	2	2023/10/21	2023/10/27	Auto Calc.	PWQO
Un-ionized Ammonia (3)	5	2023/10/21	2023/10/30	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 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.

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

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

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

(1) 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.



Your Project #: 230225-08
Site Location: North Baptiste
Your C.O.C. #: 781232

Attention: Cecilia Bandler

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

Report Date: 2023/11/14
Report #: R7911254
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3W8840

Received: 2023/10/21, 14:54

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

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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

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: CM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XJD634		XJD635		XJD636		
Sampling Date		2023/10/19 11:00		2023/10/19 11:10		2023/10/19 08:40		
COC Number		781232		781232		781232		
	UNITS	MCG-C	QC Batch	MCG-D	QC Batch	MCG-E	RDL	QC Batch
Calculated Parameters								
Hardness (CaCO3)	mg/L	190	8998229	24	8998229	40	1.0	8998229
Total Un-ionized Ammonia	mg/L	ND	8997645	ND	8997645	ND	0.00061	8997645
Field Measurements								
Field Temperature	Celsius	8.2	ONSITE	7.8	ONSITE	6.7	N/A	ONSITE
Field Measured pH	pH	6.43	ONSITE	5.93	ONSITE	6.97		ONSITE
Inorganics								
Total Ammonia-N	mg/L	ND	9004023	ND	9004023	ND	0.050	9003926
Total BOD	mg/L	ND	9000470	3	9000470	ND	2	9000470
Colour	TCU	83	9002044	96	9002880	25	2	9002880
Conductivity	umho/cm	540	9003363	67	9003363	290	1.0	9003363
Total Dissolved Solids	mg/L	270	9011139	115	9008301	195	10	9008301
Total Kjeldahl Nitrogen (TKN)	mg/L	0.91	9003788	0.97	9003788	0.27	0.10	9003788
pH	pH	7.93	9003359	7.02	9003359	7.55		9003359
Phenols-4AAP	mg/L	ND	9006440	ND	9006440	ND	0.0010	9006440
Total Phosphorus	mg/L	0.025	9003866	0.097	9003866	ND	0.020	9003866
Total Suspended Solids	mg/L	18	9008253	40	9012166	ND	10	9012166
Dissolved Sulphate (SO4)	mg/L	10	9003414	9.3	9003414	9.0	1.0	9003414
Turbidity	NTU	0.5	9002753	1.6	9002753	0.9	0.1	9002753
Alkalinity (Total as CaCO3)	mg/L	170	9003340	16	9003340	27	1.0	9003340
Dissolved Chloride (Cl-)	mg/L	58	9003410	1.0	9003410	62	1.0	9003410
Nitrite (N)	mg/L	ND	9002715	ND	9003320	ND	0.010	9003320
Nitrate (N)	mg/L	ND	9002715	ND	9003320	ND	0.10	9003320
Nitrate + Nitrite (N)	mg/L	ND	9002715	ND	9003320	ND	0.10	9003320
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not Detected at a concentration equal or greater than the indicated Detection Limit. N/A = Not Applicable								



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: CM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XJD636			XJD637		XJD638		
Sampling Date		2023/10/19 08:40			2023/10/19 09:00		2023/10/19 09:30		
COC Number		781232			781232		781232		
	UNITS	MCG-E Lab-Dup	RDL	QC Batch	MCG-F	QC Batch	MCG-G	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L				19	8998229	18	1.0	8998229
Total Un-ionized Ammonia	mg/L				ND	8997645	ND	0.00061	8997645
Field Measurements									
Field Temperature	Celsius				7.5	ONSITE	8.2	N/A	ONSITE
Field Measured pH	pH				5.72	ONSITE	6.7		ONSITE
Inorganics									
Total Ammonia-N	mg/L				ND	9004023	ND	0.050	9004023
Total BOD	mg/L				ND	9000470	ND	2	9000470
Colour	TCU				32	9002044	39	2	9002880
Conductivity	umho/cm				180	9003363	42	1.0	9003363
Total Dissolved Solids	mg/L				145	9008301	60	10	9008301
Total Kjeldahl Nitrogen (TKN)	mg/L				0.35	9003788	0.43	0.10	9003788
pH	pH				7.27	9003359	7.32		9003359
Phenols-4AAP	mg/L				ND	9006440	ND	0.0010	9006440
Total Phosphorus	mg/L				ND	9003866	0.021	0.020	9003866
Total Suspended Solids	mg/L				ND	9012166	ND	10	9012166
Dissolved Sulphate (SO4)	mg/L				3.9	9003414	1.3	1.0	9003414
Turbidity	NTU				1.2	9000944	3.1	0.1	9002753
Alkalinity (Total as CaCO3)	mg/L				14	9003340	16	1.0	9003340
Dissolved Chloride (Cl-)	mg/L				35	9003410	ND	1.0	9003410
Nitrite (N)	mg/L	ND	0.010	9003320	ND	9003320	ND	0.010	9003320
Nitrate (N)	mg/L	ND	0.10	9003320	ND	9003320	0.11	0.10	9003320
Nitrate + Nitrite (N)	mg/L	ND	0.10	9003320	ND	9003320	0.11	0.10	9003320
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. N/A = Not Applicable									



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: CM

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XJD639			XJD640			XJD640		
Sampling Date		2023/10/19 12:25			2023/10/19 08:40			2023/10/19 08:40		
COC Number		781232			781232			781232		
	UNITS	MCG-H	RDL	QC Batch	NB-QAQC-SW1	RDL	QC Batch	NB-QAQC-SW1 Lab-Dup	RDL	QC Batch

Calculated Parameters										
Hardness (CaCO3)	mg/L	86	1.0	8998229	42	1.0	8998229			
Total Un-ionized Ammonia	mg/L	ND	0.00061	8997645	ND	0.00061	8997645			
Field Measurements										
Field Temperature	Celsius	8.8	N/A	ONSITE	6.7	N/A	ONSITE			
Field Measured pH	pH	6.55		ONSITE	6.97		ONSITE			
Inorganics										
Total Ammonia-N	mg/L	ND	0.050	9004023	ND	0.050	9003926			
Total BOD	mg/L	ND	2	9000470	ND	2	9000470			
Colour	TCU	160	4	9002880	24	2	9002880	23	2	9002880
Conductivity	umho/cm	250	1.0	9003363	290	1.0	9000961	290	1.0	9000961
Total Dissolved Solids	mg/L	195	10	9013589	160	10	9013590	140	10	9013590
Total Kjeldahl Nitrogen (TKN)	mg/L	0.98	0.10	9003788	0.26	0.10	9003788			
pH	pH	7.64		9003359	7.47		9000962	7.51		9000962
Phenols-4AAP	mg/L	ND	0.0010	9006440	ND	0.0010	9006440			
Total Phosphorus	mg/L	ND	0.020	9003866	ND	0.020	9003866			
Total Suspended Solids	mg/L	ND	10	9011629	ND	10	9011629			
Dissolved Sulphate (SO4)	mg/L	2.9	1.0	9003414	8.5	1.0	9000945			
Turbidity	NTU	0.5	0.1	9002753	0.9	0.1	9000607			
Alkalinity (Total as CaCO3)	mg/L	68	1.0	9003340	26	1.0	9000960	27	1.0	9000960
Dissolved Chloride (Cl-)	mg/L	16	1.0	9003410	56	1.0	9000942			
Nitrite (N)	mg/L	ND	0.010	9002715	0.013	0.010	9000709			
Nitrate (N)	mg/L	ND	0.10	9002715	ND	0.10	9000709			
Nitrate + Nitrite (N)	mg/L	ND	0.10	9002715	ND	0.10	9000709			

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.
 N/A = Not Applicable



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: CM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XJD634	XJD635	XJD636	XJD637	XJD638	XJD639		
Sampling Date		2023/10/19 11:00	2023/10/19 11:10	2023/10/19 08:40	2023/10/19 09:00	2023/10/19 09:30	2023/10/19 12:25		
COC Number		781232	781232	781232	781232	781232	781232		
	UNITS	MCG-C	MCG-D	MCG-E	MCG-F	MCG-G	MCG-H	RDL	QC Batch

Metals									
Dissolved (0.2u) Aluminum (Al)	ug/L	8	98	14	25	33	15	5	9002541
Dissolved Mercury (Hg)	ug/L	ND	ND	ND	ND	ND	ND	0.10	9037815
Total Aluminum (Al)	ug/L	24	260	25	46	65	17	4.9	9007561
Total Arsenic (As)	ug/L	ND	ND	ND	ND	ND	ND	1.0	9007561
Total Boron (B)	ug/L	220	ND	ND	ND	ND	10	10	9007561
Total Cadmium (Cd)	ug/L	ND	ND	ND	ND	ND	ND	0.090	9007561
Total Calcium (Ca)	ug/L	54000	6100	13000	5600	5100	22000	200	9007561
Total Chromium (Cr)	ug/L	ND	ND	ND	ND	ND	ND	5.0	9007561
Total Cobalt (Co)	ug/L	ND	1.5	ND	ND	ND	ND	0.50	9007561
Total Copper (Cu)	ug/L	ND	1.3	ND	ND	ND	ND	0.90	9007561
Total Iron (Fe)	ug/L	390	1700	250	580	920	160	100	9007561
Total Lead (Pb)	ug/L	ND	0.81	ND	ND	ND	ND	0.50	9007561
Total Magnesium (Mg)	ug/L	14000	1700	2400	1100	1200	7000	50	9007561
Total Manganese (Mn)	ug/L	170	470	6.9	35	51	20	2.0	9007561
Total Nickel (Ni)	ug/L	1.4	ND	ND	ND	ND	ND	1.0	9007561
Total Potassium (K)	ug/L	14000	890	1500	1200	640	6400	200	9007561
Total Selenium (Se)	ug/L	ND	ND	ND	ND	ND	ND	2.0	9007561
Total Silver (Ag)	ug/L	ND	ND	ND	ND	ND	ND	0.090	9007561
Total Sodium (Na)	ug/L	35000	3200	41000	25000	1500	12000	100	9007561
Total Zinc (Zn)	ug/L	ND	8.2	ND	ND	ND	ND	5.0	9007561

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

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: CM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XJD640		
Sampling Date		2023/10/19 08:40		
COC Number		781232		
	UNITS	NB-QAQC-SW1	RDL	QC Batch
Metals				
Dissolved (0.2u) Aluminum (Al)	ug/L	13	5	9002541
Dissolved Mercury (Hg)	ug/L	ND	0.10	9037815
Total Aluminum (Al)	ug/L	23	4.9	9007561
Total Arsenic (As)	ug/L	ND	1.0	9007561
Total Boron (B)	ug/L	ND	10	9007561
Total Cadmium (Cd)	ug/L	ND	0.090	9007561
Total Calcium (Ca)	ug/L	12000	200	9007561
Total Chromium (Cr)	ug/L	ND	5.0	9007561
Total Cobalt (Co)	ug/L	ND	0.50	9007561
Total Copper (Cu)	ug/L	ND	0.90	9007561
Total Iron (Fe)	ug/L	240	100	9007561
Total Lead (Pb)	ug/L	ND	0.50	9007561
Total Magnesium (Mg)	ug/L	2300	50	9007561
Total Manganese (Mn)	ug/L	6.7	2.0	9007561
Total Nickel (Ni)	ug/L	ND	1.0	9007561
Total Potassium (K)	ug/L	1400	200	9007561
Total Selenium (Se)	ug/L	ND	2.0	9007561
Total Silver (Ag)	ug/L	ND	0.090	9007561
Total Sodium (Na)	ug/L	41000	100	9007561
Total Zinc (Zn)	ug/L	ND	5.0	9007561
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

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: CM

TEST SUMMARY

Bureau Veritas ID: XJD634
Sample ID: MCG-C
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9002541	N/A	2023/10/25	Nan Raykha
Alkalinity	AT	9003340	N/A	2023/10/27	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9000470	2023/10/23	2023/10/28	Frank Zhang
Chloride by Automated Colourimetry	KONE	9003410	N/A	2023/10/26	Massarat Jan
Colour	SPEC	9002044	N/A	2023/10/25	Viorica Rotaru
Conductivity	AT	9003363	N/A	2023/10/27	Nachiketa Gohil
Hardness (calculated as CaCO3)		8998229	N/A	2023/10/26	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9037815	2023/11/09	2023/11/09	Gagandeep Rai
Total Metals Analysis by ICPMS	ICP/MS	9007561	2023/10/26	2023/10/27	Nan Raykha
Total Ammonia-N	LACH/NH4	9004023	N/A	2023/10/29	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9002715	N/A	2023/10/26	Chandra Nandlal
pH	AT	9003359	2023/10/24	2023/10/27	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9006440	N/A	2023/10/26	Chloe Pollock
Field Measured pH	PH	ONSITE	N/A	2023/10/21	Pardeep Purewal
Sulphate by Automated Turbidimetry	KONE	9003414	N/A	2023/10/26	Massarat Jan
Total Dissolved Solids	BAL	9011139	2023/10/27	2023/10/28	Darshan Patel
Field Temperature	PH	ONSITE	N/A	2023/10/24	Christine Gripton
Total Kjeldahl Nitrogen in Water	SKAL	9003788	2023/10/24	2023/10/25	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9003866	2023/10/24	2023/10/26	Sachi Patel
Total Suspended Solids	BAL	9008253	2023/10/27	2023/10/30	Tina Teng
Turbidity	AT	9002753	N/A	2023/10/24	Leily Karimi
Un-ionized Ammonia	CALC/NH3	8997645	2023/10/30	2023/10/30	Automated Statchk

Bureau Veritas ID: XJD635
Sample ID: MCG-D
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9002541	N/A	2023/10/25	Nan Raykha
Alkalinity	AT	9003340	N/A	2023/10/27	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9000470	2023/10/23	2023/10/28	Frank Zhang
Chloride by Automated Colourimetry	KONE	9003410	N/A	2023/10/26	Massarat Jan
Colour	SPEC	9002880	N/A	2023/10/25	Viorica Rotaru
Conductivity	AT	9003363	N/A	2023/10/27	Nachiketa Gohil
Hardness (calculated as CaCO3)		8998229	N/A	2023/10/26	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9037815	2023/11/09	2023/11/09	Gagandeep Rai
Total Metals Analysis by ICPMS	ICP/MS	9007561	2023/10/26	2023/10/27	Nan Raykha
Total Ammonia-N	LACH/NH4	9004023	N/A	2023/10/29	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9003320	N/A	2023/10/25	Chandra Nandlal
pH	AT	9003359	2023/10/24	2023/10/27	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9006440	N/A	2023/10/26	Chloe Pollock
Field Measured pH	PH	ONSITE	N/A	2023/10/21	Pardeep Purewal
Sulphate by Automated Turbidimetry	KONE	9003414	N/A	2023/10/26	Massarat Jan
Total Dissolved Solids	BAL	9008301	2023/10/27	2023/10/31	Shaneil Hall



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: CM

TEST SUMMARY

Bureau Veritas ID: XJD635
Sample ID: MCG-D
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Field Temperature	PH	ONSITE	N/A	2023/10/24	Christine Gripton
Total Kjeldahl Nitrogen in Water	SKAL	9003788	2023/10/24	2023/10/25	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9003866	2023/10/24	2023/10/26	Sachi Patel
Total Suspended Solids	BAL	9012166	2023/10/27	2023/10/30	Tina Teng
Turbidity	AT	9002753	N/A	2023/10/24	Leily Karimi
Un-ionized Ammonia	CALC/NH3	8997645	2023/10/30	2023/10/30	Automated Statchk

Bureau Veritas ID: XJD636
Sample ID: MCG-E
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9002541	N/A	2023/10/25	Nan Raykha
Alkalinity	AT	9003340	N/A	2023/10/27	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9000470	2023/10/23	2023/10/28	Frank Zhang
Chloride by Automated Colourimetry	KONE	9003410	N/A	2023/10/26	Massarat Jan
Colour	SPEC	9002880	N/A	2023/10/25	Viorica Rotaru
Conductivity	AT	9003363	N/A	2023/10/27	Nachiketa Gohil
Hardness (calculated as CaCO3)		8998229	N/A	2023/10/26	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9037815	2023/11/09	2023/11/09	Gagandeep Rai
Total Metals Analysis by ICPMS	ICP/MS	9007561	2023/10/26	2023/10/27	Nan Raykha
Total Ammonia-N	LACH/NH4	9003926	N/A	2023/10/27	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	9003320	N/A	2023/10/25	Chandra Nandlal
pH	AT	9003359	2023/10/24	2023/10/27	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9006440	N/A	2023/10/26	Chloe Pollock
Field Measured pH	PH	ONSITE	N/A	2023/10/21	Pardeep Purewal
Sulphate by Automated Turbidimetry	KONE	9003414	N/A	2023/10/26	Massarat Jan
Total Dissolved Solids	BAL	9008301	2023/10/27	2023/10/31	Shaneil Hall
Field Temperature	PH	ONSITE	N/A	2023/10/24	Christine Gripton
Total Kjeldahl Nitrogen in Water	SKAL	9003788	2023/10/24	2023/10/25	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9003866	2023/10/24	2023/10/26	Sachi Patel
Total Suspended Solids	BAL	9012166	2023/10/27	2023/10/30	Tina Teng
Turbidity	AT	9002753	N/A	2023/10/24	Leily Karimi
Un-ionized Ammonia	CALC/NH3	8997645	2023/10/27	2023/10/27	Automated Statchk

Bureau Veritas ID: XJD636 Dup
Sample ID: MCG-E
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate & Nitrite as Nitrogen in Water	LACH	9003320	N/A	2023/10/25	Chandra Nandlal



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: CM

TEST SUMMARY

Bureau Veritas ID: XJD637
Sample ID: MCG-F
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9002541	N/A	2023/10/25	Nan Raykha
Alkalinity	AT	9003340	N/A	2023/10/27	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9000470	2023/10/23	2023/10/28	Frank Zhang
Chloride by Automated Colourimetry	KONE	9003410	N/A	2023/10/26	Massarat Jan
Colour	SPEC	9002044	N/A	2023/10/25	Viorica Rotaru
Conductivity	AT	9003363	N/A	2023/10/27	Nachiketa Gohil
Hardness (calculated as CaCO3)		8998229	N/A	2023/10/26	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9037815	2023/11/09	2023/11/09	Gagandeep Rai
Total Metals Analysis by ICPMS	ICP/MS	9007561	2023/10/26	2023/10/27	Nan Raykha
Total Ammonia-N	LACH/NH4	9004023	N/A	2023/10/29	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9003320	N/A	2023/10/25	Chandra Nandlal
pH	AT	9003359	2023/10/24	2023/10/27	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9006440	N/A	2023/10/26	Chloe Pollock
Field Measured pH	PH	ONSITE	N/A	2023/10/21	Pardeep Purewal
Sulphate by Automated Turbidimetry	KONE	9003414	N/A	2023/10/26	Massarat Jan
Total Dissolved Solids	BAL	9008301	2023/10/27	2023/10/31	Shaneil Hall
Field Temperature	PH	ONSITE	N/A	2023/10/24	Christine Gripton
Total Kjeldahl Nitrogen in Water	SKAL	9003788	2023/10/24	2023/10/25	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9003866	2023/10/24	2023/10/26	Sachi Patel
Total Suspended Solids	BAL	9012166	2023/10/27	2023/10/30	Tina Teng
Turbidity	AT	9000944	N/A	2023/10/25	Leily Karimi
Un-ionized Ammonia	CALC/NH3	8997645	2023/10/30	2023/10/30	Automated Statchk

Bureau Veritas ID: XJD638
Sample ID: MCG-G
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9002541	N/A	2023/10/25	Nan Raykha
Alkalinity	AT	9003340	N/A	2023/10/27	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9000470	2023/10/23	2023/10/28	Frank Zhang
Chloride by Automated Colourimetry	KONE	9003410	N/A	2023/10/26	Massarat Jan
Colour	SPEC	9002880	N/A	2023/10/25	Viorica Rotaru
Conductivity	AT	9003363	N/A	2023/10/27	Nachiketa Gohil
Hardness (calculated as CaCO3)		8998229	N/A	2023/10/26	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9037815	2023/11/09	2023/11/09	Gagandeep Rai
Total Metals Analysis by ICPMS	ICP/MS	9007561	2023/10/26	2023/10/27	Nan Raykha
Total Ammonia-N	LACH/NH4	9004023	N/A	2023/10/29	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9003320	N/A	2023/10/25	Chandra Nandlal
pH	AT	9003359	2023/10/24	2023/10/27	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9006440	N/A	2023/10/26	Chloe Pollock
Field Measured pH	PH	ONSITE	N/A	2023/10/21	Pardeep Purewal
Sulphate by Automated Turbidimetry	KONE	9003414	N/A	2023/10/26	Massarat Jan
Total Dissolved Solids	BAL	9008301	2023/10/27	2023/10/31	Shaneil Hall



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: CM

TEST SUMMARY

Bureau Veritas ID: XJD638
Sample ID: MCG-G
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Field Temperature	PH	ONSITE	N/A	2023/10/24	Christine Gripton
Total Kjeldahl Nitrogen in Water	SKAL	9003788	2023/10/24	2023/10/25	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9003866	2023/10/24	2023/10/26	Sachi Patel
Total Suspended Solids	BAL	9012166	2023/10/27	2023/10/30	Tina Teng
Turbidity	AT	9002753	N/A	2023/10/24	Leily Karimi
Un-ionized Ammonia	CALC/NH3	8997645	2023/10/30	2023/10/30	Automated Statchk

Bureau Veritas ID: XJD639
Sample ID: MCG-H
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9002541	N/A	2023/10/25	Nan Raykha
Alkalinity	AT	9003340	N/A	2023/10/27	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9000470	2023/10/23	2023/10/28	Frank Zhang
Chloride by Automated Colourimetry	KONE	9003410	N/A	2023/10/26	Massarat Jan
Colour	SPEC	9002880	N/A	2023/10/25	Viorica Rotaru
Conductivity	AT	9003363	N/A	2023/10/27	Nachiketa Gohil
Hardness (calculated as CaCO3)		8998229	N/A	2023/10/26	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9037815	2023/11/09	2023/11/09	Gagandeep Rai
Total Metals Analysis by ICPMS	ICP/MS	9007561	2023/10/26	2023/10/27	Nan Raykha
Total Ammonia-N	LACH/NH4	9004023	N/A	2023/10/29	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9002715	N/A	2023/10/26	Chandra Nandlal
pH	AT	9003359	2023/10/24	2023/10/27	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9006440	N/A	2023/10/26	Chloe Pollock
Field Measured pH	PH	ONSITE	N/A	2023/10/21	Pardeep Purewal
Sulphate by Automated Turbidimetry	KONE	9003414	N/A	2023/10/26	Massarat Jan
Total Dissolved Solids	BAL	9013589	2023/10/30	2023/11/01	Razieh Tabesh
Field Temperature	PH	ONSITE	N/A	2023/10/24	Christine Gripton
Total Kjeldahl Nitrogen in Water	SKAL	9003788	2023/10/24	2023/10/25	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9003866	2023/10/24	2023/10/26	Sachi Patel
Total Suspended Solids	BAL	9011629	2023/10/27	2023/11/02	Tina Teng
Turbidity	AT	9002753	N/A	2023/10/24	Leily Karimi
Un-ionized Ammonia	CALC/NH3	8997645	2023/10/30	2023/10/30	Automated Statchk

Bureau Veritas ID: XJD640
Sample ID: NB-QAQC-SW1
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9002541	N/A	2023/10/25	Nan Raykha
Alkalinity	AT	9000960	N/A	2023/10/27	Nachiketa Gohil
Biochemical Oxygen Demand (BOD)	DO	9000470	2023/10/23	2023/10/28	Frank Zhang
Chloride by Automated Colourimetry	KONE	9000942	N/A	2023/10/24	Massarat Jan



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: CM

TEST SUMMARY

Bureau Veritas ID: XJD640
Sample ID: NB-QAQC-SW1
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Colour	SPEC	9002880	N/A	2023/10/25	Viorica Rotaru
Conductivity	AT	9000961	N/A	2023/10/27	Nachiketa Gohil
Hardness (calculated as CaCO3)		8998229	N/A	2023/10/26	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	9037815	2023/11/09	2023/11/09	Gagandeep Rai
Total Metals Analysis by ICPMS	ICP/MS	9007561	2023/10/26	2023/10/27	Nan Raykha
Total Ammonia-N	LACH/NH4	9003926	N/A	2023/10/27	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	9000709	N/A	2023/10/25	Chandra Nandlal
pH	AT	9000962	2023/10/23	2023/10/27	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9006440	N/A	2023/10/26	Chloe Pollock
Field Measured pH	PH	ONSITE	N/A	2023/10/21	Pardeep Purewal
Sulphate by Automated Turbidimetry	KONE	9000945	N/A	2023/10/24	Massarat Jan
Total Dissolved Solids	BAL	9013590	2023/10/28	2023/10/31	Razieh Tabesh
Field Temperature	PH	ONSITE	N/A	2023/10/24	Christine Gripton
Total Kjeldahl Nitrogen in Water	SKAL	9003788	2023/10/24	2023/10/25	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9003866	2023/10/24	2023/10/26	Sachi Patel
Total Suspended Solids	BAL	9011629	2023/10/27	2023/11/02	Tina Teng
Turbidity	AT	9000607	N/A	2023/10/24	Leily Karimi
Un-ionized Ammonia	CALC/NH3	8997645	2023/10/27	2023/10/27	Automated Statchk

Bureau Veritas ID: XJD640 Dup
Sample ID: NB-QAQC-SW1
Matrix: Water

Collected: 2023/10/19
Shipped:
Received: 2023/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9000960	N/A	2023/10/27	Nachiketa Gohil
Colour	SPEC	9002880	N/A	2023/10/25	Viorica Rotaru
Conductivity	AT	9000961	N/A	2023/10/27	Nachiketa Gohil
pH	AT	9000962	2023/10/23	2023/10/27	Nachiketa Gohil
Total Dissolved Solids	BAL	9013590	2023/10/28	2023/10/31	Razieh Tabesh



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
Sampler Initials: CM

GENERAL COMMENTS

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

Package 1	1.0°C
Package 2	3.0°C

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

Sample XJD634 [MCG-C] : TSS Analysis: Analysis was performed past sample holding time. This may increase the variability associated with these results.

Sample XJD639 [MCG-H] : TDS Analysis: Analysis was performed past sample holding time. This may increase the variability associated with these results.

Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840

Report Date: 2023/11/14

QUALITY ASSURANCE REPORT

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste

Sampler Initials: CM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9000470	Total BOD	2023/10/28					ND,RDL=2	mg/L	NC	30	95	80 - 120
9000607	Turbidity	2023/10/24			101	80 - 120	ND, RDL=0.1	NTU	0.53	20		
9000709	Nitrate (N)	2023/10/25	94	80 - 120	91	80 - 120	ND, RDL=0.10	mg/L	NC	20		
9000709	Nitrite (N)	2023/10/25	102	80 - 120	103	80 - 120	ND, RDL=0.010	mg/L	NC	20		
9000942	Dissolved Chloride (Cl-)	2023/10/24	91	80 - 120	97	80 - 120	ND, RDL=1.0	mg/L	4.4	20		
9000944	Turbidity	2023/10/25			103	80 - 120	ND, RDL=0.1	NTU	0.91	20		
9000945	Dissolved Sulphate (SO4)	2023/10/24	95	75 - 125	100	80 - 120	ND, RDL=1.0	mg/L	18	20		
9000960	Alkalinity (Total as CaCO3)	2023/10/27			97	85 - 115	ND, RDL=1.0	mg/L	4.7	20		
9000961	Conductivity	2023/10/27			102	85 - 115	ND, RDL=1.0	umho/cm	0	10		
9000962	pH	2023/10/27			102	98 - 103			0.46	N/A		
9002044	Colour	2023/10/25			97	80 - 120	ND,RDL=2	TCU	0.098	25		
9002541	Dissolved (0.2u) Aluminum (Al)	2023/10/25	99	80 - 120	101	80 - 120	ND,RDL=5	ug/L	NC	20		
9002715	Nitrate (N)	2023/10/26	97	80 - 120	101	80 - 120	ND, RDL=0.10	mg/L	NC	20		
9002715	Nitrite (N)	2023/10/26	104	80 - 120	108	80 - 120	ND, RDL=0.010	mg/L	NC	20		
9002753	Turbidity	2023/10/24			102	80 - 120	ND, RDL=0.1	NTU	1.6	20		
9002880	Colour	2023/10/25			99	80 - 120	ND,RDL=2	TCU	0.99	25		
9003320	Nitrate (N)	2023/10/25	83	80 - 120	96	80 - 120	ND, RDL=0.10	mg/L	NC	20		
9003320	Nitrite (N)	2023/10/25	103	80 - 120	105	80 - 120	ND, RDL=0.010	mg/L	NC	20		
9003340	Alkalinity (Total as CaCO3)	2023/10/27			98	85 - 115	ND, RDL=1.0	mg/L	0.36	20		
9003359	pH	2023/10/27			102	98 - 103			0.050	N/A		
9003363	Conductivity	2023/10/27			103	85 - 115	ND, RDL=1.0	umho/cm	0.47	10		
9003410	Dissolved Chloride (Cl-)	2023/10/26	NC	80 - 120	99	80 - 120	ND, RDL=1.0	mg/L	0.039	20		
9003414	Dissolved Sulphate (SO4)	2023/10/26	NC	75 - 125	96	80 - 120	ND, RDL=1.0	mg/L	0.35	20		
9003788	Total Kjeldahl Nitrogen (TKN)	2023/10/26	NC	80 - 120	105	80 - 120	ND, RDL=0.10	mg/L	1.6	20	108	80 - 120
9003866	Total Phosphorus	2023/10/26	103	80 - 120	107	80 - 120	ND, RDL=0.020	mg/L	5.2	20	104	80 - 120



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840

Report Date: 2023/11/14

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste

Sampler Initials: CM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9003926	Total Ammonia-N	2023/10/27	101	75 - 125	102	80 - 120	ND, RDL=0.050	mg/L	5.9	20		
9004023	Total Ammonia-N	2023/10/29	105	75 - 125	104	80 - 120	ND, RDL=0.050	mg/L	NC	20		
9006440	Phenols-4AAP	2023/10/26	99	80 - 120	97	80 - 120	ND, RDL=0.0010	mg/L	0	20		
9007561	Total Aluminum (Al)	2023/10/27	104	80 - 120	104	80 - 120	ND, RDL=4.9	ug/L	2.6	20		
9007561	Total Arsenic (As)	2023/10/27	98	80 - 120	98	80 - 120	ND, RDL=1.0	ug/L	NC	20		
9007561	Total Boron (B)	2023/10/27	94	80 - 120	98	80 - 120	ND, RDL=10	ug/L	NC	20		
9007561	Total Cadmium (Cd)	2023/10/27	97	80 - 120	96	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9007561	Total Calcium (Ca)	2023/10/27	NC	80 - 120	102	80 - 120	ND, RDL=200	ug/L	1.5	20		
9007561	Total Chromium (Cr)	2023/10/27	101	80 - 120	100	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9007561	Total Cobalt (Co)	2023/10/27	100	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9007561	Total Copper (Cu)	2023/10/27	100	80 - 120	101	80 - 120	ND, RDL=0.90	ug/L	NC	20		
9007561	Total Iron (Fe)	2023/10/27	97	80 - 120	96	80 - 120	ND, RDL=100	ug/L	1.8	20		
9007561	Total Lead (Pb)	2023/10/27	102	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9007561	Total Magnesium (Mg)	2023/10/27	100	80 - 120	101	80 - 120	ND, RDL=50	ug/L	2.2	20		
9007561	Total Manganese (Mn)	2023/10/27	97	80 - 120	98	80 - 120	ND, RDL=2.0	ug/L				
9007561	Total Nickel (Ni)	2023/10/27	97	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L	NC	20		
9007561	Total Potassium (K)	2023/10/27	100	80 - 120	100	80 - 120	ND, RDL=200	ug/L	2.2	20		
9007561	Total Selenium (Se)	2023/10/27	103	80 - 120	103	80 - 120	ND, RDL=2.0	ug/L	NC	20		
9007561	Total Silver (Ag)	2023/10/27	96	80 - 120	97	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9007561	Total Sodium (Na)	2023/10/27	100	80 - 120	102	80 - 120	ND, RDL=100	ug/L	1.3	20		
9007561	Total Zinc (Zn)	2023/10/27	99	80 - 120	100	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9008253	Total Suspended Solids	2023/10/30			100	85 - 115	ND, RDL=10	mg/L	NC	20		
9008301	Total Dissolved Solids	2023/10/31			100	90 - 110	ND, RDL=10	mg/L	2.5	20		
9011139	Total Dissolved Solids	2023/10/28			95	90 - 110	ND, RDL=10	mg/L	0	20		
9011629	Total Suspended Solids	2023/11/02			95	85 - 115	ND, RDL=10	mg/L	0	20		
9012166	Total Suspended Solids	2023/10/30			99	85 - 115	ND, RDL=10	mg/L	5.4	20		
9013589	Total Dissolved Solids	2023/11/01			95	90 - 110	ND, RDL=10	mg/L	13	20		



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840

Report Date: 2023/11/14

QUALITY ASSURANCE REPORT(CONT'D)

BluMetric Environmental Inc

Client Project #: 230225-08

Site Location: North Baptiste

Sampler Initials: CM

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9013590	Total Dissolved Solids	2023/10/31			97	90 - 110	ND, RDL=10	mg/L	13	20		
9037815	Dissolved Mercury (Hg)	2023/11/09	111	75 - 125	110	80 - 120	ND, RDL=0.10	ug/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).



BUREAU
VERITAS

Bureau Veritas Job #: C3W8840
Report Date: 2023/11/14

BluMetric Environmental Inc
Client Project #: 230225-08
Site Location: North Baptiste
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.



Custody Tracking Form



T781232

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: MCG-A
Last Sample: NB-QAQC-SW1
Sample Count: 9

Relinquished By				Received By			
Brad H'Callum	<i>Brad McCall</i>	Date	2023/10/20	AVISHET SURESTHA	<i>AS</i>	Date	2023/10/21
Print	Sign	Time (24 HR)	09:00	Print	Sign	Time (24 HR)	14:54
		Date	YY/MM/DD			Date	YY/MM/DD
		Time (24 HR)	HH:MM			Time (24 HR)	HH:MM
		Date	YY/MM/DD			Date	YY/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) # of Coolers/Pkgs:

Brad McCallum / Matt DeGeer *2*

Rush Immediate Test Food Residue

Micro Food Chemistry

*** LABORATORY USE ONLY ***

Received At	Lab Comments:	<table border="1"> <thead> <tr> <th colspan="2">Custody Seal</th> <th>Cooling Media</th> <th colspan="3">Temperature °C</th> </tr> <tr> <th>Present (Y/N)</th> <th>Intact (Y/N)</th> <th>Present (Y/N)</th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td><i>Y</i></td> <td><i>Y</i></td> <td><i>Y</i></td> <td><i>1</i></td> <td><i>1</i></td> <td><i>1</i></td> </tr> <tr> <td><i>Y</i></td> <td><i>Y</i></td> <td><i>Y</i></td> <td><i>3</i></td> <td><i>4</i></td> <td><i>2</i></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="3">Drinking Water Metals Preservation Check Done (Circle)</td> <td>YES</td> <td colspan="2">NO</td> </tr> </tbody> </table>						Custody Seal		Cooling Media	Temperature °C			Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3	<i>Y</i>	<i>Y</i>	<i>Y</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>Y</i>	<i>Y</i>	<i>Y</i>	<i>3</i>	<i>4</i>	<i>2</i>							Drinking Water Metals Preservation Check Done (Circle)			YES	NO	
Custody Seal		Cooling Media	Temperature °C																																								
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3																																						
<i>Y</i>	<i>Y</i>	<i>Y</i>	<i>1</i>	<i>1</i>	<i>1</i>																																						
<i>Y</i>	<i>Y</i>	<i>Y</i>	<i>3</i>	<i>4</i>	<i>2</i>																																						
Drinking Water Metals Preservation Check Done (Circle)			YES	NO																																							
Labeled By		<p>21-Oct-23 14:54 Christine Gripton C3W8840 JDK ENV-1217</p>																																									
Verified By																																											

COR FCD-00383/4

Appendix D

D-4 Toxicity Sampling Laboratory Reports

NAUTILUS ENVIRONMENTAL RAINBOW TROUT TOXICITY TEST BENCH SHEET

Po# 230225-08

Sample Information	Sam Method: Composite <input checked="" type="radio"/> Grab Other	Test Information	Ti Type: Single Concentration	LC50	TIE	Screen
Account 8602.0 8602.002	Sample Number 8602.0022301	Date/Time Started	05.05.23 / 1240	Analyst Starting Test		W
Client Blumetric	Sample Name MCG-C	Date/Time Ended	09.05.23 / 1230	Fish Lot #		LF150323
Person Collecting Sample N/A	Temperature Upon Receipt 12.8 °C	Test Volume	20 L Per Vessel	Number of Fish Per Vessel	10	Number of Vessels Per Conc. (1) 2
Date/Time Collected	03.05.23 / 1000	Pre-Aeration	No <input checked="" type="radio"/> Yes	Pre-Aeration Duration	30 min	Pre-Aeration Rate 6.5 ±0.26 ml/min·L ⁻¹
Date/Time Received in Lab	05.05.23 / 1110	Rate of Aeration During Test	6.5 ±0.26 ml/min·L ⁻¹	Dilution Water	dechlor	Sample pH Adjustment <input checked="" type="radio"/> No Yes
Sample Description	clear, brown	Sample Type Description	surface water	Sample Point Description:	MISA <input checked="" type="radio"/> Other	Storage Temperature - °C

Initial Sample Measurements Before Aeration - Cond.: 478 183 µmhos D.O.: 9.0 mg/L 89 % Temp: 15 °C pH: 7.2 6.9 Air Flow Meter Reading: 0.150 L/min.
 Instrument Identification- M/P #: 718 M/P #: 715 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			
		3.5	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	0	1420	235	10.0	100	15	8.0	7/8	7/5	13/91	W	09.05.23	1230	15.3	8.8	88	7.8	7/5	13/91	CS	
(1)	100%	0	0	0	0	0	↓	181	9.6	95	15	7.1	↓	↓	↓	↓	↓	↓	14.8	8.9	89	7.7	↓	↓	CS	
Time Initials		1615 W	10:00 CF	11:20 CF	12:45 W	12:30 CS	Number of Control Fish Showing Atypical Behaviour: <24h: <u>0</u> 24h: <u>0</u> 48h: <u>0</u> 72h: <u>0</u> 96h: <u>0</u>																			

Percent Mortality	0 %	LENGTH (mm)	WEIGHT (g)	Initials:	Holding Mortalities 7-days Preceding Test	Number of Fish in Batch at Day (-)7
LC50 (Lower; Upper Limit)	-	Mean (SD) 44.4 (2.4)	Mean (SD) 0.76 (0.17)	CS	Number Dead (recorded daily for 7 days)	853
Method	-	Min/Max 40 / 47	Min/Max 0.51 / 1.00		0 + 0 + 0 + 0 + 0 + 0 + 0	Total Number Dead for 7 days Preceding Test = 0
Verified By (initials)	CS	Sample Size 60	Loading Density 0.38 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		Sample Method: Composite <input checked="" type="radio"/> Grab <input type="radio"/> Other		Test Information		Test Type: <input checked="" type="radio"/> Single Concentration <input type="radio"/> LC50 <input type="radio"/> TIE <input type="radio"/> Screen	
Account Number <u>8602-002</u>		Sample # <u>8602-0022301</u>		Date Started/Time <u>08.05.23 / 1415</u>		Analyst Starting Test <u>ET</u>	
Client <u>Blumetric</u>		Sample Name <u>MCG-C</u>		Date Ended/Time <u>10.05.23 / 1420</u>		#Neonates/Vessel <u>10</u>	
Person Collecting Sample <u>N/A</u>		Temperature Upon Receipt <u>12.8 °C</u>		Test Volume <u>250 mL/Vessel</u>		mL Solution/Daphnid <u>25 mL</u>	
Date/Time Sampled <u>03.05.23 / 1000</u>		Pre-aeration <u>no</u> <input checked="" type="radio"/> <input type="radio"/> yes		Pre-aeration Duration <u>30 min</u>		Sample Hardness Adjustment <input checked="" type="radio"/> no <input type="radio"/> yes	
Date/Time Received <u>05.05.23 / 1110</u>		Pre-aeration Rate <u>40.8 ±2 mL/min L'</u>		Sample pH Adjustment <input checked="" type="radio"/> no <input type="radio"/> yes		Storage Temperature <u>4 ±2 °C</u>	
Sample Description <u>clear, brown</u>		Dilution H ₂ O # <u>DW2337</u>		Sample Point Description: MISA <input checked="" type="radio"/> other <input type="radio"/>		Test Row(s): <u>1</u>	
Sample Type Description <u>surface water</u>		LC50 Randomization Template: <u>-</u>					

Initial Sample Measurements: pH 6.9 Dissolved O₂ 9.3 mg/L 106 % Conductivity 181 µmhos Temperature 18.21 °C
 Instrument Identification: Meter/Probe # 725 / 13/9 Meter/Probe # 715 Meter/Probe # 715 Meter/Probe # 715

Concentration (% Volume)	pH			Dissolved Oxygen			Cond. (µmhos)	Hard. (mg/L)	Temperature (°C)		
	Initial	Final	Final M/P	Initial (mg/L)	Final (%)	Final M/P	Initial	Initial	Initial	Final	Final M/P
Control	7.9	8.0	13/91	7.9	91%	7/5	727	184	21	21	7/5
100%	7.3	7.6	↓	8.6	98%	↓	184	56	21	21	↓
Initials	ET	ET	ET	ET	ET	ET	ET	ET	ET	ET	ET

BROOD CULTURE HEALTH INFORMATION

Brood Culture #	<u>91B</u>			
Culture age (days)	<u>20</u>			
Days to 1 st Brood (≤12)	<u>8</u>			
Average # of Neonates/Brood (≥15)	<u>22.5</u>			
Previous 7 Days Mortality in Culture (≤25%)	<u>0</u>			

NEONATE SOURCE AND OBSERVATIONS OF NUMBER IMMOBILE AND DEAD

	Control				100%								Init	
	A	B	C	D	A	B	C	D	A	B	C	D		
Brood culture #	<u>91B →</u>				<u>91B →</u>									
24-Hr. # Immobile	○	○	○	○	○	○	○	○	○	○	○	○	○	ET
48-Hr. # Immobile	○	○	○	○	○	○	○	○	○	○	○	○	○	ET
48-Hr. # Dead	○	○	○	○	○	○	○	○	○	○	○	○	○	ET
Total # Immobile	○				○									
Total # Dead	○				○									

Percent Mortality 0 % Standard Deviation of Control Survival 0 Standard Deviation of Test Survival 0 Verified By (Initials) CO Notes _____

NAUTILUS ENVIRONMENTAL RAINBOW TROUT TOXICITY TEST BENCH SHEET PO# 230225-08

Sample Information		Sarr Method: Composite <u>Grab</u> Other	Test Information		Ti Type: Single <u>Concentration</u> LC50 TIE Screen
Account <u>8602.002</u>	Sample Number <u>8602.0622302</u>	Date/Time Started <u>05.05.23</u> / <u>1245</u>	Analyst Starting Test <u>UL</u>		
Client <u>8th Biometric</u>	Sample Name <u>MCG-H</u>	Date/Time Ended <u>09.05.23</u> / <u>1235</u>	Fish Lot # <u>LF150323</u>		
Person Collecting Sample <u>N/A</u>	Temperature Upon Receipt <u>12.5 °C</u>	Test Volume <u>20</u> L Per Vessel	Number of Fish Per Vessel <u>10</u>	Number of Vessels Per Conc. <u>(1) 2</u>	
Date/Time Collected <u>03.05.23</u> / <u>1145</u>	Pre-Aeration <u>No</u> <u>(Yes)</u>	Pre-Aeration Duration <u>30</u> min	Pre-Aeration Rate <u>6.5 ±0.26 ml/min·L⁻¹</u>		
Date/Time Received in Lab <u>05.05.23</u> / <u>1110</u>	Rate of Aeration During Test <u>6.5 ±0.26 ml/min·L⁻¹</u>	Dilution Water <u>dechlor</u>	Sample pH Adjustment <u>No</u> <u>(Yes)</u>		
Sample Description <u>clear, green</u>		Sample Type Description <u>Surface water</u>	Sample Point Description: MISA <u>Other</u>		Storage Temperature <u>-</u> °C

Initial Sample Measurements Before Aeration - Cond.: 38 µmhos D.O.: 10.21 mg/L 100 % Temp: 15 °C pH: 7.68 Air Flow Meter Reading: 0.150 L/min.
 Instrument Identification- M/P #: 718 M/P #: 715 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		
		3.5	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	1 ^A	1 ^A	1420	235	10.0	100	15	8.0	7/8	7/5	13/91	UL	09.05.23	1235	14.7	9.0	90	7.8	7/5	13/91	g	
<u>(1)</u>	100%	0	0	0	0	0	↓	38	10.1	100	15	6.9	↓	↓	↓	↓	↓	↓	14.6	9.1	90	7.3	↓	↓	↓	
Time Initials		1615 UL	10:00 CF	11:20 CF	12:45 RR	12:50 S	Number of Control Fish Showing Atypical Behaviour: <24h: <u>0</u> 24h: <u>0</u> 48h: <u>0</u> 72h: <u>0</u> 96h: <u>0</u>																			

Percent Mortality	<u>0</u> %	LENGTH (mm)	WEIGHT (g)	Initials: <u>UL</u>	Holding Mortalities 7-days Preceding Test	Number of Fish in Batch at Day (-)7 <u>853</u>
LC50 (Lower; Upper Limit)	<u>-</u>	Mean (SD) <u>45.5 (1.4)</u>	Mean (SD) <u>0.83 (0.14)</u>		Number Dead (recorded daily for 7 days)	Total Number Dead for 7 days Preceding Test
Method	<u>-</u>	Min/Max <u>40 / 48</u>	Min/Max <u>0.51 / 1.02</u>		<u>0 + 0 + 0 + 0 + 0 + 0 + 0</u>	= <u>0</u>
Verified By (initials)	<u>UL</u>	Sample Size <u>10</u>	Loading Density <u>0.42</u> g/L		7-Day Holding Mortality ((total number dead/number of fish in batch) x 100)	<u>0</u>

Observations and notes: (A) Jump

Nautilus Daphnia magna Toxicity Test Bench Sheet

Sample Information		Sample Method: Composite <u>Grab</u> Other		Test Information		Test Type: <u>Single Concentration</u> LC50 TIE Screen	
Account Number <u>8602-002</u>		Sample # <u>8602-0022302</u>		Date Started/Time <u>08.05.23 / 12:20</u>		Analyst Starting Test <u>KK</u>	
Client <u>BlaMetric</u>		Sample Name <u>MCG-#</u>		Date Ended/Time <u>10.05.23 / 12:25</u>		#Neonates/Vessel <u>10</u>	
Person Collecting Sample <u>NIA</u>		Temperature Upon Receipt <u>12.5 °C</u>		Test Volume <u>125 mL/Vessel</u>		mL Solution/Daphnid <u>125</u> mL	
Date/Time Sampled <u>03.05.23 / 11:45</u>		Pre-aeration <u>no</u> <input checked="" type="checkbox"/>		Pre-aeration Duration <u>30</u> <u>6</u> min		Sample Hardness Adjustment <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
Date/Time Received <u>05.05.23 / 11:10</u>		Pre-aeration Rate <u>29.3 ±2 mL/min L'</u>		Sample pH Adjustment <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>		Sample pH Adjustment <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
Sample Description <u>clear, green</u>		Dilution H ₂ O # <u>DN2337</u>		Sample pH Adjustment <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>		Storage Temperature <u>4±2</u> °C	
Sample Type Description <u>surface water</u>		Sample Point Description: MISA <input checked="" type="checkbox"/> <u>other</u>		Storage Temperature <u>4±2</u> °C		Test Row(s): <u>22</u>	
LC50 Randomization Template: <u>NIA</u>							

Pre-hardness adjust: pH: 7.2 DO: 9.9 mg/L, 111% Cond: 42 µmhos Temp: 20°C Hard: 8mg/L
 Initial Sample Measurements: pH 7.5 Dissolved O₂ 9.8 mg/L 116% % Conductivity 154 µmhos Temperature 21 °C Hardness adjuster
 Instrument Identification: Meter/Probe # 715 Meter/Probe # 715 Meter/Probe # 715 Meter/Probe # 715

Concentration (% Volume)	pH			Dissolved Oxygen			Cond. (µmhos)	Hard. (mg/L)	Temperature (°C)		
	Initial	Final	Final M/P	Initial (mg/L)	Final (%)	Final M/P			Initial	Initial	Initial
Control	8.0	8.0	13/91	8.5	97	7/5	721	184	21	21	7/5
100%	7.6	7.8	↓	9.2	104	↓	154	283 <u>283</u>	21	21	↓
Initials	KK	ET		KK	ET		KK	KK	KK	ET	

Hardness adj. ~~32 to 28 mg/L~~
8 to 28

Brood Culture #	<u>73^C</u>	<u>73^B</u>		
Culture age (days)	<u>28</u>	→		
Days to 1 st Brood (≤12)	<u>9</u>	→		
Average # of Neonates/Brood (≥15)	<u>34.3</u>	<u>40.4</u>		
Previous 7 Days Mortality in Culture (≤25%)	<u>0</u>	<u>0</u>		

	Control				100%								Init	
	A	B	C	D	A	B	C	D	A	B	C	D		
Brood culture #	<u>73^C</u>	→	<u>73^B</u>		<u>73^C</u>	→	<u>73^B</u>							KK
24-Hr. # Immobile	○	○	○		○	○	○							ET
48-Hr. # Immobile	○ ^A	○	○		○	○	○							
48-Hr. # Dead	○	○	○		○	○	○							ET
Total # Immobile	○				○									
Total # Dead	○				○									

Percent Mortality 0 % Standard Deviation of Control Survival 0 Standard Deviation of Test Survival 0 Verified By (Initials) GO Notes _____

A - close to surface, however, movement is considered viable and active. ET
 Y:\Masters\MASTERS BINDER\8. Daphnia magna\Daphnia magna Toxicity Testing Sheet R1.0 January 2022.doc

Work Order : 253056
 Sample Number : 79943

SAMPLE IDENTIFICATION

Company :	Bureau Veritas Laboratories		
Location :	Mississauga ON	Sampling Date :	2023-10-19
Job Number :	C3W8840	Sampling Time :	11:00
Substance :	MCG-C	Date Received :	2023-10-23
Sampling Method :	Grab	Time Received :	14:05
Sampled By :	B. McCallum	Temperature at Receipt :	8 °C
Sample Description :	Clear, brown, contains settled solids	Date Tested :	2023-10-24

 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 :	<i>Daphnia magna</i>	Time to First Brood :	9.8 days
Organism Batch :	Dm23-20	Average Brood Size :	34.3
Culture Mortality :	0.3% (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 :	30 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 :	2023-10-25	LC50 :	6.0 g/L
Organism Batch :	Dm23-20	95% Confidence Limits :	5.7 - 6.3 g/L
Analyst(s) :	SSF, NM	Historical Mean LC50 :	6.4 g/L
Statistical Method :	Spearman-Kärber	Warning Limits (± 2SD) :	5.6 - 7.4 g/L

COMMENTS

- All test validity criteria as specified in the test method were satisfied.

Approved By : _____

Project Manager

Work Order : 253056
 Sample Number : 79943

TEST DATA

	pH	Dissolved O ₂ (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O ₂ Saturation (%)*	Hardness (as CaCO ₃)
Initial Chemistry (100%) :	7.2	8.7	488	21	104	220 mg/L

0 HOURS

 Date & Time : 2023-10-24 9:55
 Analyst(s) : SV/AW

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature	O ₂ Saturation*	Hardness
100	A	0	0	7.4	8.4	490	21	100	220
100	B	0	0	7.4	8.4	490	21	100	220
100	C	0	0	7.4	8.4	490	21	100	220
Control	A	0	0	8.3	8.4	446	21	99	150
Control	B	0	0	8.3	8.4	446	21	99	150
Control	C	0	0	8.3	8.4	446	21	99	150

Notes:

24 HOURS

 Date & Time : 2023-10-25 9:55
 Analyst(s) : SV/FM (SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature
100	A	-	0	-	-	-	21
100	B	-	0	-	-	-	21
100	C	-	0	-	-	-	21
Control	A	-	0	-	-	-	21
Control	B	-	0	-	-	-	21
Control	C	-	0	-	-	-	21

Notes:

48 HOURS

 Date & Time : 2023-10-26 9:55
 Analyst(s) : FM (NM)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature
100	A	0	0	8.4	8.1	493	21
100	B	0	0	8.4	8.2	491	21
100	C	0	0	8.4	8.2	491	21
Control	A	0	0	8.3	8.1	457	21
Control	B	0	0	8.3	8.1	454	21
Control	C	0	0	8.3	8.2	457	21

Notes:

Number immobile does not include number dead.

"-" = not measured/not required

* adjusted for temperature and barometric pressure

 Test Data Reviewed By : JJ

 Date : 2023-11-01

Work Order : 253056

Sample Number : 79943

SAMPLE IDENTIFICATION

Company :	Bureau Veritas Laboratories		
Location :	Mississauga ON	Sampling Date :	2023-10-19
Job Number :	C3W8840	Sampling Time :	11:00
Substance :	MCG-C	Date Received :	2023-10-23
Sampling Method :	Grab	Time Received :	14:05
Sampled By :	B. McCallum	Temperature at Receipt :	8 °C
Sample Description :	Clear, brown, contains settled solids	Date Tested :	2023-10-24

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 :	<i>Oncorhynchus mykiss</i>	Average Fork Length (\pm 2 SD) :	38.7 mm (\pm 8.7)
Organism Batch :	T23-22	Range of Fork Lengths :	31 - 46 mm
Control Sample Size :	10	Average Wet Weight (\pm 2 SD) :	0.5 g (\pm 0.4)
Cumulative stock tank mortality rate :	0% (previous 7 days)	Range of Wet Weights :	0.2 - 0.8 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.2 g/L

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 \pm 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 :	T23-22	LC50 :	3277 mg/L
Date Tested :	2023-10-18	95% Confidence Limits :	2932 - 3675 mg/L
Analyst(s) :	DT, JGR	Historical Mean LC50 :	3551 mg/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (\pm 2SD) :	2852 - 4421 mg/L

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Approved By : _____

Project Manager

Work Order : 253056

Sample Number : 79943

TEST DATA

	pH	Dissolved O ₂ (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O ₂ Saturation (%) ³
Initial Water Chemistry (100%) :	7.1	9.3	462	15	98
After 30 min pre-aeration :	7.2	9.4	464	15	98

0 HOURS

Date & Time	2023-10-24	10:55					
Analyst(s) :	CN						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	O ₂ Saturation ³
100%	0	0	7.2	9.4	464	15	98
Control	0	0	8.3	9.6	639	14	98

Notes:

24 HOURS

Date & Time	2023-10-25	10:55				
Analyst(s) :	NM					
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature
100%	0	0	-	-	-	15
Control	0	0	-	-	-	15

Notes:

48 HOURS

Date & Time	2023-10-26	10:55				
Analyst(s) :	DT (KP)					
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature
100%	0	0	-	-	-	14
Control	0	0	-	-	-	14

Notes:

72 HOURS

Date & Time	2023-10-27	10:55				
Analyst(s) :	DT (AJS)					
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature
100%	0	0	-	-	-	14
Control	0	0	-	-	-	14

Notes:

96 HOURS

Date & Time	2023-10-28	10:55				
Analyst(s) :	JGR					
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature
100%	0	0	8.3	9.3	470	15
Control	0	0	8.3	9.3	639	15

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 : 2023-10-29

Work Order : 253056
 Sample Number : 79944

SAMPLE IDENTIFICATION

Company :	Bureau Veritas Laboratories		
Location :	Mississauga ON	Sampling Date :	2023-10-19
Job Number :	C3W8840	Sampling Time :	12:25
Substance :	MCG-H	Date Received :	2023-10-23
Sampling Method :	Grab	Time Received :	14:05
Sampled By :	B. McCallum	Temperature at Receipt :	8 °C
Sample Description :	Clear, brown, contains settled solids	Date Tested :	2023-10-24

 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 :	<i>Daphnia magna</i>	Time to First Brood :	9.8 days
Organism Batch :	Dm23-20	Average Brood Size :	34.3
Culture Mortality :	0.3% (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 :	30 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 :	2023-10-25	LC50 :	6.0 g/L
Organism Batch :	Dm23-20	95% Confidence Limits :	5.7 - 6.3 g/L
Analyst(s) :	SSF, NM	Historical Mean LC50 :	6.4 g/L
Statistical Method :	Spearman-Kärber	Warning Limits (± 2SD) :	5.6 - 7.4 g/L

COMMENTS

- All test validity criteria as specified in the test method were satisfied.

Approved By : _____

Project Manager

Work Order : 253056
 Sample Number : 79944

TEST DATA

	pH	Dissolved O ₂ (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O ₂ Saturation (%)*	Hardness (as CaCO ₃)
Initial Chemistry (100%) :	7.1	8.7	208	21	104	110 mg/L

0 HOURS

 Date & Time : 2023-10-24 10:10
 Analyst(s) : SV/AW

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature	O ₂ Saturation*	Hardness
100	A	0	0	7.7	8.4	209	21	100	110
100	B	0	0	7.7	8.4	209	21	100	110
100	C	0	0	7.7	8.4	209	21	100	110
Control	A	0	0	8.3	8.4	446	21	99	150
Control	B	0	0	8.3	8.4	446	21	99	150
Control	C	0	0	8.3	8.4	446	21	99	150

Notes:

24 HOURS

 Date & Time : 2023-10-25 10:10
 Analyst(s) : FM (SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature
100	A	-	0	-	-	-	21
100	B	-	0	-	-	-	21
100	C	-	0	-	-	-	21
Control	A	-	0	-	-	-	21
Control	B	-	0	-	-	-	21
Control	C	-	0	-	-	-	21

Notes:

48 HOURS

 Date & Time : 2023-10-26 10:10
 Analyst(s) : MEP (NM)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O ₂	Conductivity	Temperature
100	A	0	0	8.0	8.1	221	21
100	B	0	0	8.0	8.1	218	21
100	C	0	0	8.0	8.1	222	21
Control	A	0	0	8.3	8.3	456	21
Control	B	0	0	8.3	8.3	455	21
Control	C	0	0	8.3	8.3	455	21

Notes:

Number immobile does not include number dead.

"-" = not measured/not required

* adjusted for temperature and barometric pressure

 Test Data Reviewed By : JJ

 Date : 2023-11-01

Work Order : 253056

Sample Number : 79944

SAMPLE IDENTIFICATION

Company :	Bureau Veritas Laboratories		
Location :	Mississauga ON	Sampling Date :	2023-10-19
Job Number :	C3W8840	Sampling Time :	12:25
Substance :	MCG-H	Date Received :	2023-10-23
Sampling Method :	Grab	Time Received :	14:05
Sampled By :	B. McCallum	Temperature at Receipt :	8 °C
Sample Description :	Clear, brown, contains settled solids	Date Tested :	2023-10-24

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 :	<i>Oncorhynchus mykiss</i>	Average Fork Length (\pm 2 SD) :	40.2 mm (\pm 5.1)
Organism Batch :	T23-22	Range of Fork Lengths :	37 - 46 mm
Control Sample Size :	10	Average Wet Weight (\pm 2 SD) :	0.5 g (\pm 0.2)
Cumulative stock tank mortality rate :	0% (previous 7 days)	Range of Wet Weights :	0.4 - 0.8 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.3 g/L

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 \pm 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 :	T23-22	LC50 :	3277 mg/L
Date Tested :	2023-10-18	95% Confidence Limits :	2932 - 3675 mg/L
Analyst(s) :	DT, JGR	Historical Mean LC50 :	3551 mg/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (\pm 2SD) :	2852 - 4421 mg/L

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Approved By : _____

Project Manager

Work Order : 253056

Sample Number : 79944

TEST DATA

	pH	Dissolved O ₂ (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O ₂ Saturation (%) ³
Initial Water Chemistry (100%) :	7.1	9.4	200	15	98
After 30 min pre-aeration :	7.1	9.4	201	15	98

0 HOURS

Date & Time	2023-10-24	11:00					
Analyst(s) :	CN						
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature	O ₂ Saturation ³
100%	0	0	7.1	9.4	201	15	98
Control	0	0	8.3	9.6	639	14	98

Notes:

24 HOURS

Date & Time	2023-10-25	11:00				
Analyst(s) :	NM					
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature
100%	0	0	-	-	-	15
Control	0	0	-	-	-	15

Notes:

48 HOURS

Date & Time	2023-10-26	11:00				
Analyst(s) :	DT (KP)					
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature
100%	0	0	-	-	-	14
Control	0	0	-	-	-	14

Notes:

72 HOURS

Date & Time	2023-10-27	11:00				
Analyst(s) :	DT (AJS)					
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature
100%	0	0	-	-	-	14
Control	0	0	-	-	-	14

Notes:

96 HOURS

Date & Time	2023-10-28	11:00				
Analyst(s) :	JGR					
Concentration	Dead	Impaired	pH	Dissolved O ₂	Conductivity	Temperature
100%	0	0	7.9	9.2	211	16
Control	0	0	8.3	9.1	646	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 : 2023-10-29

CHAIN OF CUSTODY RECORD



Nautilus Work Order No:

253056

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: C3W8840 +
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, ON
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.)
2023-10-19	11:00	MCG-C	79943	8	✓		✓								✗		1 x 20L
2023-10-19	12:25	MCG-H	79944	8	✓		✓								✗		1 x 20L

For Lab Use Only	
Received By:	VC
Date:	2023-10-23
Time:	14:05
Storage Location:	
Storage Temp. (°C):	

Please list any special requests or instructions: * 'Grab' as per pail label (VC) 2023-10-23

Appendix D

D-5 Quality Assurance/Quality Control (QA/QC)

2023 Groundwater Sampling Quality Assurance and Quality Control
(Spring)

Sample Description		RDL	NB MW4	NB-QAQC GW1	Relative Percent Difference
Date Sampled			3-May-23	3-May-23	
Parameter	Unit				
pH	pH Units	0.01	7.87	7.83	1%
Alkalinity (as CaCO ₃)	mg/L	5	68	67	1%
Electrical Conductivity	uS/cm	2	277	275	1%
Hardness (as CaCO ₃) (Calculated)	mg/L	0.5	110	111	1%
Total Dissolved Solids	mg/L	10	192	188	2%
Total Suspended Solids	mg/L	10	278	296	6%
Chloride	mg/L	0.1	30.4	30.4	0%
Nitrate as N	mg/L	0.05	<0.05	<0.05	NA
Nitrite as N	mg/L	0.05	<0.05	<0.05	NA
Sulphate	mg/L	0.1	22.4	22.4	0%
Ammonia as N	mg/L	0.02	<0.02	<0.02	NA
Total Kjeldahl Nitrogen	mg/L	0.1	<0.10	<0.10	NA
Total Phosphorus	mg/L	0.02	0.5	0.57	13%
Chemical Oxygen Demand	mg/L	5	<5	<5	NA
Dissolved Organic Carbon	mg/L	0.5	0.6	<0.5	NA
Phenols	mg/L	0.001	<0.001	<0.001	NA
Turbidity	NTU	0.5	49.5	52.8	6%
Dissolved Calcium	mg/L	0.05	33	33.6	2%
Dissolved Magnesium	mg/L	0.05	6.76	6.66	1%
Dissolved Potassium	mg/L	0.5	3.24	3.17	2%
Dissolved Sodium	mg/L	0.05	5.77	5.94	3%
Dissolved Aluminum	mg/L	0.004	<0.004	<0.004	NA
Dissolved Arsenic	mg/L	0.003	<0.001	<0.001	NA
Dissolved Barium	mg/L	0.002	0.012	0.011	9%
Dissolved Beryllium	mg/L	0.001	<0.0005	<0.0005	NA
Dissolved Boron	mg/L	0.010	<0.010	<0.010	NA
Dissolved Cadmium	mg/L	0.0001	<0.0001	<0.0001	NA
Dissolved Chromium	mg/L	0.003	<0.002	<0.002	NA
Dissolved Cobalt	mg/L	0.0005	<0.0005	<0.0005	NA
Dissolved Copper	mg/L	0.002	<0.001	<0.001	NA
Dissolved Lead	mg/L	0.001	<0.0005	<0.0005	NA
Dissolved Iron	mg/L	0.010	<0.010	<0.010	NA
Dissolved Manganese	mg/L	0.002	<0.002	<0.002	NA
Dissolved Mercury	mg/L	0.0001	<0.0001	<0.0001	NA
Dissolved Molybdenum	mg/L	0.002	<0.002	<0.002	NA
Dissolved Nickel	mg/L	0.001	<0.001	<0.001	NA
Dissolved Selenium	mg/L	0.004	<0.001	<0.001	NA
Dissolved Silicon	mg/L	0.05	9.09	8.94	2%
Dissolved Silver	mg/L	0.0001	<0.0001	<0.0001	NA
Dissolved Strontium	mg/L	0.005	0.097	0.097	0%
Dissolved Thallium	mg/L	0.0003	<0.0003	<0.0003	NA
Dissolved Titanium	mg/L	0.002	<0.002	<0.002	NA
Dissolved Vanadium	mg/L	0.002	<0.002	<0.002	NA
Dissolved Zinc	mg/L	0.005	<0.005	<0.005	NA

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.

NA: RPD is not calculated because the average of the measured parameter concentrations of the original (S) and duplicate (D) samples are not greater than 5X the laboratory readable detection limit (RDL)

2023 Surface Water Sampling Quality Assurance and Quality Control
(Spring)

Sample Description		RDL	MCG-E	NB-QAQC SW1	Relative Percent Difference
Date Sampled			3-May-23	3-May-23	
Parameter	Unit				
pH	pH Units	0.01	6.84	6.84	0%
Alkalinity (as CaCO ₃)	mg/L	5	11	10	NA
Electrical Conductivity	uS/cm	2	105	105	0%
Hardness (as CaCO₃) (Calculated)	mg/L	0.5	11	14.1	25%
Total Dissolved Solids	mg/L	10	88	86	2%
Total Suspended Solids	mg/L	10	<10	<10	NA
Chloride	mg/L	0.10	20.4	20.5	0%
Nitrate as N	mg/L	0.05	0.05	<0.05	NA
Nitrite as N	mg/L	0.05	<0.05	<0.05	NA
Sulphate	mg/L	0.10	3.77	3.67	3%
Ammonia as N	mg/L	0.02	<0.02	<0.02	NA
Biochemical Oxygen Demand	mg/L	2	<2	<2	NA
Total Kjeldahl Nitrogen	mg/L	0.10	0.2	0.21	NA
Total Phosphorus	mg/L	0.02	<0.02	<0.02	NA
Phenols	mg/L	0.001	<0.001	<0.001	NA
True Colour	TCU	5.00	47.9	49.4	3%
Turbidity	NTU	0.5	1.4	1.3	NA
Total Calcium	mg/L	0.32	3.21	4.46	33%
Total Magnesium	mg/L	0.34	0.73	0.73	NA
Total Potassium	mg/L	1.15	0.71	0.67	NA
Total Sodium	mg/L	0.45	15.3	13.1	15%
Aluminum-dissolved	mg/L	0.004	0.08	0.079	1%
Total Arsenic	mg/L	0.003	<0.003	<0.003	NA
Total Boron	mg/L	0.010	<0.010	0.012	NA
Total Cadmium	mg/L	0.0001	<0.0001	<0.0001	NA
Total Chromium	mg/L	0.003	<0.003	<0.003	NA
Total Cobalt	mg/L	0.0005	<0.0005	<0.0005	NA
Total Copper	mg/L	0.002	<0.001	0.001	NA
Total Iron	mg/L	0.010	0.25	0.243	3%
Total Lead	mg/L	0.001	0.002	<0.001	NA
Total Manganese	mg/L	0.002	0.015	0.01	40%
Dissolved Mercury	mg/L	0.0001	<0.0001	<0.0001	NA
Total Nickel	mg/L	0.003	<0.003	<0.003	NA
Total Selenium	mg/L	0.002	<0.002	<0.002	NA
Total Silver	mg/L	0.0001	<0.0001	<0.0001	NA
Total Zinc	mg/L	0.020	<0.020	<0.020	NA

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.

NA: RPD is not calculated because the average of the measured parameter concentrations of the original (S) and duplicate (D) samples are not greater than 5X the laboratory readable detection limit (RDL)

2023 Surface Water Sampling Quality Assurance and Quality Control
(Summer)

Sample Description		RDL	MCG-E	NB-QAOC-1	Relative Percent Difference
Date Sampled			9-Aug-23	9-Aug-23	
Parameter	Unit				
pH	pH Units	0.01	7.33	7.42	1%
Alkalinity (as CaCO ₃)	mg/L	1	30	30	0%
Electrical Conductivity	uS/cm	2	283.00	284.00	0%
Hardness (as CaCO ₃) (Calculated)	mg/L	1.00	40	39	3%
Total Dissolved Solids	mg/L	10	140	130	7%
Total Suspended Solids	mg/L	10	<10	<10	NA
Chloride	mg/L	1	53	54	2%
Nitrate as N	mg/L	0.1	0.17	0.17	NA
Nitrite as N	mg/L	0.01	<0.010	<0.010	NA
Sulphate	mg/L	1	6.1	6.2	2%
Ammonia as N	mg/L	0.05	<0.050	<0.050	NA
Ammonia (un-ionized)	mg/L	0.00061	<0.00061	<0.00061	NA
Biochemical Oxygen Demand	mg/L	2	<2	<2	NA
Total Kjeldahl Nitrogen	mg/L	0.1	0.29	0.23	NA
Total Phosphorus	mg/L	0.02	<0.020	<0.020	NA
Phenols	mg/L	0.001	<0.0010	<0.0010	NA
True Colour	TCU	2	46	47	2%
Turbidity	NTU	0.1	2.6	2.7	4%
Total Calcium	mg/L	0.20	12.00	12.00	0%
Total Magnesium	mg/L	0.05	2.10	2.10	0%
Total Potassium	mg/L	0.20	1.10	1.10	0%
Total Sodium	mg/L	0.10	36.00	36.00	0%
Aluminum-dissolved	mg/L	0.01	0.04	0.04	8%
Total Aluminum	mg/L	0.00	0.09	0.09	6%
Total Arsenic	mg/L	0.00	<0.001	<0.001	NA
Total Boron	mg/L	0.01	<0.01	<0.01	NA
Total Cadmium	mg/L	0.00	<0.00009	<0.00009	NA
Total Chromium	mg/L	0.01	<0.005	<0.005	NA
Total Cobalt	mg/L	0.00	<0.0005	<0.0005	NA
Total Copper	mg/L	0.00	<0.0009	<0.0009	NA
Total Iron	mg/L	0.10	1.10	1.10	0%
Total Lead	mg/L	0.00	<0.0005	<0.0005	NA
Total Manganese	mg/L	0.00	0.04	0.04	3%
Dissolved Mercury	mg/L	0.00	<0.00010	<0.00010	NA
Total Nickel	mg/L	0.00	<0.001	<0.001	NA
Total Selenium	mg/L	0.00	<0.002	<0.002	NA
Total Silver	mg/L	0.00	<0.00009	<0.00009	NA
Total Zinc	mg/L	0.01	<0.005	<0.005	NA

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.

NA: RPD is not calculated because the average of the measured parameter concentrations of the original (S) and duplicate (D) samples are not greater than 5X the laboratory readable detection limit (RDL)

2023 Groundwater Sampling Quality Assurance and Quality Control
(Fall)

Sample Description		RDL	NB-MW4	NB-QAQC GW1	Relative Percent Difference
Date Sampled			19-Oct-23	19-Oct-23	
Parameter	Unit				
pH	pH Units	0.01	8.03	8.03	0%
Alkalinity (as CaCO ₃)	mg/L	1.0	61	61	0%
Electrical Conductivity	uS/cm	2	728	731	0%
Hardness (as CaCO ₃) (Calculated)	mg/L	1.0	110	120	9%
Total Dissolved Solids	mg/L	10	160	220	32%
Total Suspended Solids	mg/L	10	910	900	1%
Chloride	mg/L	1.0	26	26	0%
Nitrate as N	mg/L	0.10	<0.10	<0.10	NA
Nitrite as N	mg/L	0.010	<0.010	<0.010	NA
Sulphate	mg/L	0.10	20	20	0%
Ammonia as N	mg/L	0.050	<0.050	<0.050	NA
Total Kjeldahl Nitrogen	mg/L	0.10	0.14	<0.10	NA
Total Phosphorus	mg/L	0.02	2.5	2.6	4%
Chemical Oxygen Demand	mg/L	4.0	<4.0	<4.0	NA
Dissolved Organic Carbon	mg/L	0.4	0.6	0.7	NA
Phenols	mg/L	0.001	<0.0010	0.0011	NA
Turbidity	NTU	0.1	14	15	7%
Dissolved Calcium	mg/L	0.2	35	35	0%
Dissolved Magnesium	mg/L	0.05	6.9	7.1	3%
Dissolved Potassium	mg/L	0.2	3.2	3.3	3%
Dissolved Sodium	mg/L	0.1	6.6	6.9	4%
Dissolved Aluminum	mg/L	0.0049	0.005	<0.0049	NA
Dissolved Arsenic	mg/L	0.001	<0.001	<0.001	NA
Dissolved Barium	mg/L	0.002	0.013	0.013	0%
Dissolved Beryllium	mg/L	0.0004	<0.0004	<0.0004	NA
Dissolved Boron	mg/L	0.01	<0.01	<0.01	NA
Dissolved Cadmium	mg/L	0.00009	<0.00009	<0.00009	NA
Dissolved Chromium	mg/L	0.005	<0.005	<0.005	NA
Dissolved Cobalt	mg/L	0.0005	<0.0005	<0.0005	NA
Dissolved Copper	mg/L	0.0009	<0.0009	<0.0009	NA
Dissolved Lead	mg/L	0.0005	<0.0005	<0.0005	NA
Dissolved Iron	mg/L	0.1	<0.1	<0.1	NA
Dissolved Manganese	mg/L	0.002	0.0031	0.0032	NA
Dissolved Mercury	mg/L	0.0001	<0.0001	<0.0001	NA
Dissolved Molybdenum	mg/L	0.0005	0.0021	0.002	NA
Dissolved Nickel	mg/L	0.001	<0.001	<0.001	NA
Dissolved Selenium	mg/L	0.002	<0.002	<0.002	NA
Dissolved Silicon	mg/L	0.05	10	10	0%
Dissolved Silver	mg/L	0.00009	<0.00009	<0.00009	NA
Dissolved Strontium	mg/L	0.001	0.099	0.1	1%
Dissolved Thallium	mg/L	0.00005	<0.00005	<0.00005	NA
Dissolved Titanium	mg/L	0.005	<0.005	<0.005	NA
Dissolved Vanadium	mg/L	0.0005	<0.0005	<0.0005	NA
Dissolved Zinc	mg/L	0.005	<0.005	<0.005	NA

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.

NA: RPD is not calculated because the average of the measured parameter concentrations of the original (S) and duplicate (D) samples are not greater than 5X the laboratory readable detection limit (RDL)

2023 Surface Water Sampling Quality Assurance and Quality Control
(Summer)

Sample Description		RDL	MCG-E	NB-QAQC SW1	Relative Percent Difference
Date Sampled			19-Oct-23	19-Oct-23	
Parameter	Unit				
pH	pH Units	0.01	7.55	7.47	1%
Alkalinity (as CaCO ₃)	mg/L	1.0	27	26	4%
Electrical Conductivity	uS/cm	2	245	249	2%
Hardness (as CaCO ₃) (Calculated)	mg/L	1.0	40	42	5%
Total Dissolved Solids	mg/L	10	195	160	20%
Total Suspended Solids	mg/L	10	<10	<10	NA
Chloride	mg/L	1.0	62	56	10%
Nitrate as N	mg/L	0.10	<0.10	<0.10	NA
Nitrite as N	mg/L	0.010	<0.010	0.013	NA
Sulphate	mg/L	1.0	9.0	8.5	6%
Ammonia as N	mg/L	0.050	<0.050	<0.050	NA
Ammonia (un-ionized)	mg/L	0.00061	<0.000002	<0.000002	NA
Biochemical Oxygen Demand	mg/L	2	<2	<2	NA
Total Kjeldahl Nitrogen	mg/L	0.10	0.27	0.26	NA
Total Phosphorus	mg/L	0.02	<0.020	<0.020	NA
Phenols	mg/L	0.001	<0.0010	<0.0010	NA
True Colour	TCU	2	25	24	4%
Turbidity	NTU	0.1	0.9	0.9	0%
Total Calcium	mg/L	0.2	13	12	8%
Total Magnesium	mg/L	0.05	2.40	2.30	4%
Total Potassium	mg/L	0.2	1.5	1.4	7%
Total Sodium	mg/L	0.1	41	41	0%
Aluminum-dissolved	mg/L	0.005	0.0140	0.0130	NA
Total Aluminum	mg/L	0.0049	0.025	0.023	NA
Total Arsenic	mg/L	0.001	<0.001	<0.001	NA
Total Boron	mg/L	0.01	<0.01	<0.01	NA
Total Cadmium	mg/L	0.00009	<0.00009	<0.00009	NA
Total Chromium	mg/L	0.005	<0.005	<0.005	NA
Total Cobalt	mg/L	0.0005	<0.0005	<0.0005	NA
Total Copper	mg/L	0.0009	<0.0009	<0.0009	NA
Total Iron	mg/L	0.1	0.25	0.24	NA
Total Lead	mg/L	0.0005	<0.0005	<0.0005	NA
Total Manganese	mg/L	0.002	0.0069	0.0067	NA
Dissolved Mercury	mg/L	0.001	<0.0001	<0.0001	NA
Total Nickel	mg/L	0.002	<0.001	<0.001	NA
Total Selenium	mg/L	0.00009	<0.002	<0.002	NA
Total Silver	mg/L	0.005	<0.00009	<0.00009	NA
Total Zinc	mg/L	0.0001	<0.005	<0.005	NA

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.

NA: RPD is not calculated because the average of the measured parameter concentrations of the original (S) and duplicate (D) samples are not greater than 5X the laboratory readable detection limit (RDL)

Appendix E

Environment Canada Weather Data



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Daily Data Report for May 2023

**BANCROFT AUTO
ONTARIO**
Current Station Operator: ECCC - MSC

Latitude:	45°04'17.000" N
Longitude:	77°52'44.000" W
Elevation:	330.70 m
Climate ID:	616I001
WMO ID:	71294
TC ID:	WRK

DAY	Max Temp °C °F	Min Temp °C °F	Mean Temp °C °F	Heat Deg Days	Cool Deg Days	Total Rain mm in	Total Snow cm in	Total Precip mm in	Snow on Grnd cm in	Dir of Max Gust 10's deg	Spd of Max Gust km/h mi/h
<u>01</u>	7.9	3.2	5.5	12.5	0.0			14.1			
<u>02</u>	10.9	3.4	7.1	10.9	0.0			7.0			
<u>03</u>	8.6	3.6	6.1	11.9	0.0			11.2			
<u>04</u>	10.3	3.8	7.0	11.0	0.0			0.0			
<u>05</u>	15.4	1.1	8.2	9.8	0.0			0.0			
<u>06</u>	20.9	-1.0	9.9	8.1	0.0			0.0			
<u>07</u>	19.8	1.9	10.8	7.2	0.0			0.0			
<u>08</u>	17.0	0.1	8.6	9.4	0.0			0.0		4	31
<u>09</u>	<u>M</u>	<u>M</u>	<u>M</u>	<u>M</u>	<u>M</u>			<u>M</u>		<u>M</u>	<u>M</u>
<u>10</u>	<u>M</u>	<u>M</u>	<u>M</u>	<u>M</u>	<u>M</u>			<u>M</u>		<u>M</u>	<u>M</u>
<u>11</u>	26.0	3.5	14.8	3.2	0.0			0.0		32	52
<u>12</u>	27.2	7.6	17.4	0.6	0.0			0.0			
<u>13</u>	20.5	3.2	11.8	6.2	0.0			0.0		36	38
<u>14</u>	17.5	0.0	8.8	9.2	0.0			0.0		3	34
<u>15</u>	21.2	-1.9	9.6	8.4	0.0			0.0		30	39
<u>16</u>	18.9	0.4	9.7	8.3	0.0			0.0		2	40
<u>17</u>	9.5	-3.6	3.0	15.0	0.0			0.0		31	34
<u>18</u>	16.5	-5.7	5.4	12.6	0.0			0.0			
<u>19</u>	23.1	0.1	11.6	6.4	0.0			2.9		18	34
<u>20</u>	14.4	8.6	11.5	6.5	0.0			29.8			
<u>21</u>	21.4	4.0	12.7	5.3	0.0			1.0			
<u>22</u>	18.4	-0.2	9.1	8.9	0.0			0.0			
<u>23</u>	23.8	-0.2	11.8	6.2	0.0			0.0			

DAY	Max Temp °C °F	Min Temp °C °F	Mean Temp °C °F	Heat Deg Days °C °F	Cool Deg Days °C °F	Total Rain mm mm	Total Snow cm cm	Total Precip mm mm	Snow on Grnd cm cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h km/h
<u>24</u>	11.7	0.8	6.2	11.8	0.0			3.5		4	38
<u>25</u>	16.5	-0.4	8.1	9.9	0.0			0.0			
<u>26</u>	22.7	-1.7	10.5	7.5	0.0			0.0			
<u>27</u>	26.7	2.9	14.8	3.2	0.0			0.0			
<u>28</u>	29.7	3.6	16.6	1.4	0.0			0.0			
<u>29</u>	25.5	5.8	15.6	2.4	0.0			0.0			
<u>30</u>	28.9	2.7	15.8	2.2	0.0			0.0			
<u>31</u>	31.0	7.4	19.2	0.0	1.2			0.0			
Sum				216.0 [^]	1.2 [^]			69.5 [^]			
Avg	19.4 [^]	1.8 [^]	10.6 [^]								
Xtrm	31.0 [^]	-5.7 [^]				<u>M</u>	<u>M</u>	29.8 [^]		32 [^]	52 [^]
Summary, average and extreme values are based on the data above.											

Legend

- A = Accumulated
- C = Precipitation occurred, amount uncertain
- E = Estimated
- F = Accumulated and estimated
- L = Precipitation may or may not have occurred
- M = Missing
- N = Temperature missing but known to be > 0
- S = More than one occurrence
- T = Trace
- Y = Temperature missing but known to be < 0
- [empty] = Indicates an unobserved value
- ^ = The value displayed is based on incomplete data
- † = Data that is not subject to review by the National Climate Archives

Date modified:

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Daily Data Report for August 2023

**BANCROFT AUTO
ONTARIO**
Current Station Operator: ECCC - MSC

Latitude: 45°04'17.000" N
Longitude: 77°52'44.000" W
Elevation: 330.70 m
Climate ID: 616I001
WMO ID: 71294
TC ID: WRK

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01	22.2	6.1	14.1	3.9	0.0			0.0			
02	24.9	8.5	16.7	1.3	0.0			0.0			
03	26.6	14.6	20.6	0.0	2.6			8.6			
04	25.1	11.7	18.4	0.0	0.4			1.9			
05	24.2	7.9	16.1	1.9	0.0			0.0			
06	26.2	7.8	17.0	1.0	0.0			0.0			
07	20.3	15.9	18.1	0.0	0.1			5.5			
08	20.0	12.1	16.0	2.0	0.0			2.2			
09	26.5	10.5	18.5	0.0	0.5			0.0			
10	21.7	9.7	15.7	2.3	0.0			1.2			
11	24.0	8.9	16.4	1.6	0.0			0.0			
12	21.7	11.9	16.8	1.2	0.0			16.8			
13	22.7	11.3	17.0	1.0	0.0			0.0			
14	23.7	8.5	16.1	1.9	0.0			0.0			
15	24.2	11.9	18.0	0.0	0.0			0.0			
16	26.8	12.5	19.6	0.0	1.6			0.0			
17	24.4	11.2	17.8	0.2	0.0			1.5			
18	19.8	12.6	16.2	1.8	0.0			4.6		31	34
19	23.8	12.6	18.2	0.0	0.2			0.0		31	40
20	25.1	12.5	18.8	0.0	0.8			0.0			
21	20.8	7.9	14.3	3.7	0.0			0.0			
22	24.7	5.9	15.3	2.7	0.0			0.0			
23	24.2	10.1	17.2	0.8	0.0			0.0			

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
<u>24</u>	18.6	10.5	14.5	3.5	0.0			0.8			
<u>25</u>	22.7	15.2	19.0	0.0	1.0			0.0			
<u>26</u>	19.5	6.0	12.8	5.2	0.0			0.2			
<u>27</u>	22.2	5.2	13.7	4.3	0.0			0.0			
<u>28</u>	24.4	7.4	15.9	2.1	0.0			0.0			
<u>29</u>	25.1	6.2	15.7	2.3	0.0			0.0			
<u>30</u>	16.0	5.9	11.0	7.0	0.0			2.1		30	31
<u>31</u>	22.2	1.9	12.0	6.0	0.0			0.0			
Sum				57.7	7.2			45.4			
Avg	23.0	9.7	16.4								
Xtrm	26.8	1.9				<u>M</u>	<u>M</u>	16.8		31 [^]	40 [^]
Summary, average and extreme values are based on the data above.											

Legend

- A = Accumulated
- C = Precipitation occurred, amount uncertain
- E = Estimated
- F = Accumulated and estimated
- L = Precipitation may or may not have occurred
- M = Missing
- N = Temperature missing but known to be > 0
- S = More than one occurrence
- T = Trace
- Y = Temperature missing but known to be < 0
- [empty] = Indicates an unobserved value
- ^ = The value displayed is based on incomplete data
- † = Data that is not subject to review by the National Climate Archives

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2024-01-30



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Daily Data Report for October 2023

**BANCROFT AUTO
ONTARIO**
Current Station Operator: ECCC - MSC

Latitude:	45°04'17.000" N
Longitude:	77°52'44.000" W
Elevation:	330.70 m
Climate ID:	616I001
WMO ID:	71294
TC ID:	WRK

DAY	Max Temp °C °F	Min Temp °C °F	Mean Temp °C °F	Heat Deg Days	Cool Deg Days	Total Rain mm in	Total Snow cm in	Total Precip mm in	Snow on Grnd cm in	Dir of Max Gust 10's deg	Spd of Max Gust km/h
<u>01</u>	25.0	7.5	16.3	1.7	0.0			0.0			
<u>02</u>	28.1	9.8	18.9	0.0	0.9			0.0			
<u>03</u>	30.3	10.7	20.5	0.0	2.5			0.0			
<u>04</u>	29.6	8.2	18.9	0.0	0.9			0.0			
<u>05</u>	26.4	11.5	18.9	0.0	0.9			4.9			
<u>06</u>	22.5	10.5	16.5	1.5	0.0			19.3			
<u>07</u>	14.6	2.5	8.5	9.5	0.0			0.8			
<u>08</u>	7.9	2.0	5.0	13.0	0.0			9.3			
<u>09</u>	7.4	3.0	5.2	12.8	0.0			16.9			
<u>10</u>	10.2	5.7	7.9	10.1	0.0			3.6			
<u>11</u>	13.0	5.6	9.3	8.7	0.0			2.6			
<u>12</u>	9.7	0.5	5.1	12.9	0.0			0.0			
<u>13</u>	13.2	-0.3	6.4	11.6	0.0			0.0			
<u>14</u>	13.1	-1.6	5.7	12.3	0.0			0.0			
<u>15</u>	8.6	6.0	7.3	10.7	0.0			1.1			
<u>16</u>	9.4	1.1	5.2	12.8	0.0			0.0		33	34
<u>17</u>	15.4	-0.8	7.3	10.7	0.0			0.0			
<u>18</u>	12.4	-1.5	5.5	12.5	0.0			0.0			
<u>19</u>	13.6	3.5	8.5	9.5	0.0			0.2		17	31
<u>20</u>	12.0	10.2	11.1	6.9	0.0			7.6			
<u>21</u>	10.7	3.9	7.3	10.7	0.0			0.0		30	35
<u>22</u>	5.9	-0.8	2.6	15.4	0.0			3.5		32	33
<u>23</u>	11.2	-4.6	3.3	14.7	0.0			0.0			

DAY	Max Temp °C °F	Min Temp °C °F	Mean Temp °C °F	Heat Deg Days °C	Cool Deg Days °C	Total Rain mm mm	Total Snow cm cm	Total Precip mm mm	Snow on Grnd cm cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h km/h
<u>24</u>	14.2	5.2	9.7	8.3	0.0			0.8			
<u>25</u>	20.3	12.9	16.6	1.4	0.0			0.0			
<u>26</u>	15.8	13.5	14.7	3.3	0.0			4.0			
<u>27</u>	17.6	14.0	15.8	2.2	0.0			4.2			
<u>28</u>	17.9	2.9	10.4	7.6	0.0			0.0		30	39
<u>29</u>	4.7	0.1	2.4	15.6	0.0			3.4			
<u>30</u>	4.1	-4.8	-0.3	18.3	0.0			3.5			
<u>31</u>	2.3	-7.4	-2.5	20.5	0.0			0.3			
Sum				275.2	5.2			86.0			
Avg	14.4	4.2	9.3								
Xtrm	30.3	-7.4				<u>M</u>	<u>M</u>	19.3		30 [^]	39 [^]
Summary, average and extreme values are based on the data above.											

Legend

- A = Accumulated
- C = Precipitation occurred, amount uncertain
- E = Estimated
- F = Accumulated and estimated
- L = Precipitation may or may not have occurred
- M = Missing
- N = Temperature missing but known to be > 0
- S = More than one occurrence
- T = Trace
- Y = Temperature missing but known to be < 0
- [empty] = Indicates an unobserved value
- ^ = The value displayed is based on incomplete data
- † = Data that is not subject to review by the National Climate Archives

Date modified:

2024-01-30

Appendix F

Historical Water Chemistry

Appendix F

F-1 Historic Groundwater Chemistry

Appendix F-1: Historic Groundwater Chemistry						Location	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	
Parameter	Units	RUV-NB	ODWQS	PWOO-GENERAL	PWOO-INTERIM	Sample ID	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	
						Sample Date	2006-May-11	2006-Nov-20	2007-May-03	2007-Nov-22	2008-May-07	2008-Oct-09	2009-Jun-03	2009-Oct-22	2010-May-17	2010-Oct-18	2011-May-18	2011-Nov-03	2013-Apr-18	2013-Oct-30	2014-May-13	2014-Oct-14	
Anions						Detection Limit																	
Chloride	mg/L	-	250	-	-	0.1	-	-	36	22	57	36	78	35	28	32	42	29	40.8	36.9	43.9	24.8	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate as N	mg/L	2.755	10	-	-	0.05	0.45	0.17	0.38	0.35	0.72	0.58	0.61	0.34	0.23	0.25	0.34	0.24	0.47	0.34	0.46	0.44	
Nitrite as N	mg/L	-	1	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	mg/L	-	500	-	-	0.1	6	14	8	10	7	8	10	11	11	11	10	12	6.03	6.29	6.3	4.31	
Cations																							
Calcium (diss)	mg/L	-	-	-	-	0.05	12	8	13	8	19	13	26	12	10	10	14	10	12.1	11.3	10.6	8.53	
Magnesium (diss)	mg/L	-	-	-	-	0.05	3	2	3	2	4	3	5	3	2	2	3	2	2.47	2.15	2.23	1.55	
Potassium (diss)	mg/L	-	-	-	-	0.05	2	2	2	2	3	2	3	2	2	2	2	2	2.01	2.51	1.88	3.04	
Sodium (diss)	mg/L	110.4	200	-	-	0.05	15	14	16	13	20	16	24	17	16	17	19	19	22	24.6	19.9	14.7	
General Chemistry																							
Alkalinity (as CaCO3)	mg/L	-	30 - 500	See Factsheet	-	1	22	22	24	22	21	22	21	26	24	24	29	28	32	26	21	18	
Ammonia as N	mg/L	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	0.04	-	0.05	-	0.25	
Chemical Oxygen Demand	mg/L	-	-	-	-	4	-	-	-	-	-	-	5	-	-	-	8	12	-	7	-	8	
Dissolved Organic Carbon	mg/L	-	5	-	-	0.4	-	-	1.5	1.4	1.2	1.1	1.4	1.5	1.1	1.1	1.1	1.4	1.1	0.7	1.1	2.8	
Electrical Conductivity	uS/cm	-	-	-	-	1	175	141	180	143	257	188	338	201	172	171	205	174	209	193	219	158	
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		6.74	6.55	6.33	6.74	6.64	6.85	6.56	6.79	7.04	6.92	6.01	6.15	7.14	7.2	7.33	6.93	
Phenols	mg/L	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phenols-4AAP	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids	mg/L	-	500	-	-	10	-	-	117	93	167	122	220	131	112	111	133	113	134	104	142	84	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	-	-	-	-	-	0.12	0.12	-	-	-	-	0.27	-	0.18	0.96	0.46	
Total Phosphorus	mg/L	-	-	0.03	-	0.02	-	-	-	-	6.17	2.21	0.02	3.39	0.61	0.44	0.68	2.47	1.56	0.87	-	0.4	
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Turbidity	NTU	-	5	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals																							
Aluminum (diss)	mg/L	0.055	0.1	-	Calculated	0.004	0.07	0.02	0.02	-	-	0.11	-	-	-	-	-	0.01	0.005	0.02	-	0.01	
Arsenic (diss)	mg/L	-	0.01	-	0.005	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium (diss)	mg/L	-	1	-	-	0.002	0.01	-	0.01	0.01	0.02	0.02	0.03	0.01	0.01	0.01	0.02	0.01	0.014	0.014	0.014	0.013	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron (diss)	mg/L	1.2575	5	-	0.2	0.01	0.02	0.01	-	-	0.01	0.01	0.01	-	-	0.01	-	-	0.013	0.014	-	-	
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium (diss)	mg/L	-	0.05	-	-	0.002	0.001	0.001	0.001	0.002	0.002	0.001	0.002	0.001	-	-	-	-	-	-	-	-	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper (diss)	mg/L	0.5005	1	-	Calculated	0.0009	0.001	-	0.003	0.001	0.002	-	-	-	-	-	-	-	-	-	-	-	
Iron (diss)	mg/L	0.15425	0.3	0.3	-	0.01	-	-	-	-	-	0.12	-	-	-	-	-	-	-	-	-	-	
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese (diss)	mg/L	0.026	0.05	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003	-	0.003	
Mercury (diss)	mg/L	-	0.001	0.0002	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	0.0001	-	-	-	-	
Molybdenum (diss)	mg/L	-	-	-	0.04	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (diss)	mg/L	-	-	0.025	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium (diss)	mg/L	-	0.05	0.1	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silicon (diss)	mg/L	-	-	-	-	0.05	7.6	6.8	7.4	7	6	6.9	7.4	8.1	7.5	7.7	7.8	7.7	6.68	5.62	6.08	6.64	
Silver (diss)	mg/L	-	-	0.0001	-	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Strontium (diss)	mg/L	-	-	-	-	0.001	0.114	0.087	0.121	0.091	0.184	0.121	0.324	0.135	0.107	0.133	0.152	0.11	0.152	0.144	0.137	0.129	
Thallium (diss)	mg/L	-	-	-	0.0003	0.00005	-	-	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium (diss)	mg/L	-	-	-	0.006	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc (diss)	mg/L	-	5	-	0.02	0.005	-	-	0.01	-	-	-	-	-	-	-	-	-	-	0.06	-	0.008	
Zirconium (diss)	mg/L	-	-	-	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

- LEGEND-
- Detection Limit DL: May vary between sample locations and events
 - DL exceeds criteria
 - Concentration exceeds RUV-NB Reasonable Use Values North Baptiste
 - Concentration exceeds ODWQS Ontario Drinking Water Quality Standards
 - Concentration exceeds PWOO-GENERAL Provincial Water Quality Objectives General
 - Concentration exceeds PWOO-INTERIM Provincial Water Quality Objectives Interim

Appendix F-1: Historic Groundwater Chemistry						Location	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	
Parameter	Units	RUV-NB	ODWQS	PWOQ-GENERAL	PWOQ-INTERIM	Sample ID	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	NB-MW1	
						Sample Date	2015-May-04	2015-Oct-26	2016-Apr-28	2016-Oct-26	2017-May-10	2017-Oct-23	2018-May-07	2018-Oct-22	2019-May-07	2019-Oct-24	2020-May-06	2020-Oct-06	2021-Apr-20	2021-Oct-18	2022-May-03	2022-Oct-18	
Anions						Detection Limit																	
Chloride	mg/L	-	250	-	-	0.1	74.6	64.7	76.1	48.8	36.7	29.1	102	60	77	43.5	94.5	41.2	48.1	15	17	12.6	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate as N	mg/L	2.755	10	-	-	0.05	0.68	0.57	0.69	0.42	0.58	1.2	0.31	0.27	0.57	0.2	0.31	0.17	0.26	0.22	0.16	0.13	
Nitrite as N	mg/L	-	1	-	-	0.01	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	0.26	<0.05	<0.05	
Sulphate	mg/L	-	500	-	-	0.1	5.44	6.37	6.4	6.99	11.6	6.18	6.94	8.35	10.1	7.88	7.1	7.36	7.09	6.91	7.89	7.27	
Cations																							
Calcium (diss)	mg/L	-	-	-	-	0.05	20.7	15.7	18.7	11.3	11	8.46	23.3	13.7	17.9	9.8	17.9	8.43	10.2	4.63	4.56	3.51	
Magnesium (diss)	mg/L	-	-	-	-	0.05	3.94	2.96	3.78	2.21	2.29	1.86	4.63	2.63	3.44	2.02	3.54	1.59	2.01	0.91	0.88	0.76	
Potassium (diss)	mg/L	-	-	-	-	0.05	2.69	2.75	2.71	1.84	2.09	3.92	2.7	2.12	2.6	2.15	2.58	1.7	1.86	1.57	1.26	1.09	
Sodium (diss)	mg/L	110.4	200	-	-	0.05	29.5	26.6	30.3	22.9	25.5	18	36.5	28.1	36.3	25.2	37.1	21.6	25.2	14	16.6	11.4	
General Chemistry																							
Alkalinity (as CaCO3)	mg/L	-	30 - 500	See Factsheet	-	1	24	23	26	25	40	22	22	20	36	22	23	25	23	26	24	17	
Ammonia as N	mg/L	-	-	-	-	0.02	-	-	-	-	-	0.12	0.05	-	-	0.06	0.03	<0.02	<0.02	0.23	<0.02	<0.02	
Chemical Oxygen Demand	mg/L	-	-	-	-	4	-	-	-	-	-	11	-	-	-	-	<5	7	<5	<5	<5	<5	
Dissolved Organic Carbon	mg/L	-	5	-	-	0.4	2.6	1.6	1.8	1.1	1.1	2.3	2.3	1.7	1.2	0.9	0.9	1.8	2.2	2.1	2.1	1.9	
Electrical Conductivity	uS/cm	-	-	-	-	1	318	258	317	232	241	151	384	277	348	244	442	186	239	116	126	101	
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		6.9	6.31	7.56	7.11	7.48	6.88	6.42	7.28	6.7	7.22	6.53	6.56	6.75	6.74	6.59	6.7	
Phenols	mg/L	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	0.001	0.003	
Phenols-4AAP	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids	mg/L	-	500	-	-	10	244	158	202	120	126	152	212	160	190	144	230	128	144	92	84	86	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.19	-	0.16	-	-	0.28	0.29	-	-	-	0.13	0.1	<0.1	0.47	<0.1	-	
Total Phosphorus	mg/L	-	-	0.03	-	0.02	1.12	0.45	2.24	1.21	0.68	1.56	1.74	0.91	0.83	1.47	1.59	0.91	0.61	0.51	0.79	0.28	
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	-	-	-	-	1120	2510	996	1590	289	508	767	1860	
Turbidity	NTU	-	5	-	-	0.1	-	-	-	-	-	-	-	-	464	659	480	204	423	330	543	140	
Metals																							
Aluminum (diss)	mg/L	0.055	0.1	-	Calculated	0.004	0.005	0.005	-	0.187	0.007	0.011	-	-	0.006	0.009	0.023	<0.004	0.008	0.04	0.041	0.021	
Arsenic (diss)	mg/L	-	0.01	-	0.005	0.001	-	-	-	-	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.001	
Barium (diss)	mg/L	-	1	-	-	0.002	0.026	0.019	0.025	0.02	0.016	0.016	0.034	0.017	0.031	0.016	0.028	0.012	0.013	0.007	0.007	0.005	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.0004	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	
Boron (diss)	mg/L	1.2575	5	-	0.2	0.01	-	-	-	-	-	-	0.011	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.00009	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium (diss)	mg/L	-	0.05	-	-	0.002	-	-	-	-	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.002	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Copper (diss)	mg/L	0.5005	1	-	Calculated	0.0009	-	-	-	-	-	-	-	-	-	-	0.002	<0.002	<0.002	<0.002	<0.002	0.002	
Iron (diss)	mg/L	0.15425	0.3	0.3	-	0.01	-	-	-	0.125	-	-	-	-	-	-	<0.01	<0.01	<0.01	0.029	<0.01	<0.01	
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	
Manganese (diss)	mg/L	0.026	0.05	-	-	0.002	0.003	0.002	0.002	0.004	-	0.003	0.003	-	0.003	-	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	
Mercury (diss)	mg/L	-	0.001	0.0002	-	0.0001	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Molybdenum (diss)	mg/L	-	-	-	0.04	0.0005	-	-	-	-	-	-	-	-	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Nickel (diss)	mg/L	-	-	0.025	-	0.001	-	-	-	-	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	
Selenium (diss)	mg/L	-	0.05	0.1	-	0.001	-	-	-	-	-	-	-	-	-	-	<0.004	<0.004	<0.004	<0.004	<0.004	<0.001	
Silicon (diss)	mg/L	-	-	-	-	0.05	6.85	7.12	7.56	9.04	7.01	7.79	7.76	8.41	6.39	8.29	6.95	8.29	7.08	8.68	9.35	8.74	
Silver (diss)	mg/L	-	-	0.0001	-	0.00009	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	
Strontium (diss)	mg/L	-	-	-	-	0.001	0.255	0.166	0.243	0.145	0.151	0.107	0.315	0.153	0.261	0.117	0.244	0.107	0.13	0.051	0.059	0.041	
Thallium (diss)	mg/L	-	-	-	0.0003	0.00005	-	-	-	-	-	-	-	-	-	-	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	-	0.013	-	-	-	-	-	-	<0.002	0.002	<0.002	<0.002	<0.002	0.002	
Vanadium (diss)	mg/L	-	-	-	0.006	0.0005	-	-	-	-	-	-	-	-	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Zinc (diss)	mg/L	-	5	-	0.02	0.005	-	-	-	-	-	-	0.018	0.009	0.011	0.005	0.007	0.007	0.024	0.018	<0.005	0.011	
Zirconium (diss)	mg/L	-	-	-	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

- LEGEND-
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 - Concentration exceeds PWOQ-GENERAL Provincial Water Quality Objectives General
 - Concentration exceeds PWOQ-INTERIM Provincial Water Quality Objectives Interim

Appendix F-1: Historic Groundwater Chemistry						Location	NB-MW1	NB-MW1	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R
Parameter	Units	RUV-NB	ODWQS	PWOQ-GENERAL	PWOQ-INTERIM	Sample ID	NB MW1	NB MW1	NB-MW2	NB-MW2	NB-MW2	NB-MW2	NB-MW2	NB-MW2	NB-MW2	NB-MW2	NB-MW2	NB-MW2	NB-MW2	NB-MW2	NB-MW2	
						Sample Date	2023-May-03	2023-Oct-19	2006-May-11	2006-Nov-20	2007-Nov-22	2008-May-07	2008-Oct-09	2009-Jun-03	2009-Oct-22	2010-May-17	2010-Oct-18	2011-May-18	2011-Nov-03	2013-Apr-18	2016-Apr-28	2016-Oct-26
Anions						Detection Limit																
Chloride	mg/L	-	250	-	-	0.1	48.1	31	-	-	2	1	1	2	1	2	1	3	3	2.12	9.81	8.41
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	0.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	2.755	10	-	-	0.05	0.21	0.19	0.14	0.13	0.14	0.16	0.2	0.15	0.15	-	0.12	0.14	0.13	0.26	0.21	0.19
Nitrite as N	mg/L	-	1	-	-	0.01	<0.05	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	-	500	-	-	0.1	5.99	6.8	16	22	13	14	14	13	12	12	12	10	10	11.4	6.99	6.64
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05	11.6	9.5	11	10	8	8	9	9	6	7	7	7	7	8.6	7.93	7.48
Magnesium (diss)	mg/L	-	-	-	-	0.05	2.15	1.7	4	3	3	3	3	4	3	3	3	3	3	3.56	3.32	3.06
Potassium (diss)	mg/L	-	-	-	-	0.05	1.89	1.7	2	2	2	2	2	2	2	1	1	1	2	1.71	1.78	1.67
Sodium (diss)	mg/L	110.4	200	-	-	0.05	27.4	24	3	4	4	3	3	4	2	2	3	3	4	4.18	4.69	4.41
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	-	30 - 500	See Factsheet	-	1	29	24	32	32	29	29	32	31	33	30	29	34	36	31	31	30
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	<0.05	-	-	0.02	0.02	-	-	0.02	-	-	0.03	-	0.26	-	0.03
Chemical Oxygen Demand	mg/L	-	-	-	-	4	<5	6.2	-	-	-	-	5	5	-	-	-	15	12	12	-	-
Dissolved Organic Carbon	mg/L	-	5	-	-	0.4	1.4	1.2	-	-	2.3	0.8	2.3	1.5	1.2	1.2	1.1	1.2	0.9	1.4	0.9	1
Electrical Conductivity	uS/cm	-	-	-	-	1	229	190	112	109	93	92	100	93	92	90	87	84	90	98	104	105
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		7.05	7.21	7.21	7.05	7.53	7.52	7.54	7.56	7.64	7.61	7.56	6.17	6.39	7.24	7.75	7.45
Phenols	mg/L	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols-4AAP	mg/L	-	-	-	-	0.001	0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	500	-	-	10	144	130	-	-	61	60	65	61	60	59	57	55	58	92	82	76
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	<0.1	<0.1	-	-	-	0.25	0.12	-	-	-	-	0.31	0.63	0.26	-	-
Total Phosphorus	mg/L	-	-	0.03	-	0.02	1.15	1.4	-	-	-	2.07	1.14	5.71	4.3	3.74	2.83	3.31	1.5	10.1	6.89	8.64
Total Suspended Solids	mg/L	-	-	-	-	10	414	860	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	-	5	-	-	0.1	258	140	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																						
Aluminum (diss)	mg/L	0.055	0.1	-	Calculated	0.004	<0.004	<0.0049	0.04	0.02	-	-	-	-	0.03	-	-	-	-	0.023	0.008	0.072
Arsenic (diss)	mg/L	-	0.01	-	0.005	0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (diss)	mg/L	-	1	-	-	0.002	0.014	0.011	-	-	-	-	-	-	-	-	-	-	-	0.006	0.01	0.009
Beryllium (diss)	mg/L	-	-	Calculated	-	0.0004	<0.0005	<0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (diss)	mg/L	1.2575	5	-	0.2	0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.00009	<0.0001	<0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (diss)	mg/L	-	0.05	-	-	0.002	<0.002	<0.005	0.001	0.002	0.001	0.003	0.001	0.002	0.001	-	0.001	0.001	0.001	-	-	-
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (diss)	mg/L	0.5005	1	-	Calculated	0.0009	<0.001	0.0054	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (diss)	mg/L	0.15425	0.3	0.3	-	0.01	0.012	<0.1	-	-	0.05	-	0.03	-	0.05	-	-	-	-	0.857	-	0.118
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (diss)	mg/L	0.026	0.05	-	-	0.002	<0.002	<0.002	-	-	0.04	-	-	-	-	-	-	-	-	0.054	0.002	0.003
Mercury (diss)	mg/L	-	0.001	0.0002	-	0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (diss)	mg/L	-	-	-	0.04	0.0005	<0.002	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (diss)	mg/L	-	-	0.025	-	0.001	0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (diss)	mg/L	-	0.05	0.1	-	0.001	<0.001	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (diss)	mg/L	-	-	-	-	0.05	8.55	10	8.7	9.3	9.2	10.3	10.1	10.6	10	9.5	12	9	11	11.4	11.8	12.6
Silver (diss)	mg/L	-	-	0.0001	-	0.00009	<0.0001	<0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (diss)	mg/L	-	-	-	-	0.001	0.125	0.085	0.046	0.055	0.053	0.045	0.048	0.048	0.044	0.042	0.042	0.034	0.041	0.039	0.067	0.051
Thallium (diss)	mg/L	-	-	-	0.0003	0.00005	<0.0003	<0.00005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (diss)	mg/L	-	-	-	-	0.002	<0.002	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.004
Vanadium (diss)	mg/L	-	-	-	0.006	0.0005	<0.002	0.00054	0.004	0.004	0.004	0.005	0.005	0.005	0.004	0.004	0.005	0.004	0.005	0.007	0.003	0.004
Zinc (diss)	mg/L	-	5	-	0.02	0.005	0.019	0.03	-	-	-	-	-	-	-	-	-	-	-	-	0.011	-
Zirconium (diss)	mg/L	-	-	-	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

-LEGEND-
Detection Limit DL: May vary between sample locations and events
DL exceeds criteria
Concentration exceeds RUV-NB Reasonable Use Values North Baptiste
Concentration exceeds ODWQS Ontario Drinking Water Quality Standards
Concentration exceeds PWOQ-GENERAL Provincial Water Quality Objectives General
Concentration exceeds PWOQ-INTERIM Provincial Water Quality Objectives Interim

Appendix F-1: Historic Groundwater Chemistry						Location	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	
Parameter	Units	RUV-NB	ODWQS	PWOO-GENERAL	PWOO-INTERIM	Sample ID	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	V2R-OAQC (NB-1)	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R	NB-MW2R		
						Sample Date	2017-May-10	2017-Oct-23	2018-May-07	2018-Oct-22	2019-May-07	2019-May-07	2019-Oct-24	2020-May-06	2020-Oct-06	2021-Apr-20	2021-Apr-20	2021-Oct-18	2022-May-03	2022-May-03	2022-May-03	2022-Oct-18	2023-May-03
						Detection Limit																	
Chloride	mg/L	-	250	-	-	0.1	7.5	8.98	11.3	9.69	15.9	15.4	18.3	16.9	15.6	16.6	17.1	9.32	9.17	8.87	6.26	6.67	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate as N	mg/L	2.755	10	-	-	0.05	0.22	0.16	0.17	0.15	0.16	0.16	0.16	0.19	0.14	0.13	0.14	0.11	0.12	0.11	0.11	0.11	
Nitrite as N	mg/L	-	1	-	-	0.01	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Sulphate	mg/L	-	500	-	-	0.1	7.7	6.55	6.76	6.37	6.25	6.2	6.64	7.43	7.7	6.86	6.86	7.09	7.2	7.2	7.61	6.93	
Calcium (diss)	mg/L	-	-	-	-	0.05	7	8.41	8.79	8.17	9.68	9.6	10.5	8.48	9.01	9.77	9.99	7.31	8.37	8.37	7.52	7.61	
Magnesium (diss)	mg/L	-	-	-	-	0.05	3	3.42	3.83	3.14	3.8	3.74	4.05	3.61	3.56	4.17	4.21	3.24	3.53	3.51	3.16	3.31	
Potassium (diss)	mg/L	-	-	-	-	0.05	1.68	2.02	1.71	1.69	1.82	1.78	1.91	1.64	1.8	1.77	1.79	1.72	1.7	1.65	1.61	1.74	
Sodium (diss)	mg/L	110.4	200	-	-	0.05	4.2	4.8	4.84	4.74	5.08	5.09	5.56	4.79	5.24	5.88	6.04	4.25	4.89	4.89	3.92	4.55	
General Chemistry																							
Alkalinity (as CaCO3)	mg/L	-	30 - 500	See Factsheet	-	1	29	29	40	24	32	32	27	26	35	29	30	30	27	30	27	33	
Ammonia as N	mg/L	-	-	-	-	0.02	-	0.03	0.12	-	-	-	0.05	<0.02	<0.02	<0.02	<0.02	0.11	<0.02	<0.02	<0.02	<0.02	
Chemical Oxygen Demand	mg/L	-	-	-	-	4	-	-	-	-	-	-	-	14	10	<5	<5	<5	<5	13	<5	<5	
Dissolved Organic Carbon	mg/L	-	5	-	-	0.4	0.9	1	0.9	0.8	1.3	0.8	1	0.8	0.7	2.3	2	1	0.7	0.7	0.9	0.7	
Electrical Conductivity	uS/cm	-	-	-	-	1	101	92	110	108	117	118	173	148	122	144	146	108	111	110	100	100	
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		7.66	7.27	6.72	7.45	6.96	7.03	7.59	7.16	6.73	7.32	7.36	7.11	6.87	6.98	7.29	7.34	
Phenols	mg/L	-	-	0.001	-	0.001	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.003	-	
Phenols-4AAP	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	
Total Dissolved Solids	mg/L	-	500	-	-	10	74	82	64	67	72	74	86	92	74	96	98	86	46	52	72	78	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	-	-	0.36	-	-	-	-	0.1	0.1	<0.1	<0.1	<0.1	0.12	<0.1	-	<0.1	
Total Phosphorus	mg/L	-	-	0.03	-	0.02	3.52	3.54	1.33	0.75	0.56	0.63	2.28	2.31	3.01	0.87	0.68	0.63	0.21	0.28	0.45	0.31	
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	316	301	2900	2030	1770	948	1300	324	232	248	240	776	
Turbidity	NTU	-	5	-	-	0.1	-	-	-	-	119	126	316	375	357	177	232	107	65.6	79.7	71.8	77.1	
Metals																							
Aluminum (diss)	mg/L	0.055	0.1	-	Calculated	0.004	0.01	0.006	-	0.007	0.006	0.005	0.17	0.01	<0.004	<0.004	0.011	0.011	0.006	0.045	0.016	<0.004	
Arsenic (diss)	mg/L	-	0.01	-	0.005	0.001	-	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	
Barium (diss)	mg/L	-	1	-	-	0.002	0.005	0.006	0.005	0.005	0.006	0.005	0.011	0.005	0.005	0.005	0.005	0.003	0.004	0.004	0.003	0.003	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.0004	-	-	-	-	0.0006	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005		
Boron (diss)	mg/L	1.2575	5	-	0.2	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	0.00009	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium (diss)	mg/L	-	0.05	-	-	0.002	-	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.002	<0.002	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005	-	-	-	-	-	-	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Copper (diss)	mg/L	0.5005	1	-	Calculated	0.0009	-	-	-	-	-	-	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	
Iron (diss)	mg/L	0.15425	0.3	0.3	-	0.01	-	-	-	-	-	-	0.221	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005		
Manganese (diss)	mg/L	0.026	0.05	-	-	0.002	-	-	-	-	-	-	0.03	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Mercury (diss)	mg/L	-	0.001	0.0002	-	0.0001	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Molybdenum (diss)	mg/L	-	-	-	0.04	0.0005	-	-	-	-	-	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Nickel (diss)	mg/L	-	-	0.025	-	0.001	-	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	<0.001	<0.001	
Selenium (diss)	mg/L	-	0.05	0.1	-	0.001	-	-	-	-	-	-	-	<0.004	<0.004	<0.004	0.039	<0.004	<0.004	<0.004	<0.001	0.002	
Silicon (diss)	mg/L	-	-	-	-	0.05	11	11.1	11	11.8	9.46	9.36	11.6	13.062	6.85	10.1	10.4	11.7	12.2	11.7	12.5	11.6	
Silver (diss)	mg/L	-	-	0.0001	-	0.00009	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	0.0036	<0.0001	<0.0001	
Strontium (diss)	mg/L	-	-	-	-	0.001	0.044	0.045	0.059	0.05	0.057	0.057	0.067	0.061	0.086	0.081	0.102	0.048	0.061	0.061	0.058	0.044	
Thallium (diss)	mg/L	-	-	-	0.0003	0.00005	-	-	-	-	-	-	-	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	0.009	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Vanadium (diss)	mg/L	-	-	-	0.006	0.0005	0.003	0.004	0.003	0.004	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	
Zinc (diss)	mg/L	-	5	-	0.02	0.005	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	
Zirconium (diss)	mg/L	-	-	-	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

- LEGEND-
- Detection Limit DL: May vary between sample locations and events
 - DL exceeds criteria
 - Concentration exceeds RUV-NB Reasonable Use Values North Baptiste
 - 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

Appendix F-1: Historic Groundwater Chemistry						Location	NB-MW2R	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	
Parameter	Units	RUV-NB	ODWQS	PWOQ-GENERAL	PWOQ-INTERIM	Sample ID	NB-MW2R	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	NB-MW3	
						Sample Date	2023-Oct-19	2009-Oct-22	2010-May-17	2010-Oct-18	2011-May-18	2011-Nov-03	2013-Apr-18	2013-Oct-30	2014-May-13	2014-Oct-14	2015-May-04	2015-Oct-26	2016-Apr-28	2016-Oct-26	2017-May-10	2017-Oct-23	
Anions						Detection Limit																	
Chloride	mg/L	-	250	-	-	0.1	4.1	61	69	67	52	42	39.1	36.7	36.1	34.5	34.1	37.7	39.8	43.9	51.2	63.8	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate as N	mg/L	2.755	10	-	-	0.05	0.11	0.29	-	0.2	0.16	-	0.58	0.39	0.42	0.25	0.28	-	0.53	0.29	0.84	0.41	
Nitrite as N	mg/L	-	1	-	-	0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	mg/L	-	500	-	-	0.1	5.6	29	37	34	34	34	30.1	26.9	29.3	23.7	23	22.5	21.3	19.1	16.8	16.6	
Cations																							
Calcium (diss)	mg/L	-	-	-	-	0.05	7.6	42	39	40	35	34	29.7	32.5	28.9	29.5	29.1	29.5	30.2	29.7	32.7	40.3	
Magnesium (diss)	mg/L	-	-	-	-	0.05	3.1	17	16	15	13	14	11.9	12.2	11.5	11.8	11.9	11.1	12	11.4	13.6	15.9	
Potassium (diss)	mg/L	-	-	-	-	0.05	1.6	5	5	4	4	5	4.05	4.97	3.81	3.95	3.97	4.12	4.34	3.88	4.37	4.4	
Sodium (diss)	mg/L	110.4	200	-	-	0.05	4.4	58	71	70	67	61	46.9	46.4	36.4	35	35.1	34	34.8	30.5	33	33	
General Chemistry																							
Alkalinity (as CaCO3)	mg/L	-	30 - 500	See Factsheet	-	1	32	216	192	190	193	189	151	133	139	120	127	126	137	128	132	142	
Ammonia as N	mg/L	-	-	-	-	0.02	<0.05	0.1	-	-	0.02	0.06	-	0.03	-	0.13	-	-	-	-	-	-	
Chemical Oxygen Demand	mg/L	-	-	-	-	4	<4	8	10	8	40	112	-	-	-	7	-	-	-	47	-	8	
Dissolved Organic Carbon	mg/L	-	5	-	-	0.4	1.2	3.4	3.5	3.4	3.4	3.2	1.9	1.9	1.8	2	1.5	2	1.9	1.4	1.5	3.4	
Electrical Conductivity	uS/cm	-	-	-	-	1	92	661	659	623	588	539	461	428	457	455	396	405	409	424	493	444	
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		7.61	7.44	7.58	7.45	6.75	6.86	7.78	7.9	7.53	8.09	7.5	6.87	8.15	8.01	7.89	8.02	
Phenols	mg/L	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	0.003	-	-	-	-	
Phenols-4AAP	mg/L	-	-	-	-	0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids	mg/L	-	500	-	-	10	70	430	428	405	382	350	290	264	262	246	232	218	242	224	246	282	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	<0.1	0.32	-	-	-	0.48	-	0.15	1.59	0.46	0.14	-	2.92	0.18	0.11	-	
Total Phosphorus	mg/L	-	-	0.03	-	0.02	2.3	0.42	0.59	1.27	1.2	2.9	0.69	0.31	0.62	0.19	0.11	0.46	0.45	0.81	1.39	0.17	
Total Suspended Solids	mg/L	-	-	-	-	10	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Turbidity	NTU	-	5	-	-	0.1	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals																							
Aluminum (diss)	mg/L	0.055	0.1	-	Calculated	0.004	0.013	-	-	-	-	-	-	0.138	-	-	-	0.008	-	0.02	0.007	0.014	
Arsenic (diss)	mg/L	-	0.01	-	0.005	0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium (diss)	mg/L	-	1	-	-	0.002	0.0032	0.05	0.05	0.05	0.04	0.04	0.031	0.039	0.034	0.04	0.033	0.039	0.035	0.038	0.037	0.048	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.0004	<0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron (diss)	mg/L	1.2575	5	-	0.2	0.01	<0.01	0.45	0.34	0.3	0.25	0.25	0.199	0.184	0.19	0.21	0.146	0.157	0.14	0.132	0.117	0.122	
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.00009	<0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium (diss)	mg/L	-	0.05	-	-	0.002	<0.005	0.002	-	0.002	0.002	0.002	-	-	-	-	-	-	-	-	-	-	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005	<0.0005	0.0012	0.0003	0.0011	0.0005	0.0009	0.002	-	0.002	0.003	-	0.007	0.001	-	0.001	0.002	
Copper (diss)	mg/L	0.5005	1	-	Calculated	0.0009	<0.0009	0.002	0.002	0.001	0.002	0.002	-	-	-	-	-	-	-	-	-	-	
Iron (diss)	mg/L	0.15425	0.3	0.3	-	0.01	<0.1	0.83	-	0.18	-	0.08	-	-	-	2.21	-	0.115	-	-	-	-	
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese (diss)	mg/L	0.026	0.05	-	-	0.002	<0.002	0.04	-	0.02	-	0.01	0.017	0.019	0.02	0.05	0.005	0.146	0.02	0.003	0.015	0.023	
Mercury (diss)	mg/L	-	0.001	0.0002	-	0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Molybdenum (diss)	mg/L	-	-	-	0.04	0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (diss)	mg/L	-	-	0.025	-	0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium (diss)	mg/L	-	0.05	0.1	-	0.001	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silicon (diss)	mg/L	-	-	-	-	0.05	13	14	13.6	15	15	14	15.4	13.4	12	15	14.8	14.2	15.4	15.6	15	14.4	
Silver (diss)	mg/L	-	-	0.0001	-	0.00009	<0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Strontium (diss)	mg/L	-	-	-	-	0.001	0.047	0.428	0.372	0.378	0.317	0.306	0.268	0.307	0.29	0.341	0.257	0.288	0.28	0.292	0.308	0.354	
Thallium (diss)	mg/L	-	-	-	0.0003	0.00005	<0.00005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium (diss)	mg/L	-	-	-	-	0.002	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium (diss)	mg/L	-	-	-	0.006	0.0005	0.004	0.004	0.001	0.001	0.002	0.002	-	-	0.002	-	-	-	-	-	-	-	
Zinc (diss)	mg/L	-	5	-	0.02	0.005	<0.005	-	-	-	-	-	-	0.252	-	-	-	-	-	0.013	-	-	
Zirconium (diss)	mg/L	-	-	-	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

-LEGEND-
Detection Limit DL: May vary between sample locations and events
DL exceeds criteria
Concentration exceeds RUV-NB Reasonable Use Values North Baptiste
Concentration exceeds ODWQS Ontario Drinking Water Quality Standards
Concentration exceeds PWOQ-GENERAL Provincial Water Quality Objectives General
Concentration exceeds PWOQ-INTERIM Provincial Water Quality Objectives Interim

Appendix F-1: Historic Groundwater Chemistry						Location	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4
Parameter	Units	RUV-NB	ODWQS	PWOQ-GENERAL	PWOQ-INTERIM	Sample ID	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	
						Sample Date	2007-May-03	2007-Nov-22	2008-May-07	2008-Oct-09	2009-Jun-03	2009-Oct-22	2010-May-17	2010-Oct-18	2011-May-18	2011-Nov-03	2013-Apr-18	2013-Oct-30	2014-May-13	2014-Oct-14	2015-May-04	2015-Oct-26
Anions						Detection Limit																
Chloride	mg/L	-	250	-	-	0.1	34	32	32	30	28	28	30	29	28	29	34.2	29.9	32.5	35.7	36.3	39
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	2.755	10	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-
Nitrite as N	mg/L	-	1	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	-	500	-	-	0.1	21	20	21	21	19	20	22	20	19	21	21.3	20.4	20.2	19.6	20.6	23.7
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05	30	27	31	28	31	29	28	28	28	32	32.2	32.7	29.3	34.4	34.7	33.9
Magnesium (diss)	mg/L	-	-	-	-	0.05	6	5	6	6	7	6	6	5	6	7	6.95	6.67	6.18	7.12	7.21	6.76
Potassium (diss)	mg/L	-	-	-	-	0.05	3	3	3	3	3	3	3	2	2	3	3.21	3.55	2.95	3.23	3.43	3.34
Sodium (diss)	mg/L	110.4	200	-	-	0.05	6	6	6	5	6	5	6	5	5	6	5.9	6.01	5.33	6.08	6.28	5.94
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	-	30 - 500	See Factsheet	-	1	53	49	51	49	53	54	58	54	63	64	64	60	60	65	60	62
Ammonia as N	mg/L	-	-	-	-	0.02	-	-	-	-	-	0.02	-	-	-	-	-	-	-	0.15	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	4	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	27
Dissolved Organic Carbon	mg/L	-	5	-	-	0.4	0.7	0.8	0.5	0.6	0.8	0.9	0.9	0.9	0.9	0.7	0.5	0.8	1.2	0.7	0.8	1.3
Electrical Conductivity	uS/cm	-	-	-	-	1	256	248	255	246	246	247	267	241	248	253	273	257	278	303	279	284
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		6.91	7.97	7.95	7.84	8.05	7.94	7.89	7.92	6.78	6.76	8.03	7.93	7.95	7.86	8.04	7.03
Phenols	mg/L	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols-4AAP	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	500	-	-	10	166	161	166	160	160	161	174	157	161	164	190	176	194	170	204	168
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	-	-	-	-	-	0.16	-	-	-	0.29	0.12	-	1.73	0.21	-	-
Total Phosphorus	mg/L	-	-	0.03	-	0.02	-	-	1.74	1.41	4.03	1.52	1.21	1.66	1.28	0.91	2.43	0.83	1.34	0.91	0.77	1.16
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	-	5	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																						
Aluminum (diss)	mg/L	0.055	0.1	-	Calculated	0.004	0.02	-	-	-	-	-	-	-	-	-	0.008	0.146	0.005	0.01	0.004	0.006
Arsenic (diss)	mg/L	-	0.01	-	0.005	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	0.011	0.016	0.012	0.013	0.013	0.013
Beryllium (diss)	mg/L	-	-	Calculated	-	0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (diss)	mg/L	1.2575	5	-	0.2	0.01	-	-	-	-	-	0.01	0.01	0.01	-	-	-	-	-	-	-	-
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (diss)	mg/L	-	0.05	-	-	0.002	-	-	0.001	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (diss)	mg/L	0.5005	1	-	Calculated	0.0009	0.001	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (diss)	mg/L	0.15425	0.3	0.3	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (diss)	mg/L	0.026	0.05	-	-	0.002	-	-	-	-	0.01	-	-	-	-	-	-	0.019	-	0.01	-	0.009
Mercury (diss)	mg/L	-	0.001	0.0002	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (diss)	mg/L	-	-	-	0.04	0.0005	-	-	-	-	-	-	-	-	-	-	0.002	0.002	0.002	-	0.002	0.002
Nickel (diss)	mg/L	-	-	0.025	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (diss)	mg/L	-	0.05	0.1	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (diss)	mg/L	-	-	-	-	0.05	8.3	7.8	8.5	8.7	9	7.6	7.7	7.8	8.3	8.2	8.86	8.03	7.68	8.51	8.2	7.72
Silver (diss)	mg/L	-	-	0.0001	-	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (diss)	mg/L	-	-	-	-	0.001	0.103	0.097	0.097	0.1	0.104	0.078	0.093	0.094	0.086	0.102	0.098	0.121	0.11	0.109	0.11	0.109
Thallium (diss)	mg/L	-	-	-	0.0003	0.00005	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (diss)	mg/L	-	-	-	0.006	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (diss)	mg/L	-	5	-	0.02	0.005	-	-	-	-	-	-	-	-	-	-	-	0.287	-	-	-	-
Zirconium (diss)	mg/L	-	-	-	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

-LEGEND-
Detection Limit DL: May vary between sample locations and events
DL exceeds criteria
Concentration exceeds RUV-NB Reasonable Use Values North Baptiste
Concentration exceeds ODWQS Ontario Drinking Water Quality Standards
Concentration exceeds PWOQ-GENERAL Provincial Water Quality Objectives General
Concentration exceeds PWOQ-INTERIM Provincial Water Quality Objectives Interim

Appendix F-1: Historic Groundwater Chemistry						Location	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	
Parameter	Units	RUV-NB	ODWQS	PWOQ-GENERAL	PWOQ-INTERIM	Sample ID	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	
						Sample Date	2016-Apr-28	2016-Oct-26	2017-May-10	2017-Oct-23	2018-May-07	2018-Oct-22	2019-May-07	2019-Oct-24	2020-May-06	2020-May-06	2020-Oct-06	2020-Oct-06	2021-Apr-20	2021-Oct-18	2021-Oct-18	2022-May-03	
Anions						Detection Limit																	
Chloride	mg/L	-	250	-	-	0.1	36.4	36	33.9	32.1	33.2	32.1	31.8	28.1	31.9	31.7	28.8	28.6	29.1	28.6	28.6	27.8	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate as N	mg/L	2.755	10	-	-	0.05	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Nitrite as N	mg/L	-	1	-	-	0.01	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Sulphate	mg/L	-	500	-	-	0.1	21	20.7	22	21.2	21.8	22.3	22.6	22.9	25.8	25.9	24.2	24.3	22.1	23.9	23.9	23.3	
Cations																							
Calcium (diss)	mg/L	-	-	-	-	0.05	32.6	32.1	32.5	32.9	32.2	33	32.2	31.2	29.9	29.9	28.9	29.1	33	29.8	29.7	31.1	
Magnesium (diss)	mg/L	-	-	-	-	0.05	6.67	6.42	7	6.77	6.76	6.42	6.41	6.09	6.22	6.28	5.73	5.79	7.04	6.32	6.43	6.43	
Potassium (diss)	mg/L	-	-	-	-	0.05	3.5	3.29	3.38	3.26	3.14	3.31	3.09	3.07	3.13	3.13	3.05	3.05	3.45	3.13	3.22	3.22	
Sodium (diss)	mg/L	110.4	200	-	-	0.05	5.84	5.49	5.9	5.95	5.66	5.65	5.9	5.67	5.52	5.51	5.3	5.32	6.23	5.67	5.78	5.85	
General Chemistry																							
Alkalinity (as CaCO3)	mg/L	-	30 - 500	See Factsheet	-	1	66	64	66	65	69	56	75	62	64	63	66	68	62	61	62	59	
Ammonia as N	mg/L	-	-	-	-	0.02	-	-	-	-	0.11	-	-	0.07	0.02	0.15	<0.02	<0.02	<0.02	0.1	0.09	<0.02	
Chemical Oxygen Demand	mg/L	-	-	-	-	4	-	-	-	5	-	-	-	-	<5	<5	11	14	<5	<5	<5	<5	
Dissolved Organic Carbon	mg/L	-	5	-	-	0.4	1.6	1.1	0.8	2.5	1.3	3.1	1	0.6	0.8	0.7	0.7	0.7	1.9	0.7	0.7	0.7	
Electrical Conductivity	uS/cm	-	-	-	-	1	279	285	310	241	267	287	276	303	339	339	248	248	285	257	257	261	
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		7.89	7.72	7.84	7.63	7.21	7.63	7.37	7.71	7.66	7.69	7.14	7.21	7.8	7.62	7.6	7.29	
Phenols	mg/L	-	-	0.001	-	0.001	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	0.002	
Phenols-4AAP	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids	mg/L	-	500	-	-	10	174	162	176	172	152	174	160	148	174	166	152	162	180	176	180	128	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	1.61	-	-	-	0.36	-	-	-	0.12	0.16	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Total Phosphorus	mg/L	-	-	0.03	-	0.02	0.51	1.42	1.46	2.66	0.86	1.62	0.67	1.21	0.86	0.79	0.64	0.67	0.55	0.91	1.1	1.21	
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	-	-	310	1580	446	340	665	609	446	199	240	410	
Turbidity	NTU	-	5	-	-	0.1	-	-	-	-	-	-	130	110	88.9	92	123	139	115	110	107	109	
Metals																							
Aluminum (diss)	mg/L	0.055	0.1	-	Calculated	0.004	0.005	0.026	0.008	0.009	-	0.008	0.007	0.02	0.02	0.019	0.011	<0.004	0.011	0.024	0.022	0.029	
Arsenic (diss)	mg/L	-	0.01	-	0.005	0.001	-	-	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	
Barium (diss)	mg/L	-	1	-	-	0.002	0.013	0.015	0.013	0.015	0.014	0.013	0.014	0.016	0.013	0.013	0.011	0.012	0.012	0.012	0.013	0.012	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.0004	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Boron (diss)	mg/L	1.2575	5	-	0.2	0.01	-	-	-	0.011	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.011	0.012	<0.01	
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.00009	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	
Chromium (diss)	mg/L	-	0.05	-	-	0.002	-	-	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Copper (diss)	mg/L	0.5005	1	-	Calculated	0.0009	-	-	-	-	-	-	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Iron (diss)	mg/L	0.15425	0.3	0.3	-	0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.016	<0.01	
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	
Manganese (diss)	mg/L	0.026	0.05	-	-	0.002	-	0.006	-	0.002	-	0.003	-	0.004	<0.002	<0.002	0.004	0.003	<0.002	0.003	0.005	<0.002	
Mercury (diss)	mg/L	-	0.001	0.0002	-	0.0001	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Molybdenum (diss)	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	
Nickel (diss)	mg/L	-	-	0.025	-	0.001	-	-	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	
Selenium (diss)	mg/L	-	0.05	0.1	-	0.001	-	-	-	-	-	-	-	-	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	
Silicon (diss)	mg/L	-	-	-	-	0.05	8.51	9.58	8.4	8.12	8.95	8.42	7.24	8.74	7.96	8.66	10.9	8.81	7.96	8.25	8.91	9.38	
Silver (diss)	mg/L	-	-	0.0001	-	0.00009	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Strontium (diss)	mg/L	-	-	-	-	0.001	0.11	0.108	0.105	0.096	0.106	0.103	0.111	0.106	0.098	0.105	0.113	0.106	0.098	0.097	0.096	0.107	
Thallium (diss)	mg/L	-	-	-	0.0003	0.00005	-	-	-	-	-	-	-	-	<0.0003	<0.0003	0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Vanadium (diss)	mg/L	-	-	-	0.006	0.0005	-	-	-	-	-	-	-	-	<0.002	<0.002	<0.002	<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	<0.005	<0.005	<0.005	
Zirconium (diss)	mg/L	-	-	-	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

-LEGEND-
Detection Limit DL: May vary between sample locations and events
DL exceeds criteria
Concentration exceeds RUV-NB Reasonable Use Values North Baptiste
Concentration exceeds ODWQS Ontario Drinking Water Quality Standards
Concentration exceeds PWOQ-GENERAL Provincial Water Quality Objectives General
Concentration exceeds PWOQ-INTERIM Provincial Water Quality Objectives Interim

Appendix F-1: Historic Groundwater Chemistry						Location	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW4	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R
Parameter	Units	RUV-NB	ODWQS	PWOQ-GENERAL	PWOQ-INTERIM	Sample ID	NB MW4	NB MW4	AQC-GW1 (NB-MW4)	NB MW4	AQC-GW1 (NB-MW4)	NB-MW5	NB-MW5	NB-MW5	NB-MW5	NB-MW5	NB-MW5	NB-MW5	NB-MW5	NB-MW5	NB-MW5	NB-MW5
						Sample Date	2022-Oct-18	2023-May-03	2023-May-03	2023-Oct-19	2023-Oct-19	2006-May-11	2006-Nov-20	2007-May-03	2007-Nov-22	2008-May-07	2008-Oct-09	2009-Jun-03	2009-Oct-22	2010-May-17	2016-Apr-28	2016-Oct-26
Anions						Detection Limit																
Chloride	mg/L	-	250	-	-	0.1	28.8	30.4	30.4	26	26	-	-	22	21	23	24	24	23	25	24.4	24.8
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	2.755	10	-	-	0.05	<0.05	<0.05	<0.05	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-
Nitrite as N	mg/L	-	1	-	-	0.01	<0.05	<0.05	<0.05	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	-	500	-	-	0.1	25.4	22.4	22.4	20	20	16	35	18	17	18	17	16	17	19	27.9	21
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05	30	33	33.6	35	35	15	14	15	13	16	16	15	15	14	9.96	9.21
Magnesium (diss)	mg/L	-	-	-	-	0.05	6.17	6.76	6.66	6.9	7.1	6	6	6	5	6	6	6	6	6	2.92	2.76
Potassium (diss)	mg/L	-	-	-	-	0.05	3.17	3.24	3.17	3.2	3.3	3	2	2	2	3	3	2	4	2	1.95	1.46
Sodium (diss)	mg/L	110.4	200	-	-	0.05	5.54	5.77	5.94	6.6	6.9	5	6	6	6	6	6	6	6	5	73.3	29.8
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	-	30 - 500	See Factsheet	-	1	59	68	67	61	61	26	26	29	26	25	26	27	31	27	138	55
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	<0.02	<0.02	<0.05	<0.05	-	-	0.03	-	-	-	-	-	-	-	0.04
Chemical Oxygen Demand	mg/L	-	-	-	-	4	<5	<5	<5	<4	<4	-	-	-	-	7	5	-	6	8	12	-
Dissolved Organic Carbon	mg/L	-	5	-	-	0.4	0.8	0.6	<0.5	0.6	0.7	-	-	3	1.4	1.3	2.4	2.9	3	2.6	9.9	3.8
Electrical Conductivity	uS/cm	-	-	-	-	1	260	277	275	270	270	167	168	167	168	170	175	175	180	183	387	234
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		7.85	7.87	7.83	8.03	8.03	6.99	6.87	6.53	7.53	7.38	7.4	7.3	7.52	7.45	8.26	7.68
Phenols	mg/L	-	-	0.001	-	0.001	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols-4AAP	mg/L	-	-	-	-	0.001	-	<0.001	<0.001	<0.001	0.0011	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	500	-	-	10	166	192	188	160	220	-	-	109	109	111	114	114	117	119	294	198
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	-	<0.1	<0.1	0.14	<0.1	-	-	-	-	0.11	-	-	-	-	0.46	-
Total Phosphorus	mg/L	-	-	0.03	-	0.02	0.68	0.5	0.57	2.5	2.6	-	-	-	-	5.13	5.75	8.81	2.24	5.79	0.8	9.94
Total Suspended Solids	mg/L	-	-	-	-	10	459	278	296	910	900	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	-	5	-	-	0.1	2.5	49.5	52.8	14	15	-	-	-	-	-	-	-	-	-	-	-
Metals																						
Aluminum (diss)	mg/L	0.055	0.1	-	Calculated	0.004	0.021	<0.004	<0.004	0.005	<0.0049	0.02	0.02	0.02	-	-	-	-	-	-	0.053	0.606
Arsenic (diss)	mg/L	-	0.01	-	0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-
Barium (diss)	mg/L	-	1	-	-	0.002	0.011	0.012	0.011	0.013	0.013	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.017	0.023
Beryllium (diss)	mg/L	-	-	Calculated	-	0.0004	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	-	-	-	-	-	-	-	-	-	-	-
Boron (diss)	mg/L	1.2575	5	-	0.2	0.01	0.012	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	0.057	0.023
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.00009	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	-	-	-	-	-	-	-	-	-	-	-
Chromium (diss)	mg/L	-	0.05	-	-	0.002	<0.002	<0.002	<0.002	<0.005	<0.005	-	-	0.001	0.001	-	0.001	0.001	-	-	-	-
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	0.002
Copper (diss)	mg/L	0.5005	1	-	Calculated	0.0009	<0.001	<0.001	<0.001	<0.0009	<0.0009	-	-	0.002	-	0.002	-	0.003	0.001	-	-	0.004
Iron (diss)	mg/L	0.15425	0.3	0.3	-	0.01	<0.01	<0.01	<0.01	<0.1	<0.1	-	-	-	-	-	-	-	-	-	0.097	0.649
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-
Manganese (diss)	mg/L	0.026	0.05	-	-	0.002	0.006	<0.002	<0.002	0.0031	0.0032	0.02	0.02	0.02	-	-	-	-	-	-	0.149	0.139
Mercury (diss)	mg/L	-	0.001	0.0002	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (diss)	mg/L	-	-	-	0.04	0.0005	0.002	<0.002	<0.002	0.0021	0.002	-	-	-	-	-	-	-	-	-	0.023	0.007
Nickel (diss)	mg/L	-	-	0.025	-	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-
Selenium (diss)	mg/L	-	0.05	0.1	-	0.001	<0.001	<0.001	<0.001	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-
Silicon (diss)	mg/L	-	-	-	-	0.05	9.42	9.09	8.94	10	10	9.9	9.4	9.2	8.8	9.6	9.4	9.6	9	9.4	5.98	7.79
Silver (diss)	mg/L	-	-	0.0001	-	0.00009	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	-	-	-	-	-	-	-	-	-	-	-
Strontium (diss)	mg/L	-	-	-	-	0.001	0.095	0.097	0.097	0.099	0.1	0.085	0.085	0.086	0.085	0.086	0.094	0.095	0.087	0.096	0.069	0.061
Thallium (diss)	mg/L	-	-	-	0.0003	0.00005	<0.0003	<0.0003	<0.0003	<0.00005	<0.00005	-	-	0.0005	-	-	-	-	-	-	-	-
Titanium (diss)	mg/L	-	-	-	-	0.002	0.002	<0.002	<0.002	<0.005	<0.005	-	-	-	-	-	-	-	-	-	0.004	0.047
Vanadium (diss)	mg/L	-	-	-	0.006	0.0005	<0.002	<0.002	<0.002	<0.0005	<0.0005	0.002	0.002	0.002	0.002	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	-	-	-	-	-	-	-	-	-	0.007	0.007
Zirconium (diss)	mg/L	-	-	-	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

-LEGEND-
Detection Limit DL: May vary between sample locations and events
DL exceeds criteria
Concentration exceeds RUV-NB Reasonable Use Values North Baptiste
Concentration exceeds ODWQS Ontario Drinking Water Quality Standards
Concentration exceeds PWOQ-GENERAL Provincial Water Quality Objectives General
Concentration exceeds PWOQ-INTERIM Provincial Water Quality Objectives Interim

Appendix F-1: Historic Groundwater Chemistry						Location	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	
Parameter	Units	RUV-NB	ODWQS	PWOQ-GENERAL	PWOQ-INTERIM	Sample ID	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	NB-MW5R	
						Sample Date	2017-May-10	2017-Oct-23	2018-May-07	2018-Oct-22	2019-May-07	2019-Oct-24	2020-May-06	2020-Oct-06	2021-Apr-20	2021-Oct-18	2022-May-03	2022-Oct-18	2023-May-03	2023-Jun-01	2023-Oct-19	
Anions						Detection Limit																
Chloride	mg/L	-	250	-	-	0.1	24.7	22.4	21.6	21.5	22	21.2	24.5	24.4	24.2	24.1	23.2	26.2	25.9	23	20	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	
Nitrate as N	mg/L	2.755	10	-	-	0.05	0.09	-	-	-	-	-	0.06	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	
Nitrite as N	mg/L	-	1	-	-	0.01	-	-	-	-	-	-	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.1	<0.01	
Sulphate	mg/L	-	500	-	-	0.1	21.4	20	19.5	20.6	20.7	21	23.7	22.1	20.1	21.7	20.4	23.4	20.9	20	13	
Cations																						
Calcium (diss)	mg/L	-	-	-	-	0.05	14.2	15.5	15.5	16.8	17.3	17.6	17	18.6	18.7	18.3	19	18.8	19.8	20	23	
Magnesium (diss)	mg/L	-	-	-	-	0.05	4.7	5.06	5.19	5.13	5.38	5.47	5.89	5.66	6.16	6.03	6.02	6.22	6.34	6.2	6.9	
Potassium (diss)	mg/L	-	-	-	-	0.05	1.91	2.22	1.75	1.75	1.9	2.17	2.09	2.2	2.24	2.21	2.32	2.4	2.51	2.2	2.6	
Sodium (diss)	mg/L	110.4	200	-	-	0.05	14.9	13.3	8.2	7.74	6.35	6.1	4.96	5.13	5.14	5.47	4.86	4.72	4.8	4.8	5.9	
General Chemistry																						
Alkalinity (as CaCO3)	mg/L	-	30 - 500	See Factsheet	-	1	41	40	50	32	42	35	34	38	35	35	33	47	43	35	37	
Ammonia as N	mg/L	-	-	-	-	0.02	-	0.05	0.18	0.03	-	0.11	0.07	<0.02	<0.02	0.11	<0.02	<0.02	<0.02	0.059	<0.05	
Chemical Oxygen Demand	mg/L	-	-	-	-	4	5	8	-	-	-	-	<5	17	<5	<5	11	<5	<4	<4	4.9	
Dissolved Organic Carbon	mg/L	-	5	-	-	0.4	1.8	4	3.2	1.7	1.8	1	1	1.2	2.4	1.4	1	1.1	1.1	0.7	1.1	
Electrical Conductivity	uS/cm	-	-	-	-	1	223	174	182	197	191	230	235	186	213	195	194	206	210	200	210	
pH	pH units	-	6.5 - 8.5	6.5 - 8.5	-		7.76	7.41	6.84	7.48	7.09	7.59	7.33	6.78	7.48	7.24	7.01	7.51	7.58	7.6	7.68	
Phenols	mg/L	-	-	0.001	-	0.001	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	0.002	0.001	-	-	-	
Phenols-4AAP	mg/L	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	
Total Dissolved Solids	mg/L	-	500	-	-	10	164	140	160	156	126	120	136	136	146	154	184	138	158	170	170	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	-	-	0.58	-	-	-	0.1	0.14	0.17	0.17	<0.1	-	0.21	<0.1	<0.1	
Total Phosphorus	mg/L	-	-	0.03	-	0.02	3.4	14	4.15	10.3	4.75	6.4	2.87	5.52	4.41	3.05	4.16	2.25	6.06	1.8	2.1	
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	2470	4860	1510	3880	2760	1390	2540	1890	1780	1800	1900	
Turbidity	NTU	-	5	-	-	0.1	-	-	-	-	5560	3620	1910	4310	3680	2280	462	236	1050	180	210	
Metals																						
Aluminum (diss)	mg/L	0.055	0.1	-	Calculated	0.004	0.011	0.007	-	0.008	0.004	0.007	0.012	<0.004	0.004	0.279	0.023	0.018	0.01	0.005	<0.0049	
Arsenic (diss)	mg/L	-	0.01	-	0.005	0.001	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	<0.001	<0.001	
Barium (diss)	mg/L	-	1	-	-	0.002	0.014	0.013	0.015	0.013	0.018	0.017	0.017	0.016	0.016	0.021	0.016	0.017	0.014	0.016	0.017	
Beryllium (diss)	mg/L	-	-	Calculated	-	0.0004	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0004	<0.0004	
Boron (diss)	mg/L	1.2575	5	-	0.2	0.01	-	-	-	-	-	-	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01	<0.01	<0.01	
Cadmium (diss)	mg/L	-	0.005	-	Calculated	0.00009	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	
Chromium (diss)	mg/L	-	0.05	-	-	0.002	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.002	<0.002	<0.005	<0.005	
Cobalt (diss)	mg/L	-	-	-	0.0009	0.0005	-	-	-	-	-	-	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Copper (diss)	mg/L	0.5005	1	-	Calculated	0.0009	-	-	-	0.001	-	-	<0.002	<0.002	<0.002	0.002	<0.002	0.001	<0.001	<0.0009	<0.0009	
Iron (diss)	mg/L	0.15425	0.3	0.3	-	0.01	-	-	-	-	-	-	<0.01	0.018	<0.01	0.319	<0.01	<0.01	0.03	<0.1	<0.1	
Lead (diss)	mg/L	-	0.01	-	Calculated	0.0005	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	
Manganese (diss)	mg/L	0.026	0.05	-	-	0.002	0.18	0.046	0.251	0.283	0.264	0.309	0.148	0.252	0.225	0.102	0.18	0.206	0.071	0.19	0.16	
Mercury (diss)	mg/L	-	0.001	0.0002	-	0.0001	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Molybdenum (diss)	mg/L	-	-	-	0.04	0.0005	0.003	0.003	0.002	0.003	0.002	0.002	<0.002	0.003	<0.002	<0.002	0.002	<0.002	<0.002	0.0022	0.0022	
Nickel (diss)	mg/L	-	-	0.025	-	0.001	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium (diss)	mg/L	-	0.05	0.1	-	0.001	-	-	-	-	-	-	<0.004	<0.004	<0.004	<0.004	<0.004	<0.001	<0.001	<0.002	<0.002	
Silicon (diss)	mg/L	-	-	-	-	0.05	7.3	6.76	7.39	7.33	6.29	7.62	7.58	8.95	8.51	9.13	7.85	8.84	8.75	7.9	9.8	
Silver (diss)	mg/L	-	-	0.0001	-	0.00009	-	-	-	-	-	-	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	
Strontium (diss)	mg/L	-	-	-	-	0.001	0.081	0.073	0.09	0.094	0.1	0.095	0.09	0.102	0.091	0.107	0.106	0.111	0.099	0.11	0.1	
Thallium (diss)	mg/L	-	-	-	0.0003	0.00005	-	-	-	-	-	-	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.00005	<0.00005	
Titanium (diss)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	<0.002	0.01	<0.002	0.014	<0.002	0.003	<0.002	<0.005	<0.005	
Vanadium (diss)	mg/L	-	-	-	0.006	0.0005	-	-	-	-	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0005	<0.0005	
Zinc (diss)	mg/L	-	5	-	0.02	0.005	-	-	-	-	-	-	<0.005	<0.005	<0.005	0.066	<0.005	<0.005	<0.005	<0.005	<0.005	
Zirconium (diss)	mg/L	-	-	-	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	

-LEGEND-
Detection Limit DL: May vary between sample locations and events
DL exceeds criteria
Concentration exceeds RUV-NB Reasonable Use Values North Baptiste
Concentration exceeds ODWQS Ontario Drinking Water Quality Standards
Concentration exceeds PWOQ-GENERAL Provincial Water Quality Objectives General
Concentration exceeds PWOQ-INTERIM Provincial Water Quality Objectives Interim

Appendix F

F-2 Historic Surface Water Chemistry

Appendix F-2: Historic Surface Water Chemistry																										
Parameter	Units	PWOO-GENERAL	PWOO-INTERIM	MECP-GD-TA	MECP-GD-TB	Location	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A			
						Sample ID	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A
						Sample Date	2003-Sep-30	2003-Oct-29	2003-Nov-17	2004-Apr-29	2004-Jun-23	2004-Aug-20	2004-Sep-10	2004-Oct-28	2006-May-11	2006-Jul-19	2006-Nov-20	2007-May-03	2007-Jun-04	2008-May-07	2008-Jun-19	2008-Sep-16	2008-Oct-09	2009-Jun-03	2009-Jul-16	
Anions						Detection Limit																				
Chloride	mg/L	-	-	180	128	0.1	68	4	4	3	6	12	9	15	3	24	1	2	2	2	2	6	10	2	9	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate as N	mg/L	-	-	-	-	0.05	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrite as N	mg/L	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	mg/L	-	-	100	-	0.1	17	8	30	8	7	6	8	8	7	5	7	7	5	6	5	7	6	6	4	
Cations																										
Calcium (tot)	mg/L	-	-	-	-	0.05	17	5	4	5	8	9	10	4	7	11	4	5	8	4	7	8	9	5	9	
Magnesium (tot)	mg/L	-	-	-	-	0.05	2	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	
Potassium (tot)	mg/L	-	-	-	-	0.05	4	-	1	-	-	1	2	2	1	-	-	-	-	-	-	1	1	-	-	
Sodium (tot)	mg/L	-	-	-	-	0.05	39	4	2	2	6	13	12	24	3	16	-	2	2	-	2	5	11	2	8	
Field Parameters																										
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
General Chemistry																										
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	39	18	13	18	29	51	44	57	15	39	9	17	24	12	20	26	38	14	34	
Ammonia as N	mg/L	-	-	-	-	0.02	1.01	0.06	0.04	0.02	0.2	0.68	0.48	1.11	0.06	0.86	0.04	0.03	0.06	0.02	0.07	0.25	0.58	0.04	0.27	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	-	-		
Colour	TCU	-	-	-	-	2	120	18	11	9	96	358	216	56	17	286	13	16	28	10	38	128	162	31	331	
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	7.6	-	-	11	8.8	7.1	7.1	1.5	-	5.4	-	-	-	-	-	-	-	-	-	
Electrical Conductivity	us/cm	-	-	-	-	1	338	66	51	49	88	138	130	178	63	165	40	48	65	43	52	88	128	45	108	
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	6.43	7.47	6.3	6.17	6.68	6.62	6.56	6.14	6.71	6.65	6.59	6.37	7.58	6.92	7.1	7.16	7.08	6.94	7.11	
Phenols	mg/L	0.001	-	0.04	0.004	0.001	-	-	-	-	-	-	-	0.003	-	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids	mg/L	-	-	-	-	10	-	43	33	32	57	90	85	116	41	107	26	31	42	28	34	57	83	29	70	
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	51	13	10	13	20	23	25	10	18	32	10	13	20	10	18	20	23	13	23	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	1.17	0.31	0.17	0.19	0.44	0.97	0.73	10.5	0.28	1.42	-	0.1	0.24	0.23	-	0.46	0.81	0.15	0.52	
Total Phosphorus	mg/L	0.03	-	-	-	0.02	0.05	0.03	-	0.02	0.02	0.04	0.03	0.9	-	0.04	-	0.01	-	-	-	0.01	0.01	-	-	
Total Suspended Solids	mg/L	-	-	-	-	10	76	6	6	-	19	19	3	3100	8	212	-	-	-	4	-	28	-	-	3	
Turbidity	NTU	-	-	-	-	0.1	45.1	8.6	7.5	0.7	29.8	44.9	14.5	-	6.3	-	0.8	1.4	3.5	0.8	1.9	4.2	-	2.3	14.2	
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0001362	0.0008349	
Metals																										
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (diss, PWOO)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.16	0.06	0.08	0.06	0.11	0.28	0.23	2.8	0.51	0.23	0.08	0.07	0.07	0.06	0.05	0.06	0.12	0.07	0.12	
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium (tot)	mg/L	-	-	0.064	-	0.003	0.001	-	-	-	-	0.002	0.002	-	-	0.003	-	-	0.001	0.001	-	-	0.001	-	0.002	
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	0.0123	0.0006	0.0004	-	0.018	0.0096	0.0061	0.046	0.0006	0.0105	0.0002	0.0003	0.0009	0.0003	0.0012	0.0023	0.0048	0.0007	0.0048	
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	-	0.001	-	-	0.032	-	0.001	-	-	-	-	-	0.001	-	-	-	-	-	-	
Iron (tot)	mg/L	0.3	-	1	-	0.01	19.8	1.49	1.54	0.28	6.23	21.5	12.4	125	1.95	41.8	0.49	0.68	1.16	0.45	1.68	5.17	15.7	1.32	14.4	
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002	-	-	
Manganese (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (tot)	mg/L	0.025	-	-	-	0.001	-	-	-	-	0.046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium (tot)	mg/L	0.1	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	0.32	0.02	0.02	0.02	0.51	0.1	0.14	0.3	0.05	0.08	-	0.02	0.03	0.03	0.05	0.05	0.05	0.06	0.06	

-LEGEND-

Detection Limit DL: May vary between sample locations and events

DL exceeds criteria

Concentration exceeds PWOO-GENERAL Provincial Water Quality Objectives General

Concentration exceeds PWOO-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

Appendix F-2: Historic Surface Water Chemistry					Location	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	
Parameter	Units	PWOO-GENERAL	PWOO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	MCG-A	
						Sample Date	2009-Aug-06	2009-Sep-16	2009-Oct-22	2010-May-17	2010-Jul-19	2010-Oct-18	2011-May-18	2012-Apr-17	2013-Apr-18	2013-Oct-30	2014-May-13	2015-May-04	2016-Apr-28	2016-Aug-17	2017-May-10	2017-Jul-20	2018-May-07	2019-May-07
Anions					Detection Limit																			
Chloride	mg/L	-	-	180	128	0.1	2	6	2	4	4	3	4	2	5.56	1.55	3.15	4.12	4.26	8.56	2.03	4.5	3.64	3.04
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	0.7	0.064	0.08	0.07	-	-	-	-	0.06	-	<0.05	-
Nitrite as N	mg/L	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-
Sulphate	mg/L	-	-	100	-	0.1	5	4	5	5	4	5	5	8	5.5	12	7.62	9.4	6.02	14.4	4.69	5.93	4.21	4.42
Cations																								
Calcium (tot)	mg/L	-	-	-	-	0.05	6	9	6	6	7	4	4	11.9	4.02	8.65	5.51	6.43	4.39	10.8	3.15	7.3	3.31	3.19
Magnesium (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	0.817	-	8	0.59	0.65	0.47	0.79	0.38	0.7	0.39	0.36
Potassium (tot)	mg/L	-	-	-	-	0.05	-	1	-	-	-	-	-	0.749	-	0.87	0.58	0.68	0.43	1.54	0.4	0.81	0.38	0.39
Sodium (tot)	mg/L	-	-	-	-	0.05	3	9	2	3	2	-	2	3.17	3.67	2.43	2.76	3.57	2.57	10.3	2.01	4.37	2.63	2.77
Field Parameters																								
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	23	44	24	17	26	11	16	21	6.1	13	10	10	8	38	12	26	8	10
Ammonia as N	mg/L	-	-	-	-	0.02	0.06	0.6	0.08	0.08	0.12	0.06	0.07	0.15	-	-	-	-	-	-	-	0.15	<0.02	-
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<5	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Colour	TCU	-	-	-	-	2	199	334	49	58	81	46	38	9	11	7	8	10	8	17	10	35	10	<5
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	-	9.7	5.58	10.93	11.54	-	-	-	12.22	7.52	12.64	8.49	12.83	6.78	9.08	-
Electrical Conductivity	us/cm	-	-	-	-	1	59	113	56	56	62	42	42	85	48	67	56	62	48	124	41	76	39	40
pH	pH units	6.5 - 8.5	-	6 - 9	-	7.1	7.37	7.26	7.06	7.19	7.03	5.86	7.1	6.82	6.88	7.05	7.28	6.57	7.54	8.58	7	6.17	6.45	-
Phenols	mg/L	0.001	-	0.04	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-
Total Dissolved Solids	mg/L	-	-	-	-	10	38	74	36	36	40	27	27	149	26	48	36	40	38	80	28	54	20	28
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	15	23	15	15	18	10	10	33.1	10	24.9	16.2	18.7	12.9	30.2	9.4	21.1	9.9	9.4
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.11	0.92	0.16	0.45	0.19	0.18	0.22	0.2	-	0.23	1.13	0.19	0.13	0.21	0.17	0.18	0.37	<0.1
Total Phosphorus	mg/L	0.03	-	-	-	0.02	-	0.01	-	-	0.01	-	-	0.01	-	-	-	-	-	-	-	0.02	-	0.09
Total Suspended Solids	mg/L	-	-	-	-	10	-	2	-	-	-	-	-	41	-	11	-	-	-	-	-	-	-	<10
Turbidity	NTU	-	-	-	-	0.1	3.4	26.3	5.6	6.3	3.3	2	2	3.4	0.8	-	1	0.6	259	0.8	-	5.8	0.5	0.9
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	0.0001714	0.002667	0.000029	0.00005	0.00028	0.000038	0.0000002	0.0000524	-	-	0.00002	0.00002	0.000001	0.000027	0.000002	0.000055	0.0000369	-
Metals																								
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	44	70	65	0.055	0.049	0.066	0.044	0.083	0.037	0.072	0.071
Aluminum (diss, PWOO)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.06	0.18	0.06	0.05	0.07	0.06	0.06	0.046	-	-	-	-	-	-	-	-	-	-
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	-	-	-	-	-	-	-	0.011	-	-	-	-	-	0.017	-	-	-	-
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (tot)	mg/L	-	-	0.064	-	0.003	-	0.002	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	<0.003
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	0.0017	0.006	0.0008	0.0008	0.0012	0.0006	0.0005	0.0006	-	-	-	-	-	-	-	0.0013	-	<0.0005
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	-	0.002	-	-	-	-	0.0012	0.0021	-	-	-	-	-	0.002	-	-	-	<0.002
Iron (tot)	mg/L	0.3	-	1	-	0.01	3.96	21.1	2.53	3.02	4.17	2.5	1.93	0.92	0.03	0.02	0.19	0.12	0.07	0.21	0.03	3.24	0.17	0.17
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001
Manganese (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (tot)	mg/L	0.025	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.003
Selenium (tot)	mg/L	0.1	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.004
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	0.04	0.05	0.02	0.01	0.02	0.01	0.02	0.015	0.136	0.097	0.007	0.006	0.011	0.008	-	0.01	0.006	<0.005

-LEGEND-

Detection Limit DL: May vary between sample locations and events

DL exceeds criteria

Concentration exceeds PWOO-GENERAL Provincial Water Quality Objectives General

Concentration exceeds PWOO-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

Appendix F-2: Historic Surface Water Chemistry					Location	MCG-A	MCG-A	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	
Parameter	Units	PWOO-GENERAL	PWOO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-A	MCG-A	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	MCG-A2	
						Sample Date	2022-May-03	2023-May-03	2008-May-08	2008-Jun-19	2009-Jun-03	2009-Oct-22	2010-May-17	2010-Oct-18	2011-May-18	2012-Apr-17	2013-Apr-18	2014-May-13	2015-May-04	2016-Apr-28	2017-May-10	2017-Jul-20	2018-May-07	2019-May-07	2020-May-06
Anions					Detection Limit																				
Chloride	mg/L	-	-	180	128	0.1	5.43	1.3	1	1	2	1	-	1	2	-	0.361	0.38	0.67	0.39	0.24	0.25	0.24	0.8	0.38
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
Nitrite as N	mg/L	-	-	-	-	0.01	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
Sulphate	mg/L	-	-	100	-	0.1	4.08	2.49	6	6	6	5	5	5	5	5	4.31	4.38	4.25	3.84	3.76	3.56	3.16	2.93	3.03
Cations																									
Calcium (tot)	mg/L	-	-	-	-	0.05	4.54	1.53	2	3	3	4	3	2	2	3.19	1.7	2.12	2.38	1.79	1.56	2.16	1.59	1.84	1.61
Magnesium (tot)	mg/L	-	-	-	-	0.05	0.42	0.24	-	-	-	-	-	-	-	0.509	-	0.35	0.39	0.31	0.28	0.34	0.29	0.27	<0.25
Potassium (tot)	mg/L	-	-	-	-	0.05	<1.15	<0.5	-	-	-	-	-	-	-	0.549	-	0.38	0.4	0.26	0.26	0.27	0.23	0.3	0.38
Sodium (tot)	mg/L	-	-	-	-	0.05	3.88	1.43	-	-	-	-	-	-	-	1.11	0.78	0.88	1.09	0.81	0.78	1.07	0.76	1.08	0.85
Field Parameters																									
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																									
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	8	7	-	8	7	15	10	13	11	6	-	-	-	-	-	8	-	5	<5
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	<0.02	-	0.02	-	0.05	-	0.04	0.06	0.02	-	-	0.07	-	-	-	0.09	<0.02	0.02
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<2	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<5	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	<5
Colour	TCU	-	-	-	-	2	9.07	9	7	4	6	27	17	25	14	11	21	-	10	7	10	7	10	7	-
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	-	-	-	6.3	4.49	9.76	-	-	9.85	5.82	10.05	10.75	4.93	9.48	-	-	-
Electrical Conductivity	us/cm	-	-	-	-	1	51	25	24	28	27	42	29	39	25	29	18	23	24	19	19	24	17	21	21
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	6.5	6.92	6.33	6.4	5.61	6.89	6.75	7.06	5.65	6.5	5.97	5.52	6.45	5.78	6.65	6.4	5.85	6.12	5.99
Phenols	mg/L	0.001	-	0.04	0.004	0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001
Total Dissolved Solids	mg/L	-	-	-	-	10	<10	36	16	18	18	27	19	25	16	119	24	20	22	22	-	26	-	24	<20
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	13.1	4.8	5	7	7	10	7	5	5	10.1	4.24	6.7	7.5	5.7	5	6.8	5.2	5.7	4.5
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.11	<0.1	0.31	0.53	0.23	0.16	0.29	0.3	0.48	0.1	-	1.45	0.24	0.13	0.16	0.36	0.37	<0.1	0.2
Total Phosphorus	mg/L	0.03	-	-	-	0.02	<0.02	<0.02	0.02	0.07	-	-	-	0.02	-	-	0.02	-	0.05	-	-	0.13	0.02	<0.02	<0.02
Total Suspended Solids	mg/L	-	-	-	-	10	<10	<10	29	15	4	4	6	9	3	9	-	137	17	21	-	415	30	<10	24
Turbidity	NTU	-	-	-	-	0.1	0.5	0.7	2.3	0.4	0.3	5	4.6	8.1	2.8	1.8	-	2.1	3.4	7.9	-	147	1.6	0.7	4.6
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	-	<0.000002	-	-	-	0.00001	-	0.000013	0	0.000006	-	0.000002	0.000009	0.0000001	0.0000002	0.0000028	0.0000015	-	-
Metals																									
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	0.038	-	-	-	-	-	-	-	-	0.065	0.125	0.09	0.074	0.092	0.106	0.07	0.111	0.082	0.114
Aluminum (diss, PWOO)	mg/L	-	Calculated	-	-	0.004	-	0.095	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (tot)	mg/L	-	-	-	-	0.004	-	-	0.08	0.48	0.12	0.08	0.08	0.08	0.08	0.13	-	-	-	-	-	-	-	-	0.173
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.003
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	<0.01	0.013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
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	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.003
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	<0.0005	<0.0005	-	0.0007	-	0.0014	0.0004	0.0005	0.0003	-	-	-	-	-	-	0.0037	-	<0.0005	<0.0005
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	<0.002	0.001	-	0.001	-	-	-	-	-	0.0008	-	-	-	-	-	0.005	-	<0.002	<0.002
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.49	0.085	0.39	2.65	0.55	5.17	2.57	2.86	1.82	0.513	16	0.1	1.15	0.48	-	34.9	0.07	0.05	0.042
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002	-	<0.001	<0.001
Manganese (tot)	mg/L	-	-	-	-	0.002	0.037	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.007
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	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002
Nickel (tot)	mg/L	0.025	-	-	-	0.001	<0.003	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.003
Selenium (tot)	mg/L	0.1	-	-	-	0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.004
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.62
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.012
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0003
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	<0.02	<0.02	-	-	-														

Appendix F-2: Historic Surface Water Chemistry					Location		MCG-A2	MCG-A2	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	
Parameter	Units	PWO0-GENERAL	PWO0-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-A2	MCG-A2	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B		
						Sample Date	2021-Apr-20	2021-Jul-14	2003-Aug-14	2003-Sep-17	2003-Sep-30	2003-Oct-29	2003-Nov-17	2004-Apr-29	2004-Jun-23	2004-Aug-20	2004-Sep-10	2004-Oct-28	2006-May-11	2006-Jul-19	2006-Aug-21	2006-Sep-19	2006-Nov-20	2007-May-03	2007-Jun-04
Anions																									
Chloride	mg/L	-	-	180	128	0.1	0.34	0.19	39	33	31	36	34	29	29	36	31	28	28	31	32	25	28	24	27
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	0.28	-	-	-	-	-	-
Nitrite as N	mg/L	-	-	-	-	0.01	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	-	-	100	-	0.1	2.97	2.65	10	35	62	93	128	115	74	61	60	25	35	30	19	11	54	61	30
Cations																									
Calcium (tot)	mg/L	-	-	-	-	0.05	1.7	1.84	50	33	69	95	89	92	92	56	84	68	40	35	35	36	35	70	55
Magnesium (tot)	mg/L	-	-	-	-	0.05	0.35	0.3	13	9	16	22	20	21	20	14	18	15	11	9	9	9	9	16	14
Potassium (tot)	mg/L	-	-	-	-	0.05	<0.58	<0.58	13	12	20	23	21	21	18	14	21	18	8	8	7	10	7	16	13
Sodium (tot)	mg/L	-	-	-	-	0.05	0.98	1.08	26	26	27	23	21	19	17	28	16	13	10	10	9	8	9	13	11
Field Parameters																									
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																									
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	<5	6	215	120	200	252	206	199	267	177	243	232	89	92	89	88	72	180	171
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	<0.02	0.89	3.04	0.44	0.88	0.11	0.23	0.49	0.13	0.21	0.53	0.2	0.39	0.04	0.18	0.18	0.35	0.21
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<2	<6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	51	5	-	-	-	-	56	-	6	-	-	4	2	3	6	-	14
Colour	TCU	-	-	-	-	2	8	9	34	49	37	9	10	13	47	22	35	67	13	18	39	79	21	19	20
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	0.7	5	1.9	-	-	8.6	9.4	2.8	2.5	1	-	1.8	1.4	4.4	-	-	-
Electrical Conductivity	us/cm	-	-	-	-	1	19	18	486	396	572	760	691	673	733	550	655	577	356	331	311	286	331	549	480
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	5.98	6.41	7.04	6.72	6.95	7.26	8.83	6.69	6.86	6.91	6.69	6.67	7.13	6.82	6.78	6.75	7.07	7.27	7.64
Phenols	mg/L	0.001	-	0.04	0.004	0.001	<0.001	<0.001	0.017	0.002	0.001	0.002	0.017	-	0.014	-	-	0.005	-	-	-	0.002	0.01	-	-
Total Dissolved Solids	mg/L	-	-	-	-	10	32	28	316	257	-	494	449	437	476	358	426	375	231	215	202	186	215	357	312
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	5.7	5.8	178	119	238	328	305	316	312	197	284	232	145	124	124	127	124	241	195
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.18	<0.1	21.7	12.9	3.35	1.67	2.22	0.75	2.46	6.2	2.33	6.41	1.52	2.47	1.11	0.57	1.77	0.81	16
Total Phosphorus	mg/L	0.03	-	-	-	0.02	<0.02	<0.02	1.59	0.18	0.18	0.15	0.69	0.12	1.35	0.44	0.21	1.17	0.16	1.68	0.04	-	2.33	0.15	1.77
Total Suspended Solids	mg/L	-	-	-	-	10	<10	<10	1940	305	100	160	2250	12	2540	125	168	330	38	2030	320	16	5410	23	766
Turbidity	NTU	-	-	-	-	0.1	1.2	0.8	137	13.1	18.9	33.8	-	20.8	-	51.7	51.7	-	11	-	85.6	7.8	-	24.4	-
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																									
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	0.094	0.096	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (diss, PWO0)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.131	0.159	0.58	0.14	0.09	0.21	3.13	-	3.92	0.25	0.12	0.2	0.09	1.71	0.16	0.04	5.5	0.02	0.86
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	0.011	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	<0.0001	<0.0001	0.0007	0.0007	-	0.0001	0.0014	-	0.002	0.0002	-	0.0003	-	0.0007	-	-	-	-	0.0004
Chromium (tot)	mg/L	-	-	0.064	-	0.003	<0.003	<0.003	-	0.005	0.006	0.002	<0.003	-	0.011	0.001	0.002	-	-	0.002	-	-	-	0.001	0.002
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	<0.0005	<0.0005	0.0011	0.0003	0.0002	0.004	0.0022	0.0003	0.02	0.0003	0.0004	0.0003	-	0.001	0.0009	-	0.006	-	0.0004
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	<0.002	<0.002	0.007	0.004	0.001	0.001	0.002	-	0.043	0.001	0.001	-	-	-	-	-	0.06	-	0.001
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.036	0.052	27	4.15	3.99	12.5	79.5	2.54	76.2	16.8	22.8	20.9	4.8	65.9	2.2	3.89	110	6.27	22.1
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	<0.001	<0.001	0.009	0.002	0.001	0.003	0.013	-	0.04	0.003	-	0.002	-	0.007	-	-	0.04	-	0.008
Manganese (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (tot)	mg/L	0.025	-	-	-	0.001	<0.003	<0.003	0.005	-	-	-	0.009	-	0.01	-	-	-	-	0.006	-	-	0.02	-	-
Selenium (tot)	mg/L	0.1	-	-	-	0.002	<0.004	<0.002	0.001	-	-	0.002	0.004	-	-	-	-	0.002	-	0.009	-	-	-	-	-
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	0.006	<0.005	0.18	0.07	0.01	0.03	0.49	-	0.54	0.06	0.01	0.08	0.01	0.42	-	-	0.85	-	0.15

-LEGEND-

Detection Limit DL: May vary between sample locations and events

DL exceeds criteria

Concentration exceeds PWO0-GENERAL Provincial Water Quality Objectives General

Concentration exceeds PWO0-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

Appendix F-2: Historic Surface Water Chemistry						Location		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		MCG-B		
Parameter	Units	PWOO-GENERAL	PWOO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B			
						Sample Date	2007-Aug-15	2007-Sep-27	2007-Nov-22	2008-May-07	2008-Jun-19	2008-Aug-21	2008-Sep-16	2008-Oct-09	2009-Jun-03	2009-Jul-16	2009-Aug-06	2009-Sep-16	2009-Oct-22	2010-May-17	2010-Jul-19	2010-Oct-18	2011-May-18	2011-Aug-11	2011-Nov-03															
Anions						Detection Limit																																		
Chloride	mg/L	-	-	180	128	0.1	31	29	25	17	17	22	22	18	16	17	14	16	16	20	16	24	14	19	20															
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Nitrate as N	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Nitrite as N	mg/L	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sulphate	mg/L	-	-	100	-	0.1	13	7	60	132	61	26	127	49	109	47	125	33	68	107	21	101	109	8	51															
Cations																																								
Calcium (tot)	mg/L	-	-	-	-	0.05	36	37	79	113	93	55	118	69	119	91	142	105	122	116	56	119	114	42	96															
Magnesium (tot)	mg/L	-	-	-	-	0.05	10	10	19	22	21	12	25	17	24	19	25	20	24	21	11	25	23	9	20															
Potassium (tot)	mg/L	-	-	-	-	0.05	7	12	18	23	20	10	30	18	24	19	27	21	26	23	13	27	23	12	23															
Sodium (tot)	mg/L	-	-	-	-	0.05	9	10	16	16	14	11	19	12	16	14	16	13	15	15	9	14	12	9	14															
Field Parameters																																								
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
General Chemistry																																								
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	96	118	276	239	279	168	326	241	302	299	355	344	409	298	198	364	277	171	280															
Ammonia as N	mg/L	-	-	-	-	0.02	0.3	0.34	0.87	0.5	0.65	0.28	0.76	0.83	0.6	0.87	0.49	0.86	1.68	0.36	0.83	1.49	0.51	13.4	0.86															
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-															
Chemical Oxygen Demand	mg/L	-	-	-	-	5	7	6	32	-	7	17	3	18	2	2	1	-	11	3	7	15	2	90	19															
Colour	TCU	-	-	-	-	2	27	119	21	8	12	8	13	14	10	14	12	15	14	20	56	18	13	119	24															
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-															
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.3	1.41	4.46	1.57	2.12	-														
Electrical Conductivity	uS/cm	-	-	-	-	1	323	345	697	740	680	443	898	614	790	697	907	729	911	819	471	911	743	393	651															
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	7.62	7.26	7.41	7.69	7.42	7.52	7.48	7.43	6.87	7.44	7.23	7.72	7.25	7.47	7.41	7.22	7.06	7.25	7.2															
Phenols	mg/L	0.001	-	0.04	0.004	0.001	0.001	0.011	0.014	-	-	0.003	-	0.01	-	-	-	-	0.001	-	0.004	0.01	-	0.009																
Total Dissolved Solids	mg/L	-	-	-	-	10	210	224	453	481	442	288	584	399	514	453	590	474	592	532	306	592	483	255	423															
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	131	134	276	373	319	187	398	242	396	305	458	345	403	376	185	400	379	142	322															
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	2.3	4.4	2.66	0.86	2.72	1.05	2.31	1.57	1.47	2.1	1.42	2.07	2.29	1.18	2.89	2.87	1.79	97	5.21															
Total Phosphorus	mg/L	0.03	-	-	-	0.02	-	0.34	1.32	0.09	0.37	2.1	0.36	1.33	0.14	0.35	0.17	0.65	0.32	0.07	0.35	0.5	0.13	1.02	0.38															
Total Suspended Solids	mg/L	-	-	-	-	10	336	64	940	42	176	2130	105	2720	59	49	63	77	37	350	231	66	8120	231																
Turbidity	NTU	-	-	-	-	0.1	79.1	5	-	58.4	18.2	-	81.4	-	-	60.1	-	95.7	-	38.2	-	33.8	-	71.1																
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	-	-	-	-	-	-	-	-	0.00162	0.000757	0.00054	0.000808	0.000587	0.00056	0.00021	0.00052	0.0000817	0.0198	0.000257															
Metals																																								
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-															
Aluminum (diss, PWOO)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-															
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.68	-	-	-	0.15	0.7	0.05	0.83	0.01	-	0.02	0.02	0.02	0.2	0.5	0.6	-	2.6	0.2															
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	0.001	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-															
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-															
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-															
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	-	-	-	-	0.15	0.17	0.23	0.23	0.18	0.15	0.23	0.17	0.27	0.17	0.2	0.4	0.16	0.9	0.3															
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	0.0004	-	-	-	-	0.0005	-	0.0006	-	-	-	-	-	-	-	-	-	-	-															
Chromium (tot)	mg/L	-	-	0.064	-	0.003	0.001	0.002	-	0.003	0.002	0.002	0.003	0.002	0.003	0.004	0.004	0.004	0.006	-	-	-	0.002	-	-															
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	0.0002	-	-	0.0004	0.0003	0.0003	0.0006	0.0003	0.0003	0.0002	0.0006																							

Appendix F-2: Historic Surface Water Chemistry																													
Parameter	Units	PWOO-GENERAL	PWOO-INTERIM	MECP-GD-TA	MECP-GD-TB	Location																							
						Sample ID	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B		
						Sample Date	2012-Apr-17	2012-Jul-11	2012-Oct-17	2013-Apr-18	2013-Aug-15	2013-Oct-30	2014-May-13	2014-Aug-19	2014-Oct-14	2015-May-04	2015-Sep-09	2015-Oct-26	2016-Apr-28	2016-Aug-17	2016-Oct-26	2017-May-10	2017-Jul-20	2017-Oct-23	2018-May-07				
Anions																													
Chloride	mg/L	-	-	180	128	Detection Limit	0.1	11	22	16	23.7	18.3	16.6	43.2	29.7	30.3	43.7	37.6	44.3	36.4	30.1	34.6	21.8	29.2	27.8	46.3			
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Nitrate as N	mg/L	-	-	-	-	0.05	-	-	-	0.298	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Nitrite as N	mg/L	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Sulphate	mg/L	-	-	100	-	0.1	123	14	446	72	24.9	71	120	72.9	61	141	17.4	158	94.8	186	31.9	111	57.1	41	71.1				
Cations																													
Calcium (tot)	mg/L	-	-	-	-	0.05	71.8	43.2	168	69.4	57.9	116	95.9	110	119	98.1	73.6	108	93	132	90.9	104	115	118	69.4				
Magnesium (tot)	mg/L	-	-	-	-	0.05	21.9	8.97	27.7	10.2	11.3	21.3	16.2	19.5	22.7	18.5	15.2	23.8	15.4	22.7	17.3	15.2	18.6	21	10.8				
Potassium (tot)	mg/L	-	-	-	-	0.05	22.1	10.3	30	9.69	10.8	19.8	14.8	18.1	25	17.9	21.5	25.9	13.3	21.1	17.3	13.4	17	21.7	9.49				
Sodium (tot)	mg/L	-	-	-	-	0.05	11.3	7.42	9.32	18.4	9.99	14.9	19.2	19.1	20	27.8	21.8	25.8	21.9	33	17.5	22.2	22.5	22.5	32.9				
Field Parameters																													
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
General Chemistry																													
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	61	131	189	170	188	330	217	288	307	222	226	258	218	297	305	246	365	384	187				
Ammonia as N	mg/L	-	-	-	-	0.02	0.25	2.01	0.23	-	0.27	0.3	0.06	0.36	0.09	0.28	0.12	0.22	0.12	0.23	0.58	0.13	0.39	0.82	0.05				
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	145	19	-	-	9	-	20	43	-	14	45	-	21	76	-	-	69	8				
Colour	TCU	-	-	-	-	2	8	49	10	27	30	13	13	19	16	14	98	27	12	28	17	10	23	18	19				
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	-	-	-	-	2.52	-	2.1	0.87	-	-	3.41	0.68	1.48	1.55	0.24	1.98	2.99				
Electrical Conductivity	uS/cm	-	-	-	-	1	191	390	1220	524	469	740	774	806	934	813	592	859	704	992	688	797	858	733	603				
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	7	7	7.2	8.1	7.5	7.73	7.9	7.64	7.85	7.43	7.66	7.81	7.67	7.98	7.9	8.12	8.16	7.96	7.38				
Phenols	mg/L	0.001	-	0.04	0.004	0.001	-	0.027	0.037	-	0.014	0.051	-	0.044	0.035	-	0.005	0.026	-	-	0.027	-	-	0.019	0.002				
Total Dissolved Solids	mg/L	-	-	-	-	10	566	228	943	342	310	458	436	468	484	488	330	528	404	632	390	418	388	500	348				
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	53.9	145	533	215	191	377	306	355	391	321	246	368	296	423	298	322	364	381	218				
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.6	24	1.7	0.308	7.38	6.1	2.64	11.2	11.2	1.85	3.6	9.46	1.29	4.58	4.02	0.65	1.92	4.83	4.58				
Total Phosphorus	mg/L	0.03	-	-	-	0.02	0.07	3.28	0.21	0.031	1.23	0.43	0.28	1.83	1	0.11	0.66	1.49	0.06	0.52	3.37	0.21	0.44	7.66	0.52				
Total Suspended Solids	mg/L	-	-	-	-	10	28	871	91	15	237	260	79	1710	304	59	208	206	50	176	2480	37	188	2570	172				
Turbidity	NTU	-	-	-	-	0.1	40.9	236	94	2.5	128	135	58	245	158	77.9	49.9	29.5	33.7	21.2	510	58.2	112	5040	54.3				
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	0.000159	0.00403	0.000134	-	0.000525	0.000133	0.000125	0.000631	0.0000896	0.00047	0.00187	0.00026	0.000014	0.000213	0.00028	0.000079	0.000821	0.000781	0.000037				
Metals																													
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	-	-	-	0.0112	0.025	0.009	-	0.005	0.006	0.004	0.007	-	-	0.008	0.016	-	0.008	0.019	-				
Aluminum (diss, PWOO)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.013	0.42	0.089	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	-	-	-	-	-	-	-	-	-	0.003	-	-	-	-	-	-	-	-	-				
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	0.17	0.957	0.61	0.123	0.586	0.238	0.202	0.595	0.363	0.16	0.335	0.28	0.182	0.332	0.295	0.149	0.199	0.291	0.179				
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	-	-	0.0005	-	0.0002	0.001	-	0.0013	0.0009	-	-	0.0002	-	-	0.0017	0.0002	0.0002	0.0018	0.0003				
Chromium (tot)	mg/L	-	-	0.064	-	0.003	-	-	-	-	0.003	-	-	-	-	-	-	-	-	-	0.005	-	0.007	0.009	0.004				
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	0.0025	0.0005	0.0025	-	0.0005	-	-	-	-	0.0008	-	-	-	-	0.0021	-	0.0006	0.0037	0.0005				
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	0.0025	0.0007	0.0024	-	0.002	-	-	-	-	0.003	-	-	-	-	-	0.003	-	-	0.002				
Iron (tot)	mg/L	0.3	-	1	-	0.01	6.89	102	8.95	0.338	28.4	35.8	8.84	62.8	69.3	14.8	6	8.71	9.17	3.37	45.5	13	28.8	44	11.2				
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	-	0.0011	0.0014	-	0.001	0.005	-	0.002	0.005	-	-	0.001	-	-	0.019	0.001	0.002	0.036	0.008				
Manganese (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Nickel (tot)	mg/L	0.025	-	-	-	0.001	-	0.006	0.009	-	0.003	-	-	-	-	0.004	-	0.003	0.005	-	0.006	-	-	0.008	-				
Selenium (tot)	mg/L	0.1	-	-	-	0.002	-	0.003	-	-	0.004	0.013	-	0.285	0.074	-	-	0.014	-	-	0.022	-	-	0.086	0.033				
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	-	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	0.0002	-	-	-				
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	-	0.247	0.658	0.0364	0.081	0.443	0.019	0.221	0.291	0.026	0.027	0.11	0.042	0.032	0.443	0.111	0.026	0.386	0.067				

-LEGEND-
Detection Limit DL: May vary between sample locations and events
DL exceeds criteria
Concentration

Appendix F-2: Historic Surface Water Chemistry					Location		MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C		
Parameter	Units	PWO0-GENERAL	PWO0-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-B	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C			
						Sample Date	2018-Jul-30	2018-Oct-22	2019-May-07	2019-Aug-14	2019-Oct-24	2020-May-06	2020-Oct-06	2021-Apr-20	2021-Jul-14	2022-May-03	2023-May-03	2003-Oct-29	2003-Nov-17	2004-Apr-29	2004-Jun-23	2004-Aug-20	2004-Sep-10	2004-Oct-28	2006-May-11	
Anions																										
Chloride	mg/L	-	-	180	128	Detection Limit	0.1	42.5	38	33.6	33	47.3	31.7	47.8	25.6	27.3	17.4	9.78	21	-	27	33	56	36	62	72
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	-	-	<0.1	<0.05	<0.05	<0.25	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-
Nitrite as N	mg/L	-	-	-	-	0.01	-	-	<0.1	<0.05	<0.05	<0.25	<0.1	<0.1	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	-	-	100	-	0.1	55.1	80.3	64.5	6.22	37.9	53.4	15.9	44.6	14.4	44.1	50.2	24	33	19	5	5	6	21	48	
Cations																										
Calcium (tot)	mg/L	-	-	-	-	0.05	70.9	125	86.2	30	76.2	85.39	100.49	109	116	102	88.4	13	17	15	19	21	11	23	36	
Magnesium (tot)	mg/L	-	-	-	-	0.05	13.5	22.1	13.7	6.37	14.6	15.39	18	19.7	20.4	16.2	11.6	4	5	4	5	5	3	6	9	
Potassium (tot)	mg/L	-	-	-	-	0.05	10.3	22.2	12.9	4.04	15.2	14.46	20.94	18	21.4	17.7	13.3	4	4	5	-	-	3	6	8	
Sodium (tot)	mg/L	-	-	-	-	0.05	24.7	27.3	28.3	11.6	22	21.23	23.17	24.3	21.7	21.7	13.4	7	10	11	11	13	25	14	30	
Field Parameters																										
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																										
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	157	330	299	79	228	236	338	296	426	261	279	26	40	24	38	34	37	16	39	
Ammonia as N	mg/L	-	-	-	-	0.02	0.57	0.55	0.13	0.41	0.42	0.05	0.12	<0.02	0.1	<0.02	0.03	0.06	0.09	0.12	-	0.07	0.1	0.07	0.18	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	<5	13	17	-	5	2	14	2	<2	-	-	-	-	-	-	-	-	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	50	7	-	-	-	23	-	-	-	-	-	-	-	-	26	-	6	-	4	
Colour	TCU	-	-	-	-	2	9	8	8	49	13	-	19	17	34	13.1	27.8	138	122	52	124	69	250	25	52	
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	3.32	6.68	-	-	-	-	-	-	-	-	-	-	-	10.7	9.6	10.4	4.5	4.7	-	
Electrical Conductivity	uS/cm	-	-	-	-	1	551	979	684	304	680	805	730	776	782	654	622	148	206	182	210	238	201	308	453	
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	7.81	7.7	7.63	7.21	7.69	7.27	7.93	7.5	7.64	7.17	7.61	6.61	6.31	6.29	6.27	6.26	6.18	5.99	6.82	
Phenols	mg/L	0.001	-	0.04	0.004	0.001	0.006	0.011	0.002	0.016	0.031	0.003	0.025	0.004	0.006	0.014	0.0012	-	0.001	-	0.001	-	-	-	-	
Total Dissolved Solids	mg/L	-	-	-	-	10	344	590	380	166	376	408	434	462	472	376	384	96	134	118	137	155	131	200	294	
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	233	403	272	101	250	277	325	353	374	321	269	49	63	54	68	73	40	82	127	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	12	0.84	0.64	2.93	1.89	0.46	1.82	0.54	1.68	0.7	0.33	0.18	1.37	2.6	0.84	6.2	9.97	8.28	1.33	
Total Phosphorus	mg/L	0.03	-	-	-	0.02	2.21	0.68	0.18	0.76	1.24	0.02	0.37	0.05	0.48	0.1	0.05	0.09	0.95	0.22	2.24	0.55	0.55	2.28	0.44	
Total Suspended Solids	mg/L	-	-	-	-	10	346	461	<10	60	630	<10	169	10	12	50	<10	53	950	22	520	100	1910	1460	564	
Turbidity	NTU	-	-	-	-	0.1	63.6	249	31.8	63	184	10.1	125	12.8	94.6	9	9.9	15.5	81.3	2.7	43	12.8	-	-	-	
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	0.000317	0.000121	-	-	-	-	-	-	-	-	0.000035	-	-	-	-	-	-	-	-	
Metals																										
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	0.009	0.015	<0.004	0.006	0.132	0.032	0.011	<0.004	0.004	0.005	-	-	-	-	-	-	-	-	-	
Aluminum (diss, PWO0)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	<0.004	-	-	-	-	-	-	-	-	-	
Aluminum (tot)	mg/L	-	-	-	-	0.004	-	-	-	-	-	0.011	1.83	0.014	0.145	-	-	0.16	1.29	0.1	1.19	0.08	0.44	0.18	0.53	
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	0.004	0.001	-	-	-	-	-	
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	0.067	-	-	-	-	-	-	-	-	-	-	-	-	-	
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	0.863	0.141	-	-	-	0.133	0.161	0.184	0.2	0.164	0.184	-	-	-	-	-	-	-	-	
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	0.0003	-	-	-	-	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	-	0.0006	-	-	-	0.0001	-	-	
Chromium (tot)	mg/L	-	-	0.064	-	0.003	-	-	<0.003	<0.003	<0.003	0.014	<0.003	<0.003	<0.003	<0.003	<0.003	-	0.002	-	-	-	0.001	-	-	
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	-	0.0027	<0.0005	<0.0005	0.0006	0.0006	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	0.0018	0.0087	0.0008	0.018	0.0014	0.0021	0.0013	0.0014	
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	0.002	0.01	<0.002	<0.002	0.004	0.003	0.004	0.003	<0.002	<0.002	<0.002	0.001	0.013	0.002	0.03	-	0.001	0.001	0.001	
Iron (tot)	mg/L	0.3	-	1	-	0.01	14.8	15.2	5.35	8.3	10.6	1.57	16.9	2.97	18.1	7.06	2.31	1.47	13.7	0.71	28.6	5.94	8.13	10.9	1.29	
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	0.001	0.002	<0.001	<0.001	0.003	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.017	-	-	-	0.003	0.002	0.001	
Manganese (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	0.414	-	-	-	0.938	0.385	-	-	-	-	-	-	-	-	
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	-	-	-	-	-	-	-	-	
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (tot)	mg/L	0.025	-	-	-	0.001	-	-	<0.003	<0.003	<0.003	0.013	<0.003	<0.003	0.004	<0.003	<0.003	-	-	-	-	-	-	-	-	
Selenium (tot)	mg/L	0.1	-	-	-	0.002	0.037	-	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	8.73	-	-	-	-	-	-	-	-	-	-	-	-	-	
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	-	-	-	-	-	-	-	-	
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	0.456	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	<0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-															

Appendix F-2: Historic Surface Water Chemistry					Location	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C				
Parameter	Units	PWOO-GENERAL	PWOO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C	MCG-C				
						Sample Date	2006-Sep-19	2006-Nov-20	2007-May-03	2007-Jun-04	2008-May-07	2008-Jun-19	2008-Aug-21	2008-Sep-16	2008-Oct-09	2009-Oct-22	2010-May-17	2010-Jul-19	2010-Oct-18	2011-May-18	2011-Nov-03	2012-Apr-17	2012-Oct-17	2013-Apr-18	2013-Oct-30		
Anions																											
Chloride	mg/L	-	-	180	128	Detection Limit	0.1	50	14	31	36	24	2	22	18	26	105	62	92	83	75	89	91	129	31.5	65.5	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate as N	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.34	-	
Nitrite as N	mg/L	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	mg/L	-	-	100	-	0.1	75	12	34	9	30	1	5	9	12	101	79	81	92	115	119	222	359	153	99.8		
Cations																											
Calcium (tot)	mg/L	-	-	-	-	0.05	26	10	16	16	17	6	15	15	16	52	38	51	48	46	40	63.1	99.2	70.6	38.4		
Magnesium (tot)	mg/L	-	-	-	-	0.05	7	3	4	4	5	1	4	4	5	13	9	11	12	12	11	16	26	12.4	9.46		
Potassium (tot)	mg/L	-	-	-	-	0.05	5	2	7	4	5	-	2	2	2	26	17	14	21	21	20	27.3	27.2	20.4	18.4		
Sodium (tot)	mg/L	-	-	-	-	0.05	19	6	20	19	14	-	8	6	8	84	57	85	75	68	74	88.7	102	46.4	76.3		
Field Parameters																											
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
General Chemistry																											
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	9	14	26	45	17	16	28	22	25	148	105	176	125	108	76	213	26	154	125		
Ammonia as N	mg/L	-	-	-	-	0.02	0.11	0.05	0.04	0.1	0.03	0.12	0.04	0.05	0.05	0.02	-	-	-	0.03	0.03	0.03	0.01	0.675	-		
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Chemical Oxygen Demand	mg/L	-	-	-	-	5	7	4	-	23	-	3	8	7	10	3	150	2	4	57	2	3	3	-	36		
Colour	TCU	-	-	-	-	2	160	235	69	191	82	94	242	242	113	53	99	147	67	50	81	44	55	61	99		
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	3.6	-	-	-	-	-	-	-	-	-	2	6.05	4.2	5.21	8.01	-	-	-	-		
Electrical Conductivity	uS/cm	-	-	-	-	1	287	109	253	232	198	42	150	141	175	880	609	831	733	722	704	603	1150	708	670		
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	5.83	6.55	6.44	7.04	7.03	7.23	6.76	6.58	6.74	7.78	7.33	7.72	7.8	6.73	6.7	7.7	6.8	8.05	7.78		
Phenols	mg/L	0.001	-	0.04	0.004	0.001	-	-	-	0.003	-	-	-	-	-	-	-	0.001	-	-	-	0.003	0.003	0.003	-		
Total Dissolved Solids	mg/L	-	-	-	-	10	187	71	164	151	129	27	98	92	114	572	396	540	476	469	458	596	749	48	428		
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	94	37	56	56	63	19	54	54	61	183	132	173	169	164	145	44.8	355	227	135		
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	1.4	4.93	0.68	6.53	1.03	0.38	2.62	3.11	2.49	1.39	4.76	1.86	0.7	3.41	0.77	1.2	1.1	1.66	1.2		
Total Phosphorus	mg/L	0.03	-	-	-	0.02	0.83	0.84	0.02	1.55	0.15	0.02	0.4	0.63	0.56	0.04	0.16	0.02	0.09	0.02	-	0.05	0.01	0.056	0.04		
Total Suspended Solids	mg/L	-	-	-	-	10	1120	175	-	162	23	3	160	190	182	27	4690	-	202	596	27	156	114	-	1030		
Turbidity	NTU	-	-	-	-	0.1	-	43.5	1.4	32	3.6	2.4	18.9	46.9	-	5.9	-	1.9	0.9	-	0.7	10	11.5	2.9	23		
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	-	-	-	-	-	-	-	-	-	0.000005	-	-	-	0.0000029	0.0000138	0.000023	0.000001	0.000516	-		
Metals																											
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.009	-	0.011	0.024
Aluminum (diss, PWOO)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.41	0.29	0.07	0.2	0.09	0.06	0.12	0.2	0.09	0.02	0.6	0.02	0.3	0.01	0.02	0.024	0.021	-	-		
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	-	-	-	-	-	-	0.03	0.02	0.02	0.15	0.2	0.35	0.1	0.1	0.2	0.227	0.948	0.382	0.208		
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Chromium (tot)	mg/L	-	-	0.064	-	0.003	-	0.002	0.002	0.002	0.002	-	0.005	0.001	-	0.003	-	0.008	-	-	0.002	-	-	-	-		
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	0.002	0.0042	0.0008	0.0031	0.0005	-	0.002	0.0019	0.0018	0.0003	-	0.0004	-	0.0002	-	0.0006	0.0007	-	-		
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	0.002	0.001	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	0.0012	0.0021	-		
Iron (tot)	mg/L	0.3	-	1	-	0.01	3.16	4.61	0.38	17.9	0.45	1.69	3.66	3.57	3.55	0.08	1.7	0.11	0.3	0.6	0.1	-	0.133	0.022	0.018		
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	0.008	0.003	-	0.003	-	-	0.001	0.001	-	-	0.01	-	-	-	-	0.0005	0.0005	-	-		
Manganese (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Nickel (tot)	mg/L	0.025	-	-	-	0.001	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	0.004	-		
Selenium (tot)	mg/L	0.1	-	-	-	0.002	-	-	-	-	-	-	0.001	-	0.002	0.002	-	-	-	-	-	-	-	-	-		
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	-	-	-	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-		
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	0.04	0.02	-	-	0.01	-	-	-	-	-	0.08	-	-	-	-	-	0.017	0.0092	0.051		

-LEGEND-

Detection Limit DL: May vary between sample locations and events

DL exceeds criteria

Concentration exceeds PWOO-GENERAL Provincial Water Quality Objectives General

Concentration exceeds PWOO-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

Appendix F-2: Historic Surface Water Chemistry						Location		MCG-C		MCG-D		MCG-D		MCG-D		MCG-D		MCG-D		MCG-D		MCG-D		MCG-D		
Parameter	Units	PWO0- GENERAL	PWO0- INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-C	MCG-C	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D	MCG-D		
						Sample Date	2023-Aug-09	2023-Oct-19	2023-Aug-14	2023-Sep-17	2023-Sep-30	2023-Oct-29	2023-Nov-17	2004-Apr-29	2004-Jun-23	2004-Aug-20	2004-Sep-10	2004-Oct-28	2006-May-11	2006-Jul-19	2006-Aug-21	2006-Sep-19	2006-Nov-20	2007-May-03	2007-Jun-04	
Anions						Detection Limit																				
Chloride	mg/L	-	-	180	128	0.1	28	58	12.8	3.1	2.64	1.6	7.3	1.2	2.3	7	1.4	2.4	4	6.6	6.5	6.1	1.5	1.6	4.2	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate as N	mg/L	-	-	-	-	0.05	<0.1	<0.1	<0.1	<0.1	2.64	0.58	0.72	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.23	<0.1	<0.1	
Nitrite as N	mg/L	-	-	-	-	0.01	<0.01	<0.01	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Sulphate	mg/L	-	-	100	-	0.1	2.9	10	7	11	26	21	27	8	4	3	10	9	7	2	4	18	9	7	2	
Cations																										
Calcium (tot)	mg/L	-	-	-	-	0.05	51	54	7	7	7	5	3	3	5	5	4	5	5	6	7	12	3	3	4	
Magnesium (tot)	mg/L	-	-	-	-	0.05	13	14	3	2	3	2	1	<1	1	2	1	2	1	2	2	4	1	<1	1	
Potassium (tot)	mg/L	-	-	-	-	0.05	4	14	<1	2	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	
Sodium (tot)	mg/L	-	-	-	-	0.05	21	35	2	4	3	2	2	3	3	3	2	3	2	2	<2	3	2	<2	<2	
Field Parameters																										
pH (Field)	pH units	-	-	-	-		6.38	6.43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Temperature	deg. C	-	-	-	-		16.6	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
General Chemistry																										
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	180	170	29	38	6	5	7	12	16	21	8	12	15	17	24	-	-	-	13	
Ammonia as N	mg/L	-	-	-	-	0.02	<0.05	<0.05	0.16	0.24	0.15	0.06	-	0.04	-	0.05	-	0.05	-	0.07	-	0.04	0.04	-	0.05	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	4	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	14	3	-	-	-	1	-	-	-	-	4	3	2	-	1	-	4	
Colour	TCU	-	-	-	-	2	98	83	82	118	52	62	62	96	182	124	129	67	130	166	116	49	97	78	214	
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	2.8	8.5	8.5	-	8.1	9.7	5	6	5.8	-	7.5	6.7	6.9	-	-	-	-	
Electrical Conductivity	uS/cm	-	-	-	-	1	420	540	64	87	93	59	52	38	58	57	49	61	52	47	59	122	38	34	35	
pH	pH units	6.5 - 8.5	-	6 - 9	-		7.6	7.93	6.5	6.48	5.82	5.77	5.51	5.88	6.11	6.18	5.58	5.85	6.53	6.27	6.29	5.48	5.84	5.88	6.62	
Phenols	mg/L	0.001	-	0.04	0.004	0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids	mg/L	-	-	-	-	10	250	270	42	57	-	38	34	25	38	37	32	40	34	31	38	79	25	22	23	
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	180	190	30	26	30	21	12	9.6	17	21	14	21	17	23	26	46	12	9.6	14	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.77	0.91	2.1	1.1	0.84	0.22	0.82	0.86	0.96	2.12	0.94	0.66	1.01	0.87	1.95	1.05	0.46	0.65	1.7	
Total Phosphorus	mg/L	0.03	-	-	-	0.02	0.026	0.025	0.1	0.04	0.03	0.02	0.28	0.07	0.07	0.19	0.07	0.03	0.05	0.02	0.26	-	0.03	0.02	0.18	
Total Suspended Solids	mg/L	-	-	-	-	10	12	18	36	10	21	3	44	11	17	12	5	5	13	16	21	5	-	4	13	
Turbidity	NTU	-	-	-	-	0.1	0.8	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	<0.00061	<0.00061	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals																										
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (diss, PWO0)	mg/L	-	Calculated	-	-	0.004	<0.005	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.014	0.024	0.03	0.14	0.12	0.2	0.83	0.19	0.25	0.11	0.26	0.08	0.48	0.12	0.2	0.19	0.27	0.22	0.38	
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.001	<0.001	<0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	0.19	0.22	-	-	0.001	0.0001	0.0005	-	-	-	-	-	-	-	-	-	0.0002	-	-	
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	<0.00009	<0.00009	<0.0001	<0.0001	0.001	0.0001	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	
Chromium (tot)	mg/L	-	-	0.064	-	0.003	<0.005	<0.005	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0004	<0.001	0.0002	0.001	<0.001	0.002	0.002	
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	<0.0005	<0.0005	0.0007	0.0006	0.0013	0.0004	0.0019	0.0003	0.016	0.002	0.0016	0.0012	0.0004	0.0013	0.0002	0.001	<0.0002	0.0003	0.0024	
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	<0.0009	<0.0009	0.004	<0.001	0.001	0.002	0.003	0.001	0.018	<0.001	0.002	<0.001	0.001	<0.001	0.002	0.001	0.001	0.002	0.002	
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.74	0.39	1.59	2.01	0.52	0.26	3.01	0.39	2.45	2.09	1.19	1.31	0.66	1.97	2.97	0.63	0.34	0.45	2.12	
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.008	<0.001	<0.01	<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	0.64	0.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (tot)	mg/L	0.025	-	-	-	0.001	<0.001	0.0014	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Selenium (tot)	mg/L	0.1	-	-	-	0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	<0.001	<0.001	<0.001	<0.001	0.002	0.001	<0.001	<0.001	<0.001	<0.001	
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.00009	<0.00009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	<0.005	<0.005	<0.001	<0.01	0.02	0.01	0.04	0.01	0.17	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.03	<0.01	<0.01	0.01

-LEGEND-

Detection Limit DL: May vary between sample locations and events

DL exceeds criteria

Concentration exceeds PWO0-GENERAL Provincial Water Quality Objectives General

Concentration exceeds PWO0-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

Appendix F-2: Historic Surface Water Chemistry					Location		MCG-D	MCG-D	MCG-D	MCG-D	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	
Parameter	Units	PWOO-GENERAL	PWOO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-D	MCG-D	MCG-D	MCG-D	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E		
						Sample Date	2022-Oct-18	2023-May-03	2023-Aug-09	2023-Oct-19	2008-May-07	2008-Jun-19	2008-Aug-21	2008-Sep-16	2008-Oct-09	2009-Jun-03	2009-Oct-22	2010-May-17	2010-Oct-18	2011-May-18	2011-Nov-03	2012-Apr-17	2012-Jul-11	2012-Oct-17	2013-Apr-18
Anions																									
Chloride	mg/L	-	-	180	128	0.1	1.99	0.67	<20	1	32	5	61	40	59	31	25	39	29	31	48	28	78	59	23.6
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	<0.05	<0.05	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.141
Nitrite as N	mg/L	-	-	-	-	0.01	<0.05	<0.05	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	-	-	100	-	0.1	20.8	4.73	<20	9.3	7	5	6	6	7	6	6	7	6	6	10	8	9	19	5.53
Cations																									
Calcium (tot)	mg/L	-	-	-	-	0.05	5.89	1.98	8	6.1	7	10	15	8	11	7	7	8	7	7	11	7.36	9.43	8.59	4.53
Magnesium (tot)	mg/L	-	-	-	-	0.05	2.01	0.68	2.1	1.7	1	2	2	1	2	1	1	1	1	1	2	1.46	2.55	2.95	0.78
Potassium (tot)	mg/L	-	-	-	-	0.05	0.67	<0.5	1.2	0.89	-	-	1	-	1	-	-	-	-	-	2	0.814	1.27	1.74	0.79
Sodium (tot)	mg/L	-	-	-	-	0.05	3.3	1.35	2.3	3.2	20	25	36	25	32	22	16	24	18	18	26	17.1	33.4	33.3	13.5
Field Parameters																									
pH (Field)	pH units	-	-	-	-	-	-	-	5.6	5.93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	deg. C	-	-	-	-	-	-	-	16.8	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																									
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	<5	<5	30	16	13	23	28	14	25	22	23	17	22	21	26	15	24	20	6.63
Ammonia as N	mg/L	-	-	-	-	0.02	0.05	<0.02	0.072	<0.05	0.03	0.06	-	0.15	0.05	-	-	-	-	0.09	-	0.04	-	0.02	0.148
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	3	<2	12	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	-	-	-	2	-	-	-	-	1	-	4	-	2	-	-	-	-
Colour	TCU	-	-	-	-	2	34.8	102	150	96	34	337	40	61	35	43	44	32	40	32	32	22	20	19	39
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.3	14.19	-	-	-
Electrical Conductivity	us/cm	-	-	-	-	1	72	32	66	67	155	194	278	188	265	159	146	193	158	153	227	149	281	295	107
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	6.13	6.26	6.58	7.02	7	7.28	7.36	7.18	7.41	6.27	7.42	7.25	7.31	6.06	6.29	7.1	7.3	7.3	6.81
Phenols	mg/L	0.001	-	0.04	0.004	0.001	0.002	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	-	-	-	10	74	68	70	115	101	126	181	122	172	103	95	125	103	99	148	170	157	154	64
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	23	7.7	29	24	22	33	46	24	36	22	24	22	22	22	36	4.9	34.1	33.6	14.5
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.78	0.38	1.1	0.97	0.32	0.26	0.47	0.59	0.24	0.18	0.19	-	0.15	0.56	-	0.2	0.1	0.3	0.119
Total Phosphorus	mg/L	0.03	-	-	-	0.02	<0.02	0.03	0.2	0.097	0.03	-	-	0.02	-	-	-	-	0.01	-	-	-	-	-	0.025
Total Suspended Solids	mg/L	-	-	-	-	10	26	<10	47	40	-	-	-	5	40	-	-	-	2	-	-	-	16	-	-
Turbidity	NTU	-	-	-	-	0.1	24.5	0.6	5.1	1.6	0.6	1.3	1.4	2.7	-	1	1.1	0.8	0.8	1.3	1.2	1.3	1.2	0.6	0.8
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	0.000005	<0.000002	<0.00061	<0.00061	-	-	-	-	-	-	-	-	-	0.0000229	-	0.0000442	0.000162	0.0000108	0.00145
Metals																									
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	0.073	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	0.0544
Aluminum (diss, PWOO)	mg/L	-	Calculated	-	-	0.004	-	0.187	0.098	0.098	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.517	-	0.2	0.26	0.04	0.05	0.01	0.07	0.03	0.06	0.05	0.05	0.04	0.04	0.03	0.049	0.016	0.022	-
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	<0.003	<0.003	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	<0.01	0.014	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	0.026	0.02	-
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	0.0001	<0.0001	<0.00009	<0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (tot)	mg/L	-	-	0.064	-	0.003	<0.003	<0.003	<0.005	<0.005	0.001	0.001	<0.003	<0.005	<0.005	-	-	-	-	-	-	-	-	-	-
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	0.0018	<0.0005	0.0028	0.0015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	0.002	0.001	<0.0009	0.0013	-	-	-	-	-	-	-	-	-	-	-	-	0.0007	-	-
Iron (tot)	mg/L	0.3	-	1	-	0.01	2.31	0.271	4.1	1.7	0.25	0.84	0.45	0.54	0.37	0.34	0.35	0.34	0.31	0.26	0.25	-	0.313	0.163	0.108
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	0.003	<0.001	0.00074	0.00081	-	-	-	-	-	-	-	-	-	-	-	-	0.0001	-	-
Manganese (tot)	mg/L	-	-	-	-	0.002	0.464	0.014	1.2	0.47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (tot)	mg/L	0.025	-	-	-	0.001	<0.003	<0.003	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (tot)	mg/L	0.1	-	-	-	0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	0.002	-	-
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.0001	<0.0001	<0.00009	<0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	<0.02	<0.02	<0.005	0.0082	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0264

-LEGEND-

Detection Limit DL: May vary between sample locations and events

DL exceeds criteria

Concentration exceeds PWOO-GENERAL Provincial Water Quality Objectives General

Concentration exceeds PWOO-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

Appendix F-2: Historic Surface Water Chemistry					Location		MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E			
Parameter	Units	PWOO-GENERAL	PWOO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E				
						Sample Date	2013-Aug-15	2013-Oct-30	2014-May-13	2014-Aug-19	2014-Oct-14	2015-May-04	2015-Sep-09	2015-Oct-26	2016-Apr-28	2016-Aug-17	2016-Oct-26	2017-May-10	2017-Jul-20	2017-Oct-23	2018-May-07	2018-Jul-30	2018-Oct-22	2019-May-07	2019-May-07		
Anions																											
Chloride	mg/L	-	-	180	128	Detection Limit	0.1	67.1	42.8	44.2	58.2	60.9	51.6	62.6	79.6	28.6	37.7	70	34.9	52	55.6	29.9	73	74.4	31	30.9	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate as N	mg/L	-	-	-	-	0.05	0.15	0.08	0.06	0.08	0.06	0.08	0.09	-	-	0.14	0.06	0.05	0.11	0.06	0.07	0.12	-	-	<0.05	<0.05	
Nitrite as N	mg/L	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
Sulphate	mg/L	-	-	100	-	0.1	8.81	7.01	6.94	5.85	5.77	7.16	7.65	9.6	5.85	7.44	10.4	5.78	4.6	5.83	4.62	7.6	8.1	5.17	5.07		
Cations																											
Calcium (tot)	mg/L	-	-	-	-	0.05	13.1	8.73	7.79	11.8	10.2	8.85	13.3	13	5.27	6.13	13.5	5.49	9.09	10.3	4.88	13	12.7	5.45	5.41		
Magnesium (tot)	mg/L	-	-	-	-	0.05	2.46	1.65	1.39	2.11	1.89	1.52	2.38	2.45	0.92	1.22	2.68	0.95	1.61	1.94	0.86	2.25	2.3	0.89	0.89		
Potassium (tot)	mg/L	-	-	-	-	0.05	1.3	1.44	0.99	1.11	1.44	1.1	1.83	1.64	0.64	1.03	1.42	0.76	0.81	1.25	0.66	1.2	1.25	0.65	0.66		
Sodium (tot)	mg/L	-	-	-	-	0.05	32.3	25.1	24	32.1	34.4	29.3	40.2	37.8	16.9	24.8	35.1	21.5	29.9	33.3	17.9	39.5	40.8	18.3	18.3		
Field Parameters																											
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
General Chemistry																											
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	24	17	12	25	17	13	24	24	9	12	25	11	28	26	11	24	21	12	12		
Ammonia as N	mg/L	-	-	-	-	0.02	0.07	0.02	-	0.1	0.14	-	-	-	0.06	-	-	-	-	0.16	0.06	-	-	-	<0.02	<0.02	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<5	<5	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Colour	TCU	-	-	-	-	2	27	43	37	42	46	33	52	30	32	75	26	44	84	46	39	10	10	15	14		
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	12.42	-	11.18	7.85	-	-	13.15	9.55	11.52	14	8.74	10.29	11.36	7.47	13.71	-	-		
Electrical Conductivity	uS/cm	-	-	-	-	1	317	200	197	271	283	222	273	304	136	180	310	174	231	221	133	324	333	144	145		
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	6.69	7	7.15	7.49	7.24	7.22	7.55	6.95	6.31	7.22	7.43	7.35	7	7.18	6.25	7.12	6.84	6.56	6.63		
Phenols	mg/L	0.001	-	0.04	0.004	0.001	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	
Total Dissolved Solids	mg/L	-	-	-	-	10	178	108	118	140	144	120	152	168	78	112	162	86	112	132	70	170	178	86	72		
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	42.8	28.6	25.2	38.2	33.3	28.4	43	42.6	16.9	20.3	44.7	17.6	29.3	33.7	15.7	41.6	41.2	17.3	17.2		
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.21	0.42	1.45	0.33	0.46	0.29	0.27	0.21	0.25	0.56	0.14	0.25	0.32	0.3	0.47	0.25	-	-	<0.1	<0.1	
Total Phosphorus	mg/L	0.03	-	-	-	0.02	-	-	-	-	0.04	-	-	0.01	0.01	0.03	-	0.01	0.03	0.02	0.05	-	-	-	<0.02	<0.02	
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-	<10	<10	
Turbidity	NTU	-	-	-	-	0.1	1	0.9	2.3	-	1.1	3.4	1.8	0.6	1.4	4.3	-	0.8	2.1	1.5	1.2	3.5	4.9	1.3	1.4		
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	0.000263	0.0000433	0.000082	0.000998	0.0000493	0.000003	0.00009	0.00004	0.000007	0.000057	0.00003	0.0000119	0.000251	0.0006	0.0000276	0.0001083	0.0000203	-	-		
Metals																											
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	0.025	0.065	0.041	0.021	0.022	0.034	0.018	0.014	0.06	0.081	0.01	0.07	0.036	0.018	0.065	0.016	0.014	0.052	0.053		
Aluminum (diss, PWOO)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Aluminum (tot)	mg/L	-	-	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	-	-	-	-	-	-	-	-	-	0.013	-	-	-	-	-	-	-	-	-		
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Chromium (tot)	mg/L	-	-	0.064	-	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.003	<0.003	
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.002	
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.22	0.27	0.22	0.52	0.28	0.18	0.3	0.01	0.11	0.42	0.08	0.1	0.69	0.27	0.15	0.42	0.12	0.1	0.12		
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	
Manganese (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Nickel (tot)	mg/L	0.025	-	-	-	0.001	-	-	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.003	<0.003	
Selenium (tot)	mg/L	0.1	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.004	<0.004	
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	-	0.064	-	-	-	-	-	-	0.007	-	-	-	0.005	-	-	-	-	-	<0.005	<0.005	

-LEGEND-

Detection Limit DL: May vary between sample locations and events

DL exceeds criteria

Concentration exceeds PWOO-GENERAL Provincial Water Quality Objectives General

Concentration exceeds PWOO-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

Appendix F-2: Historic Surface Water Chemistry					Location		MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-E	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F		
Parameter	Units	PWO0-GENERAL	PWO0-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-E	QAQC-SW1 (MC	MCG-E	QAQC-1 (MCG	MCG-E	QAQC-SW1 (MC	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F		
						Sample Date	2023-May-03	2023-May-03	2023-Aug-09	2023-Aug-09	2023-Oct-19	2023-Oct-19	2008-May-07	2008-Jun-19	2008-Aug-21	2008-Sep-16	2008-Oct-09	2009-Jun-03	2009-Oct-22	2010-May-17	2010-Oct-18	2011-May-18	2011-Nov-03	2012-Apr-17	2012-Jul-11	
Anions																										
Chloride	mg/L	-	-	180	128	Detection Limit	0.1	20.4	20.5	53	54	62	56	48	54	59	58	57	49	36	40	21	22	28	46	90
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	0.17	0.17	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	0.05	<0.05	0.17	0.17	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	0.2	0.1	
Nitrite as N	mg/L	-	-	-	-	0.01	<0.05	<0.05	<0.01	<0.01	<0.01	0.013	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	mg/L	-	-	100	-	0.1	3.77	3.67	6.1	6.2	9	8.5	7	4	3	3	3	5	3	5	4	5	4	6	3	
Cations																										
Calcium (tot)	mg/L	-	-	-	-	0.05	3.21	4.46	12	12	13	12	5	6	9	6	6	5	5	5	5	3	4	5	7.94	5.51
Magnesium (tot)	mg/L	-	-	-	-	0.05	0.73	0.73	2.1	2.1	2.4	2.3	-	1	1	1	1	1	1	1	-	-	-	-	1.26	1.5
Potassium (tot)	mg/L	-	-	-	-	0.05	0.71	0.67	1.1	1.1	1.5	1.4	1	1	1	-	-	1	1	1	1	1	2	1.7	1.78	
Sodium (tot)	mg/L	-	-	-	-	0.05	15.3	13.1	36	36	41	41	31	35	38	36	35	34	23	25	13	13	17	27.5	36.9	
Field Parameters																										
pH (Field)	pH units	-	-	-	-	-	-	-	6.55	6.55	6.97	6.97	-	-	-	-	-	-	-	-	-	-	-	-	-	
Temperature	deg. C	-	-	-	-	-	-	-	15	15	6.7	6.7	-	-	-	-	-	-	-	-	-	-	-	-	-	
General Chemistry																										
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	11	10	30	30	27	26	11	13	15	12	15	9	22	9	11	10	12	9	12	
Ammonia as N	mg/L	-	-	-	-	0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	-	0.05	0.05	-	-	-	-	-	-	0.02	-	0.03	-	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<2	<2	<2	<2	<2	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	-	-	-	-	-	2	-	-	-	-	-	-	3	-	2	-	-	
Colour	TCU	-	-	-	-	2	47.9	49.4	46	47	25	24	35	71	47	35	42	39	50	27	44	25	37	18	31	
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.34	11.64	-	
Electrical Conductivity	us/cm	-	-	-	-	1	105	105	270	260	290	290	205	232	244	240	233	210	175	179	106	100	129	198	275	
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	6.84	6.84	7.33	7.42	7.55	7.47	6.84	6.94	7.09	7.07	7.06	6.2	7.37	7.06	7.02	5.84	6.15	6.7	6.8	
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	-	-	-	-	-	
Total Dissolved Solids	mg/L	-	-	-	-	10	88	86	140	130	195	160	133	151	159	156	151	137	114	116	69	65	84	132	135	
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	11	14.1	40	39	40	42	13	19	27	19	19	17	17	13	7	10	12	25	19.9	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.2	0.21	0.29	0.23	0.27	0.26	0.35	0.18	0.54	0.33	0.36	0.15	0.53	-	0.17	0.47	-	0.2	0.4	
Total Phosphorus	mg/L	0.03	-	-	-	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.02	-	0.02	-	0.01	-	0.01	0.01	-	-	-	0.02	
Total Suspended Solids	mg/L	-	-	-	-	10	<10	<10	<10	<10	<10	<10	<10	3	3	2	2	-	-	4	-	-	-	5	14	
Turbidity	NTU	-	-	-	-	0.1	1.4	1.3	2.6	2.7	0.9	0.9	0.8	2.2	2.2	1.1	-	0.5	1.1	1.6	0.8	1.1	0.8	1.3	1.9	
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	<0.000002	<0.000002	<0.00061	<0.00061	<0.00061	<0.00061	-	-	-	-	-	-	-	-	-	0.0000003	-	0.0000107	0.0000867	
Metals																										
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.031	-	
Aluminum (diss, PWO0)	mg/L	-	Calculated	-	-	0.004	0.08	0.079	0.036	0.039	0.014	0.013	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (tot)	mg/L	-	-	-	-	0.004	-	-	0.092	0.087	0.025	0.023	0.06	0.08	0.04	0.03	0.04	0.06	0.06	0.07	0.05	0.04	0.05	0.036	0.044	
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	<0.003	<0.003	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	<0.01	0.012	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	0.01	0.011	
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009	<0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium (tot)	mg/L	-	-	0.064	-	0.003	<0.003	<0.003	<0.005	<0.005	<0.005	<0.005	0.001	0.001	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	0.001	0.0003	-	-	-	-	-	-	-	-	-	-	
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	<0.001	0.001	<0.0009	<0.0009	<0.0009	<0.0009	-	-	-	-	-	-	-	-	-	-	-	-	0.0006	
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.25	0.243	1.1	1.1	0.25	0.24	0.18	1.4	0.64	0.31	0.5	0.27	0.29	0.6	0.4	0.28	0.23	0.341	0.761	
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	0.002	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	0.0002	
Manganese (tot)	mg/L	-	-	-	-	0.002	0.015	0.01	0.036	0.035	0.0069	0.0067	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (tot)	mg/L	0.025	-	-	-	0.001	<0.003	<0.003	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium (tot)	mg/L	0.1	-	-	-	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.0001	<0.0001	<0.00009	<0.00009	<0.00009	<0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	<0.02	<0.02	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-	0.01	-	-	-	

-LEGEND-
 Detection Limit DL: May vary between sample locations and events
 DL exceeds criteria
 Concentration exceeds P

Appendix F-2: Historic Surface Water Chemistry																									
Parameter	Units	PWO0-GENERAL	PWO0-INTERIM	MECP-GD-TA	MECP-GD-TB	Location		MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F		
						Sample ID	Sample Date	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F	MCG-F
Anions						Detection Limit																			
Chloride	mg/L	-	-	180	128	0.1	63	30.4	64.9	58.8	70.9	62.8	72.3	84.4	95.4	119	41.2	57.4	66.8	52.4	58.5	64.1	-	-	
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate as N	mg/L	-	-	-	-	0.05	-	0.154	0.06	-	0.05	-	-	0.08	-	-	-	-	-	0.09	-	-	37.5	62.3	
Nitrite as N	mg/L	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	71.7	
Sulphate	mg/L	-	-	100	-	0.1	6	4.66	4.92	4.18	5.98	2.52	2.96	6.12	5.63	5.38	4.99	3.42	4.8	5.95	2.46	2.74	-	-	
Cations																									
Calcium (tot)	mg/L	-	-	-	-	0.05	4.55	3.55	6.75	5.89	6.18	7.29	6.19	7.91	9.65	9.08	3.85	4.69	6.35	4.51	6.42	7.3	3.59	8.04	7.4
Magnesium (tot)	mg/L	-	-	-	-	0.05	1.67	0.66	1.27	1.28	1.24	1.44	1.36	1.49	1.92	1.86	0.73	1.07	1.34	0.88	1.26	1.39	0.67	1.45	1.43
Potassium (tot)	mg/L	-	-	-	-	0.05	2.5	1.53	1.86	2.81	2.27	2.18	2.48	2.97	3.47	3.13	1.35	1.37	1.7	1.72	1.32	1.76	1.09	1.37	1.35
Sodium (tot)	mg/L	-	-	-	-	0.05	36.1	17.2	34.3	35.3	39.6	37	41.3	47.5	60.9	58.2	24.7	36.7	35.5	33.6	36.6	40	23.1	37.1	40
Field Parameters																									
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																									
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	6	6.86	14	10	8	22	11	8	13	10	8	11	12	12	29	23	9	22	10
Ammonia as N	mg/L	-	-	-	-	0.02	0.02	-	-	0.02	0.02	0.23	0.19	-	-	-	-	-	-	-	-	0.23	0.04	-	-
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	TCU	-	-	-	-	2	16	33	39	49	28	72	41	29	54	19	32	41	32	51	94	51	36	9	9
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	-	-	9.27	-	8.83	6.32	-	-	10.85	7.76	10.06	12.08	7.23	8.31	10.78	7.47	10.58
Electrical Conductivity	uS/cm	-	-	-	-	1	255	126	277	238	281	279	307	326	364	395	171	233	269	241	245	235	152	270	292
pH	pH units	6.5 - 8.5	-	6 - 9	-	6.6	6.76	6.39	6.72	6.88	7.19	6.91	6.89	7.26	6.69	6.31	7.2	7.13	7.35	7.04	7.16	6.22	7.27	6.94	
Phenols	mg/L	0.001	-	0.04	0.004	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	-	-	-	10	131	62	150	138	156	144	152	170	180	206	86	124	112	112	114	138	82	130	156
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	18.3	11.6	22.1	20	20.5	24.1	21.1	25.9	32	30.3	12.6	16.1	21.4	14.9	21.2	24	11.7	26	24.4
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.3	0.179	0.27	0.52	1.39	0.72	0.58	0.39	0.43	0.32	0.26	0.46	0.26	0.34	0.41	0.39	0.68	0.42	0.14
Total Phosphorus	mg/L	0.03	-	-	-	0.02	-	0.025	-	-	-	0.02	0.04	-	-	-	0.01	0.02	-	0.01	0.03	0.03	0.02	0.03	-
Total Suspended Solids	mg/L	-	-	-	-	10	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	-	-	-	-	0.1	1.3	0.9	4	0.9	2.4	-	1.7	1.3	433	0.8	1.8	1.8	0.9	0.7	2.4	1.5	1	5.1	3
Un-ionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	0.0000072	-	-	0.0000605	0.0000139	0.00009875	0.0000673	0.00003	0.00007	0.00003	0.000001	0.000023	0.000001	0.0000098	0.000128	0.000036	0.0000967	0.00010766	0.0000088
Metals																									
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	-	0.0597	0.086	0.056	0.042	0.044	0.042	0.029	0.031	0.012	0.055	0.028	0.022	0.07	0.034	0.021	0.056	0.032	0.018
Aluminum (diss, PWO0)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.01	3.16	4.04
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	0.015	-	-	-	-	-	-	-	-	0.018	-	-	-	-	-	-	-	-	-
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (tot)	mg/L	-	-	0.064	-	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	-	-	-	-	-	0.0017	0.0009	-	-	-	-	-	-	-	-	-	-	-	-
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	0.0006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.712	0.09	0.59	0.2	0.34	3.23	1.08	0.3	0.87	0.21	0.09	0.23	0.39	0.1	0.99	0.41	0.16	1.33	0.41
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (tot)	mg/L	0.025	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (tot)	mg/L	0.1	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	-	0.0096	-	0.024	-	-	-	-	-	-	-	-	-	-	-	0.011	-	0.006	-

-LEGEND-

Detection Limit DL: May vary between sample locations and events

DL exceeds criteria

Concentration exceeds PWO0-GENERAL Provincial Water Quality Objectives General

Concentration exceeds PWO0-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

Appendix F-2: Historic Surface Water Chemistry																									
Parameter	Units	PWO0-GENERAL	PWO0-INTERIM	MECP-GD-TA	MECP-GD-TB	Location																			
						Sample ID	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G
						Sample Date	2008-Jun-19	2008-Aug-21	2008-Sep-16	2008-Oct-09	2009-Jun-03	2009-Oct-22	2010-May-17	2010-Oct-18	2011-May-18	2011-Nov-03	2012-Apr-17	2012-Jul-11	2012-Oct-17	2013-Apr-18	2013-Aug-15	2013-Oct-30	2014-May-13	2014-Aug-19	2014-Oct-14
Anions																									
Chloride	mg/L	-	-	180	128	DL	5	-	1	-	2	1	1	2	3	-	-	-	-	0.325	0.39	0.4	0.32	0.31	0.43
Nitrate + Nitrite	mg/L	-	-	-	-	DL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	-	0.23	-	-	-	-	-	-	-	-	0.2	-	-	0.065	0.35	-	-	0.06	-
Nitrite as N	mg/L	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	-	-	100	-	0.1	5	-	1	1	4	2	3	4	5	6	8	2	12	4.27	3.13	3.9	4.45	3.35	2.16
Cations																									
Calcium (tot)	mg/L	-	-	-	-	0.05	16	9	6	5	4	3	4	4	4	6	4.92	3.93	4.56	2.7	5.77	5.2	3.85	6.23	5
Magnesium (tot)	mg/L	-	-	-	-	0.05	4	2	1	1	-	-	-	-	-	2	0.988	1.4	2.23	0.57	1.38	1.36	0.84	1.44	1.22
Potassium (tot)	mg/L	-	-	-	-	0.05	1	-	-	-	-	-	-	-	-	-	0.644	0.281	0.861	-	0.38	0.75	0.6	0.35	0.58
Sodium (tot)	mg/L	-	-	-	-	0.05	10	-	-	2	-	-	-	-	2	-	1.44	1.15	2.53	0.86	1.55	1.91	1.28	1.47	1.87
Field Parameters																									
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																									
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	33	24	21	17	14	13	14	16	17	25	7	19	19	-	17	16	9	18	14
Ammonia as N	mg/L	-	-	-	-	0.02	-	-	0.05	0.04	-	-	-	-	-	0.03	0.01	-	0.01	-	-	-	-	0.15	0.12
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	3	-	-	-	1	-	-	3	1	2	-	-	-	-	-	-	-	-	-
Colour	TCU	-	-	-	-	2	227	34	69	43	43	46	34	44	37	24	28	44	14	34	22	28	42	56	59
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	-	-	-	-	-	-	11.4	10.77	-	-	-	-	-	-	9.91	-	9.36
Electrical Conductivity	us/cm	-	-	-	-	1	160	51	42	41	33	36	36	38	38	55	42	51	67	24	57	45	36	52	48
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	6.73	7.31	7.3	7.27	6.97	7.15	7.09	7.18	6	6.27	6.6	6.9	7.2	6.51	6.33	6.81	6.76	7.33	6.92
Phenols	mg/L	0.001	-	0.04	0.004	0.001	-	-	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	-	-	-	10	104	33	27	27	22	23	23	25	25	36	110	34	41	-	42	52	28	32	30
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	56	31	19	17	10	7	10	10	10	23	16.4	15.6	20.6	9.09	20.1	18.6	13.1	21.5	17.5
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	1.08	0.53	0.45	0.34	0.39	0.36	0.14	0.26	0.56	0.12	0.2	0.4	0.3	0.131	-	0.3	1.53	0.49	0.51
Total Phosphorus	mg/L	0.03	-	-	-	0.02	0.46	0.01	0.03	0.02	0.02	-	-	-	-	0.01	-	0.03	-	0.022	-	-	-	0.03	0.03
Total Suspended Solids	mg/L	-	-	-	-	10	349	3	2	-	4	-	-	-	-	-	5	10	-	-	-	-	-	-	-
Turbidity	NTU	-	-	-	-	0.1	1.3	1.7	3.1	-	1.7	1.1	0.9	1.1	1.3	0.8	1.1	1.2	0.5	0.9	1	0.9	1.6	1.5	1.3
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	-	-	-	-	-	-	-	-	-	0.0000141	0.0000029	0.000123	0.0000103	-	-	-	0.0000355	0.0000126	0.0000402
Metals																									
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	0.04	-	-	0.0527	0.025	0.031	0.043	0.032	0.025
Aluminum (diss, PWO0)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.33	0.02	0.04	0.03	0.07	0.05	0.05	0.04	0.03	0.02	0.044	0.029	0.013	-	-	-	-	-	-
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	0.03	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (tot)	mg/L	-	-	0.064	-	0.003	0.001	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	0.0021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	0.001	-	-	-	-	-	-	-	-	-	-	-	0.0005	-	-	-	0.004	-	-
Iron (tot)	mg/L	0.3	-	1	-	0.01	2.31	0.49	1.5	0.69	0.76	0.61	0.47	0.69	0.54	0.19	0.28	0.706	0.128	0.153	0.14	0.34	0.33	0.82	0.89
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (tot)	mg/L	0.025	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (tot)	mg/L	0.1	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	0.02	-	-	-	-	-	-	-	-	-	-	-	-	0.0062	-	0.059	-	-	-

-LEGEND-

Detection Limit DL: May vary between sample locations and events

DL exceeds criteria

Concentration exceeds PWO0-GENERAL Provincial Water Quality Objectives General

Concentration exceeds PWO0-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

Appendix F-2: Historic Surface Water Chemistry																										
Parameter	Units	PWO0-GENERAL	PWO0-INTERIM	MECP-GD-TA	MECP-GD-TB	Location																				
						Sample ID	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G
						Sample Date	2015-May-04	2015-Sep-09	2015-Oct-26	2016-Apr-28	2016-Aug-17	2016-Oct-26	2017-May-10	2017-Jul-20	2017-Oct-23	2018-May-07	2018-Jul-30	2018-Oct-22	2019-May-07	2019-Oct-24	2020-May-06	2020-Aug-25	2020-Oct-06	2021-Apr-20	2021-Jul-14	
Anions																										
Chloride	mg/L	-	-	180	128	Detection Limit	0.1	0.59	0.32	1.01	0.41	0.18	0.54	0.25	-	0.33	0.37	0.31	0.44	0.37	0.45	0.29	0.28	0.42	0.24	0.36
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	0.07	0.05	0.07	-	-	-	-	-	-	0.06	0.05	-	<0.05	<0.05	<0.05	0.14	<0.05	<0.05	<0.05	<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
Sulphate	mg/L	-	-	100	-	0.1	4.98	2.42	4.65	4.96	14.2	7.62	5.08	2.4	3.26	4.59	3.93	8.06	4.2	14.4	4.84	1.42	2.73	3.39	1.95	
Cations																										
Calcium (tot)	mg/L	-	-	-	-	0.05	3.83	6.81	5.98	3.16	7.33	6.97	3.44	4.27	4.97	2.94	6.73	5.61	3.11	7.11	3.69	8.55	5.3	3.95	5.09	
Magnesium (tot)	mg/L	-	-	-	-	0.05	0.88	1.68	1.57	0.73	1.65	1.74	0.75	0.95	1.23	0.68	1.67	1.4	0.62	1.8	0.67	1.99	1.12	0.97	1.09	
Potassium (tot)	mg/L	-	-	-	-	0.05	0.66	0.62	1.19	0.5	0.81	1.17	0.46	0.27	0.78	0.52	0.56	0.95	0.48	0.85	0.52	0.76	0.7	<0.58	<0.58	
Sodium (tot)	mg/L	-	-	-	-	0.05	1.31	1.96	2.67	1.16	1.94	2.34	1.09	1.36	2.01	1.01	2.14	2.1	1.02	2.19	1.21	2.01	1.69	1.41	1.35	
Field Parameters																										
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																										
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	10	23	25	6	17	25	8	18	18	8	21	13	8	15	12	30	18	8	14	
Ammonia as N	mg/L	-	-	-	-	0.02	-	-	0.07	-	-	-	-	-	-	0.07	-	-	<0.02	0.04	0.04	<0.02	<0.02	<0.02	<0.02	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	<5	<5	-	<2	<5	<2	<2	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-	
Colour	TCU	-	-	-	-	2	45	58	54	35	75	40	44	79	50	43	10	12	16	27	-	63	58	46	80	
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.4	-	-	-	-	
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	6.72	-	-	10.65	9.06	10.03	13.24	7.1	9.27	11.36	7.09	11.28	-	-	-	-	-	-	-	
Electrical Conductivity	us/cm	-	-	-	-	1	36	54	58	32	72	67	36	39	43	30	59	59	28	107	42	58	43	33	36	
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	7.06	7.58	7.31	6.18	7.36	7.45	7.02	6.81	7.08	6.14	7.3	6.93	6.41	7.38	7.9	6.57	6.61	6.78	6.85	
Phenols	mg/L	0.001	-	0.04	0.004	0.001	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	0.003	0.001	0.002	<0.001	<0.001	<0.001	
Total Dissolved Solids	mg/L	-	-	-	-	10	30	42	52	40	68	32	34	32	36	26	40	50	26	66	28	52	34	64	46	
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	13.2	23.9	21.4	10.9	25.1	24.6	11.7	14.6	17.5	10.1	23.7	19.8	10.3	25.2	12	29.5	17.8	13.9	17.2	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.42	0.42	0.47	0.26	0.69	0.26	0.28	0.36	0.29	0.39	0.42	0.26	<0.1	0.34	0.52	0.57	0.48	0.41	0.33	
Total Phosphorus	mg/L	0.03	-	-	-	0.02	-	-	0.02	0.01	0.04	-	0.01	0.03	0.02	0.03	0.02	-	0.05	<0.02	<0.02	0.02	0.09	<0.02	0.03	
Total Suspended Solids	mg/L	-	-	-	-	10	47	-	-	-	-	-	-	-	-	10	-	-	<10	<10	<10	<10	<10	<10	<10	
Turbidity	NTU	-	-	-	-	0.1	1.7	-	4	1.5	3.8	1.2	0.8	2.3	1.3	1.4	2.7	2.9	1.5	1.4	1.3	5.4	3.2	1.4	4.6	
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	0.0001	0.00007	0.0001	0.000003	0.000065	0.00003	0.000004	0.000148	0.000014	0.00001	0.000055	0.000004	-	-	-	-	-	-	-	
Metals																										
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	0.041	0.019	0.038	0.058	0.055	0.022	0.077	0.028	0.021	0.059	0.014	0.019	0.06	0.02	0.084	0.029	0.035	0.038	0.041	
Aluminum (diss, PWO0)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (tot)	mg/L	-	-	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.179	0.085	0.108	0.072	0.134	
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.011	-	-	-	-	
Beryllium (tot)	mg/L	Calculated	-	-	-	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	
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	0.0005	<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	
Cobalt (tot)	mg/L	-	0.0009	-	-	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	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.32	0.84	1.3	0.19	1.14	0.84	0.19	0.75	0.41	0.2	0.54	0.19	0.15	0.29	0.313	0.854	0.653	0.356	1.65	
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.026	-	-	-	-	
Mercury (diss)	mg/L	0.0002	-	-	-	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	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	-	-	-	-	
Nickel (tot)	mg/L	0.025	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	
Selenium (tot)	mg/L	0.1	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.62	-	-	-	-	
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.032	-	-	-	-	
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0003	-	-	-	-	
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.005	-	-	-	-	
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	-	-	-	-	
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005	-	-	-	-	0.006	-	0.006	0.007	0.008	-	-	-	<0.005	<0.00						

Appendix F-2: Historic Surface Water Chemistry					Location		MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	
Parameter	Units	PWOO-GENERAL	PWOO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-G	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H		
						Sample Date	2021-Oct-18	2022-May-03	2022-Aug-04	2022-Oct-18	2023-May-03	2023-Aug-09	2023-Oct-19	2014-May-13	2014-Aug-19	2014-Oct-14	2015-May-04	2015-Sep-09	2015-Oct-26	2016-Apr-28	2016-Aug-17	2016-Oct-26	2017-May-10	2017-Jul-20	2017-Oct-23
Anions																									
Chloride	mg/L	-	-	180	128	0.1	0.4	0.28	0.25	0.45	0.32	<1	<1	6.14	7.5	8.9	6.32	11.2	13.1	6.61	13.1	13.5	4.31	6.24	63.5
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	0.38	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate as N	mg/L	-	-	-	-	0.05	<0.05	<0.05	0.23	<0.05	<0.05	0.38	0.11	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite as N	mg/L	-	-	-	-	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	-	-	100	-	0.1	1.67	4.02	0.93	2	2.92	1.5	1.3	6.9	4.81	5.47	7.13	5.7	10.9	5.68	14.2	12.6	5.24	2.29	2.7
Cations																									
Calcium (tot)	mg/L	-	-	-	-	0.05	5.32	3.34	7.48	4.21	2.82	7.6	5.1	5.27	10.5	7.73	5.18	10.7	9.8	4.12	8.69	11.3	3.91	7.18	7.17
Magnesium (tot)	mg/L	-	-	-	-	0.05	1.15	0.8	1.61	1.24	0.64	1.6	1.2	1.08	2.51	1.82	1.08	2.49	2.49	0.86	2.4	3.24	0.83	1.49	1.38
Potassium (tot)	mg/L	-	-	-	-	0.05	0.88	<1.15	0.58	0.75	0.53	0.74	0.64	0.87	1.36	1.24	0.83	1.78	1.91	0.63	1.74	2.08	0.66	0.74	1.76
Sodium (tot)	mg/L	-	-	-	-	0.05	1.58	1.57	1.94	1.86	0.62	1.4	1.5	4.38	6.33	6.45	4.5	8.71	7.61	4.13	10.1	7.5	3.7	5.13	39.5
Field Parameters																									
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	6.64	6.7	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	16.2	8.2	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																									
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	17	5	23	15	7	25	16	11	36	16	10	29	25	7	23	30	9	31	23
Ammonia as N	mg/L	-	-	-	-	0.02	0.11	<0.02	<0.02	0.03	<0.02	<0.05	<0.05	-	0.09	0.19	-	-	-	0.25	-	0.06	-	-	-
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	<2	<2	<2	<2	<2	<2	<2	-	-	-	-	-	-	-	-	-	-	-	-
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour	TCU	-	-	-	-	2	63	34.3	87.4	38.5	50.1	63	39	29	73	60	36	101	68	23	112	65	38	65	50
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	-	-	-	-	-	-	-	9.72	-	11.1	6.75	-	-	10.96	6.74	4.84	10.19	4.72	3.82
Electrical Conductivity	us/cm	-	-	-	-	1	43	31	54	42	27	56	42	68	115	100	64	110	114	58	129	137	54	82	235
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	6.82	6.27	7.03	7.03	6.66	7.34	7.32	6.78	7.25	6.72	6.95	7.45	7.05	6.2	7.32	7.27	7.23	7.12	7.19
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	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	-	-	-	10	52	56	54	42	50	55	60	48	74	66	50	90	82	38	110	96	44	46	78
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	18	11.6	25.3	15.6	9.7	27	18	17.6	36.6	26.8	17.4	37	34.7	13.8	31.6	41.6	13.2	24.1	23.6
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.36	0.27	0.73	0.51	0.28	0.38	0.43	1.39	0.38	0.46	0.28	0.56	0.29	0.45	0.58	0.43	0.22	0.28	0.35
Total Phosphorus	mg/L	0.03	-	-	-	0.02	<0.02	<0.02	0.08	0.04	<0.02	0.036	0.021	-	0.03	0.04	-	0.02	0.03	0.01	0.02	0.03	-	0.04	0.05
Total Suspended Solids	mg/L	-	-	-	-	10	<10	<10	<10	<10	<10	13	<10	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	-	-	-	-	0.1	2.2	0.7	7.7	2.1	5.9	7.9	3.1	0.7	1.9	3.4	1.4	32.8	2.3	-	1.7	5	-	1.9	2.9
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	-	-	<0.000002	0.000009	<0.000002	<0.00061	<0.00061	0.00004	0.00049	0.00006	0.00007	0.00006	0.00001	0.000001	0.000005	0.00001	0.0000022	0.00004	0.00001
Metals																									
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	0.032	0.043	0.035	0.021	-	-	-	0.065	0.063	0.061	0.072	0.077	0.071	0.066	0.146	0.088	0.077	0.063	0.08
Aluminum (diss, PWOO)	mg/L	-	Calculated	-	-	0.004	-	-	-	0.073	0.048	0.033	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum (tot)	mg/L	-	-	-	-	0.004	0.083	-	0.158	0.086	-	0.23	0.065	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (tot)	mg/L	-	0.005	-	-	0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (tot)	mg/L	Calculated	-	-	-	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	-	-	-	-	-	-	-	0.032	0.011	-	-	-
Cadmium (tot)	mg/L	-	Calculated	0.00021	0.000017	0.00009	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.00009	<0.00009	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (tot)	mg/L	-	-	0.064	-	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.005	<0.005	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	<0.0005	<0.0005	0.0009	<0.0005	0.0005	0.00088	<0.0005	-	-	-	-	-	-	-	0.0005	0.0005	-	-	-
Copper (tot)	mg/L	-	Calculated	0.0069	-	0.0009	<0.002	<0.002	<0.002	<0.002	<0.001	<0.0009	<0.0009	-	-	-	-	-	-	-	-	-	-	-	-
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.978	0.248	2.54	0.885	0.755	2.5	0.92	0.17	0.44	0.55	0.17	0.62	0.72	0.05	0.51	1.46	0.06	0.46	0.59
Lead (tot)	mg/L	-	Calculated	0.002	-	0.0005	<0.001	<0.001	<0.001	<0.001	0.001	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (tot)	mg/L	-	-	-	-	0.002	0.04	0.016	0.244	0.075	0.06	0.33	0.051	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (diss)	mg/L	0.0002	-	-	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (tot)	mg/L	0.0002	-	-	-	0.0001	-	-	-	-	-	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (tot)	mg/L	-	0.04	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel (tot)	mg/L	0.025	-	-	-	0.001	<0.003	<0.003	<0.003	<0.003	0.004	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (tot)	mg/L	0.1	-	-	-	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver (tot)	mg/L	0.0001	-	-	-	0.00009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00009	<0.00009	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (tot)	mg/L	-	0.02	0.089	0.03	0.005</																			

Appendix F-2: Historic Surface Water Chemistry					Location		MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H		
Parameter	Units	PWOO-GENERAL	PWOO-INTERIM	MECP-GD-TA	MECP-GD-TB	Sample ID	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H	MCG-H		
						Sample Date	2018-May-07	2018-Jul-30	2018-Oct-22	2019-May-07	2019-Aug-14	2019-Oct-24	2020-May-06	2020-Aug-25	2020-Oct-06	2021-Apr-20	2021-Oct-18	2022-May-03	2022-Aug-04	2022-Oct-18	2023-May-03	2023-Aug-09	2023-Oct-19	
Anions																								
Chloride	mg/L	-	-	180	128	Detection Limit	0.1	6.63	10.4	14.3	5.15	6.94	14.4	5.49	10.9	11.8	7.44	4.7	9.79	5.68	19.4	2.75	10	16
Nitrate + Nitrite	mg/L	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1
Nitrate as N	mg/L	-	-	-	-	0.05	-	-	0.06	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<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	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01
Sulphate	mg/L	-	-	100	-	0.1	4.1	6.83	7.61	4.39	3.33	17.9	4.21	2.6	4.42	4.1	1.44	3.48	0.49	2.53	2.78	1.7	2.9	
Cations																								
Calcium (tot)	mg/L	-	-	-	-	0.05	3.79	11.4	9.78	3.86	9.16	11.9	4.02	14.27	7.07	6.38	7.53	7.1	9.18	16	4.4	9.6	22	
Magnesium (tot)	mg/L	-	-	-	-	0.05	0.79	2.83	2.54	0.73	2.23	3.56	0.81	3.42	1.22	1.77	1.47	1.63	2.05	6.02	0.67	2.6	7	
Potassium (tot)	mg/L	-	-	-	-	0.05	0.56	1.36	1.52	0.58	0.61	2.32	0.59	1.7	0.89	1.25	1.19	<1.15	1.6	5.36	<0.5	0.83	6.4	
Sodium (tot)	mg/L	-	-	-	-	0.05	4.18	7.21	7.36	3.97	5.58	7.79	3.82	8.04	7.17	5.18	4.34	6.46	6.09	11.1	2.74	4.8	12	
Field Parameters																								
pH (Field)	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.86	6.55	
Temperature	deg. C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.1	8.8	
General Chemistry																								
Alkalinity (as CaCO3)	mg/L	See Factsheet	-	-	-	1	9	24	21	11	30	24	7	42	18	15	29	11	30	34	8	34	68	
Ammonia as N	mg/L	-	-	-	-	0.02	0.07	-	0.02	<0.02	<0.02	0.05	0.03	<0.02	<0.02	<0.02	0.12	<0.02	<0.02	0.02	<0.02	<0.05	<0.05	
Biochemical Oxygen Demand	mg/L	-	-	-	-	2	-	-	-	<5	<5	<5	<2	<5	<2	<2	2	5	<2	<2	5	<2	<2	
Chemical Oxygen Demand	mg/L	-	-	-	-	5	-	-	-	-	-	-	<5	-	-	-	-	-	-	-	-	-	-	
Colour	TCU	-	-	-	-	2	27	69	15	13	69	108	-	156	42	49	48	29.5	93.9	108	33.5	90	160	
Dissolved Organic Carbon	mg/L	-	-	-	-	0.5	-	-	-	-	-	-	4.6	-	-	-	-	-	-	-	-	-	-	
Dissolved Oxygen	mg/L	See Factsheet	-	-	-	-	9.64	7.7	6.47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Electrical Conductivity	uS/cm	-	-	-	-	1	53	126	125	52	111	145	64	119	86	78	72	77	83	146	40	89	250	
pH	pH units	6.5 - 8.5	-	6 - 9	-	-	6.17	7.32	7.25	6.5	7	7.26	6.59	6.62	6.6	6.74	6.83	6.38	6.95	6.98	6.62	6.89	7.64	
Phenols	mg/L	0.001	-	0.04	0.004	0.001	-	-	-	<0.001	0.002	0.004	<0.001	0.004	<0.001	<0.001	<0.001	0.002	0.004	0.012	<0.001	<0.001	<0.001	
Total Dissolved Solids	mg/L	-	-	-	-	10	34	94	88	28	54	118	34	110	66	68	80	44	72	124	64	60	195	
Total Hardness (as CaCO3)	mg/L	-	-	-	-	0.5	12.7	40.1	34.9	12.6	32.1	44.4	13.4	49.7	22.7	23.2	24.9	24.4	31.4	64.7	13.7	36	86	
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.1	0.47	0.36	0.18	<0.1	0.37	0.46	0.24	0.72	0.33	0.42	0.27	0.24	1.02	0.81	0.18	0.62	0.98	
Total Phosphorus	mg/L	0.03	-	-	-	0.02	0.05	-	0.04	<0.02	0.04	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.1	<0.02	<0.02	0.057	<0.02	
Total Suspended Solids	mg/L	-	-	-	-	10	-	-	19	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	39	<10	
Turbidity	NTU	-	-	-	-	0.1	0.7	4	5.1	<0.5	2.4	1.6	0.7	8.4	1.8	2.8	2.3	0.5	2.6	1.3	0.7	1.7	0.5	
Unionized Ammonia (Calc)	mg/L	-	-	-	-	0.000002	0.0000039	0.0000197	0.0000042	-	-	-	-	-	-	-	-	-	<0.000002	0.000006	<0.000002	<0.000061	<0.00061	
Metals																								
Aluminum (diss)	mg/L	-	Calculated	-	-	0.004	0.07	0.045	0.05	0.065	0.023	0.113	0.053	0.084	0.058	0.047	0.044	0.024	0.02	0.036	-	-	-	
Aluminum (diss, PWOO)	mg/L	-	Calculated	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.077	0.031	0.015	
Aluminum (tot)	mg/L	-	-	-	-	0.004	-	-	-	-	-	-	0.089	0.119	0.122	0.057	0.087	-	0.105	0.044	-	0.081	0.017	
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	<0.001	<0.001	
Barium (tot)	mg/L	-	-	2.3	-	0.002	-	-	-	-	-	-	0.012	-	-	-	-	-	-	-	-	-	-	
Beryllium (tot)	mg/L	Calculated	-	-	-	0.001	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	
Boron (tot)	mg/L	-	0.2	3.55	1.5	0.01	-	-	-	-	-	-	<0.01	<0.01	<0.01	0.014	<0.01	<0.01	0.014	0.017	0.012	0.02	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	<0.00009	<0.00009	
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	<0.005	<0.005	
Cobalt (tot)	mg/L	-	0.0009	-	-	0.0005	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<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	<0.002	<0.002	<0.002	0.005	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.001	<0.0009	<0.0009	
Iron (tot)	mg/L	0.3	-	1	-	0.01	0.24	0.63	1.28	0.04	0.62	0.39	0.054	1.63	0.568	0.056	0.78	0.087	1.17	0.326	0.079	1.3	0.16	
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	<0.0005	<0.0005	
Manganese (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	0.007	-	-	-	0.14	0.021	0.234	0.095	0.004	0.09	0.02	
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	
Molybdenum (tot)	mg/L	-	0.04	-	-	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	<0.001	<0.001	
Selenium (tot)	mg/L	0.1	-	-	-	0.002	-	-	-	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Silicon (tot)	mg/L	-	-	-	-	0.05	-	-	-	-	-	-	3.44	-	-	-	-	-	-	-	-	-	-	
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	<0.00009	<0.00009	
Strontium (tot)	mg/L	-	-	-	-	0.005	-	-	-	-	-	-	0.035	-	-	-	-	-	-	-	-	-	-	
Thallium (tot)	mg/L	-	0.0003	-	-	0.0003	-	-	-	-	-	-	<0.0003	-	-	-	-	-	-	-	-	-	-	
Titanium (tot)	mg/L	-	-	-	-	0.002	-	-	-	-	-	-	<0.002	-	-	-	-	-	-	-	-	-	-	
Vanadium (tot)	mg/L	-	0.006	-	-	0.002	-</																	

Appendix G

Selby Creek Comparison Table

Appendix G: Comparison of Surface Water Quality Upstream & Downstream on Selby Creek 2023

Parameter	Units	MDL	MCG-F (upstream)			Average	MCG-E (downstream)			Average	Percent Difference
			3-May-23	9-Aug-23	19-Oct-23		3-May-23	9-Aug-23	19-Oct-23		
pH	pH Units	NA	6.84	7.42	7.55	7.27	6.67	7.1	7.27	7.01	4%
Alkalinity (as CaCO3)	mg/L	5	11	30	27	22.67	8	27	14	16.33	32%
Electrical Conductivity	uS/cm	2	105	270	290	221.67	143	170	180	164.33	30%
Hardness (as CaCO3) (Calculated)	mg/L	0.5	10.5	24	19	17.83	11	40	40	30.33	-52%
Total Dissolved Solids	mg/L	20	88	130	195	137.67	100	90	145	111.67	21%
Total Suspended Solids	mg/L	10	10	10	10	10.00	10	10	10	10.00	0%
Chloride	mg/L	0.20	20.4	54	62	45.47	34.7	30	35	33.23	31%
Nitrate as N	mg/L	0.10	0.05	0.17	0.1	0.11	0.05	0.1	0.1	0.08	25%
Nitrite as N	mg/L	0.10	0.05	0.01	0.01	0.02	0.05	0.01	0.01	0.02	0%
Sulphate	mg/L	0.20	3.77	6.2	9	6.32	3.33	2.6	3.9	3.28	63%
Ammonia as N	mg/L	0.02	0.02	0.05	0.05	0.04	0.02	0.057	0.05	0.04	-6%
Total Kjeldahl Nitrogen	mg/L	0.10	0.2	0.23	0.27	0.23	0.26	0.38	0.35	0.33	-34%
Total Phosphorus	mg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0%
Phenols	mg/L	0.001	0.0	0.001	0.001	0.00	0.0	0.001	0.001	0.00	0%
True Colour	TCU	5	47.9	47	25	39.97	37.8	61	32	43.60	-9%
Turbidity	NTU	0.5	1.4	2.6	0.9	1.63	1.7	3.8	1.2	2.23	-31%
Total Calcium	mg/L	0.16	3.21	12	13	9.40	3.20	7	5.6	5.27	56%
Total Magnesium	mg/L	0.17	0.73	2.10	2.4	1.74	0.61	1.10	1.1	0.94	60%
Total Potassium	mg/L	0.58	0.71	1.1	1.5	1.10	0.82	0.91	1.2	0.98	12%
Total Sodium	mg/L	0.22	15.3	36	41	30.77	20.4	24	25	23.13	28%
Aluminum-dissolved	mg/L	0.004	0.080	0.036	0.014	0.04	0.065	0.039	0.025	0.04	1%
Total Aluminum	mg/L	0.010	-	0.087	0.025	0.06	-	0.069	0.046	0.06	-3%
Total Arsenic	mg/L	0.003	0.003	0.001	0.001	0.00	0.003	0.001	0.001	0.00	0%
Total Boron	mg/L	0.010	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0%
Total Cadmium	mg/L	0.0001	0.0001	0.00009	0.00009	0.00	0.0001	0.00009	0.00009	0.00	0%
Total Chromium	mg/L	0.003	0.00	0.005	0.005	0.00	0.00	0.005	0.005	0.00	0%
Total Cobalt	mg/L	0.0005	0.0005	0.0005	0.0005	0.00	0.0005	0.00053	0.0005	0.00	-2%
Total Copper	mg/L	0.002	0.001	0.0009	0.0009	0.00	0.001	0.0009	0.0009	0.00	0%
Total Iron	mg/L	0.010	0.25	1.1	0.25	0.53	0.3	2	0.58	0.96	-57%
Total Lead	mg/L	0.001	0.00	0.0005	0.0005	0.00	0.00	0.0005	0.0005	0.00	40%
Total Manganese	mg/L	0.002	0.015	0.036	0.0069	0.02	0.012	0.2	0.035	0.08	-124%
Dissolved Mercury	mg/L	0.0001	0.0001	-	-	0.00	0.0001	-	-	0.00	0%
Total Nickel	mg/L	0.003	0.00	0.001	0.001	0.00	0.00	0.001	0.001	0.00	0%
Total Selenium	mg/L	0.004	0.002	0.002	0.002	0.00	0.002	0.002	0.002	0.00	0%
Total Silver	mg/L	0.0001	0.00	0.00009	0.00009	0.00	0.00	0.00009	0.00009	0.00	0%
Total Zinc	mg/L	0.005	0.02	0.005	0.005	0.01	0.02	0.005	0.005	0.01	0%
BOD5	mg/L	6	2	2	2	2.00	2	2	2	2.00	0%

RDL = Readable Detection Limit

Negative percentages represent higher concentrations at downstream compared to upstream monitoring location

Appendix H

Final Trigger Mechanisms and Contingency Plan (January 2020)

**NORTH BAPTISTE WASTE TRANSFER STATION
(FORMER WDS)
SURFACE WATER CONTINGENCY PLAN
(FINAL APPROVED – AUGUST 16, 2019)**

OBJECTIVE AND BACKGROUND

The objective of the contingency plan for the North Baptiste Lake Waste Transfer Station (WTS)/Waste Disposal Site (WDS) is to ensure that procedures have been developed in the event of a failing toxicity sample result at either surface water location MCG-H or MCG-C. The toxicity testing includes a 48-hour *Daphnia magna* single concentration test and 96-hour Rainbow Trout single concentration test. The single concentration test is typically reported as a “pass” or “fail” test, with 50% mortality being the passing limit. Surface water has been monitored at the Site since 2008 and toxicity testing has been conducted continuously (once annually) since 2013.

The MOECC requested this Contingency Plan be developed as part of the surface water review of the 2015 Annual Monitoring Report for the Site (August 15, 2016) to “ensure fast and effective steps to mitigate environmental impacts should a failed toxicity test occur”.

OBJECTIVE: MITIGATE SURFACE WATER IMPACTS

- To identify steps in the mitigation of surface water run-off impacts from the waste site.
- To identify steps in the mitigation of groundwater discharging from below the waste site to the surface.

Wetland East and South of Site-Surface Water

Assessment Points- MCG-H (East) and MCG-C (South)

Trigger Mechanisms- Failed Toxicity Results

Frequency-Sampling: Semi - annually in the spring and fall

Contingency Plan is activated if a failed toxicity result is obtained

Note: The MOECC requested fall toxicity sampling, the current locations are sometimes dry, or have too little water to obtain samples during the fall sampling event, therefore we are



suggesting continuing with the spring toxicity sampling and collecting fall toxicity samples when sufficient water is present. Additionally if fall sampling fails, it is likely that the surface water may be frozen by the time analytical results are obtained, reviewed, and re-sampling can be scheduled. Sampling in the wetland during frozen/semi-frozen conditions is a Health and Safety Hazard and is not recommended during snow cover or semi-frozen conditions. Historic toxicity sampling location MCG-B (East) and adjacent to the toe of the mound, is hereby replaced by MCG-H for "East" toxicity sampling.

SURFACE WATER CONTINGENCY PLAN

Tier 1: If a toxicity test results in a failed test, a repeat toxicity and the site surface water suite will be collected and analyzed at the failed sample location within one (1) month to confirm or refute the result.

Tier 2: If the "failed" test result is confirmed through additional sampling then the following measures will be implemented:

- Increase toxicity sample monitoring frequency to twice monthly, for four months under non-freezing or snow cover conditions.
- Collect groundwater monitoring at the nearest monitoring well location to coincide with the additional toxicity sampling.
- If four "failed" toxicity test results are obtained (including the initial and Tier 1 sampling) then proceed to Tier 3 procedures.
- If four consecutive "pass" toxicity test results are obtained, revert back to semi-annual sampling; and
- Review site conditions during each sampling event to identify any other potential causes for surface water impacts.

Tier 3: If four "failed" toxicity test results are obtained from semi-annual, Tier 1, and Tier 2 additional sampling, then the following measures are to be implemented:

- Within six months of the failed test results (allowing for additional drilling to be completed around the perimeter toe of the waste mound) an additional hydrogeological and surface water assessment will be completed. Following the completion of hydrogeological/surface water assessment, then one or more of the following Tier 4 mitigation measures will be designed.

Tier 4: If additional remedial measures are necessary they may include but are not limited to:



Tier 4: If additional remedial measures are necessary they may include but are not limited to:

- Installation of purge wells upgradient of the “failed” toxicity test location;
- Installation of a barrier wall immediately adjacent to licensed disposal area within the groundwater flow path.
- Installation of interceptor trenches immediately adjacent to the licensed disposal area within the groundwater flow path.



**NORTH BAPTISTE WASTE TRANSFER STATION
(FORMER WDS)
GROUNDWATER
TRIGGER MECHANISMS
APPROVED AUGUST 16, 2019**

OBJECTIVE: GROUNDWATER IMPACTS

The objective of the groundwater trigger mechanisms and contingency plan for the former Waste Disposal Site (WDS) is to identify increased concerns for leachate impacted groundwater discharging to surface water and ensure timely action to prevent and mitigate any adverse impacts to the environment.

East & South Property Boundary-Groundwater

Assessment Points- NB-MW3 (East) and NB-MW5R (South)

Trigger Parameters- Alkalinity, Chloride, Iron, Manganese, Sodium, and TDS

Frequency-Sampling four times per year (Semi-annually)

Contingency Plan is activated if three or more of the following trigger parameter exceedances occur at one assessment point for one discreet sample:

- Alkalinity, Chloride, Iron, Manganese, Sodium, and TDS exceeds the 75th percentile of the historical data for the assessment point;

Table 2: Trigger Parameter Concentrations (2009- 2017)

Parameter	MW3 75 th percentile of historic data (2009-2017) (mg/L)	MW5R 75 th percentile of historic data (2006-2017) (mg/L)
Alkalinity	190	40
Chloride	57	25
Iron	0.83	0.51
Manganese	0.23	0.14
Sodium	60	13
TDS	366	152

Note: MW5R includes historic data from MW5



CONTINGENCY PLAN – GROUNDWATER

Tier 1: If three or more trigger parameter concentrations are exceeded at one assessment point during one sampling event, a 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 confirms parameter exceedances then collect a toxicity sample at the downgradient surface water monitoring location from the assessment point which was triggered (MCG-H for well NB-MW3, MCG-C for NB-MW-5R).

Respectfully submitted,

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