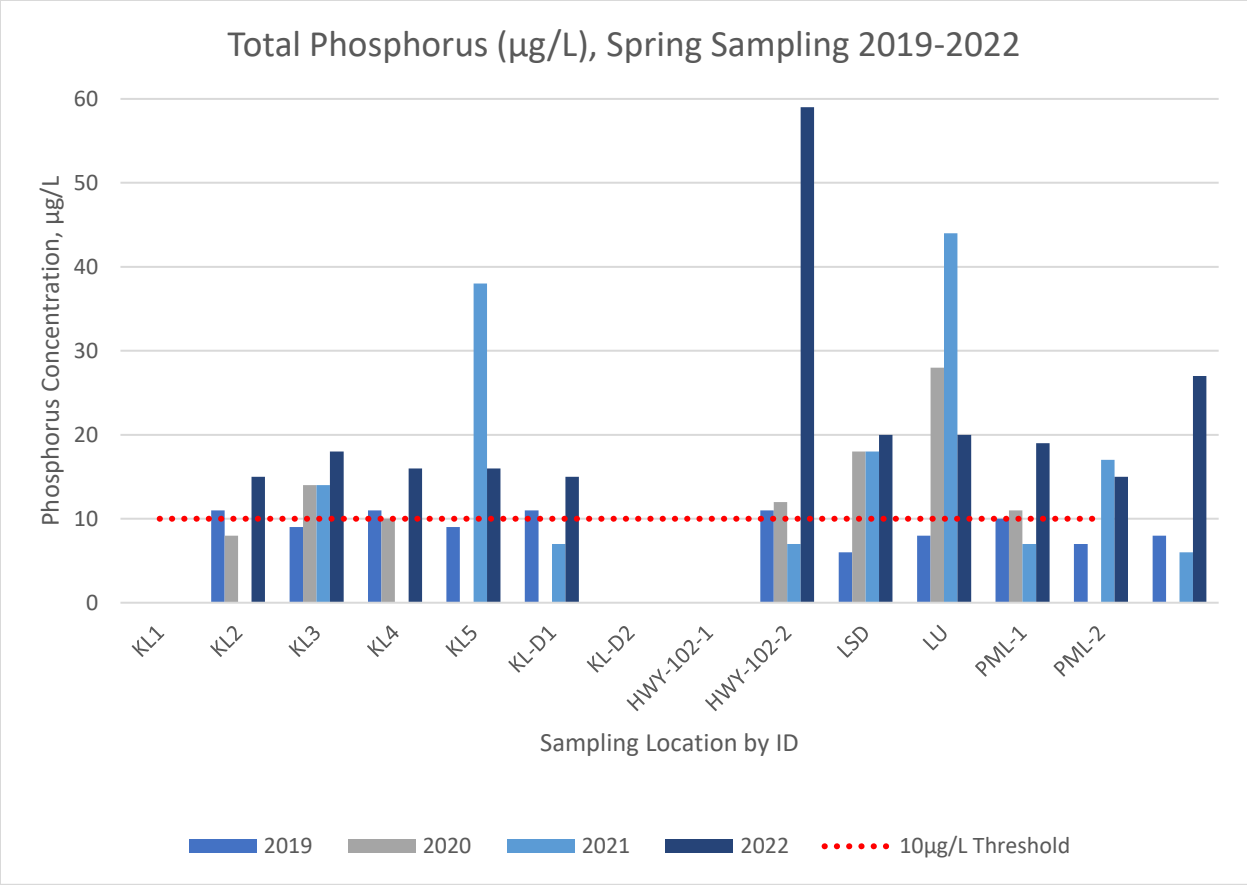


*Figure 1: Total Phosphorus Concentrations from the Bedford West Water Quality Monitoring Program, Spring Sampling Events, 2019-2022*

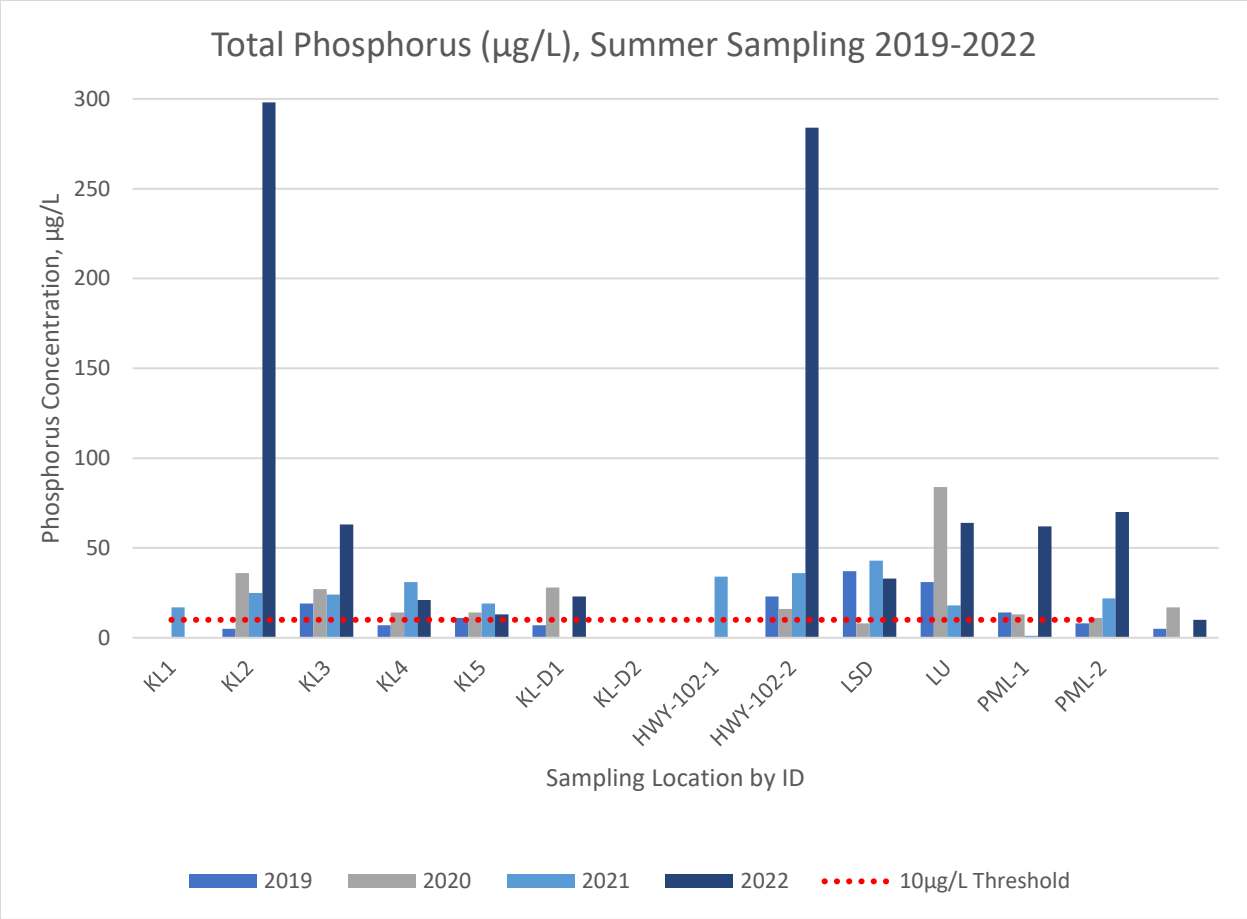


*Figure 2: Total Phosphorus Concentrations from the Bedford West Water Quality Monitoring Program, Summer Sampling Events, 2019-2022*

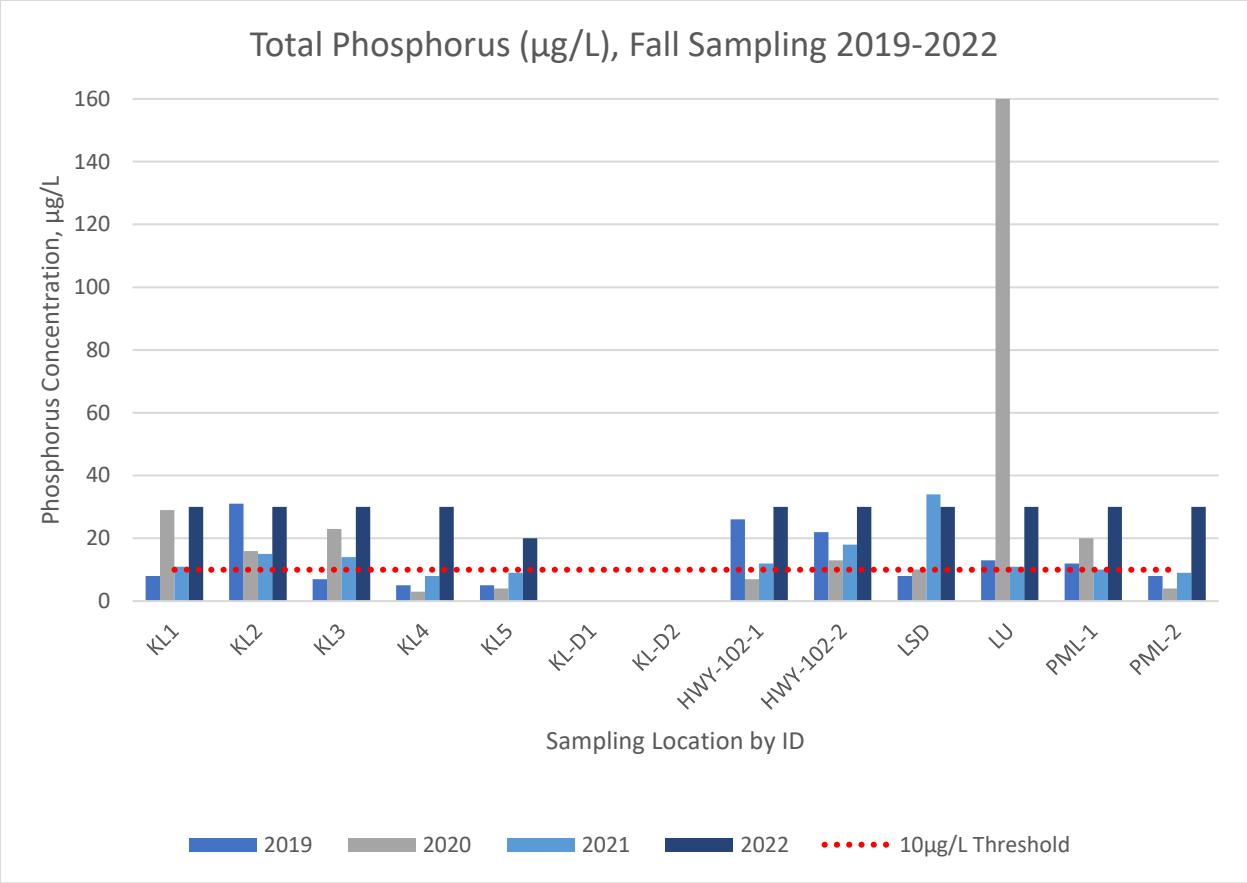


*Figure 3: Total Phosphorus Concentrations from the Bedford West Water Quality Monitoring Program, Fall Sampling Event, 2019-2022*

**2022 Exceedances**

*Table 1: Total Phosphorus and E. Coli results from May 31, 2022, sampling event. Exceedances are indicated by shaded red cells.*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | 15 | 18 |
| KL2 | 18 | 36 |
| KL3 | 16 | 41 |
| KL4 | 16 | 37 |
| KL5 | 15 | 4 |
| KL-D1 | Not sampled | Not sampled |
| KL-D2 | Not sampled | Not sampled |
| HWY-102-1 | 59 | 46 |
| HWY-102-2 | 20 | 33 |
| LSD | 20 | 109 |
| LU | 19 | 32 |
| PML-1 | 15 | 29 |
| PML-2 | 27 | 6 |

*Table 2: Total Phosphorus and E. Coli results from August 18, 2022, sampling event. Exceedances are indicated by shaded red cells.*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | 298 | 1500 |
| KL2 | 63 | 13 |
| KL3 | 21 | 173 |
| KL4 | 13 | 100 |
| KL5 | 23 | 13 |
| KL-D1 | Not sampled | Not sampled |
| KL-D2 | Not sampled | Not sampled |
| HWY-102-1 | 284 | 400 |
| HWY-102-2 | 33 | 49 |
| LSD | 64 | Above detection limit |
| LU | 62 | Above detection limit |
| PML-1 | 70 | 48 |
| PML-2 | 10 | 10 |

*Table 3: Total Phosphorus and E. Coli results from October 21, 2022, sampling event. Exceedances are indicated by shaded red cells.*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | 30 | 86 |
| KL2 | 30 | 28 |
| KL3 | 30 | 62 |
| KL4 | 30 | 50 |
| KL5 | 20 | 12 |
| KL-D1 | Not sampled | Not sampled |
| KL-D2 | Not sampled | Not sampled |
| HWY-102-1 | 30 | 68 |
| HWY-102-2 | 30 | 22 |
| LSD | 30 | 53 |
| LU | 30 | 500 |
| PML-1 | 30 | 44 |
| PML-2 | 30 | 50 |

**2021 Exceedances**

*Table 4: Total Phosphorus and E. Coli results from May 27, 2021, sampling event. Exceedances are indicated by shaded red cells.*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | Below detection limit | 25 |
| KL2 | 14 | 195 |
| KL3 | Below detection limit | 12 |
| KL4 | 38 | 39 |
| KL5 | 7 | Below detection limit |
| KL-D1 | Not sampled | Not sampled |
| KL-D2 | Not sampled | Not sampled |
| HWY-102-1 | 7 | 27 |
| HWY-102-2 | 18 | 14 |
| LSD | 44 | Above detection limit |
| LU | 7 | Below detection limit |
| PML-1 | 17 | 2 |
| PML-2 | 6 | 2 |

*Table 5: Total Phosphorus and E. Coli results from August 9, 2021, sampling event. Exceedances are indicated by shaded red cells.*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | 17 | 130 |
| KL2 | 25 | 26 |
| KL3 | 24 | 18 |
| KL4 | 31 | 24 |
| KL5 | 19 | 9 |
| KL-D1 | Not sampled | Not sampled |
| KL-D2 | Not sampled | Not sampled |
| HWY-102-1 | 34 | 34 |
| HWY-102-2 | 36 | 31 |
| LSD | 43 | 27 |
| LU | 18 | 60 |
| PML-1 | 1 | 23 |
| PML-2 | 22 | 19 |

*Table 6: Total Phosphorus and E. Coli results from October 22, 2021, sampling event. Exceedances are indicated by shaded red cells.*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | 11 | 43 |
| KL2 | 15 | 12 |
| KL3 | 14 | 29 |
| KL4 | 8 | 44 |
| KL5 | 9 | 1 |
| KL-D1 | Not sampled | Not sampled |
| KL-D2 | Not sampled | Not sampled |
| HWY-102-1 | 12 | 1 |
| HWY-102-2 | 18 | <1 |
| LSD | 34 | 18 |
| LU | 11 | 70 |
| PML-1 | 10 | 2 |
| PML-2 | 9 | 9 |

**2020 Exceedances**

*Table 7: Total Phosphorus and E. Coli results from July 2, 2020, sampling event. Exceedances are indicated by shaded red cells. Note: Spring sampling event was delayed due to logistical and safety concerns related to the COVID-19 pandemic.*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | 8 | 59 |
| KL2 | 14 | 31 |
| KL3 | 10 | 44 |
| KL4 | Below detection limit | 48 |
| KL5 | Below detection limit | 6 |
| KL-D1 | Not sampled | Not sampled |
| KL-D2 | Not sampled | Not sampled |
| HWY-102-1 | 12 | 70 |
| HWY-102-2 | 18 | 365 |
| LSD | 28 | 12 |
| LU | 11 | 11 |
| PML-1 | Below detection limit | 3 |
| PML-2 | Below detection limit | 2 |

*Table 8: Total Phosphorus and E. Coli results from August 17, 2020, sampling event. Exceedances are indicated by shaded red cells.*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | 36 | 11 |
| KL2 | 27 | 58 |
| KL3 | 14 | 61 |
| KL4 | 14 | 133 |
| KL5 | 28 | 122 |
| KL-D1 | Not sampled | Not sampled |
| KL-D2 | Not sampled | Not sampled |
| HWY-102-1 | 16 | 33 |
| HWY-102-2 | 8 | 172 |
| LSD | 84 | 172 |
| LU | 13 | 2 |
| PML-1 | 11 | 10 |
| PML-2 | 17 | 7 |

*Table 9: Total Phosphorus and E. Coli results from October 29, 2020, sampling event. Exceedances are indicated by shaded red cells*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | 29 | 1 |
| KL2 | 16 | 4 |
| KL3 | 23 | <1 |
| KL4 | 3 | 5 |
| KL5 | 4 | <1 |
| KL-D1 | Not sampled | 179 |
| KL-D2 | Not sampled | 37 |
| HWY-102-1 | 7 | 3 |
| HWY-102-2 | 13 | <1 |
| LSD | 10 | 2 |
| LU | 160 | <1 |
| PML-1 | 20 | 2 |
| PML-2 | 4 | 2 |

**2019 Exceedances**

*Table 10: Total Phosphorus and E. Coli results from May 9, 2019, sampling event. Exceedances are indicated by shaded red cells.*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | 11 | <1 |
| KL2 | 9 | <10 |
| KL3 | 11 | 1 |
| KL4 | 9 | <1 |
| KL5 | 11 | 1 |
| KL-D1 | Not sampled | Not sampled |
| KL-D2 | Not sampled | Not sampled |
| HWY-102-1 | 11 | 1 |
| HWY-102-2 | 6 | <10 |
| LSD | 8 | 7 |
| LU | 10 | <10 |
| PML-1 | 7 | <1 |
| PML-2 | 8 | <1 |

*Table 11: Total Phosphorus and E. Coli results from August 20, 2019, sampling event. Exceedances are indicated by shaded red cells.*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | 5 | 6 |
| KL2 | 19 | 2 |
| KL3 | 7 | 15 |
| KL4 | 11 | 1 |
| KL5 | 7 | <1 |
| KL-D1 | Not sampled | Not sampled |
| KL-D2 | Not sampled | Not sampled |
| HWY-102-1 | 23 | 3 |
| HWY-102-2 | 37 | 30 |
| LSD | 31 | 50 |
| LU | 14 | 26 |
| PML-1 | 8 | 4 |
| PML-2 | 5 | 3 |

*Table 12: Total Phosphorus and E. Coli results from November 8, 2019, sampling event. Exceedances are indicated by shaded red cells.*

| Sample Station | TP Concentration (µ/L) | *E. Coli* Concentration (MPN/100mL) |
|---|---|---|
| KL1 | 8 | 26 |
| KL2 | 31 | 12 |
| KL3 | 7 | 6 |
| KL4 | 5 | <1 |
| KL5 | 5 | 8 |
| KL-D1 | Not sampled | Not sampled |
| KL-D2 | Not sampled | Not sampled |
| HWY-102-1 | 26 | 2 |
| HWY-102-2 | 22 | 14 |
| LSD | 8 | 12 |
| LU | 13 | 8 |
| PML-1 | 12 | 14 |
| PML-2 | 8 | 20 |

**SNC-Lavalin Inc.**
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Halifax, Nova Scotia, Canada, B3J 3R4
902.492.4544 902.492.4540

June 14, 2019

SENT VIA EMAIL: deacofc@halifax.ca

**Halifax Regional Municipality**
Halifax, Nova Scotia

**Attention:** **Mr. Cameron Deacoff, MMM, PMP, CLP**
Environmental Performance Officer
Planning and Development

Dear Mr. Deacoff:

**RE: Final Report: Surface Water Quality Monitoring Program, 2019 Spring Sampling Event, Bedford West, Bedford, Nova Scotia**

SNC-Lavalin Inc. is pleased to submit one electronic copy of the final report presenting the results of the 2019 spring surface water quality sampling event for the Bedford West Water Quality Monitoring Program in Bedford, Nova Scotia.

If you have any questions, please contact the undersigned.

Yours truly,

**SNC♦LAVALIN INC.**

Michael Smith, *AScT, B.Tech, EP*
Area Lead, Environmental Engineering
*Infrastructure Engineering – Eastern Canada*
(709) 368-0118 Ext. 54957

631477-0001-T-4E-REP-000-0014-C01

# Surface Water Quality Monitoring Program, Bedford West

# Bedford West, Nova Scotia, Canada

Final Report Spring 2019

2019/06/14

Prepared for:

**Halifax Regional Municipality**

Attention: Cameron Deacoff, MMM, PMP, CLP

Environmental Performance Officer

Halifax, NS

PH: (902) 490-1926

Prepared by:

**SNC-Lavalin Inc.**

5657 Spring Garden Road, Suite 200

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# EXECUTIVE SUMMARY

On May 9, 2019 SNC-Lavalin Inc. (SNCL) completed the Bedford West water quality monitoring program (2019 spring event) on behalf of Halifax Regional Municipality (HRM). The sampling program consisted of collecting surface water samples from eleven (11) water quality stations. Field parameters were recorded and surface water samples were collected for laboratory analyses. The laboratory analyses included the following: inorganics, calculated parameters, standard elements and microbiological.

The applicable water quality assessment standards included:

- Canadian Council of Ministers of the Environment (CCME) guidelines for the Protection of Aquatic Life Freshwater (PAL-F);
- Health Canada guidelines for Canadian Recreational Water Quality (2012, Third Edition); and
- Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Surface Water, EQS for Contaminated Sites (NSE 2014) Table A2, Reference for Pathway Specific Standards for Surface Water – Fresh Water.

During the spring monitoring event, four (4) monitoring stations reported concentrations that exceeded the Total Phosphorous (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) listed in the HRM RFP14-338. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL1: 0.011 mg/L (equivalent to 11 µg/L);
- KL3: 0.011 mg/L (equivalent to 11 µg/L);
- KL5: 0.011 mg/L (equivalent to 11 µg/L); and
- HWY102-1: 0.011 mg/L (equivalent to 11 µg/L).

In-situ readings of parameters such as pH, dissolved oxygen, water temperature and conductivity were recorded at all eleven (11) stations:

- Nine (9) stations were within the acceptable pH ranges of 5.0 - 9.0 for Health Canada Recreational Water Quality and pH ranges of 6.5 - 9.0 for the CCME-PAL-F. The following two (2) stations were found outside both recommended ranges: KL1 (pH 9.70), and KL5 (pH 9.20).
- Related to dissolved oxygen (DO), SNCL encountered issues with the DO sensor of the YSI multimeter. This was indicated when SNCL began to compare the extremely low recorded values to the CCME dissolved oxygen guideline. The supplier was immediately contacted and completed a non-routine post calibration of the YSI multimeter (including all sensors) after the fieldwork was conducted. The DO sensor of the YSI multimeter failed the post calibration.

Collected in-situ DO readings are not presented in the table of results. It should be noted; all other in-situ parameters (sensors) passed the post calibration.

- In-situ water temperature was recorded between 9.6°C and 14.0°C.
- In-situ water conductivity was recorded between 6.1 µs/cm to 621.0 µs/cm.
- Secchi depth readings were collected at six (6) stations. Recorded values meet the Health Canada reference guideline of minimum of 1.2 meters (m): KL1 (2.5 m); KL2 (2.15 m); KL5 (3.1 m); PML-1 (1.85 m); and PML-2 (2.4 m).

The following parameters reported concentrations above the recommended Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (CCME-PAL-F, edition 2015) and/or the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Surface Water, EQS for Contaminated Sites (NSE 2014) and/or the Health Canada guidelines for Recreational Water Quality:

- Chloride concentrations were reported above the CCME-PAL-F limit of 120 mg/L at stations; HWY-102-2 (161 mg/L) and LU (174 mg/L).
- Nitrite concentrations were reported above the CCME-PAL-F limit of 0.06 mg/L at stations; HWY-102-1 (0.25 mg/L), HWY-102-2 (0.43 mg/L), and LU (0.47 mg/L).
- Laboratory pH was reported at all eleven (11) stations within Health Canada range of 5.0-9.0 for Recreational Water Quality. However, pH was reported outside of the CCME-PAL-F recommended range of 6.5-9.0 pH at stations KL2 (pH 6.44) and HWY-102-2 (pH 6.36).
- Aluminum concentrations exceeded the NSE EQS guideline of 5 µg/L at all of the sampling stations and nine (9) of those stations also exceeded the CCME-PAL-F limit of 100 µg/L including; KL1 (145 µg/L), KL2 (156 µg/L), KL3 (139 µg/L), KL4 (132 µg/L), KL5 (142 µg/L), HWY102-2 (126 µg/L), LSD (124 µg/L), PML-1 (139 µg/L), and PML-2 (134 µg/L).
- Cadmium concentrations exceeded the NSE EQS guideline of 0.01 µg/L and the CCME-PAL-F limit of 0.09 µg/L: at sampling station LU (0.12 µg/L).
- Copper concentrations exceeded the NSE EQS and CCME-PAL-F limit of 2 µg/L at station LU (3 µg/L).
- Iron concentrations exceeded the NSE EQS and CCME-PAL-F limit of 300 µg/L at stations HWY-102-2 (728 µg/L) and LSD (560 µg/L).
- Lead concentrations exceeded the NSE EQS and CCME-PAL-F limit of 1.0 µg/L at station HWY-102-2 (1.4 µg/L).

In terms of microbiological analyses, E. Coli was not found in exceedance of the Health Canada Guideline of 400 CFU/100 mL, at any of the eleven (11) sampling locations. There are no applicable Health Canada recreational water quality guidelines for Total Coliforms (TC); however, reported

concentrations were above the laboratory RDL of 1 CFU/100mL at all eleven (11) stations. Reported TC concentrations ranged from 55 CFU/100ml to 1960 CFU/100ml.

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Appendix B Field Reports

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Table D2 - Historical Results, Bedford West Water Quality Sampling Program

Appendix E Laboratory Certificates of Analysis

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# 1. INTRODUCTION

SNC-Lavalin Inc. (SNCL) has prepared this report to provide Halifax Regional Municipality (HRM) with water quality data for eleven (11) surface water stations throughout the Bedford West development area.

Water quality monitoring in the Bedford West development area has been ongoing since 2009. SNCL was retained by HRM to complete water quality monitoring programs each spring, summer and autumn since 2015. The results of the 2019 spring monitoring program are detailed herein.

The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the Bedford West development in order to detect any impacts on and/or changes to water quality.

The 2019 spring sampling stations are summarized in Table 1 and shown in Drawing 1.

**Table 1: Bedford West Water Quality Sampling Stations**

| Water Course | Sample Location Name | Updated Coordinates (UTM NAD 83) | |
|---|---|---|---|
| | | Easting | Northing |
| Kearney Lake | KL-1 | 20T445718E | 4948496N |
| Kearney Lake | KL-2 | 20T0443859 | 4949738N |
| Kearney Run | KL-3 | 20T444390E | 4950406N |
| Kearney Run | KL-4 | 20T444463E | 4950571N |
| Kearney Lake | KL-5 | 20T4949142E | 445280N |
| Creek Above Highway | HWY-102-1 | 20T444708E | 4951644N |
| Creek Below Highway | HWY-102-2 | 20T444829E | 4951778N |
| Lake Shore Drive | LSD | 20T442583E | 4950431N |
| Larry Uteck Off-Ramp | LU | 20T444954E | 4949891N |
| Paper Mill Lake | PML-1 | 20T445129E | 4951154N |
| Paper Mill Lake | PML-2 | 20T445363E | 4951740N |

N

HWY102-2

PML2

HWY102-1

PAPER MILL LAKE

PML1

KL4

LSD

KL3

KL2

LU

KEARNEY LAKE

KL5

KL1

## Legend

- Water Quality Monitoring Test Locations/Sample Identification

0 200 400 800 1,200 1,600

Meters

SNC•LAVALIN

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Certified ISO 9001

HALIFAX REGIONAL MUNICIPALITY

PROJECT: WATER QUALITY MONITORING WITHIN BEDFORD WEST

TITLE: WATER QUALITY MONITORING TEST LOCATIONS

| | |
|---|---|
| DESIGNED: | CH |
| DRAWN: | CH |
| CHECKED: | DH |
| SCALE: | AS SHOWN |
| DATE: | 21-09-2015 |
| PROJECT #: | 631477-0001 |
| DRAWING #: | 1 |

# 2. METHODOLOGY

The 2019 spring water quality sampling event included the collection of Field Parameters (Group A) and surface water for laboratory analysis of:

- Inorganics (Group B);
- Calculated Parameters (Group C);
- Standard Elements/Metals (Group D);
- Microbiological Analyses (Group E); and
- Additional Metals (Group F).

Table 2 below summarizes the water quality parameters measured in the field or analyzed by the laboratory.

**Table 2: Analytical Parameter Groups**

| Field Parameters (A) | Inorganics (B) | Calculated Parameters (C) | Standard Metals (D) | Microbiological (E) | Additional Metals (F) |
|---|---|---|---|---|---|
| · pH<br>· TDS<br>· Dissolved Oxygen<br>· Temperature<br>· Secchi Depth<br>· Conductance<br>· Air Temperature<br>· Cloud Cover<br>· Incidental Wildlife Sightings | · Total Alkalinity (as $CaCO_3$)<br>· Dissolved Chloride<br>· Colour<br>· Total Kjeldahl Nitrogen<br>· Nitrate + Nitrite<br>· Nitrate<br>· Nitrite<br>· Nitrogen (as NH4)<br>· Total Organic Carbon<br>· Orthophosphate (P)<br>· pH<br>· Low Total Phosphorus<br>· Reactive Silica<br>· Total Suspended Solids<br>· Dissolved Sulphate<br>· Turbidity<br>· Conductivity | · Anion Sum<br>· Cation Sum<br>· Ion Balance<br>· Bicarbonate Alkalinity(as $CaCO_3$)<br>· Carbonate Alkalinity (as $CaCO_3$)<br>· Hardness<br>· Total Dissolved Solids<br>· Saturation pH (@4°C & 20°C)<br>· Langelier Index (@4°C & 20°C) | · Calcium<br>· Copper<br>· Iron<br>· Magnesium<br>· Manganese<br>· Potassium<br>· Sodium<br>· Zinc | · Chlorophyll A<br>· E. coli<br>· Most Probable Number (MPN) or CFU per 100 mL | · Aluminum<br>· Antimony<br>· Arsenic<br>· Barium<br>· Boron<br>· Cadmium<br>· Chromium<br>· Cobalt<br>· Lead<br>· Molybdenum<br>· Nickel<br>· Selenium<br>· Nickel<br>· Selenium<br>· Silver<br>· Strontium<br>· Thallium<br>· Tin<br>· Titanium<br>· Uranium<br>· Vanadium |

All surface water samples, associated field parameters and secchi depth measurements were collected on May 9, 2019.

Field measurements of pH, dissolved oxygen, specific conductivity and water temperature were taken at each station using an YSI Professional Plus multimeter (serial number 18G100434). The instrument was calibrated on May 7, 2019. The calibration certificate issued by the equipment provider is enclosed in Appendix A.

Site conditions (i.e. weather, air temperature, cloud cover, site accessibility and wildlife sightings) and field parameters for each sampling location were recorded on a field report sheet (See Appendix B, Field Reports). Each sample station was photographed during the sample event (See Appendix C, Site Photographs).

Surface water sampling followed SNCL's Standard Operating Procedures (SOP) for surface water sampling. A new pair of nitrile gloves was used at each sample location. Water samples and field parameter readings were collected within a depth of ≤1.0 m below surface (if possible). It should be noted that samples were collected from the shore at nine (9) stations (KL1, KL2, KL3, KL4, KL5, HWY-102-1, HWY-102-2, LSD and LU) and from a boat at two (2) stations (PML-1 and PML-2) which require secchi depth readings.

Surface water samples were collected and placed in clean laboratory-supplied bottles and stored in a chilled container together with a chain of custody record for transport to the laboratory. Laboratory analysis was completed by AGAT Laboratories located in Dartmouth, Nova Scotia. AGAT is an accredited laboratory by the Standard Council of Canada (SCC), Canadian Association for Laboratory Accreditation (CALA), and ISO 9001:2015.

# 3. APPLICABLE GUIDELINES

For this water quality monitoring program, the Federal and Provincial water quality guidelines being used for the assessment of surface water quality results are as follows, the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Aquatic Life – Freshwater (PAL-F) (Version 2015), the Health Canada (HC) guidelines for Canadian Recreational Water Quality (2012, Third Edition), and the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2, Reference for Pathway Specific Standards for Surface Water (µg/L) for Fresh Water. These guidelines were used to determine whether a tested parameter was in exceedance. Exceedances may be an indication of water quality impairment or conditions that will eventually lead to impairment. A detailed description of the guidelines is presented below:

### CCME Guidelines

- The CCME PAL-F guidelines were used for parameters such as dissolved oxygen, pH (in-situ and analytical), Chloride, Nitrate, Nitrite, Nitrogen, as well as for total metals such as Aluminum,

Arsenic, Boron, Cadmium, Cooper, Iron, Lead, Molybdenum, Nickel, Selenium, Silver, Thallium, Uranium, and Zinc.

- There is no CCME recommended value for Total Suspended Solids (TSS), however the following CCME narrative for TSS at high flow was applied “maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L should not increase more than 10% of background levels when background is ≥ 250 mg/L”.
- According to CCME, 10 µg/L of total phosphorous is the threshold between oligotrophic and mesotrophic classifications. In the Canadian framework, a trigger range is a desired concentration range for phosphorus; if the upper limit of the range is exceeded, it indicates potential for environmental quality issues, which may trigger the need for further investigation. HRM defined a Total Phosphorous management threshold value of 10 µg/L or 0.01 mg/L for this monitoring program.

### HC Guidelines

- The HC guidelines for Canadian Recreational Water Quality was used for parameters such as secchi depth (i.e. visibility at a minimum depth of 1.2 metres), pH guideline of 5.0-9, turbidity (limit of 50 Nephelometric Turbidity Units), and E. coli (i.e. ≤400 E.Coli/100mL).

### NSE Guidelines

- The NSE EQS were used for assessment of total metals such as Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Uranium, Vanadium and Zinc.

# 4. FIELD OBSERVATIONS

The 2019 spring site conditions were recorded for all eleven (11) surface water quality monitoring stations and are included in the field data sheets in Appendix B. Site condition observations include weather, cloud cover, air temperature, wildlife sightings and site accessibility.

In addition, site photographs are included in Appendix C.

# 5. FIELD MEASUREMENTS

Field parameters such as in situ pH, dissolved oxygen, water temperature, conductivity and secchi depth (where applicable) were recorded on field data sheets. Collected data is enclosed in Appendix B.

Field measurements are also tabulated in Appendix D: Table D1 - Spring Results and Table D2 – Historical Results.

### In-situ pH

Nine (9) stations were within the 5.0 - 9.0 pH Health Canada range for Recreational Water Quality and the CCME-PAL-F recommended range of 6.5 - 9.0. Two (2) sampling stations were found outside both recommended ranges at the following:

- KL1: pH 9.70; and
- KL5: pH 9.20.

### Dissolved Oxygen

SNCL encountered issues with the dissolved oxygen (DO) sensor of the YSI Professional Plus multimeter. This was indicated by extremely low recorded values in comparison to the CCME dissolved oxygen guideline. Once the equipment was returned to the supplier, a non-routine post calibration was conducted on the YSI multimeter (including all sensors), revealing that the DO sensor failed to meet the calibration standards after the fieldwork was conducted. As a result, the collected in-situ DO readings are not presented in the 2019 Spring results table. It should be noted; all other in-situ tested parameters (sensors) passed the post calibration.

It's SNCL recommendation to include DO as part of the laboratory analytical analysis (i.e. standard package). This approach can provide 'back up' data, should a similar instrumental issue occur in future events.

### Water Temperature

There are no applicable Health Canada or NSE guidelines for recreation water temperature. Water temperature was recorded between 9.6°C and 14.0°C.

### Conductivity

There are no applicable Health Canada or NSE guidelines for recreation water conductivity. However, specific water conductivity was recorded between 6.1 µs/cm to 621.0 µs/cm.

### Secchi Disk Depth

As per scope of work secchi depths were collected at five (5) monitoring stations. Secchi depth readings met the Health Canada reference guideline of minimum of 1.2 meters (m). Recorded values were as follows:

- KL1: 2.5 m;
- KL2: 2.15 m;
- KL5: 3.1 m;
- PML-1: 1.85 m; and
- PML-2: 2.4 m.

# 6. ANALYTICAL RESULTS

Analytical results of the 2019 spring monitoring event and applicable/reference guidelines are tabulated in Table D1 and enclosed in Appendix D. In addition, historical water quality results from 2009 - 2019 are summarized in Table D2 and enclosed in Appendix D.

Laboratory certificates of analysis for the 2019 spring event are located in Appendix E.

## 6.1 Total Phosphorous

Four (4) monitoring stations reported concentrations that exceeded the Total Phosphorous (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) listed in the HRM RFP14-338. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL1: 0.011 mg/L (equivalent to 11 µg/L);
- KL3: 0.011 mg/L (equivalent to 11 µg/L);
- KL5: 0.011 mg/L (equivalent to 11 µg/L); and
- HWY-102-1: 0.011 mg/L (equivalent to 11 µg/L).

## 6.2 General Chemistry

Of the tested inorganic parameters, only concentrations of chloride, nitrite and pH values were reported outside or above the applicable guidelines.

**Chloride**

Two (2) sampling stations reported chloride concentrations above the CCME-PAL-F limit of 120 mg/L;

- HWY-102-2:161 mg/L; and
- LU: 174 mg/L.

**Nitrite**

Three (3) sampling stations reported nitrite concentrations above the CCME-PAL-F limit of 0.06 mg/L;

- HWY-102-1: 0.25 mg/L;
- HWY-102-2: 0.43 mg/L; and
- LU: 0.47 mg/L.

**Laboratory pH**

All eleven (11) stations reported pH values well within Health Canada range of 5.0-9.0 for Recreational Water Quality; however, two stations KL2 (pH 6.44) and HWY-102-2 (pH 6.36) were reported outside the CCME-PAL-F range of 6.5-9.0.

## 6.3 Metals

The following metals were analyzed during the spring 2019 monitoring event: Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium and Zinc. Exceedances were reported as follows:

### Aluminum

All eleven (11) of the sampling stations exceeded the NSE EQS aluminum guideline of 5 µg/L and nine (9) of those stations also exceeded the CCME-PAL-F limit of 100 µg/L:

- KL1: 145 µg/L;
- KL2: 156 µg/L;
- KL3: 139 µg/L;
- KL4: 132 µg/L;
- KL5: 142 µg/L;
- HWY-102-1: 45.0 µg/L (exceedance of NSE EQS only);
- HWY-102-2: 126 µg/L;
- LSD: 124 µg/L;
- LU: 84 µg/L (exceedance of NSE EQS only);
- PML-1:139 µg/L; and
- PML-2:134 µg/L.

### Cadmium

One (1) sampling station exceeded the NSE EQS cadmium guideline of 0.01 µg/L and the CCME-PAL-F limit of 0.09 µg/L:

- LU: 0.12 µg/L.

### Copper

One (1) station exceeded the NSE EQS copper guideline and CCME-PAL-F limit of 2 µg/L (based on hardness of <82 mg/L):

- LU: 3 µg/L.

### Iron

Two (2) stations exceeded the NSE EQS iron guideline and CCME-PAL-F limit of 300 µg/L:

- HWY-102-2: 728 µg/L; and
- LSD: 560 µg/L.

### Lead

One (1) station exceeded the NSE EQS lead guideline and CCME-PAL-F limit of 1.0 µg/L:

- HWY-102-2: 1.4 µg/L.

## 6.4 Microbiological

There were no exceedances of the Heath Canada (HC) E.Coli Guideline of ≤ 400 CFU/100 mL.

HC does not have a recreational water quality guideline for Total Coliform (TC). All eleven (11) stations reported TC concentrations above the laboratory RDL of 1 CFU/100mL. Reported concentrations ranged from 55 CFU/100ml to 1960 CFU/100ml.

# 7. STATISTICAL PRESENTATION

Statistics include water quality data from 2009 to May 2019 of all eleven (11) water quality monitoring stations. Table 3 provides the spring seasonal statistics for the following six (6) key water quality parameters selected by HRM:

- Total phosphorus (mg/L);
- Dissolved chloride (mg/L);
- Laboratory measured pH;
- Total suspended solids (mg/L);
- Conductivity (µS/cm); and
- Chlorophyll A (µg/L).

Where analytical results were found to be less than the laboratory Reportable Detection Limit (<RDL), the statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory reportable detection limit (1/2 RDL value) as a conservative approach.

It should be noted that number of decimal places presented for each listed parameter is based on the decimal places of the RDL and reported Laboratory certificate of analysis.

**Table 3: Statistical Presentation of Key Water Quality Parameters for Spring**

| KL-1 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.011 | 0.007 | 0.037 | 0.010 | 0.013 |
| Chloride (mg/L) | 1 | 75 | 53 | 81 | 66 | 67 |
| Lab pH | N/A | 6.70 | 6.52 | 6.94 | 6.70 | 6.72 |
| Total Suspended Solids (mg/L) | 5 | <5 | 0.5 | 38 | 2.5 | 5.5 |
| Conductivity (µS/cm) | 1 | 280 | 212 | 310 | 259 | 260 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 1.50 | 0.40 | 2.76 | 1.22 | 1.23 |

| KL-2 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.009 | 0.008 | 0.021 | 0.010 | 0.013 |
| Chloride (mg/L) | 1 | 13 | 12 | 48 | 19 | 22 |
| Lab pH | N/A | 6.44 | 6.27 | 6.85 | 6.46 | 6.50 |
| Total Suspended Solids (mg/L) | 5 | <5 | 0.5 | 103 | 2.5 | 20.4 |
| Conductivity (µS/cm) | 1 | 72 | 64 | 212 | 79 | 102 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 0.50 | 0.13 | 0.99 | 0.51 | 0.54 |

| KL-3 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.011 | 0.004 | 0.019 | 0.008 | 0.009 |
| Chloride (mg/L) | 1 | 49 | 49 | 66 | 55 | 56 |
| Lab pH | N/A | 6.66 | 6.38 | 6.82 | 6.68 | 6.65 |
| Total Suspended Solids (mg/L) | 5 | <5 | 0.5 | 2.8 | 2.5 | 2.2 |
| Conductivity (µS/cm) | 1 | 244 | 197 | 250 | 220 | 226 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 0.74 | 0.52 | 1.96 | 1.04 | 1.10 |

| KL-4 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.009 | 0.004 | 0.022 | 0.009 | 0.012 |
| Chloride (mg/L) | 1 | 50 | 50 | 67 | 56 | 57 |
| Lab pH | N/A | 6.67 | 6.57 | 6.83 | 6.69 | 6.68 |
| Total Suspended Solids (mg/L) | 5 | <5 | 0.5 | 7 | 2.5 | 2.7 |
| Conductivity (µS/cm) | 1 | 246 | 200 | 260 | 220 | 227 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 0.78 | 0.44 | 2.40 | 0.78 | 1.00 |

| KL-5 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.011 | 0.004 | 0.030 | 0.010 | 0.012 |
| Chloride (mg/L) | 1 | 51 | 51 | 65 | 57 | 57 |
| Lab pH | N/A | 6.64 | 6.56 | 6.74 | 6.68 | 6.66 |
| Total Suspended Solids (mg/L) | 5 | <5 | 0.5 | 2.5 | 2.5 | 2.3 |
| Conductivity (µS/cm) | 1 | 249 | 208 | 249 | 230 | 231 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 1.24 | 0.20 | 6.25 | 1.16 | 1.56 |

| HWY-102-1 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.011 | 0.005 | 0.070 | 0.011 | 0.017 |
| Chloride (mg/L) | 1 | 90 | 24 | 130 | 58 | 64 |
| Lab pH | N/A | 7.07 | 4.54 | 7.07 | 6.61 | 6.42 |
| Total Suspended Solids (mg/L) | 5 | <5 | 0.5 | 9 | 2.5 | 3.3 |
| Conductivity (µS/cm) | 1 | 464 | 100 | 470 | 263 | 275 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 1.88 | 0.25 | 18.12 | 1.27 | 3.90 |

| HWY-102-2 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.006 | 0.006 | 0.222 | 0.013 | 0.034 |
| Chloride (mg/L) | 1 | 161 | 21 | 260 | 113 | 121 |
| Lab pH | N/A | 6.36 | 5.43 | 7.20 | 6.22 | 6.27 |
| Total Suspended Solids (mg/L) | 5 | <5 | 1 | 342 | 3 | 40 |
| Conductivity (µS/cm) | 1 | 737 | 85 | 920 | 433 | 464 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 3.06 | 1.00 | 540.00 | 2.00 | 51 |

| LSD | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.008 | 0.007 | 1.250 | 0.018 | 0.145 |
| Chloride (mg/L) | 1 | 30 | 22 | 49 | 38 | 35 |
| Lab pH | N/A | 6.93 | 6.20 | 7.10 | 6.91 | 6.77 |
| Total Suspended Solids (mg/L) | 5 | 8 | 2.5 | 138 | 6.0 | 30 |
| Conductivity (µS/cm) | 1 | 151 | 96 | 200 | 151 | 151 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 2.47 | 0.93 | 18.67 | 1.67 | 3.90 |

| LU | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.010 | 0.006 | 0.260 | 0.036 | 0.067 |
| Chloride (mg/L) | 1 | 174 | 43 | 243 | 182 | 167 |
| Lab pH | N/A | 7.17 | 6.42 | 7.17 | 6.93 | 6.87 |
| Total Suspended Solids (mg/L) | 5 | 7 | 0.5 | 626 | 18 | 108 |
| Conductivity (µS/cm) | 1 | 871 | 178 | 871 | 761 | 663 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 4.19 | 0.69 | 99.13 | 4.81 | 26.36 |

| PML-1 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.007 | 0.005 | 0.173 | 0.014 | 0.030 |
| Chloride (mg/L) | 1 | 55 | 39 | 67 | 57 | 57 |
| Lab pH | N/A | 6.78 | 6.36 | 6.84 | 6.66 | 6.63 |
| Total Suspended Solids (mg/L) | 5 | <5 | 1 | 531 | 2.5 | 53 |
| Conductivity (µS/cm) | 1 | 256 | 170 | 260 | 230 | 227 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 1.53 | 0.57 | 8.00 | 1.17 | 2.20 |

| PML-2 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.008 | 0.006 | 0.050 | 0.010 | 0.015 |
| Chloride (mg/L) | 1 | 50 | 44 | 245 | 63 | 76 |
| Lab pH | N/A | 6.78 | 6.37 | 7.13 | 6.38 | 6.71 |
| Total Suspended Solids (mg/L) | 5 | <5 | 0.5 | 45 | 2.5 | 8.4 |
| Conductivity (µS/cm) | 1 | 261 | 170 | 777 | 254 | 288 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 1.58 | 0.55 | 5.31 | 1.37 | 1.99 |

# 8. GRAPHS

Graphs were completed for all eleven (11) water quality monitoring stations including water quality data collected from 2009 to May 2019. Appendix F presents seasonal and annual graphs that illustrate concentrations of the following six (6) key water quality parameters selected by HRM:

- Total phosphorus (mg/L);
- Dissolved chloride (mg/L);
- Laboratory measured pH;
- Total suspended solids (mg/L);
- Conductivity (µS/cm); and
- Chlorophyll A (µg/L).

The graphs allow for comparison between water quality sampling stations and identification of concentration increases (i.e. above applicable CCME guidelines). As many parameters show seasonal concentration fluctuations, the water quality data was also graphed showing only the concentrations for a given season.

It should be noted that where results were found to be less than the laboratory Reportable Detection Limit (<RDL), they were graphed as half the reportable detection limit (1/2 RDL value) as a conservative approach.

# 9. CONCLUSIONS

The 2019 spring water quality monitoring event included the collection of surface water samples at eleven (11) water quality sampling stations for the analysis of inorganics, calculated parameters, standard metals, microbiological analyses and additional metals. Additionally, field parameters collected at each station included in-situ pH, water temperature, dissolved oxygen, conductivity, Secchi depth (where applicable), air temperature, cloud cover and wildlife sightings.

## Total Phosphorous

The following four (4) monitoring stations reported total phosphorous concentrations above the HRM management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L):

- KL1: 0.011 mg/L (equivalent to 11 µg/L);
- KL3: 0.011 mg/L (equivalent to 11 µg/L);
- KL5: 0.011 mg/L (equivalent to 11 µg/L); and
- HWY-102-1: 0.011 mg/L (equivalent to 11 µg/L).

## Field Measurements

- Nine (9) stations were within the 5.0 - 9.0 pH Health Canada range for Recreational Water Quality and the CCME-PAL-F recommended range of 6.5 - 9.0. Two (2) sampling stations were found outside both recommended ranges at KL1: (pH 9.70) and KL5: (pH 9.20).
- SNCL encountered issues with the DO sensor and upon return of the instrument to the supplier a non-routine post calibration of the YSI multimeter was conducted. The post calibration of the DO sensor failed after the fieldwork was conducted, as a result, the collected in-situ DO readings are not presented in the table of results. It should be noted; all other in-situ parameters (sensors) passed the post calibration.
- In-situ water temperature was recorded between 9.6°C and 14.0°C.
- In-situ water conductivity was recorded between 6.1 µs/cm to 621.0 µs/cm.
- Secchi depth readings were collected at six (6) stations. Recorded values meet the Health Canada reference guideline of minimum of 1.2 meters (m): KL1 (2.5 m); KL2 (2.15 m); KL5 (3.1 m); PML-1 (1.85; and PML-2 (2.4 m).

## General Chemistry and Metals

The following parameters reported concentrations above the recommended Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (CCME-PAL-F, edition 2015) and/or the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Surface Water, EQS for Contaminated Sites (NSE 2014):

- Chloride concentrations were reported above the CCME-PAL-F limit of 120 mg/L at stations; HWY-102-2 (161 mg/L) and LU (174 mg/L).
- Nitrite concentrations were reported above the CCME-PAL-F limit of 0.06 mg/L at stations; HWY-102-1 (0.25 mg/L), HWY-102-2 (0.43 mg/L), and LU (0.47 mg/L).
- Laboratory pH was reported at all eleven (11) stations within Health Canada range of 5.0-9.0 for Recreational Water Quality. However, pH was reported outside of the CCME-PAL-F recommended range of 6.5-9.0 pH at stations KL2 (pH 6.44) and HWY-102-2 (pH 6.36).
- Aluminum concentrations exceeded the NSE EQS guideline of 5 µg/L at all of the sampling stations and nine (9) of those stations also exceeded the CCME-PAL-F limit of 100 µg/L including; KL1 (145 µg/L), KL2 (156 µg/L), KL3 (139 µg/L), KL4 (132 µg/L), KL5 (142 µg/L), HWY-102-2 (126 µg/L), LSD (124 µg/L), PML-1 (139 µg/L), and PML-2 (134 µg/L).
- Cadmium concentrations exceeded the NSE EQS guideline of 0.01 µg/L and the CCME-PAL-F limit of 0.09 µg/L: at sampling station LU (0.12 µg/L).
- Copper concentrations exceeded the NSE EQS and CCME-PAL-F limit of 2 µg/L at station LU (3 µg/L).
- Iron concentrations exceeded the NSE EQS and CCME-PAL-F limit of 300 µg/L at stations HWY-102-2 (728 µg/L) and LSD (560 µg/L).

- Lead concentrations exceeded the NSE EQS and CCME-PAL-F limit of 1.0 µg/L at station HWY-102-2 (1.4 µg/L).

### Microbiological

The Heath Canada guideline of ≤ 400 CFU/100 mL of E.Coli was met at all eleven (11) stations monitored during the 2019 spring event.

There are no recreational water quality guidelines for Total Coliform (TC). All monitoring stations reported TC concentrations above the Lab RDL of 1 CFU/100mL. Reported TC concentrations ranged from 55 CFU/100ml to 1960 CFU/100ml.

# 10. LIMITATION

Related to the dissolved oxygen field parameter, SNCL encountered issues with the DO sensor. Upon completing the fieldwork, a post-calibration of the YSI multimeter was completed by the supplier. The YSI DO sensor failed the calibration after the field work was complete. As a result, the recorded data is not included in the table of results. It should be noted that the other field sensors passed the post calibration and there are no concerns about the integrity of the data enclosed.

# 11. CLOSURE

This report has been prepared and the work referred to in this report has been undertaken by SNC-Lavalin Inc (SNCL) for Halifax Regional Municipality (HRM), hereafter referred to as the “Client”. It is intended for the sole and exclusive use of Halifax Regional Municipality. The report has been prepared in accordance with the Scope of Work and agreement between SNCL and the Client. Other than by the Client and as set out herein, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of SNCL.

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This report was prepared by Cally Baxter, BSc, EPt, and reviewed and approved by Michael Smith, AScT, B.Tech, EP.

# 12. REFERENCES

*Canadian Environmental Quality Guidelines for the Protection of Aquatic Life, 2004, "Phosphorous: Canadian Guidance Framework for the Management of Freshwater Systems".*

*Canadian Council of Ministers of the Environment guidelines for the Protection of Aquatic Life Freshwater.*

*Health Canada guidelines for Canadian Recreational Water Quality, 2012, Third Edition.*

*Nova Scotia Environment, Notification of Contamination Protocol, Table 3 Tier 1 EQS for Surface Water, Revision July 2013*

# Appendix A

Instrument Calibration Report

*Open Road Environmental Limited*

# YSI Professional Plus

*Serial Number 18G100434 (Quattro)*

## *Calibration Certificate*

| *3 Point Calibration pH (4.00, 7.00, 10.00)* | *Calibration solution* | *Specific Conductivity 1413 uS/cm* | *DO 100% @22.0 Deg.C* |
|---|---|---|---|
| *pH 4.00 pass 137.6mV* | *Lot#S180501018 Exp. May-20* | *pass* | *pass* |
| *pH 7.00 pass 9.2mV* | *Lot#S180315008 Exp. Mar-20* | | |
| *pH 10.00 pass -187.9mV* | *Lot#S180104003 Exp. Jul-19* | | |

May 7, 2019

Ghislain Pitre, CET

# Appendix B

Field Reports

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake | | **Site ID: KL1** |
| **Watercourse:** Kearney Lake | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0445718E, 4948496N (UTM, NAD83) | |
| **SNC Field Personnel:** | Maria Gutierrez / Cally Baxter | |

**Site Conditions**

| | |
|---|---|
| Weather: | Partly cloudy |
| Air Temperature: | 7.0 °C |
| Cloud Cover : | 40% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Off Kearney Lake Road |
| Site Access Detail: | Sample taken off the end of dock at Kearney Lake beach. Parked in public parking of Hamshaw Dr. and walked down to beach area. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **09/05/2019** |
| Time (hh:mm): | 8:40am |
| Sample Depth (m): | 0.5m |
| pH: | 9.70 |
| Dissolved Oxygen (mg/L): | 0.03 mg/L |
| Secchi Depth (m): | 2.5 m |
| Water Temperature (degrees Celsius): | 12.2°C |
| Conductivity (µs/cm): | 205 µs/cm |

**Additional Comments / Notes**

Foam visible on beach and surface water - first time observed on this site.

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake | | **Site ID: KL2** |
| **Watercourse:** Kearney Lake | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0443942E, 4949803N (UTM, NAD83) | |
| **SNC Field Personnel:** | Maria Gutierrez / Cally Baxter | |

**Site Conditions**

| | |
|---|---|
| Weather: | Partly cloudy |
| Air Temperature: | 9.0 °C |
| Cloud Cover: | 40% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Off Colin's Rd. |
| Site Access Detail: | Sample taken on the lake side of the culvert between residential buildings 20 and 28. Walked down rock to left of culvert. Note: Sample when standing downstream of bottle. |
| | |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **09/05/2019** |
| Time (hh:mm): | 10:44 am |
| Sample Depth (m): | 0.25 m |
| pH: | 8.50 |
| Dissolved Oxygen (mg/L): | Missed recording |
| Secchi Depth (m): | 2.15 |
| Water Temperature (degrees Celsius): | 10.3°C |
| Conductivity (µs/cm): | 48.3 µs/cm |

**Additional Comments / Notes**

| |
|---|
| |

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake Run | | **Site ID: KL3** |
| **Watercourse:** Kearney Lake Run | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444390E, 4950406N (UTM, NAD83) | |
| **SNC Field Personnel:** | Maria Gutierrez / Cally Baxter | |

**Site Conditions**

| | |
|---|---|
| Weather: | Partly cloudy |
| Air Temperature: | 8.0 °C |
| Cloud Cover: | 50% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Off walking trail from Amesbury Gate Rd. |
| Site Access Detail: | Access to site is via a walking path clearly evident off of Amesbury Gate Rd. (off Larry Uteck Blvd.) roughly 205m down road on left. Walk down path, follow gravel walkway down hill and take sample at the low point facing the dam. Look for large rock outcrop on right. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **09/05/2019** |
| Time (hh:mm): | 10:00 am |
| Sample Depth (m): | 0.5 m |
| pH: | 8.25 |
| Dissolved Oxygen (mg/L): | 0.12 mg/L |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 9.6°C |
| Conductivity (µs/cm): | 158.6 µs/cm |

**Additional Comments / Notes**

| |
|---|
| Foam floating on water surface. |

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake Run | | **Site ID: KL4** |
| **Watercourse:** Kearney Lake Run | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444463E, 4950571N (UTM, NAD83) | |
| **SNC Field Personnel:** | Maria Gutierrez / Cally Baxter | |

**Site Conditions**

| | |
|---|---|
| Weather: | Partly cloudy |
| Air Temperature: | 7.0 °C |
| Cloud Cover: | 40% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Via the extended road at the end of Weybridge Ln. |
| Site Access Detail: | At Weybridge, go to end of extended road on right and walk and take sample above the rocky area at the base of the wider, slow moving section of the river. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **09/05/2019** |
| Time (hh:mm): | 9:43 am |
| Sample Depth (m): | 0.25 m |
| pH: | 8.68 |
| Dissolved Oxygen (mg/L): | 0.04 mg/L |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 9.9°C |
| Conductivity (µs/cm): | 161.1 µs/cm |

**Additional Comments / Notes**

| |
|---|
| |

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 9 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake | | **Site ID: KL5** |
| **Watercourse:** Kearney Lake | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 4949142E, 445280N (UTM, NAD83) | |
| **SNC Field Personnel:** | Maria Gutierrez / Cally Baxter | |

**Site Conditions**

| | |
|---|---|
| Weather: | Partly cloudy |
| Air Temperature: | 7.0 °C |
| Cloud Cover: | 40% |
| Wildlife Sightings: | Waterfowl, songbirds |
| Site Accessibility: Yes, Accessible | Along Kearney Lake Road |
| Site Access Detail: | Easily accessible, sample location is directly off the Kearney Lake Road on a rocky outcrop supporting a power line pole (two pole structure). Slow truck down carefully, turn hazard lights on. Samples were taken on left front of outcrop facing lake. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **09/05/2019** |
| Time (hh:mm): | 9:10am |
| Sample Depth (m): | 0.5m |
| pH: | 9.20 |
| Dissolved Oxygen (mg/L): | 0.15 mg/L |
| **Secchi Depth (m):** | 3.1m |
| Water Temperature (degrees Celsius): | 11.2°C |
| Conductivity (µs/cm): | 171.6 µs/cm |

**Additional Comments / Notes**

| |
|---|
| Lots of debris washed up on shoreline. |

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Highway 102 | **Site ID: HWY 102-1** | |
| **Watercourse:** Marsh area | **Location:** Highway 102, south of exit 3 | |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444708E, 4951644N (UTM, NAD83) | |
| **SNC Field Personnel:** | Maria Gutierrez / Cally Baxter | |

**Site Conditions**

| | |
|---|---|
| Weather: | Partly cloudy |
| Air Temperature: | 12.0 °C |
| Cloud Cover: | 40% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Off Highway 102 Park before guardrail. |
| Site Access Detail: | Carefully slow truck down while pulling off highway 102. Park truck with hazard lights on before the start of the guardrail. Walk along outside of guardrail (for approximately 150m). Site is on right fed by a swampy bog area. Samples were taken in front of culvert. There is a concrete pad to step on to take samples. Sample while standing downstream. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **09/05/2019** |
| Time (hh:mm): | 2:45 pm |
| Sample Depth (m): | 0.25 m |
| pH: | 7.20 |
| Dissolved Oxygen (mg/L): | 0.03 mg/L |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 14°C |
| Conductivity (µs/cm): | 330 µs/cm |

**Additional Comments / Notes**

| |
|---|
| Clear water, able to see the bottom. |

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Highway 102 | **Site ID: HWY 102-2** | |
| **Watercourse:** Marsh area | **Location:** HWY 102, south of exit 3 | |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444829E, 4951778N (UTM, NAD83) | |
| **SNC Field Personnel:** | Maria Gutierrez / Cally Baxter | |

**Site Conditions**

| | |
|---|---|
| Weather: | Partly cloudy |
| Air Temperature: | 12.0 °C |
| Cloud Cover: | 80% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Off Highway 102 (Small gravel drive way- *Back in) |
| Site Access Detail: | Travel along Highway 102 toward Bedford NS. Site is on right easily to identify based on swamp/bog. Carefully slow truck down with hazard lights flashing. There is a small driveway to park truck. Pull a head of driveway and when lanes are clear back truck down into spot. Take samples in water body in front of culvert. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y) | **09/05/2019** |
| Time (hh:mm): | 3:55 pm |
| Sample Depth (m): | 0.25 m |
| pH: | 6.83 |
| Dissolved Oxygen (mg/L): | 0.05 mg/L |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 11.4°C |
| Conductivity (µs/cm): | 501 µs/cm |

**Additional Comments / Notes**

Lots of plastic debris and litter. Green algae visible in the water channel. Culvert deteriorating.

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Lake Shore Drive | | **Site ID: LSD** |
| **Watercourse:** Marsh @ Lakeshore Dr. | | **Location:** Kingswood Subdivision |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0442583E, 4950431N (UTM, NAD83) | |
| **SNC Field Personnel:** | Maria Gutierrez / Cally Baxter | |

**Site Conditions**

| | |
|---|---|
| Weather: | Mostly cloudy |
| Air Temperature: | 9.0 °C |
| Cloud Cover: | 90% |
| Wildlife Sightings: | Waterfowl |
| Site Accessibility: Yes, Accessible | Via Lakeshore Drive in Kingswood Subdivision |
| Site Access Detail: | Take Kingswood Drive off Hammonds Plains Road. Travel down to Diana Drive on left go to end and take a left on Lakeshore drive. Travel approximately 1.0 km. There will be a clearing on left down to power lines. Drive truck (4X4) down until larger clearing is reached and park. Continue (walk) down hill to ATV pathway on left. Follow pathway for approximately 250m. Sample location is on right (river with a lot of vegetation throughout) |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **09/05/2019** |
| Time (hh:mm): | 11:26 am |
| Sample Depth (m): | 0.25m |
| pH: | 7.01 |
| Dissolved Oxygen (mg/L): | 0.06 |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 10.2°C |
| Conductivity (µs/cm): | 99.7 µs/cm |

**Additional Comments / Notes**

| |
|---|
| Beaver dam across the water, lots of smaller trees along the shoreline brought down by the beaver. |

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 9 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Larry Uteck Blvd. | | **Site ID: LU** |
| **Watercourse:** Pond | | **Location:** Larry Uteck off-ramp |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444954E, 4949891N (UTM, NAD83) | |
| **SNC Field Personnel:** | Maria Gutierrez / Cally Baxter | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny |
| Air Temperature: | 12.0 °C |
| Cloud Cover: | 30% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | From Larry Uteck Road |
| Site Access Detail: | Take Larry Uteck off ramp and continue down Larry Uteck Blvd. for approximately 320m. Park truck safely on grassy clearing on left. Sample location is at shore line of lake across road. Take walking pathway to wooded area and travel approximately 80m to lake shore. Avoid walking through the bog area on right. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **09/05/2019** |
| Time (hh:mm): | 3:20 pm |
| Sample Depth (m): | 0.25 m |
| pH: | 7.22 |
| Dissolved Oxygen (mg/L): | 0.03 mg/L |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 13.8°C |
| Conductivity (µs/cm): | 621 µs/cm |

**Additional Comments / Notes**

- Water level high, clear enough to see the bottom of the pond.

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Paper Mill Lake | **Site ID: PML1** | |
| **Watercourse:** Paper Mill Lake | **Location:** Moirs Mill Subdivision | |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0445129E, 4951154N (UTM, NAD83) | |
| **SNC Field Personnel:** | Maria Gutierrez / Cally Baxter | |

**Site Conditions**

| | |
|---|---|
| Weather: | Mostly Cloudy |
| Air Temperature: | 11.0 °C |
| Cloud Cover: | 40% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Travel down Ahmadi Cr. approximately 340m (around second bend in road). Park truck in front of Halifax Water station and carefully walk down rock wall on left. At the bottom locate the small stream and continue along the left and side facing lake. Sample location is a small clearing to the left at the mouth of the river. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **09/05/2019** |
| Time (hh:mm): | 1:10 pm |
| Sample Depth (m): | 0.5 m |
| pH: | 7.38 |
| Dissolved Oxygen (mg/L): | 0.03 mg/L |
| Secchi Depth (m): | 1.85 |
| Water Temperature (degrees Celsius): | 12.0°C |
| Conductivity (µs/cm): | 177.9 µs/cm |

**Additional Comments / Notes**

| |
|---|
| |

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Paper Mill Lake | | **Site ID: PML2** |
| **Watercourse:** Paper Mill Lake | | **Location:** Moirs Mill Subdivision |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0445363E, 4951740N (UTM, NAD83) | |
| **SNC Field Personnel:** | Maria Gutierrez / Cally Baxter | |

**Site Conditions**

| | |
|---|---|
| Weather: | Partly cloudy |
| Air Temperature: | 11.0 °C |
| Cloud Cover: | 50% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Via Lake Dr., off Hammonds Plains Rd. |
| Site Access Detail: | Follow pathway along lake bank to small clearing, use GPS to find exact sample location. Travel over small ridge to reach lake and sample at edge. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **09/05/2019** |
| Time (hh:mm): | 12:50 pm |
| Sample Depth (m): | 0.25 m |
| pH: | 6.76 |
| Dissolved Oxygen (mg/L): | 0.03 mg/L |
| Secchi Depth (m): | 2.4 m |
| Water Temperature (degrees Celsius): | 12.7° C |
| Conductivity (µs/cm): | 6.1 (µs/cm |

**Additional Comments / Notes**

| |
|---|
| |

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# Appendix C

Site Photographs



Photo 1: KL1 Kearney Lake Sample Location



Photo 2: KL2 Kearney Lake Sample Location.


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Photo 3: KL3 Kearney Lake Sample Location



Photo 4: KL4 Kearney Lake Sample Location


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Photo 5: KL5 Kearney Lake Sample Location



Photo 6: HWY 102-1 Sample Location


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Photo 7: HWY102-2 Sample Location



Photo 8: LSD Lake Shore Drive Sample Location


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Photo 9: LU Larry Uteck Sample Location



Photo 10: PML-1 Paper Mill Lake Sample Location


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Photo 11: PML-2 Paper Mill Lake Sample Location


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# Appendix D

Summary Table Results (Seasonal and Historical)

**TABLE D1: 2019 Spring Results, Bedford West Water Quality Sampling Program**

| Tested Parameters | | RDL | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | LSD | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | | | | | 05/09/2019 | 05/09/2019 | 05/09/2019 | 05/09/2019 | 05/09/2019 | 05/09/2019 | 05/09/2019 | 05/09/2019 | 05/09/2019 | 05/09/2019 | 05/09/2019 |
| Sampling Time | | | | | | 8:40 AM | 10:44 AM | 10:00 AM | 9:43 AM | 9:10 AM | 2:45 PM | 3:55PM | 11:26 AM | 3:20PM | 1:10PM | 12:50PM |
| Field Data (in Situ) | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | minimum of 1.2 | -- | 2.50 | 2.15 | N/A | N/A | 3.10 | N/A | N/A | N/A | N/A | 1.85 | 2.40 |
| Water Temp | Celsius | -- | -- | -- | -- | 12.2 | 10.3 | 9.6 | 9.9 | 11.2 | 14.0 | 11.4 | 10.2 | 13.8 | 12.0 | 12.7 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| pH | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | **9.70** | 8.50 | 8.25 | 8.68 | **9.70** | 7.20 | 6.83 | 7.01 | 7.22 | 7.38 | 6.76 |
| Specific Conductance (µs/cm) | uS/cm | -- | -- | -- | -- | 205.0 | 48.3 | 158.6 | 161.1 | 171.6 | 330.0 | 501.0 | 99.7 | 621.0 | 177.9 | 6.1 |
| Inorganic Parameters | | | | | | | | | | | | | | | | |
| Alkalinity | mg/L | 5 | -- | -- | -- | <5 | <5 | <5 | <5 | <5 | 12.0 | <5 | 12.0 | 10.0 | <5 | <5 |
| Chloride | mg/L | 1 | -- | -- | 120 | 75 | 13 | 49 | 50 | 51 | 90 | **161** | 30 | **174** | 55 | 50 |
| True Color | TCU | 5 | -- | -- | -- | 41 | 76 | 53 | 42 | 38 | 35 | 22 | 39 | 18 | 46 | 43 |
| Nitrate + Nitrite as N | mg/L | 0.05 | -- | -- | -- | 0.16 | 0.06 | 0.14 | 0.15 | 0.14 | 0.57 | 0.60 | 0.08 | 1.27 | 0.18 | 0.14 |
| Nitrate as N | mg/L | 0.05 | -- | -- | 13 | 0.16 | 0.06 | 0.14 | 0.15 | 0.14 | 0.32 | 0.17 | 0.08 | 0.80 | 0.18 | 0.14 |
| Nitrite as N | mg/L | 0.05 | -- | -- | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | **0.25** | **0.43** | <0.05 | **0.47** | <0.05 | <0.05 |
| Ammonia as N | mg/L | 0.03 | -- | -- | 18 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | <0.03 | <0.03 | 0.06 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | <0.4 | 0.50 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 0.60 | 0.60 | 1.30 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | 4.30 | 6.90 | 4.40 | 4.50 | 4.50 | 4.40 | 3.20 | 5.90 | 4.30 | 4.20 | 4.30 |
| Ortho-Phosphate as P | mg/L | 0.01 | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | | | -- | 5.0-9.0 | 6.5 - 9.0 | 6.70 | **6.44** | 6.66 | 6.67 | 6.64 | 7.07 | **6.36** | 6.93 | 7.17 | 6.78 | 6.78 |
| Calcium | mg/L | 0.1 | -- | -- | -- | 7.0 | 2.3 | 5.9 | 6.2 | 6.4 | 16.5 | 22.8 | 6.0 | 25.2 | 7.0 | 7.1 |
| Magnesium | mg/L | 0.1 | -- | -- | -- | 1.2 | 0.7 | 1.0 | 1.0 | 1.1 | 2.5 | 3.6 | 1.5 | 3.5 | 1.2 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | 0.01 | **0.011** | 0.009 | **0.011** | 0.009 | **0.011** | **0.011** | 0.006 | 0.008 | 0.010 | 0.007 | 0.008 |
| Potassium | mg/L | 0.1 | -- | -- | -- | 0.8 | 0.6 | 0.7 | 0.8 | 0.8 | 2.3 | 2.2 | 1.3 | 3.2 | 0.9 | 0.9 |
| Sodium | mg/L | 0.1 | -- | -- | -- | 46.3 | 11.9 | 44.3 | 37.0 | 43.8 | 69.1 | 148.0 | 24.4 | 159.0 | 42.6 | 42.9 |
| Reactive Silica as SiO2 | mg/L | 0.5 | -- | -- | -- | 1.7 | 1.7 | 2.1 | 2.1 | 2.1 | 2.2 | 3.1 | 1.7 | 3.7 | 2.3 | 2.0 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 8.0 | 7.0 | <5 | <5 |
| Sulphate | mg/L | 2 | -- | -- | -- | 10.0 | 3.0 | 6.0 | 6.0 | 6.0 | 14.0 | 13.0 | 4.0 | 22.0 | 7.0 | 7.0 |
| Turbidity | NTU | 0.1 | -- | 50 | -- | 0.9 | 0.6 | 0.9 | 0.8 | 0.9 | 0.8 | 1.2 | 5.0 | 3.6 | 1.2 | 1.0 |
| Conductivity | umho/cm | 1 | -- | -- | -- | 280 | 72 | 244 | 246 | 249 | 464 | 737 | 151 | 871 | 256 | 261 |
| Calculated Parameters | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | | -- | -- | -- | 2.3 | 0.4 | 1.5 | 1.6 | 1.6 | 3.1 | 4.9 | 1.2 | 5.7 | 1.7 | 1.6 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | <5 | <5 | <5 | <5 | <5 | 12.0 | <5 | 12.0 | 10.0 | <5 | <5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | 141.0 | 32.0 | 108.0 | 102.0 | 110.0 | 204.0 | 354.0 | 76.0 | 399.0 | 115.0 | 110.0 |
| Carb. Alkalinity (as CaCO3) | mg/L | 10 | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation sum | me/L | -- | -- | -- | -- | 2.5 | 0.7 | 2.3 | 2.0 | 2.4 | 4.1 | 8.0 | 1.6 | 8.6 | 2.4 | 2.4 |
| Hardness | mg/L | -- | -- | -- | -- | 22.4 | 8.6 | 18.9 | 19.6 | 20.5 | 51.5 | 71.8 | 21.2 | 77.3 | 22.4 | 22.7 |
| % Difference/ Ion Balance (NS) | % | -- | -- | -- | -- | 3.5 | 25.6 | 21.4 | 13.8 | 19.9 | 13.8 | 24.3 | 14.2 | 20.4 | 15.7 | 20.4 |
| Langelier Index (@20C) | NA | -- | -- | -- | -- | -3.4 | -4.0 | -3.5 | -3.4 | -3.5 | -2.3 | -3.2 | -2.8 | -2.1 | -3.3 | -3.3 |
| Langelier Index (@ 4C) | NA | -- | -- | -- | -- | -3.7 | -4.4 | -3.8 | -3.8 | -3.8 | -2.6 | -3.6 | -3.1 | -2.4 | -3.6 | -3.6 |
| Saturation pH (@ 20C) | NA | -- | -- | -- | -- | 10.1 | 10.5 | 10.1 | 10.1 | 10.1 | 9.3 | 9.6 | 9.7 | 9.3 | 10.1 | 10.0 |
| Saturation pH (@ 4C) | NA | -- | -- | -- | -- | 10.4 | 10.8 | 10.4 | 10.4 | 10.4 | 9.6 | 9.9 | 10.0 | 9.6 | 10.4 | 10.4 |
| Metals (ICP-MS) | | | | | | | | | | | | | | | | |
| Total Aluminum | ug/L | 5 | 5 | -- | 100 ug/L (based on pH) | **145.0** | **156.0** | **139.0** | **132.0** | **142.0** | 45.0 | **126.0** | **124.0** | 84.0 | **139.0** | **134.0** |
| Total Antimony | ug/L | 2 | 20 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Arsenic | ug/L | 2 | 5.0 | -- | 5 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Barium | ug/L | 5 | 1000 | -- | -- | 14.0 | 10.0 | 17.0 | 18.0 | 17.0 | 108.0 | 272.0 | 13.0 | 135.0 | 21.0 | 25.0 |
| Total Beryllium | ug/L | 2 | 5.3 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Bismuth | ug/L | 2 | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Boron | ug/L | 5 | 1200 | -- | 1500 | 5.0 | 7.0 | 6.0 | 6.0 | 6.0 | 10.0 | 7.0 | 9.0 | 11.0 | 7.0 | 6.0 |
| Total Cadmium | ug/L | 0.09 | 0.01 | -- | 0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | **0.1** | <0.09 | <0.09 |
| Total Chromium | ug/L | 1 | --- | -- | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Cobalt | ug/L | 1 | 10 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Copper | ug/L | 1 | 2 | -- | 2 ug/L (based on hardness) | <1 | <1 | <1 | <1 | <1 | 1.0 | 2.0 | <1 | **3.0** | 1.0 | <1 |
| Total Iron | ug/L | 50 | 300 | -- | 300 | 155.0 | 227.0 | 123.0 | 120.0 | 121.0 | 122.0 | **728.0** | **560.0** | 290.0 | 136.0 | 128.0 |
| Total Lead | ug/L | 0.5 | 1 | -- | 1 ug/L (base on hardness) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | **1.4** | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Manganese | ug/L | 2 | 820 | -- | -- | 42.0 | 28.0 | 26.0 | 24.0 | 25.0 | 14.0 | 137.0 | 368.0 | 51.0 | 26.0 | 28.0 |
| Total Molybdenum | ug/L | 2 | 73 | -- | 73 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Nickel | ug/L | 2 | 25 | -- | 25 ug/L (base on hardness) | 2.0 | <2 | 3.0 | <2 | <2 | <2 | 3.0 | <2 | 10.0 | 5.0 | <2 |
| Total Selenium | ug/L | 1 | 1.0 | -- | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Silver | ug/L | 0.1 | 0.1 | -- | 0.25 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Strontium | ug/L | 5 | 21000 | -- | -- | 36.0 | 13.0 | 30.0 | 33.0 | 31.0 | 93.0 | 129.0 | 27.0 | 107.0 | 35.0 | 35.0 |
| Total Thallium | ug/L | 0.1 | 0.8 | -- | 0.8 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin | ug/L | 2 | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Titanium | ug/L | 2 | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Uranium | ug/L | 0.1 | 300 | -- | 15 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Vanadium | ug/L | 2 | 6 | -- | -- | 2.0 | <2 | 2.0 | 2.0 | 2.0 | 2.0 | 4.0 | <2 | 5.0 | 2.0 | 2.0 |
| Total Zinc | ug/L | 5 | 30 | -- | 30 | 8.0 | <5 | 16.0 | 7.0 | 7.0 | 5.0 | 16.0 | <5 | 27.0 | 7.0 | 7.0 |
| Microbiological Parameters | | | | | | | | | | | | | | | | |
| Total Coliforms | CFU/100 mL | 1 to 10 | -- | -- | -- | 256 | 1960 | 103.0 | 198.0 | 55.0 | 1,520.0 | 930.0 | 1120 | 540.0 | 128 | 106 |
| E. Coli | CFU/100 mL | 1 to 10 | -- | 400 | -- | <1 | <10 | 1.0 | <1 | 1.0 | 1.0 | <10 | 7 | <10 | <1 | <1 |
| Chlorophyll A - Acidification Method | ug/L | 0.05 | -- | -- | -- | 1.50 | 0.47 | 0.74 | 0.78 | 1.24 | 1.88 | 3.06 | 2.47 | 4.19 | 1.53 | 1.58 |
| Chlorophyll A - Welschmeyer Method | ug/L | 0.05 | -- | -- | -- | 1.46 | 0.49 | 0.74 | 0.82 | 1.19 | 1.90 | 3.04 | 2.51 | 4.24 | 1.44 | 1.50 |

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
RDL = Reported Detection Limit (represents most recent sampling event)
(**) Dissolved oxygen field data not reported - Post-calibration failure of field equipment for DO sensor.
" -- " = no guideline available / no parameter tested.
NDOGT- No Data Overgrown With Target
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
Health Canada Guidelines for Canadian
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015)
CCME Phosphorus Trigger Range (Applied) of 0.01 mg/L
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness.
CCME PAL-F Guideline for Ammonia-N vary base on water pH and Temperature. The value is converted to mg/L total ammonia-N by multiplying by 0.8224
Comment 1: CCME PAL-F reference values between 25-250 mg/L, and >250 mg/L.

**Bold and Black Shaded** Concentration exceeds CCME FWAL applicable guideline.

Underlined and Black Shaded Concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality (Reference Guidelines)

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KL1 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 |
| Sampling Time | hh:mm | -- | | | | | 08:00 | 11:45 | 08:30 | 11:00 | 13:10 | 12:00 | 11:00 | 14:30 | 14:00 | 8:30 | 11:20 | 9:50 | 10:20 | 11:10 | 13:30 | 10:30 | 14:15 | 14:55 | 08:30 | 14:54 | 12:30 | 9:30 | 7:50 | 13:20 | 8:30 | 9:30 AM | 9:35 AM | 9:15 AM | 7:50 AM | 9:00 AM | 8:40 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 4.1 | 4.2 | 5.0 | N/A | 5.0 | 4.9 | 2.4 | 3.2 | 2.4 | 2.4 | 5.4 | N/A | 2.5 | 2.0 | 2.9 | 2.4 | 2.7 | 2.5 | NCC | N/A | 2.2 | 1.8 | 2.1 | 2.5 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.5 | 2.5 |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.0 | 22.2 | 16.7 | 12.9 | 23.3 | 8.8 | 11.5 | 25.6 | 15.9 | 8.9 | 23.3 | 15.4 | 13.2 | 22.2 | 14.1 | 12.7 | 23.2 | 12.2 | 14.1 | 26.1 | 9.4 | 12.8 | 22.2 | 11.9 | 16.6 | 23.2 | 14.1 | 12.2 | 24.2 | 12.8 | 12.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.8 | 8.2 | 7.0 | 9.1 | 7.9 | 10.5 | 10.7 | 8.2 | 9.2 | 9.0 | 7.9 | 8.7 | 9.8 | 8.6 | 8.3 | 15.3 | 7.2 | 8.1 | 9.6 | 8.1 | 7.4 | 14.0 | 10.3 | 12.1 | 8.3 | 7.9 | 8.2 | 11.1 | 6.7 | 8.6 | ** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.20 | 6.76 | 6.67 | 7.23 | 7.32 | 6.61 | 6.60 | 6.16 | 6.04 | 8.67 | 6.91 | 6.32 | 6.32 | 8.24 | 6.35 | 6.74 | 7.46 | 6.44 | 8.33 | 6.95 | 7.02 | 8.29 | 4.49 | 6.23 | 7.47 | 7.00 | 7.84 | 7.85 | 7.51 | 6.84 | 5.70 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 263.0 | 299.0 | 261.0 | 248.0 | 242.0 | 218.7 | 288.0 | 178.6 | 146.3 | 277.0 | 279.0 | 198.1 | 243.0 | 216.5 | 217.9 | 547.0 | 341.0 | 223.0 | 0.2 | 298.3 | 238.5 | 239.0 | 298.0 | 212.4 | 240.0 | 292.0 | 312.0 | 203.1 | 288.2 | 253.7 | 205.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 8 | 8 | 7 | 8 | 6 | <5 | 9 | 7 | 24 | 7 | <5 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 | <5 | 9 | 7.0 | <5 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 81 | 74 | 64 | 62 | 60 | 55 | 73 | 45 | 33 | 66 | 70 | 50 | 66 | 59 | 48 | 80 | 76 | 46 | 60 | 62 | 58 | 55 | 57 | 45 | 71 | 73 | 60 | 53 | 54 | 55 | 75 |
| Colour | TCU | 5 | -- | -- | -- | | 18 | 18 | 16 | 26 | 8 | 21 | 28 | 40 | 45 | 50 | 11 | 20 | 11 | 37 | 20 | 13 | 8 | 23 | 37 | 8 | 22 | 11 | 17 | 18 | 15 | 14 | 12 | 42 | 16 | 18 | 41 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.18 | 0.09 | 0.12 | 0.21 | 0.16 | 0.23 | 0.20 | 0.11 | 0.13 | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.15 | 0.13 | 0.20 | 0.29 | 0.10 | 0.26 | 0.16 | 0.2 | 0.2 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.18 | -- | -- | 0.21 | 0.16 | -- | 0.20 | -- | -- | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.08 | 0.13 | 0.08 | 0.08 | 0.10 | 0.16 | 0.07 | 0.2 | 0.2 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.07 | <0.05 | 0.12 | 0.21 | <0.05 | 0.10 | 0.09 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.04 | 0.03 | <0.03 | 0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | 0.09 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | 0.08 | 0.1 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.9 | 1.1 | 0.4 | -- | 0.7 | <0.4 | 1.1 | <0.4 | 0.4 | 0.2 | 4.5 | 0.4 | 0.7 | <0.4 | 0.6 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.4 | 2.9 | 4.7 | 3.3 | 3.2 | 3.1 | 3.4 | 5.9 | 5.5 | 5.4 | 2.9 | 5.2 | 4.4 | 4.1 | 4.3 | 4.6 | 2.4 | 4.4 | 3.0 | 5.3 | 5.5 | 4.3 | 3.4 | 7.3 | 4.5 | 4.6 | 4.8 | 5.1 | 3.1 | 4.0 | 4.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.94 | 6.65 | 6.68 | 6.91 | 7.00 | 6.79 | 6.52 | 6.51 | 6.52 | 6.70 | 7.20 | 6.90 | 6.78 | 6.93 | 6.85 | 6.72 | 7.06 | 6.78 | 6.62 | 6.95 | 6.99 | 6.64 | 7.23 | 6.81 | 6.64 | 7.07 | 7.00 | 6.71 | 7.31 | 7.07 | 6.70 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 9.2 | 8.5 | 7.2 | 7.7 | 8.7 | 8.3 | 7.7 | 4.8 | 5.3 | 6.6 | 5.2 | 6.3 | 7.5 | 6.6 | 6.5 | 8.1 | 11.0 | 6.0 | 6,400.0 | 7.9 | 6.1 | 6.8 | 8.0 | 6.3 | 8.6 | 7.1 | 8.3 | 5.8 | 7.2 | 6.9 | 7.0 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.5 | 1.4 | 1.2 | 1.4 | 1.4 | 1.3 | 1.3 | 0.9 | 1.1 | 1.1 | 1.5 | 1.5 | 1.1 | 1.2 | 1.2 | 1.6 | 1.6 | 0.9 | 920.0 | 1.3 | 0.9 | 1.1 | 1.1 | 1.2 | 1.3 | 1.2 | 1.3 | 1.0 | 1.2 | 1.3 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.020 | <0.020 | <0.002 | 0.009 | 0.007 | 0.005 | 0.008 | 0.012 | 0.009 | 0.017 | 0.043 | 0.007 | 0.007 | 0.007 | 0.008 | 0.008 | 0.051 | 0.026 | 0.013 | 0.008 | 0.002 | 0.016 | 0.014 | 0.005 | 0.008 | 0.010 | 0.010 | 0.005 | 0.012 | 0.007 | 0.008 | 0.011 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 0.9 | 1.3 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.7 | 1.1 | 0.9 | 1.6 | 0.7 | 680.0 | 0.9 | 0.7 | 0.7 | 0.9 | 0.8 | 1.0 | 0.9 | 1.2 | 0.7 | 1.0 | 0.8 | 0.8 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 51.0 | 46.0 | 37.0 | 31.8 | 35.2 | 33.8 | 43.7 | 22.8 | 19.8 | 40.1 | 42.0 | 29.8 | 35.8 | 26.2 | 31.6 | 50.2 | 54.2 | 37.6 | 33.0 | 43.3 | 39.8 | 35.5 | 32.2 | 31.0 | 44.9 | 50.3 | 35.7 | 36.4 | 34.7 | 31.7 | 46.3 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.6 | 2.2 | 2.3 | 2.9 | 2.7 | 2.9 | 2.8 | 1.9 | 2.3 | 2.4 | 1.3 | 2.2 | 2.5 | 1.8 | 2.2 | 2.0 | 1.5 | 1.8 | 2.5 | 1.8 | 2.7 | 2.8 | 2.0 | 1.6 | 2.0 | 1.6 | 1.8 | 2.6 | 1.7 | 1.7 | 1.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 1 | 1 | <1 | 4 | 17 | 3 | 2 | 2 | 3 | <5 | <5 | <5 | <5 | <5 | 5 | <5 | <5 | <5 | <1.0 | <5 | 1.1 | 10.6 | 0.9 | 2.6 | 1.4 | 1.1 | 0.8 | 1.3 | 0.7 | 2.1 | 0.9 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 14 | 13 | 12 | 11 | 11 | 11 | 12 | 10 | 8 | 8 | 9 | 9 | 11 | 9 | 9 | 12 | 11 | 7 | 9 | 10 | 8 | 10 | 10 | 10 | 11 | 9 | 10 | 8 | 7.0 | 9.0 | 10.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 0.8 | 1.0 | 1.3 | 0.6 | 1.0 | 1.0 | 1.0 | 0.9 | 2.4 | 0.8 | 1.3 | 1.6 | 3.3 | 0.5 | 2.9 | 0.7 | 1.9 | 0.8 | 1.9 | 1.1 | 10.6 | 0.9 | 2.6 | 1.4 | 1.1 | 0.8 | 1.3 | 0.7 | 2.1 | 0.9 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 310 | 290 | 250 | 240 | 240 | 230 | 290 | 180 | 140 | 246 | 274 | 196 | 259 | 241 | 212 | 290 | 339 | 235 | 220 | 257 | 244 | 212 | 270 | 161 | 271 | 260 | 249 | 243 | 261 | 215 | 280 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.72 | 2.52 | 2.23 | 2.12 | 2.08 | 1.91 | 2.33 | 1.66 | 1.27 | 2.52 | 2.31 | 1.60 | 2.10 | 1.86 | 1.71 | 3.11 | 2.66 | 1.45 | 1.98 | 2.09 | 1.95 | 1.87 | 1.99 | 1.61 | 2.25 | 2.43 | 2.11 | 1.68 | 1.86 | 1.9 | 2.3 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 8 | 8 | 7 | 8 | 6 | <1 | 9 | 7 | 24 | 7 | <5 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 | <5 | 9 | 7.0 | <5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 166 | 151 | 131 | 123 | 125 | 118 | 143 | 92 | 77 | 139 | 137 | 98 | 124 | 104 | 103 | 172 | 165 | 99 | 120 | 130 | 119 | 113 | 105 | 99 | 139 | 148 | 123 | 106 | 112 | 110.0 | 141.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.85 | 2.57 | 2.12 | 1.92 | 2.10 | 2.02 | 2.42 | 1.33 | 1.25 | 2.24 | 2.41 | 1.79 | 2.08 | 1.61 | 1.84 | 2.77 | 3.09 | 2.05 | 1.84 | 2.43 | 2.14 | 2.03 | 1.93 | 1.82 | 2.54 | 2.67 | 2.12 | 2.00 | 2.01 | 1.9 | 2.5 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 29.00 | 27.00 | 23.00 | 25.00 | 27.00 | 26.00 | 24.00 | 16.00 | 18.00 | 21.50 | 27.20 | 21.90 | 23.30 | 21.40 | 21.20 | 26.80 | 34.10 | 18.70 | 20.00 | 25.10 | 18.90 | 21.50 | 24.50 | 20.70 | 26.80 | 22.70 | 26.10 | 18.6 | 22.9 | 22.6 | 22.4 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 2.33 | 0.98 | 2.53 | 4.95 | 0.48 | 2.80 | 1.89 | 11.00 | 0.79 | 5.90 | 2.10 | 5.30 | 0.70 | 7.30 | 3.40 | 5.80 | 7.50 | 17.20 | 3.66 | 7.50 | 4.50 | 4.10 | 1.50 | 6.20 | 6.10 | 4.80 | 0.20 | 8.6 | 3.8 | 0.4 | 3.5 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.68 | -2.87 | -2.94 | -2.72 | -2.51 | -2.87 | NC | -3.18 | -3.21 | -2.69 | -2.63 | -3.19 | -3.24 | -3.14 | -3.02 | -2.51 | -2.36 | -1.76 | -3.21 | -2.97 | -2.97 | -3.42 | -2.56 | -3.20 | -3.33 | -2.78 | -2.68 | -3.42 | -2.47 | -2.8 | -3.4 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -2.93 | -3.12 | -3.19 | -2.97 | -2.76 | -3.12 | NC | -3.43 | -3.46 | -3.01 | -2.95 | -3.51 | -3.56 | -3.46 | -3.34 | -2.83 | -2.68 | -4.08 | -3.46 | -3.29 | -3.29 | -3.74 | -2.88 | -3.52 | -3.65 | -3.10 | -3.00 | -3.74 | -2.79 | -3.2 | -3.7 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.62 | 9.52 | 9.62 | 9.63 | 9.51 | 9.66 | NC | 9.69 | 9.73 | 9.39 | 9.83 | 10.10 | 10.00 | 10.10 | 9.87 | 9.23 | 9.42 | 10.10 | 9.83 | 9.92 | 9.96 | 10.10 | 9.79 | 10.00 | 9.97 | 9.85 | 9.68 | 10.1 | 9.78 | 9.9 | 10.1 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.87 | 9.77 | 9.87 | 9.88 | 9.76 | 9.91 | NC | 9.94 | 9.98 | 9.71 | 10.20 | 10.40 | 10.30 | 10.40 | 10.20 | 9.55 | 9.74 | 10.40 | 10.10 | 10.20 | 10.30 | 10.40 | 10.10 | 10.30 | 10.30 | 10.20 | 10.00 | 10.4 | 10.1 | 10.2 | 10.4 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 230 | -- | -- | 289 | 48 | -- | 338 | -- | -- | 321 | 43 | 168 | 191 | 120 | 56 | 229 | 42 | 155 | 100 | -- | 88 | 206 | -- | -- | 158 | 41 | 46 | 169 | 29 | -- | 145.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 16 | -- | -- | 19 | 16 | -- | 13 | -- | -- | 12 | 15 | 9 | 12 | 7 | 16 | 14 | 20 | 9 | 16 | -- | 17 | 14 | -- | -- | 16 | -- | 17 | 12 | 16 | -- | 14.0 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 11 | -- | -- | 11 | 9 | -- | <50 | -- | -- | <5 | 11 | 33 | 6 | 10 | 9 | 7 | 22 | 10 | <50 | -- | <5 | 8 | -- | -- | <5 | -- | 26 | 5 | 10 | -- | 5.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.3 | -- | -- | 0.053 | 0.017 | -- | 0.056 | -- | -- | 0.032 | 0.027 | 0.021 | 0.020 | <0.017 | 0.017 | 0.017 | 0.037 | <0.017 | 0.025 | -- | 0.197 | 0.029 | -- | -- | 0.058 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | -- | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 6 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | 1 | -- | -- | <1 | <0.40 | -- | 1 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | 8 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <2 | <1 | 1 | <1 | 1 | <2.0 | <1 | 2 | <1 | <1 | 1 | <1 | 2 | 1 | <1 | 2.0 | -- | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 130 | -- | -- | 313 | 62 | 125 | 177 | 162 | 344 | 229 | 137 | 195 | 207 | 132 | 92 | 147 | 124 | 168 | 110 | 157 | 81 | 149 | 62 | 269 | 78 | 70 | 116 | 96 | 142 | 142.0 | 155.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 10.3 | <0.50 | -- | <0.50 | -- | -- | <0.5 | <0.5 | 1.9 | <0.5 | <0.5 | <0.5 | 5.1 | <0.5 | <0.5 | <0.50 | -- | <0.5 | <0.5 | -- | -- | 1.3 | -- | <0.5 | 1.3 | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 100 | -- | -- | 79 | 57 | 59 | 78 | 52 | 56 | 48 | 65 | 68 | 73 | 48 | 24 | 48 | 115 | 42 | 39 | 41 | 22 | 47 | 23 | 45 | 46 | 31 | 17 | 28 | 49 | 28.0 | 42.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 5 | -- | -- | 3 | <2.0 | -- | 3 | -- | -- | <2 | <2 | 2 | 2 | <2 | <2 | 3 | <2 | 3 | <2.0 | -- | <2 | 3 | -- | -- | 15 | -- | <2 | <2 | <2 | -- | 2.0 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.5 | -- | -- | <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 | <0.1 | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 46 | -- | -- | 39 | 38 | -- | 36 | -- | -- | 32 | 41 | 32 | 37 | 33 | 30 | 40 | 45 | 26 | 29 | -- | 19 | 30 | -- | -- | 38 | -- | 40 | 26 | 38 | -- | 36.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 11 | -- | -- | 6 | <2.0 | -- | 5 | -- | -- | 8 | <2 | 3 | 4 | 2 | <2 | 2 | <2 | 5 | 2 | -- | <2 | 2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | 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 | -- | <0.1 | <0.1 | <0.1 | -- | 0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | 2 | -- | <2 | <2 | <2 | -- | 2.0 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 27 | -- | -- | 14 | 8 | 11 | 12 | 13 | 10 | 5 | <5 | 11 | 11 | 6 | 5 | 14 | <5 | 9 | 13 | 8 | <5 | 11 | <5 | 19 | 58 | <5 | 6 | 8 | <5 | 19.0 | 8.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 200 | 65 | -- | >250 | 63 | >250 | 91 | >250 | -- | 2,420 | >2420 | 1,120 | 1,200 | 866 | 488 | 525 | 1,550 | >2420 | --- | 980 | 122 | 866 | 548 | >2420 | 299 | 488 | 154 | 14 | 611 | 157.0 | 256 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 39 | 24 | -- | 9 | 15 | 37 | 8 | >250 | <100 | 41 | 11 | 17 | 48 | 2 | 7 | <1 | 15 | 28 | 60 | 24 | 6 | 4 | 33 | 99 | 29 | 18 | 3 | 5 | 11 | 61.0 | <1 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.53 | 0.79 | 1.11 | 1.73 | 1.47 | 0.99 | 0.76 | 1.44 | 1.36 | 0.62 | 2.30 | 1.54 | 1.22 | 1.40 | 1.19 | 0.40 | 0.41 | 0.84 | 0.64 | 1.14 | 1.79 | 2.76 | 0.90 | 2.08 | 1.45 | 1.75 | 1.10 | 1.91 | 1.26 | 1.63 | 1.50 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.48 | 0.69 | 1.17 | 1.61 | 1.42 | 0.81 | 0.69 | 1.15 | 1.14 | 0.63 | 2.30 | 2.16 | 1.40 | 1.40 | 1.19 | 1.32 | 0.36 | 0.80 | 0.62 | 1.11 | 0.95 | 3.48 | 1.15 | 2.19 | 2.55 | 1.87 | 1.18 | 3.09 | -- | * | 1.46 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
"--" = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
Comment 1: CCME PAL-F reference values between 25-250 mg/L, and >250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.
**bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.
**underlined black shading** = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality
**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KL2 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 |
| Sampling Time | hh:mm | -- | | | | | 11:00 | 10:30 | 10:45 | 10:15 | 12:25 | 10:50 | 09:30 | 14:00 | 13:15 | 9:50 | 10:30 | 10:20 | 09:10 | 16:10 | 14:30 | 10:45 | 9:20 | 14:04 | 09:15 | 13:29 | 13:05 | 10:30 | 8:30 | 12:50 | 10:47 | 11:15 AM | 10:30 AM | 11:00 AM | 10:10 AM | 10:00 AM | 10:44 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 1.3 | 2.1 | 1.8 | 1.9 | 2.0 | 1.5 | 1.2 | 2.1 | 1.4 | 1.4 | 2.2 |
| Water Temp | Celsius | -- | -- | -- | -- | | 16.8 | 18.2 | 15.4 | 13.5 | 20.4 | 8.0 | 9.9 | 19.1 | 14.1 | 7.6 | 21.8 | 12.3 | 10.1 | 22.9 | 9.7 | 11.7 | 21.1 | 10.8 | 13.1 | 24.7 | 8.1 | 10.7 | 20.3 | 10.2 | 15.7 | 21.2 | 10.6 | 11.7 | 21.6 | 10.3 | 10.3 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.2 | 8.5 | 5.7 | 6.3 | 4.7 | 9.6 | 9.7 | 7.1 | 8.4 | 6.5 | 5.8 | 7.6 | 9.4 | 6.4 | 7.4 | 14.9 | 7.0 | 7.7 | 8.4 | 7.3 | 7.1 | 7.9 | 4.2 | 9.7 | 9.7 | 6.6 | 6.2 | 9.4 | 4.2 | 7.5 | ** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.33 | 6.35 | 6.19 | 6.61 | 6.96 | 6.25 | 6.77 | 5.90 | 5.62 | 7.72 | 6.41 | 6.29 | 5.75 | 7.47 | 5.57 | 6.60 | 7.22 | 5.79 | 6.36 | 5.88 | 6.43 | 7.64 | 5.47 | 6.54 | 6.69 | 6.00 | 6.29 | 6.21 | 5.16 | 5.54 | 8.50 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 46.0 | 106.0 | 89.2 | 198.5 | 104.0 | 75.1 | 79.7 | 66.7 | 54.3 | 58.0 | 96.6 | 61.1 | 77.9 | 65.3 | 64.5 | 188.0 | 266.0 | 63.0 | 0.1 | 107.9 | 73.6 | 82.0 | 117.0 | 103.7 | 78.0 | 114.0 | 109.0 | 57.4 | 109.9 | 67.2 | 66.3 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 8 | 8 | 8 | 8 | 7 | <5 | <5 | 7 | <5 | 20 | <5 | 8 | <5 | <5 | <5 | 29 | 7 | 28 | <5.0 | 7 | <5 | <5 | 10 | 6 | 5 | 12 | 9 | <5 | 11 | <5 | <5 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 48 | 48 | 48 | 48 | 25 | 17 | 19 | 14 | 10 | 16 | 20 | 12 | 19 | 21 | 14 | 20 | 17 | 12 | 15 | 14 | 12 | 17 | 26 | 30 | 20 | 19 | 19 | 12 | 19 | 11 | 13 |
| Colour | TCU | 5 | -- | -- | -- | | 20 | 20 | 20 | 20 | 63 | 95 | 80 | 110 | 120 | 52 | 60 | 94 | 37 | 90 | 71 | 25 | 44 | 168 | 50 | 63 | 61 | 47 | 48 | 93 | 46 | 46 | 57 | 82 | 59 | 123 | 76 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.19 | 0.19 | 0.19 | 0.19 | 0.07 | 0.06 | 0.12 | 0.07 | <0.05 | 0.11 | 0.08 | <0.05 | 0.12 | <0.05 | <0.05 | 0.08 | <0.05 | <0.05 | 0.06 | 0.08 | <0.05 | <0.05 | 0.06 | 0.19 | 0.05 | 0.08 | <0.05 | 0.07 | 0.05 | <0.05 | 0.1 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.19 | 0.19 | 0.19 | 0.19 | 0.07 | -- | 0.12 | -- | -- | 0.11 | 0.08 | <0.05 | 0.12 | <0.05 | <0.05 | 0.08 | <0.05 | <0.05 | 0.06 | 0.08 | <0.05 | <0.05 | <0.05 | 0.19 | <0.05 | 0.08 | <0.05 | 0.07 | <0.05 | <0.05 | 0.1 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.05 | <0.05 | <0.05 | 0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | <0.03 | 0.04 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | 0.06 | <0.03 | <0.03 | 0.03 | 0.04 | 0.04 | 0.06 | 0.1 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 2.2 | 0.7 | -- | 1.1 | <0.4 | <0.4 | 0.4 | 0.4 | 0.8 | 0.8 | 0.4 | 0.9 | 0.5 | <0.4 | 0.5 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 0.5 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 4.3 | 4.3 | 4.3 | 4.3 | 6.6 | 9.7 | 6.5 | 10.0 | 12.0 | 8.1 | 7.1 | 10.9 | 7.5 | 11.1 | 10.9 | 6.2 | 6.6 | 12.9 | 4.0 | 13.3 | 14.0 | 6.2 | 7.0 | 13.2 | 8.5 | 8.2 | 8.5 | 9.0 | 6.6 | 14.0 | 6.9 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | 0.09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.85 | 6.85 | 6.85 | 6.85 | 6.78 | 6.31 | 6.27 | 6.40 | 6.05 | 6.50 | 6.70 | 6.50 | 6.37 | 6.62 | 6.34 | 6.51 | 6.87 | 6.66 | 6.32 | 6.99 | 6.78 | 6.76 | 6.87 | 6.19 | 6.57 | 6.87 | 6.66 | 6.46 | 7.04 | 6.27 | 6.44 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.5 | 6.5 | 6.5 | 6.5 | 4.1 | 3.6 | 2.5 | 2.5 | 2.2 | 2.4 | 3.6 | 2.9 | 2.7 | 2.5 | 2.4 | 3.4 | 4.0 | 2.4 | 2,600.0 | 3.4 | 1.1 | 2.9 | 4.5 | 5.6 | 3.6 | 4.3 | 3.9 | 2.3 | 4.2 | 2.9 | 2.3 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.2 | 1.2 | 1.2 | 1.0 | 0.8 | 0.6 | 0.6 | 0.4 | 0.7 | 1.0 | 1.0 | 0.7 | 0.5 | 0.8 | 1.1 | 1.0 | 0.6 | 640.0 | 0.9 | 0.7 | 0.7 | 1.1 | 1.5 | 1.0 | 1.2 | 0.9 | 0.7 | 1.1 | 0.8 | 0.7 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.020 | 0.020 | 0.020 | 0.020 | 0.009 | 0.009 | 0.009 | 0.008 | 0.015 | 0.021 | 0.054 | 0.011 | 0.010 | 0.020 | 0.029 | 0.013 | 0.019 | 0.029 | 0.008 | 0.012 | 0.008 | 0.009 | 0.016 | 0.013 | 0.012 | 0.024 | 0.010 | 0.014 | 0.013 | 0.004 | 0.009 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 0.6 | 0.8 | 0.5 | 0.5 | 0.7 | 0.5 | 0.7 | 0.8 | 0.5 | 0.5 | 0.7 | 0.7 | 0.9 | 540.0 | 0.7 | 0.6 | 0.9 | 0.8 | 1.1 | 0.8 | 0.8 | 0.7 | 0.5 | 0.8 | 0.6 | 0.6 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 31.6 | 31.6 | 31.6 | 31.6 | 14.7 | 10.6 | 11.1 | 7.8 | 6.9 | 9.8 | 14.2 | 9.5 | 8.9 | 7.0 | 7.9 | 17.5 | 14.0 | 7.6 | 8.4 | 11.5 | 6.6 | 11.5 | 16.1 | 17.7 | 13.8 | 15.4 | 13.0 | 9.2 | 13.9 | 11.8 | 11.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.2 | 2.2 | 2.2 | 2.2 | 4.2 | 4.7 | 2.7 | 4.3 | 4.0 | 2.6 | 4.0 | 4.9 | 2.8 | 4.4 | 4.9 | 2.4 | 3.3 | 4.6 | 2.0 | 3.7 | 5.1 | 2.0 | 2.3 | 4.5 | 1.3 | 2.2 | 4.6 | 2.3 | 2.8 | 3.6 | 1.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 103 | 103 | 103 | 103 | 7 | <1 | <1 | <2 | <1 | <5 | <5 | <5 | <5 | 135 | <5 | <5 | <5 | <5 | <5 | <1.0 | <5 | 17 | <5 | <5 | <5 | 12 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 9 | 9 | 9 | 9 | <2 | <2 | <2 | <2 | <2 | 3 | 3 | 2 | 4 | 5 | 4 | 4 | 2 | 3 | 3 | <2 | 3 | 4 | 3 | 7 | 3 | 2 | 3 | 3 | <2 | 3.0 | 3.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.5 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 | 0.4 | 0.7 | 0.6 | 0.5 | 1.1 | 1.0 | 1.9 | 2.2 | 1.0 | 0.9 | 0.8 | 1.2 | <1.0 | 1.6 | 6.2 | 0.7 | 2.0 | 1.9 | 0.8 | 4.4 | 1.6 | 0.9 | 1.2 | 1.1 | 0.6 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 212 | 212 | 212 | 212 | 100 | 97 | 79 | 66 | 54 | 71 | 91 | 61 | 83 | 69 | 62 | 87 | 94 | 66 | 64 | 81 | 73 | 79 | 135 | 125 | 93 | 110 | 97 | 68 | 115 | 70 | 72 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 0.49 | 0.82 | 0.45 | 0.77 | 0.85 | 0.49 | 0.53 | 0.53 | 0.28 | 0.92 | 0.63 | 0.54 | 0.63 | 0.70 | 0.48 | 1.23 | 0.66 | 0.96 | 0.48 | 0.54 | 0.40 | 0.56 | 1.00 | 1.13 | 0.73 | 0.82 | 0.78 | 0.41 | 0.76 | 0.4 | 0.4 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | 8 | <1 | 5 | 7 | <1 | <1 | 7 | <1 | 20 | <5 | 8 | <5 | <5 | <5 | 29 | 7 | 28 | <1.0 | 7 | <5 | <5 | 10 | 6 | 5 | 12 | 9 | <5 | 11 | <5 | <5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 36 | 55 | 35 | 46 | 55 | 38 | 37 | 34 | 25 | 45 | 44 | 34 | 37 | 37 | 31 | 65 | 44 | 44 | 32 | 36 | 25 | 38 | 59 | 68 | 46 | 51 | 47 | 28 | 47 | 31.0 | 32.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 0.71 | 0.99 | 0.67 | 0.74 | 0.95 | 0.74 | 0.68 | 0.55 | 0.49 | 0.65 | 0.94 | 0.73 | 0.63 | 0.63 | 0.54 | 0.60 | 1.07 | 0.97 | 0.57 | 0.57 | 0.82 | 0.47 | 0.76 | 1.09 | 1.25 | 0.91 | 1.05 | 0.90 | 0.62 | 0.97 | 0.8 | 0.7 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 10.00 | 15.00 | 10.00 | 12.00 | 14.00 | 12.00 | 9.00 | 9.00 | 8.00 | 8.90 | 13.00 | 11.40 | 9.60 | 8.30 | 9.30 | 13.00 | 14.10 | 8.50 | 9.10 | 12.20 | 5.60 | 10.10 | 15.80 | 20.20 | 13.10 | 15.70 | 13.40 | 8.6 | 15 | 10.5 | 8.6 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 18.30 | 9.39 | 19.60 | 1.99 | 5.56 | 20.30 | 12.40 | 1.85 | 27.30 | 17.60 | 19.70 | 15.10 | 0.30 | 12.90 | 11.00 | 7.10 | 19.10 | 25.70 | 8.57 | 20.50 | 7.50 | 14.90 | 4.50 | 5.30 | 11.00 | 12.30 | 7.50 | 20.8 | 12.4 | 36.7 | 25.6 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | -3.20 | NC | -3.44 | -3.05 | NC | NC | -3.66 | NC | -3.37 | -3.60 | -3.68 | -4.05 | -3.83 | -4.12 | -3.04 | -3.23 | -3.66 | NC | -3.18 | -4.51 | -4.04 | -3.04 | -3.85 | -3.73 | -2.98 | -4.35 | -4.02 | -2.85 | -4.1 | -4.0 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | -3.45 | NC | -3.70 | -3.30 | NC | NC | -3.91 | NC | -3.69 | -3.92 | -4.00 | -4.37 | -4.15 | -4.44 | -3.36 | -3.55 | -3.98 | NC | -3.50 | -4.83 | -4.36 | -3.36 | -4.17 | -4.05 | -3.30 | -3.67 | -4.34 | -3.17 | -4.4 | -4.4 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | 9.78 | NC | 10.00 | 9.83 | NC | NC | 10.10 | NC | 9.87 | 10.30 | 10.20 | 10.40 | 10.50 | 10.50 | 9.57 | 10.10 | 9.72 | NC | 10.20 | 10.80 | 10.40 | 9.91 | 10.00 | 10.30 | 9.85 | 10.00 | 10.5 | 9.89 | 10.4 | 10.5 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | 10.00 | NC | 10.30 | 10.10 | NC | NC | 10.30 | NC | 10.20 | 10.60 | 10.50 | 10.70 | 10.80 | 10.80 | 9.89 | 10.40 | 10.00 | NC | 10.50 | 11.10 | 10.70 | 10.20 | 10.40 | 10.60 | 10.20 | 10.30 | 10.8 | 10.2 | 10.7 | 10.8 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 5 | 5 | -- | 5 - 100 | | 290 | -- | -- | 175 | 151 | -- | 271 | -- | -- | 209 | 205 | 338 | 256 | 270 | 259 | 205 | 236 | 340 | 180 | -- | 284 | 107 | -- | -- | 185 | 150 | 240 | 228 | 123 | -- | 154.0 |
| Total Antimony (Sb) | ug/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Arsenic (As) | ug/L | 2 | 5.0 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | <2 | -- | <2 | -- | <2 | <2 | <2 | <2 | -- | <2 |
| Total Barium (Ba) | ug/L | 5 | 1000 | -- | -- | | 9 | -- | -- | 12 | 14 | -- | 10 | -- | -- | 9 | 11 | 10 | 8 | <5 | 13 | 13 | 18 | 9 | 9 | -- | 9 | 10 | -- | -- | 10 | -- | 14 | 7 | 14 | -- | 10.0 |
| Total Beryllium (Be) | ug/L | 2 | 5.3 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | <2 | -- | <2 | -- | <2 | <2 | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | ug/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | <2 | -- | <2 | -- | <2 | <2 | <2 | <2 | -- | <2 |
| Total Boron (B) | ug/L | 5 | 1200 | -- | 1500 | | 8 | -- | -- | 15 | 13 | -- | <50 | -- | -- | 6 | 14 | 22 | 6 | 11 | 9 | 11 | 12 | 12 | <50 | -- | <5 | 9 | -- | -- | <5 | -- | 17 | 7 | 13 | -- | 7.0 |
| Total Cadmium (Cd) | ug/L | 0.017 | 0.01 | -- | 0.09 | | <0.3 | -- | -- | 0.018 | <0.017 | -- | <0.017 | -- | -- | <0.017 | <0.017 | <0.017 | <0.017 | <0.017 | <0.017 | 0.018 | <0.017 | 0.018 | 0.016 | -- | 0.176 | <0.017 | -- | -- | 0.041 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 |
| Total Chromium (Cr) | ug/L | 1 | -- | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 9 | <1 | <1 | <1.0 | -- | <1 | 1 | -- | -- | <1 | -- | 1 | <1 | <1 | -- | <1 |
| Total Cobalt (Co) | ug/L | 1 | 10 | -- | -- | | <1 | -- | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Copper (Cu) | ug/L | 1 | 2 | -- | 2 | | <2 | -- | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <2 | <1 | 2 | <1 | 4 | <2.0 | <1 | <1 | <1 | 2 | <1 | 1 | 1 | 1 | <1 | <1 | 1.0 | <1 |
| Total Iron (Fe) | ug/L | 50 | 300 | -- | 300 | | 250 | -- | -- | 227 | 403 | 238 | 202 | 418 | 358 | 154 | 541 | 813 | 269 | 528 | 523 | 174 | 723 | 909 | 250 | 641 | 478 | 232 | 1,000 | 290 | 168 | 759 | 572 | 148 | 783 | 336.0 | 227.0 |
| Total Lead (Pb) | ug/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 1.0 | <0.50 | -- | <0.50 | -- | -- | <0.5 | <0.5 | 1.1 | <0.5 | 0.5 | 0.5 | <0.5 | 5.8 | <0.5 | 0.5 | <0.5 | -- | 0.6 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 1.2 | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | ug/L | 2 | 820 | -- | -- | | 26 | -- | -- | 43 | 83 | 35 | 12 | 68 | 23 | 17 | 90 | 114 | 24 | 67 | 53 | 33 | 146 | 25 | 47 | 120 | 57 | 21 | 109 | 39 | 39 | 96 | 64 | 17 | 78 | 29.0 | 28.0 |
| Total Molybdenum (Mo) | ug/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Nickel (Ni) | ug/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Selenium (Se) | ug/L | 1 | 1.0 | -- | 1 | | <2 | -- | -- | <1 | <1 | -- | <1 | -- | -- | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Silver (Ag) | ug/L | 0.1 | 0.1 | -- | 0.25 | | <0.5 | -- | -- | 0.4 | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | ug/L | 5 | 21000 | -- | -- | | 14 | -- | -- | 18 | 20 | -- | 12 | -- | -- | 10 | 18 | 15 | 12 | 9 | 12 | 16 | 17 | 12 | 12 | -- | 8 | 12 | -- | -- | 15 | -- | 20 | 10 | 24 | -- | 13.0 |
| Total Thallium (Tl) | ug/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Tin (Sn) | ug/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Titanium (Ti) | ug/L | 2 | -- | -- | -- | | 2 | -- | -- | <2 | <2 | -- | 3 | -- | -- | <2 | 2 | 3 | 4 | <2 | 2 | 2 | <2 | 3 | 3 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Uranium (U) | ug/L | 0.1 | 300 | -- | 15 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Vanadium (V) | ug/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Zinc (Zn) | ug/L | 5 | 30 | -- | 30 | | 8 | -- | -- | 5 | 5 | 7 | <5.0 | <5.0 | <5.0 | <5 | <5 | 7 | <5 | <5 | <5 | <5 | <5 | <5 | <5.0 | <5 | <5 | <5 | 8 | <5 | 8 | 6 | <5 | <5 | 20.0 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 1,800 | 170 | -- | >250 | 11 | >250 | 59 | >250 | -- | >2420 | 1,986 | >2420 | >2420 | >2420 | >2420 | 525 | >2420 | >2420 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | 659 | 10 | 2420 | 140.0 | 1960 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 1,500 | 100 | -- | >250 | 6 | 6 | 2 | >250 | <100 | 3 | 7 | 3 | 12 | 6 | 2 | <1 | 18 | 11 | 30 | 11 | 5 | 4 | 15 | 25 | 31 | 16 | 3 | 4 | 20 | 50.0 | <10 |
| Chlorophyll A - Acidification method | ug/L | 0.05 | -- | -- | -- | | 0.82 | 6.05 | 1.97 | 0.73 | 0.55 | 0.22 | 0.44 | 0.89 | 0.97 | 0.53 | 2.20 | 0.07 | 0.62 | 1.00 | 0.73 | 0.13 | 0.83 | 0.41 | 0.34 | 0.96 | 0.46 | 0.30 | 1.86 | 0.32 | 0.99 | 1.47 | 0.31 | 0.51 | 1.25 | 0.75 | 0.47 |
| Chlorophyll A - Welschmeyer method | ug/L | 0.05 | -- | -- | -- | | 0.87 | 5.97 | 1.95 | 0.66 | 0.54 | 0.21 | 0.42 | 0.73 | 0.82 | 0.56 | 2.20 | 0.12 | 0.72 | 1.00 | 0.74 | 0.14 | 0.86 | 0.41 | --- | 1.26 | 0.26 | 0.43 | 2.43 | 0.36 | 1.86 | 1.81 | 0.49 | 0.91 | -- | * | 0.49 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
"--" = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
[**] Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold and black shaded** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KL3 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 |
| Sampling Time | hh:mm | -- | | | | | 09:00 | 11:00 | 09:30 | 11:30 | 14:12 | 11:40 | 10:30 | 12:20 | 12:00 | 10:26 | 12:20 | 11:00 | 9:50 | 10:00 | 14:00 | 11:00 | 11:50 | 14:25 | 10:35 | 11:45 | 10:40 | 11:00 | 11:30 | 11:00 | 9:36 | 10:15 | 10:15 | 10:30 | 9:10 | 11:30 AM | 10:00 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.0 | 21.6 | 17.3 | 14.7 | 23.1 | 9.9 | 10.3 | 21.1 | 15.5 | 9.0 | 24.5 | 15.6 | 11.7 | 21.5 | 13.6 | 11.0 | 22.7 | 12.8 | 14.7 | 25.0 | 8.4 | 12.1 | 21.7 | 12.5 | 16.1 | 22.5 | 13.8 | 12.1 | 23.8 | 12.4 | 9.6 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.8 | 8.0 | 8.0 | 9.3 | 7.8 | 10.4 | 11.1 | 8.4 | 9.6 | 8.9 | 8.2 | 7.7 | 10.2 | 9.2 | 8.9 | 5.9 | 7.9 | 8.1 | 8.0 | 9.9 | 8.7 | 9.3 | 7.7 | 11.4 | 9.0 | 7.4 | 8.2 | 7.3 | 6.9 | 8.6 | ** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.27 | 6.74 | 6.97 | 7.27 | 7.33 | 6.76 | 6.83 | 6.96 | 6.30 | 7.68 | 6.85 | 6.51 | 5.86 | 7.25 | 6.49 | 6.55 | 7.37 | 6.67 | 6.84 | 6.87 | 7.17 | 7.40 | 6.82 | 5.58 | 7.02 | 7.04 | 6.97 | 6.66 | 6.94 | 6.64 | 8.25 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 95.0 | 282.0 | 246.0 | 220.0 | 228.0 | 199.4 | 220.0 | 175.0 | 161.3 | 204.0 | 225.0 | 177.2 | 207.3 | 194.4 | 210.6 | 405.0 | 252.0 | 208.0 | 0.2 | 245.1 | 236.6 | 213.0 | 264.0 | 227.8 | 204.0 | 248.0 | 248.0 | 190.3 | 242.7 | 209.8 | 158.6 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 | 5 | 6 | <5.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 | <5 | 8 | 7.0 | <5 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 66 | 63 | 60 | 55 | 55 | 53 | 56 | 43 | 37 | 50 | 57 | 46 | 54 | 40 | 46 | 58 | 46 | 45 | 60 | 56 | 56 | 54 | 56 | 49 | 63 | 56 | 59 | 54 | 48 | 46 | 49 |
| Colour | TCU | 5 | -- | -- | -- | | 22 | 20 | 20 | 28 | 12 | 20 | 31 | 38 | 40 | 57 | 15 | 31 | 19 | 23 | 20 | 16 | 13 | 20 | 34 | 13 | 14 | 29 | 13 | 21 | 24 | 13 | 15 | 63 | 26 | 27 | 53 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.14 | 0.12 | 0.14 | 0.24 | 0.15 | 0.22 | 0.24 | 0.15 | 0.16 | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.13 | 0.10 | 0.24 | 0.30 | 0.24 | 0.17 | 0.06 | 0.1 | 0.1 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.14 | -- | -- | 0.24 | 0.15 | -- | 0.24 | -- | -- | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.06 | 0.10 | 0.13 | 0.17 | 0.24 | 0.17 | 0.06 | 0.1 | 0.1 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.07 | <0.05 | 0.11 | 0.13 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.04 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 | 0.03 | <0.03 | 0.04 | 0.03 | <0.03 |
| Total Kjeldahl-Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 2.8 | <0.4 | -- | 1.3 | <0.4 | 0.6 | 0.4 | 0.4 | 0.2 | 1.2 | 0.9 | <0.4 | <0.4 | 0.4 | <0.4 | 0.8 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.6 | 3.9 | 4.3 | 3.6 | 3.1 | 3.3 | 3.8 | 5.1 | 5.0 | 5.9 | 3.4 | 4.9 | 4.3 | 4.4 | 4.6 | 4.6 | 2.8 | 4.5 | 3.4 | 5.7 | 5.8 | 4.3 | 2.7 | 8.0 | 5.3 | 4.9 | 4.1 | 5.1 | 3.2 | 4.0 | 4.4 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.38 | 6.67 | 6.82 | 6.82 | 6.99 | 6.87 | 6.52 | 6.50 | 6.38 | 6.70 | 7.10 | 6.90 | 6.68 | 6.96 | 6.86 | 6.68 | 6.87 | 6.59 | 6.54 | 6.92 | 6.94 | 6.69 | 7.26 | 6.93 | 6.77 | 7.13 | 6.88 | 6.72 | 7.21 | 7.10 | 6.66 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.7 | 7.1 | 6.8 | 6.8 | 8.0 | 8.3 | 7.1 | 4.7 | 5.6 | 5.7 | 6.9 | 6.0 | 7.0 | 5.3 | 6.8 | 6.4 | 7.9 | 6.8 | 6,600.0 | 7.8 | 5.2 | 6.2 | 8.3 | 7.3 | 6.9 | 7.2 | 8.1 | 6.0 | 7.3 | 8.4 | 5.9 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.2 | 1.1 | 1.2 | 1.3 | 1.3 | 1.2 | 0.8 | 1.0 | 1.0 | 1.2 | 1.3 | 1.0 | 0.9 | 1.3 | 1.4 | 1.2 | 1.0 | 940.0 | 1.2 | 0.9 | 1.0 | 1.3 | 1.3 | 1.0 | 1.1 | 1.2 | 1.0 | 1.2 | 1.4 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | 0.005 | 0.005 | <0.002 | 0.003 | 0.008 | 0.003 | 0.012 | 0.019 | 0.045 | 0.007 | 0.006 | 0.006 | 0.012 | 0.009 | 0.023 | 1.168 | 0.004 | 0.004 | 0.002 | 0.008 | 0.005 | 0.004 | 0.006 | 0.009 | 0.007 | 0.010 | 0.010 | 0.006 | 0.011 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 1.1 | 0.9 | 0.8 | 0.8 | 1.0 | 0.9 | 0.7 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.6 | 1.2 | 0.8 | 1.1 | 0.9 | 770.0 | 0.9 | 0.7 | 0.7 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 | 0.7 | 1.0 | 1.1 | 0.7 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 38.0 | 38.0 | 35.0 | 28.3 | 33.1 | 33.0 | 33.0 | 20.8 | 21.3 | 31.2 | 34.5 | 26.4 | 35.1 | 20.1 | 32.1 | 36.4 | 39.0 | 35.3 | 34.0 | 40.0 | 27.1 | 32.1 | 37.2 | 32.8 | 44.0 | 41.4 | 35.9 | 35.9 | 36.6 | 39.9 | 44.3 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.7 | 2.6 | 2.6 | 3.2 | 2.9 | 3.2 | 2.9 | 2.5 | 2.6 | 2.7 | 2.0 | 2.6 | 2.9 | 2.6 | 2.7 | 2.6 | 1.9 | 2.4 | 2.5 | 2.4 | 2.6 | 2.6 | 1.8 | 2.5 | 2.2 | 1.6 | 1.9 | 2.6 | 1.7 | 1.9 | 2.1 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <1 | 1 | 1 | 2 | <2 | <1 | <1 | <1 | <1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 3 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 12 | 12 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 8 | 7 | 7 | 7 | 8 | 9 | 7 | 7 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 9 | 10 | 8 | 7.0 | 7.0 | 6.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 1.4 | 0.6 | 0.3 | 0.5 | 0.6 | 0.6 | 0.6 | 0.4 | 0.8 | 0.7 | 1.0 | 0.7 | 2.4 | 0.4 | 0.4 | 0.3 | 0.9 | 0.7 | 0.5 | 0.7 | 1.1 | 1.1 | 1.0 | 1.0 | 1.3 | 2.6 | 1.0 | 0.5 | 1.2 | 0.9 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 250 | 250 | 240 | 220 | 220 | 220 | 220 | 170 | 160 | 197 | 222 | 182 | 219 | 216 | 204 | 218 | 243 | 216 | 220 | 242 | 238 | 206 | 262 | 185 | 245 | 251 | 247 | 244 | 246 | 232 | 244 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.11 | 2.17 | 2.08 | 1.90 | 1.93 | 1.87 | 1.90 | 1.58 | 1.36 | 2.03 | 1.90 | 1.55 | 1.68 | 1.38 | 1.60 | 2.14 | 1.55 | 1.54 | 1.87 | 1.90 | 1.88 | 1.74 | 1.98 | 1.76 | 2.00 | 1.95 | 2.07 | 1.70 | 1.66 | 1.6 | 1.5 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 | 5 | 6 | <1.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 | <5 | 8 | <5 | <5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 128 | 130 | 123 | 110 | 117 | 116 | 115 | 88 | 82 | 111 | 113 | 91 | 106 | 78 | 100 | 122 | 106 | 100 | 110 | 119 | 103 | 105 | 120 | 107 | 127 | 122 | 122 | 107 | 106 | 109.0 | 108.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.12 | 2.16 | 1.99 | 1.69 | 1.97 | 1.98 | 1.92 | 1.23 | 1.32 | 1.77 | 1.98 | 1.60 | 2.00 | 1.24 | 1.89 | 2.07 | 2.23 | 2.00 | 1.89 | 2.27 | 1.55 | 1.83 | 2.18 | 1.94 | 2.38 | 2.28 | 2.10 | 1.98 | 2.09 | 2.3 | 2.3 |
| Hardness (CACO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 23.00 | 22.00 | 22.00 | 25.00 | 26.00 | 23.00 | 15.00 | 18.00 | 18.40 | 22.20 | 20.30 | 21.60 | 16.90 | 22.30 | 24.00 | 24.40 | 16.70 | 19.60 | 26.10 | 23.60 | 21.30 | 26.10 | 23.60 | 21.30 | 22.50 | 25.20 | 19.1 | 23.2 | 26.7 | 18.9 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 0.24 | 0.23 | 2.21 | 5.85 | 1.03 | 2.86 | 0.52 | 12.50 | 1.49 | 6.80 | 2.10 | 1.60 | 8.60 | 5.50 | 8.30 | 1.50 | 17.90 | 12.80 | 0.53 | 9.00 | 9.80 | 2.60 | 4.80 | 4.90 | 8.60 | 7.90 | 0.80 | 7.6 | 11.4 | 18.4 | 21.4 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | 1.00 | -2.89 | -2.92 | -2.60 | -2.73 | -3.23 | -3.33 | -3.35 | -2.77 | -2.88 | -3.21 | -3.37 | -3.19 | -3.05 | -2.93 | -3.12 | -3.39 | NC | -3.00 | -3.15 | -3.41 | -2.44 | -2.89 | -3.29 | -2.71 | -2.85 | -3.39 | -2.61 | -2.7 | -3.5 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | -3.25 | -3.14 | -3.17 | -2.85 | -2.99 | -3.49 | -3.58 | -3.60 | -3.09 | -3.20 | -3.53 | -3.69 | -3.51 | -3.37 | -3.25 | -3.44 | -3.71 | NC | -3.32 | -3.47 | -3.73 | -2.76 | -3.21 | -3.61 | -3.03 | -3.17 | -3.71 | -2.93 | -3.0 | -3.8 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | 9.67 | 9.71 | 9.74 | 9.59 | 9.60 | 9.75 | 9.83 | 9.73 | 9.47 | 9.98 | 10.10 | 10.00 | 10.20 | 9.91 | 9.61 | 9.99 | 9.98 | NC | 9.92 | 10.10 | 10.10 | 9.72 | 9.82 | 10.10 | 9.84 | 9.73 | 10.1 | 9.82 | 9.8 | 10.1 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | 9.92 | 9.96 | 9.99 | 9.84 | 9.86 | 10.00 | 10.10 | 9.98 | 9.79 | 10.30 | 10.40 | 10.40 | 10.50 | 10.20 | 9.93 | 10.30 | 10.30 | NC | 10.20 | 10.40 | 10.40 | 10.00 | 10.10 | 10.40 | 10.20 | 10.10 | 10.4 | 10.1 | 10.1 | 10.4 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 259 | 259 | -- | 124 | 54 | -- | 266 | -- | -- | 109 | 54 | 153 | 140 | 65 | 100 | 260 | 52 | 105 | 180 | -- | 90 | 163 | -- | -- | 128 | 36 | 43 | 164 | 26 | -- | 135.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | -- | <2 | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 13 | 13 | -- | 16 | 13 | -- | 19 | -- | -- | 18 | 17 | 15 | 19 | 9 | 18 | 17 | 17 | 16 | 19 | -- | 19 | 15 | -- | -- | 17 | -- | 20 | 14 | 15 | -- | 17.0 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 9 | 9 | -- | 8 | 9 | -- | <50 | -- | -- | 5 | 9 | 17 | 7 | 10 | 8 | 10 | 12 | <50 | -- | <5 | 8 | -- | -- | 7 | -- | 12 | 5 | 10 | -- | 6.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | 0.019 | 0.019 | -- | 0.026 | <0.017 | -- | 0.046 | -- | -- | 0.019 | 0.021 | 0.027 | 0.028 | <0.017 | <0.017 | 0.038 | 0.017 | 0.013 | -- | <0.017 | 0.021 | -- | -- | 0.022 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | -- | -- | 1 | | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | 7 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | <1 | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | 2 | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <2 | <2 | 1 | <1 | 2 | <2.0 | 1 | <1 | 2 | <1 | <1 | <1 | <1 | 1 | <1 | <1 | 1.0 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 523 | 523 | -- | 73 | 133 | 58 | 136 | 104 | 154 | 137 | 136 | 119 | 131 | 71 | 172 | 137 | 96 | 118 | 120 | 165 | 115 | 112 | 117 | 99 | 125 | 83 | 130 | 81 | 148 | <50 | 123.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | <0.5 | -- | 0.6 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.7 | <0.5 | <0.5 | 0.9 | 3.6 | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 0.7 | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 53 | 53 | -- | 37 | 67 | 32 | 42 | 33 | 33 | 25 | 47 | 46 | 37 | 20 | 92 | 41 | 45 | 27 | 36 | 48 | 24 | 31 | 41 | 20 | 30 | 35 | 54 | 21 | 50 | 22.0 | 26.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | <2 | -- | 2 | <2.0 | -- | 2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 3.0 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.1 | <0.1 | -- | <0.10 | <0.10 | -- | <0.10 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 12 | 12 | -- | 34 | 36 | -- | 33 | -- | -- | 25 | 33 | 29 | 33 | 18 | 32 | 31 | 32 | 29 | 29 | -- | 21 | 28 | -- | -- | 33 | -- | 41 | 27 | 38 | -- | 30.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 2 | 2 | -- | <2.0 | <2.0 | -- | 5 | -- | -- | <2 | <2 | <2 | <2 | <2 | 2 | 3 | <2 | 2 | 3 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <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 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | <2 | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | <5 | <5 | -- | 10 | 7 | 6 | 9 | 7 | 9 | <5 | <5 | 8 | 10 | 5 | 7 | 10 | <5 | 6 | 9 | 7 | 8 | 8 | <5 | <5 | 6 | 6 | 6 | 6 | <5 | <5 | 16.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 120 | 24 | -- | 190 | 16 | 58 | 72 | 110 | -- | 291 | 1,553 | 178 | 345 | 2,420 | 1,300 | 86 | 1,730 | >2420 | -- | 2,420 | 285 | 548 | 1,990 | 2,420 | 687 | 2,420 | 411 | <1 | NDOGT | 5,020.0 | 103.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 1 | 17 | -- | 2 | <1 | 8 | 5 | 37 | <100 | 2 | <1 | 3 | 8 | 21 | <1 | <1 | <1 | 13 | <0.10 | 7 | 6 | 2 | 38 | 30 | 7 | 13 | 46 | <1 | 51 | 20.0 | 1.0 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.04 | 1.11 | 1.18 | 1.30 | 1.14 | 0.51 | 0.78 | 1.26 | 1.24 | 0.52 | 1.30 | 0.81 | 1.44 | 2.00 | 0.65 | 0.76 | 0.59 | 1.23 | 0.72 | 1.27 | 1.34 | 1.63 | 0.81 | 2.29 | 1.96 | 1.24 | 1.34 | 1.16 | 1.14 | 1.28 | 0.74 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.94 | 0.97 | 1.21 | 1.09 | 1.19 | 0.42 | 0.67 | 0.98 | 1.01 | 0.55 | 1.20 | 1.14 | 1.62 | 2.30 | 0.61 | 0.69 | 0.51 | 1.12 | 0.68 | 1.34 | 0.69 | 2.00 | 0.99 | 2.37 | 2.46 | 1.32 | 1.87 | 1.80 | -- | * | 0.74 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environment Environmental Quality Standards for Surface Water (Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KL4 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 |
| Sampling Time | hh:mm | -- | | | | | 10:00 | 11:30 | 10:00 | 11:20 | 13:50 | 11:15 | 10:10 | 11:40 | 11:40 | 10:16 | 12:00 | 11:40 | 9:41 | 10:30 | 14:20 | 11:15 | 11:35 | 14:35 | 10:25 | 11:02 | 11:15 | 11:30 | 12:00 | 11:11 | 9:25 | 10:45 AM | 10:05 AM | 10:45 AM | 9:00 AM | 11:45 AM | 9:43 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 13.4 | 21.9 | 17.3 | 14.5 | 21.9 | 9.8 | 10.1 | 21.2 | 15.3 | 9.0 | 24.4 | 15.7 | 11.7 | 20.4 | 13.5 | 11.0 | 21.8 | 12.5 | 14.8 | 24.7 | 9.5 | 12.2 | 20.6 | 12.3 | 16.5 | 22.4 | 13.8 | 12.7 | 23.1 | 12.7 | 9.9 |
| Dissolved Oxygen | mg/L | -- | -- | | 5.5 - 9.5 | | 10.9 | 8.1 | 8.3 | 9.0 | 6.3 | 10.9 | 11.0 | 8.6 | 9.7 | 8.7 | 7.3 | 8.9 | 10.1 | 8.9 | 9.6 | 14.5 | 5.9 | 7.5 | 9.8 | 9.1 | 8.8 | 8.3 | 5.5 | 10.1 | 8.3 | 6.4 | 7.3 | 11.0 | 4.7 | 8.5 | ** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 8.00 | 6.71 | 6.94 | 7.19 | 6.98 | 6.07 | 6.49 | 6.43 | 6.02 | 9.00 | 6.71 | 6.77 | 5.72 | 7.08 | 6.41 | 6.30 | 7.25 | 6.55 | 6.64 | 6.81 | 7.09 | 7.32 | 6.72 | 8.14 | 6.90 | 6.88 | 6.84 | 7.01 | 6.67 | 6.91 | 8.68 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 771.0 | 262.0 | 247.0 | 224.0 | 226.0 | 214.8 | 218.0 | 171.9 | 126.2 | 206.0 | 225.0 | 185.9 | 207.1 | 196.2 | 209.0 | 273.0 | 251.0 | 208.0 | 0.2 | 243.5 | 232.4 | 215.0 | 260.0 | 228.0 | 213.0 | 262.0 | 252.0 | 202.9 | 251.0 | 210.6 | 161.1 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <5.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 | 10 | <5 | 9 | 8.0 | <5 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 67 | 65 | 60 | 56 | 56 | 53 | 56 | 44 | 37 | 51 | 57 | 46 | 54 | 41 | 47 | 59 | 47 | 48 | 61 | 56 | 55 | 54 | 58 | 49 | 64 | 62 | 59 | 52 | 50 | 47 | 50 |
| Colour | TCU | 5 | -- | -- | -- | | 22 | 18 | 20 | 27 | 15 | 20 | 32 | 38 | 43 | 48 | 11 | 20 | 17 | 21 | 20 | 13 | 11 | 28 | 33 | 10 | 12 | 25 | 12 | 22 | 19 | 11 | 16 | 35 | 10 | 16 | 42 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.15 | 0.12 | 0.14 | 0.23 | 0.19 | 0.21 | 0.23 | 0.15 | 0.17 | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.21 | 0.10 | 0.27 | 0.12 | 0.15 | 0.27 | 0.25 | 0.1 | 0.2 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.15 | -- | -- | 0.23 | 0.19 | -- | 0.23 | -- | -- | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.14 | 0.10 | 0.15 | 0.12 | 0.15 | 0.17 | 0.13 | 0.1 | 0.2 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.07 | <0.05 | 0.12 | <0.05 | 0.10 | 0.12 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.10 | <0.03 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 | 0.04 | <0.03 | 0.04 | 0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | <0.4 | 0.7 | -- | 1.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.2 | 0.4 | 1.0 | <0.4 | <0.4 | 0.4 | <0.4 | 0.5 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.6 | 4.0 | 3.3 | 2.6 | 3.1 | 3.7 | 6.0 | 5.4 | 7.5 | 3.2 | 4.8 | 4.2 | 4.5 | 4.3 | 4.4 | 2.1 | 4.4 | 2.8 | 5.2 | 5.7 | 4.3 | 3.3 | 8.1 | 5.1 | 4.3 | 4.0 | 5.1 | 2.7 | 4.0 | 4.5 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.61 | 6.75 | 6.83 | 6.83 | 6.93 | 6.83 | 6.57 | 6.57 | 6.46 | 6.70 | 7.00 | 6.90 | 6.69 | 6.96 | 6.85 | 6.69 | 6.91 | 6.85 | 6.59 | 6.94 | 6.97 | 6.70 | 7.03 | 6.89 | 6.75 | 6.99 | 6.95 | 6.74 | 7.13 | 7.13 | 6.67 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.8 | 7.7 | 7.0 | 6.8 | 8.0 | 8.5 | 6.8 | 4.9 | 5.2 | 5.7 | 6.8 | 5.8 | 6.8 | 5.1 | 6.8 | 6.4 | 7.9 | 6.8 | 6,500.0 | 7.9 | 3.7 | 6.5 | 7.1 | 7.3 | 7.7 | 7.5 | 8.6 | 5.9 | 7.9 | 7.7 | 6.2 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.2 | 0.9 | 1.0 | 1.0 | 1.2 | 1.2 | 1.0 | 0.8 | 1.2 | 1.3 | 1.2 | 1.0 | 920.0 | 1.3 | 1.0 | 1.0 | 1.1 | 1.3 | 1.2 | 1.1 | 1.3 | 1.0 | 1.2 | 1.3 | 1.0 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | <0.002 | 0.004 | <0.002 | <0.002 | 0.007 | 0.003 | 0.026 | 0.022 | 0.043 | 0.007 | 0.006 | 2.360 | 0.016 | 0.022 | 0.031 | 0.015 | 0.006 | 0.007 | 0.003 | 0.007 | 0.004 | 0.007 | 0.010 | 0.008 | 0.006 | 0.024 | 0.004 | 0.004 | 0.009 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 | 0.8 | 0.7 | 1.1 | 0.7 | 1.0 | 0.9 | 0.8 | 0.6 | 1.2 | 0.8 | 1.1 | 0.9 | 760.0 | 0.9 | 0.7 | 0.7 | 0.9 | 1.0 | 0.8 | 0.9 | 1.1 | 0.7 | 1.0 | 1.0 | 0.8 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 39.0 | 41.0 | 37.0 | 28.5 | 34.3 | 33.9 | 32.1 | 21.5 | 21.1 | 31.5 | 34.5 | 25.2 | 31.6 | 20.1 | 30.7 | 35.9 | 38.6 | 34.1 | 34.0 | 40.0 | 28.2 | 32.4 | 41.4 | 31.1 | 37.6 | 41.4 | 38.9 | 35.6 | 39.2 | 40.6 | 37.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.7 | 2.6 | 2.6 | 3.1 | 2.9 | 3.1 | 2.9 | 2.5 | 2.7 | 2.7 | 2.2 | 2.6 | 3.0 | 2.6 | 2.5 | 2.6 | 2.0 | 2.4 | 2.5 | 2.6 | 3.0 | 2.6 | 2.0 | 2.4 | 2.3 | 1.7 | 2.1 | 2.6 | 1.8 | 2.0 | 2.1 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <1 | 1 | <1 | <2 | <2 | <1 | 2 | <1 | <2 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <1.0 | 7 | <5 | 7 | <5 | 10 | 6 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 12 | 11 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 8 | 7 | 7 | 7 | 9 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 9 | 10 | 8 | 7.0 | 8.0 | |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.5 | 1.0 | 0.3 | 0.3 | 0.2 | 0.8 | 0.7 | 0.7 | 0.4 | 0.7 | 0.4 | 0.8 | 0.7 | 2.6 | 2.1 | 1.1 | 0.6 | 0.8 | 0.6 | 0.7 | 1.2 | 1.2 | 1.5 | 1.6 | 1.3 | 0.9 | 1.6 | 1.2 | 0.5 | 1.7 | 0.8 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 260 | 250 | 230 | 220 | 230 | 250 | 210 | 170 | 160 | 200 | 224 | 183 | 218 | 218 | 204 | 219 | 241 | 218 | 220 | 241 | 235 | 206 | 275 | 185 | 251 | 255 | 248 | 243 | 252 | 231 | 246 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.23 | 2.22 | 2.09 | 1.91 | 1.94 | 1.85 | 1.88 | 1.62 | 1.36 | 2.04 | 1.94 | 1.45 | 1.68 | 1.31 | 1.53 | 2.47 | 1.60 | 2.11 | 1.88 | 1.90 | 1.87 | 1.74 | 2.04 | 1.76 | 2.03 | 2.12 | 2.08 | 1.65 | 1.75 | 1.7 | 1.6 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <1.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 | 10 | <5 | 9 | 8.0 | <5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 132 | 135 | 125 | 111 | 118 | 116 | 113 | 90 | 81 | 111 | 114 | 87 | 103 | 75 | 97 | 132 | 108 | 117 | 110 | 121 | 102 | 106 | 125 | 105 | 123 | 128 | 126 | 105 | 113 | 111.0 | 102.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.16 | 2.32 | 2.07 | 1.70 | 2.02 | 2.03 | 1.86 | 1.28 | 1.30 | 1.78 | 1.97 | 1.53 | 1.84 | 1.23 | 1.84 | 2.04 | 2.21 | 1.94 | 1.91 | 2.35 | 1.53 | 1.86 | 2.28 | 1.87 | 2.17 | 2.31 | 2.27 | 1.96 | 2.24 | 2.24 | 2.3 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 25.00 | 22.00 | 22.00 | 25.00 | 27.00 | 22.00 | 16.00 | 17.00 | 18.40 | 21.90 | 19.40 | 21.10 | 16.00 | 21.90 | 21.30 | 24.70 | 21.10 | 20.00 | 25.10 | 13.40 | 20.30 | 22.30 | 23.60 | 24.20 | 23.30 | 26.80 | 18.9 | 24.7 | 24.7 | 19.6 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 1.59 | 2.20 | 0.48 | 5.82 | 2.02 | 4.64 | 0.53 | 11.70 | 2.26 | 6.60 | 0.80 | 2.80 | 4.50 | 3.20 | 9.20 | 9.50 | 15.80 | 4.20 | 0.79 | 10.70 | 10.10 | 3.40 | 5.50 | 3.00 | 3.20 | 4.10 | 4.30 | 8.6 | 12.1 | 16.2 | 13.8 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.21 | -2.89 | -2.84 | -2.92 | -2.64 | -2.75 | -3.22 | -3.18 | -3.31 | -2.79 | -2.86 | -3.22 | -3.37 | -3.21 | -3.23 | -3.21 | -2.63 | -3.08 | -2.45 | NC | -2.98 | -3.20 | -3.38 | -2.76 | -2.93 | -3.26 | -2.78 | -2.71 | -3.38 | -2.61 | -2.7 | -3.4 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.46 | -3.14 | -3.09 | -3.17 | -2.89 | -3.00 | -3.47 | -3.43 | -3.56 | -3.11 | -3.18 | -3.54 | -3.69 | -3.53 | -3.53 | -2.95 | -3.40 | -2.77 | NC | -3.30 | -3.52 | -3.70 | -3.08 | -3.25 | -3.58 | -3.10 | -3.03 | -3.70 | -2.93 | -3.0 | -3.8 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.82 | 9.64 | 9.67 | 9.75 | 9.57 | 9.58 | 9.79 | 9.75 | 9.77 | 9.49 | 9.86 | 10.10 | 10.10 | 10.20 | 10.10 | 9.32 | 9.99 | 9.30 | NC | 9.92 | 10.20 | 10.10 | 9.79 | 9.82 | 10.00 | 9.77 | 9.66 | 10.1 | 9.74 | 9.8 | 10.1 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.10 | 9.89 | 9.92 | 10.00 | 9.82 | 9.83 | 10.00 | 10.00 | 10.00 | 9.81 | 10.20 | 10.40 | 10.40 | 10.50 | 10.40 | 9.64 | 10.30 | 9.62 | NC | 10.20 | 10.50 | 10.40 | 10.10 | 10.10 | 10.30 | 10.10 | 9.98 | 10.4 | 10.1 | 10.1 | 10.4 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 150 | -- | -- | 125 | 29 | -- | 231 | -- | -- | -- | 188 | 48 | 149 | 141 | 106 | 159 | 236 | 46 | 93 | 160 | -- | 84 | 172 | -- | -- | 180 | -- | 89 | 55 | 157 | 33 | -- | 132.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 16 | -- | -- | 17 | 18 | -- | 18 | -- | -- | 18 | 17 | 16 | 18 | 10 | 19 | 17 | 19 | 16 | 20 | -- | 17 | 16 | -- | -- | 20 | -- | 20 | 15 | 19 | -- | 18.0 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 6 | -- | -- | 9 | 9 | -- | <50 | -- | -- | 6 | 9 | 16 | 7 | 6 | 9 | 8 | 11 | 11 | <50 | -- | <5 | 7 | -- | -- | <5 | -- | 11 | 6 | 10 | -- | 6.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | 0.03 | -- | -- | 0.031 | <0.017 | -- | <0.017 | -- | -- | 0.021 | <0.017 | 0.027 | 0.022 | 0.017 | 0.058 | 0.027 | <0.017 | <0.017 | 0.031 | -- | <0.017 | 0.026 | -- | -- | 0.051 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | -- | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | 6 | <1 | <1 | <1 | <1 | 6 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | 4 | <1 | <1 | <1 | <1 | <1 | <1 | <0.4 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | <2.0 | 2 | <2.0 | 2 | <2.0 | <2.0 | <2 | <2 | 9 | <1 | 1 | <1 | <1 | 2 | 7 | 1 | 1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.0 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 86 | -- | -- | 82 | 51 | 55 | 119 | 109 | 138 | 129 | 118 | 133 | 213 | 144 | 248 | 129 | 55 | 104 | 100 | 217 | 83 | 122 | 61 | 114 | 136 | 131 | 141 | 83 | 119 | 78.0 | 120.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 3.2 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.8 | 0.9 | <0.5 | <0.5 | 2.6 | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 1.4 | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 51 | -- | -- | 35 | 64 | 29 | 39 | 27 | 30 | 23 | 34 | 38 | 34 | 77 | 130 | 34 | 29 | 24 | 25 | 78 | 34 | 34 | 58 | 29 | 74 | 76 | 48 | 19 | 84 | 43.0 | 24.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 3 | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | 5 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | 7 | -- | <2 | <2 | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | 1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.5 | -- | -- | <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 | <0.1 | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 34 | -- | -- | 33 | 37 | -- | 33 | -- | -- | 25 | 32 | 28 | 32 | 17 | 31 | 31 | 31 | 29 | 30 | -- | 20 | 28 | -- | -- | 33 | -- | 40 | 27 | 39 | -- | 33.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | 5 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | <2 | <2 | <2 | <2 | 3 | 2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 14 | -- | -- | 10 | 7 | 7 | 11 | 7 | 7 | <5 | <5 | 68 | 21 | <5 | 9 | 9 | <5 | <5 | 10 | 8 | 12 | 7 | <5 | <5 | 13 | 7 | <5 | 7 | <5 | 7.0 | 7.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 28 | 58 | -- | 100 | 16 | 75 | 83 | 95 | -- | 345 | >2420 | 921 | 548 | >2420 | 770 | 308 | 1,550 | >2420 | --- | >2420 | 281 | 488 | 1,730 | >2420 | 792 | >2420 | >2420 | 4 | NDOGT | 8,000.0 | 198.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 4 | 33 | -- | 1 | <1 | 2 | 5 | 39 | <100 | 4 | <1 | 4 | 6 | 38 | <1 | <1 | 1 | 8 | <10 | 5 | 1 | 2 | 35 | 29 | 15 | 1 | 3 | 2 | 19 | 12.0 | <1 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.78 | 1.11 | 1.06 | 0.92 | 0.07 | 0.50 | 0.60 | 1.04 | 1.31 | 0.52 | 0.70 | 0.55 | 1.34 | 1.50 | 0.40 | 0.44 | 0.50 | 1.03 | 0.55 | 0.26 | 1.09 | 1.62 | 0.16 | 2.18 | 2.40 | 0.33 | 0.35 | 1.06 | 0.24 | 1.12 | 0.78 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.69 | 0.96 | 1.11 | 0.77 | 0.07 | 0.41 | 0.55 | 0.82 | 1.07 | 0.55 | 0.70 | 0.74 | 1.48 | 1.70 | 0.39 | 0.40 | 0.57 | 0.95 | 0.51 | 0.31 | 0.55 | 2.09 | 0.21 | 2.15 | 3.04 | 0.39 | 0.43 | 1.71 | -- | * | 0.82 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environment Environmental Quality Standards for Surface Water (Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

**Underlined (bold, shaded)** = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KLS | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2011/10/17 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/11/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/09 | 2018/08/17 | 2018/10/17 | 05/09/2019 |
| Sampling Time | hh:mm | -- | | | | | 9:40 | 10:52 | 13:10 | 12:10 | 10:03 | 10:50 | 13:45 | 11:30 | 13:55 | 10:45 | 09:00 | 12:04 | 12:00 | 10:00 | 8:00 | 13:05 | 9:00 | 9:45 | 9:50 | 9:30 | 8:20 | 9:30 AM | 9:10 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.7 | 2.1 | 5.3 | 4.2 | 2.1 | 4.6 | 2.7 | 3.1 | 3.01 | 3.8 | 3.1 |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.7 | 10.5 | 26.1 | 16.6 | 13.3 | 22.7 | 14.7 | 13.7 | 22.9 | 12.8 | 14.1 | 25.4 | 9.4 | 12.2 | 22.2 | 12.7 | 16.8 | 21.0 | 14.6 | 12.7 | 24.5 | 13.1 | 11.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 9.4 | 7.9 | 7.9 | 8.2 | 9.7 | 8.9 | 8.6 | 15.8 | 7.6 | 7.9 | 8.3 | 8.8 | 7.6 | 10.5 | 8.4 | 9.9 | 8.7 | 7.1 | 7.2 | 10.42 | 6.42 | 7.6 | ** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.52 | 7.76 | 6.69 | 6.72 | 6.20 | 8.57 | 6.51 | 6.79 | 7.86 | 6.60 | 7.82 | 6.77 | 7.05 | 5.76 | 5.11 | 5.72 | 7.00 | 6.83 | 7.05 | 6.74 | 7.14 | 6.67 | 6.26 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 111.9 | 230.0 | 229.0 | 189.0 | 219.5 | 202.1 | 212.9 | 472.0 | 251.0 | 211.0 | 0.2 | 249.8 | 240.8 | 209.0 | 267.0 | 243.2 | 219.0 | 246.0 | 257.0 | 196.4 | 244.9 | 236.4 | 171.6 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 9 | 21 | 8 | <5 | <5 | 6 | 5 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26.0 | <5 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 37 | 55 | 57 | 48 | 58 | 44 | 46 | 61 | 47 | 47 | 59 | 58 | 58 | 54 | 56 | 53 | 65 | 58 | 60 | 56 | 49 | 47 | 51 |
| Colour | TCU | 5 | -- | -- | -- | | 35 | 43 | 10 | 27 | 10 | 22 | 18 | 14 | 11 | 22 | 35 | 8 | 19 | 27 | 13 | 17 | 18 | 14 | 14 | 14 | 14 | 12 | 38 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.17 | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.25 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.19 | 0.15 | 0.25 | 0.25 | 0.21 | 0.09 | 0.17 | 0.20 | 0.4 | 0.1 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | -- | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.20 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.09 | 0.15 | 0.13 | 0.07 | 0.09 | 0.17 | 0.09 | 0.4 | 0.1 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.10 | <0.05 | 0.12 | 0.14 | <0.05 | <0.05 | 0.11 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.06 | <0.050 | <0.03 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | 0.05 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | <0.4 | 2.3 | 1.0 | -- | 0.6 | 1.1 | <0.4 | 0.5 | 1.1 | 0.3 | <0.4 | 1.8 | 0.5 | <0.4 | 0.7 | 0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 4.8 | 5.8 | 3.4 | 4.7 | 4.0 | 4.6 | 7.0 | 4.3 | 2.7 | 4.5 | 3.1 | 5.3 | 5.7 | 4.4 | 3.3 | 7.0 | 4.7 | 4.8 | 3.9 | 4.9 | 2.9 | 3.0 | 4.5 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.57 | 6.70 | 7.10 | 6.50 | 6.71 | 6.93 | 6.89 | 6.64 | 6.84 | 6.63 | 6.56 | 6.90 | 6.94 | 6.66 | 7.16 | 7.03 | 6.74 | 7.09 | 6.93 | 6.70 | 7.15 | 7.47 | 6.64 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 5.8 | 6.1 | 6.6 | 5.9 | 7.1 | 5.7 | 6.4 | 6.5 | 7.6 | 7.0 | 6,500.0 | 8.0 | 4.7 | 6.3 | 7.3 | 8.2 | 7.4 | 7.0 | 7.5 | 5.9 | 6.7 | 7.6 | 6.4 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.0 | 1.3 | 1.2 | 1.0 | 1.0 | 1.1 | 1.4 | 1.2 | 1.0 | 930.0 | 1.3 | 0.9 | 1.0 | 1.1 | 1.3 | 1.2 | 1.0 | 1.1 | 1.0 | 1.1 | 1.2 | 1.1 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.009 | 0.018 | 0.040 | 0.006 | 0.005 | 0.013 | 0.010 | 0.010 | 0.026 | 0.116 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 | 0.003 | 0.010 | 0.012 | 0.005 | 0.011 | 0.005 | 0.005 | **0.011** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 0.7 | 0.9 | 0.8 | 0.8 | 0.7 | 1.1 | 0.8 | 1.1 | 0.9 | 720.0 | 0.1 | 0.7 | 0.7 | 0.9 | 1.0 | 0.9 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 22.0 | 34.6 | 32.0 | 27.7 | 33.6 | 19.2 | 31.3 | 37.5 | 40.3 | 38.3 | 33.0 | 42.6 | 28.3 | 32.5 | 33.1 | 33.5 | 38.9 | 42.4 | 37.2 | 37.2 | 38.5 | 41.7 | 43.8 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.7 | 2.0 | 2.4 | 2.7 | 2.5 | 2.5 | 2.7 | 2.1 | 2.5 | 3.3 | 1.9 | 2.2 | 2.7 | 2.0 | 2.3 | 2.1 | 1.6 | 1.7 | 2.4 | 1.7 | 3.4 | 2.1 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <1.0 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 9 | 7 | 8 | 8 | 8 | 7 | 8 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 8 | 10 | 8 | 7.0 | 11.0 | 6.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.9 | 1.1 | 0.7 | 0.9 | 0.7 | 0.8 | 0.4 | 1.1 | 0.4 | 0.8 | 0.7 | 1.0 | 1.0 | 0.7 | 1.3 | 1.2 | 0.9 | 0.9 | 0.9 | 1.4 | 0.4 | 0.7 | 0.9 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 160 | 215 | 226 | 189 | 232 | 223 | 204 | 228 | 246 | 225 | 220 | 248 | 244 | 208 | 267 | 196 | 248 | 249 | 246 | 247 | 247 | 286 | 249 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.42 | 2.13 | 1.95 | 1.58 | 1.82 | 1.52 | 1.58 | 2.56 | 1.50 | 1.50 | 1.94 | 1.95 | 1.96 | 1.74 | 1.94 | 1.89 | 2.06 | 1.96 | 2.09 | 1.76 | 1.68 | 2.1 | 1.6 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 9 | 21 | 8 | <5 | <5 | 6 | 5 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26.0 | <5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 84 | 118 | 111 | 96 | 110 | 82 | 98 | 136 | 106 | 103 | 120 | 124 | 106 | 105 | 114 | 113 | 125 | 122 | 123 | 110 | 108 | 127.0 | 110.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.36 | 1.94 | 1.85 | 1.64 | 1.94 | 1.23 | 1.81 | 2.12 | 2.27 | 2.14 | 1.87 | 2.40 | 1.58 | 1.86 | 1.93 | 2.01 | 2.20 | 2.30 | 2.12 | 2.04 | 2.13 | 2.3 | 2.4 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 19.00 | 19.30 | 21.00 | 19.70 | 21.80 | 18.40 | 20.50 | 22.00 | 23.90 | 21.60 | 20.00 | 25.30 | 15.40 | 19.80 | 22.80 | 25.80 | 23.40 | 21.60 | 23.30 | 18.9 | 21.3 | 23.9 | 20.5 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 2.16 | 4.70 | 2.60 | 2.00 | 3.20 | 10.60 | 6.70 | 9.40 | 20.30 | 17.50 | 1.84 | 10.20 | 10.80 | 3.20 | 0.40 | 3.00 | 3.40 | 8.10 | 0.70 | 7.3 | 11.8 | 5.0 | 19.9 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.06 | -2.79 | -2.77 | -3.62 | -3.33 | -3.11 | -3.19 | -2.64 | -3.17 | -3.42 | -3.24 | -3.20 | -3.13 | -3.43 | -2.72 | -2.69 | -3.29 | -2.82 | -2.84 | -3.42 | -2.77 | -1.8 | -3.5 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.31 | -3.11 | -3.09 | -3.94 | -3.65 | -3.43 | -3.51 | -2.96 | -3.49 | -3.74 | -3.50 | -3.34 | -3.45 | -3.75 | -3.04 | -3.01 | -3.61 | -3.14 | -3.16 | -3.74 | -3.09 | -2.2 | -3.8 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.63 | 9.49 | 9.87 | 10.10 | 10.00 | 10.00 | 10.10 | 9.28 | 10.00 | 10.00 | 9.81 | 9.92 | 10.10 | 10.10 | 9.88 | 9.72 | 10.00 | 9.91 | 9.77 | 10.1 | 9.92 | 9.3 | 10.1 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.88 | 9.81 | 10.20 | 10.40 | 10.40 | 10.40 | 10.40 | 9.60 | 10.30 | 10.40 | 10.10 | 10.20 | 10.40 | 10.40 | 10.20 | 10.00 | 10.30 | 10.20 | 10.10 | 10.4 | 10.2 | 9.6 | 10.4 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | -- | 222 | 52 | 154 | 136 | 58 | 61 | 224 | 53 | 108 | 160 | --- | 79 | 161 | -- | -- | 156 | 45 | 44 | 172 | 30 | -- | **142.0** |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | -- | 18 | 16 | 15 | 19 | 9 | 16 | 16 | 17 | 17 | 17 | --- | 19 | 14 | -- | -- | 17 | -- | 17 | 13 | 13 | -- | 17.0 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | -- | 6 | 9 | 15 | 7 | 7 | 9 | 7 | 6 | 10 | <50 | --- | <5 | 7 | -- | -- | <5 | -- | 10 | 5 | 9 | -- | 6.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | -- | 0.022 | 0.027 | 0.029 | 0.024 | <0.017 | 0.034 | 0.036 | <0.017 | 0.034 | 0.035 | --- | 0.172 | 0.034 | -- | -- | 0.021 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | -- | -- | 1 | | -- | <1 | <1 | 5 | <1 | <1 | <1 | 6 | <1 | <1 | <1.0 | --- | 7 | <1 | -- | -- | 2 | -- | <1 | <1 | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | <1 | <1 | 5 | <2.0 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | <1 | <1 | 1.0 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 175 | 160 | 78 | 120 | 111 | 70 | 79 | 111 | <50 | 119 | 100 | 123 | 158 | 96 | 55 | 88 | 59 | <50 | 106 | 80 | 81 | <50 | 121.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | -- | <0.5 | <0.5 | 0.6 | <0.5 | <0.5 | <0.5 | 1.9 | <0.5 | 0.5 | <0.5 | --- | <0.5 | <0.5 | -- | -- | <0.5 | -- | 0.9 | <0.5 | -- | <0.5 | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 36 | 30 | 14 | 37 | 35 | 13 | 12 | 40 | 18 | 25 | 34 | 24 | 35 | 23 | 15 | 17 | 24 | 11 | 13 | 24 | 15 | 14.0 | 25.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | -- | <2 | <2 | 5 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | --- | 3 | 3 | -- | -- | 14 | -- | <2 | <2 | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | --- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | -- | 27 | 31 | 29 | 31 | 18 | 31 | 31 | 30 | 30 | 29 | --- | 23 | 28 | -- | -- | 32 | -- | 38 | 28 | 35 | -- | 31.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | -- | <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 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | -- | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | 2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | -- | 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 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 9 | 5 | <5 | 64 | 11 | 7 | 5 | 10 | <5 | 10 | 14 | 6 | 12 | 10 | <5 | <5 | 11 | 8 | <5 | 8 | <5 | 7.0 | 7.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | -- | 461 | 613 | 93 | 461 | 308 | 461 | 42 | 629 | >2470 | --- | 356 | 163 | 179 | 517 | 2,420 | 260 | 577 | >2420 | 58 | 601 | 6,000.0 | 55.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 100 | 14 | 2 | 6 | 6 | 6 | 4 | <1 | 1 | 17 | <10 | 1 | 2 | <1 | 23 | 44 | <1 | 5 | 517 | 8 | 1 | 11.0 | 1.0 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.91 | 0.30 | 1.20 | 1.09 | 1.44 | 2.20 | 0.64 | 0.20 | 0.61 | 0.90 | 0.48 | 1.22 | 2.71 | 1.52 | 1.20 | 2.32 | 1.09 | 1.43 | 1.22 | 6.25 | 1.28 | 1.68 | 1.24 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.85 | 0.33 | 1.00 | 1.41 | 1.59 | 2.40 | 0.62 | 0.20 | 0.54 | 0.84 | --- | 1.26 | 1.44 | 1.86 | 1.57 | 2.34 | 1.28 | 1.40 | 1.33 | 3.35 | -- | * | 1.19 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environment Environmental Quality Standards for Surface Water (Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Highway 102 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | HWY102-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/15 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 |
| Sampling Time | hh:mm | -- | | | | | 07:00 | 12:45 | 08:00 | 13:00 | 10:20 | 09:00 | 13:40 | 11:00 | 11:00 | 14:50 | 11:00 | 9:50 | 14:15 | 12:22 | 12:30 | 12:00 | 10:10 | 9:30 | 13:15 | 09:20 | 9:40 | 14:30 | 11:00 | 10:20 | 12:00 | 15:00 | 11:40 | 12:40 | 11:00 | 15:40:00 PM | 2:45 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 11.8 | 18.8 | 15.7 | 14.9 | 19.6 | 7.4 | 11.4 | 17.8 | 14.6 | 10.7 | 21.8 | 13.6 | 11.7 | 19.5 | 8.9 | 12.1 | 19.6 | 10.2 | 14.3 | 20.7 | 5.4 | 13.4 | 19.3 | 9.2 | 16.4 | 22.1 | 10.1 | 14.4 | 21.4 | 10.6 | 14.0 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 11.4 | 5.8 | 4.3 | 8.2 | 4.3 | 6.1 | 8.2 | 3.9 | 5.3 | 5.7 | 1.0 | 3.8 | 7.6 | 3.3 | 3.1 | 12.0 | 2.1 | 4.5 | 4.3 | 3.8 | 5.0 | 8.2 | 10.1 | 7.4 | 5.8 | 5.8 | 5.6 | 7.1 | 2.8 | 6.1 | ** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.98 | 5.35 | 5.25 | 6.31 | 5.26 | 5.62 | 5.75 | 5.77 | 5.99 | 8.76 | 5.73 | 6.38 | 6.19 | 7.10 | 6.79 | 6.02 | 6.63 | 5.12 | 6.35 | 6.24 | 6.92 | 7.34 | 6.14 | 5.58 | 6.40 | 7.76 | 6.32 | 6.13 | 6.13 | 6.70 | 7.20 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 194.0 | 153.0 | 103.8 | 135.0 | 106.0 | 108.6 | 114.1 | 107.6 | 88.6 | 288.0 | 225.0 | 155.5 | 226.0 | 173.2 | 234.0 | 880.0 | 337.0 | 109.0 | 0.4 | 335.8 | 251.2 | 289.0 | 353.0 | 208.9 | 354.0 | 257.0 | 266.0 | 232.2 | 280.5 | 189.4 | 330.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | <5 | <5 | <5 | <5 | <5 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 | 17 | 21 | 16 | 13 | 26 | 12.0 | 12.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 24 | 38 | 24 | 32 | 25 | 22 | 24 | 19 | 12 | 58 | 48 | 28 | 53 | 31 | 40 | 65 | 57 | 19 | 130 | 67 | 49 | 71 | 87 | 35 | 101 | 49 | 51 | 51 | 54 | 61 | 90 |
| Colour | TCU | 5 | -- | -- | -- | | 67 | 68 | 57 | 37 | 89 | 53 | 39 | 65 | 79 | 24 | 65 | 40 | 9 | 65 | 25 | 11 | 31 | 93 | 22 | 27 | 29 | 23 | 37 | 64 | 24 | 31 | 29 | 27 | 56 | 68 | 35 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | <0.05 | <0.05 | <0.05 | 0.69 | <0.05 | 1.20 | 0.69 | 0.25 | 1.20 | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | 0.13 | 0.53 | 0.35 | 0.71 | 0.58 | 0.37 | 0.11 | 0.2 | 0.6 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | <0.05 | -- | -- | 0.69 | <0.05 | -- | 0.69 | -- | -- | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | <0.05 | 0.53 | 0.18 | 0.50 | 0.58 | 0.37 | <0.05 | 0.2 | 0.3 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.13 | <0.05 | 0.17 | 0.21 | <0.05 | <0.05 | 0.11 | <0.05 | 0.25 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.29 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.10 | 0.07 | 0.31 | 0.19 | 0.04 | <0.03 | 0.05 | 0.06 | <0.03 | 0.04 | 0.03 | <0.050 | <0.03 | 0.04 | 0.06 | 0.06 | <0.03 | <0.03 | 0.10 | 0.07 | <0.03 | 0.07 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.1 | 1.3 | 0.6 | -- | 0.6 | 0.6 | 0.7 | 0.6 | <0.4 | 0.3 | 0.5 | 0.6 | 0.7 | 1.2 | 0.7 | 0.5 | 1.3 | 3.8 | 1.1 | 0.70 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 6.5 | 10.0 | 7.7 | 4.7 | 11.0 | 6.3 | 4.5 | 7.2 | 7.4 | 5.5 | 10.0 | 7.0 | 5.1 | 10.1 | 17.7 | 4.1 | 7.7 | 9.0 | 2.7 | 14.6 | 8.4 | 4.5 | 8.0 | 11.5 | 7.4 | 8.6 | 6.9 | 5.0 | 7.7 | 7.0 | 4.4 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 4.54 | 5.24 | 5.40 | 5.48 | 6.24 | 5.31 | 6.42 | 6.55 | 6.28 | 6.40 | 6.90 | 6.80 | 6.86 | 6.87 | 6.73 | 6.56 | 7.49 | 5.90 | 6.61 | 7.46 | 6.80 | 6.87 | 7.03 | 6.45 | 6.84 | 6.91 | 6.90 | 7.02 | 7.14 | 6.94 | 7.07 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 1.7 | 1.8 | 1.6 | 4.9 | 3.3 | 5.1 | 4.9 | 5.2 | 5.6 | 12.5 | 11.7 | 7.5 | 11.1 | 10.5 | 13.9 | 7.2 | 23.3 | 2.2 | 18,000.0 | 18.0 | 12.4 | 12.9 | 25.8 | 9.9 | 20.9 | 10.3 | 14.6 | 12.5 | 15.6 | 9.9 | 16.5 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.3 | 0.5 | 0.5 | 1.1 | 0.8 | 1.1 | 0.9 | 0.9 | 1.2 | 1.7 | 2.0 | 1.4 | 1.4 | 1.5 | 2.3 | 1.6 | 3.2 | 0.6 | 2,400.0 | 2.7 | 2.3 | 1.7 | 2.7 | 1.7 | 3.0 | 1.7 | 2.2 | 1.8 | 2.2 | 1.8 | 2.5 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.070 | 0.140 | 0.020 | 0.006 | 0.007 | 0.011 | 0.009 | 0.012 | 0.010 | 0.019 | 0.039 | 0.020 | 0.006 | 0.021 | 0.032 | 0.013 | 0.018 | 0.031 | 0.007 | 0.020 | 0.002 | 0.005 | 0.018 | 0.009 | 0.017 | 0.052 | 0.008 | 0.022 | 0.014 | 0.010 | 0.011 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.5 | 1.2 | 0.7 | 1.1 | 1.6 | 1.3 | 1.1 | 1.5 | 1.9 | 1.6 | 2.5 | 1.5 | 1.3 | 1.7 | 2.4 | 1.2 | 2.5 | 0.7 | 2,000.0 | 2.1 | 1.5 | 1.4 | 1.9 | 1.7 | 2.0 | 2.1 | 2.0 | 1.6 | 2.0 | 1.4 | 2.3 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 15.0 | 25.0 | 13.0 | 15.9 | 14.5 | 14.6 | 14.8 | 10.2 | 8.3 | 36.3 | 27.7 | 14.6 | 30.8 | 15.0 | 20.5 | 39.1 | 38.7 | 18.6 | 64.0 | 37.7 | 28.8 | 45.4 | 43.8 | 24.8 | 64.1 | 29.7 | 29.6 | 41.2 | 35.5 | 47.9 | 69.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.2 | 2.0 | 1.1 | 3.8 | 5.1 | 2.8 | 5.2 | 4.6 | 4.1 | 6.1 | 5.1 | 3.1 | 5.1 | 5.8 | 1.7 | 7.1 | 4.7 | 2.1 | 4.9 | 4.8 | 1.4 | 6.3 | 4.6 | 1.8 | 3.8 | 5.6 | 2.5 | 5.3 | 4.6 | 2.2 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 7 | 80 | 2 | <2 | 11 | <2 | <1 | 1 | <1 | 9 | 6 | <5 | <5 | <5 | <5 | <5 | 6 | <5 | <1.0 | <5 | <5 | <5 | 10 | <5 | <5 | 11 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 5 | 3 | 3 | 8 | <2 | 8 | 10 | 8 | 10 | 14 | 8 | 9 | 12 | 8 | 12 | 10 | 7 | 6 | 13 | 9 | 14 | 14 | 14 | 18 | 15 | 13 | 19 | 12 | 7.0 | 11.0 | 14.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 14.0 | 35.0 | 0.9 | 1.4 | 1.2 | 0.6 | 0.4 | 0.6 | 1.1 | 0.9 | 1.9 | 0.9 | 0.5 | 1.6 | 0.5 | 0.7 | 1.6 | 0.9 | 0.6 | 0.9 | 0.8 | 1.0 | 4.1 | 1.0 | 1.3 | 7.7 | 1.1 | 1.7 | 1.1 | 3.2 | 0.8 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 100 | 140 | 92 | 130 | 100 | 110 | 110 | 100 | 88 | 263 | 231 | 143 | 243 | 188 | 218 | 252 | 338 | 112 | 470 | 324 | 244 | 289 | 440 | 167 | 411 | 251 | 258 | 298 | 306 | 306 | 464 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 0.77 | 1.12 | 0.73 | 1.11 | 0.71 | 0.88 | 1.03 | 0.95 | 0.80 | 2.55 | 2.02 | 1.31 | 1.96 | 1.50 | 1.78 | 2.66 | 2.31 | 1.30 | 4.20 | 2.50 | 1.93 | 2.58 | 3.29 | 1.60 | 3.53 | 2.12 | 2.20 | 1.97 | 2.2 | 2.2 | 3.1 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 | 17 | 21 | 16 | 13 | 26 | 12.0 | 12.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 50 | 73 | 45 | 67 | 50 | 63 | 65 | 58 | 54 | 150 | 117 | 73 | 117 | 83 | 104 | 143 | 150 | 68 | 240 | 151 | 116 | 155 | 193 | 100 | 218 | 127 | 131 | 130 | 133 | 142.0 | 204.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 0.84 | 1.32 | 0.74 | 1.06 | 0.93 | 1.02 | 1.00 | 0.83 | 0.80 | 2.43 | 6.04 | 1.19 | 2.06 | 1.40 | 1.87 | 2.25 | 3.22 | 1.04 | 3.94 | 2.88 | 2.11 | 2.81 | 3.51 | 1.79 | 4.14 | 2.22 | 2.28 | 2.62 | 2.6 | 2.8 | 4.1 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 6.00 | 6.00 | 6.00 | 17.00 | 12.00 | 17.00 | 16.00 | 17.00 | 19.00 | 38.20 | 37.50 | 24.50 | 33.50 | 32.40 | 44.20 | 24.60 | 71.40 | 8.00 | 55.00 | 56.10 | 40.40 | 39.20 | 75.50 | 31.70 | 64.50 | 32.70 | 45.50 | 38.6 | 48 | 32.1 | 51.5 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 4.35 | 8.20 | 0.68 | 2.30 | 13.40 | 7.37 | 1.48 | 6.74 | 0.00 | 2.60 | 1.90 | 4.60 | 2.40 | 3.50 | 2.60 | 8.40 | 16.40 | 11.20 | 3.19 | 7.10 | 4.70 | 4.40 | 3.10 | 5.70 | 8.00 | 2.20 | 1.80 | 14.0 | 8.3 | 12.1 | 13.8 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | -3.50 | -2.99 | -3.36 | -2.77 | -2.23 | -2.72 | -2.73 | -2.33 | -2.41 | -2.69 | -1.30 | -3.85 | -2.32 | -1.57 | -2.62 | -2.48 | -1.74 | -3.14 | -2.23 | -2.35 | -2.33 | -2.37 | -1.85 | -2.6 | -2.3 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | -3.75 | -3.25 | -3.61 | -3.09 | -2.55 | -3.04 | -3.05 | -2.65 | -2.73 | -3.01 | -1.62 | -4.17 | -2.57 | -1.89 | -2.94 | -2.80 | -2.06 | -3.46 | -2.55 | -2.67 | -2.65 | -2.69 | -2.17 | -2.9 | -2.6 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | 9.92 | 9.54 | 9.64 | 9.17 | 9.13 | 9.52 | 9.59 | 9.20 | 9.14 | 9.25 | 8.79 | 9.75 | 8.93 | 9.03 | 9.42 | 9.35 | 8.77 | 9.59 | 9.07 | 9.26 | 9.23 | 9.39 | 8.99 | 9.5 | 9.3 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | 10.20 | 9.80 | 9.89 | 9.49 | 9.45 | 9.84 | 9.91 | 9.52 | 9.46 | 9.57 | 9.11 | 10.10 | 9.18 | 9.35 | 9.74 | 9.67 | 9.09 | 9.91 | 9.39 | 9.58 | 9.55 | 9.71 | 9.31 | 9.9 | 9.6 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 510 | -- | -- | 169 | 192 | -- | 205 | -- | -- | 134 | 183 | 146 | 86 | 145 | 150 | 187 | 83 | 310 | 51 | -- | 52 | 81 | -- | -- | 69 | 450 | 100 | 77 | 80 | -- | 45.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 22 | -- | -- | 53 | 37 | -- | 37 | -- | -- | 58 | 284 | 42 | 57 | 57 | 80 | 46 | 142 | 17 | 130 | -- | 86 | 79 | -- | -- | 130 | -- | 77 | 68 | 100 | -- | 108.0 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <5 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | <5 | -- | -- | 11 | 11 | -- | <50 | -- | -- | 12 | 18 | 13 | 10 | 10 | 11 | 9 | 14 | 11 | <50 | -- | <5 | 10 | -- | -- | <5 | -- | 24 | 11 | 14 | -- | 10.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | 0.043 | <0.017 | -- | 0.023 | -- | -- | 0.034 | 0.021 | <0.017 | <0.017 | <0.017 | 0.040 | 0.022 | <0.017 | 0.026 | <0.017 | -- | <0.017 | <0.017 | -- | -- | 0.032 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | 8 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | 1 | -- | 1 | <1 | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | 0 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | -- | -- | 3 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | 3 | <2 | <1 | 2 | <1 | <1 | 2 | <2.0 | <1 | 1 | <1 | <1 | 2 | <1 | 4 | 1 | 1 | <1 | 3.0 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 720 | -- | -- | 146 | 617 | 150 | 107 | 209 | 219 | 102 | 1,380 | 255 | 111 | 938 | 446 | 147 | 820 | 290 | 140 | 1,290 | 138 | 144 | 766 | 228 | 151 | 3,960 | 281 | 85 | 634 | 403.0 | 122.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | 1.6 | -- | -- | 2.4 | 0.6 | -- | <0.5 | -- | -- | <0.5 | 0.7 | <0.5 | <0.5 | <0.5 | 0.6 | 2.6 | <0.5 | 0.6 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 0.8 | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 40 | -- | -- | 55 | 39 | 67 | 28 | 21 | 31 | 34 | 79 | 28 | 23 | 45 | 31 | 56 | 122 | 61 | 28 | 95 | 22 | 19 | 78 | 38 | 22 | 511 | 28 | 9 | 99 | 71.0 | 14.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | 12 | -- | <2 | 6 | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 | <0.1 | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 11 | -- | -- | 29 | 20 | -- | 24 | -- | -- | 48 | 58 | 36 | 52 | 47 | 62 | 38 | 103 | 13 | 85 | -- | 39 | 58 | -- | -- | 92 | -- | 76 | 54 | 88 | -- | 93.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 6 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | 3 | <2 | <2 | <2 | 4 | 2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 21 | -- | -- | 16 | 7 | 7 | <5.0 | <5.0 | 7 | <5 | 6 | <5 | <5 | <5 | 10 | 10 | <5 | 7 | 11 | <5 | <5 | <5 | <5 | 6 | 9 | 37 | 8 | 6 | <5 | 12.0 | 5.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 84 | >250 | -- | >250 | >250 | 180 | 120 | 180 | -- | 687 | >2420 | >2420 | 1,550 | >2420 | 1,553 | 120 | >2420 | >2420 | --- | >2420 | 659 | >2420 | >2420 | | 914 | >2420 | >2420 | 105 | 9010 | 370.0 | 1,520.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 54 | >250 | -- | 12 | 17 | 5 | 1 | 78 | <100 | 3 | 68 | 145 | 4 | 9 | 5 | 3 | 179 | 3 | 20 | 25 | 2 | <1 | 86 | | 12 | 14 | 3 | <1 | 10 | 2.0 | 1.0 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 15.40 | 19.29 | 0.70 | 18.12 | 1.61 | 8.45 | 0.93 | 0.58 | 0.69 | 0.53 | 2.59 | 0.81 | 1.27 | 14.70 | 1.99 | 0.25 | 1.10 | 1.22 | 0.50 | 7.27 | 0.36 | 0.94 | 51.51 | 0.33 | 1.56 | 5.32 | 0.62 | 1.57 | 0.86 | 1.11 | 1.88 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 17.50 | 19.60 | 0.84 | 17.62 | 1.68 | 7.52 | 0.84 | 0.56 | 0.65 | 0.59 | 2.89 | 1.05 | 1.45 | 15.80 | 2.20 | 0.82 | 1.11 | 1.38 | 0.55 | 6.79 | 0.23 | 1.30 | 60.68 | 0.43 | 2.04 | 5.48 | 0.99 | 2.62 | -- | * | 1.90 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.

Comment 1: CCME PAL-F reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Highway 102 | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | HWY102-2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/15 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2107/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/09 | 2018/08/17 | 2018/10/17 | 05/09/2019 |
| Sampling Time | hh:mm | -- | | | | | 12:30 | 12:15 | 12:30 | 12:40 | 09:30 | 12:30 | 11:20 | 15:00 | 15:30 | 11:20 | 12:20 | 10:35 | 10:40 | 10:00 | 10:22 | 12:15 | 10:07 | 11:00 | 12:58 | 14:30 | 12:50 | 12:45 | 10:40 | 11:45 | 15:25 | 12:25 | 12:30 | 11:30 | 14:15 PM | 3:55PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 16.7 | 19.2 | 16.4 | 17.2 | 17.0 | 8.7 | 10.8 | 24.2 | 15.1 | 7.8 | 23.7 | 14.3 | 11.5 | 22.0 | 10.7 | 11.4 | 10.4 | 12.7 | 23.7 | 9.3 | 13.4 | 20.4 | 10.2 | 13.0 | 22.4 | 15.2 | 14.9 | 18.3 | 10.6 | 11.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.0 | 5.9 | 4.8 | 4.9 | 2.5 | 3.0 | 6.9 | 7.0 | 5.1 | 3.7 | 13.1 | 8.3 | 6.3 | 1.6 | 4.2 | 10.5 | 9.3 | 4.2 | 6.1 | 5.3 | 6.8 | 7.1 | 6.8 | 5.7 | 1.8 | 11.3 | 8.8 | 2.3 | 5.6 | ** |
| pH (In Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.57 | 5.71 | 5.40 | 6.33 | 5.86 | 5.64 | 6.22 | 5.89 | 5.29 | 7.30 | 6.37 | 6.72 | 6.01 | 6.92 | 5.40 | 5.40 | 5.85 | 6.45 | 6.04 | 5.96 | 5.56 | 6.13 | 5.56 | 6.04 | 7.56 | 8.32 | 6.13 | 5.88 | 7.24 | 6.83 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 37.0 | 457.0 | 162.1 | 415.0 | 167.0 | 101.2 | 92.2 | 123.1 | 96.0 | 225.0 | 226.0 | 159.1 | 288.0 | 188.5 | 204.4 | 204.4 | 174.0 | 0.4 | 699.0 | 197.6 | 968.0 | 838.0 | 219.2 | 400.0 | 414.0 | 338.0 | 355.6 | 394.7 | 246.4 | 501.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | <5 | 7 | 6 | 5 | <5 | <5 | 5 | <5 | 17 | 7 | <5 | 6 | 14 | 7 | 30 | 8 | 8 | 5 | <5 | 13 | 21 | 6 | <5 | 22 | 11 | 9 | 21 | 13.0 | <5 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 21 | 82 | 83 | 170 | 41 | 18 | 21 | 21 | 17 | 63 | 109 | 45 | 71 | 50 | 52 | 113 | 34 | 260 | 178 | 78 | 236 | 226 | 48 | 136 | 107 | 92 | 79 | 90 | 30 | 161 |
| Colour | TCU | 5 | -- | -- | -- | | 120 | 190 | 91 | 96 | 160 | 68 | 65 | 98 | 77 | 32 | 100 | 70 | 11 | 61 | 36 | 13 | 85 | 17 | 9 | 8 | 14 | 39 | 86 | 20 | 41 | 22 | 25 | 85 | 85 | 22 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | <0.05 | <0.05 | <0.05 | 0.10 | <0.05 | 0.62 | 0.26 | 1.80 | 3.20 | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 | 0.12 | <0.050 | <0.05 | 0.15 | 0.21 | 0.23 | 0.11 | 0.20 | 0.09 | 0.07 | 0.33 | 0.21 | 0.8 | 0.6 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | <0.05 | -- | -- | 0.10 | <0.05 | -- | 0.26 | -- | -- | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 | 0.12 | <0.050 | <0.05 | 0.15 | <0.05 | <0.05 | 0.11 | <0.05 | 0.09 | 0.07 | 0.16 | <0.05 | 0.8 | 0.2 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | 0.21 | 0.21 | <0.05 | 0.20 | <0.05 | <0.05 | 0.17 | 0.21 | <0.05 | 0.43 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.06 | <0.05 | <0.05 | 0.20 | <0.05 | <0.05 | 0.30 | 0.08 | 0.09 | <0.03 | <0.03 | <0.03 | 0.17 | 0.09 | <0.03 | <0.03 | 0.06 | 0.19 | 0.05 | 0.14 | 0.37 | <0.03 | <0.03 | 0.09 | 0.14 | <0.03 | 0.24 | 0.06 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.6 | 1.1 | 0.5 | -- | 0.7 | 2.0 | 15.3 | <0.4 | 0.3 | 62.6 | 2.0 | 24.3 | 2.1 | 0.6 | <0.4 | 0.7 | 0.6 | 1.4 | 0.90 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 8.5 | 13.0 | 13.0 | 7.2 | 14.0 | 7.4 | 5.7 | 9.2 | 8.4 | 7.0 | 15.8 | 11.2 | 6.1 | 10.6 | 5.1 | 17.4 | 8.0 | 3.0 | 29.0 | 9.9 | 79.3 | 11.1 | 13.4 | 5.4 | 9.2 | 5.9 | 5.6 | 7.5 | 8.0 | 3.2 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 5.43 | 5.96 | 6.30 | 6.05 | 6.32 | 5.47 | 5.93 | 6.18 | 5.92 | 5.90 | 6.70 | 6.80 | 6.61 | 6.59 | 6.34 | 7.20 | 6.40 | 6.12 | 6.64 | 6.18 | 6.46 | 6.80 | 6.15 | 6.22 | 6.73 | 6.51 | 6.79 | 6.79 | 7.07 | 6.36 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 1.6 | 4.0 | 4.8 | 7.4 | 3.8 | 4.0 | 3.1 | 2.2 | 3.8 | 7.0 | 8.4 | 5.6 | 7.6 | 8.5 | 8.2 | 14.1 | 9.5 | 20,000.0 | 33.3 | 9.8 | 23.9 | 23.8 | 8.6 | 13.3 | 14.7 | 14.7 | 11.5 | 12.5 | 16.5 | 22.8 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.4 | 0.7 | 0.9 | 1.0 | 0.6 | 1.0 | 0.7 | 0.7 | 1.4 | 1.2 | 1.4 | 1.2 | 1.2 | 1.3 | 2.2 | 3.1 | 1.8 | 2,500.0 | 32.7 | 2.2 | 3.2 | 2.5 | 1.7 | 2.5 | 1.9 | 2.1 | 1.4 | 1.7 | 1.9 | 3.6 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | 0.040 | 0.034 | 0.010 | 0.028 | 0.003 | 0.009 | 0.019 | 0.041 | 0.021 | 0.054 | 0.030 | 0.014 | 0.028 | 0.199 | 0.028 | 0.201 | 0.010 | 1.560 | 0.012 | 0.222 | 0.034 | 0.012 | 0.013 | 0.042 | 0.011 | 0.018 | 0.025 | 0.014 | 0.006 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.5 | 0.8 | 1.1 | 1.0 | 1.0 | 1.0 | 1.4 | 0.8 | 1.3 | 1.9 | 1.2 | 1.7 | 1.6 | 1.3 | 1.5 | 2.5 | 2.9 | 1.7 | 1,900.0 | 12.5 | 1.1 | 4.0 | 2.1 | 1.4 | 1.1 | 1.6 | 1.6 | 1.3 | 1.6 | 1.7 | 2.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 15.0 | 51.0 | 55.0 | 83.7 | 32.0 | 12.1 | 13.3 | 13.1 | 13.3 | 41.5 | 63.6 | 20.4 | 39.0 | 19.1 | 34.5 | 69.6 | 24.0 | 150.0 | 124.0 | 36.8 | 149.0 | 124.0 | 26.4 | 68.8 | 66.0 | 55.2 | 59.4 | 81.6 | 29.4 | 148.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.2 | 4.4 | 4.0 | 3.0 | 6.4 | 5.4 | 2.5 | 6.5 | 6.7 | 4.1 | 6.9 | 5.8 | 1.6 | 6.2 | 6.6 | 1.6 | 5.9 | 2.3 | 7.2 | 5.6 | 2.8 | 9.0 | 4.5 | 3.1 | 5.7 | 6.4 | 1.6 | 8.8 | 4.6 | 3.1 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <2 | 58 | 62 | 34 | 27 | 3 | <1 | 10 | 14 | <5 | 39 | <5 | <5 | <5 | 194 | 34 | <5 | 2 | 1,020 | 15 | 342 | 69 | <5 | 6 | 7 | 8 | 12 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | <2 | 3 | 8 | 11 | <2 | 7 | 5 | 5 | 8 | 12 | 6 | 10 | 10 | 9 | <2 | 12 | 8 | 15 | 7 | 8 | 22 | 21 | 8 | 10 | 7 | 9 | 4.0 | 16.0 | 13.0 | |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 3.8 | 4.2 | 2.6 | 3.1 | 0.5 | 0.4 | 1.2 ( 1 ) | 3.9 | 0.6 | 10.8 | 2.0 | 1.5 | 3.3 | 164.0 | 1.1 | 1.1 | 1.2 | 1,490.0 | 9.9 | 131.0 | 54.2 | 1.1 | 2.4 | 9.9 | 12.5 | 7.0 | 13.8 | 1.1 | 1.2 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 85 | 290 | 310 | 590 | 160 | 94 | 91 | 100 | 110 | 263 | 403 | 179 | 295 | 203 | 223 | 433 | 194 | 920 | 662 | 315 | 817 | 952 | 177 | 451 | 413 | 366 | 422 | 444 | 208 | 737 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 0.60 | 2.37 | 2.62 | 5.13 | 1.27 | 0.70 | 0.73 | 0.91 | 0.86 | 2.48 | 3.34 | 1.49 | 2.34 | 1.88 | 1.81 | 4.04 | 1.29 | 7.88 | 5.27 | 2.38 | 7.39 | 7.25 | 1.65 | 4.06 | 3.61 | 3.01 | 2.62 | 3.06 | 1.5 | 4.9 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | <1 | 7 | 6 | 5 | <1 | <1 | 5 | <1 | 17 | 7 | <5 | 6 | 14 | 7 | 30 | 8 | 8 | 5 | <5 | 13 | 21 | 6 | <5 | 22 | 11 | 9 | 21 | 13.0 | <5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 42 | 150 | 165 | 282 | 93 | 52 | 48 | 62 | 67 | 143 | 200 | 86 | 135 | 100 | 145 | 235 | 85 | 460 | 712 | 138 | 473 | 422 | 99 | 233 | 215 | 187 | 170 | 209 | 107.0 | 354.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <3 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 0.81 | 2.65 | 2.89 | 4.17 | 1.81 | 0.86 | 0.82 | 0.83 | 0.97 | 2.32 | 2.10 | 1.40 | 2.24 | 1.50 | 3.50 | 4.17 | 1.76 | 7.87 | 29.10 | 2.35 | 9.27 | 7.23 | 1.80 | 3.92 | 3.93 | 3.60 | 3.36 | 4.53 | 2.3 | 8.0 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 6.00 | 13.00 | 16.00 | 23.00 | 12.00 | 14.00 | 11.00 | 8.00 | 15.00 | 22.40 | 26.70 | 18.90 | 23.90 | 26.60 | 29.50 | 48.00 | 31.10 | 59.00 | 218.00 | 33.50 | 72.90 | 69.70 | 28.50 | 43.50 | 44.50 | 45.40 | 34.5 | 38.2 | 49.0 | 71.8 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 14.90 | 5.58 | 4.90 | 10.30 | 17.50 | 10.30 | 5.81 | 4.60 | 6.01 | 3.30 | 3.60 | 3.10 | 2.30 | 11.30 | 31.70 | 1.60 | 15.10 | 0.06 | 69.40 | 0.50 | 11.30 | 0.10 | 4.30 | 1.80 | 4.20 | 8.90 | 12.4 | 19.4 | 21.8 | 24.3 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | -3.57 | -3.72 | -3.70 | NC | NC | -4.07 | NC | -3.63 | -3.15 | -3.34 | -3.33 | -2.92 | -3.50 | -1.80 | -3.30 | -3.18 | -2.81 | -3.73 | -2.70 | -2.15 | -3.72 | -3.58 | -2.38 | -2.90 | -2.81 | -2.41 | -2.2 | -3.2 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | -3.82 | -3.97 | -3.95 | NC | NC | -4.32 | NC | -3.95 | -3.47 | -3.66 | -3.65 | -3.24 | -3.82 | -2.12 | -3.62 | -3.42 | -3.13 | -4.05 | -3.02 | -2.47 | -4.04 | -3.90 | -2.70 | -3.22 | -3.13 | -2.73 | -2.5 | -3.6 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | 9.87 | 9.77 | 10.00 | NC | NC | 10.30 | NC | 9.53 | 9.85 | 10.10 | 9.94 | 9.51 | 9.84 | 9.00 | 9.70 | 9.29 | 9.45 | 9.91 | 9.16 | 8.95 | 9.87 | 9.80 | 9.11 | 9.41 | 9.60 | 9.2 | 9.3 | 9.6 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | 10.10 | 10.00 | 10.30 | NC | NC | 10.50 | NC | 9.85 | 10.20 | 10.50 | 10.30 | 9.83 | 10.20 | 9.32 | 10.00 | 9.54 | 9.77 | 10.20 | 9.48 | 9.27 | 10.20 | 10.10 | 9.43 | 9.73 | 9.92 | 9.52 | 9.6 | 9.9 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 270 | -- | -- | 189 | 368 | -- | 260 | -- | -- | 145 | 466 | 259 | 130 | 138 | 2,760 | 400 | 216 | 100 | -- | 129 | 3,880 | -- | -- | 99 | 149 | 542 | 167 | 152 | -- | 126.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | 2 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | 6 | <2 | <2 | <1.0 | -- | <2 | 3 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 20 | -- | -- | 53 | 28 | -- | 27 | -- | -- | 49 | 74 | 33 | 44 | 43 | 213 | 381 | 63 | 140 | -- | 147 | 762 | -- | -- | 151 | -- | 122 | 96 | 146 | -- | 272.0 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | 6 | -- | 3 | <2 | <2 | -- | 3.0 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | <5 | -- | -- | 8 | 8 | -- | <50 | -- | -- | 10 | 17 | 15 | 9 | 10 | 13 | 11 | 12 | <50 | -- | <5 | 9 | -- | -- | <5 | -- | 12 | 7 | 11 | -- | 7.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | 0.051 | <0.017 | -- | <0.017 | -- | -- | 0.037 | 0.031 | 0.032 | 0.019 | <0.017 | 0.096 | 0.051 | 0.019 | 0.100 | -- | <0.017 | 0.778 | -- | -- | 0.019 | -- | 0.048 | <0.09 | <0.09 | -- | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | 1 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | 1 | 9 | 2 | <1 | <1.0 | -- | <1 | 8 | -- | -- | <1 | -- | 2 | <1 | 2 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | 1 | -- | <0.40 | -- | -- | <1 | 1 | 1 | <1 | 1 | 3 | 1 | <1 | 2 | -- | 3 | 4 | -- | -- | <1 | -- | 2 | <1 | 2 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | -- | -- | 2 | <2.0 | <2.0 | <2.0 | 3 | 3 | <2 | 3 | 3 | <2 | 1 | 12 | 4 | 2 | <2.0 | 404 | 2 | 13 | <1 | 2 | <1 | 1 | 3 | 2 | 1 | 2.0 | 2.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 880 | -- | -- | 1,380 | 1,850 | 303 | 229 | 897 | 1,110 | 214 | 5,210 | 1,550 | 383 | 1,720 | 28,400 | 1,660 | 485 | 960 | 217,000 | 714 | 21,300 | 7,380 | 375 | 369 | 2,650 | 4,760 | 870 | 3600 | 93.0 | 728.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | 1.9 | -- | -- | 1.6 | 2.7 | -- | 0.6 | -- | -- | <0.5 | 5.2 | 2.1 | 0.6 | 0.7 | 19.4 | 3.5 | 1.0 | <0.50 | -- | 0.6 | 39.7 | -- | -- | <0.5 | -- | 3.3 | 2.3 | 1 | -- | 1.4 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 110 | -- | -- | 387 | 135 | 53 | 41 | 106 | 176 | 78 | 219 | 207 | 83 | 173 | 327 | 212 | 93 | 470 | 2,800 | 303 | 586 | 359 | 71 | 125 | 160 | 215 | 55 | 262 | 10.0 | 137.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | 4 | 2 | <2 | <2.0 | -- | <2 | 8 | -- | -- | 6 | -- | 3 | <2 | <2 | -- | 3.0 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 11 | -- | -- | 37 | 21 | -- | 17 | -- | -- | 33 | 45 | 31 | 39 | 40 | 45 | 75 | 43 | 96 | -- | 38 | 96 | -- | -- | 72 | -- | 80 | 53 | 81 | -- | 129.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | <0.1 | <0.1 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 4 | -- | -- | <2 | 6 | -- | 5 | -- | -- | <2 | 10 | 4 | 4 | <2 | 60 | 9 | 6 | <2 | -- | <2 | 41 | -- | -- | <2 | -- | 15 | 4 | 3 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <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 | 0.2 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | 2 | <2 | <2 | <2 | 11 | <2 | <2 | <2.0 | -- | <2 | 18 | -- | -- | 2 | -- | 3 | <2 | 2 | -- | 4.0 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 12 | -- | -- | 14 | 12 | 9 | 6 | 9 | 13 | <5 | 7 | 12 | 12 | <5 | 46 | 36 | 17 | 27 | 1,210 | 10 | 170 | 22 | 11 | 14 | 9 | 19 | 12 | 6 | 69.0 | 16.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 28 | >250 | -- | >250 | 75 | 41 | 110 | >250 | -- | 1,553 | >2420 | >2420 | 2,420 | 1,990 | >2420 | 687 | >2420 | --- | >2420 | 328 | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | 6 | 410 | 81.0 | 930.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 4 | 230 | -- | 9 | 5 | <1 | 7 | >250 | <100 | <1 | 16 | 50 | 111 | 9 | 4 | <1 | <1 | <10 | 201 | 2 | 1 | 20 | 11 | <1 | 8 | 41 | 1 | 26 | 3.0 | <10 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.90 | 82.63 | 48.17 | 0.85 | 16.36 | 0.25 | 0.97 | 4.91 | 1.90 | 2.07 | 21.03 | 0.33 | 2.41 | 1.10 | 21.62 | 10.34 | 0.46 | 0.53 | 119.14 | 6.24 | 539.78 | 54.98 | 0.43 | 1.40 | 2.11 | 28.94 | 2.56 | 2.58 | 0.53 | 3.06 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.91 | 81.20 | 52.50 | 0.85 | 17.35 | 0.23 | 0.87 | 4.49 | 2.15 | 2.27 | 17.26 | 0.50 | 3.02 | 1.30 | 27.02 | 11.09 | 0.55 | 0.58 | 129.77 | 2.23 | 793.90 | 73.67 | 0.56 | 1.74 | 3.20 | 37.67 | 4.28 | -- | * | 3.04 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
"--" = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
* *CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality
Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

Sample site: Lake Shore Drive (LSD)

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) |
|---|---|---|---|---|---|---|
| Sample Sites | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | |
| Sampling Time | hh:mm | -- | | | | |
| **FIELD DATA** | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | |
| Water Temp | Celsius | -- | -- | -- | -- | |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | |
| Specific Conductance | uS/cm | -- | -- | -- | -- | |
| **INORGANICS** | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | |
| Colour | TCU | 5 | -- | -- | -- | |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | |
| **Calculated Parameters** | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | |
| Calculated TDS | mg/L | 1 | -- | -- | -- | |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | |
| Cation Sum | me/L | N/A | -- | -- | -- | |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | |
| **Metals (ICP-MS)** | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | |
| **MICROBIOLOGICAL** | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | |

| Tested Parameters | Lake Shore Drive | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | LSD | | | | | | | | | | | | | | |
| Sampling Date | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/17 | 2012/05/01 | 2012/08/15 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 |
| Sampling Time | 12:00 | 09:30 | 11:45 | 09:00 | 11:28 | 10:00 | 08:45 | 13:20 | 9:00 | 9:15 | 13:00 | 9:10 | 08:40 | 15:30 | 11:55 |
| **FIELD DATA** | | | | | | | | | | | | | | | |
| Secchi Depth | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | 13.1 | 16.7 | 15.3 | 13.4 | 21.3 | 7.3 | 10.2 | 21.0 | 12.0 | 5.7 | 25.7 | 13.4 | 7.7 | 20.2 | 8.8 |
| Dissolved Oxygen | 10.8 | 5.7 | 5.5 | 8.6 | 5.4 | 8.5 | 9.4 | 7.9 | 8.2 | 4.1 | 2.7 | 7.6 | 8.8 | 7.3 | 7.6 |
| pH (in Situ) | 7.88 | 6.74 | 6.34 | 6.42 | 6.64 | 6.17 | 7.09 | 6.88 | 6.63 | 8.22 | 7.16 | 6.92 | 5.19 | 7.28 | 6.23 |
| Specific Conductance | 723.0 | 210.0 | 167.7 | 217.8 | 203.2 | 110.3 | 145.9 | 126.4 | 111.9 | 62.0 | 177.5 | 116.7 | 123.6 | 132.5 | 147.8 |
| **INORGANICS** | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | 13 | 16 | 12 | 13 | 21 | 9 | 9 | 15 | 12 | 21 | 14 | 11 | 8 | 20 | 11 |
| Dissolved Chloride (Cl) | 41 | 34 | 31 | 49 | 45 | 25 | 38 | 27 | 22 | 22 | 33 | 23 | 39 | 32 | 23 |
| Colour | 32 | 27 | 37 | 20 | 26 | 33 | 32 | 41 | 49 | 13 | 20 | 40 | 10 | 21 | 25 |
| Nitrite + Nitrate | 0.14 | 0.14 | 0.06 | 0.23 | 0.10 | 0.12 | 0.25 | 0.17 | 0.09 | 0.13 | 0.80 | <0.05 | 0.18 | 0.20 | <0.05 |
| Nitrate (N) | 0.14 | -- | -- | 0.23 | 0.10 | -- | 0.25 | -- | -- | 0.13 | 0.80 | <0.05 | 0.18 | 0.20 | <0.05 |
| Nitrite (N) | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.06 | 0.03 | <0.03 | <0.03 | <0.03 | 0.03 | 0.03 |
| Total Kjeldahl Nitrogen as N | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | 3.5 | 0.5 | -- | 0.7 | 3.0 |
| Total Organic Carbon | 5.0 | 3.8 | 6.8 | 3.7 | 6.0 | 5.3 | 4.7 | 7.1 | 7.5 | 3.1 | 8.0 | 7.7 | 4.7 | 6.3 | 6.9 |
| Orthophosphate (as P) | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | 6.69 | 6.69 | 6.93 | 7.10 | 7.30 | 6.67 | 6.72 | 6.79 | 6.49 | 6.20 | 6.90 | 6.90 | 6.94 | 6.95 | 6.49 |
| Total Calcium (Ca) | 6.5 | 6.9 | 5.4 | 8.0 | 10.5 | 5.3 | 5.9 | 5.1 | 5.0 | 2.6 | 18.1 | 5.1 | 6.4 | 6.0 | 5.6 |
| Total Magnesium (Mg) | 1.4 | 1.6 | 1.3 | 2.0 | 2.1 | 1.2 | 1.3 | 1.2 | 1.2 | 0.7 | 3.3 | 1.4 | 1.2 | 1.4 | 1.6 |
| Total Phosphorus | <0.02 | 0.030 | 0.009 | 0.018 | 0.100 | 0.009 | 0.018 | 0.028 | 0.014 | 0.022 | 0.063 | 0.003 | 0.007 | 0.015 | 0.078 |
| Total Potassium (K) | 1.2 | 1.1 | 1.3 | 1.2 | 1.2 | 1.0 | 1.1 | 1.0 | 1.2 | 0.6 | 1.9 | 1.3 | 1.2 | 1.1 | 1.4 |
| Total Sodium (Na) | 24.0 | 21.0 | 18.0 | 24.8 | 26.9 | 15.2 | 23.2 | 14.3 | 13.8 | 11.3 | 18.6 | 15.2 | 21.9 | 26.6 | 14.6 |
| Reactive Silica (SiO2) | 3.1 | 4.2 | 4.0 | 3.2 | 3.4 | 4.3 | 2.6 | 3.9 | 3.8 | 3.1 | 2.9 | 4.9 | 2.6 | 3.9 | 5.0 |
| Total Suspended Solids | 16 | 98 | 5 | 6 | 110 | 7 | 4 | 77 | 5 | <5 | 16 | 19 | <5 | 17 | 9 |
| Dissolved Sulphate (SO4) | 6 | 4 | 5 | 7 | 3 | 4 | 6 | 4 | 4 | 5 | 5 | 5 | 6 | 7 | 5 |
| Turbidity (NTU) | 0.6 | 12.0 | 2.5 | 12.0 | 6.2 | 1.0 | 0.6 | 2.5 | 1.7 | 6.7 | 283.0 | 2.1 | 1.1 | 31.6 | 82.6 |
| Conductivity (uS/cm) | 170 | 150 | 140 | 200 | 200 | 110 | 150 | 130 | 110 | 96 | 161 | 110 | 168 | 136 | 105 |
| **Calculated Parameters** | | | | | | | | | | | | | | | |
| Anion Sum | 1.56 | 0.82 | 1.22 | 1.80 | 1.77 | 0.97 | 1.39 | 1.14 | 0.96 | 1.15 | 1.37 | 0.97 | 1.40 | 1.46 | 0.97 |
| Bicarb. Alkalinity (calc. as CaCO3) | 13 | 8 | 12 | 13 | 21 | 9 | 9 | 15 | 12 | 21 | 14 | 11 | 8 | 20 | 11 |
| Calculated TDS | 92 | 55 | 74 | 104 | 107 | 62 | 84 | 66 | 60 | 56 | 163 | 58 | 82 | 87 | 66 |
| Carb. Alkalinity (calc. as CaCO3) | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | 1.53 | 0.99 | 1.20 | 1.69 | 1.94 | 1.05 | 1.44 | 1.02 | 1.00 | 0.76 | 3.59 | 1.10 | 1.43 | 1.62 | 1.62 |
| Hardness (CaCO3) | 22.00 | 15.00 | 19.00 | 28.00 | 35.00 | 18.00 | 20.00 | 18.00 | 18.00 | 9.40 | 58.80 | 18.50 | 20.90 | 20.70 | 20.60 |
| Ion Balance (% Difference) | 0.97 | 9.39 | 0.83 | 3.15 | 4.58 | 3.96 | 1.77 | 5.56 | 2.04 | 20.70 | 63.00 | 6.10 | 1.00 | 5.20 | 25.00 |
| Langelier Index (@ 20C) | -2.74 | -3.20 | -2.60 | -2.22 | -1.71 | -2.99 | -2.88 | -2.64 | -3.05 | -3.62 | -2.30 | -2.91 | -2.93 | -2.55 | -3.29 |
| Langelier Index (@ 4C) | -2.99 | -3.45 | -2.85 | -2.47 | -1.96 | -3.24 | -3.13 | -2.89 | -3.31 | -3.94 | -2.62 | -3.23 | -3.25 | -2.87 | -3.61 |
| Saturation pH (@ 20C) | 9.43 | 9.78 | 9.53 | 9.32 | 9.01 | 9.66 | 9.60 | 9.43 | 9.54 | 9.82 | 9.20 | 9.81 | 9.87 | 9.50 | 9.78 |
| Saturation pH (@ 4C) | 9.68 | 10.00 | 9.78 | 9.57 | 9.26 | 9.91 | 9.85 | 9.68 | 9.80 | 10.10 | 9.52 | 10.10 | 10.20 | 9.82 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | 99 | -- | -- | 349 | 189 | -- | 217 | -- | -- | 490 | 19,200 | 186 | 131 | 93 | 3,420 |
| Total Antimony (Sb) | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Arsenic (As) | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | 8 | <2 | <2 | <2 | <2 |
| Total Barium (Ba) | 14 | -- | -- | 15 | 19 | -- | 14 | -- | -- | 11 | 86 | 12 | 12 | 7 | 24 |
| Total Beryllium (Be) | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | 2 | <2 | <2 | <2 | <2 |
| Total Bismuth (Bi) | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Boron (B) | 13 | -- | -- | 41 | 22 | -- | <50 | -- | -- | 6 | 24 | 16 | 10 | 15 | 15 |
| Total Cadmium (Cd) | <0.300 | -- | -- | 0.018 | <0.017 | -- | <0.017 | -- | -- | 0.029 | 1.050 | 0.023 | <0.017 | <0.017 | 0.073 |
| Total Chromium (Cr) | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | 11 | <1 | <1 | <1 | 2 |
| Total Cobalt (Co) | <1 | -- | -- | <0.40 | 1 | -- | <0.40 | -- | -- | <1 | 34 | <1 | <1 | <1 | 1 |
| Total Copper (Cu) | <2 | -- | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | 22 | 2 | <2 | 1 | 12 |
| Total Iron (Fe) | 180 | -- | -- | 554 | 965 | 120 | 211 | 388 | 384 | 161 | 38,900 | 312 | 236 | 254 | 4,200 |
| Total Lead (Pb) | <0.5 | -- | -- | 3.0 | 0.5 | -- | <0.5 | -- | -- | 0.6 | 82.4 | <0.5 | <0.5 | <0.5 | 5.2 |
| Total Manganese (Mn) | 51 | -- | -- | 113 | 632 | 23 | 30 | 53 | 39 | 26 | 13,200 | 67 | 71 | 81 | 124 |
| Total Molybdenum (Mo) | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Nickel (Ni) | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | 13 | <2 | <2 | <2 | 2 |
| Total Selenium (Se) | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | 2 | <1 | <1 | <1 | <1 |
| Total Silver (Ag) | <0.5 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Strontium (Sr) | 30 | -- | -- | 36 | 42 | -- | 24 | -- | -- | 12 | 82 | 22 | 24 | 24 | 25 |
| Total Thallium (Tl) | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 0.2 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin (Sn) | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Titanium (Ti) | <2 | -- | -- | 7 | 4 | -- | 5 | -- | -- | 3 | 405 | 4 | <2 | 2 | 36 |
| Total Uranium (U) | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 1.6 | <0.1 | <0.1 | <0.1 | 0.1 |
| Total Vanadium (V) | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | 30 | <2 | <2 | <2 | 2 |
| Total Zinc (Zn) | 7 | -- | -- | 7 | 7 | <5.0 | <5.0 | <5.0 | 5 | <5 | 110 | 7 | 6 | <5 | 15 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | |
| Total Coliform | 53 | >250 | -- | >250 | >250 | 280 | 85 | >250 | -- | 1,414 | >2420 | >2420 | 1,990 | >2420 | >2420 |
| E. coli | 22 | 24 | -- | 4 | 45 | 6 | 10 | >250 | <100 | 2 | 26 | 10 | 10 | 20 | 2 |
| Chlorophyll A - Acidification method | 1.46 | 10.70 | 4.68 | 1.21 | 6.64 | 0.21 | 1.19 | 1.93 | 1.41 | 1.88 | 6.62 | 0.13 | <0.50 | 1.60 | 2.02 |
| Chlorophyll A - Welschmeyer method | 1.85 | 11.10 | 5.62 | 1.32 | 7.71 | 0.19 | 1.07 | 1.73 | 1.18 | 2.28 | 7.58 | 0.22 | <0.50 | 2.00 | 2.98 |

| Tested Parameters | Lake Shore Drive | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | LSD | | | | | | | | | | | | | | |
| Sampling Date | 2014/05/15 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/09 | 2018/08/17 | 2018/10/17 | 05/09/2019 |
| Sampling Time | 9:30 | 13:30 | 09:50 | 16:02 | 13:40 | 15:00 | 12:10 | 12:25 | 10:20 | 11:55 | 11:05 | 11:30 | 10:30 | 10:50 AM | 11:26 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | |
| Secchi Depth | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | 8.9 | 10.5 | 12.5 | 24.3 | 5.8 | 13.2 | 24.0 | 9.4 | 15.6 | 23.0 | 9.7 | 14.4 | 22.4 | 9.3 | 10.2 |
| Dissolved Oxygen | 14.8 | 7.2 | 6.3 | 7.3 | 7.2 | 8.2 | 1.9 | 8.7 | 11.4 | 7.0 | 5.3 | 9.1 | 6.9 | 7.2 | ** |
| pH (in Situ) | 7.02 | 6.31 | 6.88 | 6.34 | 6.48 | 6.63 | 6.16 | 6.25 | 6.78 | 6.57 | 5.91 | 5.82 | 6.41 | 5.90 | 7.01 |
| Specific Conductance | 180.0 | 111.0 | 0.1 | 155.3 | 132.3 | 162.0 | 254.0 | 162.2 | 150.0 | 188.0 | 92.0 | 75.0 | 182.9 | 108.1 | 99.7 |
| **INORGANICS** | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | 35 | 10 | 11 | 7 | 9 | 11 | 22 | 8 | 12 | 26 | 20 | 9 | 27 | 9.0 | 12.0 |
| Dissolved Chloride (Cl) | 29 | 23 | 32 | 27 | 26 | 39 | 45 | 31 | 43 | 38 | 36 | 23 | 32 | 20 | 30 |
| Colour | 9 | 31 | 20 | 11 | 26 | 25 | 26 | 24 | 25 | 31 | 21 | 36 | 40 | 65 | 39 |
| Nitrite + Nitrate | 0.09 | 0.11 | 0.15 | 0.25 | 0.30 | 0.08 | 0.08 | <0.05 | 0.19 | 0.48 | 0.22 | 0.32 | <0.05 | 0.1 | 0.1 |
| Nitrate (N) | 0.09 | 0.11 | 0.15 | 0.16 | 0.30 | 0.08 | 0.08 | <0.05 | 0.10 | 0.39 | 0.22 | 0.32 | <0.05 | 0.1 | 0.1 |
| Nitrite (N) | <0.05 | <0.05 | <0.010 | 0.09 | <0.05 | <0.05 | <0.05 | <0.05 | 0.09 | 0.09 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | 0.04 | <0.03 | <0.050 | 0.11 | <0.03 | 0.06 | 0.10 | <0.03 | <0.03 | 0.08 | 0.04 | <0.03 | 0.06 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | 1.0 | <0.4 | 0.3 | 77.4 | 2.8 | 2.2 | 11.8 | 0.5 | 1.0 | 34.5 | 10.0 | <0.4 | 1.70 | <0.4 | <0.4 |
| Total Organic Carbon | 5.2 | 8.1 | 3.2 | 14.1 | 9.9 | 5.5 | 14.0 | 8.9 | 7.7 | 8.1 | 6.9 | 5.8 | 5.8 | 8.0 | 5.9 |
| Orthophosphate (as P) | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | 6.47 | 6.72 | 7.02 | 6.59 | 6.68 | 6.65 | 7.01 | 6.38 | 6.92 | 7.08 | 7.01 | 6.91 | 7.20 | 6.99 | 6.93 |
| Total Calcium (Ca) | 5.4 | 5.1 | 6,100.0 | 52.2 | 5.4 | 6.6 | 9.9 | 4.8 | 7.1 | 8.0 | 6.7 | 4.4 | 10.2 | 3.5 | 6.0 |
| Total Magnesium (Mg) | 1.5 | 1.1 | 1,300.0 | 23.0 | 1.5 | 1.4 | 1.8 | 1.3 | 1.6 | 1.7 | 1.6 | 1.1 | 2.3 | 0.9 | 1.5 |
| Total Phosphorus | 0.100 | 0.031 | 0.011 | 0.501 | 0.095 | 1.250 | 0.023 | 0.012 | 0.102 | 0.059 | 0.015 | 0.052 | 0.305 | 0.018 | 0.008 |
| Total Potassium (K) | 1.1 | 1.1 | 1,100.0 | 9.7 | 1.0 | 1.2 | 1.3 | 1.1 | 1.3 | 1.4 | 1.2 | 0.9 | 1.6 | 0.8 | 1.3 |
| Total Sodium (Na) | 23.4 | 18.1 | 19.0 | 24.4 | 13.4 | 25.1 | 23.4 | 19.7 | 25.2 | 26.0 | 23.0 | 16.5 | 21.7 | 15.4 | 24.4 |
| Reactive Silica (SiO2) | 2.9 | 4.2 | 2.4 | 4.2 | 4.4 | 1.6 | 3.3 | 3.5 | 1.1 | 2.7 | 4.0 | 2.4 | 2.4 | 3.3 | 1.7 |
| Total Suspended Solids | 51 | 8 | 5 | 719 | 69 | 93 | 9,020 | 15 | 138 | 41 | <5 | <5 | 444 | 6.0 | 8.0 |
| Dissolved Sulphate (SO4) | 5 | 4 | 5 | <2 | 3 | 5 | 6 | 7 | 4 | 3 | 4 | 5 | <2 | 5.0 | 4.0 |
| Turbidity (NTU) | 6.6 | 1.4 | 1.2 | 4,430.0 | 5.4 | 65.3 | 206.0 | 7.9 | 53.8 | 21.3 | 15.1 | 2.0 | 72.2 | 2.5 | 5.0 |
| Conductivity (uS/cm) | 122 | 125 | 140 | 129 | 136 | 160 | 236 | 133 | 178 | 192 | 171 | 122 | 192 | 123 | 151 |
| **Calculated Parameters** | | | | | | | | | | | | | | | |
| Anion Sum | 1.63 | 0.94 | 1.22 | 0.92 | 1.00 | 1.43 | 1.84 | 1.18 | 1.55 | 1.69 | 1.51 | 0.96 | 1.44 | 0.9 | 1.2 |
| Bicarb. Alkalinity (calc. as CaCO3) | 35 | 10 | 11 | 7 | 9 | 11 | 22 | 8 | 12 | 26 | 20 | 9 | 27 | 9.0 | 12.0 |
| Calculated TDS | 88 | 59 | 74 | 498 | 65 | 91 | 107 | 70 | 92 | 97 | 87 | 58 | 95 | 52.0 | 76.0 |
| Carb. Alkalinity (calc. as CaCO3) | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | 1.52 | 1.19 | 1.28 | 31.00 | 1.42 | 1.94 | 2.04 | 1.27 | 1.75 | 1.74 | 1.59 | 1.08 | 2.27 | 1.0 | 1.6 |
| Hardness (CaCO3) | 19.70 | 17.30 | 21.00 | 225.00 | 19.70 | 22.20 | 32.10 | 17.30 | 24.30 | 27.00 | 23.30 | 15.5 | 34.9 | 12.4 | 21.2 |
| Ion Balance (% Difference) | 3.40 | 11.80 | 2.40 | 94.20 | 17.50 | 15.20 | 5.30 | 3.80 | 6.10 | 1.40 | 2.30 | 6.0 | 22.2 | 6.6 | 14.2 |
| Langelier Index (@ 20C) | -2.84 | -3.14 | -2.50 | -2.50 | -3.20 | -2.97 | -2.24 | -3.61 | -2.73 | -2.19 | -2.44 | -3.06 | -1.94 | -3.1 | -2.8 |
| Langelier Index (@ 4C) | -3.16 | -3.46 | -2.75 | -2.82 | -3.52 | -3.29 | -2.56 | -3.93 | -3.05 | -2.51 | -2.76 | -3.38 | -2.26 | -3.4 | -3.1 |
| Saturation pH (@ 20C) | 9.31 | 9.86 | 9.51 | 9.09 | 9.88 | 9.72 | 9.25 | 9.99 | 9.65 | 9.27 | 9.45 | 9.97 | 9.14 | 10.1 | 9.7 |
| Saturation pH (@ 4C) | 9.63 | 10.20 | 9.77 | 9.41 | 10.20 | 10.00 | 9.57 | 10.30 | 9.97 | 9.59 | 9.77 | 10.3 | 9.46 | 10.4 | 10.0 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | 487 | 141 | 120 | -- | 1,960 | 2,150 | -- | -- | 731 | 48 | 401 | 142 | 2590 | -- | 124.0 |
| Total Antimony (Sb) | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Arsenic (As) | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Barium (Ba) | 15 | 11 | 12 | -- | 27 | 34 | -- | -- | 32 | -- | 11 | 8 | 53 | -- | 13.0 |
| Total Beryllium (Be) | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Boron (B) | 14 | 16 | <50 | -- | <5 | 12 | -- | -- | <5 | -- | 20 | 10 | 20 | -- | 9.0 |
| Total Cadmium (Cd) | 0.032 | <0.017 | 0.011 | -- | <0.017 | 0.120 | -- | -- | 0.031 | -- | <0.017 | <0.09 | 0.13 | -- | <0.09 |
| Total Chromium (Cr) | <1 | <1 | <1.0 | -- | 3 | 2 | -- | -- | <1 | -- | 1 | <1 | 2 | -- | <1 |
| Total Cobalt (Co) | <1 | <1 | <0.40 | -- | 4 | 4 | -- | -- | 1 | -- | <1 | <1 | 6 | -- | <1 |
| Total Copper (Cu) | 2 | 3 | <2.0 | 183 | 6 | 3 | <1 | <1 | <1 | <1 | 1 | <1 | 4 | 1.0 | <1 |
| Total Iron (Fe) | 593 | 363 | 230 | 176,000 | 4,570 | 2,790 | 2,190 | 303 | 1,080 | 375 | 874 | 239 | 5460 | 164.0 | 560.0 |
| Total Lead (Pb) | 0.5 | <0.5 | <0.5 | -- | 5.9 | 4.3 | -- | -- | 0.6 | -- | 0.7 | 0.7 | 4.3 | -- | <0.5 |
| Total Manganese (Mn) | 140 | 60 | 130 | 13,800 | 985 | 921 | 2,420 | 75 | 436 | 212 | 250 | 55 | 2630 | 58.0 | 368.0 |
| Total Molybdenum (Mo) | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Nickel (Ni) | <2 | <2 | <2.0 | -- | 5 | 2 | -- | -- | <2 | -- | <2 | <2 | 4 | -- | <2 |
| Total Selenium (Se) | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Silver (Ag) | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | 26 | 19 | 25 | -- | 16 | 29 | -- | -- | 28 | -- | 31 | 17 | 54 | -- | 27.0 |
| Total Thallium (Tl) | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Tin (Sn) | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Titanium (Ti) | 6 | 3 | 3 | -- | 41 | 30 | -- | -- | 14 | -- | 7 | 3 | 36 | -- | <2 |
| Total Uranium (U) | <0.1 | <0.1 | <0.1 | -- | 0.2 | 0.2 | -- | -- | <0.1 | -- | <0.1 | <0.1 | 0.2 | -- | <0.1 |
| Total Vanadium (V) | <2 | <2 | <2 | -- | 6 | 4 | -- | -- | <2 | -- | <2 | <2 | 4 | -- | <2 |
| Total Zinc (Zn) | <5 | <5 | <5.0 | 799 | 11 | 17 | 14 | <5 | 8 | <5 | 7 | <5 | 23 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | |
| Total Coliform | 1,203 | 8 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | 534 | >2420 | 641 | 46 | 3020 | 2,380.0 | 1120 |
| E. coli | <1 | >2420 | <10 | 16 | 17 | 9 | 30 | 16 | 1 | 479 | 1 | 23 | 20 | 20.0 | 7 |
| Chlorophyll A - Acidification method | 1.91 | 0.32 | 1.02 | 90.33 | 5.12 | 8.22 | 127.14 | 0.38 | 18.67 | 20.15 | 1.85 | 0.93 | 141.49 | 0.60 | 2.47 |
| Chlorophyll A - Welschmeyer method | 1.91 | 0.33 | 1.07 | 121.83 | 4.62 | 13.77 | 185.98 | 0.48 | 25.84 | 24.37 | 2.89 | 1.60 | -- | * | 2.51 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.

**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

| | |
|---|---|
| **Bold (black shaded)** | = Present Result - Parameter concentration exceeds CCME FWAL Guideline. |
| Underlined (black shaded) | = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality |
| Blue shaded | = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality |

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Larry Uteck Blvd | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | LU | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2011/10/17 | 2012/05/01 | 2012/08/15 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/15 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 |
| Sampling Time | hh:mm | -- | | | | | 10:30 | 15:20 | 11:30 | 10:10 | 14:30 | 14:30 | 13:00 | 11:45 | 10:45 | 9:54 | 13:45 | 10:23 | 10:05 | 12:20 | 11:20 | 11:45 | 11:25 | 10:15 AM | 12:00 | 10:00 | 8:40 | 12:25 PM | 3:20PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 11.3 | 12.8 | 27.3 | 14.6 | 13.9 | 18.3 | 10.9 | 15.0 | 22.8 | 10.2 | 16.1 | 23.4 | 8.2 | 13.3 | 21.9 | 11.6 | 18.2 | 22.4 | 13.3 | 14.3 | 23.1 | 12.4 | 13.8 |
| Dissolved Oxygen | mg/L | -- | -- | 5.5 - 9.5 | | | 4.2 | 6.2 | 8.2 | 9.0 | 10.2 | 8.3 | 4.5 | 12.0 | 8.1 | 7.6 | 7.3 | 9.5 | 8.5 | 8.8 | 16.6 | 9.7 | 9.6 | 8.3 | 7.4 | 11.3 | 6.8 | 9.8 | ** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.07 | 7.82 | 6.65 | 6.78 | 6.39 | 7.49 | 5.45 | 6.50 | 7.23 | 6.17 | 6.57 | 6.80 | 6.99 | 7.17 | 6.24 | 6.21 | 6.80 | 7.11 | 6.90 | 6.73 | 6.85 | 7.09 | 7.22 |
| Specific Conductance | uS/cm | -- | | -- | -- | | 203.0 | 955.0 | 480.0 | 262.0 | 670.0 | 320.0 | 845.0 | 999.0 | 611.0 | 371.0 | 0.6 | 569.0 | 436.2 | 588.0 | 574.0 | 483.4 | 755.0 | 660.0 | 590.0 | 434.6 | 588.0 | 384.4 | 621.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 | 11 | 23 | 13.0 | 10.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 34 | 224 | 116 | 52 | 190 | 99 | 258 | 243 | 104 | 70 | 210 | 132 | 93 | 154 | 164 | 92 | 247 | 154 | 143 | 96 | 124 | 74 | 174 |
| Colour | TCU | 5 | -- | -- | -- | | 94 | 18 | 14 | 18 | 7 | 7 | 19 | 6 | 8 | 18 | 8 | 8 | 6 | 17 | 13 | 26 | 12 | 12 | 8 | 28 | 21 | 24 | 18 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.61 | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.47 | 2.61 | 1.35 | 0.87 | 1.72 | 1.01 | 0.41 | 1.3 | 1.3 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | -- | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.41 | 2.61 | 1.01 | 0.51 | 1.72 | 0.87 | 0.16 | 1.3 | 0.8 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.34 | 0.36 | <0.05 | 0.14 | 0.25 | <0.05 | 0.47 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | 0.06 | 0.04 | 0.16 | <0.03 | <0.03 | 0.04 | 0.04 | 0.05 | <0.03 | <0.03 | <0.050 | 0.05 | <0.03 | 0.05 | 0.05 | <0.03 | <0.03 | 0.09 | 0.04 | <0.03 | 0.17 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | 0.4 | 4.2 | 0.7 | -- | 0.5 | <0.4 | 1.2 | 1.7 | <0.4 | 0.3 | 8.0 | 0.7 | 1.2 | 1.1 | 0.6 | 0.7 | 3.8 | 0.6 | 1.1 | 0.60 | <0.4 | 0.6 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 11.0 | 3.7 | 22.8 | 4.8 | 3.1 | 4.5 | 2.9 | 6.9 | 4.7 | 4.7 | 2.2 | 7.6 | 6.5 | 3.9 | 5.3 | 7.6 | 6.1 | 6.8 | 5.4 | 9.3 | 5.5 | 5.0 | 4.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.43 | 6.70 | 7.20 | 7.20 | 6.92 | 7.11 | 6.49 | 6.42 | 7.42 | 6.41 | 6.95 | 7.30 | 7.15 | 6.94 | 7.42 | 6.96 | 7.26 | 7.40 | 7.13 | 7.01 | 7.46 | 7.29 | 7.17 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 7.6 | 30.7 | 22.1 | 14.5 | 22.0 | 17.6 | 21.8 | 23.9 | 27.6 | 12.6 | 27,000.0 | 20.3 | 15.9 | 20.6 | 17.2 | 17.9 | 25.7 | 23.8 | 22.8 | 12.7 | 20.8 | 14.9 | 25.2 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 2.3 | 4.2 | 3.6 | 2.2 | 2.8 | 2.7 | 4.0 | 4.2 | 3.8 | 2.2 | 3,800.0 | 3.4 | 1.9 | 2.9 | 3.4 | 2.6 | 3.8 | 3.0 | 2.5 | 1.6 | 2.7 | 2.1 | 3.5 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.034 | 0.043 | 0.036 | 0.030 | 0.006 | 0.027 | 0.046 | 0.260 | 0.028 | 0.039 | 0.007 | 0.009 | 0.011 | 0.028 | 0.011 | 0.012 | 0.024 | 0.027 | 0.008 | 0.028 | 0.018 | 0.021 | 0.010 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 2.1 | 3.2 | 3.6 | 2.5 | 2.6 | 2.8 | 2.9 | 3.1 | 3.7 | 3.0 | 3,300.0 | 2.8 | 1.6 | 2.8 | 2.6 | 2.7 | 3.2 | 3.0 | 2.6 | 2.2 | 2.9 | 2.3 | 3.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 22.7 | 124.0 | 62.2 | 32.3 | 95.1 | 51.7 | 170.0 | 147.0 | 88.1 | 62.7 | 110.0 | 102.0 | 57.8 | 96.4 | 81.1 | 65.6 | 137.0 | 113.0 | 86.9 | 73.0 | 94.7 | 69.9 | 159.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 6.9 | 4.9 | 0.7 | 6.3 | 5.1 | 8.6 | 7.0 | 2.1 | 2.5 | 6.9 | 3.6 | 4.9 | 6.9 | 4.2 | 1.3 | 6.7 | 4.6 | 3.6 | 5.9 | 3.5 | 5.4 | 4.7 | 3.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 13 | 5 | 165 | <5 | <5 | <5 | <5 | 626 | <5 | <5 | <1.0 | <5 | 6 | 29 | <5 | <5 | 22 | 16 | <5 | 52 | 11 | <5 | 7.0 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 21 | 26 | 25 | 23 | 26 | 29 | 33 | 29 | 20 | 27 | 27 | 31 | 30 | 28 | 23 | 41 | 32 | 18 | 33 | 19 | 15.0 | 24.0 | 22.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 3.3 | 4.1 | 23.0 | 2.3 | 1.8 | 1.6 | 0.7 | 42.7 | 10.1 | 1.6 | 0.3 | 2.8 | 2.4 | 15.8 | 3.0 | 3.3 | 7.3 | 6.6 | 3.0 | 21.4 | 2.4 | 4.5 | 3.6 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 190 | 813 | 482 | 255 | 732 | 433 | 840 | 819 | 605 | 394 | 790 | 575 | 462 | 582 | 739 | 371 | 849 | 673 | 610 | 518 | 620 | 422 | 871 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.69 | 7.21 | 4.12 | 2.36 | 6.10 | 4.02 | 8.13 | 8.15 | 3.80 | 2.68 | 6.77 | 4.73 | 3.62 | 5.26 | 5.68 | 3.91 | 7.99 | 5.32 | 5.24 | 3.40 | 4.3 | 2.9 | 5.7 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 | 11 | 23 | 13.0 | 10.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 109 | 426 | 246 | 144 | 347 | 229 | 496 | 477 | 262 | 187 | 400 | 305 | 216 | 321 | 310 | 242 | 463 | 341 | 311 | 216 | 277 | 201.0 | 399.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.70 | 7.40 | 4.30 | 2.43 | 5.55 | 3.51 | 8.90 | 8.24 | 5.64 | 3.64 | 6.69 | 5.86 | 3.52 | 5.78 | 4.76 | 4.06 | 7.65 | 6.74 | 5.21 | 4.04 | 5.52 | 4.1 | 8.6 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 29.00 | 94.00 | 70.00 | 45.30 | 66.50 | 55.10 | 70.90 | 77.00 | 84.60 | 40.50 | 84.00 | 64.70 | 47.50 | 63.40 | 56.90 | 55.40 | 79.80 | 71.80 | 67.20 | 38.3 | 63.1 | 45.9 | 77.3 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 0.29 | 1.30 | 2.20 | 1.40 | 4.70 | 6.80 | 4.50 | 0.60 | 19.40 | 15.20 | 0.59 | 10.60 | 1.40 | 4.70 | 8.80 | 1.80 | 2.20 | 11.80 | 0.30 | 8.7 | 12.5 | 15.9 | 20.4 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.95 | -2.32 | -1.94 | -2.10 | -2.60 | -1.93 | -2.98 | -2.38 | -1.45 | -3.41 | -1.95 | -1.82 | -2.16 | -2.27 | -1.55 | -2.27 | -1.87 | -1.43 | -1.85 | -2.47 | -1.49 | -2.0 | -2.1 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.20 | -2.64 | -2.26 | -2.42 | -2.92 | -2.25 | -3.30 | -2.70 | -1.77 | -3.73 | -2.20 | -2.14 | -2.48 | -2.59 | -1.87 | -2.59 | -2.19 | -1.75 | -2.17 | -2.79 | -1.81 | -2.4 | -2.4 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.38 | 9.02 | 9.14 | 9.30 | 9.52 | 9.04 | 9.47 | 8.80 | 8.87 | 9.82 | 8.90 | 9.12 | 9.31 | 9.21 | 8.97 | 9.23 | 9.13 | 8.83 | 8.98 | 9.48 | 8.95 | 9.3 | 9.3 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.63 | 9.34 | 9.46 | 9.62 | 9.84 | 9.36 | 9.79 | 9.12 | 9.19 | 10.10 | 9.15 | 9.44 | 9.63 | 9.53 | 9.29 | 9.55 | 9.45 | 9.15 | 9.30 | 9.80 | 9.27 | 9.7 | 9.6 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 5 | 5 | -- | 5 - 100 | | -- | 218 | 227 | 252 | 107 | 447 | 31 | 1,400 | 46 | 109 | 59 | -- | 66 | 1,420 | -- | -- | 61 | 978 | 29 | 231 | 94 | -- | 84.0 |
| Total Antimony (Sb) | ug/L | 2 | 20 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Arsenic (As) | ug/L | 2 | 5 | -- | 5 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Barium (Ba) | ug/L | 5 | 1,000 | -- | -- | | -- | 225 | 201 | 116 | 133 | 134 | 119 | 185 | 157 | 80 | 150 | -- | 111 | 127 | -- | -- | 132 | -- | 111 | 110 | 143 | -- | 135.0 |
| Total Beryllium (Be) | ug/L | 2 | 5 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | ug/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Boron (B) | ug/L | 5 | 1,200 | -- | 1,500 | | -- | 11 | 17 | 22 | 10 | 22 | 18 | 22 | 20 | 21 | <50 | -- | 9 | 14 | -- | -- | <5 | -- | 19 | 9 | 16 | -- | 11.0 |
| Total Cadmium (Cd) | ug/L | 0.017 | 0.010 | -- | 0.090 | | -- | 0.538 | 0.171 | 0.168 | 0.300 | 0.236 | 0.148 | 0.171 | 0.031 | 0.079 | 0.150 | -- | 0.176 | 0.426 | -- | -- | 0.069 | -- | 0.052 | 0.14 | <0.09 | -- | 0.1 |
| Total Chromium (Cr) | ug/L | 1 | 1 | -- | 1 | | -- | <1 | <1 | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | 3 | -- | -- | <1 | -- | 1 | <1 | <1 | -- | <1 |
| Total Cobalt (Co) | ug/L | 1 | 10 | -- | -- | | -- | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | 2 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Copper (Cu) | ug/L | 1 | 2 | -- | 2 | | 3 | <2 | 3 | 16 | 2 | 6 | 2 | 2 | <1 | 4 | 2 | 3 | 3 | 10 | <1 | 3 | <1 | 14 | 3 | 4 | 2 | 5.0 | 3.0 |
| Total Iron (Fe) | ug/L | 50 | 300 | -- | 300 | | 2,150 | 347 | 1,320 | 500 | 194 | 890 | 157 | 2,000 | 207 | 229 | 170 | 671 | 171 | 1,940 | 374 | 223 | <50 | 3,540 | 289 | 494 | 1090 | 206.0 | 290.0 |
| Total Lead (Pb) | ug/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | -- | 0.8 | 0.7 | 1.0 | <0.5 | 1.4 | <0.5 | 1.8 | <0.5 | <0.5 | <0.5 | -- | <0.5 | 3.1 | -- | -- | <0.5 | | <0.5 | 1.3 | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | ug/L | 2 | 820 | -- | -- | | 129 | 182 | 485 | 120 | 87 | 89 | 26 | 71 | 182 | 36 | 110 | 371 | 61 | 444 | 148 | 35 | 77 | 1,870 | 91 | 91 | 240 | 40.0 | 51.0 |
| Total Molybdenum (Mo) | ug/L | 2 | 73 | -- | 73 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Nickel (Ni) | ug/L | 2 | 25 | -- | 25 - 150 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | 3 | <2 | <2 | <2.0 | -- | <2 | 3 | -- | -- | <2 | -- | <2 | <2 | 2 | -- | 10.0 |
| Total Selenium (Se) | ug/L | 1 | 1 | -- | 1 | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Silver (Ag) | ug/L | 0.1 | 0.1 | -- | 0.3 | | -- | <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 |
| Total Strontium (Sr) | ug/L | 5 | 21,000 | -- | -- | | -- | 112 | 94 | 60 | 93 | 90 | 96 | 116 | 111 | 54 | 120 | -- | 43 | 89 | -- | -- | 104 | -- | 111 | 56 | 115 | -- | 107.0 |
| Total Thallium (Tl) | ug/L | 0.1 | 0.8 | -- | 0.8 | | -- | <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 |
| Total Tin (Sn) | ug/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Titanium (Ti) | ug/L | 2 | -- | -- | -- | | -- | 4 | 3 | 7 | 3 | 11 | 2 | 22 | <2 | 3 | <2 | -- | <2 | 31 | -- | -- | <2 | -- | <2 | 6 | 2 | -- | <2 |
| Total Uranium (U) | ug/L | 0.1 | 300.0 | -- | 15.0 | | -- | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | 0.2 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Vanadium (V) | ug/L | 2 | 6 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | 4 | -- | -- | 3 | -- | <2 | 2 | <2 | -- | 5.0 |
| Total Zinc (Zn) | ug/L | 5 | 30 | -- | 30 | | 9 | 79 | 92 | 39 | 57 | 49 | 26 | 17 | 8 | 23 | 27 | 17 | 16 | 64 | 7 | 52 | 21 | 120 | 22 | 41 | 13 | 38.0 | 27.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | -- | >2420 | >2420 | 2,420 | 866 | >2420 | 866 | >2420 | 961 | >2420 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | 488 | >2420 | 1,990 | 210 | 5020 | 330.0 | 540.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | <100 | <1 | 2 | 19 | 3 | 86 | <1 | <1 | 7 | 1,730 | <10 | 19 | 6 | <1 | 40 | 50 | 6 | 51 | 4 | <1 | 20 | 30.0 | <10 |
| Chlorophyll A - Acidification method | ug/L | 0.05 | -- | -- | -- | | 1.99 | 2.44 | 32.52 | 1.80 | 1.54 | 2.30 | 0.12 | 99.13 | 2.54 | 0.96 | 0.69 | 3.14 | 4.94 | 5.43 | 4.57 | 1.55 | 25.83 | 21.03 | 2.47 | 78.76 | 5.50 | 2.39 | 4.19 |
| Chlorophyll A - Welschmeyer method | ug/L | 0.05 | -- | -- | -- | | 2.08 | 2.71 | 31.31 | 2.15 | 1.77 | 2.50 | 0.11 | 98.00 | 2.51 | 0.96 | 0.68 | 3.10 | 2.71 | 6.73 | 5.23 | 1.61 | 31.14 | 24.37 | 2.85 | 131.56 | -- | * | 4.24 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality
blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Paper Mill Lake | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | PML1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/15 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 |
| Sampling Time | hh:mm | -- | | | | | 13:45 | 13:00 | 13:00 | 13:35 | 15:15 | 13:00 | 13:00 | 16:50 | 17:00 | 12:50 | 10:55 | 10:51 | 11:35 | 10:45 | 10:30 | 14:45 | 12:35 | 12:45 | 08:45 | 8:20 | 13:15 | 9:30 | 9:15 | 13:40 | 13:45 | 13:25 | 13:00 | 11:40 | 14:45 PM | 1:10PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 3.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.9 | 2.7 | 4.2 | 3.8 | 4.1 | 4.7 | 3.9 | 4.1 | 2.4 | 2.9 | 1.9 |
| Water Temp | Celsius | -- | -- | -- | -- | | 15.7 | 17.1 | 16.2 | 13.2 | 22.7 | 9.1 | 10.3 | 22.1 | 13.6 | 8.3 | 14.9 | 11.6 | 22.5 | 12.3 | 12.1 | 23.6 | 12.4 | 15.1 | 24.0 | 9.3 | 12.8 | 21.6 | 12.1 | 17.2 | 23.0 | 14.4 | 14.4 | 24.7 | 12.3 | 12.0 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.6 | 8.1 | 6.9 | 8.8 | 7.8 | 10.4 | 10.4 | 8.2 | 9.5 | 8.4 | 8.6 | 10.0 | 7.7 | 9.9 | 12.1 | 7.5 | 8.1 | 7.2 | 8.0 | 8.6 | 8.8 | 6.5 | 13.0 | 7.0 | 7.8 | 8.2 | 9.4 | 5.6 | 8.4 | ** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.39 | 6.57 | 6.64 | 7.06 | 7.35 | 5.89 | 6.28 | 6.20 | 6.31 | 7.58 | 6.63 | 6.39 | 7.20 | 6.32 | 6.60 | 7.42 | 6.60 | 6.90 | 6.34 | 7.98 | 7.57 | 5.54 | 4.43 | 6.91 | 6.74 | 7.31 | 6.29 | 6.75 | 7.19 | 7.38 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 561.0 | 279.0 | 223.0 | 265.0 | 234.0 | 124.5 | 176.6 | 173.6 | 105.5 | 366.0 | 186.4 | 215.1 | 199.0 | 250.5 | 431.0 | 263.0 | 210.0 | 0.2 | 432.1 | 289.1 | 231.0 | 289.0 | 234.3 | 234.0 | 273.0 | 255.0 | 203.7 | 203.8 | 208.1 | 177.9 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 | <5 | 8 | 7 | <5 | 13 | 9 | <5 | 10 | 8.0 | <5 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 39 | 64 | 58 | 67 | 61 | 24 | 44 | 43 | 18 | 55 | 45 | 57 | 57 | 48 | 63 | 50 | 46 | 65 | 57 | 56 | 59 | 67 | 50 | 66 | 63 | 59 | 57 | 54 | 47 | 55 |
| Colour | TCU | 5 | -- | -- | -- | | 54 | 15 | 21 | 19 | 12 | 57 | 32 | 38 | 65 | 38 | 29 | 8 | 15 | 11 | 17 | 10 | 30 | 31 | 7 | 15 | 18 | 16 | 20 | 20 | 18 | 24 | 28 | 7 | 31 | 46 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.49 | 0.10 | 0.17 | 0.42 | 0.27 | 0.66 | 0.55 | 0.15 | 0.62 | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 | 0.19 | 0.09 | 0.16 | 0.28 | 0.28 | 0.20 | 0.51 | 0.15 | 0.2 | 0.2 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.49 | -- | -- | 0.42 | 0.27 | -- | 0.55 | -- | -- | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 | 0.19 | <0.05 | 0.16 | 0.17 | 0.13 | 0.20 | 0.40 | 0.05 | 0.2 | 0.2 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.09 | <0.05 | 0.11 | 0.15 | <0.05 | 0.11 | 0.10 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.06 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | <0.03 | <0.03 | <0.050 | <0.03 | 0.03 | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | 0.05 | <0.03 | 0.04 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 0.4 | -- | 0.4 | 0.8 | 0.4 | 0.4 | <5 | 0.5 | 1.2 | 6.0 | 2.6 | 3.4 | 0.4 | 0.5 | 0.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.6 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 6.5 | 3.6 | 4.7 | 0.7 | 3.3 | 6.7 | 4.6 | 5.0 | 8.3 | 5.7 | 5.3 | 4.2 | 4.1 | 5.1 | 4.0 | 2.0 | 4.4 | 2.7 | 5.4 | 5.8 | 7.1 | 6.1 | 8.7 | 5.7 | 4.7 | 6.3 | 4.9 | 3.2 | 4.0 | 4.2 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.36 | 6.75 | 6.79 | 6.63 | 7.04 | 6.58 | 6.54 | 6.83 | 6.67 | 6.60 | 6.80 | 6.71 | 6.92 | 6.88 | 6.66 | 7.00 | 6.64 | 6.67 | 6.95 | 6.84 | 6.36 | 6.86 | 6.87 | 6.80 | 7.15 | 6.75 | 6.84 | 7.28 | 7.16 | 6.78 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 4.5 | 6.9 | 6.4 | 8.4 | 9.0 | 5.9 | 6.0 | 5.0 | 4.6 | 6.0 | 6.0 | 6.8 | 6.6 | 6.9 | 6.9 | 9.1 | 7.0 | 6,900.0 | 7.8 | 4.8 | 7.9 | 10.5 | 7.6 | 8.0 | 8.2 | 9.5 | 6.3 | 8.7 | 8.4 | 7.0 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.6 | 1.1 | 1.0 | 1.3 | 1.2 | 0.8 | 1.0 | 0.9 | 0.8 | 1.0 | 1.1 | 1.0 | 0.9 | 1.5 | 1.3 | 1.4 | 1.0 | 970.0 | 1.4 | 0.9 | 1.5 | 1.8 | 1.3 | 1.3 | 1.2 | 1.5 | 1.1 | 1.4 | 1.4 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | 0.002 | 0.018 | 0.002 | <0.002 | 0.014 | 0.011 | 0.010 | 0.019 | 0.030 | 0.006 | 0.007 | 0.047 | 0.012 | 0.030 | 0.021 | 0.005 | 0.060 | 0.018 | 0.173 | 0.104 | 0.013 | 0.041 | 0.036 | 0.099 | 0.032 | 0.011 | 0.012 | 0.007 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 0.9 | 0.9 | 1.2 | 1.1 | 1.3 | 1.2 | 0.8 | 1.4 | 0.8 | 1.0 | 0.8 | 1.0 | 1.5 | 0.9 | 1.3 | 0.9 | 800.0 | 1.0 | 0.6 | 1.0 | 1.3 | 1.1 | 1.0 | 1.1 | 1.3 | 0.9 | 1.2 | 1.1 | 0.9 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 25.0 | 38.0 | 34.0 | 35.2 | 40.2 | 18.4 | 26.8 | 22.8 | 13.7 | 33.6 | 29.8 | 35.3 | 28.5 | 32.2 | 38.1 | 41.6 | 33.7 | 35.0 | 38.6 | 25.6 | 37.6 | 35.1 | 32.1 | 40.9 | 45.3 | 36.0 | 35.5 | 37.5 | 39.2 | 42.6 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 4.5 | 2.6 | 2.8 | 3.8 | 3.4 | 5.9 | 3.7 | 2.6 | 5.4 | 2.9 | 3.2 | 2.8 | 2.6 | 2.6 | 2.5 | 2.3 | 2.7 | 2.4 | 2.4 | 2.5 | 2.5 | 0.8 | 2.7 | 2.4 | 1.8 | 2.7 | 1.2 | 2.3 | 2.3 | 2.3 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <2 | 3 | 9 | 7 | <2 | <1 | 1 | <2 | 5 | 9 | 6 | <5 | <5 | 23 | 6 | <5 | <5 | 1 | 149 | 6 | 531 | 10 | 18 | 20 | 5 | 104 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 13 | 11 | 11 | 13 | 12 | 12 | 12 | 10 | 12 | 7 | 10 | 8 | 10 | 10 | 8 | 8 | 8 | 8 | 9 | 8 | 11 | 11 | 11 | 10 | 9 | 11 | 9 | 7.0 | 9.0 | 7.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.4 | 0.5 | 0.6 | 8.2 | 0.9 | 0.5 | 0.6 | 1.0 | 1.2 | 0.7 | 1.0 | 0.7 | 1.1 | 19.2 | 1.4 | 0.9 | 1.5 | 0.5 | 3.8 | 24.2 | 199.0 | 112.0 | 2.6 | 3.3 | 3.2 | 31.3 | 0.7 | 0.5 | 2.1 | 1.2 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 170 | 250 | 230 | 260 | 250 | 130 | 180 | 170 | 100 | 214 | 179 | 227 | 218 | 209 | 230 | 261 | 224 | 240 | 246 | 241 | 224 | 310 | 189 | 256 | 277 | 248 | 242 | 274 | 232 | 256 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.51 | 2.18 | 1.99 | 2.34 | 2.15 | 1.09 | 1.62 | 1.56 | 0.92 | 2.11 | 1.49 | 1.79 | 1.95 | 1.71 | 2.62 | 1.73 | 1.62 | 2.11 | 1.93 | 1.88 | 1.91 | 2.29 | 1.79 | 2.09 | 2.24 | 2.09 | 1.83 | 1.88 | 1.7 | 1.7 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 | <5 | 8 | 7 | <5 | 13 | 9 | <5 | 10 | 8.0 | <5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 93 | 129 | 118 | 137 | 134 | 75 | 100 | 90 | 63 | 117 | 95 | 110 | 109 | 115 | 140 | 117 | 102 | 120 | 126 | 109 | 141 | 148 | 108 | 129 | 137 | 142 | 112 | 117 | 112.0 | 115.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.40 | 2.11 | 1.89 | 2.11 | 2.33 | 1.20 | 1.58 | 1.35 | 0.95 | 1.89 | 1.78 | 2.00 | 1.69 | 2.56 | 2.18 | 2.45 | 1.94 | 1.98 | 2.61 | 1.93 | 3.54 | 3.33 | 1.93 | 2.35 | 2.53 | 3.15 | 1.99 | 2.23 | 2.3 | 2.4 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 14.00 | 22.00 | 20.00 | 26.00 | 28.00 | 18.00 | 19.00 | 16.00 | 15.00 | 19.10 | 19.50 | 21.10 | 20.20 | 23.40 | 22.60 | 28.50 | 21.60 | 21.00 | 25.20 | 15.70 | 25.90 | 33.60 | 24.30 | 25.30 | 25.40 | 29.90 | 20.3 | 27.5 | 26.7 | 22.4 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 3.78 | 1.63 | 2.58 | 5.17 | 4.02 | 4.80 | 1.25 | 7.22 | 1.60 | 5.50 | 9.00 | 5.50 | 7.00 | 19.80 | 9.20 | 17.00 | 9.20 | 3.18 | 15.20 | 1.20 | 30.00 | 18.60 | 3.80 | 5.80 | 6.10 | 20.30 | 4.2 | 8.4 | 14.9 | 15.7 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.57 | -2.90 | -2.94 | -2.96 | -2.43 | -3.25 | -3.27 | -2.94 | -3.13 | -2.91 | -3.31 | -3.35 | -3.07 | -3.03 | -2.61 | -2.79 | -3.26 | -3.13 | -2.98 | -3.29 | -3.65 | -2.82 | -2.99 | -3.20 | -2.42 | -2.92 | -3.26 | -2.37 | -2.6 | -3.3 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.82 | -3.15 | -3.19 | -3.21 | -2.68 | -3.50 | -3.53 | -3.19 | -3.38 | -3.23 | -3.63 | -3.67 | -3.39 | -3.35 | -2.93 | -3.11 | -3.58 | -3.38 | -3.30 | -3.61 | -3.97 | -3.14 | -3.31 | -3.52 | -2.74 | -3.24 | -3.58 | -2.69 | -2.9 | -3.6 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.93 | 9.65 | 9.73 | 9.59 | 9.47 | 9.83 | 9.81 | 9.77 | 9.80 | 9.51 | 10.10 | 10.10 | 9.99 | 9.91 | 9.27 | 9.79 | 9.90 | 9.80 | 9.93 | 10.10 | 10.00 | 9.68 | 9.86 | 10.00 | 9.57 | 9.67 | 10.1 | 9.65 | 9.8 | 10.1 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.20 | 9.90 | 9.98 | 9.84 | 9.72 | 10.10 | 10.10 | 10.00 | 10.10 | 9.83 | 10.40 | 10.40 | 10.30 | 10.20 | 9.59 | 10.10 | 10.20 | 10.10 | 10.20 | 10.50 | 10.30 | 10.00 | 10.20 | 10.30 | 9.89 | 9.99 | 10.4 | 9.97 | 10.1 | 10.4 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 260 | -- | -- | 665 | 46 | -- | 233 | -- | -- | 177 | 306 | 141 | 103 | 3,920 | 305 | 129 | 142 | 140 | -- | 2,320 | 7,690 | -- | -- | 250 | 94 | 4,190 | 151 | 26 | -- | 139.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | 2 | <2 | <2 | <2 | <1.0 | -- | <2 | 4 | -- | -- | 3 | <2 | <2 | 3 | <2 | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 23 | -- | -- | 35 | 24 | -- | 27 | -- | -- | 22 | 19 | 20 | 12 | 40 | 23 | 23 | 18 | 21 | -- | 34 | 60 | -- | -- | 22 | -- | 58 | 19 | 12 | -- | 21.0 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | 8 | -- | -- | 11 | 9 | -- | <50 | -- | -- | 6 | 9 | 6 | 8 | 9 | 8 | 13 | 11 | <50 | -- | <5 | 10 | -- | -- | <5 | -- | 12 | 6 | 11 | -- | 7.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | 0.032 | <0.017 | -- | <0.017 | -- | -- | <0.017 | 0.066 | 0.021 | 0.018 | 0.430 | <0.017 | 0.020 | <0.017 | 0.025 | -- | 0.146 | 0.227 | -- | -- | 0.041 | -- | 0.179 | <0.09 | <0.09 | -- | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | 3 | <1 | <1 | <1 | <1.0 | -- | 2 | 6 | -- | -- | <1 | -- | 5 | <1 | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- | <1 | 2 | <1 | <1 | 9 | <1 | <1 | <1 | <0.40 | -- | 3 | 6 | -- | -- | <1 | -- | 6 | <1 | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | 2 | <2.0 | <2.0 | 4 | <2.0 | 2 | <2 | <2 | <2 | 1 | 6 | 1 | <1 | 2 | <2.0 | 3 | 4 | 10 | <1 | <1 | <1 | <1 | 3 | <1 | <1 | 1.0 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 140 | -- | -- | 837 | 89 | 161 | 141 | 315 | 528 | 137 | 742 | 130 | 205 | 5,300 | 239 | 296 | 182 | 93 | 4,460 | 6,020 | 13,600 | 8,250 | 171 | 206 | 359 | 12,600 | 93 | 184 | 82.0 | 136.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 1.7 | <0.5 | -- | <0.5 | -- | -- | <0.5 | 0.9 | <0.5 | <0.5 | 13.5 | 0.9 | <0.5 | <0.5 | <0.5 | -- | 6.3 | 13.9 | -- | -- | <0.5 | -- | 9.1 | 1.2 | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 17 | -- | -- | 142 | 69 | 41 | 14 | 128 | 62 | 48 | 214 | 33 | 58 | 693 | 54 | 260 | 49 | 34 | 296 | 278 | 424 | 281 | 53 | 64 | 125 | 894 | 21 | 64 | 22.0 | 26.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | 2 | <2 | <2 | 9 | <2 | <2 | <2 | <2.0 | -- | 5 | 7 | -- | -- | 22 | -- | 6 | 2 | <2 | -- | 5.0 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | 1 | 1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 18 | -- | -- | 36 | 37 | -- | 25 | -- | -- | 26 | 30 | 31 | 25 | 34 | 35 | 37 | 30 | 32 | -- | 22 | 40 | -- | -- | 34 | -- | 47 | 27 | 42 | -- | 35.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | <0.1 | <0.1 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | 8 | <2.0 | -- | 4 | -- | -- | <2 | 4 | <2 | <2 | 65 | 4 | <2 | 3 | <2 | -- | 25 | 106 | -- | -- | 2 | -- | 75 | <2 | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | 0.1 | <0.1 | <0.1 | <0.1 | 0.6 | <0.1 | <0.1 | <0.1 | <0.1 | -- | 0.6 | 0.9 | -- | -- | <0.1 | -- | 0.6 | <0.1 | <0.1 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | 10 | <2 | <2 | <2 | <2 | -- | 7 | 16 | -- | -- | <2 | -- | 12 | <2 | <2 | -- | 2.0 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 8 | -- | -- | 10 | 5 | 6 | 6 | 6 | 5 | <5 | 13 | 8 | <5 | 62 | <5 | <5 | 6 | 11 | 13 | 12 | 34 | 20 | <5 | 11 | <5 | 29 | 6 | 6 | <5 | 7.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 200 | 73 | -- | >250 | >250 | >250 | 85 | >250 | -- | 411 | 2,420 | 866 | 1,730 | 1,011 | 613 | 2,420 | >2420 | --- | >2420 | >2420 | >2420 | 1,410 | >2420 | 665 | >2420 | 166 | 9 | 400 | 4,000.0 | 128 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 33 | 45 | -- | 19 | >250 | 2 | 2 | 34 | <100 | 2 | 20 | 12 | 4 | 6 | 6 | 10 | 10 | <10 | 3 | 6 | >2420 | 34 | 10 | 6 | 2 | <1 | 1 | 10 | 13.0 | <1 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.62 | 2.31 | 0.57 | 0.82 | 1.12 | 0.07 | 2.85 | 0.86 | 0.15 | 1.03 | 0.69 | 1.17 | 1.10 | 5.07 | 0.67 | 0.64 | 0.91 | 0.57 | 8.84 | 4.67 | 8.00 | 4.71 | 1.70 | 4.97 | 4.40 | 4.86 | 1.93 | 1.14 | 1.12 | 1.53 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.64 | 2.21 | 0.64 | 0.74 | 1.04 | 0.06 | 2.75 | 0.76 | 0.15 | 1.10 | 0.91 | 1.37 | 1.10 | 6.39 | 0.65 | 0.65 | 0.87 | 0.54 | 9.54 | 3.69 | 12.31 | 10.82 | 1.76 | 6.45 | 4.96 | 6.58 | 0.98 | -- | * | 1.44 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shad** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (blac = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality
**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Paper Mill Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | PML2 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2013/05/15 | 2013/10/16 | 2014/05/15 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/09 | 2018/08/17 | 2018/10/17 | 05/09/2019 |
| Sampling Time | hh:mm | -- | | | | | 13:15 | 13:40 | 13:45 | 14:30 | 16:20 | 13:00 | 12:40 | 16:20 | 16:15 | 13:16 | 13:40 | 11:20 | 11:00 | 9:20 | 8:30 | 11:30 | 13:45 | 9:08 | 13:45 | 10:00 | 9:50 | 14:30 | 14:30 | 14:00 | 13:30 | 12:10 | 14:15 PM | 12:50PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | 2.8 | 2.2 | 2.3 | N/A | 3.0 | 2.0 | 2.2 | 2.3 | 2.2 | 2.4 | 3.2 | N/A | N/A | N/A | 3.1 | NCC | N/A | 2.4 | 2.7 | 2.3 | 2.6 | 2.5 | 2.5 | 2.9 | 2.9 | 3.0 | 2.2 | 2.4 |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.8 | 24.2 | 19.7 | 17.8 | 25.3 | 10.1 | 10.9 | 23.1 | 15.2 | 11.6 | 14.8 | 12.6 | 14.4 | 21.1 | 12.1 | 15.1 | 27.0 | 9.0 | 13.8 | 22.1 | 11.8 | 17.1 | 24.0 | 14.0 | 15.3 | 5.4 | 12.2 | 12.7 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.2 | 8.3 | 8.4 | 8.8 | 8.1 | 10.6 | 9.9 | 8.7 | 8.9 | 7.8 | 9.3 | 8.9 | 12.4 | 7.0 | 7.9 | 8.1 | 9.8 | 8.3 | 8.6 | 7.7 | 10.3 | 10.4 | 8.9 | 6.6 | 9.9 | 7.0 | 8.7 | ** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.36 | 6.82 | 6.84 | 7.09 | 7.39 | 6.53 | 6.31 | 6.67 | 6.13 | 8.61 | 6.49 | 6.13 | 6.50 | 7.22 | 5.92 | 6.56 | 6.76 | 7.25 | 7.57 | 5.53 | 5.37 | 6.73 | 7.01 | 6.87 | 6.33 | 24.70 | 7.00 | 6.76 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 267.0 | 264.0 | 241.0 | 237.0 | 234.0 | 200.5 | 158.7 | 173.2 | 155.9 | 231.0 | 234.0 | 250.5 | 966.0 | 266.0 | 215.0 | 0.2 | 255.6 | 454.9 | 264.0 | 298.0 | 230.3 | 242.0 | 285.0 | 252.0 | 214.4 | 293.8 | 297.3 | 6.1 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | <5 | 8 | 7 | 21 | <5 | 8 | 32 | 10 | 26 | <5.0 | 5 | 7 | 7 | 10 | 8 | 5 | 12 | 11 | 5 | 11 | 8.0 | <5 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 63 | 63 | 58 | 62 | 58 | 50 | 44 | 43 | 34 | 55 | 63 | 64 | 245 | 50 | 42 | 69 | 59 | 57 | 67 | 67 | 50 | 67 | 72 | 60 | 46 | 55 | 43 | 50 |
| Colour | TCU | 5 | -- | -- | -- | | 22 | 17 | 19 | 20 | 13 | 23 | 35 | 38 | 48 | 39 | 18 | 8 | 6 | 7 | 31 | 26 | 10 | 9 | 22 | 13 | 22 | 18 | 7 | 19 | 31 | 21 | 21 | 43 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.14 | 0.07 | 0.09 | 0.19 | 0.11 | 0.23 | 0.33 | 0.14 | 0.22 | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.32 | 0.23 | 0.10 | 0.11 | 0.18 | 0.27 | 0.07 | 0.16 | 0.17 | 0.13 | 0.2 | 0.14 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.14 | -- | -- | 0.19 | 0.11 | -- | 0.33 | -- | -- | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.17 | 0.23 | 0.10 | <0.05 | 0.18 | 0.16 | 0.07 | 0.16 | 0.17 | <0.05 | 0.2 | 0.14 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | 0.15 | <0.05 | <0.05 | 0.11 | <0.05 | 0.11 | <0.05 | <0.05 | <0.05 | 0.13 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.03 | 0.23 | 0.05 | 0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | 0.05 | 0.06 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | -- | 1.7 | <0.4 | 0.4 | <5 | 0.2 | 1.2 | 3.0 | 0.6 | <0.4 | 0.5 | 0.6 | 0.6 | <0.4 | <0.4 | <0.4 | <0.4 | 1.3 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 3.6 | 2.6 | 4.5 | 3.2 | 3.4 | 3.6 | 4.0 | 6.0 | 5.6 | 5.9 | 4.4 | 4.0 | 2.7 | 2.4 | 5.8 | 2.8 | 6.0 | 6.1 | 4.0 | 3.6 | 8.3 | 5.5 | 5.4 | 4.1 | 4.9 | 3.5 | 4.0 | 4.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.50 | 6.81 | 6.82 | 6.66 | 7.02 | 6.83 | 6.37 | 6.60 | 6.60 | 6.60 | 6.68 | 6.73 | 7.13 | 7.04 | 6.77 | 6.64 | 6.98 | 6.98 | 6.83 | 7.23 | 6.93 | 6.86 | 7.23 | 6.99 | 6.81 | 7.29 | 7.05 | 6.78 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.1 | 7.1 | 6.1 | 7.2 | 7.7 | 8.0 | 5.3 | 4.8 | 5.0 | 6.1 | 6.7 | 7.7 | 19.2 | 8.8 | 6.9 | 7,300.0 | 8.2 | 6.2 | 8.9 | 8.1 | 7.4 | 8.1 | 8.5 | 8.1 | 6.7 | 8.1 | 7.7 | 7.1 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.1 | 1.1 | 1.3 | 1.2 | 1.2 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 1.4 | 1.7 | 1.4 | 1.0 | 1,000.0 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.3 | 1.1 | 1.2 | 1.1 | 1.2 | 1.3 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | 0.002 | 0.010 | 0.002 | <0.002 | 0.009 | 0.009 | 0.007 | 0.025 | 0.006 | 0.026 | 0.011 | 0.026 | 0.018 | 0.008 | 0.012 | 0.008 | 0.012 | 0.003 | 0.005 | 0.018 | 0.013 | 0.006 | 0.047 | 0.005 | 0.012 | 0.008 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 1.0 | 0.9 | 1.0 | 0.9 | 1.0 | 0.9 | 0.8 | 1.0 | 0.8 | 0.8 | 1.3 | 1.4 | 1.2 | 1.1 | 830.0 | 1.0 | 0.9 | 1.0 | 1.0 | 1.1 | 0.9 | 1.4 | 1.1 | 0.9 | 1.1 | 1.1 | 0.9 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 35.0 | 40.0 | 34.0 | 31.1 | 35.1 | 30.8 | 25.7 | 21.3 | 20.9 | 34.6 | 37.5 | 42.0 | 133.0 | 42.6 | 33.9 | 38.0 | 43.3 | 31.3 | 42.9 | 37.5 | 32.1 | 41.5 | 47.2 | 35.5 | 37.5 | 37.7 | 39.6 | 42.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.6 | 2.5 | 2.3 | 2.6 | 2.3 | 3.3 | 2.9 | 2.5 | 3.0 | 2.8 | 2.7 | 4.2 | 2.4 | 2.3 | 2.9 | 1.9 | 1.8 | 2.8 | 2.3 | 0.6 | 2.6 | 1.7 | 0.8 | 2.0 | 2.5 | 1.0 | 2.3 | 2.0 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 2 | 3 | <1 | 15 | <2 | 11 | <1 | 8 | <1 | <5 | <5 | <5 | 16 | <5 | <5 | 1 | <5 | <5 | 45 | <5 | <5 | <5 | 14 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 11 | 11 | 10 | 10 | 10 | 9 | 10 | 9 | 7 | 9 | 11 | 27 | 7 | 7 | 8 | 9 | 9 | 12 | 7 | 10 | 10 | 8 | 11 | 7 | 7.0 | 8.0 | 7 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.8 | 0.7 | 0.6 | 1.0 | 0.8 | 0.4 | 0.4 | 3.4 | 0.5 | 0.7 | 1.0 | 3.3 | 2.6 | 0.7 | 1.0 | 0.9 | 1.9 | 1.3 | 9.4 | 1.1 | 1.4 | 1.9 | 1.9 | 1.8 | 1.4 | 0.7 | 1.2 | 1.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 240 | 250 | 230 | 230 | 230 | 210 | 170 | 170 | 150 | 213 | 254 | 277 | 777 | 273 | 212 | 260 | 251 | 246 | 263 | 319 | 190 | 259 | 286 | 255 | 249 | 289 | 227 | 261 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.11 | 2.17 | 1.99 | 2.07 | 2.01 | 1.77 | 1.46 | 1.58 | 1.30 | 2.13 | 1.98 | 2.19 | 8.12 | 1.77 | 1.86 | 2.13 | 1.97 | 1.95 | 2.29 | 2.24 | 1.79 | 2.22 | 2.44 | 2.15 | 1.56 | 1.93 | 1.6 | 1.57 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | <1 | 8 | 7 | 21 | <5 | 8 | 32 | 10 | 26 | <1.0 | 5 | 7 | 7 | 10 | 8 | 5 | 12 | 11 | 5 | 11 | 8.0 | <5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 123 | 131 | 117 | 120 | 120 | 110 | 91 | 89 | 79 | 119 | 119 | 137 | 448 | 118 | 109 | 130 | 127 | 112 | 139 | 129 | 108 | 133 | 146 | 124 | 103 | 118 | 107.0 | 110 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.94 | 2.23 | 1.88 | 1.88 | 2.03 | 1.86 | 1.48 | 1.28 | 1.27 | 1.94 | 2.09 | 2.55 | 6.96 | 2.47 | 1.95 | 2.14 | 2.44 | 1.84 | 2.53 | 2.17 | 1.92 | 2.37 | 2.62 | 2.09 | 2.10 | 2.19 | 2.3 | 2.37 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 20.00 | 22.00 | 20.00 | 23.00 | 24.00 | 25.00 | 17.00 | 15.00 | 16.00 | 19.30 | 20.80 | 25.00 | 54.90 | 27.70 | 21.30 | 23.00 | 25.80 | 20.40 | 27.20 | 25.20 | 23.80 | 25.60 | 25.80 | 25.20 | 21.3 | 25.2 | 24.6 | 22.70 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 4.20 | 1.36 | 2.84 | 4.81 | 0.50 | 2.48 | 0.68 | 10.50 | 1.17 | 4.80 | 2.80 | 7.50 | 7.70 | 16.50 | 2.20 | 0.23 | 10.60 | 3.00 | 5.10 | 1.70 | 3.40 | 3.20 | 3.50 | 1.60 | 14.9 | 6.4 | 18.7 | 20.40 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.33 | -2.83 | -2.93 | -3.06 | -2.55 | -2.80 | NC | -3.18 | -3.17 | -2.89 | -3.39 | -3.08 | -1.73 | -2.61 | -2.57 | NC | -3.00 | -2.97 | -2.98 | -2.46 | -2.89 | -3.13 | -2.37 | -2.66 | -3.25 | -2.35 | -2.8 | -3.26 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.59 | -3.08 | -3.18 | -3.31 | -2.80 | -3.05 | NC | -3.43 | -3.42 | -3.21 | -3.71 | -3.40 | -2.05 | -2.93 | -2.89 | NC | -3.32 | -3.29 | -3.30 | -2.78 | -3.21 | -3.45 | -2.69 | -2.98 | -3.57 | -2.67 | -3.1 | -3.58 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.83 | 9.64 | 9.75 | 9.72 | 9.57 | 9.63 | NC | 9.78 | 9.77 | 9.49 | 10.10 | 9.81 | 8.86 | 9.65 | 9.34 | NC | 9.98 | 9.95 | 9.81 | 9.69 | 9.82 | 9.99 | 9.60 | 9.65 | 10.1 | 9.64 | 9.8 | 10.00 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.10 | 9.89 | 10.00 | 9.97 | 9.82 | 9.88 | NC | 10.00 | 10.00 | 9.81 | 10.40 | 10.10 | 9.18 | 9.97 | 9.66 | NC | 10.30 | 10.30 | 10.10 | 10.00 | 10.10 | 10.30 | 9.92 | 9.97 | 10.4 | 9.96 | 10.1 | 10.40 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 130 | -- | -- | 1,030 | 56 | -- | 202 | -- | -- | 189 | 131 | 107 | 181 | 52 | 122 | 130 | -- | 278 | 610 | -- | -- | 215 | 40 | 34 | 141 | 75 | -- | 134.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 16 | -- | -- | 23 | 12 | -- | 23 | -- | -- | 22 | 22 | 37 | 50 | 27 | 19 | 25 | -- | 24 | 35 | -- | -- | 27 | -- | 23 | 21 | 8 | -- | 25.0 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | 5 | -- | -- | 8 | 9 | -- | <50 | -- | -- | 6 | 6 | 9 | 7 | 13 | 11 | <50 | -- | <5 | 8 | -- | -- | <5 | -- | 11 | 6 | 10 | -- | 6.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | 0.037 | <0.017 | -- | 0.028 | -- | -- | 0.023 | 0.039 | 0.060 | 0.062 | 0.019 | 0.018 | 0.023 | -- | 0.145 | 0.042 | -- | -- | <0.017 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- | <1 | <1 | 2 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 1,380 | 1 | <1 | 2 | <2.0 | 2 | 2 | <1 | <1 | 1 | <1 | <1 | 1 | <1 | <1 | 2.0 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 100 | -- | -- | 1,090 | 151 | 76 | 143 | 699 | 181 | 178 | 181 | 1,760 | 264 | 316 | 134 | 170 | 334 | 368 | 647 | 174 | 123 | <50 | 203 | 145 | 104 | 163 | 165.0 | 128.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 2.4 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 49.7 | 0.7 | <0.5 | <0.5 | <0.5 | -- | 0.5 | 1.1 | -- | -- | <0.5 | -- | <0.5 | <0.5 | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 58 | -- | -- | 159 | 81 | 28 | 34 | 89 | 31 | 22 | 87 | 866 | 206 | 278 | 24 | 43 | 67 | 61 | 109 | 36 | 23 | 85 | 68 | 26 | 20 | 42 | 74.0 | 28.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 2 | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2.0 | -- | 2 | <2 | -- | -- | 4 | -- | <2 | <2 | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 30 | -- | -- | 35 | 33 | -- | 26 | -- | -- | 27 | 31 | 35 | 68 | 37 | 29 | 34 | -- | 21 | 38 | -- | -- | 35 | -- | 39 | 29 | 38 | -- | 35.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | 21 | <2 | -- | 4 | -- | -- | <2 | <2 | 2 | 3 | <2 | <2 | 2 | -- | 4 | 7 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <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 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 12 | -- | -- | 18 | <5.0 | 6 | 7 | 8 | 10 | 8 | 11 | 762 | <5 | <5 | 5 | 14 | <5 | 8 | 7 | <5 | <5 | 8 | 9 | 5 | 5 | <5 | 6.0 | 7.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 49 | 40 | -- | >250 | 46 | 97 | 64 | >250 | -- | 261 | 1,410 | 411 | 291 | 517 | >2420 | --- | >2420 | 1,120 | 687 | >2420 | >2420 | 1,990 | >2420 | 1,730 | 1 | 4000 | 3,030.0 | 106.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 10 | 31 | -- | 69 | <1 | 6 | 17 | >250 | <100 | 1 | 12 | 2 | <1 | 3 | 16 | <0.10 | 5 | 2 | 4 | 47 | 30 | 1 | 11 | 5 | <1 | 1 | 30.0 | <1 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.15 | 1.36 | 0.59 | 3.50 | 1.54 | 0.53 | 0.55 | 2.48 | 1.33 | 0.76 | 1.18 | 0.25 | 0.99 | 0.48 | 0.72 | 1.67 | 4.79 | 1.50 | 3.82 | 1.09 | 2.02 | 5.31 | 4.30 | 1.27 | 1.37 | 1.28 | 1.78 | 1.58 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 1.22 | 1.33 | 0.66 | 3.39 | 1.51 | 0.42 | 0.51 | 2.26 | 1.13 | 0.76 | 1.34 | 0.27 | 1.13 | 0.44 | 0.70 | 1.56 | 4.59 | 0.74 | 5.04 | 1.42 | 2.12 | 6.60 | 4.23 | 1.47 | 2.22 | -- | * | 1.50 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(** ) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shad
Underlined (blue
Blue shaded

# Appendix E

Laboratory Certificate of Analysis

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

**CLIENT NAME: SNC LAVALIN INC.**
**1090 TOPSAIL RD**
**MOUNT PEARL, NL A1N5E7**
**(709) 368-0118**

**ATTENTION TO: Mike Smith**

**PROJECT: 631477**

**AGAT WORK ORDER: 19X465476**

**MICROBIOLOGY ANALYSIS REVIEWED BY: Courtney O Brien, Data Reporter, B.Eng., EIT**

**WATER ANALYSIS REVIEWED BY: Courtney O Brien, Data Reporter, B.Eng., EIT**

**DATE REPORTED: May 22, 2019**

**PAGES (INCLUDING COVER): 14**

**VERSION*: 1**

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*NOTES

**All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.**



Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

*Results relate only to the items tested. Results apply to samples as received.*
*All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request*

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# Certificate of Analysis

**AGAT WORK ORDER: 19X465476**

**PROJECT: 631477**

**CLIENT NAME: SNC LAVALIN INC.**

**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

## Total Coliforms and E.coli Membrane Filtration

**DATE RECEIVED: 2019-05-09**

**DATE REPORTED: 2019-05-22**

| | | SAMPLE DESCRIPTION: | | KL1 | | KL2 | | KL3 | KL4 | KL5 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-05-09 | | 2019-05-09 | | 2019-05-09 | 2019-05-09 | 2019-05-09 |
| Parameter | Unit | G / S | RDL | 183311 | RDL | 183324 | RDL | 183325 | 183326 | 183327 |
| Total Coliforms (MF) | CFU/100 mL | | 10 | 256 | 10 | 1960 | 1 | 103 | 198 | 55 |
| E. Coli (MF) | CFU/100 mL | | 1 | <1 | 10 | <10 | 1 | 1 | <1 | 1 |

| | | SAMPLE DESCRIPTION: | | Hwy-102-1 | | Hwy-102-2 | | LSD | | LU |
|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | | Water | | Water |
| | | DATE SAMPLED: | | 2019-05-09 | | 2019-05-09 | | 2019-05-09 | | 2019-05-09 |
| Parameter | Unit | G / S | RDL | 183328 | RDL | 183329 | RDL | 183330 | RDL | 183331 |
| Total Coliforms (MF) | CFU/100 mL | | 10 | 1520 | 10 | 930 | 10 | 1120 | 10 | 540 |
| E. Coli (MF) | CFU/100 mL | | 1 | 1 | 10 | <10 | 1 | 7 | 10 | <10 |

| | | SAMPLE DESCRIPTION: | | PML-1 | PML-2 |
|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water |
| | | DATE SAMPLED: | | 2019-05-09 | 2019-05-09 |
| Parameter | Unit | G / S | RDL | 183332 | 183333 |
| Total Coliforms (MF) | CFU/100 mL | | 1 | 128 | 106 |
| E. Coli (MF) | CFU/100 mL | | 1 | <1 | <1 |

**Comments:** RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2019-05
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.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: CoBrien



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

**AGAT WORK ORDER: 19X465476**

**PROJECT: 631477**

**CLIENT NAME: SNC LAVALIN INC.**

**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

## SNC-Lavalin Bedford West Custom Inorganics Package

**DATE RECEIVED: 2019-05-09**

**DATE REPORTED: 2019-05-22**

| SAMPLE DESCRIPTION: | | | | KL1 | KL2 | KL3 | KL4 | KL5 | Hwy-102-1 | | Hwy-102-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | | Water |
| DATE SAMPLED: | | | | 2019-05-09 | 2019-05-09 | 2019-05-09 | 2019-05-09 | 2019-05-09 | 2019-05-09 | | 2019-05-09 |
| Parameter | Unit | G / S | RDL | 183311 | 183324 | 183325 | 183326 | 183327 | 183328 | RDL | 183329 |
| Alkalinity | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | 12 | 5 | <5 |
| Chloride | mg/L | | 1 | 75 | 13 | 49 | 50 | 51 | 90 | 2 | 161 |
| True Color | TCU | | 5 | 41 | 76 | 53 | 42 | 38 | 35 | 5 | 22 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.16 | 0.06 | 0.14 | 0.15 | 0.14 | 0.57 | 0.05 | 0.60 |
| Nitrate as N | mg/L | | 0.05 | 0.16 | 0.06 | 0.14 | 0.15 | 0.14 | 0.32 | 0.05 | 0.17 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.25 | 0.05 | 0.43 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.03 | 0.04 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 |
| pH | | | | 6.70 | 6.44 | 6.66 | 6.67 | 6.64 | 7.07 | | 6.36 |
| Total Calcium | mg/L | | 0.1 | 7.0 | 2.3 | 5.9 | 6.2 | 6.4 | 16.5 | 0.1 | 22.8 |
| Total Magnesium | mg/L | | 0.1 | 1.2 | 0.7 | 1.0 | 1.0 | 1.1 | 2.5 | 0.1 | 3.6 |
| Total Phosphorus | mg/L | | 0.002 | 0.011 | 0.009 | 0.011 | 0.009 | 0.011 | 0.011 | 0.002 | 0.006 |
| Total Potassium | mg/L | | 0.1 | 0.8 | 0.6 | 0.7 | 0.8 | 0.8 | 2.3 | 0.1 | 2.2 |
| Total Sodium | mg/L | | 0.1 | 46.3 | 11.9 | 44.3 | 37.0 | 43.8 | 69.1 | 0.1 | 148 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 1.7 | 1.7 | 2.1 | 2.1 | 2.1 | 2.2 | 0.5 | 3.1 |
| Total Suspended Solids | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | <5 | 5 | <5 |
| Sulphate | mg/L | | 2 | 10 | 3 | 6 | 6 | 6 | 14 | 2 | 13 |
| Turbidity | NTU | | 0.1 | 0.9 | 0.6 | 0.9 | 0.8 | 0.9 | 0.8 | 0.1 | 1.2 |
| Electrical Conductivity | umho/cm | | 1 | 280 | 72 | 244 | 246 | 249 | 464 | 1 | 737 |
| Anion Sum | me/L | | | 2.34 | 0.43 | 1.52 | 1.55 | 1.57 | 3.11 | | 4.86 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | 12 | 5 | <5 |
| Calculated TDS | mg/L | | 1 | 141 | 32 | 108 | 102 | 110 | 204 | 1 | 354 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 | <10 | <10 | 10 | <10 |
| Cation sum | me/L | | | 2.51 | 0.73 | 2.34 | 2.04 | 2.36 | 4.10 | | 7.98 |
| Hardness | mg/L | | | 22.4 | 8.6 | 18.9 | 19.6 | 20.5 | 51.5 | | 71.8 |
| % Difference/ Ion Balance | % | | | 3.5 | 25.6 | 21.4 | 13.8 | 19.9 | 13.8 | | 24.3 |
| Langelier Index (@20C) | NA | | | -3.36 | -4.04 | -3.46 | -3.43 | -3.45 | -2.25 | | -3.23 |
| Langelier Index (@ 4C) | NA | | | -3.68 | -4.36 | -3.78 | -3.75 | -3.77 | -2.57 | | -3.55 |
| Saturation pH (@ 20C) | NA | | | 10.1 | 10.5 | 10.1 | 10.1 | 10.1 | 9.32 | | 9.59 |
| Saturation pH (@ 4C) | NA | | | 10.4 | 10.8 | 10.4 | 10.4 | 10.4 | 9.64 | | 9.91 |

Certified By: CoBrien



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FAX (902)468-8924
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# Certificate of Analysis

**AGAT WORK ORDER: 19X465476**

**PROJECT: 631477**

**CLIENT NAME: SNC LAVALIN INC.**

**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

## SNC-Lavalin Bedford West Custom Inorganics Package

**DATE RECEIVED: 2019-05-09**

**DATE REPORTED: 2019-05-22**

| SAMPLE DESCRIPTION: | | | | KL1 | KL2 | KL3 | KL4 | KL5 | Hwy-102-1 | | Hwy-102-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | | Water |
| DATE SAMPLED: | | | | 2019-05-09 | 2019-05-09 | 2019-05-09 | 2019-05-09 | 2019-05-09 | 2019-05-09 | | 2019-05-09 |
| Parameter | Unit | G / S | RDL | 183311 | 183324 | 183325 | 183326 | 183327 | 183328 | RDL | 183329 |
| Total Aluminum | ug/L | | 5 | 145 | 156 | 139 | 132 | 142 | 45 | 5 | 126 |
| Total Antimony | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Arsenic | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Barium | ug/L | | 5 | 14 | 10 | 17 | 18 | 17 | 108 | 5 | 272 |
| Total Beryllium | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Bismuth | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Boron | ug/L | | 5 | 5 | 7 | 6 | 6 | 6 | 10 | 5 | 7 |
| Total Cadmium | ug/L | | 0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | 0.09 | <0.09 |
| Total Chromium | ug/L | | 1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | <1 |
| Total Cobalt | ug/L | | 1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | <1 |
| Total Copper | ug/L | | 1 | <1 | <1 | <1 | <1 | <1 | 1 | 1 | 2 |
| Total Iron | ug/L | | 50 | 155 | 227 | 123 | 120 | 121 | 122 | 50 | 728 |
| Total Lead | ug/L | | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 1.4 |
| Total Manganese | ug/L | | 2 | 42 | 28 | 26 | 24 | 25 | 14 | 2 | 137 |
| Total Molybdenum | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Nickel | ug/L | | 2 | 2 | <2 | 3 | <2 | <2 | <2 | 2 | 3 |
| Total Selenium | ug/L | | 1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | <1 |
| Total Silver | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 |
| Total Strontium | ug/L | | 5 | 36 | 13 | 30 | 33 | 31 | 93 | 5 | 129 |
| Total Thallium | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 |
| Total Tin | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Titanium | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Uranium | ug/L | | 0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 |
| Total Vanadium | ug/L | | 2 | 2 | <2 | 2 | 2 | 2 | 2 | 2 | 4 |
| Total Zinc | ug/L | | 5 | 8 | <5 | 16 | 7 | 7 | 5 | 5 | 16 |
| Chlorophyll A - Acidification Method | ug/L | | 0.05 | 1.5 | 0.741 | 0.74 | 0.78 | 1.24 | 1.88 | 0.05 | 3.06 |
| Chlorophyll A - Welschmeyer Method | ug/L | | 0.05 | 1.46 | 0.492 | 0.743 | 0.821 | 1.19 | 1.9 | 0.05 | 3.04 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | <0.4 | 0.5 | <0.4 | <0.4 | <0.4 | <0.4 | 0.4 | <0.4 |

Certified By: CoBrien



*Results relate only to the items tested. Results apply to samples as received.*

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# Certificate of Analysis

**AGAT WORK ORDER: 19X465476**

**PROJECT: 631477**

**CLIENT NAME: SNC LAVALIN INC.**

**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

## SNC-Lavalin Bedford West Custom Inorganics Package

**DATE RECEIVED: 2019-05-09**

**DATE REPORTED: 2019-05-22**

| | | SAMPLE DESCRIPTION: | | LSD | | LU | | PML-1 | PML-2 |
|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | | Water | Water |
| | | DATE SAMPLED: | | 2019-05-09 | | 2019-05-09 | | 2019-05-09 | 2019-05-09 |
| Parameter | Unit | G / S | RDL | 183330 | RDL | 183331 | RDL | 183332 | 183333 |
| Alkalinity | mg/L | | 5 | 12 | 5 | 10 | 5 | <5 | <5 |
| Chloride | mg/L | | 1 | 30 | 2 | 174 | 1 | 55 | 50 |
| True Color | TCU | | 5 | 39 | 5 | 18 | 5 | 46 | 43 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.08 | 0.05 | 1.27 | 0.05 | 0.18 | 0.14 |
| Nitrate as N | mg/L | | 0.05 | 0.08 | 0.05 | 0.80 | 0.05 | 0.18 | 0.14 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | 0.05 | 0.47 | 0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | 0.03 | <0.03 | 0.03 | <0.03 | 0.06 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | 0.01 | <0.01 | 0.01 | <0.01 | <0.01 |
| pH | | | | 6.93 | | 7.17 | | 6.78 | 6.78 |
| Total Calcium | mg/L | | 0.1 | 6.0 | 0.1 | 25.2 | 0.1 | 7.0 | 7.1 |
| Total Magnesium | mg/L | | 0.1 | 1.5 | 0.1 | 3.5 | 0.1 | 1.2 | 1.2 |
| Total Phosphorus | mg/L | | 0.002 | 0.008 | 0.002 | 0.010 | 0.002 | 0.007 | 0.008 |
| Total Potassium | mg/L | | 0.1 | 1.3 | 0.1 | 3.2 | 0.1 | 0.9 | 0.9 |
| Total Sodium | mg/L | | 0.1 | 24.4 | 0.1 | 159 | 0.1 | 42.6 | 42.9 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 1.7 | 0.5 | 3.7 | 0.5 | 2.3 | 2.0 |
| Total Suspended Solids | mg/L | | 5 | 8 | 5 | 7 | 5 | <5 | <5 |
| Sulphate | mg/L | | 2 | 4 | 2 | 22 | 2 | 7 | 7 |
| Turbidity | NTU | | 0.1 | 5.0 | 0.1 | 3.6 | 0.1 | 1.2 | 1.0 |
| Electrical Conductivity | umho/cm | | 1 | 151 | 1 | 871 | 1 | 256 | 261 |
| Anion Sum | me/L | | | 1.18 | | 5.66 | | 1.71 | 1.57 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 12 | 5 | 10 | 5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 76 | 1 | 399 | 1 | 115 | 110 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | 10 | <10 | 10 | <10 | <10 |
| Cation sum | me/L | | | 1.56 | | 8.56 | | 2.35 | 2.37 |
| Hardness | mg/L | | | 21.2 | | 77.3 | | 22.4 | 22.7 |
| % Difference/ Ion Balance | % | | | 14.2 | | 20.4 | | 15.7 | 20.4 |
| Langelier Index (@20C) | NA | | | -2.79 | | -2.08 | | -3.27 | -3.26 |
| Langelier Index (@ 4C) | NA | | | -3.11 | | -2.40 | | -3.59 | -3.58 |
| Saturation pH (@ 20C) | NA | | | 9.72 | | 9.25 | | 10.1 | 10.0 |
| Saturation pH (@ 4C) | NA | | | 10.0 | | 9.57 | | 10.4 | 10.4 |

Certified By: CoBrien



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# Certificate of Analysis

**AGAT WORK ORDER: 19X465476**

**PROJECT: 631477**

**CLIENT NAME: SNC LAVALIN INC.**

**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

## SNC-Lavalin Bedford West Custom Inorganics Package

**DATE RECEIVED: 2019-05-09**

**DATE REPORTED: 2019-05-22**

| | | SAMPLE DESCRIPTION: | | LSD | | LU | | PML-1 | PML-2 |
|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | | Water | Water |
| | | DATE SAMPLED: | | 2019-05-09 | | 2019-05-09 | | 2019-05-09 | 2019-05-09 |
| Parameter | Unit | G / S | RDL | 183330 | RDL | 183331 | RDL | 183332 | 183333 |
| Total Aluminum | ug/L | | 5 | 124 | 5 | 84 | 5 | 139 | 134 |
| Total Antimony | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Arsenic | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Barium | ug/L | | 5 | 13 | 5 | 135 | 5 | 21 | 25 |
| Total Beryllium | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Bismuth | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Boron | ug/L | | 5 | 9 | 5 | 11 | 5 | 7 | 6 |
| Total Cadmium | ug/L | | 0.09 | <0.09 | 0.09 | 0.12 | 0.09 | <0.09 | <0.09 |
| Total Chromium | ug/L | | 1 | <1 | 1 | <1 | 1 | <1 | <1 |
| Total Cobalt | ug/L | | 1 | <1 | 1 | <1 | 1 | <1 | <1 |
| Total Copper | ug/L | | 1 | <1 | 1 | 3 | 1 | 1 | <1 |
| Total Iron | ug/L | | 50 | 560 | 50 | 290 | 50 | 136 | 128 |
| Total Lead | ug/L | | 0.5 | <0.5 | 0.5 | <0.5 | 0.5 | <0.5 | <0.5 |
| Total Manganese | ug/L | | 2 | 368 | 2 | 51 | 2 | 26 | 28 |
| Total Molybdenum | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Nickel | ug/L | | 2 | <2 | 2 | 10 | 2 | 5 | <2 |
| Total Selenium | ug/L | | 1 | <1 | 1 | <1 | 1 | <1 | <1 |
| Total Silver | ug/L | | 0.1 | <0.1 | 0.1 | <0.1 | 0.1 | <0.1 | <0.1 |
| Total Strontium | ug/L | | 5 | 27 | 5 | 107 | 5 | 35 | 35 |
| Total Thallium | ug/L | | 0.1 | <0.1 | 0.1 | <0.1 | 0.1 | <0.1 | <0.1 |
| Total Tin | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Titanium | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Uranium | ug/L | | 0.1 | <0.1 | 0.1 | <0.1 | 0.1 | <0.1 | <0.1 |
| Total Vanadium | ug/L | | 2 | <2 | 2 | 5 | 2 | 2 | 2 |
| Total Zinc | ug/L | | 5 | <5 | 5 | 27 | 5 | 7 | 7 |
| Chlorophyll A - Acidification Method | ug/L | | 0.05 | 2.47 | 0.05 | 4.19 | 0.05 | 1.53 | 1.58 |
| Chlorophyll A - Welschmeyer Method | ug/L | | 0.05 | 2.51 | 0.05 | 4.24 | 0.05 | 1.44 | 1.5 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | <0.4 | 0.4 | 0.6 | 0.4 | 0.6 | 1.3 |

Certified By: CoBrien



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# Certificate of Analysis

**AGAT WORK ORDER: 19X465476**

**PROJECT: 631477**

**CLIENT NAME: SNC LAVALIN INC.**

**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

## SNC-Lavalin Bedford West Custom Inorganics Package

**DATE RECEIVED: 2019-05-09**

**DATE REPORTED: 2019-05-22**

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

**183311** Total Phosphorus was analysed at AGAT Mississauga.
Chlorophyll A was analysed by a sub-contracted laboratory.

**183324** Total Phosphorus was analysed at AGAT Mississauga.
Chlorophyll A was analysed by a sub-contracted laboratory.
The cation and anion sums are at, or below, 1 me/L, therefore the acceptable criteria is a difference of less than 0.3me/L.

**183325-183333** Total Phosphorus was analysed at AGAT Mississauga.
Chlorophyll A was analysed by a sub-contracted laboratory.
Ion Balance is biased high, contributing parameters have been confirmed.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: CoBrien



Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Dartmouth, Nova Scotia
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# Certificate of Analysis

**AGAT WORK ORDER: 19X465476**

**PROJECT: 631477**

**CLIENT NAME: SNC LAVALIN INC.**

**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

## Total Organic Carbon in Water

**DATE RECEIVED: 2019-05-09**

**DATE REPORTED: 2019-05-22**

| | | SAMPLE DESCRIPTION: | | KL1 | KL2 | KL3 | KL4 | KL5 | Hwy-102-1 | Hwy-102-2 | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-05-09 | 2019-05-09 | 2019-05-09 | 2019-05-09 | 2019-05-09 | 2019-05-09 | 2019-05-09 | 2019-05-09 |
| **Parameter** | **Unit** | **G / S** | **RDL** | **183311** | **183324** | **183325** | **183326** | **183327** | **183328** | **183329** | **183330** |
| Total Organic Carbon | mg/L | | 0.5 | 4.3 | 6.9 | 4.4 | 4.5 | 4.5 | 4.4 | 3.2 | 5.9 |

| | | SAMPLE DESCRIPTION: | | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-05-09 | 2019-05-09 | 2019-05-09 |
| **Parameter** | **Unit** | **G / S** | **RDL** | **183331** | **183332** | **183333** |
| Total Organic Carbon | mg/L | | 0.5 | 4.3 | 4.2 | 4.3 |

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

Analysis performed at AGAT Vancouver (unless marked by *)

Certified By: CoBrien



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# Quality Assurance

**CLIENT NAME: SNC LAVALIN INC.**

**AGAT WORK ORDER: 19X465476**

**PROJECT: 631477**

**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

## Water Analysis

| RPT Date: May 22, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| **SNC-Lavalin Bedford West Custom Inorganics Package** | | | | | | | | | | | | | | | |
| Alkalinity | 181695 | | 122 | 122 | 0.0% | < 5 | 97% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Chloride | 183311 | 183311 | 75 | 75 | 0.3% | < 1 | 98% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| True Color | 182137 | | 10 | 9 | NA | < 5 | 110% | 80% | 120% | NA | | | NA | | |
| Nitrate as N | 183311 | 183311 | 0.16 | 0.12 | NA | < 0.05 | 100% | 80% | 120% | NA | 80% | 120% | 88% | 80% | 120% |
| Nitrite as N | 183311 | 183311 | <0.05 | <0.05 | NA | < 0.05 | 107% | 80% | 120% | NA | 80% | 120% | 116% | 80% | 120% |
| Ammonia as N | 193794 | | <0.03 | <0.03 | NA | < 0.03 | 105% | 80% | 120% | 105% | 80% | 120% | 102% | 80% | 120% |
| Ortho-Phosphate as P | 185429 | | 0.01 | <0.01 | NA | < 0.01 | 105% | 80% | 120% | 117% | 80% | 120% | 114% | 80% | 120% |
| pH | 181695 | | 7.81 | 7.83 | 0.3% | < | 102% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Calcium | 184753 | | 103 | 135 | NA | < 0.1 | 106% | 80% | 120% | 108% | 80% | 120% | NA | 70% | 130% |
| Total Magnesium | 184753 | | 6.3 | 6.7 | 7.4% | < 0.1 | 113% | 80% | 120% | 115% | 80% | 120% | NA | 80% | 120% |
| Total Phosphorus | 183311 | 183311 | 0.011 | 0.012 | 3.5% | < 0.002 | 95% | 90% | 110% | 102% | 90% | 110% | 95% | 80% | 120% |
| Total Potassium | 184753 | | 1.2 | 1.4 | 11.6% | < 0.1 | 115% | 80% | 120% | 112% | 80% | 120% | NA | 70% | 130% |
| Total Sodium | 184753 | | 15.7 | 19.6 | NA | < 0.1 | 114% | 80% | 120% | 117% | 80% | 120% | NA | 70% | 130% |
| Reactive Silica as SiO2 | 185429 | | 9.6 | 10.5 | 8.5% | < 0.5 | 103% | 80% | 120% | 99% | 80% | 120% | 115% | 80% | 120% |
| Total Suspended Solids | 182603 | | <5 | <5 | NA | < 5 | 101% | 80% | 120% | NA | | | 119% | 80% | 120% |
| Sulphate | 183311 | 183311 | 10 | 10 | NA | < 2 | 110% | 80% | 120% | NA | 80% | 120% | 89% | 80% | 120% |
| Turbidity | 182137 | | 1.8 | 1.8 | 5.0% | < 0.1 | 104% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 181695 | | 705 | 706 | 0.1% | < 1 | 105% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Bicarb. Alkalinity (as CaCO3) | 181695 | | 122 | 122 | 0.0% | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 181695 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Aluminum | 184753 | | 14 | 9 | NA | < 5 | 96% | 80% | 120% | 93% | 80% | 120% | 70% | 70% | 130% |
| Total Antimony | 184753 | | <2 | <2 | NA | < 2 | 109% | 80% | 120% | 120% | 80% | 120% | 120% | 70% | 130% |
| Total Arsenic | 184753 | | 3 | 3 | NA | < 2 | 108% | 80% | 120% | 105% | 80% | 120% | 107% | 70% | 130% |
| Total Barium | 184753 | | 106 | 119 | 11.2% | < 5 | 115% | 80% | 120% | 109% | 80% | 120% | NA | 70% | 130% |
| Total Beryllium | 184753 | | <2 | <2 | NA | < 2 | 94% | 80% | 120% | 94% | 80% | 120% | 90% | 70% | 130% |
| Total Bismuth | 184753 | | <2 | <2 | NA | < 2 | 114% | 80% | 120% | 116% | 80% | 120% | 103% | 70% | 130% |
| Total Boron | 184753 | | 23 | 25 | NA | < 5 | 99% | 80% | 120% | 99% | 80% | 120% | 91% | 70% | 130% |
| Total Cadmium | 184753 | | <0.09 | <0.09 | NA | < 0.09 | 107% | 80% | 120% | 104% | 80% | 120% | 101% | 70% | 130% |
| Total Chromium | 184753 | | 3 | 2 | NA | < 1 | 108% | 80% | 120% | 112% | 80% | 120% | 107% | 70% | 130% |
| Total Cobalt | 184753 | | <1 | <1 | NA | < 1 | 108% | 80% | 120% | 109% | 80% | 120% | 104% | 70% | 130% |
| Total Copper | 184753 | | 26 | 28 | 6.5% | < 1 | 112% | 80% | 120% | 115% | 80% | 120% | NA | 70% | 130% |
| Total Iron | 184753 | | 59 | 55 | NA | < 50 | 111% | 80% | 120% | 109% | 80% | 120% | 121% | 70% | 130% |
| Total Lead | 184753 | | <0.5 | <0.5 | NA | < 0.5 | 116% | 80% | 120% | 115% | 80% | 120% | 110% | 70% | 130% |
| Total Manganese | 184753 | | <2 | <2 | NA | < 2 | 108% | 80% | 120% | 109% | 80% | 120% | 108% | 70% | 130% |
| Total Molybdenum | 184753 | | <2 | <2 | NA | < 2 | 110% | 80% | 120% | 113% | 80% | 120% | 109% | 70% | 130% |
| Total Nickel | 184753 | | 3 | 3 | NA | < 2 | 110% | 80% | 120% | 113% | 80% | 120% | NA | 70% | 130% |
| Total Selenium | 184753 | | 1 | 1 | NA | < 1 | 109% | 80% | 120% | 98% | 80% | 120% | 100% | 70% | 130% |
| Total Silver | 184753 | | <0.1 | <0.1 | NA | < 0.1 | 111% | 80% | 120% | 114% | 80% | 120% | 102% | 70% | 130% |
| Total Strontium | 184753 | | 770 | 922 | 18.0% | < 5 | 111% | 80% | 120% | 112% | 80% | 120% | NA | 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.

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# Quality Assurance

**CLIENT NAME: SNC LAVALIN INC.**

**AGAT WORK ORDER: 19X465476**

**PROJECT: 631477**

**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

## Water Analysis (Continued)

**RPT Date: May 22, 2019**

| PARAMETER | Batch | Sample Id | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Total Thallium | 184753 | | <0.1 | <0.1 | NA | < 0.1 | 116% | 80% | 120% | 111% | 80% | 120% | 104% | 70% | 130% |
| Total Tin | 184753 | | <2 | <2 | NA | < 2 | 110% | 80% | 120% | 112% | 80% | 120% | 109% | 70% | 130% |
| Total Titanium | 184753 | | <2 | <2 | NA | < 2 | 99% | 80% | 120% | 99% | 80% | 120% | 82% | 70% | 130% |
| Total Uranium | 184753 | | 17.5 | 21.0 | 18.1% | < 0.1 | 115% | 80% | 120% | 111% | 80% | 120% | NA | 70% | 130% |
| Total Vanadium | 184753 | | 7 | 7 | NA | < 2 | 107% | 80% | 120% | 109% | 80% | 120% | NA | 70% | 130% |
| Total Zinc | 184753 | | 15 | 17 | NA | < 5 | 93% | 80% | 120% | 94% | 80% | 120% | 107% | 70% | 130% |
| Total Kjeldahl Nitrogen as N | 181697 | | <0.4 | <0.4 | NA | < 0.4 | 96% | 80% | 120% | 99% | 80% | 120% | 80% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**SNC-Lavalin Bedford West Custom Inorganics Package**

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 181832 | | 10 | 12 | 19.7% | < 1 | 92% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Ortho-Phosphate as P | 183329 | 183329 | <0.01 | <0.01 | NA | < 0.01 | 108% | 80% | 120% | 120% | 80% | 120% | 109% | 80% | 120% |
| Reactive Silica as SiO2 | 183329 | 183329 | 3.1 | 3.2 | 2.6% | < 0.5 | 106% | 80% | 120% | 108% | 80% | 120% | 109% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Total Organic Carbon in Water**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon | 189593 | 7.3 | 7.2 | 1.0% | < 0.5 | 106% | 85% | 115% | 91% | 90% | 110% | |

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By: CoBrien



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# Method Summary

**CLIENT NAME: SNC LAVALIN INC.**

**AGAT WORK ORDER: 19X465476**

**PROJECT: 631477**

**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| **Microbiology Analysis** | | | |
| Total Coliforms (MF) | MIC-121-7002 | Sm 9222 H | MF/INCUBATOR |
| E. Coli (MF) | MIC-121-7002 | SM 9222 H | MF/INCUBATOR |



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# Method Summary

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**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| **Water Analysis** | | | |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| True Color | INOR-121-6014 | SM 2120 C | NEPHELOMETER |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorus | INOR-93-1022 | SM 4500-P B & E | SPECTROPHOTOMETER |
| Total Potassium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Anion Sum | CALCULATION | SM 1030E | CALCULATION |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Calculated TDS | | SM 1030E | CALCULATION |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Cation sum | CALCULATION | SM 1030E | CALCULATION |
| Hardness | CALCULATION | SM 2340B | CALCULATION |
| % Difference/ Ion Balance | CALCULATION | SM 1030E | CALCULATION |
| Langelier Index (@20C) | CALCULATION | CALCULATION | CALCULATION |
| Langelier Index (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 20C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Total Aluminum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Antimony | MET121-6104 & MET-121-6105 | SM 3125 | ICP-MS |
| Total Arsenic | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Barium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Beryllium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Bismuth | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Boron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cadmium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Chromium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |



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# Method Summary

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**AGAT WORK ORDER: 19X465476**

**PROJECT: 631477**

**ATTENTION TO: Mike Smith**

**SAMPLING SITE:**

**SAMPLED BY:**

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Total Cobalt | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Lead | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Molybdenum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Nickel | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Selenium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Silver | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Strontium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Thallium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Tin | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Titanium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Uranium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Vanadium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Chlorophyll A - Acidification Method | Subcontracted | Subcontracted | |
| Chlorophyll A - Welschmeyer Method | Subcontracted | Subcontracted | ICP-MS |
| Total Kjeldahl Nitrogen as N | INOR-121-6020 | SM 4500-NORG D | COLORIMETER |
| Total Organic Carbon | INOR-181-6003 | Modified from SM 5310 B | COMBUSTION |



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# AGAT Laboratories

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Phone: 902-468-8718
Fax: 902-468-8924
www.agatlabs.com

**Laboratory use Only**
Arrival Condition: ☐ Good ☐ Poor (complete 'notes')
Arrival Temperature: 11, 6.6, 14.2 AGAT Job Number: 19X465476
Notes:

Drinking Water Sample (y/n): N Reg. No.
Waterworks Number:

**Report To:**
Company: SNC Lavalin
Contact: Michael Smith
Address: 5657 Spring Garden Road
Halifax, NS B3J 3R4
Phone: 902-492-4544 FAX:
PO#:
AGAT Quotation: 199748
Client Project #: 631477

**Invoice to:** Same (Y/N) - Circle
Company: SNC Lavalin
Contact: payables@snclavalin.com
Address:
Phone: Fax:
PO#/Credit Card #:

**Report Information**
1. Name: Michael Smith
Email: Michael.Smith@snclavalin.com
2. Name: Maria Gutierrez
Email: Maria.Gutierrez@snclavalin.com

**Regulatory Requirements (Check):**
☑ List Guidelines on Report ☐ Do Not List Guidelines on Report
☐ PIRI
Site Info (check all that apply):
☐ Teir 1 ☐ Res. ☐ Pot. ☐ Coarse
☐ Teir 2 ☐ Com ☐ N/Pot. ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☒ CCME ☐ CDWQ
☐ Ind ☐ NSDFOSP
☐ Com ☐ HRM 101
☐ Res/P Storm Water
☐ Ag ☐ HRM 101
☒ FWAL Waste Water
☐ Sediment
☐ Other Health Canada - Recreational

**Report Format**
☐ Single PDF sample per page
■ Multiple PDF samples per page
■ Excel Format Included

**Turnaround Time (TAT) Business Days**
Regular TAT:
■ 5 - 7 days
Rush TAT:
☐ 1 day ☐ 2 days
☐ 3 - 4 days
Date Required:
Time Required:

| SAMPLE IDENTIFICATION | | DATE / TIME SAMPLED | SAMPLE MATRIX | # OF CONTAINERS | COMMENTS - Site/Sample Info, Sample Containment | Field Filtered/ Preserved | Standard Water Analysis (Bedford West Pkg) | Metals (Spring Quarterly Only) | (circle-Total, Diss or Available) | Mercury | TKN | pH | TSS | TP- Low Level 0.002mg/L-Mississauga | Anions | Total Phosphorus | Phenols | TPH/BTEX (PIRI) Teir 1 | TPH/BTEX-Fractionation Teir 2 | VOC | THM | PAH | Chlorophyll A (Sub to DAL) | E. coli by MF (CFU) | Hazardous (Y/N) | Lab Sample # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KL1 | MAY 09 | 8:40 | water | 7 | | | X | X | T | | X | | X | X | | | | | | | | X | X | | |
| KL2 | MAY 9 | 10:44 | water | 7 | | | X | X | T | | X | | X | X | | | | | | | | X | X | | |
| KL3 | " | 10:00 | water | 7 | | | X | X | T | | X | | X | X | | | | | | | | X | X | | |
| KL4 | " | 9:43 | water | 7 | | | X | X | T | | X | | X | X | | | | | | | | X | X | | |
| KL5 | " | 9:10 | water | 7 | | | X | X | T | | X | | X | X | | | | | | | | X | X | | |
| HWY-102-1 | " | 2:45 | water | 7 | | | X | X | T | | X | | X | X | | | | | | | | X | X | | |
| HWY-102-2 | " | 3:55 | water | 7 | | | X | X | T | | X | | X | X | | | | | | | | X | X | | |
| LSD | " | 11:26 | water | 7 | | | X | X | T | | X | | X | X | | | | | | | | X | X | | |
| LU | " | 3:20 | water | 7 | | | X | X | T | | X | | X | X | | | | | | | | X | X | | |
| PML-1 | " | 1:10 | water | 7 | | | X | X | T | | X | | X | X | | | | | | | | X | X | | |
| PML-2 | MAY 9 | 12:50 | water | 7 | | | X | X | T | | X | | X | X | | | | | | | | X | X | | |

| Sample Relinquished By (print name & sign) | Date/Time | Samples Received By (print name and sign) | Date/Time | Special Instructions |
|---|---|---|---|---|
| MARIA GUTIERREZ | MAY 9/19 | H MacDonald | 09/05/19 | |
| Sample Relinquished By (print name & sign) | Date/Time | Samples Received By (print name and sign) | Date/Time | SNC Bedford West Package |
| | | H MacDonald | 16:50 | Page 1 of 1 |

Please CC'd results to Cally.Baxter@snclavalin.com

DALHOUSIE UNIVERSITY
Inspiring Minds

Department of Oceanography
1355 Oxford St
Halifax, NS
B3H 4R2

***Determination of chlorophyll a by fluorescence***

---

**Client:** AGAT Laboratories, 11 Morris Dr. Unit 122, Dartmouth, NS, B3B 1M2

**Attention:** Janetta Fraser

**Received:** 2019-05-10

**Project #:** 19X465476

**Completed:** 2019-05-14

Hugh MacIntyre, Ph.D.

---

Chl *a* (chlorophyll *a*; µg L-1) determined by the acidification method (Holm-Hansen et al., 1965). Estimates made with the non-acidification method (Welschmeyer, 1994) are shown for comparison. The non-acidification method is considered more reliable than the acidification method in correcting for bias due to the contributions of chlorophyll *b* and chlorophyll degradation products.

Holm-Hansen O, Lorenzen CJ, Holmes RW, Strickland JDH (1965) Fluorometric determination of chlorophyll. J Conseil 30:3-15

Welschmeyer NA (1994) Fluorometric analysis of chlorophyll *a* in the presence of chlorophyll *b* and phaeopigments. Limnol Oceanogr 39:1985-1992

| Contractor ID | Client ID | Chl *a* (acidification) | Chl *a* (non-acidification) |
|---|---|---|---|
| 183311F | KL1 | 1.5 | 1.46 |
| 183324F | KL2 | 0.471 | 0.492 |
| 183325F | KL3 | 0.74 | 0.743 |
| 183326F | KL4 | 0.78 | 0.821 |
| 183327F | KL5 | 1.24 | 1.19 |
| 183328F | HWY-102-1 | 1.88 | 1.9 |
| 183329F | HWY-102-2 | 3.06 | 3.04 |
| 183330F | LSD | 2.47 | 2.51 |

| Contractor ID | Client ID | Chl *a* (acidification) | Chl *a* (non-acidification) |
|---|---|---|---|
| 183331F | LU | 4.19 | 4.24 |
| 183332F | PML-1 | 1.53 | 1.44 |
| 183333F | PML-2 | 1.58 | 1.5 |

# Appendix F

Graphs (Seasonal and Historical)

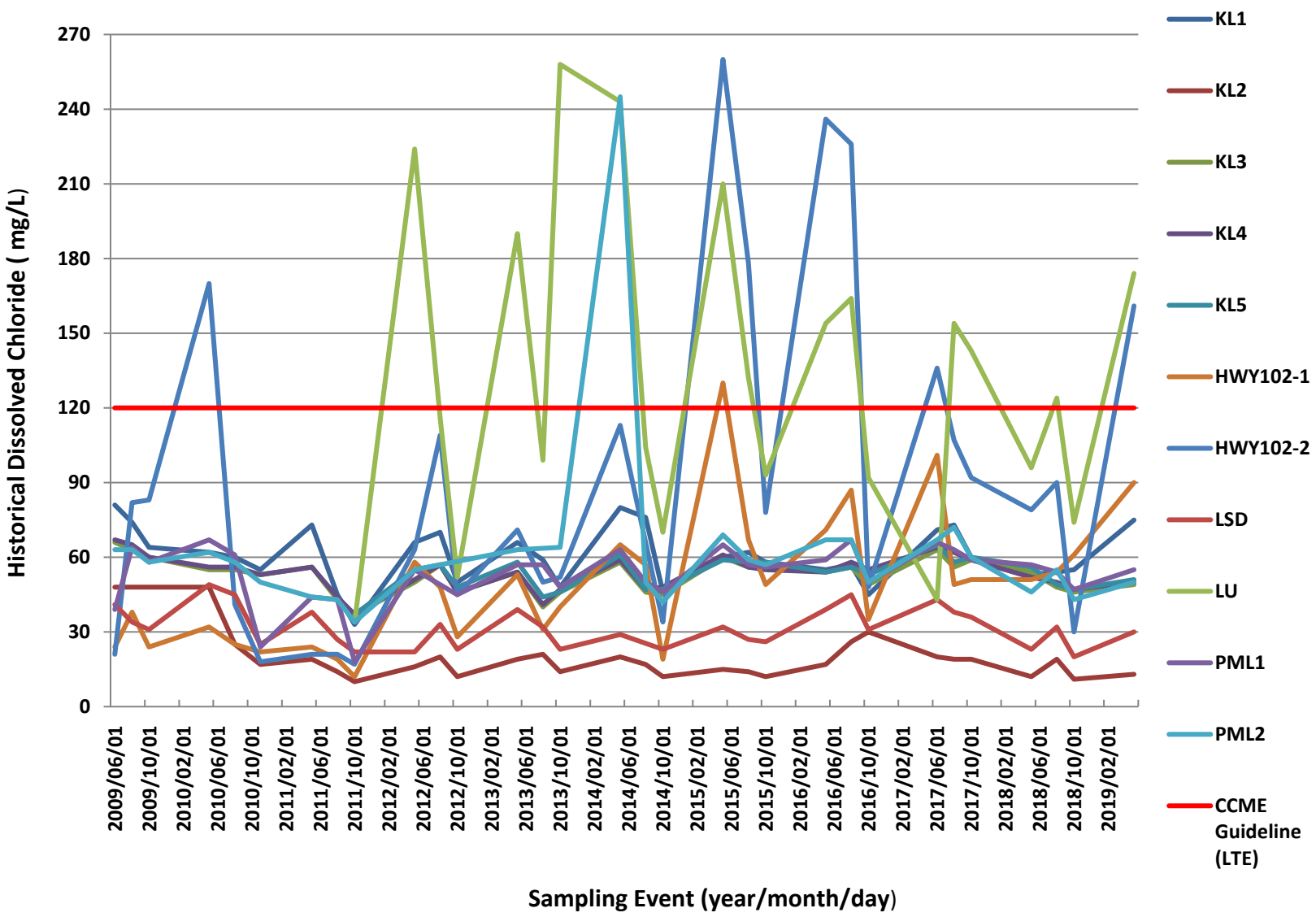


**Figure 1 - Historical Dissolved Chloride Concentrations for Water Quality Monitoring Program.**

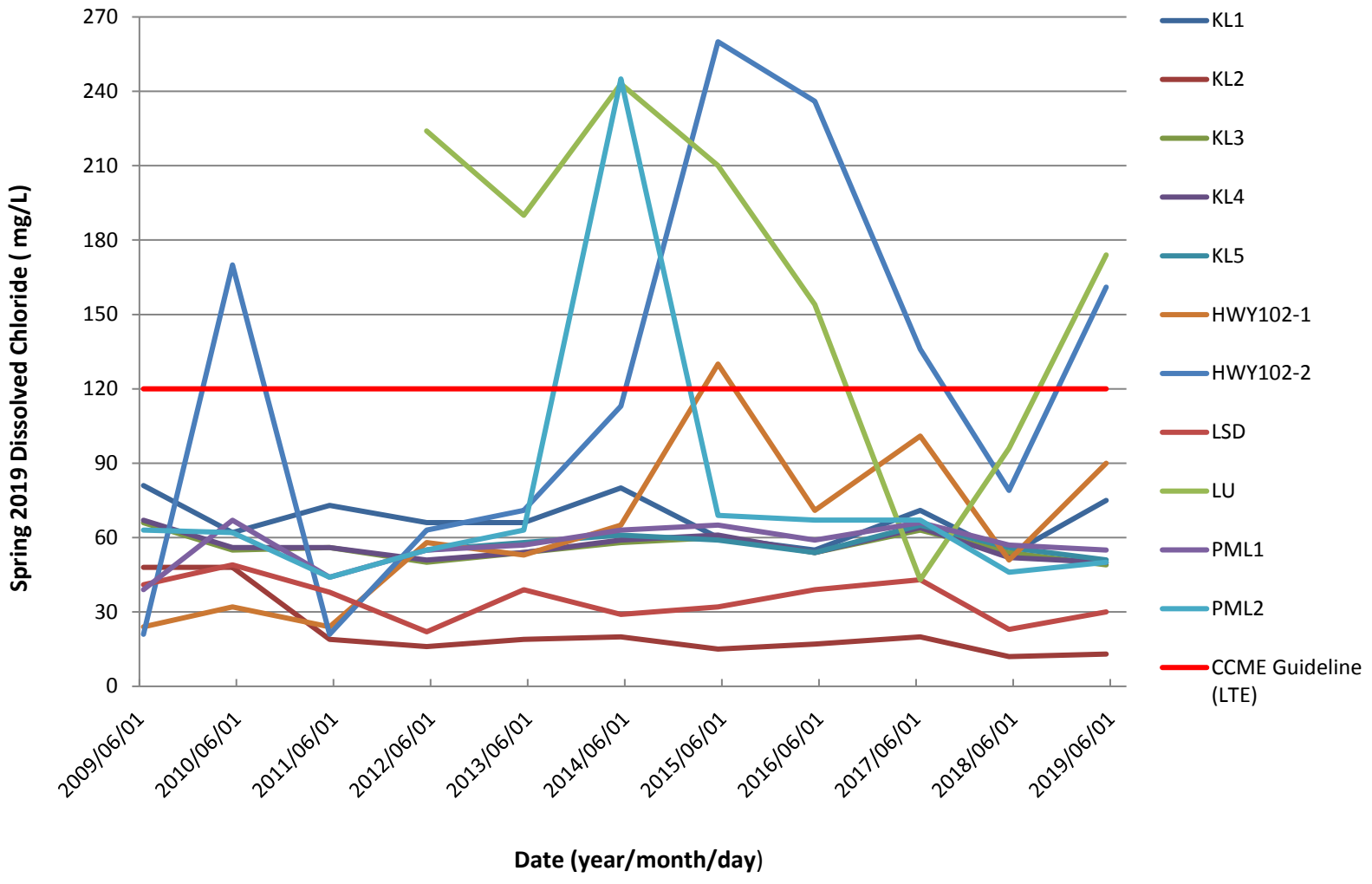


**Figure 2 – Seasonal Dissolved Chloride Concentrations for Water Quality Monitoring Program.**

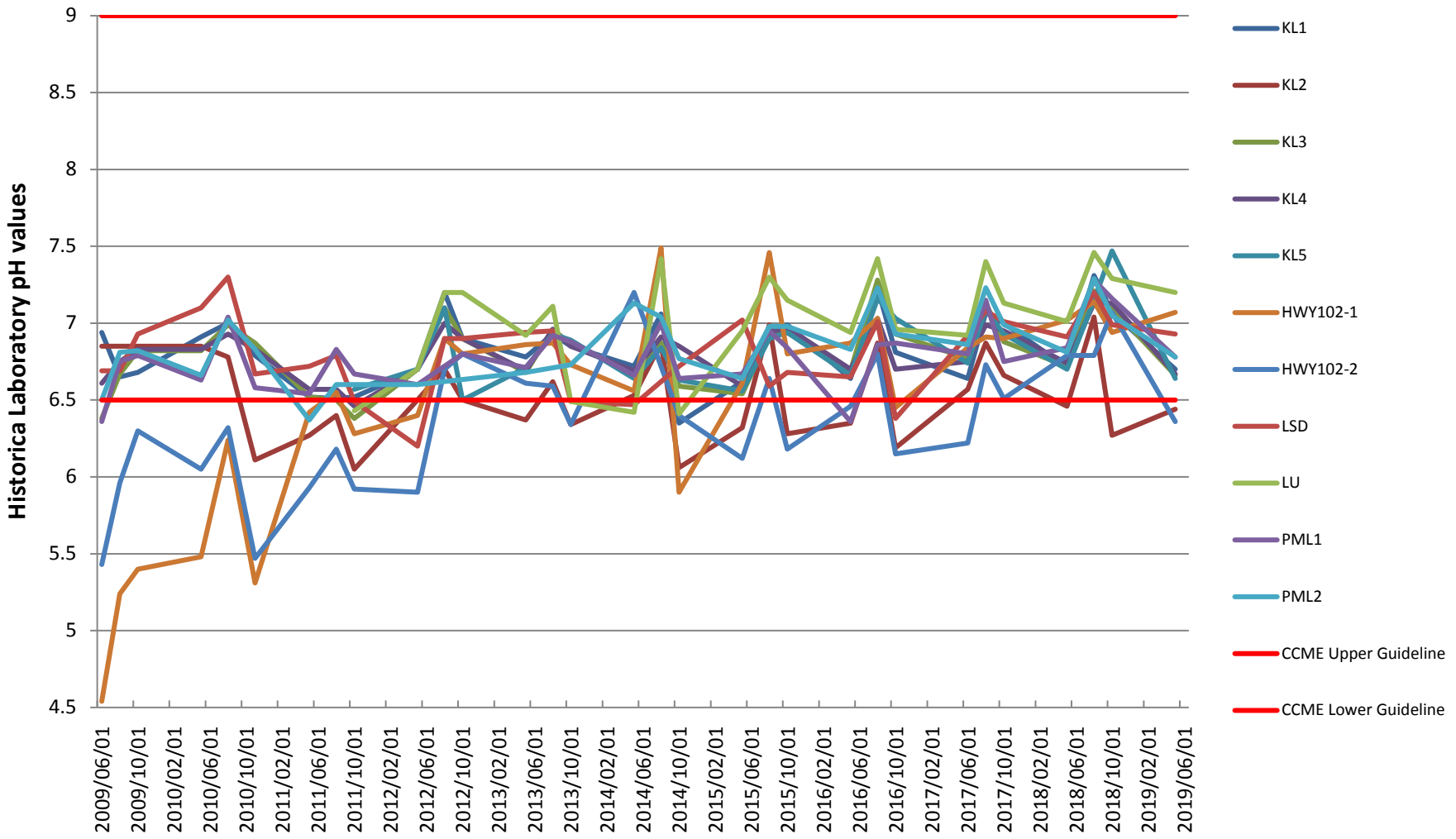


**Figure 3 –Historical pH Measurements for Water Quality Monitoring Program**

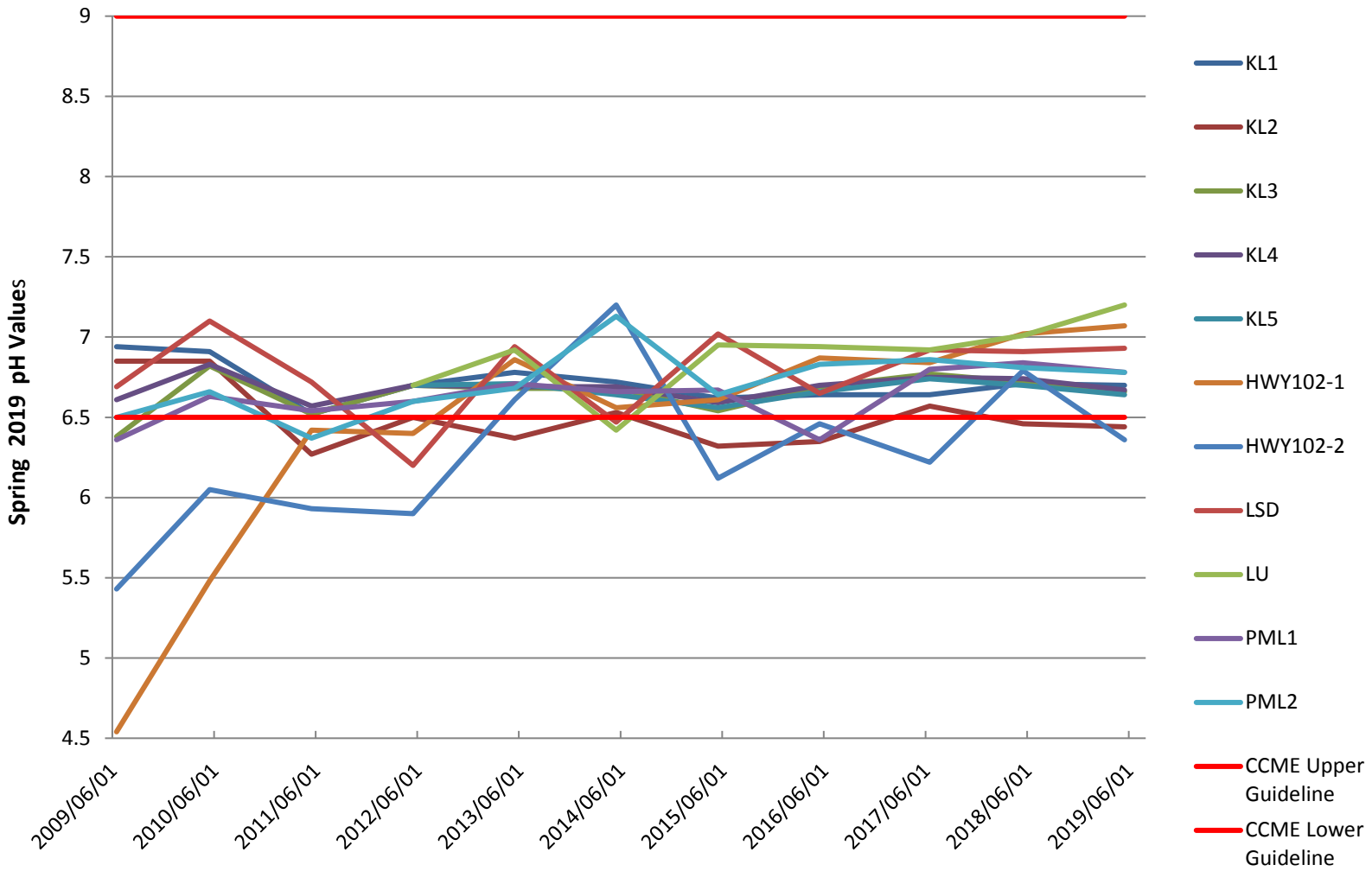


**Figure 4 – Seasonal pH Measurements for Water Quality Monitoring Program.**

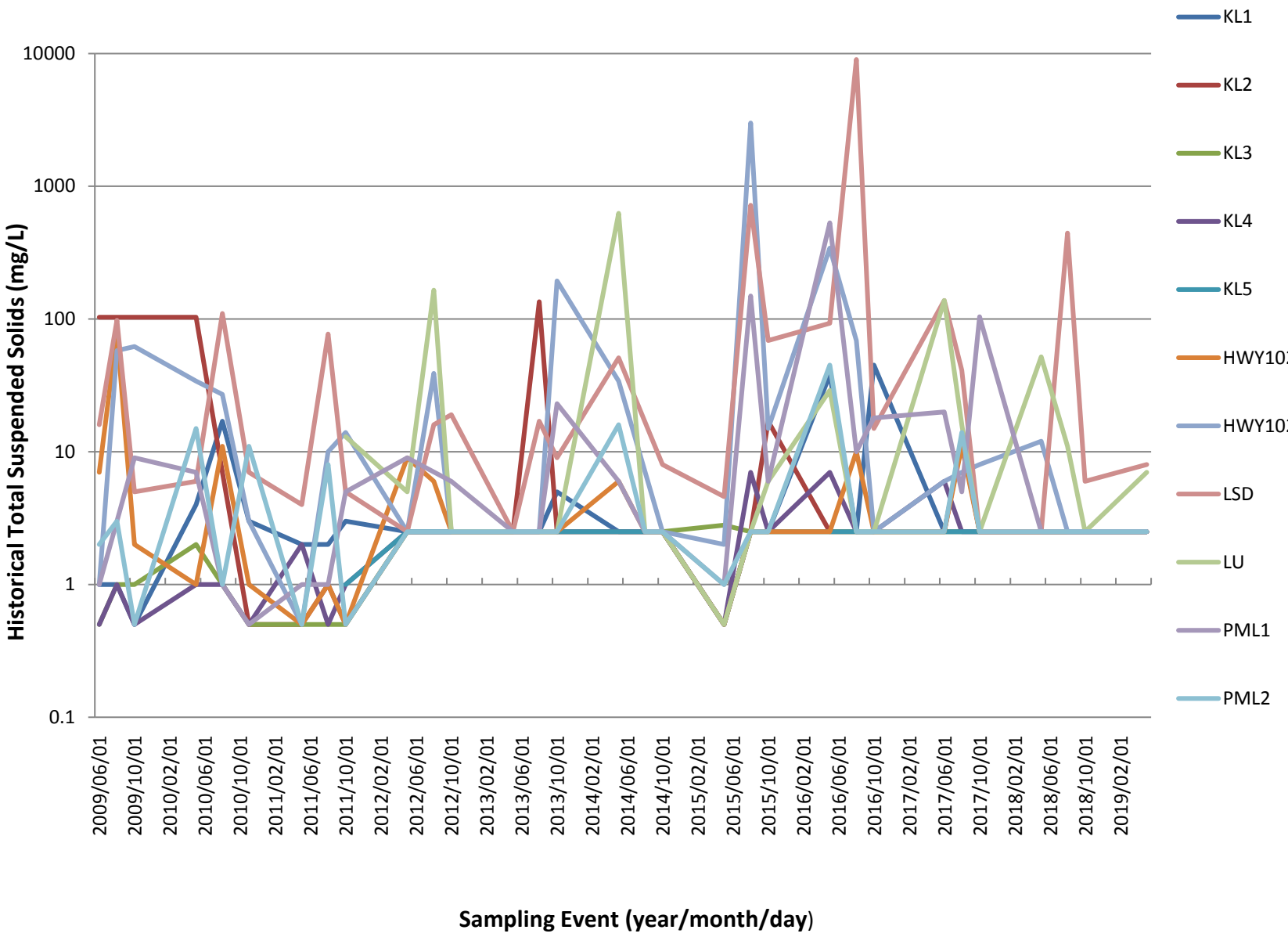


**Figure 5 – Historical Total Suspended Solids Concentrations for Water Quality Monitoring Program.**

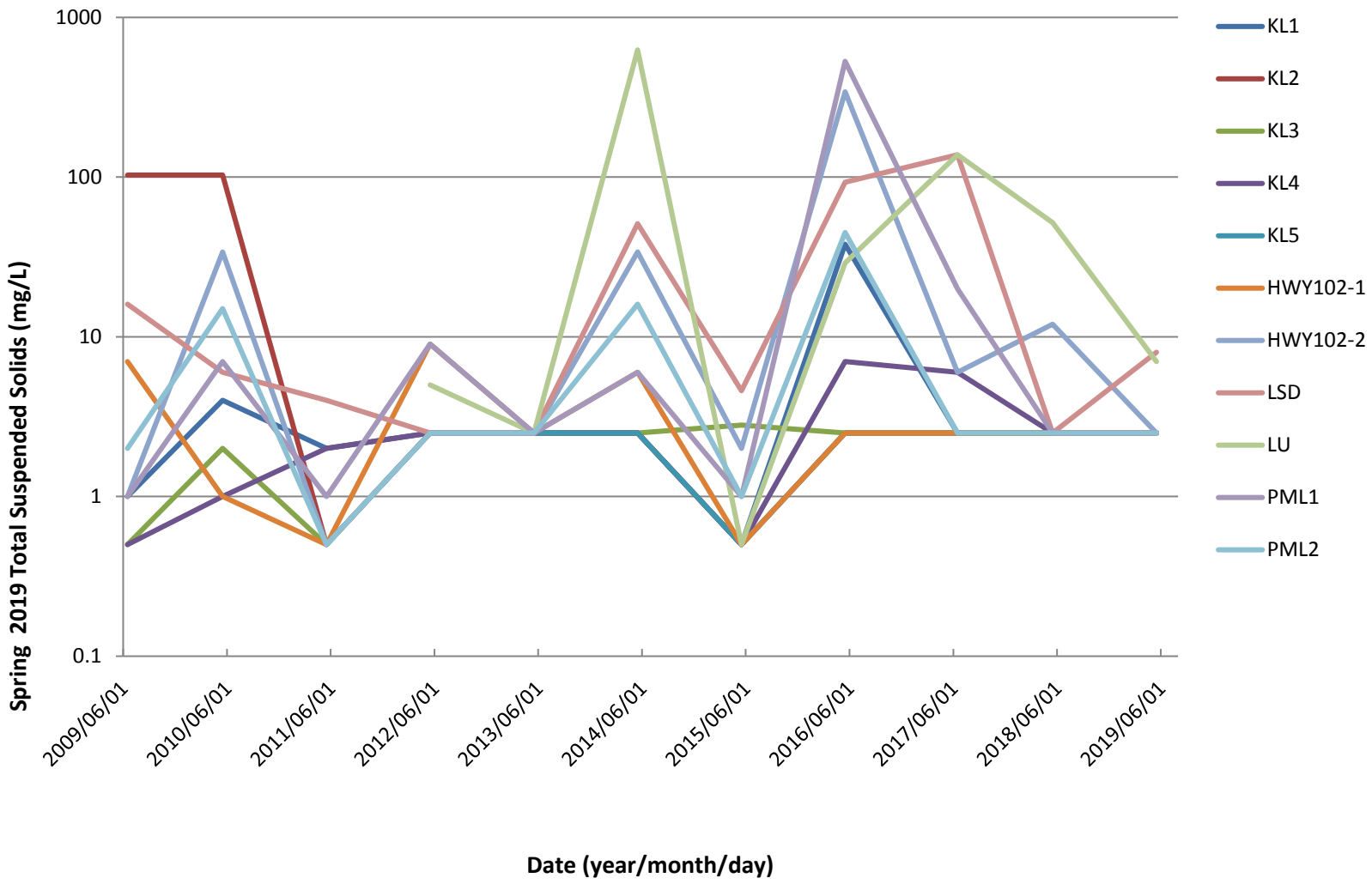


**Figure 6 – Seasonal Total Suspended Solids Concentrations for Water Quality Monitoring Program.**

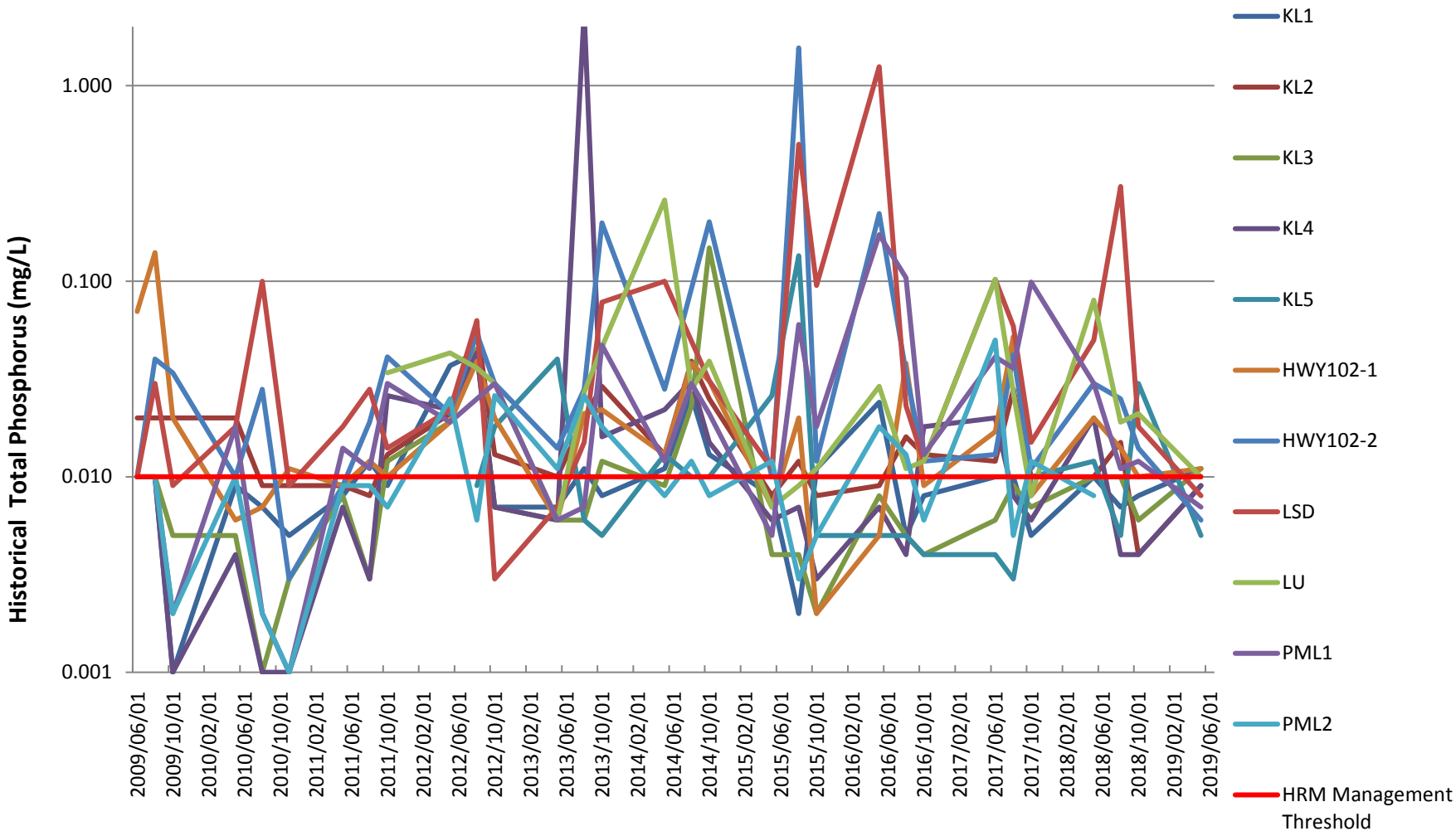


**Figure 7 – Historical Total Phosphorus Concentrations for Water Quality Monitoring Program.**

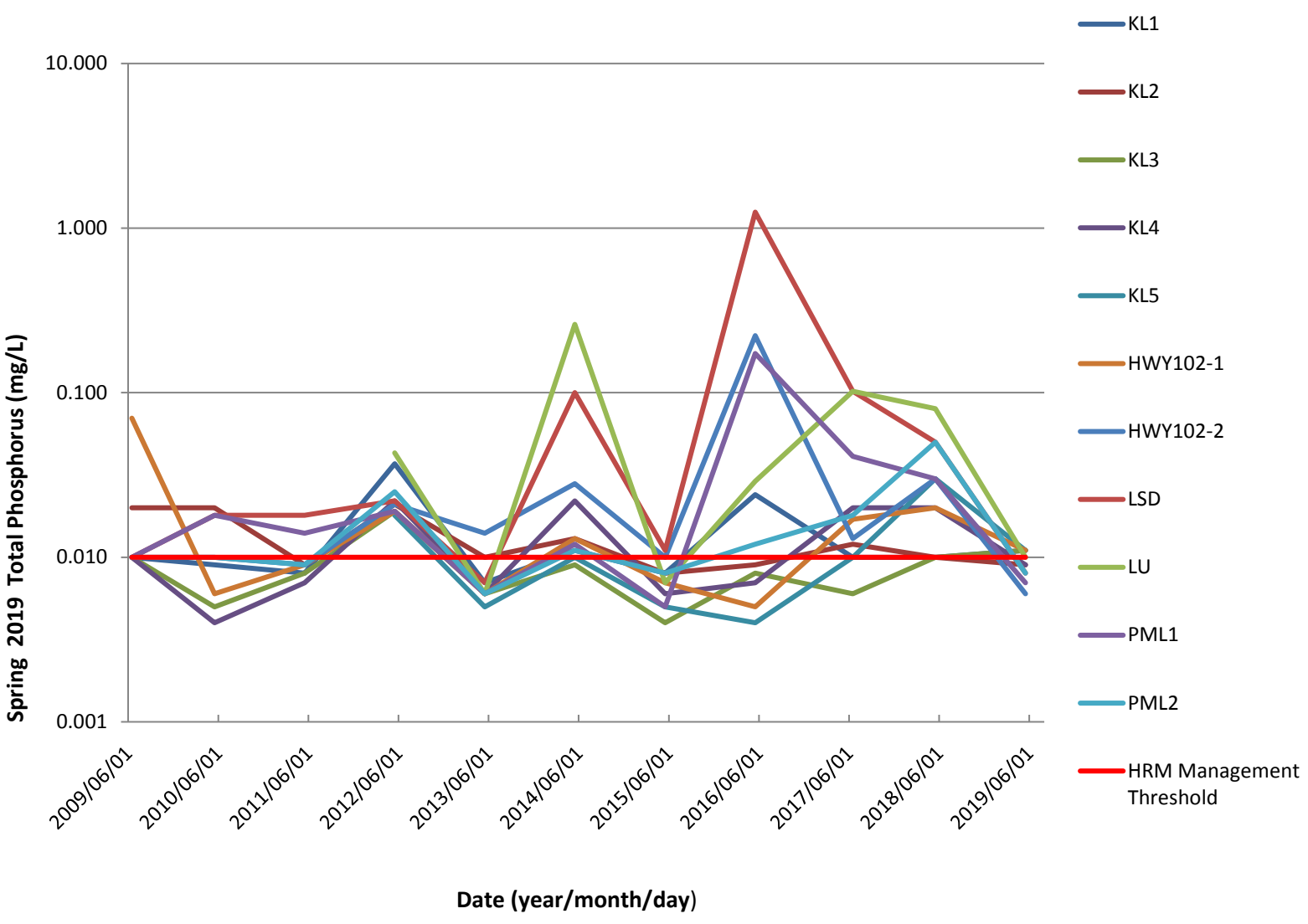


**Figure 8 – Seasonal Total Phosphorus Concentrations for Water Quality Monitoring Program.**

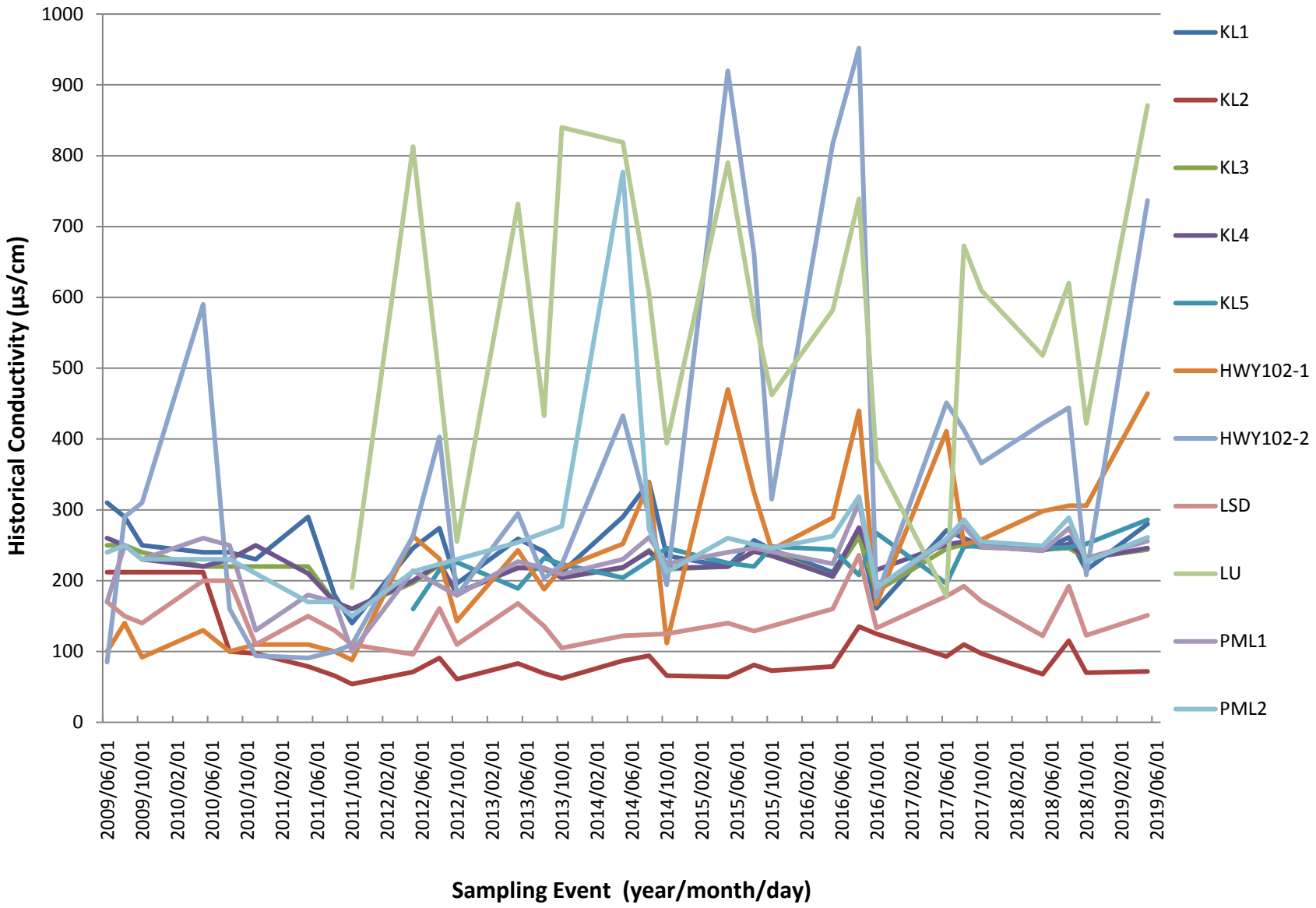


**Figure 9 – Historical Measurement of Conductivity for Water Quality Monitoring Program.**

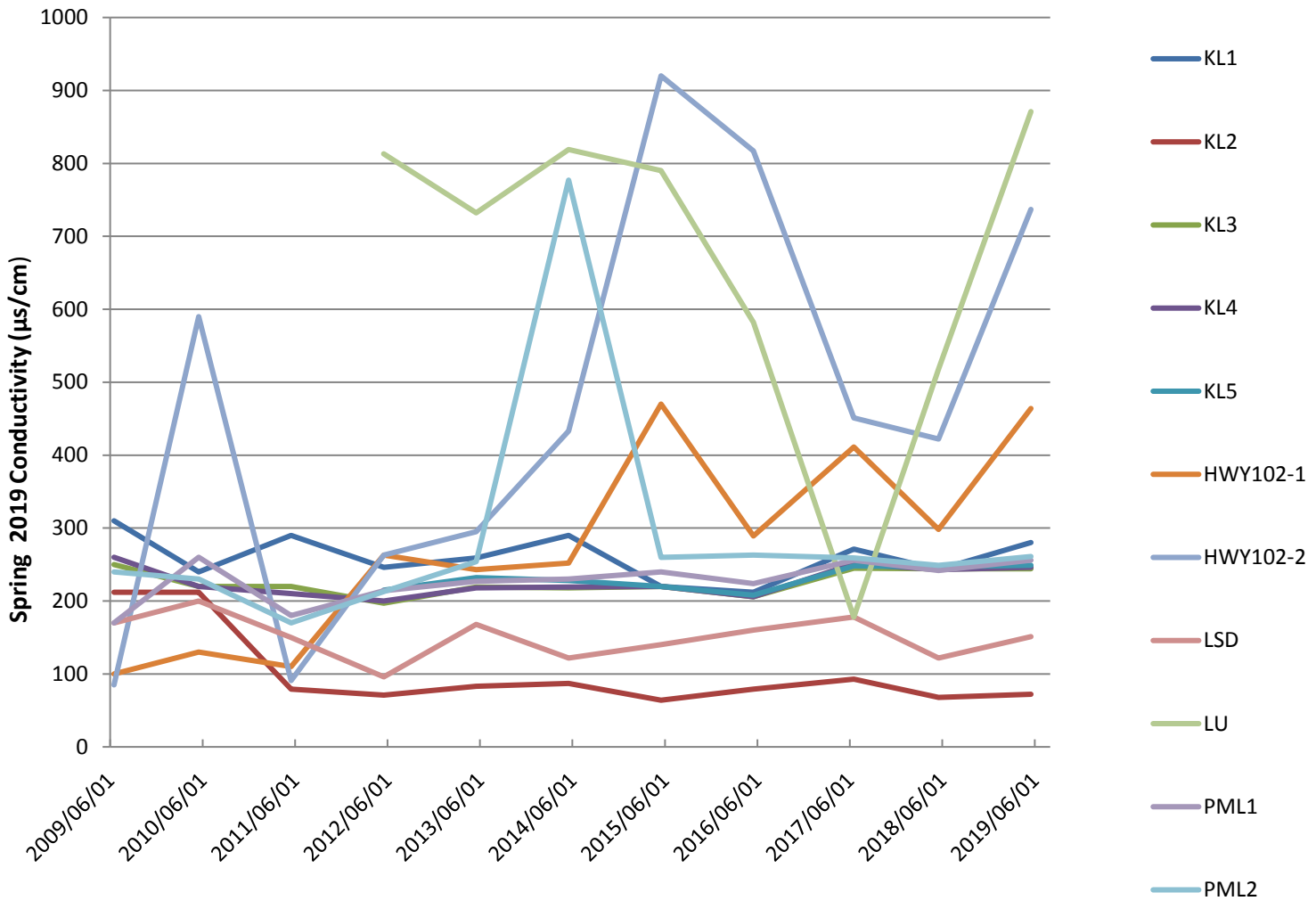


**Figure 10 – Seasonal Conductivity Measurements for Water Quality Monitoring Program.**

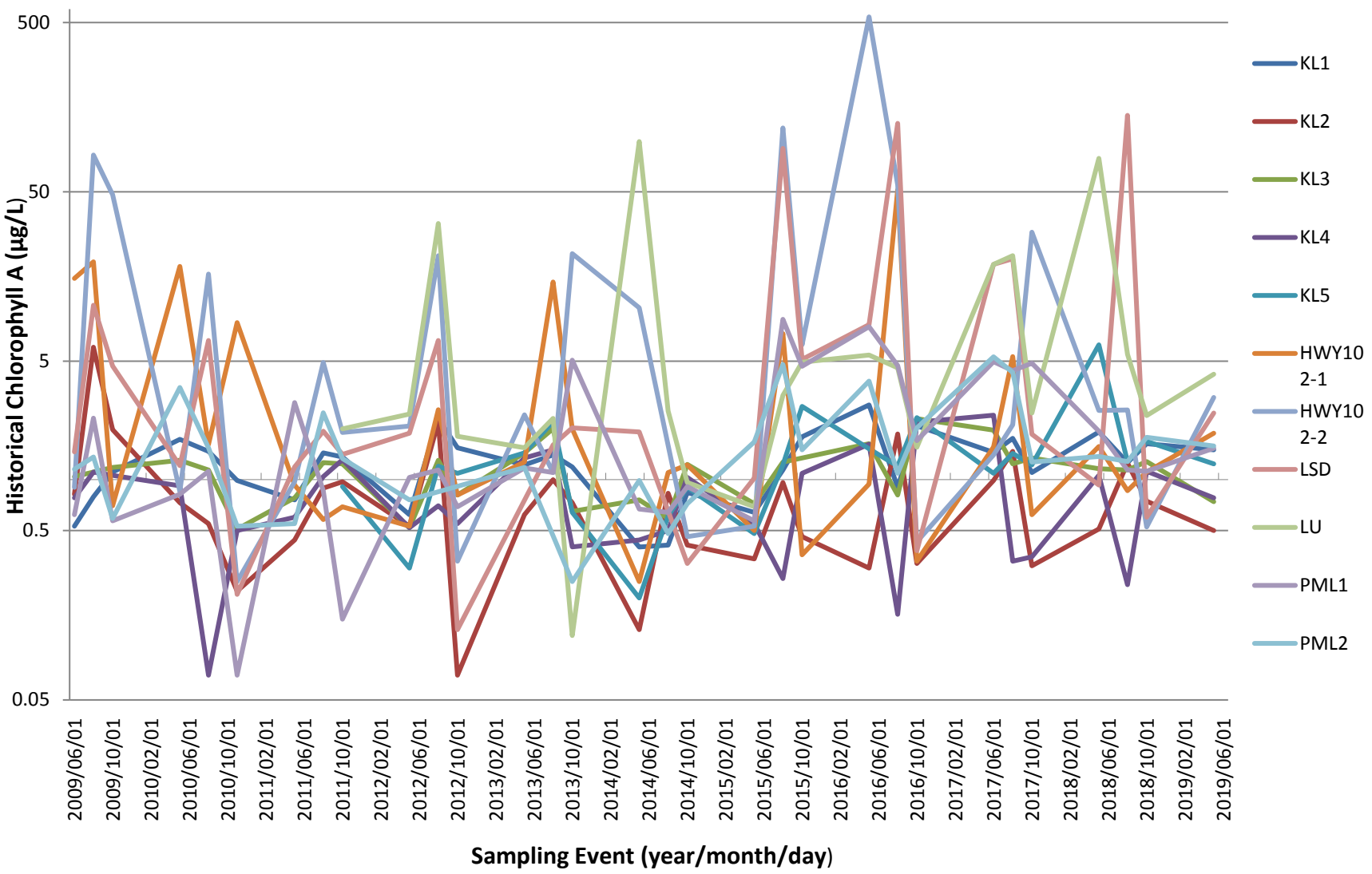


**Figure 11 – Historical Chlorophyll A Concentrations for Water Quality Monitoring Program.**

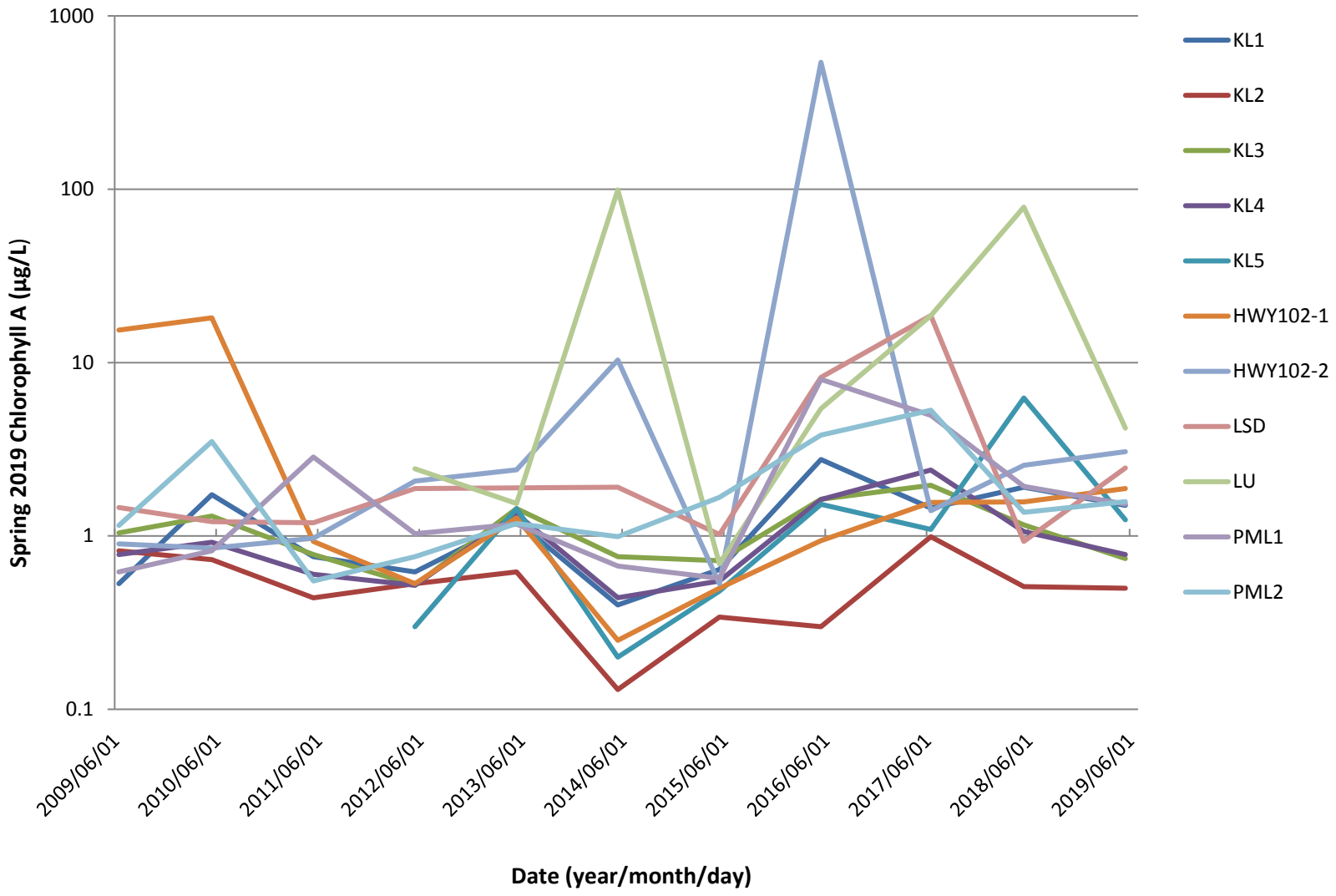


**Figure 12 – Seasonal Chlorophyll A Concentrations for Water Quality Monitoring Program.**



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**SNC-Lavalin Inc.**
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September 25, 2019

SENT VIA EMAIL: deacofc@halifax.ca

**Halifax Regional Municipality**
Halifax, Nova Scotia

**Attention:** **Mr. Cameron Deacoff, MMM, PMP, CLP**
Water Resources Specialist
Planning and Development

Dear Mr. Deacoff:

**RE: Final Report: Surface Water Quality Monitoring Program, 2019 Summer Sampling Event, Bedford West, Bedford, Nova Scotia**

SNC-Lavalin Inc. is pleased to submit one electronic copy of the final report presenting the results of the 2019 summer surface water quality sampling event for the Bedford West Surface Water Quality Monitoring Program in Bedford, Nova Scotia.

If you have any questions, please contact the undersigned.

Yours truly,

**SNC♦LAVALIN INC.**

Michael Smith, *AScT, B.Tech, EP*
Area Lead, Environmental Engineering
*Infrastructure Engineering – Eastern Canada*
(709) 368-0118 Ext. 54957

631477-0001-T-4E-REP-000-0015-C01

# Surface Water Quality Monitoring Program, Bedford West

# Bedford West, Nova Scotia, Canada

Final Report Summer 2019

2019/09/25

Prepared for:

**Halifax Regional Municipality**

Attention: Cameron Deacoff, MMM, PMP, CLP

Water Resources Specialist

Halifax, NS

PH: (902) 490-1926

Prepared by:

**SNC-Lavalin Inc.**

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# EXECUTIVE SUMMARY

On August 20, 2019 SNC-Lavalin Inc. (SNCL) completed the Bedford West Water Quality Monitoring program (2019 summer event) on behalf of Halifax Regional Municipality (HRM). The sampling program consisted of collecting surface water samples from eleven (11) water quality stations. Field parameters were recorded and surface water samples were collected for laboratory analyses. The laboratory analyses included the following: inorganics, calculated parameters, standard elements and microbiological.

The applicable water quality assessment standards included:

- Canadian Council of Ministers of the Environment (CCME) guidelines for the Protection of Aquatic Life Freshwater (PAL-F);
- Health Canada guidelines for Canadian Recreational Water Quality (2012, Third Edition); and
- Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Surface Water, EQS for Contaminated Sites (NSE 2014) Table A2, Reference for Pathway Specific Standards for Surface Water – Fresh Water.

During the summer monitoring event, six (6) monitoring stations reported concentrations that exceeded the Total Phosphorous (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) listed in the HRM RFP14-338. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL2: 0.019 mg/L (equivalent to 19 µg/L);
- KL4: 0.011 mg/L (equivalent to 11 µg/L);
- HWY-102-1: 0.023 mg/L (equivalent to 23 µg/L);
- HWY-102-2: 0.037 mg/L (equivalent to 37 µg/L);
- KL5: 0.031 mg/L (equivalent to 31 µg/L); and
- KL5: 0.014 mg/L (equivalent to 14 µg/L).

In-situ readings of parameters such as pH, dissolved oxygen, water temperature and conductivity were recorded at all eleven (11) stations:

- Eleven (11) stations were within the acceptable pH ranges of 5.0 - 9.0 for Health Canada Recreational Water Quality. The following four (4) stations were found outside the recommended pH ranges of 6.5 - 9.0 for the CCME-PAL-F: KL2 (pH 5.18), HWY-102-1 (pH 6.09), HWY-102-2 (pH 6.19) and PML-2 (pH 6.39).

- In-situ dissolved oxygen was outside of the CCME-PAL-F acceptable range of 5.5 – 9.5 mg/L at five (5) of the sampling stations including: KL2 (2.58 mg/L), KL4 (2.98 mg/L), KL5 (5.46 mg/L), HWY-102-2 (3.81 mg/L) and LSD (4.93 mg/L).
- In-situ water temperature was recorded between 23.1°C and 28.1°C.
- In-situ water conductivity was recorded between 119.0 µs/cm to 720.0 µs/cm.
- Secchi depth readings were collected at six (6) stations. Recorded values meet the Health Canada reference guideline of minimum of 1.2 meters (m): KL1 (2.7 m); KL2 (1.8 m); KL5 (3.7 m); PML-1 (4.3 m); and PML-2 (2.2 m).

The following parameters reported concentrations above the recommended Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (CCME-PAL-F, edition 2015) and/or the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Surface Water, EQS for Contaminated Sites (NSE 2014) and/or the Health Canada guidelines for Recreational Water Quality:

- Chloride concentrations were reported above the CCME-PAL-F limit of 120 mg/L at stations; HWY-102-2 (223 mg/L) and LU (202 mg/L).
- Nitrite concentrations were reported above the CCME-PAL-F limit of 0.06 mg/L at stations; HWY-102-2 (0.07 mg/L), and LU (0.07 mg/L).
- Laboratory pH was reported at all eleven (11) stations within Health Canada pH range of 5.0-9.0 for Recreational Water Quality and the CCME-PAL-F recommended pH range of 6.5-9.0.
- Aluminum concentrations exceeded the NSE EQS guideline of 5 µg/L at all of the sampling stations and three (3) of those stations also exceeded the CCME-PAL-F limit of 100 µg/L including; KL2 (257.0 µg/L), HWY102-2 (194.0 µg/L), and LSD (665.0 µg/L).
- Iron concentrations exceeded the NSE EQS and CCME-PAL-F limit of 300 µg/L at five (5) of the sampling stations including: KL2 (1210.0 µg/L), HWY-102-1 (896.0 µg/L), HWY-102-2 (8440.0 µg/L), LSD (5530.0 µg/L), and LU (556.0 µg/L).
- Lead concentrations exceeded the NSE EQS and CCME-PAL-F limit of 1.0 µg/L at stations HWY-102-2 (1.4 µg/L) and LSD (3.2 µg/L).
- Manganese concentrations exceeded the NSE EQS limit of 820 µg/L at station LSD (5050 µg/L).

In terms of microbiological analyses, E. Coli was not found in exceedance of the Health Canada Guideline of 400 CFU/100 mL, at any of the eleven (11) sampling locations. There are no applicable Health Canada recreational water quality guidelines for Total Coliforms (TC); however, reported concentrations were above the laboratory RDL of 1 CFU/100mL at all eleven (11) stations. Reported TC concentrations ranged from 450 CFU/100ml to NDOGT (No data, overgrowth with target).

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Appendix B Field Reports

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Table D1 – 2019 Summer Results, Bedford West Water Quality Sampling Program

Table D2 - Historical Results, Bedford West Water Quality Sampling Program

Appendix E Laboratory Certificates of Analysis

Appendix F Graphs

# 1. INTRODUCTION

SNC-Lavalin Inc. (SNCL) has prepared this report to provide Halifax Regional Municipality (HRM) with water quality data for eleven (11) surface water stations throughout the Bedford West development area.

Water quality monitoring in the Bedford West development area has been ongoing since 2009. SNCL was retained by HRM to complete water quality monitoring programs each spring, summer and autumn since 2015. The results of the 2019 summer monitoring program are detailed herein.

The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the Bedford West development in order to detect any impacts on and/or changes to water quality.

The 2019 summer sampling stations are summarized in Table 1 and shown in Drawing 1.

**Table 1: Bedford West Water Quality Sampling Stations**

| Water Course | Sample Location Name | Updated Coordinates (UTM NAD 83) | |
|---|---|---|---|
| | | Easting | Northing |
| Kearney Lake | KL-1 | 20T445718E | 4948496N |
| Kearney Lake | KL-2 | 20T0443859 | 4949738N |
| Kearney Run | KL-3 | 20T444390E | 4950406N |
| Kearney Run | KL-4 | 20T444463E | 4950571N |
| Kearney Lake | KL-5 | 20T4949142E | 445280N |
| Creek Above Highway | HWY-102-1 | 20T444708E | 4951644N |
| Creek Below Highway | HWY-102-2 | 20T444829E | 4951778N |
| Lake Shore Drive | LSD | 20T442583E | 4950431N |
| Larry Uteck Off-Ramp | LU | 20T444954E | 4949891N |
| Paper Mill Lake | PML-1 | 20T445129E | 4951154N |
| Paper Mill Lake | PML-2 | 20T445363E | 4951740N |

N

HWY102-2

PML2

HWY102-1

PAPER MILL LAKE

PML1

KL4

LSD

KL3

KL2

LU

KEARNEY LAKE

KL5

KL1

## Legend

- Water Quality Monitoring Test Locations/Sample Identification

0 200 400 800 1,200 1,600

Meters

SNC•LAVALIN

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Member of the SNC•LAVALIN Group

Certified ISO 9001

HALIFAX REGIONAL MUNICIPALITY

PROJECT: WATER QUALITY MONITORING WITHIN BEDFORD WEST

TITLE: WATER QUALITY MONITORING TEST LOCATIONS

| | |
|---|---|
| DESIGNED: | CH |
| DRAWN: | CH |
| CHECKED: | DH |
| SCALE: | AS SHOWN |
| DATE: | 21-09-2015 |
| PROJECT #: | 631477-0001 |
| DRAWING #: | 1 |

# 2. METHODOLOGY

The 2019 summer water quality sampling event included the measurements of Field Parameters (Group A) and collection of surface water for laboratory analysis of:

- Inorganics (Group B);
- Calculated Parameters (Group C);
- Standard Elements/Metals (Group D); and
- Microbiological Analyses (Group E).

Table 2 below summarizes the water quality parameters measured in the field or analyzed by the laboratory.

**Table 2: Analytical Parameter Groups**

| Field Parameters (A) | Inorganics (B) | Calculated Parameters (C) | Standard Metals (D) | Microbiological (E) |
|---|---|---|---|---|
| · pH<br>· TDS<br>· Dissolved Oxygen<br>· Temperature<br>· Secchi Depth<br>· Conductance<br>· Air Temperature<br>· Cloud Cover<br>· Incidental Wildlife Sightings | · Total Alkalinity (as $CaCO_3$)<br>· Dissolved Chloride<br>· Colour<br>· Total Kjeldahl Nitrogen<br>· Nitrate + Nitrite<br>· Nitrate<br>· Nitrite<br>· Nitrogen (as NH4)<br>· Total Organic Carbon<br>· Orthophosphate (P)<br>· pH<br>· Low Total Phosphorus<br>· Reactive Silica<br>· Total Suspended Solids<br>· Dissolved Sulphate<br>· Turbidity<br>· Conductivity | · Anion Sum<br>· Cation Sum<br>· Ion Balance<br>· Bicarbonate Alkalinity(as $CaCO_3$)<br>· Carbonate Alkalinity (as $CaCO_3$)<br>· Hardness<br>· Total Dissolved Solids<br>· Saturation pH (@4°C & 20°C)<br>· Langelier Index (@4°C & 20°C) | · Calcium<br>· Copper<br>· Iron<br>· Magnesium<br>· Manganese<br>· Potassium<br>· Sodium<br>· Zinc | · Chlorophyll A<br>· E. coli<br>· Most Probable Number (MPN) or CFU per 100 mL |

All surface water samples, associated field parameters and secchi depth measurements were collected on August 20, 2019.

Field measurements of pH, dissolved oxygen, specific conductivity and water temperature were taken at

each station using an YSI Professional Plus multimeter (serial number 18G100434). The instrument was calibrated on August 20, 2019. The calibration certificate issued by the equipment provider is enclosed in Appendix A.

Site conditions (i.e. weather, air temperature, cloud cover, site accessibility and wildlife sightings) and field parameters for each sampling location were recorded on a field report sheet (See Appendix B, Field Reports). Each sample station was photographed during the sample event (See Appendix C, Site Photographs).

Surface water sampling followed SNCL's Standard Operating Procedures (SOP) for surface water sampling. A new pair of nitrile gloves was used at each sample location. Water samples and field parameter readings were collected within a depth of ≤1.0 m below surface (if possible). It should be noted that samples were collected from the shore at nine (9) stations (KL1, KL2, KL3, KL4, KL5, HWY-102-1, HWY-102-2, LSD and LU) and from a boat at two (2) stations (PML-1 and PML-2) which require secchi depth readings.

Surface water samples were collected and placed in clean laboratory-supplied bottles and stored in a chilled container together with a chain of custody record for transport to the laboratory. Laboratory analysis was completed by AGAT Laboratories located in Dartmouth, Nova Scotia. AGAT is an accredited laboratory by the Standard Council of Canada (SCC), Canadian Association for Laboratory Accreditation (CALA), and ISO 9001:2015.

# 3. APPLICABLE GUIDELINES

For this water quality monitoring program, the Federal and Provincial water quality guidelines being used for the assessment of surface water quality results are as follows, the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Aquatic Life – Freshwater (PAL-F) (Version 2015), the Health Canada (HC) guidelines for Canadian Recreational Water Quality (2012, Third Edition), and the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2, Reference for Pathway Specific Standards for Surface Water (µg/L) for Fresh Water. These guidelines were used to determine whether a tested parameter was in exceedance. Exceedances may be an indication of water quality impairment or conditions that will eventually lead to impairment. A detailed description of the guidelines is presented below:

### CCME Guidelines

- The CCME PAL-F guidelines were used for parameters such as dissolved oxygen, pH (in-situ and analytical), Chloride, Nitrate, Nitrite, Nitrogen, as well as for total metals such as Aluminum, Arsenic, Boron, Cadmium, Cooper, Iron, Lead, Molybdenum, Nickel, Selenium, Silver, Thallium, Uranium, and Zinc.
- There is no CCME recommended value for Total Suspended Solids (TSS), however the following CCME narrative for TSS at high flow was applied "maximum increase of 25 mg/L from

background levels at any time when background levels are between 25 and 250 mg/L should not increase more than 10% of background levels when background is ≥ 250 mg/L".

- According to CCME, 10 µg/L of total phosphorous is the threshold between oligotrophic and mesotrophic classifications. In the Canadian framework, a trigger range is a desired concentration range for phosphorus; if the upper limit of the range is exceeded, it indicates potential for environmental quality issues, which may trigger the need for further investigation. HRM defined a Total Phosphorous management threshold value of 10 µg/L or 0.01 mg/L for this monitoring program.

### HC Guidelines

- The HC guidelines for Canadian Recreational Water Quality was used for parameters such as secchi depth (i.e. visibility at a minimum depth of 1.2 metres), pH guideline of 5.0-9.0, turbidity (limit of 50 Nephelometric Turbidity Units), and E. coli (i.e. ≤400 E.Coli/100mL).

### NSE Guidelines

- The NSE EQS were used for assessment of total metals such as Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Uranium, Vanadium and Zinc.

# 4. FIELD OBSERVATIONS

The 2019 summer site conditions were recorded for all eleven (11) surface water quality monitoring stations and are included in the field data sheets in Appendix B. Site condition observations include weather, cloud cover, air temperature, wildlife sightings and site accessibility.

In addition, site photographs are included in Appendix C.

# 5. FIELD MEASUREMENTS

Field parameters such as in situ pH, dissolved oxygen, water temperature, conductivity and secchi depth (where applicable) were recorded on field data sheets. Collected data is enclosed in Appendix B.

Field measurements are also tabulated in Appendix D: Table D1 - Summer Results and Table D2 – Historical Results.

### In-situ pH

All eleven (11) stations were within the 5.0 - 9.0 pH Health Canada range for Recreational Water Quality. Four (4) sampling stations were found outside of the CCME-PAL-F recommended range of 6.5 - 9.0. at the following:

- KL2: pH 5.18;
- HWY-102-1: pH 6.09;
- HWY-102-2: pH 6.19; and
- KL5: pH 6.39.

### Dissolved Oxygen

In-situ dissolved oxygen was outside of the CCME-PAL-F acceptable range of 5.5 – 9.5 mg/L at five (5) of the sampling stations including:

- KL2 (2.58 mg/L);
- KL4 (2.98 mg/L);
- KL5 (5.46 mg/L);
- HWY-102-2 (3.81 mg/L); and
- LSD (4.93 mg/L).

### Water Temperature

There are no applicable Health Canada or NSE guidelines for recreation water temperature. Water temperature was recorded between 23.1°C and 28.1°C.

### Conductivity

There are no applicable Health Canada or NSE guidelines for recreation water conductivity. However, specific water conductivity was recorded between 119.0 µs/cm to 720.0 µs/cm.

### Secchi Disk Depth

As per scope of work secchi depths were collected at five (5) monitoring stations. Secchi depth readings met the Health Canada reference guideline of minimum of 1.2 meters (m). Recorded values were as follows:

- KL1: 2.70 m;
- KL2: 1.80 m;
- KL5: 3.70 m;
- PML-1: 4.30 m; and
- PML-2: 2.20 m.

# 6. ANALYTICAL RESULTS

Analytical results of the 2019 summer monitoring event and applicable/reference guidelines are tabulated in Table D1 and enclosed in Appendix D. In addition, historical water quality results from 2009 - 2019 are summarized in Table D2 and enclosed in Appendix D.

Laboratory certificates of analysis for the 2019 summer event are in Appendix E.

## 6.1 Total Phosphorous

Six (6) monitoring stations reported concentrations that exceeded the Total Phosphorous (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) listed in the HRM RFP14-338. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL2: 0.019 mg/L (equivalent to 19 µg/L);
- KL4: 0.011 mg/L (equivalent to 11 µg/L);
- HWY-102-1: 0.023 mg/L (equivalent to 23 µg/L);
- HWY-102-2: 0.037 mg/L (equivalent to 37 µg/L);
- KL5: 0.031 mg/L (equivalent to 31 µg/L); and
- KL5: 0.014 mg/L (equivalent to 14 µg/L).

## 6.2 General Chemistry

Of the tested inorganic parameters, only concentrations of chloride, nitrite and pH values were reported outside or above the applicable guidelines.

### Chloride

Two (2) sampling stations reported chloride concentrations above the CCME-PAL-F limit of 120 mg/L;

- HWY-102-2:223 mg/L; and
- LU: 202 mg/L.

### Nitrite

Two (2) sampling stations reported nitrite concentrations above the CCME-PAL-F limit of 0.06 mg/L;

- HWY-102-2: 0.07 mg/L; and
- LU: 0.07 mg/L.

### Laboratory pH

All eleven (11) stations reported pH values well within Health Canada range of 5.0-9.0 for Recreational Water Quality, as well as the CCME-PAL-F range of 6.5-9.0.

## 6.3 Metals

The following metals were analyzed during the summer 2019 monitoring event: aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, tin, titanium, uranium, vanadium and zinc. Of the tested metal parameters, exceedances were reported above the guidelines/reference limits for aluminum, iron, lead and manganese parameters. Exceedances were reported as follows:

### Aluminum

All eleven (11) sampling stations exceeded the NSE EQS aluminum guideline of 5 µg/L and three (3) of those stations also exceeded the CCME-PAL-F limit of 100 µg/L:

- KL1: 49 µg/L;
- KL2: 257 µg/L (exceedance of NSE EQS and CCME-PAL-F);
- KL3: 39 µg/L;
- KL4: 70 µg/L;
- KL5: 57 µg/L;
- HWY-102-1: 93 µg/L;
- HWY-102-2: 194 µg/L (exceedance of NSE EQS and CCME-PAL-F);
- LSD: 665 µg/L (exceedance of NSE EQS and CCME-PAL-F);
- LU: 31 µg/L;
- PML-1: 25 µg/L; and
- PML-2: 27 µg/L.

### Iron

Five (5) stations exceeded the NSE EQS iron guideline and CCME-PAL-F limit of 300 µg/L:

- KL2: 1210 µg/L;
- HWY-102-1: 896 µg/L;
- HWY-102-2: 8440 µg/L; and
- LSD: 5530 µg/L; and
- LU: 556 µg/L.

### Lead

Two (2) stations exceeded the NSE EQS lead guideline and CCME-PAL-F limit of 1.0 µg/L:

- HWY-102-2: 1.4 µg/L; and
- LSD: 3.2 µg/L.

### Manganese

One (1) station exceeded the NSE EQS manganese guideline limit of 820 µg/L:

- LSD: 5050 µg/L.

### 6.4 Microbiological

There were no exceedances of the Heath Canada (HC) E.Coli Guideline of ≤ 400 CFU/100 mL.

HC does not have a recreational water quality guideline for Total Coliform (TC). All eleven (11) stations reported TC concentrations above the laboratory RDL of 1 CFU/100mL. Reported concentrations ranged from 450 CFU/100ml to NDOGT (No data, overgrowth with target).

## 7. STATISTICAL PRESENTATION

Statistics include water quality data from 2009 to August 2019 of all eleven (11) water quality monitoring stations. Table 3 provides the summer seasonal statistics for the following six (6) key water quality parameters selected by HRM:

- Total phosphorus (mg/L);
- Dissolved chloride (mg/L);
- Laboratory measured pH;
- Total suspended solids (mg/L);
- Conductivity (µS/cm); and
- Chlorophyll A (µg/L).

Where analytical results were found to be less than the laboratory Reportable Detection Limit (<RDL), the statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory reportable detection limit (1/2 RDL value) as a conservative approach.

It should be noted that number of decimal places presented for each listed parameter is based on the decimal places of the RDL and reported Laboratory certificate of analysis.

**Table 3: Statistical Presentation of Key Water Quality Parameters for Summer**

| KL-1 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.005 | 0.002 | 0.043 | 0.010 | 0.012 |
| Chloride (mg/L) | 1 | 59 | 45 | 76 | 60 | 63 |
| Lab pH | N/A | 6.95 | 6.51 | 7.31 | 7.00 | 6.99 |
| Total Suspended Solids (mg/L) | 5 | 5 | 1 | 17 | 2.5 | 3.6 |
| Conductivity (µS/cm) | 1 | 232 | 180 | 339 | 260 | 259 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 2.18 | 0.41 | 2.30 | 1.40 | 1.37 |

| KL-2 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.019 | 0.008 | 0.059 | 0.019 | 0.022 |
| Chloride (mg/L) | 1 | 16 | 14 | 48 | 19 | 22 |
| Lab pH | N/A | 6.70 | 6.40 | 7.04 | 6.85 | 6.79 |
| Total Suspended Solids (mg/L) | 5 | 5 | 1 | 135 | 2.5 | 25 |
| Conductivity (µS/cm) | 1 | 88 | 66 | 212 | 94 | 106 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 1.67 | 0.55 | 6.05 | 1.25 | 1.70 |

| KL-3 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.007 | 0.001 | 0.045 | 0.007 | 0.011 |
| Chloride (mg/L) | 1 | 56 | 40 | 63 | 56 | 52 |
| Lab pH | N/A | 7.07 | 6.50 | 7.28 | 6.99 | 6.97 |
| Total Suspended Solids (mg/L) | 5 | 5 | 0.5 | 2.5 | 2.5 | 2.0 |
| Conductivity (µS/cm) | 1 | 233 | 170 | 262 | 242 | 232 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 1.94 | 0.59 | 2.00 | 1.24 | 1.25 |

| KL-4 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.011 | 0.001 | 2.39 | 0.008 | 0.228 |
| Chloride (mg/L) | 1 | 56 | 41 | 65 | 56 | 53 |
| Lab pH | N/A | 6.91 | 6.57 | 7.13 | 6.94 | 6.92 |
| Total Suspended Solids (mg/L) | 5 | 6 | 0.5 | 7 | 2.5 | 2.7 |
| Conductivity (µS/cm) | 1 | 236 | 170 | 275 | 241 | 236 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 0.47 | 0.07 | 1.50 | 0.47 | 0.58 |

| KL-5 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.007 | 0.004 | 0.04 | 0.009 | 0.014 |
| Chloride (mg/L) | 1 | 55 | 44 | 58 | 56 | 53 |
| Lab pH | N/A | 7.04 | 6.84 | 7.16 | 7.07 | 7.02 |
| Total Suspended Solids (mg/L) | 5 | 5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Conductivity (µS/cm) | 1 | 229 | 223 | 267 | 247 | 243 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 3.70 | 0.61 | 3.70 | 1.25 | 1.61 |

| HWY-102-1 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.023 | 0.007 | 0.140 | 0.023 | 0.037 |
| Chloride (mg/L) | 1 | 80 | 19 | 87 | 46 | 50 |
| Lab pH | N/A | 7.15 | 5.24 | 7.49 | 6.91 | 6.82 |
| Total Suspended Solids (mg/L) | 5 | 8 | 1 | 80 | 6 | 12 |
| Conductivity (µS/cm) | 1 | 340 | 100 | 440 | 251 | 251 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 5.55 | 0.58 | 51.51 | 5.30 | 10.03 |

| HWY-102-2 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.037 | 0.019 | 1.56 | 0.036 | 0.187 |
| Chloride (mg/L) | 1 | 223 | 21 | 226 | 99 | 113 |
| Lab pH | N/A | 6.67 | 5.96 | 6.8 | 6.66 | 6.54 |
| Total Suspended Solids (mg/L) | 5 | 16 | 2.5 | 3000 | 22 | 323 |
| Conductivity (µS/cm) | 1 | 782 | 100 | 952 | 408 | 441 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 23.70 | 1.10 | 119.14 | 18.70 | 32.85 |

| LSD | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.031 | 0.015 | 0.501 | 0.045 | 0.116 |
| Chloride (mg/L) | 1 | 29 | 27 | 45 | 33 | 34 |
| Lab pH | N/A | 7.11 | 6.59 | 7.3 | 6.98 | 6.96 |
| Total Suspended Solids (mg/L) | 5 | 150 | 16 | 9020 | 104 | 1069 |
| Conductivity (µS/cm) | 1 | 170 | 129 | 236 | 166 | 170 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 14.60 | 1.60 | 141.59 | 12.65 | 42.12 |

| LU | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.014 | 0.009 | 0.036 | 0.023 | 0.021 |
| Chloride (mg/L) | 1 | 202 | 99 | 202 | 128 | 137 |
| Lab pH | N/A | 7.45 | 7.11 | 7.46 | 7.41 | 7.35 |
| Total Suspended Solids (mg/L) | 5 | 6 | 2.5 | 165 | 4 | 26 |
| Conductivity (µS/cm) | 1 | 765 | 433 | 765 | 613 | 612 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 6.38 | 2.30 | 32.52 | 5.04 | 9.74 |

| PML-1 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.008 | 0.002 | 0.104 | 0.011 | 0.028 |
| Chloride (mg/L) | 1 | 64 | 43 | 67 | 59 | 58 |
| Lab pH | N/A | 7.22 | 6.75 | 7.28 | 6.98 | 7 |
| Total Suspended Solids (mg/L) | 5 | 5 | 1 | 149 | 2.5 | 18 |
| Conductivity (µS/cm) | 1 | 264 | 170 | 310 | 256 | 252 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 1.84 | 0.64 | 8.84 | 1.14 | 2.55 |

| PML-2 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.005 | 0.002 | 0.026 | 0.002 | 0.009 |
| Chloride (mg/L) | 1 | 64 | 43 | 72 | 43 | 59 |
| Lab pH | N/A | 7.20 | 6.60 | 7.29 | 6.60 | 7.04 |
| Total Suspended Solids (mg/L) | 5 | 5 | 1 | 14 | 1 | 4 |
| Conductivity (µS/cm) | 1 | 268 | 170 | 319 | 170 | 260 |
| Chlorophyll-A Acidification Method (µg/L) | 0.05 | 1.62 | 0.48 | 4.79 | 0.48 | 2.10 |

# 8. GRAPHS

Graphs were completed for all eleven (11) water quality monitoring stations including water quality data collected from 2009 to August 2019. Appendix F presents seasonal and annual graphs that illustrate concentrations of the following six (6) key water quality parameters selected by HRM:

- Total phosphorus (mg/L);
- Dissolved chloride (mg/L);
- Laboratory measured pH;
- Total suspended solids (mg/L);
- Conductivity (µS/cm); and
- Chlorophyll A (µg/L).

The graphs allow for comparison between water quality sampling stations and identification of concentration increases (i.e. above applicable CCME guidelines). As many parameters show seasonal concentration fluctuations, the water quality data was also graphed showing only the concentrations for a given season.

It should be noted that where results were found to be less than the laboratory Reportable Detection Limit (<RDL), they were graphed as half the reportable detection limit (1/2 RDL value) as a conservative approach.

# 9. CONCLUSIONS

The 2019 summer water quality monitoring event included the collection of surface water samples at eleven (11) water quality sampling stations for the analysis of inorganics, calculated parameters, standard metals, microbiological analyses and additional metals. Additionally, field parameters collected at each station included in-situ pH, water temperature, dissolved oxygen, conductivity, Secchi depth (where applicable), air temperature, cloud cover and wildlife sightings.

## Total Phosphorous

The following six (6) monitoring stations reported total phosphorous concentrations above the HRM management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L):

- KL2: 0.019 mg/L (equivalent to 19 µg/L);
- KL4: 0.011 mg/L (equivalent to 11 µg/L);
- HWY-102-1: 0.023 mg/L (equivalent to 23 µg/L);
- HWY-102-2: 0.037 mg/L (equivalent to 37 µg/L);
- KL5: 0.031 mg/L (equivalent to 31 µg/L); and
- KL5: 0.014 mg/L (equivalent to 14 µg/L).

## Field Measurements

- Eleven (11) stations were within the acceptable pH ranges of 5.0 - 9.0 for Health Canada

Recreational Water Quality. The following four (4) stations were found outside the recommended pH ranges of 6.5 - 9.0 for the CCME-PAL-F: KL2 (pH 5.18), HWY-102-1 (pH 6.09), HWY-102-2 (pH 6.19) and PML-2 (pH 6.39).

- In-situ dissolved oxygen was outside of the CCME-PAL-F acceptable range of 5.5 – 9.5 mg/L at five (5) of the sampling stations including: KL2 (2.58 mg/L), KL4 (2.98 mg/L), KL5 (5.46 mg/L), HWY-102-2 (3.81 mg/L) and LSD (4.93 mg/L).
- In-situ water temperature was recorded between 23.1°C and 28.1°C.
- In-situ water conductivity was recorded between 119.0 µs/cm to 720.0 µs/cm.
- Secchi depth readings were collected at six (6) stations. Recorded values meet the Health Canada reference guideline of minimum of 1.2 meters (m): KL1 (2.7 m); KL2 (1.8 m); KL5 (3.7m); PML-1 (4.3 m); and PML-2 (2.2 m).

## General Chemistry and Metals

The following parameters reported concentrations above the recommended Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (CCME-PAL-F, edition 2015) and/or the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Surface Water, EQS for Contaminated Sites (NSE 2014):

- Chloride concentrations were reported above the CCME-PAL-F limit of 120 mg/L at stations; HWY-102-2 (223mg/L) and LU (202 mg/L).
- Nitrite concentrations were reported above the CCME-PAL-F limit of 0.06 mg/L at stations; HWY-102-2 (0.07 mg/L), and LU (0.07 mg/L).
- Laboratory pH was reported at all eleven (11) stations within Health Canada pH range of 5.0-9.0 for Recreational Water Quality and the CCME-PAL-F recommended pH range of 6.5-9.0.
- Aluminum concentrations exceeded the NSE EQS guideline of 5 µg/L at all of the sampling stations and three (3) of those stations also exceeded the CCME-PAL-F limit of 100 µg/L including; KL2 (257.0 µg/L), HWY102-2 (194.0 µg/L), and LSD (665.0 µg/L).
- Iron concentrations exceeded the NSE EQS and CCME-PAL-F limit of 300 µg/L at five (5) of the sampling stations including: KL2 (1210.0 µg/L), HWY-102-1 (896.0 µg/L), HWY-102-2 (8440.0 µg/L), LSD (5530.0 µg/L), and LU (556.0 µg/L).
- Lead concentrations exceeded the NSE EQS and CCME-PAL-F limit of 1.0 µg/L at stations HWY-102-2 (1.4 µg/L) and LSD (3.2 µg/L).
- Manganese concentrations exceeded the NSE EQS limit of 820.0 µg/L at station LSD (5050.0 µg/L).

### Microbiological

The Heath Canada guideline of ≤ 400 CFU/100 mL of E.Coli was met at all eleven (11) stations monitored during the 2019 summer event.

There are no recreational water quality guidelines for Total Coliform (TC). All monitoring stations reported TC concentrations above the Lab RDL of 1 CFU/100mL. Reported TC concentrations ranged from 450 CFU/100ml to NDOGT (No data, overgrowth with target).

# 10. LIMITATION

This report has been prepared and the work referred to in this report has been undertaken by SNC-Lavalin Inc (SNCL) for Halifax Regional Municipality (HRM), hereafter referred to as the "Client". It is intended for the sole and exclusive use of Halifax Regional Municipality. The report has been prepared in accordance with the Scope of Work and agreement between SNCL and the Client. Other than by the Client and as set out herein, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of SNCL.

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This report was prepared by Cally Baxter, BSc, EPt, and reviewed and approved by Michael Smith, AScT, B.Tech, EP.

# 11. REFERENCES

*Canadian Environmental Quality Guidelines for the Protection of Aquatic Life, 2004, "Phosphorous: Canadian Guidance Framework for the Management of Freshwater Systems".*

*Canadian Council of Ministers of the Environment guidelines for the Protection of Aquatic Life Freshwater.*

*Health Canada guidelines for Canadian Recreational Water Quality, 2012, Third Edition.*

*Nova Scotia Environment, Notification of Contamination Protocol, Table 3 Tier 1 EQS for Surface Water, Revision July 2013*

# Appendix A

Instrument Calibration Report

*Open Road Environmental Limited*

# YSI Professional Plus

*Serial Number 18G100434 (Quattro)*

## *Calibration Certificate*

| *3 Point Calibration pH (4.00, 7.00, 10.00)* | *Calibration solution* | *Specific Conductivity 1440 uS/cm* | *DO 100% @22.0 Deg.C* |
|---|---|---|---|
| *pH 4.00 pass 139.20mV* | *Lot#S180501018 Exp. May-20* | *pass* | *pass* |
| *pH 7.00 pass 23.2mV* | *Lot#S180315008 Exp. Mar-20* | | |
| *pH 10.00 pass -169.6mV* | *Lot#8GE347 Exp. May-20* | | |

August 20, 2019

Ghislain Pitre, CET

# Appendix B

Field Reports

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake | | **Site ID: KL1** |
| **Watercourse:** Kearney Lake | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0445718E, 4948496N (UTM, NAD83) | |
| **SNC Field Personnel:** | Cally Baxter / Christine Vien | |

**Site Conditions**

| | |
|---|---|
| Weather: | **Partly Cloudy** |
| Air Temperature: | 21°C |
| Cloud Cover : | 60% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Off Kearney Lake Road |
| Site Access Detail: | Sample taken off the end of dock at Kearney Lake beach. Parked in public parking off Hamshaw Dr. and walked down to beach area. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **2019/08/20** |
| Time (hh:mm): | 9:15am |
| Sample Depth (m): | 0.5m |
| pH: | 7.41 |
| Dissolved Oxygen (mg/L): | 7.10 |
| Secchi Depth (m): | 2.7m |
| Water Temperature (degrees Celsius): | 23.6°C |
| Conductivity (µs/cm): | 160 |

**Additional Comments / Notes**

| |
|---|
| |

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake | | **Site ID: KL2** |
| **Watercourse:** Kearney Lake | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0443942E, 4949803N (UTM, NAD83) | |
| **SNC Field Personnel:** | Cally Baxter / Christine Vien | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny |
| Air Temperature: | 28°C |
| Cloud Cover: | 0% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Off Colin's Rd. |
| Site Access Detail: | Sample taken on the lake side of the culvert between residential buildings 20 and 28. Walked down rock to left of culvert. Note: Sample when standing downstream of bottle. |
| | |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **2019/08/20** |
| Time (hh:mm): | 3:01pm |
| Sample Depth (m): | 0.1m |
| pH: | 5.18 |
| Dissolved Oxygen (mg/L): | 2.58 |
| Secchi Depth (m): | 1.8m |
| Water Temperature (degrees Celsius): | 26.4°C |
| Conductivity (µs/cm): | 119 |

**Additional Comments / Notes**

-Water level extremely low
- Pungent odour of decaying organic matter

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake Run | | **Site ID: KL3** |
| **Watercourse:** Kearney Lake Run | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444390E, 4950406N (UTM, NAD83) | |
| **SNC Field Personnel:** | Cally Baxter / Christine Vien | |

**Site Conditions**

| | |
|---|---|
| Weather: | Partly Cloudy |
| Air Temperature: | 23°C |
| Cloud Cover: | 50% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Off walking trail from Amesbury Gate Rd. |
| Site Access Detail: | Access to site is via a walking path clearly evident off of Amesbury Gate Rd. (off Larry Uteck Blvd.) roughly 205m down road on left. Walk down path, follow gravel walkway down hill and take sample at the low point facing the dam. Look for large rock outcrop on right. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **2019/08/20** |
| Time (hh:mm): | 10:00am |
| Sample Depth (m): | 0.3 m |
| pH: | 7.05 |
| Dissolved Oxygen (mg/L): | 7.28 |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 23.3°C |
| Conductivity (µs/cm): | 319 |

**Additional Comments / Notes**

-Water level low

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake Run | | **Site ID: KL4** |
| **Watercourse:** Kearney Lake Run | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444463E, 4950571N (UTM, NAD83) | |
| **SNC Field Personnel:** | Cally Baxter/ Christine Vien | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 23°C |
| Cloud Cover: | 50% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Via the extended road at the end of Weybridge Ln. |
| Site Access Detail: | At Weybridge, go to end of extended road on right and walk and take sample above the rocky area at the base of the wider, slow moving section of the river. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **2019/08/20** |
| Time (hh:mm): | 9:43 am |
| Sample Depth (m): | 0.3 m |
| pH: | 6.97 |
| Dissolved Oxygen (mg/L): | 2.98 |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 23.4°C |
| Conductivity (µs/cm): | 540 |

**Additional Comments / Notes**

-water level low

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 9 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake | | **Site ID: KL5** |
| **Watercourse:** Kearney Lake | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 4949142E, 445280N (UTM, NAD83) | |
| **SNC Field Personnel:** | Cally Baxter / Christine Vien | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 22°C |
| Cloud Cover: | 50% |
| Wildlife Sightings: | Fish in water |
| Site Accessibility: Yes, Accessible | Along Kearney Lake Road |
| Site Access Detail: | Easily accessible, sample location is directly off the Kearney Lake Road on a rocky outcrop supporting a power line pole (two pole structure). Slow truck down carefully, turn hazard lights on. Samples were taken on left front of outcrop facing lake. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **2019/08/20** |
| Time (hh:mm): | 9:27 am |
| Sample Depth (m): | 0.5 m |
| pH: | 7.45 |
| Dissolved Oxygen (mg/L): | 5.46 |
| **Secchi Depth (m):** | 3.7m |
| Water Temperature (degrees Celsius): | 23.8°C |
| Conductivity (µs/cm): | 220 |

**Additional Comments / Notes**

| |
|---|
| |

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Highway 102 | **Site ID: HWY 102-1** | |
| **Watercourse:** Marsh area | **Location:** Highway 102, south of exit 3 | |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444708E, 4951644N (UTM, NAD83) | |
| **SNC Field Personnel:** | Cally Baxter/ Christine Vien | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny |
| Air Temperature: | 32°C |
| Cloud Cover: | 2% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Off Highway 102 Park before guardrail. |
| Site Access Detail: | Carefully slow truck down while pulling off highway 102. Park truck with hazard lights on before the start of the guardrail. Walk along outside of guardrail (for approximately 150m). Site is on right fed by a swampy bog area. Samples were taken in front of culvert. There is a concrete pad to step on to take samples. Sample while standing downstream. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **2019/08/20** |
| Time (hh:mm): | 12:40 pm |
| Sample Depth (m): | 0.15m |
| pH: | 6.27 |
| Dissolved Oxygen (mg/L): | 6.09 |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 27.4°C |
| Conductivity (µs/cm): | 383 |

**Additional Comments / Notes**

-pungent odour, smells of decomposing organic debris and garbage.
-Lots of debris/garbage near site

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Highway 102 | **Site ID: HWY 102-2** | |
| **Watercourse:** Marsh area | **Location:** HWY 102, south of exit 3 | |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444829E, 4951778N (UTM, NAD83) | |
| **SNC Field Personnel:** | Cally Baxter/ Christine Vien | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny |
| Air Temperature: | 32°C |
| Cloud Cover: | 2% |
| Wildlife Sightings: | none |
| Site Accessibility: Yes, Accessible | Off Highway 102 (Small gravel drive way- *Back in) |
| Site Access Detail: | Travel along Highway 102 toward Bedford NS. Site is on right easily to identify based on swamp/bog. Carefully slow truck down with hazard lights flashing. There is a small driveway to park truck. Pull a head of driveway and when lanes are clear back truck down into spot. Take samples in water body in front of culvert. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y) | **2019/08/20** |
| Time (hh:mm): | 12:20pm |
| Sample Depth (m): | 0.15m |
| pH: | 6.19 |
| Dissolved Oxygen (mg/L): | 3.81 |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 23.1°C |
| Conductivity (µs/cm): | 720 |

**Additional Comments / Notes**

-Algal bloom
-oil sheen visible on surface
-low water level
-lots of garbage and debris

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Lake Shore Drive | | **Site ID: LSD** |
| **Watercourse:** Marsh @ Lakeshore Dr. | | **Location:** Kingswood Subdivision |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0442583E, 4950431N (UTM, NAD83) | |
| **SNC Field Personnel:** | Cally Baxter/ Christine Vien | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny |
| Air Temperature: | 23°C |
| Cloud Cover: | 40% |
| Wildlife Sightings: | Frogs |
| Site Accessibility: Yes, Accessible | Via Lakeshore Drive in Kingswood Subdivision |
| Site Access Detail: | Take Kingswood Drive off Hammonds Plains Road. Travel down to Diana Drive on left go to end and take a left on Lakeshore drive. Travel approximately 1.0 km. There will be a clearing on left down to power lines. Drive truck (4X4) down until larger clearing is reached and park. Continue (walk) down hill to ATV pathway on left. Follow pathway for approximately 250m. Sample location is on right (river with a lot of vegetation throughout) |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **2019/08/20** |
| Time (hh:mm): | 10:44 am |
| Sample Depth (m): | 0.1 m |
| pH: | 6.51 |
| Dissolved Oxygen (mg/L): | 4.93 |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 25.0°C |
| Conductivity (µs/cm): | 368 |

**Additional Comments / Notes**

-Water level extremely low, channel width greatly reduced.
-changes in stream side vegetation (lots of trees down due to beaver)
-beaver dam still present
- Pungent odour of decomposing organic material.

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 9 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Larry Uteck Blvd. | | **Site ID: LU** |
| **Watercourse:** Pond | | **Location:** Larry Uteck off-ramp |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444954E, 4949891N (UTM, NAD83) | |
| **SNC Field Personnel:** | Cally Baxter/Christine Vien | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny |
| Air Temperature: | 30°C |
| Cloud Cover: | 30% |
| Wildlife Sightings: | Hawk |
| Site Accessibility: Yes, Accessible | From Larry Uteck Road |
| Site Access Detail: | Take Larry Uteck off ramp and continue down Larry Uteck Blvd. for approximately 320m. Park truck safely on grassy clearing on left. Sample location is at shore line of lake across road. Take walking pathway to wooded area and travel approximately 80m to lake shore. Avoid walking through the bog area on right. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **2019/08/20** |
| Time (hh:mm): | 11:45am |
| Sample Depth (m): | 0.25m |
| pH: | 6.92 |
| Dissolved Oxygen (mg/L): | 5.54 |
| Secchi Depth (m): | N/A |
| Water Temperature (degrees Celsius): | 25.8°C |
| Conductivity (µs/cm): | 710 |

**Additional Comments / Notes**

| |
|---|
| |

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Paper Mill Lake | | **Site ID: PML1** |
| **Watercourse:** Paper Mill Lake | | **Location:** Moirs Mill Subdivision |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0445129E, 4951154N (UTM, NAD83) | |
| **SNC Field Personnel:** | Cally Baxter / Christine Vien | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny |
| Air Temperature: | 29°C |
| Cloud Cover: | 2% |
| Wildlife Sightings: | Fish |
| Site Accessibility: Yes, Accessible | Travel down Ahmadi Cr. approximately 340m (around second bend in road). Park truck in front of Halifax Water station and carefully walk down rock wall on left. At the bottom locate the small stream and continue along the left and side facing lake. Sample location is a small clearing to the left at the mouth of the river. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **2019/08/20** |
| Time (hh:mm): | 4:40pm |
| Sample Depth (m): | 0.5m |
| pH: | 6.53 |
| Dissolved Oxygen (mg/L): | 6.07 |
| Secchi Depth (m): | 4.3m |
| Water Temperature (degrees Celsius): | 28.1°C |
| Conductivity (µs/cm): | 257 |

**Additional Comments / Notes**

| |
|---|
| |

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| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Paper Mill Lake | | **Site ID: PML2** |
| **Watercourse:** Paper Mill Lake | | **Location:** Moirs Mill Subdivision |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0445363E, 4951740N (UTM, NAD83) | |
| **SNC Field Personnel:** | Cally Baxter/ Christine Vien | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny |
| Air Temperature: | 29°C |
| Cloud Cover: | 2% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Via Lake Dr., off Hammonds Plains Rd. |
| Site Access Detail: | Follow pathway along lake bank to small clearing, use GPS to find exact sample location. Travel over small ridge to reach lake and sample at edge. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | **2019/08/20** |
| Time (hh:mm): | 3:40 pm |
| Sample Depth (m): | 0.5m |
| pH: | 6.39 |
| Dissolved Oxygen (mg/L): | 6.06 |
| Secchi Depth (m): | 2.2 |
| Water Temperature (degrees Celsius): | 27.4°C |
| Conductivity (µs/cm): | 239 |

**Additional Comments / Notes**

-wasps nest located near water access

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# Appendix C

Site Photographs



Photo 1: KL1 Kearney Lake Sample Location



Photo 2: KL2 Kearney Lake Sample Location.


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Photo 3: KL3 Kearney Lake Sample Location



Photo 4: KL4 Kearney Lake Sample Location


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Photo 5: KL5 Kearney Lake Sample Location



Photo 6: HWY 102-1 Sample Location


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Photo 7: HWY102-2 Sample Location



Photo 8: LSD Lake Shore Drive Sample Location


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Photo 9: LU Larry Uteck Sample Location



Photo 10: PML-1 Paper Mill Lake Sample Location


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Photo 11: PML-2 Paper Mill Lake Sample Location


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# Appendix D

Summary Table Results (Seasonal and Historical)

# TABLE D1: 2019 Summer Results, Bedford West Water Quality Sampling Program

| Tested Parameters | | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | LSD | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | | | | | 08-20-19 | 08-20-19 | 08-20-19 | 08-20-19 | 08-20-19 | 08-20-19 | 08-20-19 | 08-20-19 | 08-20-19 | 08-20-19 | 08-20-19 |
| Sampling Time | | | | | | 9:15 AM | 3:01 PM | 10:00 AM | 9:43 AM | 9:27 AM | 12:40 PM | 12:20 PM | 10:44 AM | 11:45 AM | 4:20 PM | 3:40 PM |
| Field Data (in Situ) | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | minimum of 1.2 | -- | 2.70 | 1.80 | N/A | N/A | 3.70 | N/A | N/A | N/A | N/A | 4.30 | 2.20 |
| Water Temp | Celsius | -- | -- | -- | -- | 23.6 | 26.4 | 23.3 | 23.4 | 23.8 | 27.4 | 23.1 | 25.0 | 25.8 | 28.1 | 27.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | 7.10 | **2.58** | 7.28 | **2.98** | **5.46** | 6.27 | **3.81** | **4.93** | 5.54 | 6.07 | 6.06 |
| pH | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | 7.41 | **5.18** | 7.05 | 6.97 | 7.45 | **6.09** | **6.19** | 6.51 | 6.92 | 6.53 | **6.39** |
| Specific Conductance (µs/cm) | uS/cm | -- | -- | -- | -- | 160.0 | 119.0 | 319.0 | 540.0 | 220.0 | 383.0 | 720.0 | 368.0 | 710.0 | 257.0 | 239.0 |
| Inorganic Parameters | | | | | | | | | | | | | | | | |
| Alkalinity | mg/L | 5 | -- | -- | -- | 7.0 | 9.0 | 8.0 | 9.0 | 7.0 | 23.0 | 17.0 | 33.0 | 23.0 | 11.0 | 11.0 |
| Chloride | mg/L | 1 | -- | -- | 120 | 59 | 16 | 56 | 56 | 55 | 80 | **223** | 29 | **202** | 64 | 64 |
| True Color | TCU | 5 | -- | -- | -- | 21 | 106 | 13 | <5 | 16 | 37 | 42 | 86 | 14 | 16 | 14 |
| Nitrate + Nitrite as N | mg/L | 0.05 | -- | -- | -- | 0.12 | 0.05 | 0.10 | 0.18 | 0.16 | <0.05 | 0.14 | 0.07 | 0.37 | 0.05 | 0.07 |
| Nitrate as N | mg/L | 0.05 | -- | -- | 13 | 0.12 | 0.05 | 0.10 | 0.18 | 0.16 | <0.05 | 0.07 | 0.07 | 0.30 | 0.05 | 0.07 |
| Nitrite as N | mg/L | 0.05 | -- | -- | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | **0.07** | <0.05 | **0.07** | <0.05 | <0.05 |
| Ammonia as N | mg/L | 0.03 | -- | -- | 18 | 0.06 | 0.12 | 0.08 | 0.06 | 0.06 | 0.06 | 0.29 | 0.53 | 0.09 | 0.10 | 0.08 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | 0.60 | 0.80 | <0.4 | 0.60 | <0.4 | 0.60 | 0.70 | 1.60 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | 4.20 | 12.10 | 4.10 | 3.30 | 4.50 | 9.50 | 8.20 | 12.10 | 5.70 | 4.20 | 4.40 |
| Ortho-Phosphate as P | mg/L | 0.01 | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | | | -- | 5.0-9.0 | 6.5 - 9.0 | 6.95 | 6.70 | 7.07 | 6.91 | 7.04 | 7.15 | 6.67 | 7.11 | 7.45 | 7.22 | 7.20 |
| Calcium | mg/L | 0.1 | -- | -- | -- | 7.8 | 4.3 | 7.6 | 8.0 | 7.7 | 17.9 | 17.2 | 9.6 | 30.2 | 8.3 | 9.1 |
| Magnesium | mg/L | 0.1 | -- | -- | -- | 1.2 | 1.1 | 1.2 | 1.2 | 1.2 | 2.6 | 2.2 | 2.6 | 4.2 | 1.3 | 1.4 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | 0.01 | 0.005 | **0.019** | 0.007 | **0.011** | 0.007 | **0.023** | **0.037** | **0.031** | **0.014** | 0.008 | 0.005 |
| Potassium | mg/L | 0.1 | -- | -- | -- | 1.0 | 0.8 | 1.0 | 1.1 | 1.0 | 2.3 | 2.1 | 1.7 | 3.4 | 1.2 | 1.2 |
| Sodium | mg/L | 0.1 | -- | -- | -- | 43.9 | 10.0 | 38.9 | 36.7 | 37.7 | 54.3 | 139.0 | 20.7 | 129.0 | 45.4 | 46.7 |
| Reactive Silica as SiO2 | mg/L | 0.5 | -- | -- | -- | 1.6 | 3.7 | 1.4 | 1.4 | 1.4 | 4.7 | 7.2 | 4.2 | 3.0 | 0.9 | 0.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | <5 | <5 | <5 | 6.0 | <5 | 8.0 | 16.0 | **150.0** | 6.0 | <5 | <5 |
| Sulphate | mg/L | 2 | -- | -- | -- | 9.0 | <2 | 9.0 | 9.0 | 8.0 | 10.0 | 11.0 | <2 | 23.0 | 9.0 | 9.0 |
| Turbidity | NTU | 0.1 | -- | 50 | -- | 3.2 | 3.5 | 2.0 | 1.5 | 2.0 | 2.6 | 26.8 | 44.4 | 3.7 | 1.2 | 1.2 |
| Conductivity | umho/cm | 1 | -- | -- | -- | 232 | 88 | 233 | 236 | 229 | 340 | 782 | 170 | 765 | 264 | 268 |
| Calculated Parameters | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | | -- | -- | -- | 2.0 | 0.6 | 1.9 | 2.0 | 1.9 | 2.9 | 6.9 | 1.5 | 6.7 | 2.2 | 2.2 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | 7.0 | 9.0 | 8.0 | 9.0 | 7.0 | 23.0 | 17.0 | 33.0 | 23.0 | 11.0 | 11.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | 127.0 | 40.0 | 119.0 | 119.0 | 116.0 | 182.0 | 415.0 | 96.0 | 408.0 | 136.0 | 139.0 |
| Carb. Alkalinity (as CaCO3) | mg/L | 10 | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation sum | me/L | -- | -- | -- | -- | 2.4 | 0.9 | 2.2 | 2.1 | 2.2 | 3.6 | 7.5 | 2.1 | 7.6 | 2.6 | 2.7 |
| Hardness | mg/L | -- | -- | -- | -- | 24.4 | 15.3 | 23.9 | 24.9 | 24.2 | 55.4 | 52.0 | 34.7 | 92.7 | 26.1 | 28.5 |
| % Difference/ Ion Balance (NS) | % | -- | -- | -- | -- | 9.9 | 14.6 | 6.7 | 4.4 | 7.3 | 10.0 | 4.4 | 17.9 | 6.5 | 6.9 | 9.0 |
| Langelier Index (@20C) | NA | -- | -- | -- | -- | -2.9 | -3.3 | -2.7 | -2.8 | -2.8 | -1.9 | -2.5 | -2.0 | -1.4 | -2.4 | -2.4 |
| Langelier Index (@ 4C) | NA | -- | -- | -- | -- | -3.2 | -3.6 | -3.1 | -3.2 | -3.1 | -2.2 | -2.8 | -2.3 | -1.7 | -2.7 | -2.7 |
| Saturation pH (@ 20C) | NA | -- | -- | -- | -- | 9.9 | 10.0 | 9.8 | 9.7 | 9.9 | 9.0 | 9.2 | 9.1 | 8.8 | 9.6 | 9.6 |
| Saturation pH (@ 4C) | NA | -- | -- | -- | -- | 10.2 | 10.3 | 10.1 | 10.1 | 10.2 | 9.3 | 9.5 | 9.4 | 9.1 | 10.0 | 9.9 |
| Metals (ICP-MS) | | | | | | | | | | | | | | | | |
| Total Aluminum | ug/L | 5 | 5 | -- | 100 ug/L (based on pH) | 49.0 | **257.0** | 39.0 | 70.0 | 57.0 | 93.0 | **194.0** | **665.0** | 31.0 | 25.0 | 27.0 |
| Total Antimony | ug/L | 2 | 20 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Arsenic | ug/L | 2 | 5.0 | -- | 5 | <2 | <2 | <2 | <2 | <2 | <2 | 4.0 | 3.0 | <2 | <2 | <2 |
| Total Barium | ug/L | 5 | 1000 | -- | -- | 15.0 | 37.0 | 16.0 | 20.0 | 16.0 | 104.0 | 138.0 | 53.0 | 184.0 | 16.0 | 19.0 |
| Total Beryllium | ug/L | 2 | 5.3 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Bismuth | ug/L | 2 | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Boron | ug/L | 5 | 1200 | -- | 1500 | 11.0 | 11.0 | 9.0 | 9.0 | 9.0 | 16.0 | 9.0 | 21.0 | 16.0 | 10.0 | 11.0 |
| Total Cadmium | ug/L | 0.09 | 0.01 | -- | 0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 |
| Total Chromium | ug/L | 1 | --- | -- | 1 | <1 | <1 | <1 | <1 | <1 | <1 | 1.0 | <1 | <1 | <1 | <1 |
| Total Cobalt | ug/L | 1 | 10 | -- | -- | <1 | 1.0 | <1 | <1 | <1 | <1 | 3.0 | 6.0 | <1 | <1 | <1 |
| Total Copper | ug/L | 1 | 2 | -- | 2 ug/L (based on hardness | 1.0 | <1 | 1.0 | 1.0 | 1.0 | 2.0 | 1.0 | 2.0 | 2.0 | <1 | 1.0 |
| Total Iron | ug/L | 50 | 300 | -- | 300 | 105.0 | **1,210.0** | 93.0 | 100.0 | 63.0 | **896.0** | **8,440.0** | **5,530.0** | **556.0** | 187.0 | 258.0 |
| Total Lead | ug/L | 0.5 | 1 | -- | 1 ug/L (base on hardness) | <0.5 | 1.0 | <0.5 | <0.5 | <0.5 | 0.7 | **1.4** | **3.2** | <0.5 | <0.5 | <0.5 |
| Total Manganese | ug/L | 2 | 820 | -- | -- | 32.0 | 295.0 | 44.0 | 85.0 | 18.0 | 62.0 | 625.0 | 5,050.0 | 66.0 | 115.0 | 139.0 |
| Total Molybdenum | ug/L | 2 | 73 | -- | 73 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Nickel | ug/L | 2 | 25 | -- | 25 ug/L (base on hardness | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 2.0 | <2 |
| Total Selenium | ug/L | 1 | 1.0 | -- | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Silver | ug/L | 0.1 | 0.1 | -- | 0.25 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 | <0.1 | <0.1 | <0.1 |
| Total Strontium | ug/L | 5 | 21000 | -- | -- | 33.0 | 24.0 | 34.0 | 35.0 | 33.0 | 88.0 | 95.0 | 56.0 | 134.0 | 37.0 | 42.0 |
| Total Thallium | ug/L | 0.1 | 0.8 | -- | 0.8 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin | ug/L | 2 | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Titanium | ug/L | 2 | -- | -- | -- | <2 | 2.0 | <2 | <2 | <2 | <2 | 3.0 | 6.0 | <2 | <2 | <2 |
| Total Uranium | ug/L | 0.1 | 300 | -- | 15 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Vanadium | ug/L | 2 | 6 | -- | -- | <2 | <2 | <2 | <2 | <2 | 2.0 | 5.0 | 2.0 | <2 | <2 | <2 |
| Total Zinc | ug/L | 5 | 30 | -- | 30 | <5 | 9.0 | <5 | 6.0 | <5 | 8.0 | 15.0 | 10.0 | 8.0 | <5 | <5 |
| Microbiological Parameters | | | | | | | | | | | | | | | | |
| Total Coliforms | CFU/100 mL | 1 to 10 | -- | -- | -- | NDOGT | 630 | NDOGT | 560.0 | 770.0 | 450.0 | NDOGT | NDOGT | NDOGT | 500 | NDOGT |
| E. Coli | CFU/100 mL | 1 to 10 | -- | 400 | -- | 6 | 2 | 15.0 | 1.0 | <1 | 3.0 | 30.0 | 50 | 26.0 | 4 | 3 |
| Chlorophyll A - Acidification Method | ug/L | 0.05 | -- | -- | -- | 2.18 | 1.67 | 1.94 | 0.47 | 3.70 | 5.55 | 23.70 | 14.60 | 6.38 | 1.84 | 1.62 |
| Chlorophyll A - Welschmeyer Method | ug/L | 0.05 | -- | -- | -- | 1.89 | 1.50 | 1.73 | 0.42 | 3.00 | 5.09 | 20.50 | 15.40 | 6.19 | 1.56 | 1.44 |

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
RDL = Reported Detection Limit (represents most recent sampling event)
(**) Dissolved oxygen field data removed - Post-calibration failure of field equipment for DO sensor.
" -- '' = no guideline available / no parameter tested.
NDOGT- No Data Overgrown With Target
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
Health Canada Guidelines for
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated
CCME Phosphorus Trigger Range (Applied) of 0.01 mg/L
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness.
CCME PAL-F Guideline for Ammonia-N vary base on water pH and Temperature. The value is converted to mg/L total ammonia-N by multiplying by 0.8224
Comment 1: CCME PAL-F reference values between 25-250 mg/L, and >250 mg/L.

**Bold and Black Shaded** Concentration exceeds CCME FWAL applicable guideline.

Underlined and Black Shaded Concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality (Reference Guidelines)

# HRM Water Quality Monitoring Program Results

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KL1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 |
| Sampling Time | hh:mm | -- | | | | | 08:00 | 11:45 | 08:30 | 11:00 | 13:10 | 12:00 | 11:00 | 14:30 | 14:00 | 8:30 | 11:20 | 9:50 | 10:20 | 11:10 | 13:30 | 10:30 | 14:15 | 14:55 | 08:30 | 14:54 | 12:30 | 9:30 | 7:50 | 13:20 | 8:30 | 9:30 AM | 9:35 AM | 9:15 AM | 7:50 AM | 9:00 AM | 8:40 AM | 9:15 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 4.1 | 4.2 | 5.0 | N/A | 5.0 | 4.9 | 2.4 | 3.2 | 2.4 | 2.4 | 5.4 | N/A | 2.5 | 2.0 | 2.9 | 2.4 | 2.7 | 2.5 | NCC | N/A | 2.2 | 1.8 | 2.1 | 2.5 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.5 | 2.5 | 2.7 |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.0 | 22.2 | 16.7 | 12.9 | 23.3 | 8.8 | 11.5 | 25.6 | 15.9 | 8.9 | 23.3 | 15.4 | 13.2 | 22.2 | 14.1 | 12.7 | 23.2 | 12.2 | 14.1 | 26.1 | 9.4 | 12.8 | 22.2 | 11.9 | 16.6 | 23.2 | 14.1 | 12.2 | 24.2 | 12.8 | 12.2 | 23.6 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.8 | 8.2 | 7.0 | 9.1 | 7.9 | 10.5 | 11.7 | 8.2 | 9.2 | 9.0 | 7.9 | 8.7 | 7.8 | 8.6 | 8.3 | 11.3 | 7.2 | 8.1 | 9.4 | 8.1 | 7.4 | 14.0 | 10.3 | 12.1 | 8.3 | 7.9 | 8.2 | 11.1 | 6.7 | 8.6 | ** | 7.10 |
| pH (In Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.20 | 6.76 | 6.67 | 7.23 | 7.32 | 6.61 | 6.60 | 6.16 | 6.04 | 8.67 | 6.91 | 6.32 | 6.32 | 8.24 | 6.35 | 6.74 | 7.46 | 6.44 | 8.33 | 6.95 | 7.02 | 8.29 | 4.60 | 7.21 | 7.47 | 7.00 | 7.84 | 7.85 | 7.51 | 6.84 | 9.70 | 7.41 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 263.0 | 299.0 | 261.0 | 248.0 | 242.0 | 218.7 | 288.0 | 178.6 | 146.3 | 277.0 | 279.0 | 198.1 | 243.0 | 216.5 | 217.9 | 547.0 | 341.0 | 223.0 | 0.2 | 298.3 | 238.5 | 239.0 | 298.0 | 212.4 | 240.0 | 292.0 | 312.0 | 203.1 | 288.2 | 253.7 | 205.0 | 160.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 8 | 8 | 7 | 8 | 6 | <5 | 9 | 7 | 24 | 7 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 | <5 | 9 | 7.0 | <5 | 7.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 81 | 74 | 64 | 62 | 60 | 55 | 73 | 45 | 33 | 66 | 70 | 50 | 66 | 59 | 48 | 80 | 76 | 46 | 60 | 62 | 58 | 55 | 57 | 45 | 71 | 73 | 60 | 53 | 54 | 55 | 75 | 59 |
| Colour | TCU | 5 | -- | -- | -- | | 18 | 18 | 16 | 26 | 8 | 21 | 28 | 40 | 45 | 50 | 11 | 20 | 11 | 37 | 20 | 13 | 8 | 23 | 37 | 8 | 22 | 31 | 17 | 18 | 15 | 14 | 12 | 42 | 16 | 18 | 41 | 21 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.18 | 0.09 | 0.12 | 0.21 | 0.16 | 0.23 | 0.20 | 0.11 | 0.13 | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.15 | 0.13 | 0.20 | 0.29 | 0.10 | 0.26 | 0.16 | 0.2 | 0.2 | 0.1 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.18 | -- | -- | 0.21 | 0.16 | -- | 0.20 | -- | -- | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.08 | 0.13 | 0.08 | 0.08 | 0.10 | 0.16 | 0.07 | 0.2 | 0.2 | 0.1 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | 0.07 | <0.05 | 0.12 | 0.21 | <0.05 | 0.10 | 0.09 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.04 | 0.03 | <0.03 | 0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | 0.09 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | 0.08 | 0.1 | <0.03 | 0.1 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.9 | 3.1 | 0.4 | -- | 0.7 | <0.4 | 1.1 | <0.4 | 0.4 | 0.2 | 4.5 | 0.4 | 0.7 | <0.4 | 0.6 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 0.6 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.4 | 2.9 | 4.7 | 3.3 | 3.2 | 3.1 | 3.4 | 5.9 | 5.5 | 5.4 | 2.9 | 5.2 | 4.4 | 4.1 | 4.3 | 4.6 | 2.4 | 4.4 | 3.0 | 5.3 | 5.5 | 4.3 | 3.4 | 7.3 | 4.5 | 4.6 | 4.8 | 5.1 | 3.1 | 4.0 | 4.3 | 4.2 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.94 | 6.65 | 6.68 | 6.91 | 7.00 | 6.79 | 6.52 | 6.51 | 6.52 | 6.70 | 7.20 | 6.90 | 6.78 | 6.93 | 6.85 | 6.72 | 7.06 | 6.35 | 6.62 | 6.95 | 6.99 | 6.64 | 7.23 | 6.81 | 6.64 | 7.07 | 7.00 | 6.71 | 7.31 | 7.07 | 6.70 | 6.95 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 9.2 | 8.5 | 7.2 | 7.7 | 8.7 | 8.3 | 7.2 | 4.8 | 5.3 | 6.8 | 8.4 | 6.3 | 7.5 | 6.6 | 6.5 | 8.1 | 11.0 | 6.0 | 6,400.0 | 7.9 | 6.1 | 6.8 | 8.0 | 6.3 | 8.6 | 7.1 | 8.3 | 5.8 | 7.2 | 6.9 | 7.0 | 7.8 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.5 | 1.4 | 1.2 | 1.4 | 1.4 | 1.3 | 1.3 | 0.9 | 1.1 | 1.1 | 1.5 | 1.5 | 1.1 | 1.2 | 1.2 | 1.6 | 1.6 | 1.6 | 9.0 | 920.0 | 1.3 | 1.2 | 1.3 | 1.2 | 1.3 | 1.3 | 1.0 | 1.2 | 1.3 | 1.2 | 1.2 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.020 | <0.020 | <0.002 | 0.009 | 0.007 | 0.005 | 0.008 | 0.012 | 0.009 | 0.037 | 0.043 | 0.007 | 0.007 | 0.011 | 0.008 | 0.011 | 0.026 | 0.013 | 0.008 | 0.002 | 0.011 | 0.024 | 0.005 | 0.008 | 0.010 | 0.010 | 0.005 | 0.012 | 0.007 | 0.008 | 0.011 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 0.9 | 1.3 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.7 | 1.1 | 0.9 | 1.6 | 0.7 | 680.0 | 0.9 | 0.7 | 0.7 | 0.9 | 0.8 | 1.0 | 0.9 | 1.2 | 0.7 | 1.0 | 0.8 | 0.8 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 51.0 | 46.0 | 37.0 | 31.8 | 35.2 | 33.8 | 43.7 | 22.8 | 19.8 | 40.1 | 42.0 | 29.8 | 35.8 | 26.2 | 31.6 | 50.2 | 54.2 | 37.6 | 33.0 | 43.3 | 39.8 | 35.5 | 32.2 | 31.0 | 44.9 | 50.3 | 35.7 | 36.4 | 34.7 | 31.7 | 46.3 | 43.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.6 | 2.2 | 2.3 | 2.9 | 2.7 | 2.9 | 2.8 | 1.9 | 2.3 | 2.4 | 1.3 | 2.2 | 2.5 | 1.8 | 2.2 | 2.0 | 1.5 | 1.8 | 2.5 | 1.8 | 2.7 | 2.8 | 2.0 | 1.6 | 2.0 | 1.6 | 1.8 | 2.6 | 1.7 | 1.7 | 1.7 | 1.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 1 | 1 | <1 | 4 | 17 | 3 | 2 | 2 | 3 | <5 | <5 | <5 | <5 | <5 | 5 | <5 | <5 | <5 | <5 | <5 | <5 | 38 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 14 | 13 | 12 | 11 | 11 | 11 | 12 | 10 | 8 | 8 | 9 | 9 | 11 | 9 | 9 | 12 | 11 | 11 | 7 | 9 | 10 | 8 | 10 | 10 | 11 | 9 | 10 | 8 | 7.0 | 9.0 | 10.0 | 9.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 0.8 | 1.0 | 1.3 | 0.6 | 1.0 | 1.0 | 1.0 | 0.9 | 2.4 | 0.8 | 1.3 | 1.6 | 3.3 | 0.5 | 2.9 | 0.7 | 1.9 | 0.8 | 1.9 | 1.1 | 10.6 | 0.9 | 2.6 | 1.4 | 1.1 | 0.8 | 1.3 | 0.7 | 2.1 | 0.9 | 3.2 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 310 | 290 | 250 | 240 | 240 | 230 | 290 | 180 | 140 | 246 | 274 | 196 | 259 | 241 | 212 | 290 | 339 | 235 | 220 | 257 | 244 | 212 | 270 | 161 | 271 | 260 | 249 | 243 | 261 | 215 | 280 | 232 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.72 | 2.52 | 2.23 | 2.12 | 2.08 | 1.91 | 2.33 | 1.66 | 1.27 | 2.52 | 2.31 | 1.60 | 2.10 | 1.86 | 1.71 | 3.11 | 2.66 | 1.45 | 1.98 | 2.09 | 1.95 | 1.87 | 1.99 | 1.61 | 2.25 | 2.43 | 2.11 | 1.68 | 1.86 | 1.9 | 2.3 | 2.0 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 8 | 8 | 7 | 8 | 6 | <5 | 9 | 7 | 24 | 7 | <5 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 | <5 | 9 | 7.0 | <5 | 7.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 166 | 151 | 131 | 123 | 125 | 118 | 143 | 92 | 77 | 139 | 137 | 98 | 124 | 104 | 103 | 172 | 165 | 99 | 120 | 130 | 119 | 113 | 115 | 99 | 139 | 148 | 123 | 106 | 112 | 110.0 | 141.0 | 127.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.85 | 2.57 | 2.12 | 1.92 | 2.10 | 2.02 | 2.42 | 1.33 | 1.25 | 2.24 | 2.41 | 1.79 | 2.08 | 1.61 | 1.84 | 2.77 | 3.09 | 2.05 | 1.84 | 2.43 | 2.14 | 2.03 | 1.93 | 1.82 | 2.54 | 2.67 | 2.12 | 2.00 | 2.01 | 1.9 | 2.5 | 2.4 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 29.00 | 27.00 | 23.00 | 25.00 | 27.00 | 26.00 | 24.00 | 16.00 | 18.00 | 21.50 | 27.20 | 21.90 | 23.30 | 21.40 | 21.20 | 26.80 | 34.10 | 18.70 | 20.00 | 25.10 | 18.90 | 21.50 | 24.50 | 20.70 | 26.80 | 22.70 | 26.10 | 18.6 | 22.9 | 22.6 | 22.4 | 24.4 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 2.33 | 0.98 | 2.53 | 4.95 | 0.48 | 2.80 | 1.89 | 11.00 | 0.79 | 5.90 | 2.10 | 5.30 | 0.70 | 7.30 | 3.40 | 5.80 | 7.50 | 17.20 | 3.66 | 7.50 | 4.50 | 4.10 | 1.50 | 6.20 | 5.10 | 4.80 | 0.20 | 8.6 | 3.8 | 0.4 | 3.5 | 9.9 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.68 | -2.87 | -2.94 | -2.72 | -2.51 | -2.87 | NC | -3.18 | -3.21 | -2.69 | -2.63 | -3.19 | -3.24 | -3.14 | -3.02 | -2.53 | -2.36 | -3.76 | -3.21 | -2.97 | -2.97 | -3.42 | -2.56 | -3.20 | -3.33 | -2.78 | -2.68 | -3.42 | -2.47 | -2.8 | -3.4 | -2.9 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -2.93 | -3.12 | -3.19 | -2.97 | -2.76 | -3.12 | NC | -3.43 | -3.46 | -3.01 | -2.95 | -3.51 | -3.56 | -3.46 | -3.34 | -2.83 | -2.68 | -4.08 | -3.46 | -3.29 | -3.29 | -3.74 | -2.88 | -3.52 | -3.65 | -3.10 | -3.00 | -3.74 | -2.79 | -3.2 | -3.7 | -3.2 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.62 | 9.52 | 9.62 | 9.63 | 9.51 | 9.66 | NC | 9.69 | 9.73 | 9.39 | 9.83 | 10.10 | 10.00 | 10.10 | 9.87 | 9.23 | 9.42 | 10.10 | 9.83 | 9.92 | 9.96 | 10.10 | 9.79 | 10.00 | 9.97 | 9.85 | 9.68 | 10.1 | 9.78 | 9.9 | 10.1 | 9.9 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.87 | 9.77 | 9.87 | 9.88 | 9.76 | 9.91 | NC | 9.94 | 9.98 | 9.71 | 10.20 | 10.40 | 10.30 | 10.40 | 10.20 | 9.55 | 9.74 | 10.40 | 10.10 | 10.20 | 10.30 | 10.40 | 10.10 | 10.30 | 10.30 | 10.20 | 10.00 | 10.4 | 10.1 | 10.2 | 10.4 | 10.2 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 230 | -- | -- | 289 | 48 | -- | 338 | -- | -- | 321 | 43 | 168 | 191 | 120 | 56 | 229 | 42 | 155 | 100 | -- | 88 | 206 | -- | -- | 158 | 41 | 46 | 169 | 70 | -- | 145.0 | 49.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 16 | -- | -- | 19 | 16 | -- | 13 | -- | -- | 12 | 15 | 9 | 12 | 7 | 16 | 14 | 20 | 9 | 16 | -- | 17 | 14 | -- | -- | 16 | -- | 17 | 12 | 16 | -- | 14.0 | 15.0 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 8 | -- | -- | 11 | 9 | -- | <50 | -- | -- | <5 | 11 | 33 | 6 | 10 | 9 | 7 | 22 | 10 | <50 | -- | <5 | 6 | -- | -- | <5 | -- | 26 | 5 | 10 | -- | 5.0 | 11.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.3 | -- | -- | 0.053 | <0.017 | -- | 0.036 | -- | -- | 0.032 | 0.027 | 0.027 | 0.021 | 0.020 | <0.017 | 0.017 | 0.037 | 0.037 | 0.025 | -- | 0.187 | 0.029 | -- | -- | 0.058 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | -- | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 6 | <1 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | 1 | -- | -- | 1 | <0.40 | -- | 1 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | 6 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | 1 | <1 | 1 | <2.0 | <1 | 2 | <1 | <1 | 1 | <1 | 2 | 1 | <1 | 2 | 1.0 | <1 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 130 | -- | -- | 313 | 62 | 125 | 177 | 162 | 384 | 229 | 137 | 195 | 207 | 132 | 92 | 147 | 124 | 168 | 110 | 157 | 81 | 149 | 62 | 269 | 78 | 70 | 116 | 96 | 142 | 142.0 | 155.0 | 105.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 10.3 | <0.50 | -- | <0.50 | -- | -- | <0.5 | <0.5 | 1.9 | <0.5 | <0.5 | <0.5 | 5.1 | <0.5 | <0.5 | <0.50 | -- | <0.5 | <0.5 | -- | -- | 1.3 | -- | <0.5 | 1.3 | <0.5 | -- | <0.5 | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 100 | -- | -- | 79 | 57 | 59 | 78 | 52 | 56 | 48 | 65 | 68 | 73 | 48 | 24 | 48 | 115 | 42 | 39 | 41 | 22 | 47 | 23 | 45 | 46 | 31 | 17 | 28 | 49 | 28.0 | 42.0 | 32.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 5 | -- | -- | 3 | <2.0 | -- | 3 | -- | -- | <2 | <2 | 2 | 2 | <2 | <2 | <2 | 3 | <2 | 3 | <2.0 | -- | <2 | 3 | -- | -- | 15 | -- | <2 | <2 | <2 | -- | 2.0 | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.5 | -- | -- | <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 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 46 | -- | -- | 39 | 38 | -- | 36 | -- | -- | 32 | 41 | 32 | 37 | 33 | 30 | 40 | 45 | 26 | 29 | -- | 19 | 30 | -- | -- | 38 | -- | 40 | 26 | 38 | -- | 36.0 | 33.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 11 | -- | -- | 6 | <2.0 | -- | 5 | -- | -- | 8 | <2 | 3 | 4 | 2 | <2 | 2 | <2 | 5 | 2 | -- | <2 | 2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | 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 | -- | <0.1 | <0.1 | <0.1 | -- | 0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | 2 | -- | <2 | <2 | <2 | -- | 2.0 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 27 | -- | -- | 14 | 8 | 11 | 12 | 13 | 10 | 5 | <5 | 11 | 11 | 6 | 5 | 14 | <5 | 9 | 13 | 8 | <5 | 11 | <5 | 19 | 58 | <5 | 6 | 8 | <5 | 19.0 | 8.0 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 200 | 65 | -- | >250 | 63 | >250 | 91 | >250 | -- | 2,420 | >2420 | 1,120 | 1,200 | 866 | 488 | 525 | 1,550 | >2420 | --- | 980 | 122 | 866 | 548 | >2420 | 299 | 488 | 154 | 14 | 611 | 157.0 | 256 | NDOGT |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 39 | 24 | -- | 9 | 15 | 37 | 8 | >250 | <100 | 41 | 11 | 17 | 48 | 2 | 7 | <1 | 15 | 28 | 60 | 24 | 6 | 4 | 33 | 99 | 29 | 18 | 3 | 5 | 11 | 61.0 | <1 | 6 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.53 | 0.79 | 1.11 | 1.73 | 1.47 | 0.99 | 0.76 | 1.44 | 1.36 | 0.62 | 2.30 | 1.54 | 1.22 | 1.40 | 1.19 | 0.40 | 0.41 | 0.84 | 0.64 | 1.14 | 1.79 | 2.76 | 0.90 | 2.08 | 1.45 | 1.75 | 1.10 | 1.91 | 1.26 | 1.63 | 1.50 | 2.18 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.48 | 0.69 | 1.17 | 1.61 | 1.42 | 0.81 | 0.69 | 1.15 | 1.14 | 0.63 | 2.30 | 2.16 | 1.40 | 1.40 | 1.19 | 1.32 | 0.36 | 0.80 | 0.62 | 1.11 | 0.95 | 3.48 | 1.15 | 2.19 | 2.55 | 1.87 | 1.18 | 3.09 | -- | * | 1.46 | 1.89 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
Comment 1: CCME PAL-F reference values between 25-250 mg/L, and >250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (ESQ) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.
**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.
**Underlined (black shaded)** = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality
**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

# HRM Water Quality Monitoring Program Results

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KL2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 2018/10/17 | 05/09/2019 | 08-20-19 |
| Sampling Time | hh:mm | -- | | | | | 11:00 | 10:30 | 10:45 | 10:15 | 12:25 | 10:50 | 09:30 | 14:00 | 13:15 | 9:50 | 10:30 | 10:20 | 09:10 | 16:10 | 14:30 | 10:45 | 9:20 | 14:04 | NCC | 13:29 | 13:05 | 10:30 | 8:30 | 12:50 | 10:47 | 11:15 AM | 10:30 AM | 11:00 AM | 10:10 AM | 10:00 AM | 10:44 AM | 3:01 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 1.3 | 2.1 | 1.8 | 1.9 | 2.0 | 1.5 | 1.2 | 2.1 | 1.4 | 1.4 | 2.2 | 1.80 |
| Water Temp | Celsius | -- | -- | -- | -- | | 16.8 | 18.2 | 15.4 | 13.5 | 20.4 | 8.0 | 9.9 | 19.1 | 14.1 | 7.6 | 21.8 | 12.3 | 10.1 | 22.9 | 9.7 | 11.7 | 21.1 | 10.8 | 13.1 | 24.7 | 8.1 | 10.7 | 20.3 | 10.2 | 15.7 | 21.2 | 10.6 | 11.7 | 21.6 | 10.3 | 10.3 | 26.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.2 | 8.5 | 5.7 | 6.3 | 4.7 | 9.4 | 9.2 | 7.1 | 8.4 | 6.5 | 5.8 | 7.6 | 9.4 | 6.4 | 7.4 | 11.3 | 7.0 | 7.7 | 8.4 | 7.3 | 7.1 | 7.9 | 9.7 | 8.7 | 9.7 | 6.6 | 6.2 | 9.4 | 4.2 | 7.5 | ** | 7.53 |
| pH (In Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.33 | 6.35 | 6.19 | 6.61 | 6.96 | 6.25 | 6.77 | 5.90 | 5.62 | 7.72 | 6.41 | 6.29 | 5.75 | 7.47 | 5.57 | 6.60 | 7.22 | 5.79 | 6.36 | 5.88 | 6.43 | 7.64 | 5.97 | 5.54 | 6.69 | 6.00 | 6.29 | 6.21 | 5.16 | 5.84 | 8.50 | 5.18 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 46.0 | 106.0 | 89.2 | 198.5 | 104.0 | 75.1 | 79.7 | 66.7 | 54.3 | 58.0 | 96.6 | 61.1 | 77.9 | 65.3 | 64.5 | 188.0 | 266.0 | 63.0 | 0.1 | 107.9 | 73.6 | 82.0 | 117.0 | 103.7 | 78.0 | 114.0 | 109.0 | 57.4 | 109.9 | 67.2 | 48.3 | 119.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 8 | 8 | 8 | 8 | 7 | <5 | 20 | <5 | <5 | <5 | <5 | 29 | 7 | 28 | <5.0 | 7 | <5 | <5 | 10 | 6 | 5 | 12 | 9 | <5 | 11 | <5 | <5 | 9.0 | | | |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 48 | 48 | 48 | 48 | 25 | 17 | 19 | 14 | 10 | 16 | 20 | 12 | 19 | 21 | 14 | 20 | 17 | 12 | 15 | 14 | 12 | 17 | 26 | 30 | 20 | 19 | 19 | 12 | 19 | 11 | 13 | 16 |
| Colour | TCU | 5 | -- | -- | -- | | 20 | 20 | 20 | 20 | 20 | 63 | 95 | 80 | 110 | 120 | 52 | 60 | 94 | 37 | 90 | 71 | 25 | 44 | 168 | 50 | 63 | 61 | 47 | 48 | 93 | 46 | 46 | 57 | 82 | 59 | 123 | 76 | 106 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.19 | 0.19 | 0.19 | 0.19 | 0.07 | 0.06 | 0.12 | 0.07 | <0.05 | 0.11 | 0.08 | <0.05 | 0.12 | <0.05 | <0.05 | 0.08 | <0.05 | <0.05 | 0.06 | 0.08 | <0.05 | <0.05 | <0.05 | 0.06 | 0.19 | 0.05 | 0.08 | <0.05 | 0.07 | 0.05 | <0.05 | 0.1 | 0.05 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.19 | 0.19 | 0.19 | 0.19 | 0.07 | -- | 0.12 | -- | -- | 0.11 | 0.08 | <0.05 | 0.12 | <0.05 | <0.05 | 0.08 | <0.05 | <0.05 | 0.06 | 0.08 | <0.05 | <0.05 | <0.05 | 0.19 | <0.05 | 0.08 | <0.05 | 0.07 | <0.05 | <0.05 | 0.1 | 0.05 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.05 | <0.05 | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | <0.03 | 0.04 | <0.03 | <0.050 | <0.03 | 0.03 | 0.04 | 0.04 | <0.03 | <0.03 | 0.03 | 0.04 | 0.04 | 0.06 | 0.1 | <0.03 | 0.12 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 2.2 | 0.7 | -- | 1.1 | <0.4 | <0.4 | 0.4 | <0.4 | 0.4 | 0.8 | 0.8 | 0.4 | 0.9 | 0.5 | <0.4 | 0.5 | <0.4 | <0.4 | <0.4 | <0.4 | 0.5 | 0.80 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 4.3 | 4.3 | 4.3 | 4.3 | 6.6 | 9.7 | 6.5 | 10.0 | 12.0 | 8.1 | 7.1 | 10.9 | 7.5 | 11.1 | 10.9 | 6.2 | 6.6 | 12.9 | 4.0 | 13.3 | 14.0 | 6.2 | 7.0 | 13.2 | 8.5 | 8.2 | 8.5 | 9.0 | 6.6 | 14.0 | 6.9 | 12.10 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.0010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.85 | 6.85 | 6.85 | 6.85 | 6.78 | 6.31 | 6.27 | 6.40 | 6.05 | 6.50 | 6.70 | 6.50 | 6.37 | 6.62 | 6.34 | 6.53 | 6.87 | 6.05 | 6.32 | 6.99 | 6.28 | 6.35 | 6.87 | 6.19 | 6.57 | 6.87 | 6.66 | 6.46 | 7.04 | 6.27 | 6.44 | 6.70 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.5 | 6.5 | 6.5 | 6.5 | 4.1 | 3.6 | 2.5 | 2.5 | 2.2 | 2.4 | 3.6 | 2.9 | 2.7 | 2.5 | 2.4 | 3.4 | 4.0 | 2.4 | 2.660.0 | 3.4 | 3.1 | 2.9 | 4.5 | 5.6 | 3.6 | 4.3 | 3.9 | 2.3 | 4.2 | 2.9 | 2.3 | 4.3 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.2 | 1.2 | 1.2 | 1.0 | 0.8 | 0.6 | 0.6 | 0.4 | 0.7 | 1.0 | 1.0 | 0.7 | 0.5 | 0.8 | 1.1 | 1.0 | 0.6 | 640.0 | 0.9 | 0.7 | 0.7 | 1.1 | 1.5 | 1.0 | 1.2 | 0.9 | 0.7 | 1.1 | 0.8 | 0.7 | 1.1 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.020 | 0.020 | 0.020 | 0.020 | 0.009 | 0.009 | 0.009 | 0.008 | 0.013 | 0.021 | 0.059 | 0.013 | 0.020 | 0.020 | 0.020 | 0.013 | 0.039 | 0.025 | 0.008 | 0.012 | 0.008 | 0.009 | 0.016 | 0.013 | 0.012 | 0.028 | 0.010 | 0.014 | 0.015 | 0.004 | 0.009 | 0.019 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 0.6 | 0.8 | 0.5 | 0.5 | 0.7 | 0.5 | 0.7 | 0.8 | 0.5 | 0.5 | 0.7 | 0.7 | 0.9 | 0.7 | 540.0 | 0.7 | 0.6 | 0.9 | 0.8 | 1.1 | 0.8 | 0.8 | 0.7 | 0.5 | 0.8 | 0.6 | 0.6 | 0.8 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 31.6 | 31.6 | 31.6 | 31.6 | 14.7 | 10.6 | 11.1 | 7.8 | 6.9 | 9.8 | 14.2 | 9.5 | 8.9 | 7.0 | 7.9 | 17.5 | 14.0 | 7.6 | 8.4 | 11.5 | 6.6 | 11.5 | 16.1 | 17.7 | 13.8 | 15.4 | 13.0 | 9.2 | 13.9 | 11.8 | 11.9 | 10.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.2 | 2.2 | 2.2 | 2.2 | 4.2 | 4.7 | 2.7 | 4.3 | 4.0 | 2.6 | 4.0 | 4.9 | 2.8 | 4.4 | 4.9 | 2.4 | 3.3 | 4.6 | 2.0 | 3.7 | 5.1 | 2.0 | 2.3 | 4.5 | 1.3 | 2.2 | 4.6 | 2.3 | 2.8 | 3.6 | 1.7 | 3.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 103 | 103 | 103 | 103 | 103 | 7 | <1 | <1 | <2 | <1 | <5 | <5 | <5 | 135 | <5 | <5 | <5 | <5 | <5 | <1.0 | <5 | 17 | <5 | <5 | <5 | <5 | 12 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 9 | 9 | 9 | 9 | 9 | <2 | <2 | <2 | <2 | 3 | 3 | 2 | 4 | 5 | 4 | 4 | 2 | 3 | 3 | <2 | 3 | 4 | 3 | 7 | 3 | 2 | 3 | 3 | 2 | 3.0 | 3.0 | <2 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.5 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 | 0.4 | 0.7 | 0.6 | 0.5 | 1.1 | 1.0 | 1.9 | 2.2 | 1.0 | 0.9 | 0.8 | 1.2 | <1.0 | 1.6 | 6.2 | 0.7 | 2.0 | 1.9 | 0.8 | 4.4 | 1.6 | 0.9 | 1.2 | 1.1 | 0.6 | 3.5 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 212 | 212 | 212 | 212 | 100 | 97 | 79 | 66 | 54 | 71 | 91 | 61 | 83 | 69 | 62 | 87 | 94 | 66 | 64 | 81 | 73 | 79 | 135 | 125 | 93 | 110 | 97 | 68 | 115 | 70 | 72 | 88 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 0.49 | 0.82 | 0.45 | 0.77 | 0.85 | 0.49 | 0.53 | 0.53 | 0.28 | 0.92 | 0.63 | 0.54 | 0.63 | 0.70 | 0.48 | 1.23 | 0.66 | 0.96 | 0.48 | 0.54 | 0.40 | 0.56 | 1.00 | 1.13 | 0.73 | 0.82 | 0.78 | 0.41 | 0.76 | 0.4 | 0.4 | 0.6 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | 7 | -- | <1 | 8 | <1 | 5 | 7 | <1 | <1 | 7 | <1 | 20 | <5 | 8 | <5 | <5 | <5 | 29 | 7 | 28 | <1.0 | 7 | <5 | <5 | 10 | 6 | 5 | 12 | 9 | <5 | 11 | <5 | <5 | 9.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 36 | 55 | 35 | 46 | 55 | 38 | 37 | 34 | 25 | 45 | 44 | 34 | 37 | 37 | 31 | 65 | 44 | 44 | 32 | 36 | 25 | 38 | 59 | 68 | 46 | 51 | 47 | 28 | 47 | 31.0 | 32.0 | 40.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 0.71 | 0.99 | 0.67 | 0.74 | 0.95 | 0.74 | 0.68 | 0.55 | 0.49 | 0.65 | 0.94 | 0.73 | 0.63 | 0.54 | 0.60 | 1.07 | 0.97 | 0.57 | 0.57 | 0.82 | 0.47 | 0.76 | 1.09 | 1.25 | 0.91 | 1.05 | 0.90 | 0.62 | 0.97 | 0.8 | 0.7 | 0.9 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 10.00 | 15.00 | 10.00 | 12.00 | 14.00 | 12.00 | 9.00 | 9.00 | 8.00 | 8.90 | 13.10 | 11.40 | 9.60 | 8.30 | 9.30 | 13.00 | 14.10 | 8.50 | 9.10 | 12.20 | 5.60 | 10.10 | 15.80 | 20.20 | 13.10 | 15.70 | 13.40 | 8.6 | 15 | 10.5 | 8.6 | 15.3 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 18.30 | 9.39 | 19.60 | 1.99 | 5.56 | 20.30 | 12.40 | 1.85 | 27.30 | 17.60 | 19.70 | 15.10 | 0.30 | 12.90 | 11.00 | 7.10 | 19.90 | 12.50 | 25.70 | 20.50 | 7.50 | 14.90 | 4.50 | 5.30 | 11.00 | 12.30 | 7.50 | 20.8 | 12.4 | 36.7 | 25.6 | 14.6 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | -3.20 | NC | -3.44 | -3.05 | NC | NC | 3.66 | NC | -3.37 | -3.60 | -1.68 | -4.05 | -3.83 | -4.12 | -3.04 | -2.23 | -3.66 | NC | -3.18 | -4.51 | -4.04 | -3.04 | -3.85 | -3.73 | -2.98 | -3.35 | -4.02 | -2.85 | -4.1 | -4.0 | -3.3 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | -3.45 | NC | -3.70 | -3.30 | NC | NC | -3.91 | NC | -3.69 | -3.92 | -4.00 | -4.37 | -4.15 | -4.44 | -3.36 | -3.55 | -3.98 | NC | -3.50 | -4.83 | -4.36 | -3.36 | -4.17 | -4.05 | -3.30 | -3.67 | -4.34 | -3.17 | -4.4 | -4.4 | -3.6 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | 9.78 | NC | 10.00 | 9.83 | NC | NC | 10.10 | NC | 9.87 | 10.30 | 10.20 | 10.40 | 10.50 | 10.50 | 9.57 | 10.10 | 9.72 | NC | 10.20 | 10.80 | 10.40 | 9.91 | 10.00 | 10.30 | 9.85 | 10.00 | 10.5 | 9.89 | 10.4 | 10.5 | 10.0 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | 10.00 | NC | 10.30 | 10.10 | NC | NC | 10.30 | NC | 10.20 | 10.60 | 10.50 | 10.70 | 10.80 | 10.80 | 9.89 | 10.40 | 10.00 | NC | 10.50 | 11.10 | 10.70 | 10.20 | 10.40 | 10.60 | 10.20 | 10.30 | 10.8 | 10.2 | 10.7 | 10.8 | 10.3 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 290 | -- | -- | 175 | 151 | -- | 271 | -- | -- | 209 | 205 | 338 | 254 | 270 | 259 | 205 | 236 | 340 | 180 | -- | 294 | 187 | -- | -- | 185 | 150 | 240 | 228 | 123 | -- | 156.0 | 257.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | <1.0 | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 9 | -- | -- | 12 | 14 | -- | 10 | -- | -- | 9 | 11 | 10 | 8 | <5 | 13 | 13 | 18 | 9 | 9 | -- | 9 | 10 | -- | -- | 10 | -- | 14 | 7 | 14 | -- | 10.0 | 37.0 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | <1.0 | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | <2.0 | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 8 | -- | -- | 15 | 13 | -- | <50 | -- | -- | 6 | 14 | 22 | 6 | 11 | 9 | 11 | 12 | 12 | <50 | -- | <5 | 9 | -- | -- | <5 | -- | 17 | 7 | 13 | -- | 7.0 | 11.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.017 | -- | -- | 0.018 | 0.018 | <0.017 | <0.017 | -- | -- | <0.017 | <0.017 | <0.017 | <0.017 | <0.017 | 0.019 | <0.017 | 0.019 | <0.017 | 0.014 | -- | 0.178 | <0.017 | -- | -- | 0.041 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | -- | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | 9 | <1 | <1 | <1.0 | -- | <1 | 1 | -- | -- | <1 | -- | 1 | <1 | <1 | -- | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | 1.0 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | 2 | <1 | 4 | <2.0 | <1 | <1 | <1 | 2 | <1 | <1 | 1 | 1 | <1 | <1 | <1 | 1.0 | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 250 | -- | -- | 227 | 403 | 238 | 202 | 418 | 358 | 154 | 541 | 813 | 269 | 528 | 523 | 174 | 723 | 305 | 250 | 641 | 478 | 232 | 1,000 | 290 | 168 | 759 | 572 | 148 | 783 | 336.0 | 227.0 | 3,210.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 1.0 | <0.50 | -- | <0.50 | -- | -- | <0.5 | <0.5 | 1.1 | <0.5 | 0.5 | <0.5 | 5.8 | <0.5 | 0.5 | <0.5 | -- | 0.6 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 1.2 | <0.5 | -- | <0.5 | 1.0 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 26 | -- | -- | 43 | 83 | 35 | 12 | 68 | 23 | 17 | 90 | 114 | 24 | 67 | 53 | 33 | 146 | 25 | 47 | 120 | 57 | 109 | 39 | 96 | 64 | 17 | 78 | 29.0 | 28.0 | 295.0 | |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <1 | -- | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.5 | -- | -- | 0.4 | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 14 | -- | -- | 18 | 20 | -- | 12 | -- | -- | 10 | 18 | 15 | 12 | 9 | 12 | 16 | 17 | 12 | 12 | -- | 8 | 12 | -- | -- | 15 | -- | 20 | 10 | 24 | -- | 13.0 | 24.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 2 | -- | -- | <2 | <2 | -- | 3 | -- | -- | <2 | 2 | 3 | 4 | <2 | 2 | 2 | <2 | 3 | 3 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | 2.0 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 8 | -- | -- | 5 | 5 | 7 | <5.0 | <5.0 | <5.0 | <5 | <5 | 7 | <5 | <5 | <5 | <5 | <5 | <5 | <5.0 | <5 | <5 | <5 | 8 | <5 | 8 | 6 | <5 | <5 | 20.0 | <5 | 9.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 1,800 | 170 | -- | >250 | 11 | >250 | 59 | >250 | -- | >2420 | 1,986 | >2420 | >2420 | >2420 | >2420 | 525 | >2420 | >2420 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | 659 | 10 | 2420 | 140.0 | 1960 | 630 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 1,560 | 100 | -- | >250 | 6 | 6 | 2 | >250 | <100 | 3 | 7 | 3 | 12 | 6 | 2 | <1 | 18 | 11 | 30 | 11 | 5 | 4 | 15 | 25 | 31 | 16 | 3 | 4 | 20 | 50.0 | <10 | 2 |
| Chlorophyll A - Acidification method | ug/L | 0.05 | -- | -- | -- | | 0.82 | 6.05 | 1.97 | 0.73 | 0.55 | 0.22 | 0.44 | 0.89 | 0.97 | 0.53 | 2.20 | 0.07 | 0.62 | 1.00 | 0.73 | 0.13 | 0.83 | 0.41 | 0.34 | 0.96 | 0.46 | 0.30 | 1.86 | 0.32 | 0.99 | 1.47 | 0.31 | 0.51 | 1.25 | 0.75 | 0.47 | 1.67 |
| Chlorophyll A - Welschmeyer method | ug/L | 0.05 | -- | -- | -- | | 0.87 | 5.97 | 1.95 | 0.66 | 0.54 | 0.21 | 0.42 | 0.73 | 0.82 | 0.56 | 2.20 | 0.12 | 0.72 | 1.00 | 0.74 | 0.14 | 0.86 | 0.41 | --- | 1.26 | 0.26 | 0.43 | 2.43 | 0.36 | 1.86 | 1.81 | 0.49 | 0.91 | -- | * | 0.49 | 1.50 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environmental Quality Standards (ECQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold and black shaded** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

# HRM Water Quality Monitoring Program Results

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

Kearney Lake — Sample Site KL3 (part 1 of 2)

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | KL3 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 |
| Sampling Time | hh:mm | -- | | | | | 09:00 | 11:00 | 09:30 | 11:30 | 14:12 | 11:40 | 10:30 | 12:20 | 12:00 | 10:26 | 12:20 | 11:20 | 9:50 | 10:00 | 14:00 | 11:00 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.0 | 21.6 | 17.3 | 14.7 | 23.1 | 9.9 | 10.3 | 21.1 | 15.5 | 9.0 | 24.5 | 15.6 | 11.7 | 21.5 | 13.6 | 11.0 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.8 | 8.0 | 8.0 | 9.3 | 7.8 | 10.4 | 11.1 | 8.4 | 9.6 | 8.9 | 8.2 | 7.7 | 10.2 | 9.2 | 8.9 | 5.9 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.27 | 6.74 | 6.97 | 7.27 | 7.33 | 6.76 | 6.83 | 6.96 | 6.30 | 7.68 | 6.85 | 6.51 | 5.86 | 7.25 | 6.49 | 6.55 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 95.0 | 282.0 | 246.0 | 220.0 | 228.0 | 199.4 | 220.0 | 175.0 | 161.3 | 204.0 | 225.0 | 177.2 | 207.3 | 194.4 | 210.6 | 405.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 66 | 63 | 60 | 55 | 55 | 53 | 56 | 43 | 37 | 50 | 57 | 46 | 54 | 40 | 46 | 58 |
| Colour | TCU | 5 | -- | -- | -- | | 22 | 20 | 20 | 28 | 12 | 20 | 31 | 38 | 40 | 57 | 15 | 31 | 19 | 23 | 20 | 16 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.14 | 0.12 | 0.14 | 0.24 | 0.15 | 0.22 | 0.24 | 0.15 | 0.16 | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.14 | -- | -- | 0.24 | 0.15 | -- | 0.24 | -- | -- | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.04 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 2.8 | <0.4 | -- | 1.3 | <0.4 | 0.6 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.6 | 3.9 | 4.3 | 3.6 | 3.1 | 3.3 | 3.8 | 5.1 | 5.0 | 5.9 | 3.4 | 4.9 | 4.3 | 4.4 | 4.6 | 4.6 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.38 | 6.67 | 6.82 | 6.82 | 6.99 | 6.87 | 6.52 | 6.50 | 6.38 | 6.70 | 7.10 | 6.90 | 6.68 | 6.96 | 6.86 | 6.68 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.7 | 7.1 | 6.8 | 6.8 | 8.0 | 8.3 | 7.1 | 4.7 | 5.6 | 5.7 | 6.9 | 6.0 | 7.0 | 5.3 | 6.8 | 6.4 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.2 | 1.1 | 1.2 | 1.3 | 1.3 | 1.2 | 0.8 | 1.0 | 1.0 | 1.2 | 1.3 | 1.0 | 0.9 | 1.3 | 1.4 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | 0.005 | 0.005 | <0.002 | 0.003 | 0.008 | 0.003 | 0.012 | 0.019 | 0.045 | 0.007 | 0.006 | 0.006 | 0.012 | 0.009 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 1.1 | 0.9 | 0.8 | 0.8 | 1.0 | 0.9 | 0.7 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.6 | 1.2 | 0.8 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 38.0 | 38.0 | 35.0 | 28.3 | 33.1 | 33.0 | 33.0 | 20.8 | 21.3 | 31.2 | 34.5 | 26.4 | 35.1 | 20.1 | 32.1 | 36.4 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.7 | 2.6 | 2.6 | 3.2 | 2.9 | 3.2 | 2.9 | 2.5 | 2.6 | 2.7 | 2.0 | 2.6 | 2.9 | 2.6 | 2.7 | 2.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <1 | 1 | 1 | 2 | <2 | <1 | <1 | <1 | <1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 12 | 12 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 8 | 7 | 7 | 7 | 8 | 9 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 1.4 | 0.6 | 0.3 | 0.5 | 0.6 | 0.6 | 0.6 | 0.4 | 0.8 | 0.7 | 1.0 | 0.7 | 2.4 | 0.4 | 0.4 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 250 | 250 | 240 | 220 | 220 | 220 | 220 | 170 | 160 | 197 | 222 | 182 | 219 | 216 | 204 | 218 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.11 | 2.17 | 2.08 | 1.90 | 1.93 | 1.87 | 1.90 | 1.58 | 1.36 | 2.03 | 1.90 | 1.55 | 1.68 | 1.38 | 1.60 | 2.14 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 128 | 130 | 123 | 110 | 117 | 116 | 115 | 88 | 82 | 111 | 113 | 91 | 106 | 78 | 100 | 122 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.12 | 2.16 | 1.99 | 1.69 | 1.97 | 1.98 | 1.92 | 1.23 | 1.32 | 1.77 | 1.98 | 1.60 | 2.00 | 1.24 | 1.89 | 2.07 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 23.00 | 22.00 | 22.00 | 25.00 | 26.00 | 23.00 | 15.00 | 18.00 | 18.40 | 22.20 | 20.30 | 21.60 | 16.90 | 22.30 | 21.70 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 0.24 | 0.23 | 2.21 | 5.85 | 1.03 | 2.86 | 0.52 | 12.50 | 1.49 | 6.80 | 2.10 | 1.60 | 8.60 | 5.50 | 8.30 | 1.50 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | -3.00 | -2.89 | -2.92 | -2.60 | -2.73 | -3.23 | -3.33 | -3.35 | -2.77 | -2.88 | -3.21 | -3.37 | -3.19 | -3.05 | -2.93 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | -3.25 | -3.14 | -3.17 | -2.85 | -2.99 | -3.49 | -3.58 | -3.60 | -3.09 | -3.20 | -3.53 | -3.69 | -3.51 | -3.37 | -3.25 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | 9.67 | 9.71 | 9.74 | 9.59 | 9.60 | 9.75 | 9.83 | 9.73 | 9.47 | 9.98 | 10.10 | 10.00 | 10.20 | 9.91 | 9.61 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | 9.92 | 9.96 | 9.99 | 9.84 | 9.86 | 10.00 | 10.10 | 9.98 | 9.79 | 10.30 | 10.40 | 10.40 | 10.50 | 10.20 | 9.93 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 259 | 259 | -- | 124 | 54 | -- | 266 | -- | -- | 199 | 54 | 153 | 140 | 65 | 100 | 260 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 13 | 13 | -- | 16 | 13 | -- | 19 | -- | -- | 18 | 17 | 15 | 19 | 9 | 18 | 17 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 9 | 9 | -- | 8 | 9 | -- | <50 | -- | -- | 5 | 9 | 17 | 7 | 7 | 10 | 8 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | 0.019 | 0.019 | -- | 0.030 | <0.017 | -- | 0.046 | -- | -- | 0.019 | 0.021 | 0.027 | 0.028 | <0.017 | <0.017 | 0.038 |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | 7 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | <1 | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | 2 | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 523 | 523 | -- | 73 | 133 | 58 | 136 | 104 | 154 | 137 | 136 | 119 | 131 | 71 | 172 | 137 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | <0.5 | -- | 0.6 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.7 | <0.5 | <0.5 | 0.9 | 3.6 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 53 | 53 | -- | 37 | 67 | 32 | 42 | 33 | 33 | 25 | 47 | 46 | 37 | 20 | 92 | 41 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | <2 | -- | 2 | <2.0 | -- | 2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | 2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.1 | <0.1 | -- | <0.10 | <0.10 | -- | <0.10 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 12 | 12 | -- | 34 | 36 | -- | 33 | -- | -- | 25 | 33 | 29 | 33 | 18 | 32 | 31 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 2 | 2 | -- | <2.0 | <2.0 | -- | 5 | -- | -- | <2 | <2 | <2 | <2 | <2 | 2 | 3 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | 0.1 | -- | -- | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | <2 | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | <5 | <5 | -- | 10 | 7 | 6 | 9 | 7 | 9 | <5 | <5 | 8 | 10 | 5 | 7 | 10 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 120 | 24 | -- | 190 | 16 | 58 | 72 | 110 | -- | 291 | 1,553 | 178 | 345 | 2,420 | 1,300 | 86 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 1 | 17 | -- | 2 | <1 | 8 | 5 | 37 | <100 | 2 | <1 | 3 | 8 | 21 | <1 | <1 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.04 | 1.11 | 1.18 | 1.30 | 1.14 | 0.51 | 0.78 | 1.26 | 1.24 | 0.52 | 1.30 | 0.81 | 1.44 | 2.00 | 0.65 | 0.76 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.94 | 0.97 | 1.21 | 1.09 | 1.19 | 0.42 | 0.67 | 0.98 | 1.01 | 0.55 | 1.20 | 1.14 | 1.62 | 2.30 | 0.61 | 0.69 |

Kearney Lake — Sample Site KL3 (part 2 of 2)

| Tested Parameters | KL3 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 |
| Sampling Time | 11:50 | 14:25 | 10:35 | 11:45 | 10:40 | 11:00 | 11:30 | 11:00 | 9:36 | 10:15 | 10:15 | 10:30 | 9:10 | 11:30 AM | 10:00 AM | 10:00 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | |
| Secchi Depth | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | 22.7 | 12.8 | 14.7 | 25.0 | 8.4 | 12.1 | 21.7 | 12.5 | 16.1 | 22.5 | 13.8 | 12.1 | 23.8 | 12.4 | 9.6 | 23.3 |
| Dissolved Oxygen | 7.9 | 8.1 | 8.0 | 9.9 | 8.7 | 9.3 | 7.7 | 11.4 | 9.0 | 7.4 | 8.2 | 7.3 | 6.9 | 8.6 | ** | 7.28 |
| pH (in Situ) | 7.37 | 6.67 | 6.84 | 6.87 | 7.17 | 7.40 | 6.82 | 5.58 | 7.02 | 7.04 | 6.97 | 6.66 | 6.94 | 6.64 | 8.25 | 7.05 |
| Specific Conductance | 252.0 | 208.0 | 0.2 | 245.1 | 236.6 | 213.0 | 264.0 | 227.8 | 204.0 | 248.0 | 248.0 | 190.3 | 242.7 | 209.8 | 158.6 | 319.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | 5 | 6 | <5.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 | <5 | 8 | 7.0 | <5 | 8.0 |
| Dissolved Chloride (Cl) | 46 | 45 | 60 | 56 | 56 | 54 | 56 | 49 | 63 | 56 | 59 | 54 | 48 | 46 | 49 | 56 |
| Colour | 13 | 20 | 34 | 13 | 14 | 29 | 13 | 21 | 24 | 13 | 15 | 63 | 26 | 27 | 53 | 13 |
| Nitrite + Nitrate | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.13 | 0.10 | 0.24 | 0.30 | 0.24 | 0.17 | 0.06 | 0.1 | 0.1 | 0.10 |
| Nitrate (N) | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.06 | 0.10 | 0.13 | 0.17 | 0.24 | 0.17 | 0.06 | 0.1 | 0.1 | 0.10 |
| Nitrite (N) | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.07 | <0.05 | 0.11 | 0.13 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | <0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 | 0.03 | <0.03 | 0.04 | 0.03 | <0.03 | 0.08 |
| Total Kjeldahl Nitrogen as N | 0.4 | 0.4 | 0.2 | 1.2 | 0.9 | <0.4 | <0.4 | 0.4 | <0.4 | 0.8 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | 2.8 | 4.5 | 3.4 | 5.7 | 5.8 | 4.3 | 2.7 | 8.0 | 5.3 | 4.9 | 4.1 | 5.1 | 3.2 | 4.0 | 4.4 | 4.10 |
| Orthophosphate (as P) | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | 6.87 | 6.59 | 6.54 | 6.92 | 6.94 | 6.69 | 7.28 | 6.93 | 6.77 | 7.13 | 6.88 | 6.72 | 7.21 | 7.10 | 6.66 | 7.07 |
| Total Calcium (Ca) | 7.9 | 6.8 | 6,600.0 | 7.8 | 5.2 | 6.2 | 8.3 | 7.3 | 6.9 | 7.2 | 8.1 | 6.0 | 7.3 | 8.4 | 5.9 | 7.6 |
| Total Magnesium (Mg) | 1.2 | 1.0 | 940.0 | 1.2 | 0.9 | 1.0 | 1.3 | 1.3 | 1.0 | 1.1 | 1.2 | 1.0 | 1.2 | 1.4 | 1.0 | 1.2 |
| Total Phosphorus | 0.023 | 0.148 | 0.004 | 0.004 | 0.002 | 0.008 | 0.005 | 0.004 | 0.006 | 0.009 | 0.007 | 0.010 | 0.010 | 0.006 | 0.011 | 0.007 |
| Total Potassium (K) | 1.1 | 0.9 | 770.0 | 0.9 | 0.7 | 0.7 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 | 0.7 | 1.0 | 1.1 | 0.7 | 1.0 |
| Total Sodium (Na) | 39.0 | 35.3 | 34.0 | 40.0 | 27.1 | 32.1 | 37.2 | 32.8 | 44.0 | 41.4 | 35.9 | 35.9 | 36.6 | 39.9 | 44.3 | 38.9 |
| Reactive Silica (SiO2) | 1.9 | 2.4 | 2.5 | 2.4 | 2.6 | 2.6 | 1.8 | 2.5 | 2.2 | 1.6 | 1.9 | 2.6 | 1.7 | 1.9 | 2.1 | 1.4 |
| Total Suspended Solids | <5 | <5 | 3 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | 7 | 7 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 9 | 10 | 8 | 7.0 | 7.0 | 6.0 | 9.0 |
| Turbidity (NTU) | 0.3 | 0.9 | 0.7 | 0.5 | 0.7 | 1.1 | 1.1 | 1.0 | 1.0 | 1.3 | 2.6 | 1.0 | 0.5 | 1.2 | 0.9 | 2.0 |
| Conductivity (uS/cm) | 243 | 216 | 220 | 242 | 238 | 206 | 262 | 185 | 245 | 251 | 247 | 244 | 246 | 232 | 244 | 233 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | |
| Anion Sum | 1.55 | 1.54 | 1.87 | 1.90 | 1.88 | 1.74 | 1.98 | 1.76 | 2.00 | 1.95 | 2.07 | 1.70 | 1.66 | 1.6 | 1.5 | 1.9 |
| Bicarb. Alkalinity (calc. as CaCO3) | 5 | 6 | <1.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 | <5 | 8 | <5 | <5 | 8.0 |
| Calculated TDS | 106 | 100 | 110 | 119 | 103 | 105 | 120 | 107 | 127 | 122 | 122 | 107 | 106 | 109.0 | 108.0 | 119.0 |
| Carb. Alkalinity (calc. as CaCO3) | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | 2.23 | 2.00 | 1.89 | 2.27 | 1.55 | 1.83 | 2.18 | 1.94 | 2.38 | 2.28 | 2.10 | 1.98 | 2.09 | 2.3 | 2.3 | 2.2 |
| Hardness (CaCO3) | 24.70 | 21.10 | 20.00 | 24.40 | 16.70 | 19.60 | 26.10 | 23.60 | 21.30 | 22.50 | 25.20 | 19.1 | 23.2 | 26.7 | 18.9 | 23.9 |
| Ion Balance (% Difference) | 17.90 | 12.80 | 0.53 | 9.00 | 9.80 | 2.60 | 4.80 | 4.90 | 8.60 | 7.90 | 0.80 | 7.6 | 11.4 | 18.4 | 21.4 | 6.7 |
| Langelier Index (@ 20C) | -3.12 | -3.39 | NC | -3.00 | -3.15 | -3.41 | -2.44 | -2.89 | -3.29 | -2.71 | -2.85 | -3.39 | -2.61 | -2.7 | -3.5 | -2.7 |
| Langelier Index (@ 4C) | -3.44 | -3.71 | NC | -3.32 | -3.47 | -3.73 | -2.76 | -3.21 | -3.61 | -3.03 | -3.17 | -3.71 | -2.93 | -3.0 | -3.8 | -3.1 |
| Saturation pH (@ 20C) | 9.99 | 9.98 | NC | 9.92 | 10.10 | 10.10 | 9.72 | 9.82 | 10.10 | 9.84 | 9.73 | 10.1 | 9.82 | 9.8 | 10.1 | 9.8 |
| Saturation pH (@ 4C) | 10.30 | 10.30 | NC | 10.20 | 10.40 | 10.40 | 10.00 | 10.10 | 10.40 | 10.20 | 10.10 | 10.4 | 10.1 | 10.1 | 10.4 | 10.1 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | 52 | 105 | 180 | -- | 90 | 163 | -- | -- | 128 | 36 | 43 | 164 | 26 | -- | 139.0 | 39.0 |
| Total Antimony (Sb) | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Arsenic (As) | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Barium (Ba) | 17 | 16 | 19 | -- | 19 | 15 | -- | -- | 17 | -- | 20 | 14 | 15 | -- | 17.0 | 16.0 |
| Total Beryllium (Be) | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Bismuth (Bi) | <2 | <2 | <2.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Boron (B) | 10 | 12 | <50 | -- | <5 | 8 | -- | -- | 7 | -- | 12 | 5 | 10 | -- | 6.0 | 9.0 |
| Total Cadmium (Cd) | <0.017 | 0.017 | 0.033 | -- | <0.017 | 0.021 | -- | -- | 0.020 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 |
| Total Chromium (Cr) | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Cobalt (Co) | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Copper (Cu) | <1 | 2 | <2.0 | 1 | <1 | 2 | <1 | <1 | <1 | <1 | 1 | <1 | <1 | 1.0 | <1 | 1.0 |
| Total Iron (Fe) | 96 | 118 | 120 | 165 | 115 | 112 | 117 | 99 | 125 | 83 | 130 | 81 | 148 | <50 | 123.0 | 93.0 |
| Total Lead (Pb) | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 0.7 | <0.5 | -- | <0.5 | <0.5 |
| Total Manganese (Mn) | 45 | 27 | 36 | 48 | 24 | 31 | 41 | 20 | 30 | 35 | 54 | 21 | 50 | 22.0 | 26.0 | 44.0 |
| Total Molybdenum (Mo) | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Nickel (Ni) | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 3.0 | <2 |
| Total Selenium (Se) | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Silver (Ag) | <0.1 | <0.1 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Strontium (Sr) | 32 | 29 | 29 | -- | 21 | 28 | -- | -- | 33 | -- | 41 | 27 | 38 | -- | 30.0 | 34.0 |
| Total Thallium (Tl) | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Tin (Sn) | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Titanium (Ti) | <2 | 2 | 3 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Uranium (U) | <0.1 | <0.1 | 0.1 | -- | 0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Vanadium (V) | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 | <2 |
| Total Zinc (Zn) | <5 | 6 | 9 | 7 | 8 | 8 | <5 | <5 | 6 | 6 | 6 | 6 | <5 | <5 | 16.0 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | |
| Total Coliform | 1,730 | >2420 | --- | 2,420 | 285 | 548 | 1,990 | 2,420 | 687 | 2,420 | 411 | <1 | NDOGT | 5,020.0 | 103.0 | NDOGT |
| E. coli | <1 | 13 | <0.10 | 7 | 6 | 2 | 38 | 30 | 7 | 13 | 46 | <1 | 51 | 20.0 | 1.0 | 15.0 |
| Chlorophyll A - Acidification method | 0.59 | 1.23 | 0.72 | 1.27 | 1.34 | 1.63 | 0.81 | 2.29 | 1.96 | 1.24 | 1.34 | 1.16 | 1.14 | 1.28 | 0.74 | 1.94 |
| Chlorophyll A - Welschmeyer method | 0.51 | 1.12 | 0.68 | 1.34 | 0.69 | 2.00 | 0.99 | 2.37 | 2.46 | 1.32 | 1.87 | 1.80 | -- | * | 0.74 | 1.73 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environment Environmental Quality Standards for Surface Water (Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

# HRM Water Quality Monitoring Program Results

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE EQSs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KL4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 |
| Sampling Time | hh:mm | -- | | | | | 10:00 | 11:30 | 10:00 | 11:20 | 13:50 | 11:15 | 10:10 | 11:40 | 11:40 | 10:16 | 12:00 | 11:40 | 9:41 | 10:30 | 14:20 | 11:15 | 11:35 | 14:35 | 10:25 | 11:02 | 11:15 | 11:30 | 12:00 | 11:11 | 9:25 | 10:45 AM | 10:05 AM | 10:45 AM | 9:00 AM | 11:45 AM | 9:43 AM | 9:43 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | | | 13.4 | 21.9 | 17.3 | 14.5 | 21.9 | 9.8 | 10.1 | 21.2 | 15.3 | 9.0 | 24.4 | 15.7 | 11.7 | 20.4 | 13.5 | 11.0 | 21.8 | 12.5 | 14.8 | 24.7 | 9.5 | 12.2 | 20.6 | 12.3 | 16.5 | 22.4 | 13.8 | 12.7 | 23.1 | 12.7 | 9.9 | 23.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 11.3 | 8.1 | 8.3 | 9.0 | 6.3 | 10.3 | 11.4 | 8.5 | 7.2 | 8.7 | 7.3 | 8.9 | 10.1 | 8.9 | 9.6 | 14.5 | 5.9 | 7.5 | 9.8 | 9.1 | 8.8 | 8.3 | 5.5 | 10.1 | 8.3 | 6.4 | 7.3 | 11.2 | 4.7 | 8.5 | ** | 25.8 |
| pH (In Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 8.00 | 6.71 | 6.94 | 7.19 | 6.98 | 6.07 | 6.49 | 6.43 | 6.02 | 9.00 | 6.71 | 6.77 | 5.72 | 7.08 | 6.41 | 6.30 | 7.25 | 6.55 | 6.64 | 6.81 | 7.09 | 7.32 | 6.72 | 5.14 | 6.90 | 6.88 | 6.84 | 7.01 | 6.67 | 6.91 | 8.68 | 6.97 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 771.0 | 262.0 | 247.0 | 224.0 | 226.0 | 214.8 | 218.0 | 171.9 | 126.2 | 206.0 | 225.0 | 185.9 | 207.1 | 196.2 | 209.0 | 273.0 | 251.0 | 208.0 | 0.2 | 243.5 | 232.4 | 215.0 | 260.0 | 228.0 | 213.0 | 262.0 | 252.0 | 202.9 | 251.0 | 210.6 | 161.1 | 540.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <5.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 | 10 | <5 | 9 | 8.0 | <5 | 9.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 67 | 65 | 60 | 56 | 56 | 53 | 56 | 44 | 37 | 51 | 57 | 46 | 54 | 41 | 47 | 59 | 47 | 48 | 61 | 56 | 55 | 54 | 58 | 49 | 64 | 62 | 59 | 52 | 50 | 47 | 50 | 56 |
| Colour | TCU | 5 | -- | -- | -- | | 22 | 18 | 20 | 27 | 11 | 20 | 32 | 38 | 43 | 48 | 11 | 20 | 17 | 21 | 20 | 13 | 11 | 28 | 33 | 10 | 12 | 25 | 12 | 22 | 19 | 11 | 16 | 35 | 10 | 16 | 42 | <5 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.15 | 0.12 | 0.14 | 0.23 | 0.19 | 0.21 | 0.23 | 0.15 | 0.17 | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.21 | 0.10 | 0.27 | 0.12 | 0.15 | 0.27 | 0.25 | 0.1 | 0.2 | 0.18 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.15 | -- | -- | 0.23 | 0.19 | -- | 0.23 | -- | -- | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.14 | 0.10 | 0.15 | 0.12 | 0.15 | 0.17 | 0.13 | 0.1 | 0.2 | 0.18 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | 0.07 | <0.05 | 0.12 | <0.05 | <0.05 | 0.12 | 0.12 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.10 | <0.03 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 | 0.04 | <0.03 | 0.04 | 0.03 | <0.03 | 0.06 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | <0.4 | 0.7 | -- | 1.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.2 | 0.4 | 1.0 | <0.4 | <0.4 | 0.4 | <0.4 | 0.5 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 0.60 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.6 | 4.0 | 3.3 | 2.6 | 3.1 | 3.7 | 6.0 | 5.4 | 7.5 | 3.2 | 4.8 | 4.2 | 4.5 | 4.3 | 4.4 | 2.1 | 4.4 | 2.8 | 5.2 | 5.7 | 4.3 | 3.3 | 8.1 | 5.1 | 4.3 | 4.0 | 5.1 | 2.7 | 4.0 | 4.5 | 1.30 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.61 | 6.75 | 6.83 | 6.83 | 6.93 | 6.83 | 6.57 | 6.57 | 6.66 | 6.70 | 7.00 | 6.90 | 6.69 | 6.96 | 6.85 | 6.69 | 6.91 | 6.85 | 6.59 | 6.94 | 6.97 | 6.70 | 7.03 | 6.89 | 6.75 | 6.99 | 6.95 | 6.74 | 7.13 | 7.13 | 6.67 | 6.91 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.8 | 7.7 | 7.0 | 6.8 | 8.0 | 8.5 | 6.8 | 4.9 | 5.2 | 5.7 | 6.8 | 5.8 | 6.8 | 5.1 | 6.8 | 6.4 | 7.9 | 6.8 | 6.500.0 | 7.9 | 3.7 | 6.5 | 7.1 | 7.3 | 7.7 | 7.5 | 8.6 | 5.9 | 7.9 | 7.7 | 6.2 | 8.0 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.3 | 1.2 | 0.9 | 1.0 | 1.0 | 1.2 | 1.2 | 1.0 | 0.8 | 1.2 | 1.3 | 1.2 | 1.0 | 920.0 | 1.3 | 1.0 | 1.1 | 1.3 | 1.2 | 1.3 | 1.3 | 1.0 | 1.2 | 1.3 | 1.0 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | <0.002 | 0.004 | <0.002 | <0.002 | 0.007 | 0.003 | 0.026 | 0.022 | 0.043 | 0.007 | 0.006 | 2.390 | 0.016 | 0.022 | 0.031 | 0.015 | 0.006 | 0.007 | 0.003 | 0.007 | 0.004 | 0.007 | 0.020 | 0.008 | 0.006 | 0.024 | 0.004 | 0.004 | 0.009 | 0.011 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 | 0.8 | 0.7 | 1.1 | 0.7 | 1.0 | 0.9 | 0.8 | 0.6 | 1.2 | 0.8 | 1.1 | 0.9 | 760.0 | 0.9 | 0.7 | 0.7 | 0.9 | 1.0 | 0.8 | 0.9 | 1.1 | 0.7 | 1.0 | 1.0 | 0.8 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 39.0 | 41.0 | 37.0 | 28.5 | 34.3 | 33.9 | 32.1 | 21.5 | 21.1 | 31.5 | 34.5 | 25.2 | 31.6 | 20.1 | 30.7 | 35.9 | 30.6 | 34.1 | 34.0 | 28.5 | 40.0 | 28.2 | 32.4 | 41.4 | 31.1 | 37.6 | 41.4 | 38.9 | 35.6 | 39.2 | 40.6 | 37.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.7 | 2.6 | 2.6 | 3.1 | 2.9 | 3.1 | 2.9 | 2.5 | 2.7 | 2.7 | 2.2 | 2.6 | 3.0 | 2.6 | 2.5 | 2.6 | 2.1 | 2.5 | 2.5 | 2.6 | 3.0 | 2.6 | 2.0 | 2.4 | 2.3 | 1.7 | 2.1 | 2.6 | 1.8 | 2.0 | 2.1 | 1.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <1 | 1 | <1 | <2 | <2 | <1 | 2 | <1 | <2 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <1.0 | 7 | <5 | 7 | <5 | 10 | 6 | <5 | <5 | <5 | <5 | <5 | <5 | 6.0 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 12 | 11 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 8 | 7 | 7 | 7 | 9 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 8 | 10 | 8 | 7.0 | 8.0 | 6.0 | 9.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.5 | 1.0 | 0.3 | 0.3 | 0.2 | 0.8 | 0.7 | 0.7 | 0.4 | 0.7 | 0.4 | 0.8 | 0.7 | 2.6 | 2.1 | 1.1 | 0.6 | 0.8 | 0.6 | 0.7 | 1.2 | 1.2 | 1.5 | 1.6 | 1.3 | 0.9 | 1.6 | 1.2 | 0.5 | 1.7 | 0.8 | 1.5 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 260 | 250 | 230 | 220 | 230 | 250 | 210 | 170 | 160 | 200 | 224 | 183 | 218 | 218 | 204 | 219 | 241 | 218 | 220 | 241 | 235 | 206 | 275 | 185 | 251 | 255 | 248 | 243 | 252 | 231 | 246 | 236 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.23 | 2.22 | 2.09 | 1.91 | 1.94 | 1.85 | 1.88 | 1.62 | 1.36 | 2.04 | 1.94 | 1.45 | 1.68 | 1.31 | 1.53 | 2.47 | 1.60 | 2.11 | 1.88 | 1.90 | 1.87 | 1.74 | 2.04 | 1.76 | 2.03 | 2.12 | 2.08 | 1.65 | 1.75 | 1.7 | 1.6 | 2.0 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <5.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 | 10 | <5 | 9 | 8.0 | <5 | 9.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 132 | 135 | 125 | 111 | 118 | 116 | 113 | 90 | 81 | 111 | 114 | 87 | 103 | 75 | 97 | 132 | 108 | 117 | 110 | 121 | 102 | 106 | 125 | 105 | 123 | 128 | 126 | 105 | 113 | 111.0 | 102.0 | 119.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.16 | 2.32 | 2.07 | 1.70 | 2.02 | 2.03 | 1.86 | 1.28 | 1.30 | 1.78 | 1.97 | 1.53 | 1.84 | 1.23 | 1.84 | 2.04 | 2.21 | 2.31 | 1.91 | 2.35 | 1.53 | 1.86 | 2.28 | 1.87 | 2.17 | 2.31 | 2.27 | 1.96 | 2.24 | 2.3 | 2.0 | 2.1 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 25.00 | 22.00 | 22.00 | 25.00 | 27.00 | 22.00 | 16.00 | 17.00 | 18.40 | 21.90 | 19.40 | 21.10 | 16.00 | 21.90 | 21.30 | 24.70 | 21.10 | 20.00 | 25.10 | 13.40 | 20.30 | 22.30 | 23.60 | 24.20 | 23.30 | 26.80 | 18.9 | 24.7 | 24.6 | 19.6 | 24.9 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 1.59 | 2.20 | 0.48 | 5.82 | 2.02 | 4.64 | 0.53 | 11.70 | 2.26 | 6.60 | 0.80 | 2.80 | 4.50 | 3.20 | 9.20 | 9.50 | 15.80 | 4.20 | 0.75 | 10.70 | 10.10 | 3.40 | 5.50 | 3.00 | 3.20 | 4.10 | 4.30 | 8.6 | 12.1 | 16.2 | 13.8 | 4.4 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -1.21 | -2.89 | -2.84 | -2.92 | -2.64 | -2.75 | -3.22 | -3.18 | -3.31 | -2.79 | -2.46 | -3.22 | -3.37 | -3.21 | -3.21 | -2.63 | -3.08 | -2.45 | NC | -2.98 | -3.20 | -3.38 | -2.76 | -2.93 | -3.26 | -2.78 | -2.71 | -3.38 | -2.61 | -2.7 | -3.4 | -2.8 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.46 | -3.14 | -3.09 | -3.17 | -2.89 | -3.00 | -3.47 | -3.43 | -3.56 | -3.11 | -3.18 | -3.54 | -3.69 | -3.53 | -3.53 | -2.95 | -3.40 | -2.77 | NC | -3.30 | -3.52 | -3.70 | -3.08 | -3.25 | -3.58 | -3.10 | -3.03 | -3.70 | -2.93 | -3.0 | -3.8 | -3.2 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.82 | 9.64 | 9.67 | 9.75 | 9.57 | 9.58 | 9.79 | 9.75 | 9.77 | 9.49 | 9.86 | 10.10 | 10.10 | 10.20 | 10.10 | 9.32 | 9.99 | 9.30 | NC | 9.92 | 10.20 | 10.10 | 9.79 | 9.82 | 10.00 | 9.77 | 9.66 | 10.1 | 9.74 | 9.8 | 10.1 | 9.7 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.10 | 9.89 | 9.92 | 10.00 | 9.82 | 9.83 | 10.00 | 10.00 | 10.00 | 9.81 | 10.20 | 10.40 | 10.40 | 10.50 | 10.40 | 9.64 | 10.30 | 9.62 | NC | 10.20 | 10.50 | 10.40 | 10.10 | 10.10 | 10.30 | 10.10 | 9.98 | 10.4 | 10.1 | 10.1 | 10.4 | 10.1 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 150 | -- | -- | 125 | 29 | -- | 231 | -- | -- | 188 | 48 | 149 | 141 | 106 | 159 | 236 | 46 | 93 | 160 | -- | 84 | 172 | -- | -- | 180 | 89 | 55 | 157 | 32 | -- | 132.0 | 20.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 16 | -- | -- | 17 | 18 | -- | 18 | -- | -- | 18 | 17 | 16 | 18 | 10 | 19 | 17 | 19 | 16 | 20 | -- | 17 | 16 | -- | -- | 20 | -- | 20 | 15 | 19 | -- | 18.0 | 20.0 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | 6 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 6 | -- | -- | 9 | 9 | -- | <50 | -- | -- | 6 | 9 | 16 | 7 | 6 | 9 | 8 | 11 | 11 | <50 | -- | <5 | 7 | -- | -- | <5 | -- | 11 | 6 | 10 | -- | 6.0 | 9.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.3 | -- | -- | 0.031 | <0.017 | -- | 0.035 | -- | -- | 0.021 | <0.017 | 0.027 | 0.027 | 0.017 | 0.050 | 0.027 | 0.017 | <0.017 | 0.033 | -- | <0.017 | 0.024 | -- | -- | 0.021 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | 6 | <1 | <1 | <1 | 6 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.4 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | <2.0 | 2 | <2.0 | 2 | <2.0 | <2.0 | <2 | <2 | 4 | 3 | <1 | 1 | <1 | 1 | <1 | 2 | -- | 1 | 1 | <1 | <1 | 1 | -- | <1 | <1 | <1 | -- | 1.0 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 86 | -- | -- | 82 | 51 | 55 | 119 | 109 | 138 | 129 | 118 | 133 | 213 | 144 | 248 | 129 | 55 | 104 | 100 | 217 | 83 | 122 | 61 | 114 | 136 | 131 | 141 | 83 | 119 | 78.0 | 120.0 | 100.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 3.2 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.8 | 0.9 | <0.5 | <0.5 | 2.6 | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 1.4 | <0.5 | -- | <0.5 | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 51 | -- | -- | 35 | 64 | 29 | 39 | 27 | 30 | 23 | 34 | 38 | 34 | 77 | 130 | 34 | 29 | 24 | 25 | 78 | 34 | 34 | 87 | 29 | 74 | 76 | 48 | 19 | 84 | 43.0 | 24.0 | 85.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 3 | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | 7 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | 3 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.5 | -- | -- | <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 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 34 | -- | -- | 33 | 37 | -- | 33 | -- | -- | 25 | 32 | 28 | 32 | 17 | 31 | 31 | 31 | 29 | 30 | -- | 20 | 28 | -- | -- | 33 | -- | 40 | 27 | 39 | -- | 33.0 | 35.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | 5 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | <2 | <2 | <2 | <2 | 3 | 2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 14 | -- | -- | 10 | 7 | 7 | 11 | 7 | 7 | <5 | <5 | 68 | 21 | <5 | 9 | 9 | <5 | <5 | 10 | 8 | 12 | 7 | <5 | <5 | 13 | 7 | <5 | 7 | <5 | 7.0 | 7.0 | 6.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 28 | 58 | -- | 100 | 16 | 75 | 83 | 95 | -- | 345 | >2420 | 921 | 548 | >2420 | 770 | 308 | 1,550 | >2420 | --- | >2420 | 281 | 488 | 1,730 | >2420 | 792 | >2420 | >2420 | 4 | NDOGT | 8,000.0 | 198.0 | 560.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 4 | 33 | -- | 1 | <1 | 2 | 5 | 39 | <100 | 4 | <1 | 4 | 6 | 38 | <1 | <1 | 1 | 8 | <10 | 5 | 1 | 2 | 35 | 29 | 15 | 1 | 3 | 2 | 19 | 12.0 | <1 | 1.0 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | --- | -- | | 0.78 | 1.11 | 1.06 | 0.92 | 0.07 | 0.50 | 0.60 | 1.04 | 1.31 | 0.52 | 0.70 | 0.55 | 1.34 | 1.50 | 0.40 | 0.44 | 0.50 | 1.03 | 0.55 | 0.26 | 1.09 | 1.42 | 0.16 | 2.18 | 2.40 | 0.33 | 0.35 | 1.06 | 0.24 | 1.12 | 0.78 | 0.47 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.69 | 0.96 | 1.11 | 0.77 | 0.07 | 0.41 | 0.55 | 0.82 | 1.07 | 0.55 | 0.70 | 0.74 | 1.48 | 1.70 | 0.39 | 0.40 | 0.57 | 0.95 | 0.51 | 0.31 | 0.55 | 2.09 | 0.21 | 2.15 | 3.04 | 0.39 | 0.43 | 1.71 | -- | * | 0.82 | 0.42 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environment Environmental Quality Standards for Surface Water (Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

**Underlined (black shaded)** = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

# HRM Water Quality Monitoring Program Results

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KLS | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2011/10/17 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/09 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 |
| Sampling Time | hh:mm | -- | | | | | 9:40 | 10:52 | 13:10 | 12:10 | 10:03 | 10:50 | 13:45 | 11:30 | 13:55 | 10:45 | 09:00 | 12:04 | 12:00 | 10:00 | 8:00 | 13:05 | 9:00 | 9:45 | 9:50 | 9:30 | 8:20 | 9:30 AM | 9:10 AM | 9:27 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.7 | 2.1 | 5.3 | 4.2 | 2.1 | 4.6 | 2.7 | 3.1 | 3.01 | 3.8 | 3.1 | 3.70 |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.7 | 10.5 | 26.1 | 16.6 | 13.3 | 22.7 | 14.7 | 13.7 | 22.9 | 12.8 | 14.1 | 25.4 | 9.4 | 12.2 | 22.2 | 12.7 | 16.8 | 21.0 | 14.6 | 12.7 | 24.5 | 13.1 | 11.2 | 23.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 9.4 | 7.9 | 7.9 | 8.2 | 9.7 | 8.9 | 8.6 | 10.5 | 7.6 | 7.9 | 8.3 | 8.8 | 7.6 | 10.5 | 8.4 | 9.7 | 8.7 | 7.1 | 7.2 | 10.42 | 6.42 | 7.6 | ** | 10.4 |
| pH (In Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.52 | 7.76 | 6.69 | 6.72 | 6.20 | 8.57 | 6.51 | 6.79 | 7.86 | 6.60 | 7.82 | 6.77 | 7.05 | 5.75 | 5.11 | 5.72 | 7.00 | 6.83 | 7.05 | 6.74 | 7.14 | 6.67 | 9.20 | 7.45 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 111.9 | 230.0 | 229.0 | 189.0 | 219.5 | 202.1 | 212.9 | 472.0 | 251.0 | 211.0 | 0.2 | 249.8 | 240.8 | 209.0 | 267.0 | 243.2 | 219.0 | 246.0 | 257.0 | 196.4 | 244.9 | 236.4 | 171.6 | 220.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 9 | 21 | 8 | <5 | <5 | 6 | 5 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26.0 | <5 | 7.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 37 | 55 | 57 | 48 | 58 | 44 | 46 | 61 | 47 | 47 | 59 | 58 | 58 | 54 | 56 | 53 | 65 | 58 | 60 | 56 | 49 | 47 | 51 | 55 |
| Colour | TCU | 5 | -- | -- | -- | | 35 | 43 | 10 | 27 | 10 | 22 | 18 | 14 | 11 | 22 | 35 | 8 | 19 | 27 | 13 | 17 | 18 | 14 | 14 | 34 | 14 | 12 | 38 | 16 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.17 | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.25 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.09 | 0.15 | 0.25 | 0.21 | 0.09 | 0.17 | 0.20 | 0.4 | 0.1 | 0.16 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | -- | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.20 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.09 | 0.15 | 0.13 | 0.07 | 0.09 | 0.17 | 0.09 | 0.4 | 0.1 | 0.16 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.10 | <0.05 | 0.12 | 0.14 | <0.05 | <0.05 | 0.11 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.06 | <0.050 | <0.03 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | 0.05 | <0.03 | 0.06 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | <0.4 | 2.3 | 1.0 | -- | 0.6 | 1.1 | <0.4 | 0.5 | 1.1 | 0.3 | <0.4 | 1.8 | 0.5 | <0.4 | 0.7 | 0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 4.8 | 5.8 | 3.4 | 4.7 | 4.0 | 4.6 | 7.0 | 4.3 | 2.7 | 4.5 | 3.1 | 5.3 | 5.7 | 4.4 | 3.3 | 7.0 | 4.7 | 4.8 | 3.9 | 4.9 | 2.9 | 3.0 | 4.5 | 4.50 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.57 | 6.70 | 7.10 | 6.50 | 6.71 | 6.93 | 6.89 | 6.64 | 6.84 | 6.63 | 6.56 | 6.90 | 6.94 | 6.66 | 7.16 | 7.03 | 6.74 | 7.09 | 6.93 | 6.70 | 7.15 | 7.47 | 6.64 | 7.04 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 5.8 | 6.1 | 6.6 | 5.9 | 7.1 | 5.7 | 6.4 | 6.5 | 7.6 | 7.0 | 6.500.0 | 8.0 | 4.7 | 6.3 | 7.3 | 8.2 | 7.4 | 7.0 | 7.5 | 5.9 | 6.7 | 7.6 | 6.4 | 7.7 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.0 | 1.1 | 1.2 | 1.0 | 1.0 | 1.1 | 1.4 | 1.2 | 1.0 | 930.0 | 1.3 | 0.9 | 1.0 | 1.1 | 1.3 | 1.2 | 1.0 | 1.1 | 1.0 | 1.1 | 1.2 | 1.1 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.009 | 0.018 | 0.040 | 0.006 | 0.005 | 0.013 | 0.010 | 0.010 | 0.026 | 0.135 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 | 0.003 | 0.010 | 0.012 | 0.005 | 0.031 | 0.005 | 0.005 | 0.011 | 0.007 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 0.7 | 0.9 | 0.8 | 0.8 | 0.7 | 1.1 | 0.8 | 1.1 | 0.9 | 720.0 | 0.1 | 0.7 | 0.7 | 0.9 | 1.0 | 0.9 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 22.0 | 34.6 | 32.0 | 27.7 | 33.6 | 19.2 | 31.3 | 37.5 | 40.1 | 38.3 | 33.0 | 42.6 | 28.3 | 32.5 | 33.1 | 33.5 | 38.9 | 42.4 | 37.2 | 37.2 | 38.5 | 41.7 | 43.8 | 37.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.7 | 2.0 | 2.4 | 2.7 | 2.5 | 2.5 | 2.7 | 2.1 | 2.5 | 3.3 | 1.9 | 2.2 | 2.7 | 2.0 | 2.3 | 2.1 | 1.6 | 1.7 | 2.4 | 1.7 | 3.4 | 2.1 | 1.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <1.0 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 9 | 7 | 8 | 8 | 8 | 7 | 8 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 8 | 10 | 8 | 7.0 | 11.0 | 6.0 | 8.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.9 | 1.1 | 0.7 | 0.9 | 0.7 | 0.8 | 0.4 | 1.1 | 0.4 | 0.8 | 0.7 | 1.0 | 1.0 | 0.7 | 1.3 | 1.2 | 0.9 | 0.9 | 0.9 | 1.4 | 0.4 | 0.7 | 0.9 | 2.0 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 160 | 215 | 226 | 189 | 232 | 223 | 204 | 228 | 246 | 225 | 220 | 248 | 244 | 208 | 267 | 196 | 248 | 249 | 246 | 247 | 247 | 286 | 249 | 229 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.42 | 2.13 | 1.95 | 1.58 | 1.82 | 1.52 | 1.58 | 2.56 | 1.50 | 1.50 | 1.94 | 1.95 | 1.96 | 1.74 | 1.94 | 1.89 | 2.06 | 1.96 | 2.09 | 1.76 | 1.68 | 2.1 | 1.6 | 1.9 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 9 | 21 | 8 | <5 | <5 | 6 | 5 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26.0 | <5 | 7.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 84 | 118 | 111 | 96 | 110 | 82 | 98 | 136 | 106 | 103 | 120 | 124 | 106 | 105 | 114 | 113 | 125 | 122 | 123 | 110 | 108 | 127.0 | 110.0 | 116.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.36 | 1.94 | 1.85 | 1.64 | 1.94 | 1.23 | 1.81 | 2.12 | 2.27 | 2.27 | 1.87 | 2.40 | 1.58 | 1.86 | 1.93 | 2.01 | 2.20 | 2.30 | 2.12 | 2.04 | 2.13 | 2.3 | 2.4 | 2.2 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 19.00 | 19.30 | 21.00 | 19.70 | 21.80 | 18.40 | 20.50 | 22.00 | 23.90 | 21.60 | 20.00 | 25.30 | 15.40 | 19.80 | 22.80 | 25.80 | 23.40 | 21.60 | 23.30 | 18.9 | 21.3 | 23.9 | 20.5 | 24.2 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 2.16 | 4.70 | 2.60 | 2.00 | 3.20 | 10.60 | 6.70 | 9.40 | 20.30 | 17.50 | 1.84 | 10.20 | 10.80 | 3.20 | 0.40 | 3.00 | 3.40 | 8.10 | 0.70 | 7.3 | 11.8 | 5.0 | 19.9 | 7.3 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.06 | -2.79 | -2.77 | -3.62 | -3.33 | -3.11 | -3.19 | -2.64 | -3.17 | -3.42 | -3.24 | -3.20 | -3.13 | -3.43 | -2.72 | -2.69 | -3.29 | -2.82 | -2.84 | -3.42 | -2.77 | -1.8 | -3.5 | -2.8 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.31 | -3.11 | -3.09 | -3.94 | -3.65 | -3.43 | -3.51 | -2.96 | -3.49 | -3.74 | -3.50 | -3.34 | -3.45 | -3.75 | -3.04 | -3.01 | -3.61 | -3.14 | -3.16 | -3.74 | -3.09 | -2.2 | -3.8 | -3.1 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.63 | 9.49 | 9.87 | 10.10 | 10.00 | 10.00 | 10.10 | 9.28 | 10.00 | 10.00 | 9.81 | 9.92 | 10.10 | 10.10 | 9.88 | 9.72 | 10.00 | 9.91 | 9.77 | 10.1 | 9.92 | 9.3 | 10.1 | 9.9 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.88 | 9.81 | 10.20 | 10.40 | 10.40 | 10.40 | 10.40 | 9.60 | 10.30 | 10.40 | 10.10 | 10.20 | 10.40 | 10.40 | 10.20 | 10.00 | 10.30 | 10.20 | 10.10 | 10.4 | 10.2 | 9.6 | 10.4 | 10.2 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 5 | 5 | -- | 5 - 100 | | -- | 222 | 52 | 154 | 136 | 58 | 61 | 224 | 53 | 108 | 180 | --- | 163 | -- | -- | -- | 156 | 45 | 44 | 172 | 30 | -- | 142.0 | 57.0 |
| Total Antimony (Sb) | ug/L | 2 | 20 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Arsenic (As) | ug/L | 2 | 5.0 | -- | 5 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Barium (Ba) | ug/L | 5 | 1000 | -- | -- | | -- | 18 | 16 | 15 | 19 | 9 | 16 | 16 | 17 | 17 | 17 | --- | 19 | 14 | -- | -- | 17 | -- | 17 | 13 | 13 | -- | 17.0 | 16.0 |
| Total Beryllium (Be) | ug/L | 2 | 5.3 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Bismuth (Bi) | ug/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Boron (B) | ug/L | 5 | 1200 | -- | 1500 | | -- | 6 | 9 | 15 | 7 | 7 | 7 | 7 | 6 | 10 | <50 | --- | <5 | 7 | -- | -- | <5 | -- | 10 | 5 | 9 | -- | 6.0 | 9.0 |
| Total Cadmium (Cd) | ug/L | 0.017 | 0.01 | -- | 0.09 | | -- | 0.022 | 0.027 | 0.029 | 0.024 | <0.017 | 0.034 | 0.036 | <0.017 | 0.024 | 0.035 | --- | 0.332 | 0.024 | -- | -- | 0.025 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 |
| Total Chromium (Cr) | ug/L | 1 | ---- | -- | 1 | | -- | <1 | <1 | 5 | <1 | <1 | <1 | 6 | <1 | <1 | <1.0 | --- | 7 | <1 | -- | -- | 2 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Cobalt (Co) | ug/L | 1 | 10 | -- | -- | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Copper (Cu) | ug/L | 1 | 2 | -- | 2 | | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | <1 | <1 | 5 | <2.0 | 1 | <1 | <1 | <1 | <1 | 1 | <1 | 1 | <1 | <1 | 1.0 | <1 | 1.0 |
| Total Iron (Fe) | ug/L | 50 | 300 | -- | 300 | | 175 | 160 | 78 | 120 | 111 | 70 | 79 | 111 | <50 | 119 | 100 | 123 | 158 | 96 | 55 | 88 | 59 | <50 | 106 | 80 | 81 | <50 | 121.0 | 63.0 |
| Total Lead (Pb) | ug/L | 0.5 | 1 | -- | 1.0 - 7.0 | | -- | <0.5 | <0.5 | 0.6 | <0.5 | <0.5 | <0.5 | 1.9 | <0.5 | 0.5 | <0.5 | --- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 0.9 | <0.5 | -- | <0.5 | <0.5 |
| Total Manganese (Mn) | ug/L | 2 | 820 | -- | -- | | 36 | 30 | 14 | 37 | 35 | 13 | 12 | 40 | 18 | 25 | 34 | 24 | 35 | 21 | 15 | 17 | 24 | 11 | 13 | 24 | 15 | 14.0 | 25.0 | 18.0 |
| Total Molybdenum (Mo) | ug/L | 2 | 73 | -- | 73 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Nickel (Ni) | ug/L | 2 | 25 | -- | 25 - 150 | | -- | <2 | <2 | 5 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | --- | 3 | 3 | -- | -- | 14 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Selenium (Se) | ug/L | 1 | 1.0 | -- | 1 | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Silver (Ag) | ug/L | 0.1 | 0.1 | -- | 0.25 | | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | --- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Strontium (Sr) | ug/L | 5 | 21000 | -- | -- | | -- | 27 | 31 | 29 | 31 | 18 | 31 | 31 | 30 | 30 | 29 | --- | 23 | 28 | -- | -- | 32 | -- | 38 | 28 | 35 | -- | 31.0 | 33.0 |
| Total Thallium (Tl) | ug/L | 0.1 | 0.8 | -- | 0.8 | | -- | <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 | <0.1 |
| Total Tin (Sn) | ug/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Titanium (Ti) | ug/L | 2 | -- | -- | -- | | -- | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | 2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Uranium (U) | ug/L | 0.1 | 300 | -- | 15 | | -- | 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 | <0.1 |
| Total Vanadium (V) | ug/L | 2 | 6 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 | <2 |
| Total Zinc (Zn) | ug/L | 5 | 30 | -- | 30 | | 9 | 5 | <5 | 64 | 11 | 7 | 5 | 10 | <5 | 10 | 14 | 6 | 12 | 10 | <5 | <5 | 11 | 8 | <5 | 8 | <5 | 7.0 | 7.0 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | -- | 461 | 613 | 93 | 461 | 308 | 461 | 42 | 629 | >2470 | --- | 356 | 163 | 179 | 517 | 2,420 | 260 | 577 | >2420 | 58 | 601 | 6,000.0 | 55.0 | 770.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 100 | 14 | 2 | 6 | 6 | 6 | 4 | <1 | 1 | 17 | <10 | 1 | 2 | <1 | 23 | 44 | <1 | 5 | 517 | 8 | 1 | 11.0 | 1.0 | <1 |
| Chlorophyll A - Acidification method | ug/L | 0.05 | -- | -- | -- | | 0.91 | 0.30 | 1.20 | 1.09 | 1.44 | 2.20 | 0.64 | 0.20 | 0.63 | 0.90 | 0.48 | 1.22 | 2.71 | 1.52 | 1.20 | 2.32 | 1.09 | 1.43 | 1.22 | 6.25 | 1.28 | 1.68 | 1.24 | 3.70 |
| Chlorophyll A - Welschmeyer method | ug/L | 0.05 | -- | -- | -- | | 0.85 | 0.33 | 1.00 | 1.41 | 1.59 | 2.40 | 0.62 | 0.20 | 0.54 | 0.84 | --- | 1.26 | 1.44 | 1.86 | 1.57 | 2.34 | 1.28 | 1.40 | 1.33 | 3.35 | -- | * | 1.19 | 3.00 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environment Environmental Quality Standards for Surface Water (Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) -
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

**Underlined (black shaded)** = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

# HRM Water Quality Monitoring Program Results

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Highway 102 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | HWY102-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/15 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 |
| Sampling Time | hh:mm | -- | | | | | 07:00 | 12:45 | 08:00 | 13:00 | 10:20 | 09:00 | 13:40 | 11:00 | 11:00 | 14:50 | 11:00 | 9:50 | 14:15 | 12:22 | 12:30 | 12:00 | 10:10 | 9:30 | 13:15 | 09:20 | 9:40 | 14:30 | 11:00 | 10:20 | 12:00 | 15:00 | 11:40 | 12:40 | 11:00 | 15:40:00 PM | 2:45 PM | 12:40 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | | | 11.8 | 18.8 | 15.7 | 14.9 | 19.6 | 7.4 | 11.4 | 17.8 | 14.6 | 10.7 | 21.8 | 13.6 | 11.7 | 19.5 | 8.9 | 12.1 | 19.6 | 10.2 | 14.3 | 20.7 | 5.4 | 13.4 | 19.3 | 9.2 | 16.4 | 22.1 | 10.1 | 14.4 | 21.4 | 10.6 | 14.0 | 27.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 11.4 | 5.8 | 4.3 | 8.2 | 4.3 | 6.1 | 8.2 | 3.9 | 5.3 | 5.7 | 1.0 | 3.8 | 7.6 | 3.3 | 3.1 | 12.0 | 2.1 | 4.5 | 4.3 | 3.8 | 5.0 | 8.2 | 10.1 | 7.4 | 5.8 | 5.8 | 5.6 | 7.1 | 2.8 | 6.1 | ** | 6.27 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.98 | 5.35 | 5.25 | 6.31 | 5.26 | 5.62 | 5.75 | 5.77 | 5.99 | 8.76 | 5.73 | 6.38 | 6.19 | 7.10 | 6.79 | 6.02 | 6.63 | 5.12 | 6.35 | 6.24 | 6.92 | 7.34 | 6.14 | 5.69 | 6.40 | 7.76 | 6.32 | 6.13 | 6.13 | 6.70 | 7.20 | 6.09 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 194.0 | 153.0 | 103.8 | 135.0 | 106.0 | 108.6 | 114.1 | 107.6 | 88.6 | 288.0 | 225.0 | 155.5 | 226.0 | 173.2 | 234.0 | 880.0 | 337.0 | 109.0 | 0.4 | 335.8 | 251.2 | 289.0 | 353.0 | 208.9 | 354.0 | 257.0 | 266.0 | 232.2 | 280.5 | 189.4 | 330.0 | 383.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | <5 | <5 | <5 | <5 | <5 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 | 17 | 21 | 16 | 13 | 26 | 12.0 | 12.0 | 23.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 24 | 38 | 24 | 32 | 25 | 22 | 24 | 19 | 12 | 58 | 48 | 28 | 53 | 31 | 40 | 65 | 57 | 19 | 130 | 67 | 49 | 71 | 87 | 35 | 101 | 49 | 51 | 51 | 54 | 61 | 90 | 80 |
| Colour | TCU | 5 | -- | -- | -- | | 67 | 68 | 57 | 37 | 89 | 33 | 39 | 65 | 79 | 24 | 65 | 40 | 9 | 65 | 25 | 11 | 31 | 93 | 22 | 27 | 29 | 23 | 37 | 64 | 24 | 31 | 29 | 27 | 56 | 68 | 35 | 37 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | <0.05 | <0.05 | <0.05 | 0.69 | <0.05 | 1.20 | 0.69 | 0.25 | 1.20 | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | 0.13 | 0.53 | 0.35 | 0.71 | 0.58 | 0.37 | 0.11 | 0.2 | 0.6 | <0.05 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | <0.05 | -- | -- | 0.69 | <0.05 | -- | 0.69 | -- | -- | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | <0.05 | 0.53 | 0.18 | 0.50 | 0.58 | 0.37 | <0.05 | 0.2 | 0.3 | <0.05 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.11 | <0.05 | 0.17 | 0.21 | <0.05 | <0.05 | 0.11 | <0.05 | 0.22 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.29 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.10 | 0.07 | 0.31 | 0.19 | 0.04 | <0.03 | 0.05 | 0.06 | <0.03 | 0.04 | 0.03 | <0.050 | <0.03 | 0.04 | 0.06 | 0.06 | <0.03 | <0.03 | 0.10 | 0.07 | <0.03 | 0.07 | <0.03 | <0.03 | 0.06 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.1 | 1.3 | 0.6 | -- | 0.6 | 0.6 | 0.7 | 0.6 | <0.4 | 0.3 | 0.5 | 0.6 | 0.7 | 1.2 | 0.7 | 0.5 | 1.3 | 3.8 | 1.1 | 0.70 | <0.4 | <0.4 | 0.60 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 6.5 | 10.0 | 7.7 | 4.7 | 11.0 | 6.3 | 4.5 | 7.2 | 7.4 | 5.5 | 10.0 | 7.0 | 5.1 | 10.1 | 17.7 | 4.1 | 7.7 | 9.0 | 2.7 | 14.6 | 8.4 | 4.5 | 8.0 | 11.5 | 7.4 | 8.6 | 6.9 | 5.0 | 7.7 | 7.0 | 4.4 | 9.50 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 4.54 | 5.24 | 5.46 | 5.48 | 6.24 | 5.31 | 6.41 | 6.55 | 6.58 | 6.40 | 6.90 | 6.80 | 6.86 | 6.87 | 6.73 | 6.56 | 7.49 | 5.50 | 6.61 | 7.46 | 6.80 | 6.87 | 7.03 | 6.46 | 6.84 | 6.91 | 6.90 | 7.02 | 7.14 | 6.94 | 7.07 | 7.15 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 1.7 | 1.8 | 1.6 | 4.9 | 3.3 | 5.1 | 4.9 | 5.2 | 5.6 | 12.5 | 11.7 | 7.5 | 11.1 | 10.5 | 13.9 | 7.2 | 23.3 | 2.2 | 18,000.0 | 18.0 | 12.4 | 12.9 | 25.8 | 9.9 | 20.9 | 10.3 | 14.6 | 12.5 | 15.6 | 9.9 | 16.5 | 17.9 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.3 | 0.5 | 0.5 | 1.1 | 0.8 | 1.1 | 0.9 | 0.9 | 1.2 | 1.7 | 2.0 | 1.4 | 1.4 | 1.5 | 2.3 | 1.6 | 3.2 | 0.6 | 2,400.0 | 2.7 | 2.3 | 1.7 | 2.7 | 1.7 | 3.0 | 1.7 | 2.2 | 1.8 | 2.2 | 1.8 | 2.5 | 2.6 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.070 | 0.140 | 0.020 | 0.006 | 0.007 | 0.011 | 0.009 | 0.012 | 0.010 | 0.019 | 0.039 | 0.020 | 0.006 | 0.021 | 0.022 | 0.013 | 0.038 | 0.031 | 0.007 | 0.020 | 0.002 | 0.005 | 0.038 | 0.009 | 0.017 | 0.052 | 0.008 | 0.022 | 0.034 | 0.010 | 0.011 | 0.023 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.5 | 1.2 | 0.7 | 1.1 | 1.6 | 1.3 | 1.1 | 1.5 | 1.9 | 1.6 | 2.5 | 1.5 | 1.3 | 1.7 | 2.4 | 1.2 | 2.5 | 0.7 | 2,000.0 | 2.1 | 1.5 | 1.4 | 1.9 | 1.7 | 2.0 | 2.1 | 2.0 | 1.6 | 2.0 | 1.4 | 2.3 | 2.3 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 15.0 | 25.0 | 13.0 | 15.9 | 14.5 | 14.6 | 14.8 | 10.2 | 8.3 | 36.3 | 27.7 | 14.6 | 30.8 | 15.0 | 20.5 | 39.1 | 38.7 | 18.6 | 64.0 | 37.7 | 28.8 | 45.4 | 43.8 | 24.8 | 64.1 | 29.7 | 29.6 | 41.2 | 35.5 | 47.9 | 69.1 | 54.3 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.2 | 2.0 | 1.1 | 3.8 | 5.1 | 2.8 | 5.2 | 4.6 | 4.1 | 6.1 | 5.1 | 3.1 | 5.1 | 5.8 | 1.7 | 7.1 | 4.7 | 2.1 | 4.9 | 4.8 | 1.4 | 6.3 | 4.6 | 1.8 | 3.8 | 5.6 | 2.5 | 5.3 | 4.6 | 2.2 | 4.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 7 | 80 | 2 | <2 | 11 | <2 | <1 | 1 | <1 | 9 | 6 | <5 | <5 | <5 | <5 | 6 | <5 | <5 | <1.0 | <5 | <5 | 10 | <5 | <5 | 11 | <5 | <5 | <5 | <5 | <5 | <5 | 8.0 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 5 | 3 | 3 | 8 | <2 | 8 | 10 | 8 | 10 | 14 | 8 | 9 | 12 | 8 | 12 | 10 | 7 | 6 | 13 | 9 | 14 | 14 | 14 | 18 | 15 | 13 | 19 | 12 | 7.0 | 11.0 | 14.0 | 10.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 14.0 | 35.0 | 0.9 | 1.6 | 1.2 | 1.1 | 0.6 | 0.4 | 1.1 | 0.9 | 1.9 | 0.9 | 0.5 | 1.6 | 0.5 | 0.7 | 1.6 | 0.5 | 0.6 | 0.9 | 0.8 | 1.0 | 4.1 | 1.0 | 1.3 | 7.7 | 1.1 | 1.7 | 1.1 | 3.2 | 0.8 | 2.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 100 | 140 | 92 | 130 | 100 | 110 | 110 | 100 | 88 | 263 | 231 | 143 | 243 | 188 | 218 | 252 | 338 | 112 | 470 | 324 | 244 | 289 | 440 | 167 | 411 | 251 | 258 | 298 | 306 | 306 | 464 | 340 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 0.77 | 1.12 | 0.73 | 1.11 | 0.71 | 0.88 | 1.03 | 0.95 | 0.80 | 2.55 | 2.02 | 1.31 | 1.96 | 1.50 | 1.78 | 2.66 | 2.31 | 1.30 | 4.20 | 2.50 | 1.93 | 2.58 | 3.29 | 1.60 | 3.53 | 2.12 | 2.20 | 1.97 | 2.2 | 2.2 | 3.1 | 2.9 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 | 17 | 21 | 16 | 13 | 26 | 12.0 | 12.0 | 23.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 50 | 73 | 45 | 67 | 50 | 63 | 65 | 58 | 54 | 150 | 117 | 73 | 117 | 83 | 104 | 143 | 150 | 68 | 240 | 151 | 116 | 155 | 193 | 100 | 218 | 127 | 131 | 130 | 133 | 142.0 | 204.0 | 182.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 0.84 | 1.32 | 0.74 | 1.06 | 0.93 | 1.02 | 1.00 | 0.83 | 0.80 | 2.43 | 6.04 | 1.19 | 2.06 | 1.40 | 1.87 | 2.25 | 3.22 | 1.04 | 3.94 | 2.88 | 2.11 | 2.81 | 3.51 | 1.79 | 4.14 | 2.22 | 2.28 | 2.62 | 2.6 | 2.8 | 4.1 | 3.6 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 6.00 | 6.00 | 6.00 | 17.00 | 12.00 | 17.00 | 16.00 | 17.00 | 19.00 | 38.20 | 37.50 | 24.50 | 33.50 | 32.40 | 44.20 | 24.60 | 71.40 | 8.00 | 55.00 | 56.10 | 40.40 | 39.20 | 75.50 | 31.70 | 64.50 | 32.70 | 45.50 | 38.6 | 48 | 32.1 | 51.5 | 55.4 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 4.35 | 8.20 | 0.68 | 2.30 | 13.40 | 7.37 | 1.48 | 6.74 | 0.00 | 2.60 | 1.90 | 4.60 | 2.40 | 3.50 | 2.60 | 8.40 | 16.40 | 11.20 | 3.19 | 7.10 | 4.70 | 4.40 | 3.10 | 5.70 | 8.00 | 2.20 | 1.80 | 14.0 | 8.3 | 12.1 | 13.8 | 10.0 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | -3.50 | -2.99 | -3.36 | -2.77 | -2.23 | -2.72 | -2.73 | -2.33 | -2.41 | -2.69 | -1.30 | -3.85 | -2.32 | -1.57 | -2.62 | -2.48 | -1.74 | -3.14 | -2.23 | -2.35 | -2.33 | -2.37 | -1.85 | -2.6 | -2.3 | -1.9 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | -3.75 | -3.25 | -3.61 | -3.09 | -2.55 | -3.04 | -3.05 | -2.65 | -2.73 | -3.01 | -1.62 | -4.17 | -2.57 | -1.89 | -2.94 | -2.80 | -2.06 | -3.46 | -2.55 | -2.67 | -2.65 | -2.69 | -2.17 | -2.9 | -2.6 | -2.2 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | 9.92 | 9.54 | 9.64 | 9.17 | 9.13 | 9.52 | 9.59 | 9.20 | 9.14 | 9.25 | 8.79 | 9.75 | 8.93 | 9.03 | 9.42 | 9.35 | 8.77 | 9.59 | 9.07 | 9.26 | 9.23 | 9.39 | 8.99 | 9.5 | 9.3 | 9.0 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | 10.20 | 9.80 | 9.89 | 9.49 | 9.45 | 9.84 | 9.91 | 9.52 | 9.46 | 9.57 | 9.11 | 10.10 | 9.18 | 9.35 | 9.74 | 9.67 | 9.09 | 9.91 | 9.39 | 9.58 | 9.55 | 9.71 | 9.31 | 9.9 | 9.6 | 9.3 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 510 | -- | -- | 169 | 192 | -- | 205 | -- | -- | 134 | 183 | 146 | 86 | 145 | 150 | 187 | 83 | 310 | 51 | -- | 52 | 81 | -- | -- | 69 | 450 | 100 | 72 | 80 | -- | 1,540 | 233 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 22 | -- | -- | 53 | 37 | -- | 37 | -- | -- | 58 | 284 | 42 | 57 | 57 | 80 | 46 | 142 | 17 | 130 | -- | 86 | 79 | -- | -- | 130 | -- | 77 | 68 | 100 | -- | 108.0 | 104.0 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | <5 | -- | -- | 18 | 13 | -- | <50 | -- | -- | 12 | 18 | 13 | 9 | 14 | 11 | 10 | 14 | 11 | <50 | -- | <5 | 10 | -- | -- | <5 | -- | 24 | 11 | 14 | -- | 10.0 | 16.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | 0.043 | <0.017 | -- | 0.023 | -- | -- | 0.034 | 0.021 | <0.017 | <0.017 | <0.017 | 0.040 | 0.022 | <0.017 | 0.022 | 0.024 | -- | <0.017 | <0.017 | -- | -- | 0.032 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | 8 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | 1 | -- | 1 | <1 | <1 | -- | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | 0 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | -- | -- | 3 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | 3 | <2 | <1 | 2 | <1 | <1 | 2 | <2.0 | <1 | 1 | <1 | <1 | 2 | <1 | 4 | 1 | 1 | <1 | 3.0 | 1.0 | 2.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 720 | -- | -- | 146 | 637 | 150 | 107 | 209 | 219 | 102 | 1,380 | 255 | 111 | 938 | 446 | 147 | 820 | 290 | 140 | 1,280 | 138 | 144 | 766 | 228 | 151 | 3,960 | 281 | 85 | 634 | 403.0 | 122.0 | 856.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | 1.6 | -- | -- | 2.4 | 0.6 | -- | <0.5 | -- | -- | <0.5 | 0.7 | <0.5 | <0.5 | <0.5 | 0.6 | 2.6 | <0.5 | 0.6 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 0.8 | <0.5 | -- | <0.5 | 0.7 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 40 | -- | -- | 55 | 39 | 67 | 28 | 21 | 31 | 34 | 79 | 28 | 23 | 45 | 31 | 56 | 122 | 61 | 28 | 95 | 22 | 19 | 78 | 38 | 22 | 511 | 28 | 9 | 99 | 71.0 | 14.0 | 62.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | 12 | -- | <2 | 6 | <2 | -- | <2 | <2 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 11 | -- | -- | 29 | 20 | -- | 24 | -- | -- | 48 | 58 | 36 | 52 | 47 | 62 | 38 | 103 | 13 | 85 | -- | 39 | 58 | -- | -- | 92 | -- | 76 | 54 | 88 | -- | 93.0 | 88.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 6 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | 3 | <2 | <2 | <2 | 4 | 2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 | 2.0 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 21 | -- | -- | 16 | 7 | 7 | <5.0 | <5.0 | 7 | <5 | 6 | <5 | <5 | <5 | 10 | 10 | <5 | 7 | 11 | <5 | <5 | <5 | <5 | 6 | 9 | 37 | 8 | 6 | <5 | 12.0 | 5.0 | 8.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 84 | >250 | -- | >250 | >250 | 180 | 120 | 180 | -- | 687 | >2420 | >2420 | 1,550 | >2420 | 1,553 | 120 | >2420 | >2420 | --- | >2420 | 659 | >2420 | >2420 | | 914 | >2420 | >2420 | 105 | 9010 | 370.0 | 1,520.0 | 450.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 54 | >250 | -- | 12 | 17 | 5 | 1 | 78 | <100 | 3 | 68 | 145 | 4 | 9 | 5 | 3 | 179 | 3 | 20 | 25 | 2 | <1 | 86 | | 12 | 14 | 3 | <1 | 10 | 2.0 | 1.0 | 3.0 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 15.40 | 19.29 | 0.70 | 18.12 | 1.61 | 8.45 | 0.93 | 0.58 | 0.69 | 0.53 | 2.59 | 0.81 | 1.27 | 14.70 | 1.99 | 0.25 | 1.10 | 1.22 | 0.50 | 7.27 | 0.36 | 0.94 | 51.51 | 0.33 | 1.56 | 5.32 | 0.62 | 1.57 | 0.86 | 1.11 | 1.88 | 5.55 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 17.50 | 19.60 | 0.84 | 17.62 | 1.68 | 7.52 | 0.84 | 0.56 | 0.65 | 0.59 | 2.89 | 1.05 | 1.45 | 15.80 | 2.20 | 0.82 | 1.11 | 1.38 | 0.55 | 6.79 | 0.23 | 1.30 | 60.68 | 0.43 | 2.04 | 5.48 | 0.99 | 2.62 | -- | * | 1.90 | 5.09 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

"--" = no guideline available / Not Tested.

CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.

Comment 1: CCME PAL-F reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

# HRM Water Quality Monitoring Program Results

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Highway 102 | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | HWY102-2 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/15 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2107/06/08 | 2017/08/15 | 2017/10/18 |
| Sampling Time | hh:mm | -- | | | | | 12:30 | 12:15 | 12:30 | 12:40 | 09:30 | 12:30 | 11:20 | 15:00 | 15:30 | 11:20 | 12:20 | 10:35 | 10:40 | 10:00 | 10:22 | 12:15 | 10:07 | 11:00 | 12:58 | 14:30 | 12:50 | 12:45 | 10:40 | 11:45 | 15:25 | 12:25 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | | | 16.7 | 19.2 | 16.4 | 17.2 | 17.0 | 8.7 | 10.8 | 24.2 | 15.1 | 7.8 | 23.7 | 14.3 | 11.5 | 22.0 | 10.7 | 11.4 | 10.4 | 12.7 | 23.7 | 9.3 | 13.4 | 20.4 | 10.2 | 13.0 | 22.4 | 15.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.0 | 5.9 | 4.8 | 4.9 | 2.3 | 9.0 | 6.9 | 7.0 | 5.1 | 3.7 | 13.1 | 3.3 | 6.3 | 1.6 | 4.2 | 10.5 | 9.3 | 4.2 | 6.1 | 5.3 | 6.8 | 7.1 | 6.8 | 5.7 | 1.8 | 11.3 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.57 | 5.71 | 5.40 | 6.33 | 5.86 | 5.64 | 6.22 | 5.89 | 5.29 | 7.30 | 6.37 | 6.72 | 6.01 | 6.92 | 5.40 | 5.40 | 5.85 | 6.45 | 6.04 | 5.96 | 5.86 | 6.19 | 5.36 | 6.04 | 7.56 | 8.32 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 37.0 | 457.0 | 162.1 | 415.0 | 167.0 | 101.2 | 92.2 | 123.1 | 96.0 | 225.0 | 226.0 | 159.1 | 288.0 | 188.5 | 204.4 | 204.4 | 174.0 | 0.4 | 699.0 | 197.6 | 968.0 | 838.0 | 219.2 | 400.0 | 414.0 | 338.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | <5 | 7 | 6 | 5 | <5 | <5 | 5 | <5 | 17 | 7 | <5 | 6 | 14 | 7 | 30 | 8 | 8 | 5 | <5 | 13 | 21 | 6 | <5 | 22 | 11 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 21 | 82 | 83 | 170 | 41 | 18 | 21 | 21 | 17 | 63 | 109 | 45 | 71 | 50 | 52 | 113 | 34 | 250 | 178 | 78 | 236 | 226 | 48 | 136 | 107 | 92 |
| Colour | TCU | 5 | -- | -- | -- | | 120 | 190 | 91 | 96 | 160 | 68 | 65 | 98 | 77 | 32 | 100 | 70 | 11 | 61 | 36 | 13 | 85 | 17 | 9 | 8 | 14 | 39 | 86 | 20 | 41 | 22 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | <0.05 | <0.05 | <0.05 | 0.10 | <0.05 | 0.62 | 0.26 | 1.80 | 3.20 | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 | 0.12 | <0.050 | <0.05 | 0.15 | 0.21 | 0.23 | 0.11 | 0.20 | 0.09 | 0.07 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | <0.05 | -- | -- | 0.10 | <0.05 | -- | 0.26 | -- | -- | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 | 0.12 | <0.050 | <0.05 | 0.15 | <0.05 | <0.05 | 0.11 | <0.05 | 0.09 | 0.07 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | 0.21 | 0.23 | <0.05 | 0.20 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.06 | <0.05 | <0.05 | 0.20 | <0.05 | <0.05 | 0.30 | 0.08 | 0.09 | <0.03 | <0.03 | <0.03 | 0.17 | 0.09 | <0.03 | <0.03 | 0.06 | 0.19 | 0.05 | 0.14 | 0.37 | <0.03 | <0.03 | 0.09 | 0.14 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.6 | 1.1 | 0.5 | -- | 0.7 | 2.0 | 15.3 | <0.4 | 0.3 | 62.6 | 2.0 | 24.3 | 2.1 | 0.6 | <0.4 | 0.7 | 0.6 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 8.5 | 13.0 | 13.0 | 7.2 | 14.0 | 7.4 | 5.7 | 9.2 | 8.4 | 7.0 | 15.8 | 11.2 | 6.1 | 10.6 | 5.1 | 17.4 | 8.0 | 3.0 | 29.0 | 9.9 | 79.3 | 11.1 | 13.4 | 5.4 | 9.2 | 5.9 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 5.43 | 5.56 | 5.29 | 6.05 | 6.32 | 5.47 | 5.93 | 6.16 | 5.92 | 5.90 | 6.70 | 6.80 | 6.61 | 6.59 | 6.34 | 7.20 | 6.40 | 6.42 | 6.64 | 6.18 | 6.46 | 6.80 | 6.15 | 6.22 | 6.73 | 6.51 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 1.6 | 4.0 | 4.8 | 7.4 | 3.8 | 4.0 | 3.1 | 2.2 | 3.8 | 7.0 | 8.4 | 5.6 | 7.6 | 8.5 | 8.2 | 14.1 | 9.5 | 20,000.0 | 33.3 | 9.8 | 23.9 | 23.8 | 8.6 | 13.3 | 14.7 | 14.7 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.4 | 0.7 | 0.9 | 1.0 | 0.6 | 1.0 | 0.7 | 0.7 | 1.4 | 1.2 | 1.4 | 1.2 | 1.2 | 1.3 | 2.2 | 3.1 | 1.8 | 2,500.0 | 32.7 | 2.2 | 3.2 | 2.5 | 1.7 | 2.5 | 1.9 | 2.1 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | 0.040 | 0.034 | 0.010 | 0.028 | 0.003 | 0.009 | 0.019 | 0.041 | 0.021 | 0.054 | 0.030 | 0.014 | 0.028 | 0.199 | 0.028 | 0.201 | 0.010 | 1.560 | 0.012 | 0.222 | 0.034 | 0.012 | 0.013 | 0.042 | 0.011 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.5 | 0.8 | 1.1 | 1.0 | 1.0 | 1.4 | 0.8 | 1.3 | 1.9 | 1.2 | 1.7 | 1.6 | 1.3 | 1.5 | 2.5 | 2.9 | 1.7 | 1,500.0 | 12.5 | 1.1 | 4.0 | 2.1 | 1.4 | 1.1 | 1.6 | 1.6 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 15.0 | 51.0 | 55.0 | 83.7 | 32.0 | 12.1 | 13.3 | 13.1 | 13.3 | 41.5 | 63.6 | 20.4 | 39.0 | 19.1 | 34.5 | 69.6 | 24.0 | 150.0 | 124.0 | 36.8 | 169.0 | 124.0 | 26.4 | 68.8 | 66.0 | 55.2 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.2 | 4.4 | 4.0 | 3.0 | 6.4 | 5.4 | 2.5 | 6.5 | 6.7 | 4.1 | 6.9 | 5.8 | 1.6 | 6.2 | 6.6 | 1.6 | 5.9 | 2.3 | 7.2 | 5.6 | 2.8 | 9.0 | 4.5 | 3.1 | 5.7 | 6.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <2 | 58 | 62 | 34 | 27 | 3 | <1 | 10 | 14 | <5 | 39 | <5 | <5 | <5 | 194 | 34 | <5 | 2 | 3,000 | 15 | 382 | 69 | <5 | 6 | 7 | 8 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | <2 | 3 | 8 | 11 | <2 | 7 | 5 | 5 | 8 | 12 | 6 | 10 | 10 | 9 | 10 | 12 | 8 | 15 | 7 | 8 | 22 | 21 | 8 | 10 | 7 | 9 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 3.8 | 4.2 | 2.6 | 3.1 | 0.5 | 0.4 | 1.2 ( 1 ) | 3.9 | 0.6 | 10.8 | 2.0 | 1.5 | 3.3 | 144.0 | 1.1 | 1.1 | 1.2 | 1,490.0 | 9.9 | 131.0 | 56.2 | 1.1 | 2.4 | 9.9 | 12.5 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 85 | 290 | 310 | 590 | 160 | 94 | 91 | 100 | 110 | 263 | 403 | 179 | 295 | 203 | 223 | 433 | 194 | 920 | 662 | 315 | 817 | 952 | 177 | 451 | 413 | 366 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 0.60 | 2.37 | 2.62 | 5.13 | 1.27 | 0.70 | 0.73 | 0.91 | 0.86 | 2.48 | 3.34 | 1.49 | 2.34 | 1.88 | 1.81 | 4.04 | 1.29 | 7.88 | 5.27 | 2.38 | 7.39 | 7.25 | 1.65 | 4.06 | 3.61 | 3.01 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | <1 | 7 | 6 | 5 | <1 | <1 | 5 | <1 | 17 | 7 | <5 | 6 | 14 | 7 | 30 | 8 | 8 | 5 | <5 | 13 | 21 | 6 | <5 | 22 | 11 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 42 | 150 | 165 | 282 | 93 | 52 | 48 | 62 | 67 | 143 | 200 | 86 | 135 | 100 | 145 | 235 | 85 | 460 | 712 | 138 | 473 | 422 | 99 | 233 | 215 | 187 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 0.81 | 2.65 | 2.89 | 4.17 | 1.81 | 0.86 | 0.82 | 0.83 | 0.97 | 2.32 | 2.10 | 1.40 | 2.24 | 1.50 | 3.50 | 4.17 | 1.76 | 7.87 | 29.10 | 2.35 | 9.27 | 7.23 | 1.80 | 3.92 | 3.93 | 3.60 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 6.00 | 13.00 | 16.00 | 23.00 | 12.00 | 14.00 | 11.00 | 8.00 | 15.00 | 22.40 | 26.70 | 18.90 | 23.90 | 26.60 | 29.50 | 48.00 | 31.10 | 59.00 | 218.00 | 33.50 | 72.90 | 69.70 | 28.50 | 43.50 | 44.50 | 45.40 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 14.90 | 5.58 | 4.90 | 10.30 | 17.50 | 10.30 | 5.81 | 4.60 | 6.01 | 3.30 | 3.60 | 3.10 | 2.30 | 11.30 | 31.70 | 1.60 | 15.10 | 0.06 | 69.40 | 0.50 | 11.30 | 0.10 | 4.30 | 1.80 | 4.20 | 8.90 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | -3.57 | -3.72 | -3.70 | NC | NC | -4.07 | NC | -3.63 | -3.15 | -3.34 | -3.33 | -2.92 | -3.50 | -1.80 | -3.30 | -3.18 | -2.81 | -3.73 | -2.70 | -2.15 | -3.72 | -3.58 | -2.98 | -2.90 | -2.81 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | -3.82 | -3.97 | -3.95 | NC | NC | -4.32 | NC | -3.95 | -3.47 | -3.66 | -3.65 | -3.24 | -3.82 | -2.12 | -3.62 | -3.42 | -3.13 | -4.05 | -3.02 | -2.47 | -4.04 | -3.90 | -2.70 | -3.22 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | 9.87 | 9.77 | 10.00 | NC | NC | 10.30 | NC | 9.53 | 9.85 | 10.10 | 9.94 | 9.51 | 9.84 | 9.00 | 9.70 | 9.29 | 9.45 | 9.91 | 9.16 | 8.95 | 9.87 | 9.80 | 9.11 | 9.41 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | 10.10 | 10.00 | 10.30 | NC | NC | 10.50 | NC | 9.85 | 10.20 | 10.50 | 10.30 | 9.83 | 10.20 | 9.32 | 10.00 | 9.54 | 9.77 | 10.20 | 9.48 | 9.27 | 10.20 | 10.10 | 9.43 | 9.73 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 270 | -- | -- | 189 | 368 | -- | 260 | -- | -- | 145 | 466 | 259 | 130 | 138 | 2,740 | 400 | 216 | 100 | -- | 129 | 3,880 | -- | -- | 99 | 149 | 542 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | 2 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | 6 | <2 | <2 | <1.0 | -- | <2 | 3 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 20 | -- | -- | 53 | 28 | -- | 27 | -- | -- | 49 | 74 | 33 | 44 | 43 | 213 | 381 | 63 | 140 | -- | 147 | 762 | -- | -- | 151 | -- | 122 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | <5 | -- | -- | 8 | 8 | -- | <50 | -- | -- | 10 | 17 | 15 | 9 | 10 | 13 | 11 | 12 | <50 | -- | <5 | 9 | -- | -- | <5 | -- | 12 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | 0.051 | <0.017 | -- | <0.017 | -- | -- | 0.037 | 0.031 | 0.032 | 0.019 | <0.017 | 0.096 | 0.051 | 0.019 | 0.100 | -- | <0.017 | 0.778 | -- | -- | 0.019 | -- | 0.048 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | 1 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | 1 | 9 | 2 | <1 | <1.0 | -- | <1 | 8 | -- | -- | <1 | -- | 2 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | 1 | -- | <0.40 | -- | -- | <1 | 1 | 1 | <1 | 1 | 3 | 1 | <1 | <1.0 | -- | 3 | 4 | -- | -- | <1 | -- | 2 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | -- | -- | 2 | <2.0 | <2.0 | <2.0 | 3 | 3 | <2 | 2 | 3 | <2 | 1 | 12 | 4 | 2 | <2.0 | 404 | 2 | 13 | <1 | 1 | 3 | 2 | 3 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 880 | -- | -- | 1,380 | 1,850 | 303 | 229 | 897 | 1,310 | 214 | 5,210 | 1,550 | 383 | 1,720 | 28,400 | 1,660 | 485 | 960 | 217,000 | 714 | 21,300 | 7,380 | 375 | 369 | 2,650 | 4,760 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | 1.9 | -- | -- | 1.6 | 2.7 | -- | 0.6 | -- | -- | <0.5 | 5.2 | 2.1 | 0.6 | 0.7 | 19.4 | 3.5 | 1.0 | <0.50 | -- | 0.6 | 39.7 | -- | -- | <0.5 | -- | 3.3 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 110 | -- | -- | 387 | 135 | 53 | 41 | 106 | 176 | 78 | 219 | 207 | 83 | 173 | 327 | 212 | 93 | 470 | 2,800 | 303 | 586 | 359 | 71 | 125 | 160 | 215 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | 4 | 2 | <2 | <2.0 | -- | <2 | 8 | -- | -- | 6 | -- | 3 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 11 | -- | -- | 37 | 21 | -- | 17 | -- | -- | 33 | 45 | 31 | 39 | 40 | 45 | 75 | 43 | 96 | -- | 38 | 96 | -- | -- | 72 | -- | 80 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 4 | -- | -- | <2 | 6 | -- | 5 | -- | -- | <2 | 10 | 4 | 4 | <2 | 60 | 9 | 6 | <2 | -- | <2 | 41 | -- | -- | <2 | -- | 15 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <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 | 0.2 | -- | -- | <0.1 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | 2 | <2 | <2 | <2 | 11 | <2 | <2 | <2.0 | -- | <2 | 12 | -- | -- | 2 | -- | 3 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 12 | -- | -- | 14 | 12 | 9 | 6 | 9 | 13 | <5 | 7 | 12 | 12 | <5 | 46 | 36 | 17 | 27 | 1,210 | 10 | 170 | 22 | 11 | 14 | 9 | 19 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 28 | >250 | -- | >250 | 75 | 41 | 110 | >250 | -- | 1,553 | >2420 | >2420 | 2,420 | 1,990 | >2420 | 687 | >2420 | --- | >2420 | 328 | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 4 | 230 | -- | 9 | 5 | <1 | 7 | >250 | <100 | <1 | 16 | 50 | 111 | 9 | 4 | <1 | <1 | <10 | 201 | 2 | 1 | 20 | 11 | <1 | 8 | 41 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.90 | 82.63 | 48.17 | 0.85 | 16.36 | 0.25 | 0.97 | 4.91 | 1.90 | 2.07 | 21.03 | 0.33 | 2.41 | 1.10 | 21.62 | 10.34 | 0.46 | 0.53 | 119.14 | 6.24 | 539.78 | 54.98 | 0.43 | 1.40 | 2.11 | 28.94 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.91 | 81.20 | 52.50 | 0.85 | 17.35 | 0.23 | 0.87 | 4.49 | 2.15 | 2.27 | 17.26 | 0.50 | 3.02 | 1.30 | 27.02 | 11.09 | 0.55 | 0.58 | 129.77 | 2.23 | 793.90 | 73.67 | 0.56 | 1.74 | 3.20 | 37.67 |

| Tested Parameters | Units | Highway 102 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | HWY102-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | 2018/05/09 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Time | hh:mm | 12:30 | 11:30 | 14:15 PM | 3:55PM | 12:20PM | | | | | | | | | | | | | | | | | | | | | | | | | |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | N/A | N/A | N/A | N/A | N/A | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water Temp | Celsius | 14.9 | 18.3 | 10.6 | 11.4 | 23.1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissolved Oxygen | mg/L | 8.8 | 2.3 | 5.6 | ** | 3.81 | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH (in Situ) | pH | 6.13 | 5.88 | 7.24 | 6.83 | 6.19 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Specific Conductance | uS/cm | 355.6 | 394.7 | 246.4 | 501.0 | 720.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 9 | 21 | 13.0 | <5 | 17.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissolved Chloride (Cl) | mg/L | 79 | 107 | 92 | 79 | 90 | 30 | 161 | 223 | | | | | | | | | | | | | | | | | | | | | | |
| Colour | TCU | 22 | 25 | 85 | 85 | 85 | 22 | 42 | | | | | | | | | | | | | | | | | | | | | | | |
| Nitrite + Nitrate | mg/L | 0.33 | 0.21 | 0.8 | 0.6 | 0.14 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nitrate (N) | mg/L | 0.16 | <0.05 | 0.8 | 0.2 | 0.07 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nitrite (N) | mg/L | 0.17 | 0.21 | <0.05 | 0.43 | 0.07 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.24 | 0.06 | 0.04 | 0.29 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | mg/L | 1.4 | 0.90 | <0.4 | <0.4 | 0.70 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon | mg/L | 5.6 | 7.5 | 8.0 | 3.2 | 8.20 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orthophosphate (as P) | mg/L | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH (units) | pH | 6.79 | 6.79 | 7.07 | 6.36 | 6.67 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Calcium (Ca) | mg/L | 11.5 | 12.5 | 16.5 | 22.8 | 17.2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Magnesium (Mg) | mg/L | 1.7 | 1.9 | 3.6 | 2.2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Phosphorus | mg/L | 0.034 | 0.025 | 0.014 | 0.006 | 0.037 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Potassium (K) | mg/L | 1.3 | 1.6 | 1.7 | 2.2 | 2.1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Sodium (Na) | mg/L | 59.4 | 81.6 | 29.4 | 148.0 | 139.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reactive Silica (SiO2) | mg/L | 1.6 | 8.8 | 4.6 | 3.1 | 7.2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Suspended Solids | mg/L | 7.0 | 8.0 | <5 | <5 | 16.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissolved Sulphate (SO4) | mg/L | 9 | 4.0 | 16.0 | 13.0 | 11.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Turbidity (NTU) | NTU | 12.5 | 7.0 | 13.8 | 1.1 | 1.2 | 26.8 | | | | | | | | | | | | | | | | | | | | | | | | |
| Conductivity (uS/cm) | µS/cm | 422 | 444 | 208 | 737 | 782 | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | 2.62 | 3.06 | 1.5 | 4.9 | 6.9 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 9 | 21 | 13.0 | <5 | 17.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Calculated TDS | mg/L | 170 | 209 | 107.0 | 354.0 | 415.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | <10 | <10 | <10 | <10 | <10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cation Sum | me/L | 3.36 | 4.53 | 2.3 | 8.0 | 7.5 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hardness (CaCO3) | mg/L | 44.50 | 45.40 | 34.5 | 38.2 | 49.0 | 71.8 | 52.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Ion Balance (% Difference) | % | 4.20 | 8.90 | 12.4 | 19.4 | 21.8 | 24.3 | 4.4 | | | | | | | | | | | | | | | | | | | | | | | |
| Langelier Index (@ 20C) | N/A | -2.88 | -2.90 | -2.81 | -2.41 | -2.2 | -3.2 | -2.5 | | | | | | | | | | | | | | | | | | | | | | | |
| Langelier Index (@ 4C) | N/A | -2.70 | -2.22 | -3.13 | -2.73 | -2.5 | -3.6 | -2.8 | | | | | | | | | | | | | | | | | | | | | | | |
| Saturation pH (@ 20C) | N/A | 9.11 | 9.41 | 9.60 | 9.2 | 9.3 | 9.6 | 9.2 | | | | | | | | | | | | | | | | | | | | | | | |
| Saturation pH (@ 4C) | N/A | 9.43 | 9.73 | 9.92 | 9.52 | 9.6 | 9.9 | 9.5 | | | | | | | | | | | | | | | | | | | | | | | |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 149 | 542 | 167 | 152 | -- | 126.0 | 104.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Total Antimony (Sb) | µg/L | -- | <2 | <2 | <2 | <2 | <2 | <2 | | | | | | | | | | | | | | | | | | | | | | | |
| Total Arsenic (As) | µg/L | -- | <2 | <2 | <2 | <2 | <2 | 4.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Total Barium (Ba) | µg/L | -- | 96 | 146 | -- | 272.0 | 138.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Beryllium (Be) | µg/L | -- | <2 | <2 | <2 | -- | <2 | <2 | | | | | | | | | | | | | | | | | | | | | | | |
| Total Bismuth (Bi) | µg/L | -- | <2 | <2 | <2 | -- | <2 | <2 | | | | | | | | | | | | | | | | | | | | | | | |
| Total Boron (B) | µg/L | -- | 11 | 7 | 11 | -- | 7.0 | 9.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Total Cadmium (Cd) | µg/L | <0.09 | <0.09 | -- | <0.09 | <0.09 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Chromium (Cr) | µg/L | <1 | 2 | <1 | 2 | -- | <1 | 1.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Total Cobalt (Co) | µg/L | <1 | 2 | <1 | 2 | -- | <1 | 3.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Total Copper (Cu) | µg/L | 2 | 3 | 2 | 1 | 2.0 | 2.0 | 1.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Total Iron (Fe) | µg/L | 870 | 3600 | -- | -- | 93.0 | 728.0 | 8,440.0 | | | | | | | | | | | | | | | | | | | | | | | |
| Total Lead (Pb) | µg/L | 2.3 | 1 | -- | 1.4 | 1.4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Manganese (Mn) | µg/L | 55 | 262 | 10.0 | 137.0 | 625.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Molybdenum (Mo) | µg/L | <2 | <2 | -- | <2 | <2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Nickel (Ni) | µg/L | <2 | <2 | -- | 3.0 | <2 | | | | | | | | | | | | | | | | | | | | | | | | | |

# HRM Water Quality Monitoring Program Results

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE EQSs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Lake Shore Drive | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | LSD | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/17 | 2012/05/01 | 2012/08/15 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/15 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/09 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 |
| Sampling Time | hh:mm | -- | | | | | 12:00 | 09:30 | 11:45 | 09:00 | 11:28 | 10:00 | 08:45 | 13:20 | 9:00 | 9:15 | 13:00 | 9:10 | 08:40 | 15:30 | 11:55 | 9:30 | 13:30 | 09:50 | 16:02 | 13:40 | 15:00 | 12:10 | 12:25 | 10:20 | 11:55 | 11:05 | 11:30 | 10:30 | 10:50 AM | 11:26 AM | 10:44 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 13.1 | 16.7 | 15.3 | 13.4 | 21.3 | 7.3 | 10.2 | 21.0 | 12.0 | 5.7 | 25.7 | 13.4 | 7.7 | 20.2 | 8.8 | 8.9 | 10.5 | 12.5 | 24.3 | 5.8 | 13.2 | 24.0 | 9.4 | 15.6 | 23.0 | 9.7 | 14.4 | 22.4 | 9.3 | 10.2 | 25.0 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | 10.8 | 5.7 | 5.5 | 8.6 | 5.4 | 8.5 | 9.4 | 7.9 | 8.2 | 4.1 | 2.7 | 7.6 | 8.8 | 7.3 | 7.6 | 14.8 | 7.2 | 6.3 | 7.3 | 7.2 | 8.2 | 1.9 | 8.7 | 11.4 | 7.0 | 5.3 | 9.1 | 6.9 | 7.2 | ** | 4.93 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.88 | 6.74 | 6.34 | 6.42 | 6.64 | 6.17 | 7.09 | 6.88 | 6.63 | 8.22 | 7.16 | 6.92 | 5.19 | 7.28 | 6.23 | 7.02 | 6.31 | 6.88 | 6.34 | 6.48 | 6.63 | 6.16 | 6.25 | 6.78 | 6.57 | 5.91 | 5.82 | 6.41 | 5.90 | 7.01 | 6.51 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 723.0 | 210.0 | 167.7 | 217.8 | 203.2 | 110.3 | 145.9 | 126.4 | 111.9 | 62.0 | 177.5 | 116.7 | 123.6 | 132.5 | 147.8 | 180.0 | 111.0 | 0.1 | 155.3 | 132.3 | 162.0 | 254.0 | 162.2 | 150.0 | 188.0 | 92.0 | 75.0 | 182.9 | 108.1 | 99.7 | 368.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 13 | 16 | 12 | 13 | 21 | 9 | 9 | 15 | 12 | 21 | 14 | 11 | 8 | 20 | 11 | 35 | 10 | 11 | 7 | 9 | 11 | 22 | 8 | 12 | 26 | 20 | 9 | 27 | 9.0 | 12.0 | 33.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 41 | 34 | 31 | 49 | 45 | 25 | 38 | 27 | 22 | 22 | 33 | 23 | 39 | 32 | 23 | 29 | 23 | 32 | 27 | 26 | 39 | 45 | 31 | 43 | 38 | 36 | 23 | 32 | 20 | 30 | 29 |
| Colour | TCU | 5 | -- | -- | -- | | 32 | 27 | 37 | 20 | 26 | 33 | 32 | 41 | 49 | 13 | 20 | 40 | 10 | 21 | 25 | 9 | 31 | 20 | 11 | 26 | 25 | 26 | 24 | 25 | 31 | 21 | 36 | 40 | 65 | 39 | 86 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.14 | 0.14 | 0.06 | 0.23 | 0.10 | 0.12 | 0.25 | 0.17 | 0.09 | 0.13 | 0.80 | <0.05 | 0.18 | 0.20 | <0.05 | 0.09 | 0.11 | 0.15 | 0.25 | 0.30 | 0.08 | 0.08 | <0.05 | 0.19 | 0.48 | 0.22 | 0.32 | <0.05 | 0.1 | 0.1 | 0.07 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.14 | -- | -- | 0.23 | 0.10 | -- | 0.25 | -- | -- | 0.13 | 0.80 | <0.05 | 0.18 | 0.20 | <0.05 | 0.09 | 0.11 | 0.15 | 0.16 | 0.30 | 0.08 | 0.08 | <0.05 | 0.10 | 0.39 | 0.22 | 0.32 | <0.05 | 0.1 | 0.1 | 0.07 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | 0.09 | <0.05 | <0.05 | <0.05 | <0.05 | 0.09 | 0.09 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.06 | 0.03 | <0.03 | 0.03 | <0.03 | 0.03 | 0.03 | 0.04 | <0.03 | <0.050 | 0.11 | <0.03 | 0.06 | 0.10 | <0.03 | <0.03 | 0.08 | 0.04 | <0.03 | 0.06 | <0.03 | <0.03 | 0.53 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | 3.5 | 0.5 | -- | 0.7 | 3.0 | 1.0 | <0.4 | 0.3 | 77.4 | 2.8 | 2.2 | 11.8 | 0.5 | 1.0 | 34.5 | 10.0 | <0.4 | 1.70 | <0.4 | <0.4 | 1.60 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 5.0 | 3.8 | 6.8 | 3.7 | 6.0 | 5.3 | 4.7 | 7.1 | 7.5 | 3.1 | 8.0 | 7.7 | 4.7 | 6.3 | 6.9 | 5.2 | 8.1 | 3.2 | 14.1 | 9.9 | 5.5 | 14.0 | 8.9 | 7.7 | 8.1 | 6.9 | 5.8 | 5.8 | 8.0 | 5.9 | 12.10 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.69 | 6.69 | 6.93 | 7.10 | 7.30 | 6.67 | 6.72 | 6.79 | 6.49 | 6.20 | 6.90 | 6.90 | 6.94 | 6.95 | 6.43 | 6.42 | 6.72 | 7.02 | 6.59 | 6.68 | 6.65 | 7.01 | 6.38 | 6.92 | 7.08 | 7.01 | 6.91 | 7.20 | 6.99 | 6.93 | 7.11 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.5 | 6.9 | 5.4 | 8.0 | 10.5 | 5.3 | 5.9 | 5.1 | 5.0 | 2.6 | 18.1 | 5.1 | 6.4 | 6.0 | 5.6 | 5.4 | 5.1 | 6,100.0 | 52.2 | 5.4 | 6.6 | 9.9 | 4.8 | 7.1 | 8.0 | 6.7 | 4.4 | 10.2 | 3.5 | 6.0 | 9.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.4 | 1.6 | 1.3 | 2.0 | 2.1 | 1.2 | 1.3 | 1.2 | 1.2 | 0.7 | 3.3 | 1.4 | 1.2 | 1.4 | 1.6 | 1.5 | 1.1 | 1,300.0 | 23.0 | 1.5 | 1.4 | 1.8 | 1.3 | 1.6 | 1.7 | 1.6 | 1.1 | 2.3 | 0.9 | 1.5 | 2.6 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | 0.030 | 0.009 | 0.018 | 0.100 | 0.009 | 0.018 | 0.028 | 0.014 | 0.022 | 0.063 | 0.003 | 0.007 | 0.015 | 0.078 | 0.100 | 0.031 | 0.011 | 0.501 | 0.095 | 1.250 | 0.023 | 0.012 | 0.102 | 0.059 | 0.015 | 0.052 | 0.305 | 0.018 | 0.008 | 0.031 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.1 | 1.3 | 1.2 | 1.2 | 1.0 | 1.1 | 1.0 | 1.2 | 0.6 | 1.9 | 1.3 | 1.2 | 1.1 | 1.4 | 1.1 | 1.1 | 1,100.0 | 9.7 | 1.0 | 1.2 | 1.3 | 1.1 | 1.3 | 1.4 | 1.2 | 0.9 | 1.6 | 0.8 | 1.3 | 1.7 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 24.0 | 21.0 | 18.0 | 24.8 | 26.9 | 15.2 | 23.2 | 14.3 | 13.8 | 11.1 | 18.6 | 15.2 | 21.9 | 26.6 | 14.6 | 23.4 | 18.1 | 19.0 | 24.4 | 13.4 | 25.1 | 23.4 | 19.7 | 25.2 | 26.0 | 23.0 | 16.5 | 21.7 | 15.4 | 24.4 | 20.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 3.1 | 4.2 | 4.0 | 3.2 | 3.4 | 4.3 | 2.6 | 3.9 | 3.8 | 3.1 | 2.9 | 4.9 | 2.6 | 3.9 | 5.0 | 2.9 | 4.2 | 2.4 | 4.2 | 4.4 | 1.6 | 3.3 | 3.5 | 1.1 | 2.7 | 4.0 | 2.4 | 2.4 | 3.3 | 1.7 | 4.2 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 16 | 98 | 5 | 6 | 110 | 7 | 4 | 77 | 5 | <5 | 16 | 19 | <5 | 17 | 9 | 51 | 8 | 5 | 710 | 69 | 93 | 9,020 | 15 | 138 | 41 | <5 | <5 | 444 | 6.0 | 8.0 | 150.0 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 6 | 4 | 5 | 7 | 3 | 4 | 6 | 4 | 4 | 5 | 5 | 5 | 6 | 7 | 5 | 5 | 4 | 5 | <2 | 3 | 5 | 6 | 7 | 4 | 3 | 4 | 5 | <2 | 5.0 | 4.0 | <2 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.6 | 12.0 | 2.5 | 12.0 | 6.2 | 1.0 | 0.6 | 2.5 | 1.7 | 6.7 | 283.0 | 2.1 | 1.1 | 31.6 | 82.6 | 6.6 | 1.4 | 1.2 | 4,410.0 | 5.4 | 65.3 | 206.0 | 7.9 | 53.8 | 21.3 | 15.1 | 2.0 | 72.2 | 2.5 | 5.0 | 44.4 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 170 | 150 | 140 | 200 | 200 | 110 | 150 | 130 | 110 | 96 | 161 | 110 | 168 | 136 | 105 | 122 | 125 | 140 | 129 | 136 | 160 | 236 | 133 | 178 | 192 | 171 | 122 | 192 | 123 | 151 | 170 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.56 | 0.82 | 1.22 | 1.80 | 1.77 | 0.97 | 1.39 | 1.14 | 0.96 | 1.15 | 1.37 | 0.97 | 1.40 | 1.46 | 0.97 | 1.63 | 0.94 | 1.22 | 0.92 | 1.00 | 1.43 | 1.84 | 1.18 | 1.55 | 1.69 | 1.51 | 0.96 | 1.44 | 0.9 | 1.2 | 1.5 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 13 | 8 | 12 | 13 | 21 | 9 | 9 | 15 | 12 | 21 | 14 | 11 | 8 | 20 | 11 | 35 | 10 | 11 | 7 | 9 | 11 | 22 | 8 | 12 | 26 | 20 | 9 | 27 | 9.0 | 12.0 | 33.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 92 | 55 | 74 | 104 | 107 | 62 | 84 | 66 | 60 | 56 | 163 | 58 | 82 | 87 | 66 | 88 | 59 | 74 | 498 | 65 | 91 | 107 | 70 | 92 | 97 | 87 | 58 | 95 | 52.0 | 76.0 | 96.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.53 | 0.99 | 1.20 | 1.69 | 1.94 | 1.05 | 1.44 | 1.02 | 1.00 | 0.76 | 3.59 | 1.10 | 1.43 | 1.62 | 1.62 | 1.52 | 1.19 | 1.28 | 31.00 | 1.42 | 1.94 | 2.04 | 1.27 | 1.75 | 1.74 | 1.59 | 1.08 | 2.27 | 1.0 | 1.6 | 2.1 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 15.00 | 19.00 | 28.00 | 35.00 | 18.00 | 20.00 | 18.00 | 18.00 | 9.40 | 58.80 | 18.50 | 20.90 | 20.70 | 20.60 | 19.70 | 17.30 | 21.00 | 225.00 | 19.70 | 22.20 | 32.10 | 17.30 | 24.30 | 27.00 | 23.30 | 15.5 | 34.9 | 12.4 | 21.2 | 34.7 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 0.97 | 9.39 | 0.83 | 3.15 | 4.58 | 3.96 | 1.77 | 5.56 | 2.04 | 20.70 | 63.00 | 6.10 | 1.00 | 5.20 | 25.00 | 3.40 | 11.80 | 2.40 | 94.20 | 17.50 | 15.20 | 5.30 | 3.80 | 6.10 | 1.40 | 2.30 | 6.0 | 22.2 | 6.6 | 14.2 | 17.9 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.74 | -3.20 | -2.60 | -2.22 | -1.71 | -2.99 | -2.88 | -2.64 | -3.05 | -3.62 | -2.30 | -2.91 | -2.93 | -2.55 | -3.29 | -2.84 | -3.14 | -2.50 | -2.50 | -3.20 | -2.97 | -2.24 | -3.61 | -2.73 | -2.19 | -2.44 | -3.06 | -1.94 | -3.1 | -2.8 | -2.0 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -2.99 | -3.45 | -2.85 | -2.47 | -1.96 | -3.24 | -3.13 | -2.89 | -3.31 | -3.94 | -2.62 | -3.23 | -3.25 | -2.87 | -3.61 | -3.16 | -3.46 | -2.75 | -2.82 | -3.52 | -3.29 | -2.56 | -3.93 | -3.05 | -2.51 | -2.76 | -3.38 | -2.26 | -3.4 | -3.1 | -2.3 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.43 | 9.78 | 9.53 | 9.32 | 9.01 | 9.66 | 9.60 | 9.43 | 9.54 | 9.82 | 9.20 | 9.81 | 9.87 | 9.50 | 9.78 | 9.31 | 9.86 | 9.51 | 9.09 | 9.88 | 9.72 | 9.25 | 9.99 | 9.65 | 9.27 | 9.45 | 9.97 | 9.14 | 10.1 | 9.7 | 9.1 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.68 | 10.00 | 9.78 | 9.57 | 9.26 | 9.91 | 9.85 | 9.68 | 9.80 | 10.10 | 9.52 | 10.10 | 10.20 | 9.82 | 10.10 | 9.63 | 10.20 | 9.77 | 9.41 | 10.20 | 10.00 | 9.57 | 10.30 | 9.97 | 9.59 | 9.77 | 10.3 | 9.46 | 10.4 | 10.0 | 9.4 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 99 | -- | -- | 349 | 189 | -- | 217 | -- | -- | 490 | 19,200 | 186 | 131 | 93 | 3,420 | 487 | 141 | 120 | -- | 1,960 | 2,150 | -- | -- | 731 | 48 | 401 | 142 | 2590 | -- | 124.0 | 655.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | 8 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 3.0 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 14 | -- | -- | 15 | 19 | -- | 14 | -- | -- | 11 | 86 | 12 | 12 | 7 | 24 | 15 | 11 | 12 | -- | 27 | 34 | -- | -- | 32 | -- | 11 | 8 | 53 | -- | 13.0 | 53.0 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | 2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | 13 | -- | -- | 41 | 22 | -- | <50 | -- | -- | 6 | 24 | 16 | 10 | 15 | 15 | 14 | 16 | <50 | -- | <5 | 12 | -- | -- | <5 | -- | 20 | 10 | 20 | -- | 9.0 | 21.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | 0.018 | <0.017 | -- | <0.017 | -- | -- | 0.029 | 1.050 | 0.023 | <0.017 | <0.017 | 0.073 | 0.032 | <0.017 | 0.011 | -- | <0.017 | 0.120 | -- | -- | 0.031 | -- | <0.017 | <0.09 | 0.13 | -- | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | 11 | <1 | <1 | <1 | 2 | <1 | <1 | <1.0 | -- | 3 | 2 | -- | -- | <1 | -- | 1 | <1 | 2 | -- | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | <0.40 | 1 | -- | <0.40 | -- | -- | <1 | 14 | <1 | <1 | <1 | 1 | <1 | <1 | <0.40 | -- | 6 | 4 | -- | -- | 1 | -- | <1 | <1 | 6 | -- | <1 | 6.0 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | 22 | 2 | <2 | 1 | 12 | 2 | 3 | <2.0 | 183 | 6 | 3 | <1 | <1 | <1 | <1 | 1 | <1 | 4 | 1.0 | <1 | 2.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 180 | -- | -- | 554 | 965 | 120 | 211 | 388 | 384 | 161 | 38,900 | 312 | 236 | 254 | 4,200 | 593 | 363 | 230 | 176,000 | 4,570 | 2,790 | 2,190 | 303 | 1,080 | 375 | 874 | 239 | 5460 | 164.0 | 560.0 | 5,530.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 3.0 | 0.5 | -- | <0.5 | -- | -- | 0.6 | 82.4 | <0.5 | <0.5 | <0.5 | 5.2 | 0.5 | <0.5 | <0.5 | -- | 5.9 | 4.3 | -- | -- | 0.6 | -- | 0.7 | 0.7 | 4.3 | -- | <0.5 | 3.2 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 51 | -- | -- | 113 | 632 | 23 | 30 | 53 | 39 | 26 | 13,200 | 67 | 71 | 81 | 124 | 140 | 60 | 130 | 15,800 | 985 | 921 | 2,420 | 75 | 436 | 212 | 250 | 55 | 2630 | 58.0 | 368.0 | 5,050.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | 13 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | -- | 5 | 2 | -- | -- | <2 | -- | <2 | <2 | 4 | -- | <2 | <2 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 | <0.1 | -- | <0.1 | 0.2 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 30 | -- | -- | 36 | 42 | -- | 24 | -- | -- | 12 | 82 | 22 | 24 | 24 | 25 | 26 | 19 | 25 | -- | 16 | 29 | -- | -- | 28 | -- | 31 | 17 | 54 | -- | 27.0 | 56.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 0.2 | <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 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | 7 | 4 | -- | 5 | -- | -- | 3 | 405 | 4 | <2 | 2 | 36 | 6 | 3 | 3 | -- | 41 | 30 | -- | -- | 14 | -- | 7 | 3 | 36 | -- | <2 | 6.0 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 1.6 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | -- | 0.2 | 0.2 | -- | -- | <0.1 | -- | <0.1 | <0.1 | 0.2 | -- | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | 30 | <2 | <2 | <2 | 2 | <2 | <2 | <2 | -- | 6 | 4 | -- | -- | <2 | -- | <2 | <2 | 4 | -- | <2 | 2.0 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 7 | -- | -- | 7 | 7 | <5.0 | <5.0 | <5.0 | 5 | <5 | 110 | 7 | 6 | <5 | 15 | <5 | <5 | <5.0 | 799 | 11 | 17 | 14 | <5 | 8 | <5 | 7 | <5 | 23 | <5 | <5 | 10.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 53 | >250 | -- | >250 | >250 | 280 | 85 | >250 | -- | 1,414 | >2420 | >2420 | 1,990 | >2420 | >2420 | 1,203 | 8 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | 534 | >2420 | 641 | 46 | 3020 | 2,380.0 | 1120 | NDOGT |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 22 | 24 | -- | 4 | 45 | 6 | 10 | >250 | <100 | 2 | 26 | 10 | 10 | 20 | 2 | <1 | >2420 | <10 | 16 | 17 | 9 | 30 | 16 | 1 | 478 | 1 | 23 | 20 | 20.0 | 7 | 50 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.46 | 10.70 | 4.68 | 1.21 | 6.64 | 0.21 | 1.19 | 1.93 | 1.41 | 1.88 | 6.62 | 0.13 | <0.50 | 1.60 | 2.02 | 1.91 | 0.32 | 1.02 | 90.33 | 5.12 | 8.22 | 127.14 | 0.38 | 18.67 | 20.15 | 1.85 | 0.93 | 141.49 | 0.60 | 2.47 | 14.60 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 1.85 | 11.10 | 5.62 | 1.32 | 7.71 | 0.19 | 1.07 | 1.73 | 1.18 | 2.28 | 7.58 | 0.22 | <0.50 | 2.00 | 2.98 | 1.91 | 0.33 | 1.07 | 121.83 | 4.62 | 13.77 | 185.98 | 0.48 | 25.84 | 24.37 | 2.89 | 1.60 | -- | * | 2.51 | 15.40 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.

**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

# HRM Water Quality Monitoring Program Results

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Larry Uteck Blvd | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | LU | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2011/10/17 | 2012/05/01 | 2012/08/15 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/15 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 |
| Sampling Time | hh:mm | -- | | | | | 10:30 | 15:20 | 11:30 | 10:10 | 14:30 | 14:30 | 13:00 | 11:45 | 10:45 | 9:54 | 13:45 | 10:23 | 10:05 | 12:20 | 11:20 | 11:45 | 11:25 | 10:15 AM | 12:00 | 10:00 | 8:40 | 12:25 PM | 3:20PM | 11:45 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 11.3 | 12.8 | 27.3 | 14.6 | 13.9 | 18.3 | 10.9 | 15.0 | 22.8 | 10.2 | 16.1 | 23.4 | 8.2 | 13.3 | 21.9 | 11.6 | 18.2 | 22.4 | 13.3 | 14.3 | 23.1 | 12.4 | 13.8 | 25.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 4.2 | 6.2 | 8.2 | 9.0 | 10.2 | 8.3 | 4.5 | 12.0 | 8.1 | 7.6 | 7.3 | 9.5 | 8.5 | 8.8 | 16.6 | 9.7 | 9.6 | 8.3 | 7.4 | 11.3 | 6.8 | 7.8 | ** | 5.54 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.07 | 7.82 | 6.65 | 6.78 | 6.39 | 7.49 | 5.45 | 6.50 | 7.23 | 6.17 | 6.57 | 6.80 | 6.99 | 7.17 | 6.24 | 6.23 | 6.80 | 7.11 | 6.90 | 6.73 | 6.85 | 7.09 | 7.22 | 6.92 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 203.0 | 955.0 | 480.0 | 262.0 | 670.0 | 320.0 | 845.0 | 999.0 | 611.0 | 371.0 | 0.6 | 569.0 | 436.2 | 588.0 | 574.0 | 483.4 | 755.0 | 660.0 | 590.0 | 434.6 | 588.0 | 384.4 | 621.0 | 710.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 | 11 | 23 | 13.0 | 10.0 | 23.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 34 | 224 | 116 | 52 | 190 | 99 | 258 | 243 | 104 | 70 | 210 | 132 | 93 | 154 | 164 | 92 | 247 | 154 | 183 | 96 | 124 | 74 | 174 | 202 |
| Colour | TCU | 5 | -- | -- | -- | | 94 | 18 | 14 | 18 | 7 | 7 | 19 | 6 | 8 | 18 | 8 | 8 | 6 | 17 | 13 | 26 | 12 | 12 | 8 | 28 | 21 | 24 | 18 | 14 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.61 | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.47 | 2.61 | 1.35 | 0.87 | 1.72 | 1.01 | 0.41 | 1.3 | 1.3 | 0.37 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | -- | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.41 | 2.61 | 1.01 | 0.51 | 1.72 | 0.87 | 0.16 | 1.3 | 0.8 | 0.30 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | 0.34 | 0.36 | <0.05 | 0.14 | 0.25 | <0.05 | 0.07 | 0.07 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | 0.06 | 0.04 | 0.16 | <0.03 | <0.03 | 0.04 | 0.04 | 0.05 | <0.03 | <0.03 | <0.050 | 0.05 | <0.03 | 0.05 | 0.05 | <0.03 | <0.03 | 0.09 | 0.04 | <0.03 | 0.17 | <0.03 | <0.03 | 0.09 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | 0.4 | 4.2 | 0.7 | -- | 0.5 | <0.4 | 1.2 | 1.7 | <0.4 | 0.3 | 8.0 | 0.7 | 1.2 | 1.1 | 0.6 | 0.7 | 3.8 | 0.6 | 1.1 | 0.60 | <0.4 | 0.6 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 11.0 | 3.7 | 22.8 | 4.8 | 3.1 | 4.5 | 2.9 | 6.9 | 4.7 | 4.7 | 2.2 | 7.6 | 6.5 | 3.9 | 5.3 | 7.6 | 6.1 | 6.8 | 5.4 | 9.3 | 5.5 | 5.0 | 4.3 | 5.70 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.41 | 6.70 | 7.20 | 7.20 | 6.92 | 7.11 | 6.43 | 6.42 | 7.42 | 6.41 | 6.95 | 7.30 | 7.15 | 6.94 | 7.42 | 6.96 | 7.26 | 7.40 | 7.13 | 7.01 | 7.46 | 7.29 | 7.17 | 7.45 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 7.6 | 30.7 | 22.1 | 14.5 | 22.0 | 17.6 | 21.8 | 23.9 | 27.6 | 12.6 | 27,000.0 | 20.3 | 15.9 | 20.6 | 17.2 | 17.9 | 25.7 | 23.8 | 22.8 | 12.7 | 20.8 | 14.9 | 25.2 | 30.2 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 2.3 | 4.2 | 3.6 | 2.2 | 2.8 | 2.7 | 4.0 | 4.2 | 3.8 | 2.2 | 3,800.0 | 3.4 | 1.9 | 2.9 | 3.4 | 2.6 | 3.8 | 3.0 | 2.5 | 1.6 | 2.7 | 2.1 | 3.5 | 4.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.034 | 0.043 | 0.036 | 0.030 | 0.006 | 0.027 | 0.040 | 0.260 | 0.028 | 0.039 | 0.007 | 0.009 | 0.011 | 0.020 | 0.011 | 0.012 | 0.024 | 0.027 | 0.008 | 0.078 | 0.019 | 0.021 | 0.010 | 0.014 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 2.1 | 3.2 | 3.6 | 2.5 | 2.6 | 2.8 | 2.9 | 3.1 | 3.7 | 3.0 | 3,300.0 | 2.8 | 1.6 | 2.8 | 2.6 | 2.7 | 3.2 | 3.0 | 2.6 | 2.2 | 2.9 | 2.3 | 3.2 | 3.4 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 22.7 | 124.0 | 62.2 | 32.3 | 95.1 | 51.7 | 170.0 | 147.0 | 88.1 | 62.7 | 110.0 | 102.0 | 57.8 | 96.4 | 81.1 | 65.6 | 137.0 | 113.0 | 86.9 | 73.0 | 94.7 | 69.9 | 159.0 | 129.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 6.9 | 4.9 | 0.7 | 6.3 | 5.1 | 8.6 | 7.0 | 2.1 | 2.5 | 6.9 | 3.6 | 4.9 | 6.9 | 4.2 | 1.3 | 6.7 | 4.6 | 3.6 | 5.9 | 3.5 | 5.4 | 4.7 | 3.7 | 3.0 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 13 | 5 | 165 | <5 | <5 | <5 | <5 | 626 | <5 | <5 | <1.0 | <5 | 6 | 29 | <5 | <5 | 22 | 16 | <5 | 52 | 11 | <5 | 7.0 | 6.0 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 21 | 26 | 25 | 23 | 26 | 29 | 33 | 29 | 20 | 27 | 27 | 31 | 30 | 28 | 23 | 41 | 32 | 18 | 33 | 19 | 15.0 | 24.0 | 22.0 | 23.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 3.3 | 4.1 | 23.0 | 2.3 | 1.8 | 1.6 | 0.7 | 42.7 | 10.1 | 1.6 | 0.3 | 2.8 | 2.4 | 15.8 | 4.1 | 3.0 | 3.3 | 7.3 | 6.6 | 3.0 | 21.4 | 2.4 | 4.5 | 3.6 | 3.7 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 190 | 813 | 482 | 255 | 732 | 433 | 840 | 819 | 605 | 394 | 790 | 575 | 462 | 582 | 739 | 371 | 849 | 673 | 610 | 518 | 620 | 422 | 871 | 765 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.69 | 7.21 | 4.12 | 2.36 | 6.10 | 4.02 | 8.13 | 8.15 | 3.80 | 2.68 | 6.77 | 4.73 | 3.62 | 5.26 | 5.68 | 3.91 | 7.99 | 5.32 | 5.24 | 3.40 | 4.3 | 2.9 | 5.7 | 6.7 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 | 11 | 23 | 13.0 | 10.0 | 23.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 109 | 426 | 246 | 144 | 347 | 229 | 496 | 477 | 262 | 187 | 400 | 305 | 216 | 321 | 310 | 242 | 463 | 341 | 311 | 216 | 277 | 201.0 | 399.0 | 408.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.70 | 7.40 | 4.30 | 2.43 | 5.55 | 3.51 | 8.90 | 8.24 | 5.64 | 3.64 | 6.69 | 5.86 | 3.52 | 5.78 | 4.76 | 4.06 | 7.65 | 6.74 | 5.21 | 4.04 | 5.52 | 4.1 | 8.6 | 7.6 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 29.00 | 94.00 | 70.00 | 45.30 | 66.50 | 55.10 | 70.90 | 77.00 | 84.60 | 40.50 | 84.00 | 64.70 | 47.50 | 63.40 | 56.90 | 55.40 | 79.80 | 71.80 | 67.20 | 38.3 | 63.1 | 45.9 | 77.3 | 92.7 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 0.29 | 1.30 | 2.20 | 1.40 | 4.70 | 6.80 | 4.50 | 0.60 | 19.40 | 15.20 | 0.59 | 10.60 | 1.40 | 4.70 | 8.80 | 1.80 | 2.20 | 11.80 | 0.30 | 8.7 | 12.5 | 15.9 | 20.4 | 6.5 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.95 | -2.32 | -1.94 | -2.10 | -2.60 | -1.93 | -2.98 | -2.38 | -1.45 | -3.41 | -1.95 | -1.82 | -2.16 | -2.27 | -1.55 | -2.27 | -1.87 | -1.41 | -1.85 | -2.47 | -1.49 | -2.0 | -2.1 | -1.4 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.20 | -2.64 | -2.26 | -2.42 | -2.92 | -2.25 | -3.30 | -2.70 | -1.77 | -3.73 | -2.20 | -2.14 | -2.48 | -2.59 | -1.87 | -2.59 | -2.19 | -1.75 | -2.17 | -2.79 | -1.81 | -2.4 | -2.4 | -1.7 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.38 | 9.02 | 9.14 | 9.30 | 9.52 | 9.04 | 9.47 | 8.80 | 8.87 | 9.82 | 8.90 | 9.12 | 9.31 | 9.21 | 8.97 | 9.23 | 9.13 | 8.83 | 8.98 | 9.48 | 8.95 | 9.3 | 9.3 | 8.8 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.63 | 9.34 | 9.46 | 9.62 | 9.84 | 9.36 | 9.79 | 9.12 | 9.19 | 10.10 | 9.15 | 9.44 | 9.63 | 9.53 | 9.29 | 9.55 | 9.45 | 9.15 | 9.30 | 9.80 | 9.27 | 9.7 | 9.6 | 9.1 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminium (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | -- | 218 | 227 | 252 | 107 | 447 | 31 | 1,400 | 46 | 109 | 59 | -- | 66 | 1,420 | -- | -- | 61 | 978 | 29 | 231 | 24 | -- | 83.0 | 314.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | -- | 225 | 201 | 116 | 133 | 134 | 119 | 185 | 157 | 80 | 150 | -- | 111 | 127 | -- | -- | 132 | -- | 111 | 110 | 143 | -- | 135.0 | 184.0 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | -- | 11 | 17 | 22 | 10 | 22 | 18 | 22 | 20 | 21 | <50 | -- | 9 | 14 | -- | -- | <5 | -- | 19 | 9 | 16 | -- | 11.0 | 16.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | -- | 0.538 | 0.171 | 0.168 | 0.300 | 0.236 | 0.144 | 0.171 | 0.031 | 0.079 | 0.110 | -- | 0.176 | 0.426 | -- | -- | 0.069 | -- | 0.052 | 0.14 | <0.09 | -- | 0.1 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | -- | <1 | <1 | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | 3 | -- | -- | <1 | -- | 1 | <1 | <1 | -- | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | -- | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | 2 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 3 | <2 | 3 | 16 | 2 | 6 | 2 | 2 | <1 | 4 | 2 | 3 | 3 | 10 | <1 | 3 | <1 | 14 | 3 | 4 | 2 | 6.0 | 3.0 | 2.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 2,150 | 347 | 1,320 | 509 | 194 | 898 | 157 | 2,090 | 207 | 229 | 170 | 671 | 171 | 1,540 | 174 | 223 | <50 | 3,540 | 289 | 494 | 109 | 206.0 | 290.0 | 556.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | -- | 0.8 | 0.7 | 1.0 | <0.5 | 1.4 | <0.5 | 1.8 | <0.5 | <0.5 | <0.5 | -- | <0.5 | 3.4 | -- | -- | <0.5 | -- | <0.5 | 1.3 | <0.5 | -- | <0.5 | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 129 | 182 | 485 | 120 | 87 | 89 | 26 | 71 | 182 | 36 | 110 | 371 | 61 | 444 | 148 | 35 | 77 | 1,870 | 91 | 91 | 240 | 40.0 | 51.0 | 66.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | 3 | <2 | <2 | <2.0 | -- | <2 | 3 | -- | -- | <2 | -- | <2 | <2 | 2 | -- | 10.0 | <2 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | -- | <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 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | -- | 112 | 94 | 60 | 93 | 90 | 96 | 116 | 111 | 54 | 120 | -- | 43 | 89 | -- | -- | 104 | -- | 111 | 56 | 115 | -- | 107.0 | 134.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | -- | <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 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | -- | 4 | 3 | 7 | 3 | 11 | 2 | 22 | <2 | 3 | <2 | -- | <2 | 31 | -- | -- | <2 | -- | <2 | 6 | 2 | -- | <2 | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | -- | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | 0.2 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | 4 | -- | -- | 3 | -- | <2 | 2 | <2 | -- | 5.0 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 9 | 79 | 92 | 39 | 57 | 49 | 26 | 17 | 8 | 23 | 27 | 17 | 16 | 64 | 7 | 52 | 21 | 120 | 22 | 41 | 13 | 38.0 | 27.0 | 8.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | -- | >2420 | >2420 | 2,420 | 866 | >2420 | 866 | >2420 | 961 | >2420 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | 488 | >2420 | 1,990 | 210 | 5020 | 330.0 | 540.0 | NDOGT |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | <100 | <1 | 2 | 19 | 3 | 86 | <1 | <1 | 7 | 1,730 | <10 | 19 | 6 | <1 | 40 | 50 | 6 | 51 | 4 | <1 | 20 | 30.0 | <10 | 26.0 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.99 | 2.44 | 32.52 | 1.80 | 1.54 | 2.30 | 0.12 | 99.13 | 2.54 | 0.96 | 0.69 | 3.14 | 4.94 | 5.43 | 4.57 | 1.55 | 25.83 | 21.03 | 2.47 | 78.76 | 5.50 | 2.39 | 4.19 | 6.38 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 2.08 | 2.71 | 31.31 | 2.15 | 1.77 | 2.50 | 0.11 | 98.00 | 2.51 | 0.96 | 0.68 | 3.10 | 2.71 | 6.73 | 5.23 | 1.61 | 31.14 | 24.37 | 2.85 | 131.56 | -- | * | 4.24 | 6.19 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

"--" = no guideline available / Not Tested.

CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.

**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

# HRM Water Quality Monitoring Program Results

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

Paper Mill Lake — Sample Site: PML1

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | PML1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 |
| Sampling Time | hh:mm | -- | | | | | 13:45 | 13:00 | 13:00 | 13:35 | 15:15 | 13:00 | 13:00 | 16:50 | 17:00 |
| **FIELD DATA** | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 3.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 15.7 | 17.1 | 16.2 | 13.2 | 22.7 | 9.1 | 10.3 | 22.1 | 13.6 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.6 | 8.1 | 6.9 | 8.8 | 7.8 | 10.4 | 10.4 | 8.2 | 9.5 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.39 | 6.57 | 6.64 | 7.06 | 7.35 | 5.89 | 6.28 | 6.20 | 6.11 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 561.0 | 279.0 | 223.0 | 265.0 | 234.0 | 124.5 | 176.6 | 173.6 | 105.5 |
| **INORGANICS** | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 39 | 64 | 58 | 67 | 61 | 24 | 44 | 43 | 18 |
| Colour | TCU | 5 | -- | -- | -- | | 54 | 15 | 21 | 19 | 12 | 57 | 32 | 38 | 65 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.49 | 0.10 | 0.17 | 0.42 | 0.27 | 0.66 | 0.55 | 0.15 | 0.62 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.49 | -- | -- | 0.42 | 0.27 | -- | 0.55 | -- | -- |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 6.5 | 3.6 | 4.7 | 0.7 | 3.3 | 6.7 | 4.6 | 5.0 | 8.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.36 | 6.75 | 6.79 | 6.63 | 7.04 | 6.58 | 6.54 | 6.83 | 6.67 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 4.5 | 6.9 | 6.4 | 8.4 | 9.0 | 5.9 | 6.0 | 5.0 | 4.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.6 | 1.1 | 1.0 | 1.3 | 1.2 | 0.8 | 1.0 | 0.9 | 0.8 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | 0.002 | 0.018 | 0.002 | <0.002 | 0.014 | 0.011 | 0.030 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 0.9 | 0.9 | 1.2 | 1.1 | 1.3 | 1.2 | 0.8 | 1.4 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 25.0 | 38.0 | 34.0 | 35.2 | 40.2 | 18.4 | 26.8 | 22.8 | 13.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 4.5 | 2.6 | 2.8 | 3.8 | 3.4 | 5.9 | 3.7 | 2.6 | 5.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <2 | 3 | 9 | 7 | <2 | <1 | 1 | <2 | 5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 13 | 11 | 11 | 13 | 12 | 12 | 12 | 10 | 12 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.4 | 0.5 | 0.6 | 8.2 | 0.9 | 0.5 | 0.6 | 1.0 | 1.2 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 170 | 250 | 230 | 260 | 250 | 130 | 180 | 170 | 100 |
| **Calculated Parameters** | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.51 | 2.18 | 1.99 | 2.34 | 2.15 | 1.09 | 1.62 | 1.56 | 0.92 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 93 | 129 | 118 | 137 | 134 | 75 | 100 | 90 | 63 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.40 | 2.11 | 1.89 | 2.11 | 2.33 | 1.20 | 1.58 | 1.35 | 0.95 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 14.00 | 22.00 | 20.00 | 26.00 | 28.00 | 18.00 | 19.00 | 16.00 | 15.00 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 3.78 | 1.63 | 2.58 | 5.17 | 4.02 | 4.80 | 1.25 | 7.22 | 1.60 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.57 | -2.90 | -2.94 | -2.96 | -2.43 | -3.25 | -3.27 | -2.94 | -3.13 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.82 | -3.15 | -3.19 | -3.21 | -2.68 | -3.50 | -3.53 | -3.19 | -3.38 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.93 | 9.65 | 9.73 | 9.59 | 9.47 | 9.83 | 9.81 | 9.77 | 9.80 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.20 | 9.90 | 9.98 | 9.84 | 9.72 | 10.10 | 10.10 | 10.00 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 260 | -- | -- | 665 | 46 | -- | 233 | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 23 | -- | -- | 35 | 24 | -- | 27 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | 8 | -- | -- | 11 | 9 | -- | <50 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | 0.032 | <0.017 | -- | <0.017 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | 2 | <2.0 | <2.0 | 4 | <2.0 | 2 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 140 | -- | -- | 837 | 89 | 161 | 141 | 315 | 528 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 1.7 | <0.5 | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 17 | -- | -- | 142 | 69 | 41 | 14 | 128 | 62 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 18 | -- | -- | 36 | 37 | -- | 25 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | 8 | <2.0 | -- | 4 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 8 | -- | -- | 10 | 5 | 6 | 6 | 6 | 5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 200 | 73 | -- | >250 | >250 | >250 | 85 | >250 | -- |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 33 | 45 | -- | 19 | >250 | 2 | 2 | 34 | <100 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.62 | 2.31 | 0.57 | 0.82 | 1.12 | 0.07 | 2.85 | 0.86 | 0.15 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.64 | 2.21 | 0.64 | 0.74 | 1.04 | 0.06 | 2.75 | 0.76 | 0.15 |

| Tested Parameters | PML1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | 2012/05/01 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/15 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 |
| Sampling Time | 12:50 | 10:55 | 10:51 | 11:35 | 10:45 | 10:30 | 14:45 | 12:35 | 12:45 | 08:45 | 8:20 |
| **FIELD DATA** | | | | | | | | | | | |
| Secchi Depth | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.9 |
| Water Temp | 8.3 | 14.9 | 11.6 | 22.5 | 12.3 | 12.1 | 23.6 | 12.4 | 15.1 | 24.0 | 9.3 |
| Dissolved Oxygen | 8.4 | 8.6 | 10.0 | 7.7 | 9.9 | 12.1 | 7.5 | 8.1 | 7.2 | 8.0 | 8.6 |
| pH (in Situ) | 7.58 | 6.63 | 6.39 | 7.20 | 6.32 | 6.60 | 7.42 | 6.60 | 6.90 | 6.34 | 7.98 |
| Specific Conductance | 366.0 | 186.4 | 215.1 | 199.0 | 250.5 | 431.0 | 263.0 | 210.0 | 0.2 | 432.1 | 289.1 |
| **INORGANICS** | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 |
| Dissolved Chloride (Cl) | 55 | 45 | 57 | 57 | 48 | 63 | 50 | 46 | 65 | 57 | 56 |
| Colour | 38 | 29 | 8 | 15 | 11 | 17 | 10 | 30 | 31 | 7 | 15 |
| Nitrite + Nitrate | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 |
| Nitrate (N) | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 |
| Nitrite (N) | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | 0.06 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | <0.03 | <0.03 | <0.050 | <0.03 | 0.03 |
| Total Kjeldahl Nitrogen as N | <0.4 | 0.4 | -- | 0.4 | 0.8 | 0.4 | 0.4 | <5 | 0.5 | 1.2 | 6.0 |
| Total Organic Carbon | 5.7 | 5.3 | 4.2 | 4.1 | 5.1 | 4.0 | 2.0 | 4.4 | 2.7 | 5.4 | 5.8 |
| Orthophosphate (as P) | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 |
| pH (units) | 6.60 | 6.80 | 6.71 | 6.92 | 6.88 | 6.66 | 7.00 | 6.64 | 6.67 | 6.95 | 6.84 |
| Total Calcium (Ca) | 6.0 | 6.0 | 6.8 | 6.6 | 6.9 | 6.9 | 9.1 | 7.0 | 6,900.0 | 7.8 | 4.8 |
| Total Magnesium (Mg) | 1.0 | 1.1 | 1.0 | 0.9 | 1.5 | 1.3 | 1.4 | 1.0 | 970.0 | 1.4 | 0.9 |
| Total Phosphorus | 0.019 | 0.030 | 0.006 | 0.007 | 0.047 | 0.012 | 0.030 | 0.021 | 0.005 | 0.060 | 0.018 |
| Total Potassium (K) | 0.8 | 1.0 | 0.8 | 1.0 | 1.5 | 0.9 | 1.3 | 0.9 | 800.0 | 1.0 | 0.6 |
| Total Sodium (Na) | 33.6 | 29.8 | 35.3 | 28.5 | 32.2 | 38.1 | 41.6 | 33.7 | 35.0 | 38.6 | 25.6 |
| Reactive Silica (SiO2) | 2.9 | 3.2 | 2.8 | 2.6 | 2.6 | 2.5 | 2.3 | 2.7 | 2.4 | 2.4 | 2.5 |
| Total Suspended Solids | 9 | 6 | <5 | <5 | 23 | 6 | <5 | <5 | 1 | 149 | 6 |
| Dissolved Sulphate (SO4) | 7 | 10 | 8 | 10 | 10 | 10 | 8 | 8 | 8 | 9 | 8 |
| Turbidity (NTU) | 0.7 | 1.0 | 0.7 | 1.1 | 19.2 | 1.4 | 0.9 | 1.5 | 0.5 | 3.8 | 24.2 |
| Conductivity (uS/cm) | 214 | 179 | 227 | 218 | 209 | 230 | 261 | 224 | 240 | 246 | 241 |
| **Calculated Parameters** | | | | | | | | | | | |
| Anion Sum | 2.11 | 1.49 | 1.79 | 1.95 | 1.71 | 2.62 | 1.73 | 1.62 | 2.11 | 1.93 | 1.88 |
| Bicarb. Alkalinity (calc. as CaCO3) | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 |
| Calculated TDS | 117 | 95 | 110 | 109 | 115 | 140 | 117 | 102 | 120 | 126 | 109 |
| Carb. Alkalinity (calc. as CaCO3) | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 |
| Cation Sum | 1.89 | 1.78 | 2.00 | 1.69 | 2.56 | 2.18 | 2.45 | 1.94 | 1.98 | 2.61 | 1.93 |
| Hardness (CaCO3) | 19.10 | 19.50 | 21.10 | 20.20 | 23.40 | 22.60 | 28.50 | 21.60 | 21.00 | 25.20 | 15.70 |
| Ion Balance (% Difference) | 5.50 | 9.00 | 5.50 | 7.00 | 19.80 | 9.20 | 17.00 | 9.20 | 3.18 | 15.20 | 1.20 |
| Langelier Index (@ 20C) | -2.91 | -3.31 | -3.35 | -3.07 | -3.03 | -2.61 | -2.79 | -3.26 | -3.13 | -2.98 | -3.29 |
| Langelier Index (@ 4C) | -3.23 | -3.63 | -3.67 | -3.39 | -3.35 | -2.93 | -3.11 | -3.58 | -3.38 | -3.30 | -3.61 |
| Saturation pH (@ 20C) | 9.51 | 10.10 | 10.10 | 9.99 | 9.91 | 9.27 | 9.79 | 9.90 | 9.80 | 9.93 | 10.10 |
| Saturation pH (@ 4C) | 9.83 | 10.40 | 10.40 | 10.30 | 10.20 | 9.59 | 10.10 | 10.20 | 10.10 | 10.20 | 10.50 |
| **Metals (ICP-MS)** | | | | | | | | | | | |
| Total Aluminum (Al) | 177 | 306 | 141 | 103 | 3,920 | 305 | 129 | 142 | 140 | -- | 2,320 |
| Total Antimony (Sb) | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 |
| Total Arsenic (As) | <2 | <2 | <2 | <2 | 2 | <2 | <2 | <2 | <1.0 | -- | <2 |
| Total Barium (Ba) | 22 | 19 | 20 | 12 | 40 | 23 | 23 | 18 | 21 | -- | 34 |
| Total Beryllium (Be) | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 |
| Total Bismuth (Bi) | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 |
| Total Boron (B) | 6 | 9 | 6 | 8 | 9 | 8 | 13 | 11 | <50 | -- | <5 |
| Total Cadmium (Cd) | <0.017 | 0.066 | 0.021 | 0.018 | 0.430 | <0.017 | 0.020 | <0.017 | 0.025 | -- | 0.146 |
| Total Chromium (Cr) | <1 | <1 | <1 | <1 | 3 | <1 | <1 | <1 | <1.0 | -- | 2 |
| Total Cobalt (Co) | <1 | 2 | <1 | <1 | 9 | <1 | <1 | <1 | <0.40 | -- | 3 |
| Total Copper (Cu) | <2 | <2 | <2 | 1 | 6 | 1 | <1 | 2 | <2.0 | 3 | 4 |
| Total Iron (Fe) | 137 | 742 | 130 | 205 | 5,300 | 239 | 296 | 182 | 93 | 4,460 | 6,020 |
| Total Lead (Pb) | <0.5 | 0.9 | <0.5 | <0.5 | 13.5 | 0.9 | <0.5 | <0.5 | <0.5 | -- | 6.3 |
| Total Manganese (Mn) | 48 | 214 | 33 | 58 | 693 | 54 | 260 | 49 | 34 | 296 | 278 |
| Total Molybdenum (Mo) | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 |
| Total Nickel (Ni) | <2 | 2 | <2 | <2 | 9 | <2 | <2 | <2 | <2.0 | -- | 5 |
| Total Selenium (Se) | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | 1 |
| Total Silver (Ag) | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | 26 | 30 | 31 | 25 | 34 | 35 | 37 | 30 | 32 | -- | 22 |
| Total Thallium (Tl) | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 |
| Total Tin (Sn) | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 |
| Total Titanium (Ti) | <2 | 4 | <2 | <2 | 65 | 4 | <2 | 3 | <2 | -- | 25 |
| Total Uranium (U) | 0.1 | <0.1 | <0.1 | <0.1 | 0.6 | <0.1 | <0.1 | <0.1 | <0.1 | -- | 0.6 |
| Total Vanadium (V) | <2 | <2 | <2 | <2 | 10 | <2 | <2 | <2 | <2 | -- | 7 |
| Total Zinc (Zn) | <5 | 13 | 8 | <5 | 62 | <5 | <5 | 6 | 11 | 13 | 12 |
| **MICROBIOLOGICAL** | | | | | | | | | | | |
| Total Coliform | 411 | 2,420 | 866 | 1,730 | 1,011 | 613 | 2,420 | >2420 | --- | >2420 | >2420 |
| E. coli | 2 | 20 | 12 | 4 | 6 | 6 | 10 | 10 | <10 | 3 | 6 |
| Chlorophyll A - Acidification method | 1.03 | 0.69 | 1.17 | 1.10 | 5.07 | 0.67 | 0.64 | 0.91 | 0.57 | 8.84 | 4.67 |
| Chlorophyll A - Welschmeyer method | 1.10 | 0.91 | 1.37 | 1.10 | 6.39 | 0.65 | 0.65 | 0.87 | 0.54 | 9.54 | 3.69 |

| Tested Parameters | PML1 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 | 2009/06/29 |
| Sampling Time | 13:15 | 9:30 | 9:15 | 13:40 | 13:45 | 13:25 | 13:00 | 11:40 | 14:45 PM | 1:10PM | 4:20 PM | 13:15 |
| **FIELD DATA** | | | | | | | | | | | | |
| Secchi Depth | 2.7 | 4.2 | 3.8 | 4.1 | 4.7 | 3.9 | 4.1 | 2.4 | 2.9 | 1.9 | 4.30 | 2.8 |
| Water Temp | 12.8 | 21.6 | 12.1 | 17.2 | 23.0 | 14.4 | 14.4 | 24.7 | 12.3 | 12.0 | 28.1 | 14.8 |
| Dissolved Oxygen | 8.8 | 6.5 | 13.0 | 7.0 | 7.8 | 8.2 | 9.4 | 5.6 | 8.4 | ** | 6.07 | 10.2 |
| pH (in Situ) | 7.57 | 5.94 | 4.63 | 6.91 | 6.74 | 7.31 | 6.29 | 6.75 | 7.19 | 7.38 | 6.53 | 6.36 |
| Specific Conductance | 231.0 | 289.0 | 234.3 | 234.0 | 273.0 | 255.0 | 203.7 | 203.8 | 208.1 | 177.9 | 257.0 | 267.0 |
| **INORGANICS** | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | <5 | 8 | 7 | <5 | 13 | 9 | <5 | 10 | 8.0 | <5 | 11.0 | 5 |
| Dissolved Chloride (Cl) | 59 | 67 | 50 | 66 | 63 | 59 | 57 | 54 | 47 | 55 | 64 | 63 |
| Colour | 18 | 16 | 20 | 20 | 18 | 24 | 28 | 7 | 31 | 46 | 16 | 22 |
| Nitrite + Nitrate | 0.19 | 0.09 | 0.16 | 0.28 | 0.28 | 0.20 | 0.51 | 0.15 | 0.2 | 0.2 | 0.05 | 0.14 |
| Nitrate (N) | 0.19 | <0.05 | 0.16 | 0.17 | 0.13 | 0.20 | 0.40 | 0.05 | 0.2 | 0.2 | 0.05 | 0.14 |
| Nitrite (N) | <0.05 | 0.09 | <0.05 | 0.11 | 0.15 | <0.05 | 0.11 | 0.10 | <0.05 | <0.05 | <0.05 | <0.01 |
| Nitrogen (Ammonia Nitrogen) | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | 0.05 | <0.03 | 0.04 | <0.03 | <0.03 | 0.10 | <0.05 |
| Total Kjeldahl Nitrogen as N | 2.6 | 3.4 | 0.4 | 0.5 | 0.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.6 | <0.4 | -- |
| Total Organic Carbon | 7.1 | 6.1 | 8.7 | 5.7 | 4.7 | 6.3 | 4.9 | 3.2 | 4.0 | 4.2 | 4.20 | 3.6 |
| Orthophosphate (as P) | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | 6.36 | 6.86 | 6.87 | 6.80 | 7.15 | 6.75 | 6.84 | 7.28 | 7.16 | 6.78 | 7.22 | 6.50 |
| Total Calcium (Ca) | 7.9 | 10.5 | 7.6 | 8.0 | 8.2 | 9.5 | 6.3 | 8.7 | 8.4 | 7.0 | 8.3 | 6.1 |
| Total Magnesium (Mg) | 1.5 | 1.8 | 1.3 | 1.3 | 1.2 | 1.5 | 1.1 | 1.4 | 1.4 | 1.2 | 1.3 | 1.1 |
| Total Phosphorus | 0.173 | 0.104 | 0.013 | 0.041 | 0.036 | 0.099 | 0.032 | 0.011 | 0.012 | 0.007 | 0.008 | <0.02 |
| Total Potassium (K) | 1.0 | 1.3 | 1.1 | 1.0 | 1.1 | 1.3 | 0.9 | 1.2 | 1.1 | 0.9 | 1.2 | 0.9 |
| Total Sodium (Na) | 37.6 | 35.1 | 32.1 | 40.9 | 45.3 | 36.0 | 35.5 | 37.5 | 39.2 | 42.6 | 45.4 | 35.0 |
| Reactive Silica (SiO2) | 2.5 | 0.8 | 2.7 | 1.9 | 1.3 | 1.8 | 2.7 | 1.2 | 2.3 | 2.3 | 0.9 | 2.6 |
| Total Suspended Solids | 531 | 10 | 18 | 20 | 5 | 104 | <5 | <5 | <5 | <5 | <5 | 2 |
| Dissolved Sulphate (SO4) | 11 | 11 | 11 | 10 | 9 | 11 | 9 | 7.0 | 9.0 | 7.0 | 9.0 | 11 |
| Turbidity (NTU) | 199.0 | 112.0 | 2.6 | 3.3 | 3.2 | 31.3 | 0.7 | 0.5 | 2.1 | 1.2 | 1.2 | 0.8 |
| Conductivity (uS/cm) | 224 | 310 | 189 | 256 | 277 | 248 | 242 | 274 | 232 | 256 | 264 | 240 |
| **Calculated Parameters** | | | | | | | | | | | | |
| Anion Sum | 1.91 | 2.29 | 1.79 | 2.09 | 2.24 | 2.09 | 1.83 | 1.88 | 1.7 | 1.7 | 2.2 | 2.11 |
| Bicarb. Alkalinity (calc. as CaCO3) | <5 | 8 | 7 | <5 | 13 | 9 | <5 | 10 | 8.0 | <5 | 11.0 | 5 |
| Calculated TDS | 141 | 148 | 108 | 129 | 137 | 142 | 112 | 117 | 112.0 | 115.0 | 136.0 | 123 |
| Carb. Alkalinity (calc. as CaCO3) | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1 |
| Cation Sum | 3.54 | 3.33 | 1.93 | 2.35 | 2.53 | 3.15 | 1.99 | 2.23 | 2.3 | 2.4 | 2.6 | 1.94 |
| Hardness (CaCO3) | 25.90 | 33.60 | 24.30 | 25.30 | 25.40 | 29.90 | 20.3 | 27.5 | 26.7 | 22.4 | 26.1 | 20.00 |
| Ion Balance (% Difference) | 30.00 | 18.60 | 3.80 | 5.80 | 6.10 | 20.30 | 4.2 | 8.4 | 14.9 | 15.7 | 6.9 | 4.20 |
| Langelier Index (@ 20C) | -3.65 | -2.82 | -2.99 | -3.20 | -2.42 | -2.92 | -3.26 | -2.37 | -2.6 | -3.3 | -2.4 | -3.33 |
| Langelier Index (@ 4C) | -3.97 | -3.14 | -3.31 | -3.52 | -2.74 | -3.24 | -3.58 | -2.69 | -2.9 | -3.6 | -2.7 | -3.59 |
| Saturation pH (@ 20C) | 10.00 | 9.68 | 9.86 | 10.00 | 9.57 | 9.67 | 10.1 | 9.65 | 9.8 | 10.1 | 9.6 | 9.83 |
| Saturation pH (@ 4C) | 10.30 | 10.00 | 10.20 | 10.30 | 9.89 | 9.99 | 10.4 | 9.97 | 10.1 | 10.4 | 10.0 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | |
| Total Aluminum (Al) | 7,690 | -- | -- | 250 | 94 | 4,190 | 151 | 26 | -- | 139.0 | 25.0 | 130 |
| Total Antimony (Sb) | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Arsenic (As) | 4 | -- | -- | <2 | -- | 3 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Barium (Ba) | 60 | -- | -- | 22 | -- | 58 | 19 | 12 | -- | 21.0 | 16.0 | 16 |
| Total Beryllium (Be) | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Bismuth (Bi) | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Boron (B) | 10 | -- | -- | <5 | -- | 12 | 6 | 11 | -- | 7.0 | 10.0 | 5 |
| Total Cadmium (Cd) | 0.227 | -- | -- | 0.041 | -- | 0.179 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.300 |
| Total Chromium (Cr) | 6 | -- | -- | <1 | -- | 5 | <1 | <1 | -- | <1 | <1 | <2 |
| Total Cobalt (Co) | 6 | -- | -- | <1 | -- | 6 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Copper (Cu) | 10 | <1 | <1 | <1 | <1 | 8 | <1 | <1 | 1.0 | 1.0 | <1 | <2 |
| Total Iron (Fe) | 13,600 | 8,250 | 171 | 206 | 359 | 12,600 | 93 | 184 | 82.0 | 136.0 | 187.0 | 100 |
| Total Lead (Pb) | 13.9 | -- | -- | <0.5 | -- | 9.1 | 1.2 | <0.5 | -- | <0.5 | <0.5 | <0.5 |
| Total Manganese (Mn) | 424 | 281 | 53 | 64 | 125 | 894 | 21 | 64 | 22.0 | 26.0 | 115.0 | 58 |
| Total Molybdenum (Mo) | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Nickel (Ni) | 7 | -- | -- | 22 | -- | 6 | 2 | <2 | -- | 5.0 | 2.0 | 2 |
| Total Selenium (Se) | 1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <2 |
| Total Silver (Ag) | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.5 |
| Total Strontium (Sr) | 40 | -- | -- | 34 | -- | 47 | 27 | 42 | -- | 35.0 | 37.0 | 30 |
| Total Thallium (Tl) | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Tin (Sn) | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Titanium (Ti) | 106 | -- | -- | 2 | -- | 75 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Uranium (U) | 0.9 | -- | -- | <0.1 | -- | 0.6 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Vanadium (V) | 16 | -- | -- | <2 | -- | 12 | <2 | <2 | -- | 2.0 | <2 | <2 |
| Total Zinc (Zn) | 34 | 20 | <5 | 11 | <5 | 29 | 6 | 6 | <5 | 7.0 | <5 | 12 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | |
| Total Coliform | >2420 | 1,410 | >2420 | 665 | >2420 | 166 | 9 | 400 | 4,000.0 | 128 | 500 | 49 |
| E. coli | >2420 | 34 | 10 | 6 | 2 | <1 | 1 | 10 | 13.0 | <1 | 4 | 10 |
| Chlorophyll A - Acidification method | 8.00 | 4.71 | 1.70 | 4.97 | 4.40 | 4.86 | 1.93 | 1.14 | 1.12 | 1.53 | 1.84 | 1.15 |
| Chlorophyll A - Welschmeyer method | 12.31 | 10.82 | 1.76 | 6.45 | 4.96 | 6.58 | 0.98 | -- | * | 1.44 | 1.56 | 1.22 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black sha = Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (bla = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality
Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

# HRM Water Quality Monitoring Program Results

**TABLE D2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2017) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Paper Mill Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | PML2 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2013/05/15 | 2013/10/16 | 2014/05/15 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/09 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 |
| Sampling Time | hh:mm | -- | | | | | 13:40 | 13:45 | 14:30 | 16:20 | 13:00 | 12:40 | 16:20 | 16:15 | 13:16 | 13:40 | 11:20 | 11:00 | 9:20 | 8:30 | 11:30 | 13:45 | 9:08 | 13:45 | 10:00 | 9:50 | 14:30 | 14:30 | 14:00 | 13:30 | 12:10 | 14:15 PM | 12:50PM | 3:40 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 2.2 | 2.3 | N/A | 3.0 | 2.0 | 2.2 | 2.3 | 2.2 | 2.4 | 3.2 | N/A | N/A | N/A | 3.1 | NCC | N/A | 2.4 | 2.7 | 2.3 | 2.6 | 2.5 | 2.5 | 2.9 | 2.9 | 3.0 | 2.2 | 2.4 | 2.20 |
| Water Temp | Celsius | -- | -- | -- | -- | | 24.2 | 19.7 | 17.8 | 25.3 | 10.1 | 10.9 | 23.1 | 15.2 | 11.6 | 14.8 | 12.6 | 14.4 | 21.1 | 12.1 | 15.1 | 27.0 | 9.0 | 13.8 | 22.1 | 11.8 | 17.1 | 24.0 | 14.0 | 15.3 | 5.4 | 12.2 | 12.7 | 27.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 8.3 | 8.4 | 8.8 | 8.1 | 10.6 | 9.9 | 8.7 | 8.9 | 7.8 | 9.3 | 8.9 | 12.4 | 7.0 | 7.9 | 8.1 | 9.8 | 8.3 | 8.6 | 7.7 | 10.3 | 10.4 | 8.9 | 6.6 | 9.9 | 7.0 | 8.7 | ** | 6.06 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.82 | 6.84 | 7.09 | 7.39 | 6.53 | 6.31 | 6.67 | 6.13 | 8.61 | 6.49 | 6.13 | 6.50 | 7.22 | 5.92 | 6.56 | 6.76 | 7.25 | 7.57 | 5.93 | 5.37 | 6.73 | 7.01 | 6.87 | 6.33 | 24.70 | 7.00 | 6.76 | 6.39 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 264.0 | 241.0 | 237.0 | 234.0 | 200.5 | 158.7 | 173.2 | 155.9 | 231.0 | 234.0 | 250.5 | 966.0 | 266.0 | 215.0 | 0.2 | 255.6 | 454.9 | 264.0 | 298.0 | 230.3 | 242.0 | 285.0 | 252.0 | 214.4 | 293.8 | 297.3 | 6.1 | 239.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 7 | 7 | 6 | 8 | 7 | <5 | 8 | 7 | 21 | <5 | 8 | 32 | 10 | 26 | <5.0 | 5 | 7 | 7 | 10 | 8 | 5 | 12 | 11 | 5 | 11 | 8.0 | <5 | 11.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 63 | 58 | 62 | 58 | 50 | 44 | 43 | 34 | 55 | 63 | 64 | 245 | 50 | 42 | 69 | 59 | 57 | 67 | 67 | 50 | 67 | 72 | 60 | 46 | 55 | 43 | 50 | 64 |
| Colour | TCU | 5 | -- | -- | -- | | 17 | 19 | 20 | 13 | 23 | 35 | 38 | 48 | 39 | 18 | 8 | 6 | 7 | 31 | 26 | 10 | 9 | 22 | 13 | 22 | 18 | 7 | 19 | 31 | 21 | 21 | 43 | 14 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.07 | 0.09 | 0.19 | 0.11 | 0.23 | 0.33 | 0.14 | 0.22 | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.32 | 0.23 | 0.10 | 0.11 | 0.18 | 0.27 | 0.07 | 0.16 | 0.17 | 0.13 | 0.2 | 0.14 | 0.07 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | -- | -- | 0.19 | 0.11 | -- | 0.33 | -- | -- | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.17 | 0.23 | 0.10 | <0.05 | 0.18 | 0.16 | 0.07 | 0.16 | 0.17 | <0.05 | 0.2 | 0.14 | 0.07 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | 0.15 | <0.05 | <0.05 | 0.13 | <0.05 | 3.11 | <0.05 | <0.05 | <0.05 | 0.13 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.03 | 0.23 | 0.05 | 0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | 0.05 | 0.06 | 0.08 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | -- | 1.7 | <0.4 | 0.4 | <5 | 0.2 | 1.2 | 3.0 | 0.6 | <0.4 | 0.5 | 0.6 | 0.6 | <0.4 | <0.4 | <0.4 | <0.4 | 1.3 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.6 | 4.5 | 3.2 | 3.4 | 3.6 | 4.0 | 6.0 | 5.6 | 5.9 | 4.4 | 4.0 | 2.7 | 2.4 | 5.8 | 2.8 | 6.0 | 6.1 | 4.0 | 3.6 | 8.3 | 5.5 | 5.4 | 4.1 | 4.9 | 3.5 | 4.0 | 4.3 | 4.40 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.81 | 6.82 | 6.66 | 7.02 | 6.83 | 6.57 | 6.60 | 6.60 | 6.60 | 6.68 | 6.73 | 7.13 | 7.04 | 6.77 | 6.64 | 6.98 | 6.98 | 6.83 | 7.23 | 6.93 | 6.86 | 7.23 | 6.99 | 6.81 | 7.29 | 7.05 | 6.78 | 7.20 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 7.1 | 6.1 | 7.2 | 7.7 | 8.0 | 5.3 | 4.8 | 5.0 | 6.1 | 6.7 | 7.7 | 19.2 | 8.8 | 6.9 | 7,300.0 | 8.2 | 6.2 | 8.9 | 8.1 | 7.4 | 8.1 | 8.5 | 8.1 | 6.7 | 8.1 | 7.7 | 7.1 | 9.1 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.1 | 1.3 | 1.2 | 1.2 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 1.4 | 1.7 | 1.4 | 1.0 | 1,000.0 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.3 | 1.1 | 1.2 | 1.1 | 1.2 | 1.3 | 1.2 | 1.4 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | 0.002 | 0.010 | 0.002 | <0.002 | 0.009 | 0.009 | 0.007 | 0.025 | 0.006 | 0.026 | 0.011 | 0.026 | 0.018 | 0.008 | 0.012 | 0.008 | 0.012 | 0.003 | 0.005 | 0.018 | 0.013 | 0.006 | 0.047 | 0.005 | 0.012 | 0.008 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.0 | 0.9 | 1.0 | 0.9 | 1.0 | 0.9 | 0.8 | 1.0 | 0.8 | 0.8 | 1.3 | 1.4 | 1.2 | 1.1 | 830.0 | 1.0 | 0.9 | 1.0 | 1.0 | 1.1 | 0.9 | 1.4 | 1.1 | 0.9 | 1.1 | 1.1 | 0.9 | 1.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 40.0 | 34.0 | 31.1 | 35.1 | 30.8 | 25.7 | 21.3 | 20.9 | 34.6 | 37.5 | 42.0 | 133.0 | 42.6 | 33.9 | 38.0 | 43.3 | 31.3 | 42.9 | 37.5 | 32.1 | 41.5 | 47.2 | 35.5 | 37.5 | 37.7 | 39.6 | 42.9 | 46.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.3 | 2.6 | 2.3 | 3.3 | 2.9 | 2.5 | 3.0 | 2.8 | 2.7 | 4.2 | 2.4 | 2.3 | 2.9 | 1.9 | 1.8 | 2.8 | 2.3 | 0.6 | 2.6 | 1.7 | 0.8 | 2.0 | 2.5 | 1.0 | 2.3 | 2.0 | 0.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 3 | <1 | 15 | <2 | 11 | <1 | 8 | <1 | <5 | <5 | <5 | 16 | <5 | <5 | 1 | <5 | <5 | 45 | <5 | <5 | <5 | 14 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 11 | 10 | 10 | 10 | 9 | 10 | 9 | 7 | 9 | 11 | 27 | 7 | 7 | 8 | 9 | 9 | 12 | 7 | 10 | 10 | 8 | 11 | 7 | 7.0 | 8.0 | 7 | 9.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 0.6 | 1.0 | 0.8 | 0.4 | 0.4 | 3.4 | 0.5 | 0.7 | 1.0 | 3.3 | 2.6 | 0.7 | 1.0 | 0.9 | 1.9 | 1.3 | 9.4 | 1.1 | 1.4 | 1.9 | 1.9 | 1.8 | 1.4 | 0.7 | 1.2 | 1.0 | 1.2 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 250 | 230 | 230 | 230 | 210 | 170 | 170 | 150 | 213 | 254 | 277 | 777 | 273 | 212 | 260 | 251 | 246 | 263 | 319 | 190 | 259 | 286 | 255 | 249 | 289 | 227 | 261 | 268 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.17 | 1.99 | 2.07 | 2.01 | 1.77 | 1.46 | 1.58 | 1.30 | 2.13 | 1.98 | 2.19 | 8.12 | 1.77 | 1.86 | 2.13 | 1.97 | 1.95 | 2.29 | 2.24 | 1.79 | 2.22 | 2.44 | 2.15 | 1.56 | 1.93 | 1.6 | 1.57 | 2.2 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 7 | 7 | 6 | 8 | 7 | <1 | 8 | 7 | 21 | <5 | 8 | 32 | 10 | 26 | <1.0 | 5 | 7 | 7 | 10 | 8 | 5 | 12 | 11 | 5 | 11 | 8.0 | <5 | 11.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 131 | 117 | 120 | 120 | 110 | 91 | 89 | 79 | 119 | 119 | 137 | 448 | 118 | 109 | 130 | 127 | 112 | 139 | 129 | 108 | 133 | 146 | 124 | 103 | 118 | 107.0 | 110 | 139.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.23 | 1.88 | 1.88 | 2.03 | 1.86 | 1.48 | 1.28 | 1.27 | 1.94 | 2.09 | 2.55 | 6.96 | 2.47 | 1.95 | 2.14 | 2.44 | 1.84 | 2.53 | 2.17 | 1.92 | 2.37 | 2.62 | 2.09 | 2.10 | 2.19 | 2.3 | 2.37 | 2.7 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 20.00 | 23.00 | 24.00 | 25.00 | 17.00 | 15.00 | 16.00 | 19.30 | 20.80 | 25.00 | 54.90 | 27.70 | 21.30 | 23.00 | 25.80 | 20.40 | 27.20 | 25.20 | 23.80 | 25.60 | 25.80 | 25.20 | 21.3 | 25.2 | 24.6 | 22.70 | 28.5 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 1.36 | 2.84 | 4.81 | 0.50 | 2.48 | 0.68 | 10.50 | 1.17 | 4.80 | 2.80 | 7.50 | 7.70 | 16.50 | 2.20 | 0.23 | 10.60 | 3.00 | 5.10 | 1.70 | 3.40 | 3.20 | 3.50 | 1.60 | 14.9 | 6.4 | 18.7 | 20.40 | 9.0 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.83 | -2.93 | -3.06 | -2.55 | -2.80 | NC | -3.18 | -3.17 | -2.89 | -3.39 | -3.08 | -1.73 | -2.61 | -2.57 | NC | -3.60 | -2.97 | -2.98 | -2.46 | -2.89 | -3.13 | -2.37 | -2.66 | -3.25 | -2.35 | -2.8 | -3.26 | -2.4 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.08 | -3.18 | -3.31 | -2.80 | -3.05 | NC | -3.43 | -3.42 | -3.21 | -3.71 | -3.40 | -2.05 | -2.93 | -2.89 | NC | -3.32 | -3.29 | -3.30 | -2.78 | -3.21 | -3.45 | -2.69 | -2.98 | -3.57 | -2.67 | -3.1 | -3.58 | -2.7 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.64 | 9.75 | 9.72 | 9.57 | 9.63 | NC | 9.78 | 9.77 | 9.49 | 10.10 | 9.81 | 8.86 | 9.65 | 9.34 | NC | 9.98 | 9.95 | 9.81 | 9.69 | 9.82 | 9.99 | 9.60 | 9.65 | 10.1 | 9.64 | 9.8 | 10.00 | 9.6 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.89 | 10.00 | 9.97 | 9.82 | 9.88 | NC | 10.00 | 10.00 | 9.81 | 10.40 | 10.10 | 9.18 | 9.97 | 9.66 | NC | 10.30 | 10.30 | 10.10 | 10.00 | 10.10 | 10.30 | 9.92 | 9.97 | 10.4 | 9.96 | 10.1 | 10.40 | 9.9 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | -- | -- | 1,030 | 56 | -- | 202 | -- | -- | 189 | 131 | 107 | 181 | 52 | 122 | 130 | -- | 278 | 610 | -- | -- | 215 | 40 | 34 | 141 | 25 | -- | 134.0 | 220 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | -- | -- | 23 | 12 | -- | 23 | -- | -- | 22 | 22 | 37 | 50 | 27 | 19 | 25 | -- | 24 | 35 | -- | -- | 27 | -- | 23 | 21 | 8 | -- | 25.0 | 19.0 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | -- | -- | 8 | 9 | -- | <50 | -- | -- | 6 | 6 | 9 | 7 | 13 | 11 | <50 | -- | <5 | 8 | -- | -- | <5 | 13 | 11 | 6 | 10 | -- | 6.0 | 11.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | -- | -- | 0.037 | <0.017 | -- | 0.028 | -- | -- | 0.023 | 0.039 | 0.060 | 0.062 | 0.019 | 0.018 | 0.023 | -- | 0.145 | 0.042 | -- | -- | <0.017 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- | <1 | <1 | 2 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | -- | -- | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 1,380 | 1 | <1 | 2 | <2.0 | 2 | 2 | <1 | 1 | 1 | <1 | <1 | 1 | <1 | <1 | 2.0 | <1 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | -- | -- | 1,090 | 151 | 76 | 143 | 699 | 181 | 178 | 181 | 1,760 | 264 | 316 | 134 | 170 | 334 | 368 | 647 | 174 | 123 | <50 | 203 | 145 | 104 | 163 | 165.0 | 128.0 | 258.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | -- | -- | 2.4 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 49.7 | 0.7 | <0.5 | <0.5 | <0.5 | -- | 0.5 | 1.1 | -- | -- | <0.5 | -- | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | -- | -- | 159 | 81 | 28 | 34 | 89 | 31 | 22 | 87 | 866 | 206 | 278 | 24 | 43 | 67 | 61 | 109 | 36 | 23 | 85 | 68 | 26 | 20 | 42 | 74.0 | 28.0 | 139.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2.0 | -- | 2 | <2 | -- | -- | 4 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | -- | -- | <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 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | -- | -- | 35 | 33 | -- | 26 | -- | -- | 27 | 31 | 35 | 68 | 37 | 29 | 34 | -- | 21 | 38 | -- | -- | 35 | -- | 39 | 29 | 38 | -- | 35.0 | 42.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | -- | -- | <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 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | -- | -- | 21 | <2 | -- | 4 | -- | -- | <2 | <2 | 2 | 3 | <2 | <2 | 2 | -- | 4 | 7 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | -- | -- | 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 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | -- | -- | 18 | <5.0 | 6 | 7 | 8 | 10 | 8 | 11 | 762 | <5 | <5 | 5 | 14 | <5 | 8 | 7 | <5 | <5 | 8 | 9 | 5 | 5 | <5 | 6.0 | 7.0 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 40 | -- | >250 | 46 | 97 | 64 | >250 | -- | 261 | 1,410 | 411 | 291 | 517 | >2420 | --- | >2420 | 1,120 | 687 | >2420 | >2420 | 1,990 | >2420 | 1,730 | 1 | 4000 | 3,030.0 | 106.0 | NDOGT |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 31 | -- | 69 | <1 | 6 | 17 | >250 | <100 | 1 | 12 | 2 | <1 | 3 | 16 | <0.10 | 5 | 2 | 4 | 47 | 30 | 1 | 11 | 5 | <1 | 1 | 30.0 | <1 | 3 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.36 | 0.59 | 3.50 | 1.54 | 0.53 | 0.55 | 2.48 | 1.33 | 0.76 | 1.18 | 0.25 | 0.99 | 0.48 | 0.72 | 1.67 | 4.79 | 1.50 | 3.82 | 1.09 | 2.02 | 5.31 | 4.30 | 1.27 | 1.37 | 1.28 | 1.78 | 1.58 | 1.62 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 1.33 | 0.66 | 3.39 | 1.51 | 0.42 | 0.51 | 2.26 | 1.13 | 0.76 | 1.34 | 0.27 | 1.13 | 0.44 | 0.70 | 1.56 | 4.59 | 0.74 | 5.04 | 1.42 | 2.12 | 6.60 | 4.23 | 1.47 | 2.22 | -- | * | 1.50 | 1.44 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
"-- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

Bold (black shad
Underlined (blac
Blue shaded

# Appendix E

Laboratory Certificate of Analysis

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: SNC Lavalin Inc.
5657 SPRING GARDEN RD, SUITE 200
HALIFAX , NS B3J3R4
(902) 492-4544

ATTENTION TO: Michael Smith

PROJECT: 631477

AGAT WORK ORDER: 19X507541

MICROBIOLOGY ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

MISCELLANEOUS ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

DATE REPORTED: Aug 30, 2019

PAGES (INCLUDING COVER): 15

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

AGAT Laboratories

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Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
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# Certificate of Analysis

AGAT WORK ORDER: 19X507541

PROJECT: 631477

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2019-08-20

DATE REPORTED: 2019-08-30

| | | | | SAMPLE DESCRIPTION: | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 |
| Parameter | Unit | G / S | RDL | | 456866 | 456867 | 456868 | 456869 | 456870 | 456871 | 456872 | 456873 |
| Total Coliforms (MF) | CFU/100 mL | | 1 | | NDOGT | 630 | NDOGT | 560 | 770 | 450 | NDOGT | NDOGT |
| E. Coli (MF) | CFU/100 mL | | 1 | | 6 | 2 | 15 | 1 | <1 | 3 | 30 | 50 |

| | | | | SAMPLE DESCRIPTION: | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water |
| | | | | DATE SAMPLED: | 2019-08-20 | 2019-08-20 | 2019-08-20 |
| Parameter | Unit | G / S | RDL | | 456874 | 456875 | 456876 |
| Total Coliforms (MF) | CFU/100 mL | | 1 | | NDOGT | 500 | NDOGT |
| E. Coli (MF) | CFU/100 mL | | 1 | | 26 | 4 | 3 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2019-05
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.

456866 NDOGT - No data, overgrown target

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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# Certificate of Analysis

AGAT WORK ORDER: 19X507541

PROJECT: 631477

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## Subcontracted Data Received

DATE RECEIVED: 2019-08-20

DATE REPORTED: 2019-08-30

| | | SAMPLE DESCRIPTION: | | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 |
| Parameter | Unit | G / S | RDL | 456866 | 456867 | 456868 | 456869 | 456870 | 456871 | 456872 | 456873 |
| Subcontracted Data | | | | Y | Y | Y | Y | Y | Y | Y | Y |

| | | SAMPLE DESCRIPTION: | | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-08-20 | 2019-08-20 | 2019-08-20 |
| Parameter | Unit | G / S | RDL | 456874 | 456875 | 456876 |
| Subcontracted Data | | | | Y | Y | Y |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 19X507541

PROJECT: 631477

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## SNC-Lavalin Bedford West Custom Inorganics Package

DATE RECEIVED: 2019-08-20

DATE REPORTED: 2019-08-30

| | | SAMPLE DESCRIPTION: | | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | | HWY-102-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | | Water |
| | | DATE SAMPLED: | | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | | 2019-08-20 |
| Parameter | Unit | G / S | RDL | 456866 | 456867 | 456868 | 456869 | 456870 | 456871 | RDL | 456872 |
| Alkalinity | mg/L | | 5 | 7 | 9 | 8 | 9 | 7 | 23 | 5 | 17 |
| Chloride | mg/L | | 1 | 59 | 16 | 56 | 56 | 55 | 80 | 5 | 223 |
| True Color | TCU | | 5 | 21 | 106 | 13 | <5 | 16 | 37 | 5 | 42 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.12 | 0.05 | 0.10 | 0.18 | 0.16 | <0.05 | 0.05 | 0.14 |
| Nitrate as N | mg/L | | 0.05 | 0.12 | 0.05 | 0.10 | 0.18 | 0.16 | <0.05 | 0.05 | 0.07 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.07 |
| Ammonia as N | mg/L | | 0.03 | 0.06 | 0.12 | 0.08 | 0.06 | 0.06 | 0.06 | 0.03 | 0.29 |
| Total Organic Carbon | mg/L | | 0.5 | 4.2 | 12.1 | 4.1 | 3.3 | 4.5 | 9.5 | 0.5 | 8.2 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 |
| pH | | | | 6.95 | 6.70 | 7.07 | 6.91 | 7.04 | 7.15 | | 6.67 |
| Total Calcium | mg/L | | 0.1 | 7.8 | 4.3 | 7.6 | 8.0 | 7.7 | 17.9 | 0.1 | 17.2 |
| Total Magnesium | mg/L | | 0.1 | 1.2 | 1.1 | 1.2 | 1.2 | 1.2 | 2.6 | 0.1 | 2.2 |
| Total Phosphorus | mg/L | | 0.002 | 0.005 | 0.019 | 0.007 | 0.011 | 0.007 | 0.023 | 0.002 | 0.037 |
| Total Potassium | mg/L | | 0.1 | 1.0 | 0.8 | 1.0 | 1.1 | 1.0 | 2.3 | 0.1 | 2.1 |
| Total Sodium | mg/L | | 0.1 | 43.9 | 10.0 | 38.9 | 36.7 | 37.7 | 54.3 | 0.1 | 139 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 1.6 | 3.7 | 1.4 | 1.4 | 1.4 | 4.7 | 0.5 | 7.2 |
| Total Suspended Solids | mg/L | | 5 | <5 | <5 | <5 | 6 | <5 | 8 | 5 | 16 |
| Sulphate | mg/L | | 2 | 9 | <2 | 9 | 9 | 8 | 10 | 2 | 11 |
| Turbidity | NTU | | 0.1 | 3.2 | 3.5 | 2.0 | 1.5 | 2.0 | 2.6 | 0.1 | 26.8 |
| Electrical Conductivity | umho/cm | | 1 | 232 | 88 | 233 | 236 | 229 | 340 | 1 | 782 |
| Anion Sum | me/L | | | 2.00 | 0.63 | 1.93 | 1.96 | 1.87 | 2.92 | | 6.87 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 7 | 9 | 8 | 9 | 7 | 23 | 5 | 17 |
| Calculated TDS | mg/L | | 1 | 127 | 40 | 119 | 119 | 116 | 182 | 1 | 415 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 | <10 | <10 | 10 | <10 |
| Cation sum | me/L | | | 2.44 | 0.85 | 2.21 | 2.14 | 2.16 | 3.58 | | 7.51 |
| Hardness | mg/L | | | 24.4 | 15.3 | 23.9 | 24.9 | 24.2 | 55.4 | | 52.0 |
| % Difference/ Ion Balance | % | | | 9.9 | 14.6 | 6.7 | 4.4 | 7.3 | 10.0 | | 4.4 |
| Langelier Index (@20C) | NA | | | -2.91 | -3.26 | -2.74 | -2.83 | -2.82 | -1.85 | | -2.51 |
| Langelier Index (@ 4C) | NA | | | -3.23 | -3.58 | -3.06 | -3.15 | -3.14 | -2.17 | | -2.83 |
| Saturation pH (@ 20C) | NA | | | 9.86 | 9.96 | 9.81 | 9.74 | 9.86 | 9.00 | | 9.18 |

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 19X507541

PROJECT: 631477

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## SNC-Lavalin Bedford West Custom Inorganics Package

DATE RECEIVED: 2019-08-20

DATE REPORTED: 2019-08-30

| SAMPLE DESCRIPTION: | | | | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | | HWY-102-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | | Water |
| DATE SAMPLED: | | | | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | | 2019-08-20 |
| Parameter | Unit | G / S | RDL | 456866 | 456867 | 456868 | 456869 | 456870 | 456871 | RDL | 456872 |
| Saturation pH (@ 4C) | NA | | | 10.2 | 10.3 | 10.1 | 10.1 | 10.2 | 9.32 | | 9.50 |
| Total Aluminum | ug/L | | 5 | 49 | 257 | 39 | 70 | 57 | 93 | 5 | 194 |
| Total Antimony | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Arsenic | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | 4 |
| Total Barium | ug/L | | 5 | 15 | 37 | 16 | 20 | 16 | 104 | 5 | 138 |
| Total Beryllium | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Bismuth | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Boron | ug/L | | 5 | 11 | 11 | 9 | 9 | 9 | 16 | 5 | 9 |
| Total Cadmium | ug/L | | 0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | 0.09 | <0.09 |
| Total Chromium | ug/L | | 1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | 1 |
| Total Cobalt | ug/L | | 1 | <1 | 1 | <1 | <1 | <1 | <1 | 1 | 3 |
| Total Copper | ug/L | | 1 | 1 | <1 | 1 | 1 | 1 | 2 | 1 | 1 |
| Total Iron | ug/L | | 50 | 105 | 1210 | 93 | 100 | 63 | 896 | 50 | 8440 |
| Total Lead | ug/L | | 0.5 | <0.5 | 1.0 | <0.5 | <0.5 | <0.5 | 0.7 | 0.5 | 1.4 |
| Total Manganese | ug/L | | 2 | 32 | 295 | 44 | 85 | 18 | 62 | 2 | 625 |
| Total Molybdenum | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Nickel | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Selenium | ug/L | | 1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | <1 |
| Total Silver | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 |
| Total Strontium | ug/L | | 5 | 33 | 24 | 34 | 35 | 33 | 88 | 5 | 95 |
| Total Thallium | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 |
| Total Tin | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 |
| Total Titanium | ug/L | | 2 | <2 | 2 | <2 | <2 | <2 | <2 | 2 | 3 |
| Total Uranium | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 |
| Total Vanadium | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | 2 | 2 | 5 |
| Total Zinc | ug/L | | 5 | <5 | 9 | <5 | 6 | <5 | 8 | 5 | 15 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | 0.6 | 0.8 | <0.4 | 0.6 | <0.4 | 0.6 | 0.4 | 0.7 |

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 19X507541

PROJECT: 631477

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

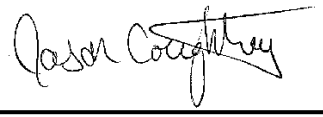
## SNC-Lavalin Bedford West Custom Inorganics Package

DATE RECEIVED: 2019-08-20

DATE REPORTED: 2019-08-30

| | | SAMPLE DESCRIPTION: | | LSD | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 |
| Parameter | Unit | G / S | RDL | 456873 | 456874 | 456875 | 456876 |
| Alkalinity | mg/L | | 5 | 33 | 23 | 11 | 11 |
| Chloride | mg/L | | 1 | 29 | 202 | 64 | 64 |
| True Color | TCU | | 5 | 86 | 14 | 16 | 14 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.07 | 0.37 | 0.05 | 0.07 |
| Nitrate as N | mg/L | | 0.05 | 0.07 | 0.30 | 0.05 | 0.07 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | 0.07 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | 0.53 | 0.09 | 0.10 | 0.08 |
| Total Organic Carbon | mg/L | | 0.5 | 12.1 | 5.7 | 4.2 | 4.4 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | | | | 7.11 | 7.45 | 7.22 | 7.20 |
| Total Calcium | mg/L | | 0.1 | 9.6 | 30.2 | 8.3 | 9.1 |
| Total Magnesium | mg/L | | 0.1 | 2.6 | 4.2 | 1.3 | 1.4 |
| Total Phosphorus | mg/L | | 0.002 | 0.031 | 0.014 | 0.008 | 0.005 |
| Total Potassium | mg/L | | 0.1 | 1.7 | 3.4 | 1.2 | 1.2 |
| Total Sodium | mg/L | | 0.1 | 20.7 | 129 | 45.4 | 46.7 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 4.2 | 3.0 | 0.9 | 0.9 |
| Total Suspended Solids | mg/L | | 5 | 150 | 6 | <5 | <5 |
| Sulphate | mg/L | | 2 | <2 | 23 | 9 | 9 |
| Turbidity | NTU | | 0.1 | 44.4 | 3.7 | 1.2 | 1.2 |
| Electrical Conductivity | umho/cm | | 1 | 170 | 765 | 264 | 268 |
| Anion Sum | me/L | | | 1.48 | 6.66 | 2.22 | 2.22 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 33 | 23 | 11 | 11 |
| Calculated TDS | mg/L | | 1 | 96 | 408 | 136 | 139 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 |
| Cation sum | me/L | | | 2.13 | 7.58 | 2.55 | 2.65 |
| Hardness | mg/L | | | 34.7 | 92.7 | 26.1 | 28.5 |
| % Difference/ Ion Balance | % | | | 17.9 | 6.5 | 6.9 | 9.0 |
| Langelier Index (@20C) | NA | | | -1.97 | -1.36 | -2.42 | -2.40 |
| Langelier Index (@ 4C) | NA | | | -2.29 | -1.68 | -2.74 | -2.72 |
| Saturation pH (@ 20C) | NA | | | 9.08 | 8.81 | 9.64 | 9.60 |

Certified By:





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# Certificate of Analysis

AGAT WORK ORDER: 19X507541

PROJECT: 631477

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## SNC-Lavalin Bedford West Custom Inorganics Package

DATE RECEIVED: 2019-08-20

DATE REPORTED: 2019-08-30

| Parameter | Unit | G / S | RDL | SAMPLE DESCRIPTION: LSD<br>SAMPLE TYPE: Water<br>DATE SAMPLED: 2019-08-20<br>456873 | LU<br>Water<br>2019-08-20<br>456874 | PML-1<br>Water<br>2019-08-20<br>456875 | PML-2<br>Water<br>2019-08-20<br>456876 |
|---|---|---|---|---|---|---|---|
| Saturation pH (@ 4C) | NA | | | 9.40 | 9.13 | 9.96 | 9.92 |
| Total Aluminum | ug/L | | 5 | 665 | 31 | 25 | 27 |
| Total Antimony | ug/L | | 2 | <2 | <2 | <2 | <2 |
| Total Arsenic | ug/L | | 2 | 3 | <2 | <2 | <2 |
| Total Barium | ug/L | | 5 | 53 | 184 | 16 | 19 |
| Total Beryllium | ug/L | | 2 | <2 | <2 | <2 | <2 |
| Total Bismuth | ug/L | | 2 | <2 | <2 | <2 | <2 |
| Total Boron | ug/L | | 5 | 21 | 16 | 10 | 11 |
| Total Cadmium | ug/L | | 0.09 | <0.09 | <0.09 | <0.09 | <0.09 |
| Total Chromium | ug/L | | 1 | <1 | <1 | <1 | <1 |
| Total Cobalt | ug/L | | 1 | 6 | <1 | <1 | <1 |
| Total Copper | ug/L | | 1 | 2 | 2 | <1 | 1 |
| Total Iron | ug/L | | 50 | 5530 | 556 | 187 | 258 |
| Total Lead | ug/L | | 0.5 | 3.2 | <0.5 | <0.5 | <0.5 |
| Total Manganese | ug/L | | 2 | 5050 | 66 | 115 | 139 |
| Total Molybdenum | ug/L | | 2 | <2 | <2 | <2 | <2 |
| Total Nickel | ug/L | | 2 | <2 | <2 | 2 | <2 |
| Total Selenium | ug/L | | 1 | <1 | <1 | <1 | <1 |
| Total Silver | ug/L | | 0.1 | 0.2 | <0.1 | <0.1 | <0.1 |
| Total Strontium | ug/L | | 5 | 56 | 134 | 37 | 42 |
| Total Thallium | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin | ug/L | | 2 | <2 | <2 | <2 | <2 |
| Total Titanium | ug/L | | 2 | 6 | <2 | <2 | <2 |
| Total Uranium | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Vanadium | ug/L | | 2 | 2 | <2 | <2 | <2 |
| Total Zinc | ug/L | | 5 | 10 | 8 | <5 | <5 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | 1.6 | <0.4 | <0.4 | <0.4 |

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 19X507541

PROJECT: 631477

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## SNC-Lavalin Bedford West Custom Inorganics Package

DATE RECEIVED: 2019-08-20

DATE REPORTED: 2019-08-30

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

| | |
|---|---|
| 456866 | Total Phosphorus was analysed at AGAT Mississauga.<br>Chlorophyll A was analysed by a sub-contracted laboratory. |
| 456867 | Total Phosphorus was analysed at AGAT Mississauga.<br>Chlorophyll A was analysed by a sub-contracted laboratory.<br>The cation and anion sums are at, or below, 1 me/L, therefore the acceptable criteria is a difference of less than 0.3me/L. |
| 456868-456872 | Total Phosphorus was analysed at AGAT Mississauga.<br>Chlorophyll A was analysed by a sub-contracted laboratory. |
| 456873 | Total Phosphorus was analysed at AGAT Mississauga.<br>Chlorophyll A was analysed by a sub-contracted laboratory.<br>Ion Balance is biased high, contributing parameters have been confirmed. |
| 456874-456876 | Total Phosphorus was analysed at AGAT Mississauga.<br>Chlorophyll A was analysed by a sub-contracted laboratory. |

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 19X507541

PROJECT: 631477

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## Total Phosphorus in Water (Low Level)

DATE RECEIVED: 2019-08-20

DATE REPORTED: 2019-08-30

| | | SAMPLE DESCRIPTION: | | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 | 2019-08-20 |
| Parameter | Unit | G / S | RDL | 456866 | 456867 | 456868 | 456869 | 456870 | 456871 | 456872 | 456873 |
| Total Phosphorus | mg/L | | 0.002 | 0.005 | 0.019 | 0.007 | 0.011 | 0.007 | 0.023 | 0.037 | 0.031 |

| | | SAMPLE DESCRIPTION: | | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-08-20 | 2019-08-20 | 2019-08-20 |
| Parameter | Unit | G / S | RDL | 456874 | 456875 | 456876 |
| Total Phosphorus | mg/L | | 0.002 | 0.014 | 0.008 | 0.005 |

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



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# Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 19X507541

PROJECT: 631477

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## Water Analysis

| RPT Date: Aug 30, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| SNC-Lavalin Bedford West Custom Inorganics Package | | | | | | | | | | | | | | | |
| Alkalinity | 455175 | | <5 | <5 | NA | < 5 | 96% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Chloride | 456866 | 456866 | 59 | 59 | 0.0% | < 1 | 95% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| True Color | 461345 | | <5 | 16 | NA | < 5 | 105% | 80% | 120% | NA | | | NA | | |
| Nitrate as N | 456866 | 456866 | 0.12 | 0.12 | NA | < 0.05 | 96% | 80% | 120% | NA | 80% | 120% | 94% | 80% | 120% |
| Nitrite as N | 456866 | 456866 | <0.05 | <0.05 | NA | < 0.05 | 106% | 80% | 120% | NA | 80% | 120% | 96% | 80% | 120% |
| Ammonia as N | 453221 | | 1.56 | 1.61 | 3.2% | < 0.03 | 99% | 80% | 120% | 107% | 80% | 120% | 102% | 80% | 120% |
| Total Organic Carbon | 453222 | | 2.0 | 1.8 | NA | < 0.5 | 93% | 80% | 120% | NA | 80% | 120% | 91% | 80% | 120% |
| Ortho-Phosphate as P | 453226 | | <0.01 | <0.01 | NA | < 0.01 | 100% | 80% | 120% | 101% | 80% | 120% | 111% | 80% | 120% |
| pH | 455175 | | 6.30 | 6.17 | 2.1% | < | 101% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Calcium | 455706 | | <0.1 | <0.1 | NA | < 0.1 | 107% | 80% | 120% | 120% | 80% | 120% | 91% | 70% | 130% |
| Total Magnesium | 455706 | | <0.1 | <0.1 | NA | < 0.1 | 107% | 80% | 120% | 120% | 80% | 120% | 91% | 80% | 120% |
| Total Phosphorus | 456866 | 456866 | 0.005 | 0.005 | NA | < 0.002 | 92% | 90% | 110% | 95% | 90% | 110% | 85% | 80% | 120% |
| Total Potassium | 455706 | | <0.1 | <0.1 | NA | < 0.1 | 103% | 80% | 120% | 120% | 80% | 120% | 87% | 70% | 130% |
| Total Sodium | 455706 | | 35.7 | 30.2 | 16.7% | < 0.1 | 103% | 80% | 120% | 120% | 80% | 120% | NA | 70% | 130% |
| Reactive Silica as SiO2 | 453226 | | 0.6 | 0.6 | NA | < 0.5 | 100% | 80% | 120% | 99% | 80% | 120% | 91% | 80% | 120% |
| Total Suspended Solids | 453830 | | 94 | 100 | 6.2% | < 5 | 102% | 80% | 120% | NA | | | 105% | 80% | 120% |
| Sulphate | 456866 | 456866 | 9 | 9 | NA | < 2 | 110% | 80% | 120% | NA | 80% | 120% | 93% | 80% | 120% |
| Turbidity | 461345 | | 15.3 | 15.6 | 1.9% | < 0.1 | 99% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 455175 | | 15 | 14 | 6.9% | < 1 | 100% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Bicarb. Alkalinity (as CaCO3) | 455175 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 455175 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Aluminum | 455706 | | 5 | <5 | NA | < 5 | 101% | 80% | 120% | 120% | 80% | 120% | 91% | 70% | 130% |
| Total Antimony | 455706 | | <2 | <2 | NA | < 2 | 80% | 80% | 120% | 120% | 80% | 120% | 118% | 70% | 130% |
| Total Arsenic | 455706 | | <2 | <2 | NA | < 2 | 101% | 80% | 120% | 120% | 80% | 120% | 107% | 70% | 130% |
| Total Barium | 455706 | | <5 | <5 | NA | < 5 | 101% | 80% | 120% | 117% | 80% | 120% | 101% | 70% | 130% |
| Total Beryllium | 455706 | | <2 | <2 | NA | < 2 | 115% | 80% | 120% | 120% | 80% | 120% | 121% | 70% | 130% |
| Total Bismuth | 455706 | | <2 | <2 | NA | < 2 | 95% | 80% | 120% | 120% | 80% | 120% | 105% | 70% | 130% |
| Total Boron | 455706 | | 8 | 6 | NA | < 5 | 111% | 80% | 120% | 120% | 80% | 120% | 113% | 70% | 130% |
| Total Cadmium | 455706 | | <0.09 | <0.09 | NA | < 0.09 | 101% | 80% | 120% | 118% | 80% | 120% | 104% | 70% | 130% |
| Total Chromium | 455706 | | <1 | <1 | NA | < 1 | 105% | 80% | 120% | 120% | 80% | 120% | 111% | 70% | 130% |
| Total Cobalt | 455706 | | <1 | <1 | NA | < 1 | 103% | 80% | 120% | 120% | 80% | 120% | 110% | 70% | 130% |
| Total Copper | 455706 | | 145 | 124 | 15.6% | < 1 | 101% | 80% | 120% | 116% | 80% | 120% | NA | 70% | 130% |
| Total Iron | 455706 | | <50 | <50 | NA | < 50 | 105% | 80% | 120% | 120% | 80% | 120% | 119% | 70% | 130% |
| Total Lead | 455706 | | 2.3 | 2.0 | NA | < 0.5 | 102% | 80% | 120% | 120% | 80% | 120% | 108% | 70% | 130% |
| Total Manganese | 455706 | | <2 | <2 | NA | < 2 | 103% | 80% | 120% | 120% | 80% | 120% | 112% | 70% | 130% |
| Total Molybdenum | 455706 | | <2 | <2 | NA | < 2 | 96% | 80% | 120% | 111% | 80% | 120% | 119% | 70% | 130% |
| Total Nickel | 455706 | | <2 | <2 | NA | < 2 | 102% | 80% | 120% | 119% | 80% | 120% | 108% | 70% | 130% |
| Total Selenium | 455706 | | <1 | <1 | NA | < 1 | 116% | 80% | 120% | 120% | 80% | 120% | 104% | 70% | 130% |
| Total Silver | 455706 | | <0.1 | <0.1 | NA | < 0.1 | 99% | 80% | 120% | 118% | 80% | 120% | 110% | 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.

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FAX (902)468-8924
http://www.agatlabs.com

# Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 19X507541

PROJECT: 631477

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Aug 30, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Total Strontium | 455706 | | <5 | <5 | NA | < 5 | 100% | 80% | 120% | 115% | 80% | 120% | 109% | 70% | 130% |
| Total Thallium | 455706 | | <0.1 | <0.1 | NA | < 0.1 | 101% | 80% | 120% | 118% | 80% | 120% | 106% | 70% | 130% |
| Total Tin | 455706 | | <2 | <2 | NA | < 2 | 99% | 80% | 120% | 115% | 80% | 120% | 108% | 70% | 130% |
| Total Titanium | 455706 | | <2 | <2 | NA | < 2 | 101% | 80% | 120% | 120% | 80% | 120% | 89% | 70% | 130% |
| Total Uranium | 455706 | | <0.1 | <0.1 | NA | < 0.1 | 105% | 80% | 120% | 117% | 80% | 120% | 108% | 70% | 130% |
| Total Vanadium | 455706 | | <2 | <2 | NA | < 2 | 104% | 80% | 120% | 119% | 80% | 120% | 109% | 70% | 130% |
| Total Zinc | 455706 | | 20 | 19 | NA | < 5 | 100% | 80% | 120% | 117% | 80% | 120% | 108% | 70% | 130% |
| Total Kjeldahl Nitrogen as N | 453536 | | 0.5 | 0.5 | NA | < 0.4 | 104% | 80% | 120% | 113% | 80% | 120% | NA | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

SNC-Lavalin Bedford West Custom Inorganics Package

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ammonia as N | 456871 | 456871 | 0.06 | 0.06 | NA | < 0.03 | 98% | 80% | 120% | 107% | 80% | 120% | 101% | 80% | 120% |
| Total Organic Carbon | 456872 | 456872 | 8.2 | 8.2 | 0% | < 0.5 | 96% | 80% | 120% | NA | 80% | 120% | 99% | 80% | 120% |
| Ortho-Phosphate as P | 456876 | | NA | NA | NA | < 0.01 | 103% | 80% | 120% | 101% | 80% | 120% | 109% | 80% | 120% |
| Reactive Silica as SiO2 | 456876 | 456876 | 0.9 | 1.0 | NA | < 0.5 | 100% | 80% | 120% | 94% | 80% | 120% | 98% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Total Phosphorus in Water (Low Level)

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Phosphorus | 456866 | 456866 | 0.005 | 0.005 | NA | < 0.002 | 92% | 90% | 110% | 95% | 90% | 110% | 85% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:



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FAX (902)468-8924
http://www.agatlabs.com

# Method Summary

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 19X507541

PROJECT: 631477

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MF) | MIC-121-7002 | Sm 9222 H | MF/INCUBATOR |
| E. Coli (MF) | MIC-121-7002 | SM 9222 H | MF/INCUBATOR |
| Miscellaneous Analysis | | | |
| Subcontracted Data | | | |



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CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 19X507541

PROJECT: 631477

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| True Color | INOR-121-6014 | SM 2120 C | NEPHELOMETER |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorus | INOR-93-1022 | SM 4500-P B & E | SPECTROPHOTOMETER |
| Total Potassium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Anion Sum | CALCULATION | SM 1030E | CALCULATION |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Calculated TDS | | SM 1030E | CALCULATION |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Cation sum | CALCULATION | SM 1030E | CALCULATION |
| Hardness | CALCULATION | SM 2340B | CALCULATION |
| % Difference/ Ion Balance | CALCULATION | SM 1030E | CALCULATION |
| Langelier Index (@20C) | CALCULATION | CALCULATION | CALCULATION |
| Langelier Index (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 20C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Total Aluminum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Antimony | MET121-6104 & MET-121-6105 | SM 3125 | ICP-MS |
| Total Arsenic | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Barium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Beryllium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Bismuth | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Boron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cadmium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |



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# Method Summary

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 19X507541

PROJECT: 631477

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Total Chromium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cobalt | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Lead | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Molybdenum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Nickel | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Selenium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Silver | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Strontium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Thallium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Tin | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Titanium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Uranium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Vanadium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Kjeldahl Nitrogen as N | INOR-121-6020 | SM 4500-NORG D | COLORIMETER |
| Total Phosphorus | INOR-93-6022 | SM 4500-P B & E | SPECTROPHOTOMETER |



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# AGAT Laboratories

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Dartmouth, Nova Scotia
B3B 1M2
http://webearth.agatlabs.com

Phone: 902-468-8718
Fax: 902-468-8924
www.agatlabs.com

**Laboratory use Only**
Arrival Condition: ☐ Good ☐ Poor (complete 'notes')
Arrival Temperature: 16.3, 17.7, 17.5 AGAT Job Number: 19x507541
Notes:

Drinking Water Sample (y/n): _____ Reg. No. _____
Waterworks Number: _____

**Report To:**
Company: SNC Lavalin
Contact: Michael Smith
Address: 5657 Spring Garden Road
Halifax, NS B3J 3R4
Phone: 902-492-4544 FAX:
PO#:
AGAT Quotation: 15-1718
Client Project #: 631477

**Invoice to:** Same (Y/N) - Circle
Company: SNC Lavalin
Contact: payables@snclavalin.com
Address:
Phone: Fax:
PO#/Credit Card #:

**Report Information**
1. Name: Michael Smith
Email: michael.smith@snclavalin.com
2. Name: Cally Baxter
Email: cally.baxter@snclavalin.com

**Regulatory Requirements (Check):**
☐ List Guidelines on Report ☐ Do Not List Guidelines on Report
☐ PIRI
☐ Teir 1 ☐ Res. ☐ Pot. ☐ Coarse
☐ Teir 2 ☐ Com ☐ N/Pot. ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Ind ☐ NSDFOSP
☐ Com ☐ HRM 101
☐ Res/P Storm Water
☐ Ag ☐ HRM 101
☐ FWAL Waste Water
☐ Sediment
☐ Other

Site Info (check all that apply):
☐ Pot. ☐ Coarse
☐ N/Pot. ☐ Fine

**Report Format**
☐ Single PDF sample per page
■ Multiple PDF samples per page
■ Excel Format Included

**Turnaround Time (TAT) Business Days**
**Regular TAT:**
■ 5 - 7 days
**Rush TAT:**
☐ 1 day ☐ 2 days
☐ 3 - 4 days
Date Required:
Time Required:

| SAMPLE IDENTIFICATION | DATE / TIME SAMPLED | SAMPLE MATRIX | # OF CONTAINERS | COMMENTS - Site/Sample Info, Sample Containment | Field Filtered/ Preserved | Standard Water Analysis | Metals (Spring Quarterly Only) | (circle-Total, Diss or Available) | Mercury | TKN | pH | TSS | TP- Low Level 0.002mg/L- Mississauga | Anions | Total Phosphorus | Phenols | TPH/BTEX (PIRI) Teir 1 | TPH/BTEX-Fractionation Teir 2 | VOC | THM | PAH | Chlorophyll A | E. coli by MF | Hazardous (Y/N) | Lab Sample # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KL1 | Aug.20 9:15am | water | 7 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| KL2 | " 3:01pm | water | 7 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| KL3 | " 10:00am | water | 7 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| KL4 | " 9:43am | water | 7 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| KL5 | " 9:27am | water | 7 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| HWY-102-1 | " 12:40 | water | 7 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| HWY-102-2 | " 12:20 | water | 7 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| LSD | " 10:44am | water | 7 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| LU | " 11:45am | water | 7 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| PML-1 | " 4:20pm | water | 7 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| PML-2 | " 3:40pm | water | 7 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

| Sample Relinquished By (print name & sign) | Date/Time | Samples Received By (print name and sign) | Date/Time | Special Instructions |
|---|---|---|---|---|
| CALLY BAXTER | Aug 20/19 | | Aug 20/19 | |
| Sample Relinquished By (print name & sign) | Date/Time | Samples Received By (print name and sign) | Date/Time | SNC Bedford West Package |
| | | | 17:25 | Page 1 of 1 |

DALHOUSIE UNIVERSITY
Inspiring Minds

Department of Oceanography
1355 Oxford St
Halifax, NS
B3H 4R2

***Determination of chlorophyll a by fluorescence***

---

**Client:** AGAT Laboratories, 11 Morris Dr. Unit 122, Dartmouth, NS, B3B 1M2

**Attention:** Janetta Fraser

**Received:** 2019-08-22

**Project #:** 19X507541

**Completed:** 2019-08-23

Hugh MacIntyre

Hugh MacIntyre, Ph.D.

---

Chl *a* (chlorophyll *a*; µg L-1) determined by the acidification method (Holm-Hansen et al., 1965). Estimates made with the non-acidification method (Welschmeyer, 1994) are shown for comparison. The non-acidification method is considered more reliable than the acidification method in correcting for bias due to the contributions of chlorophyll *b* and chlorophyll degradation products.

Holm-Hansen O, Lorenzen CJ, Holmes RW, Strickland JDH (1965) Fluorometric determination of chlorophyll. J Conseil 30:3-15

Welschmeyer NA (1994) Fluorometric analysis of chlorophyll *a* in the presence of chlorophyll *b* and phaeopigments. Limnol Oceanogr 39:1985-1992

| Contractor ID | Client ID | Chl *a* (acidification) | Chl *a* (non-acidification) |
|---|---|---|---|
| 456866 | KL1 | 2.18 | 1.89 |
| 456867 | KL2 | 1.67 | 1.5 |
| 456868 | KL3 | 1.94 | 1.73 |
| 456869 | KL4 | 0.47 | 0.421 |
| 456870 | KL5 | 3.7 | 3 |
| 456871 | HWY-102-1 | 5.55 | 5.09 |
| 456872 | HWY-102-2 | 23.7 | 20.5 |
| 456873 | LSD | 14.6 | 15.4 |

| Contractor ID | Client ID | Chl *a* (acidification) | Chl *a* (non-acidification) |
|---|---|---|---|
| 456874 | LU | 6.38 | 6.19 |
| 456875 | PML-1 | 1.84 | 1.56 |
| 456876 | PML-2 | 1.62 | 1.44 |

# Appendix F

Graphs (Seasonal and Historical)

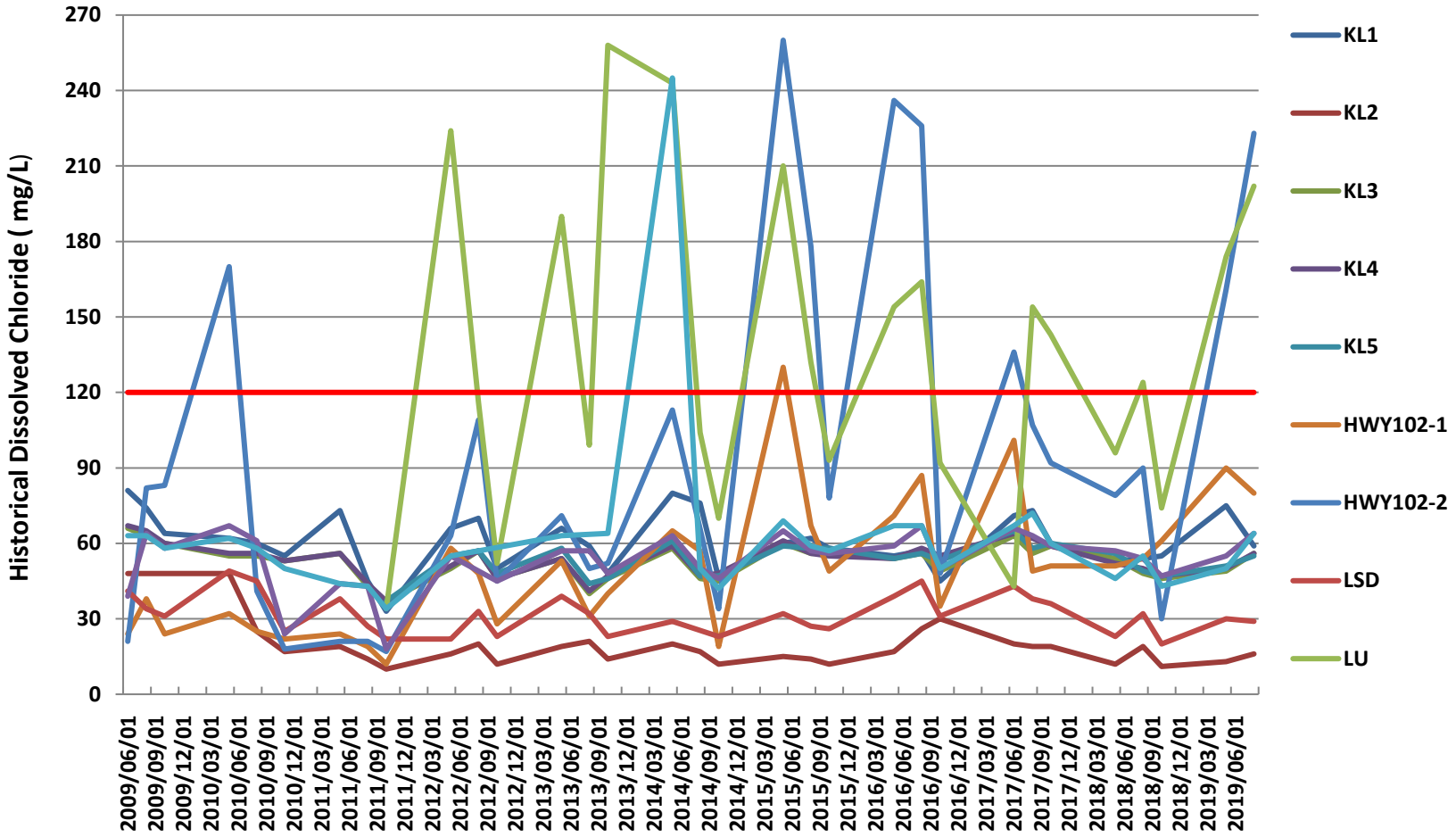


**Figure 1 - Historical Dissolved Chloride Concentrations for Water Quality Monitoring Program.**

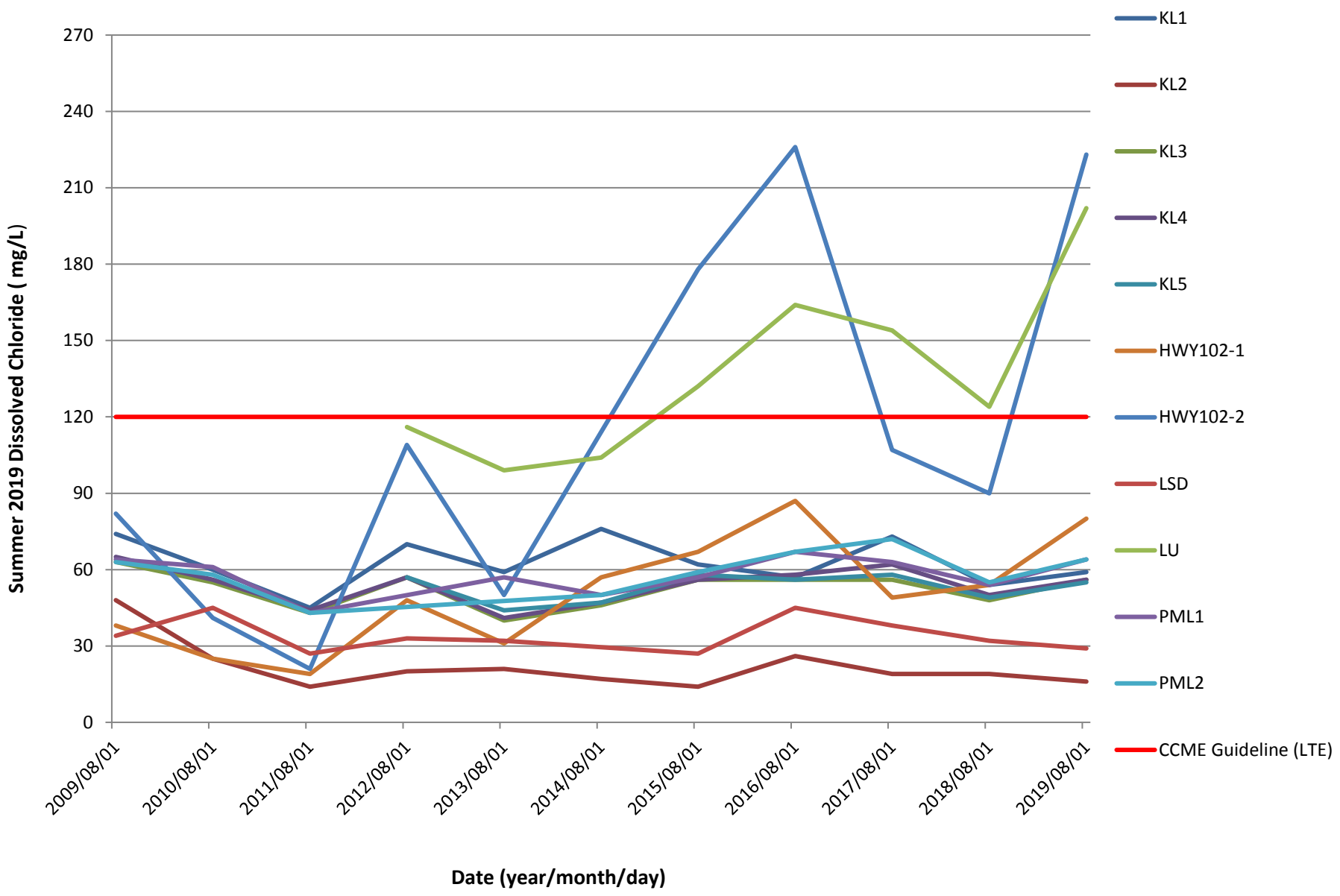


**Figure 2 – Seasonal Dissolved Chloride Concentrations for Water Quality Monitoring Program.**

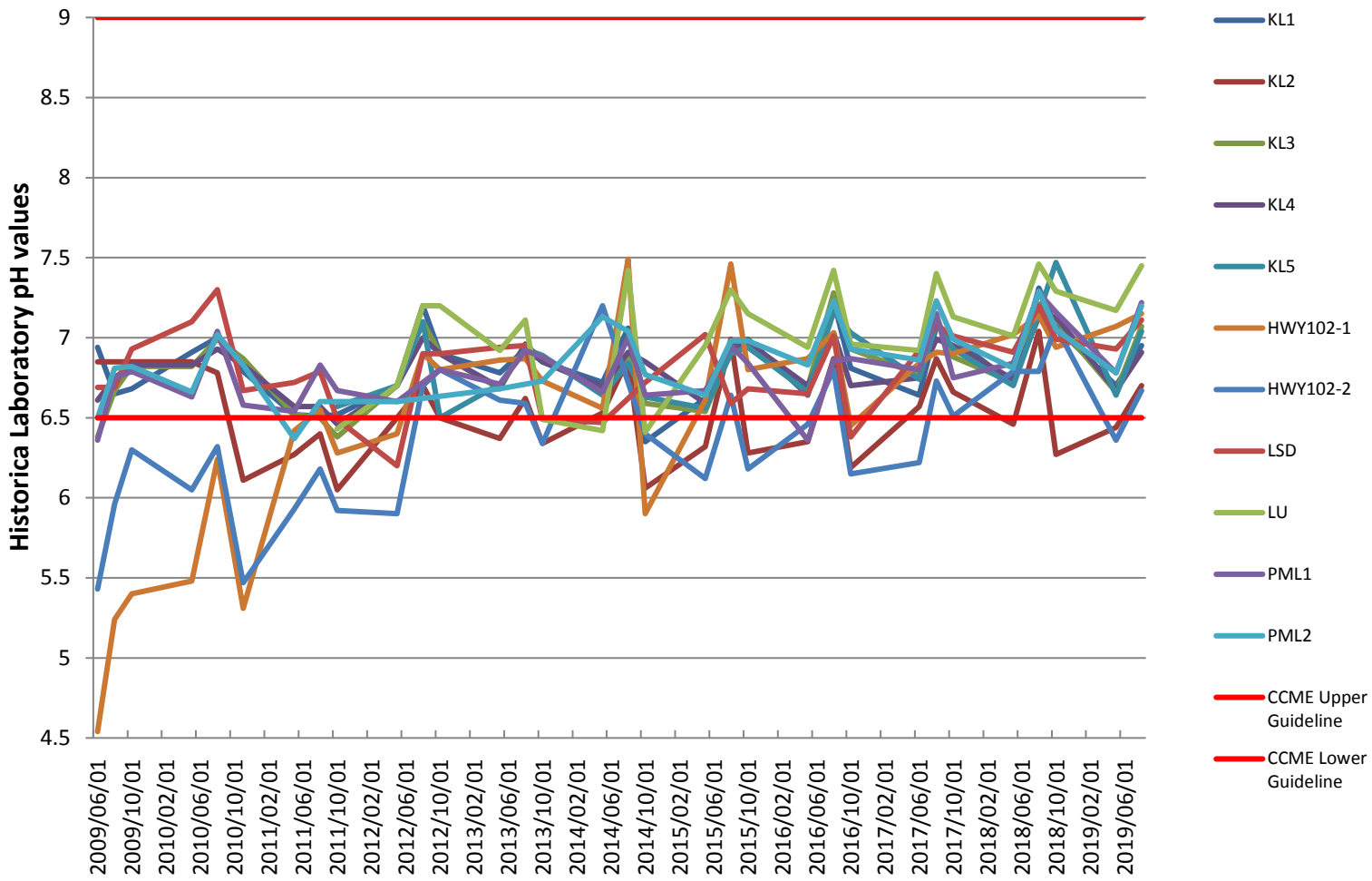


**Figure 3 –Historical pH Measurements for Water Quality Monitoring Program**

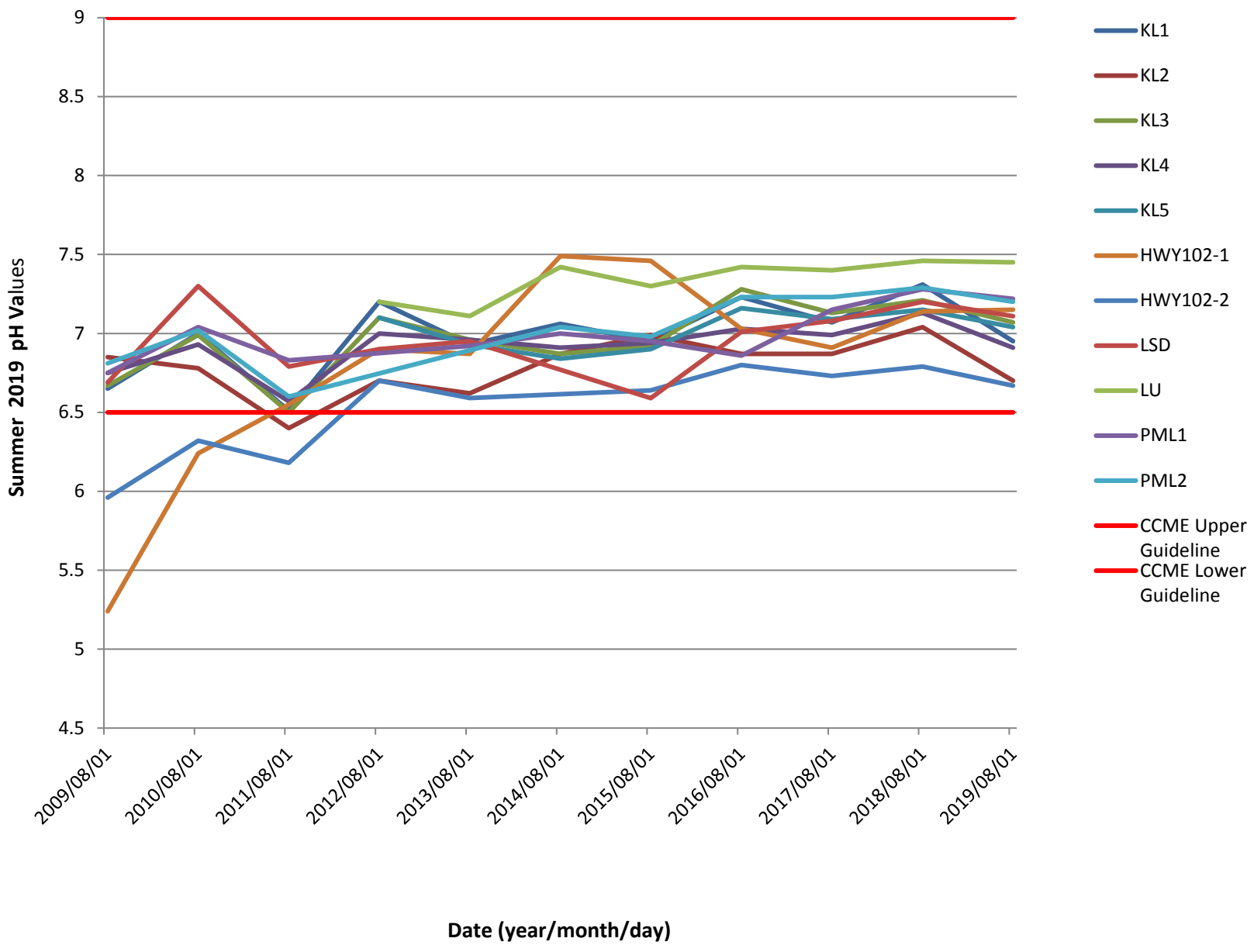


**Figure 4 – Seasonal pH Measurements for Water Quality Monitoring Program.**

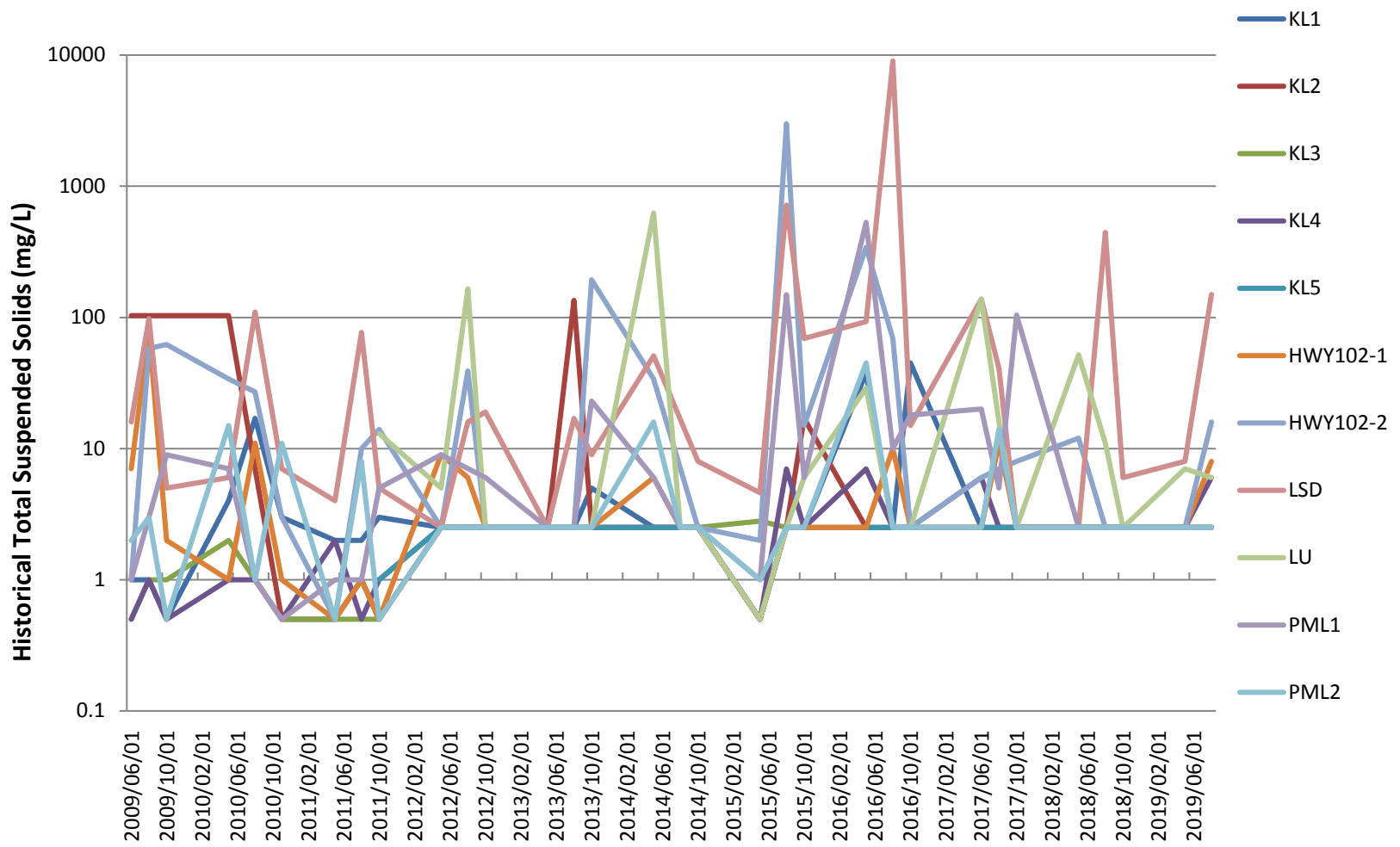


**Figure 5 – Historical Total Suspended Solids Concentrations for Water Quality Monitoring Program.**

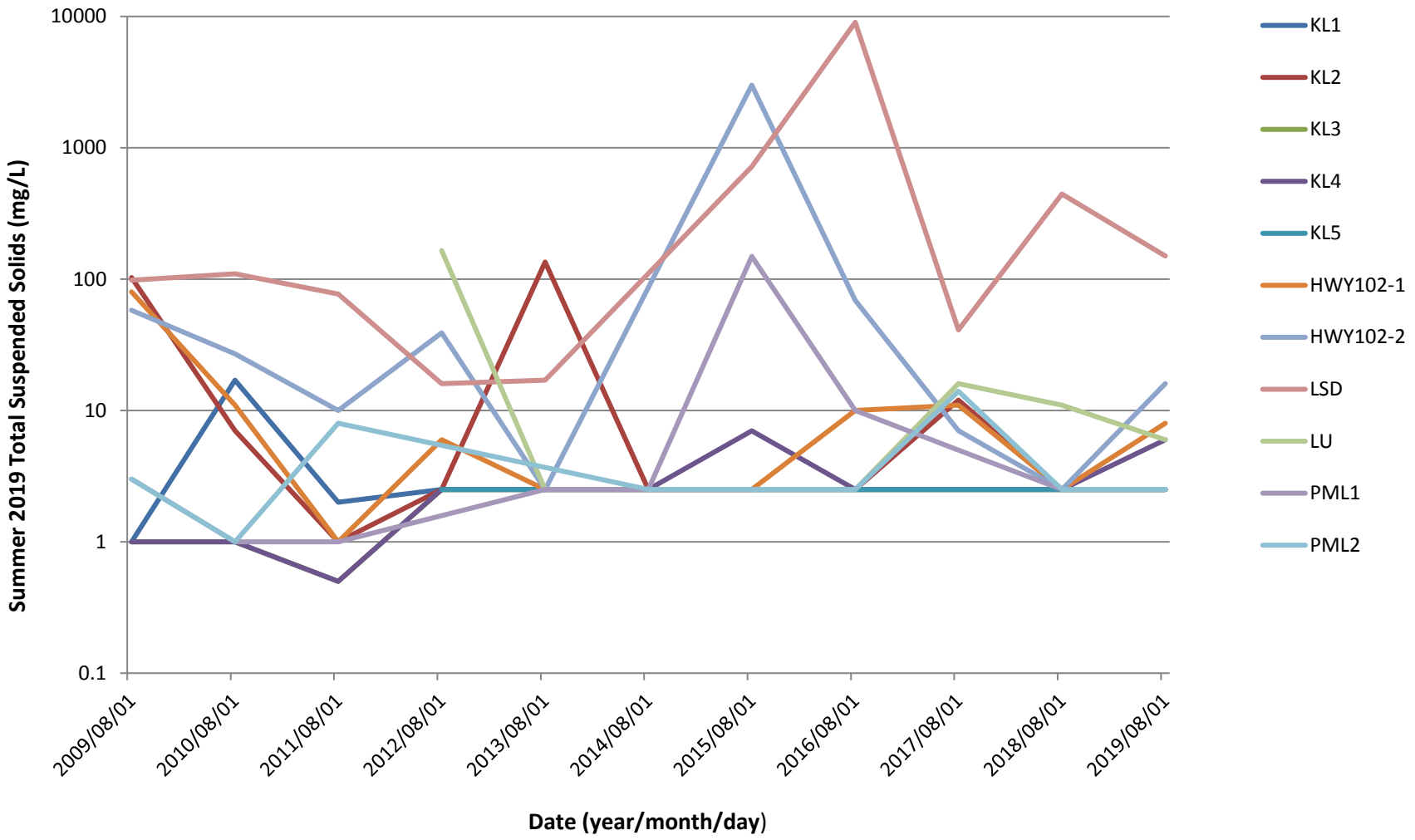


**Figure 6 – Seasonal Total Suspended Solids Concentrations for Water Quality Monitoring Program.**

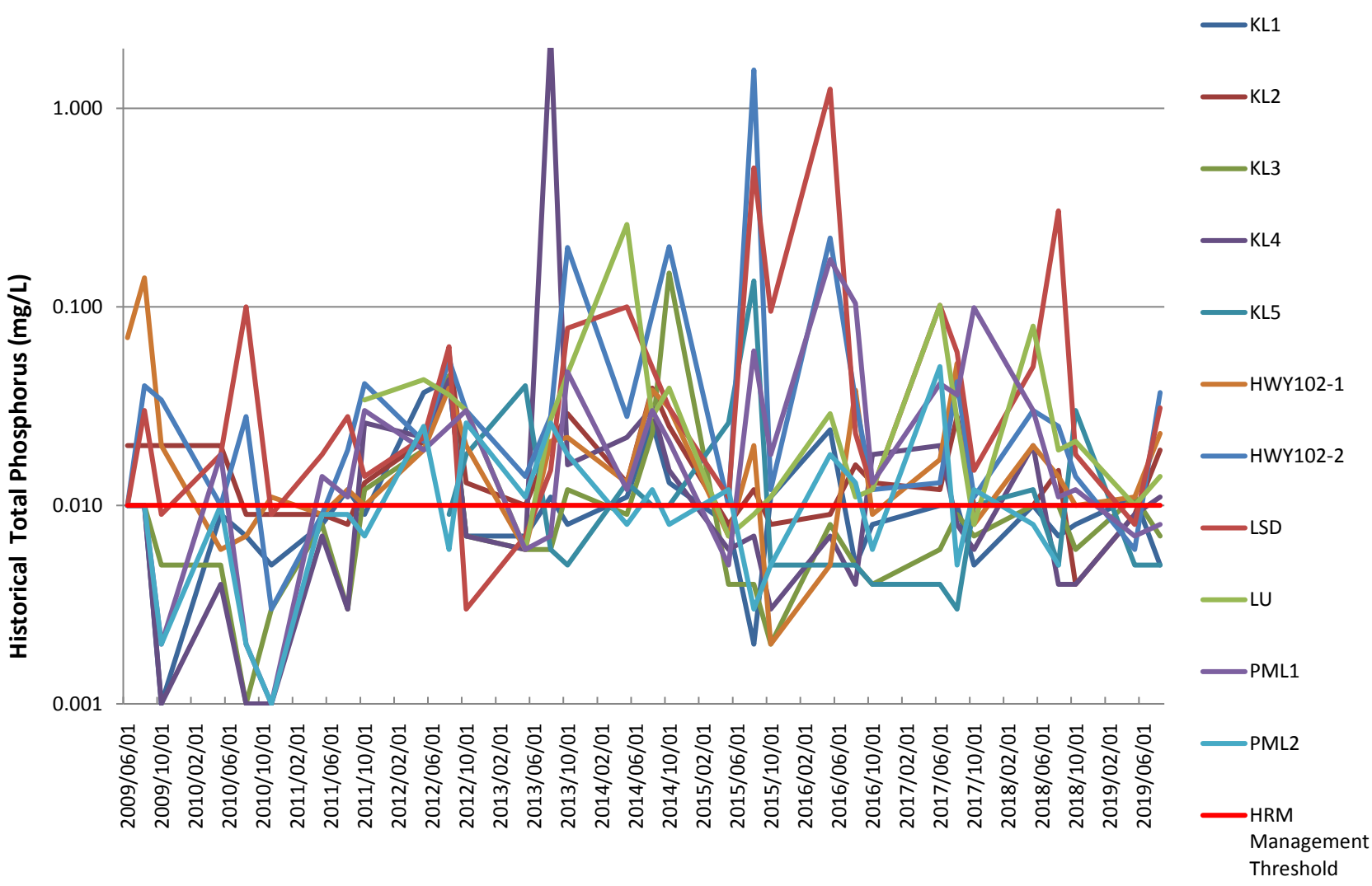


**Figure 7 – Historical Total Phosphorus Concentrations for Water Quality Monitoring Program.**

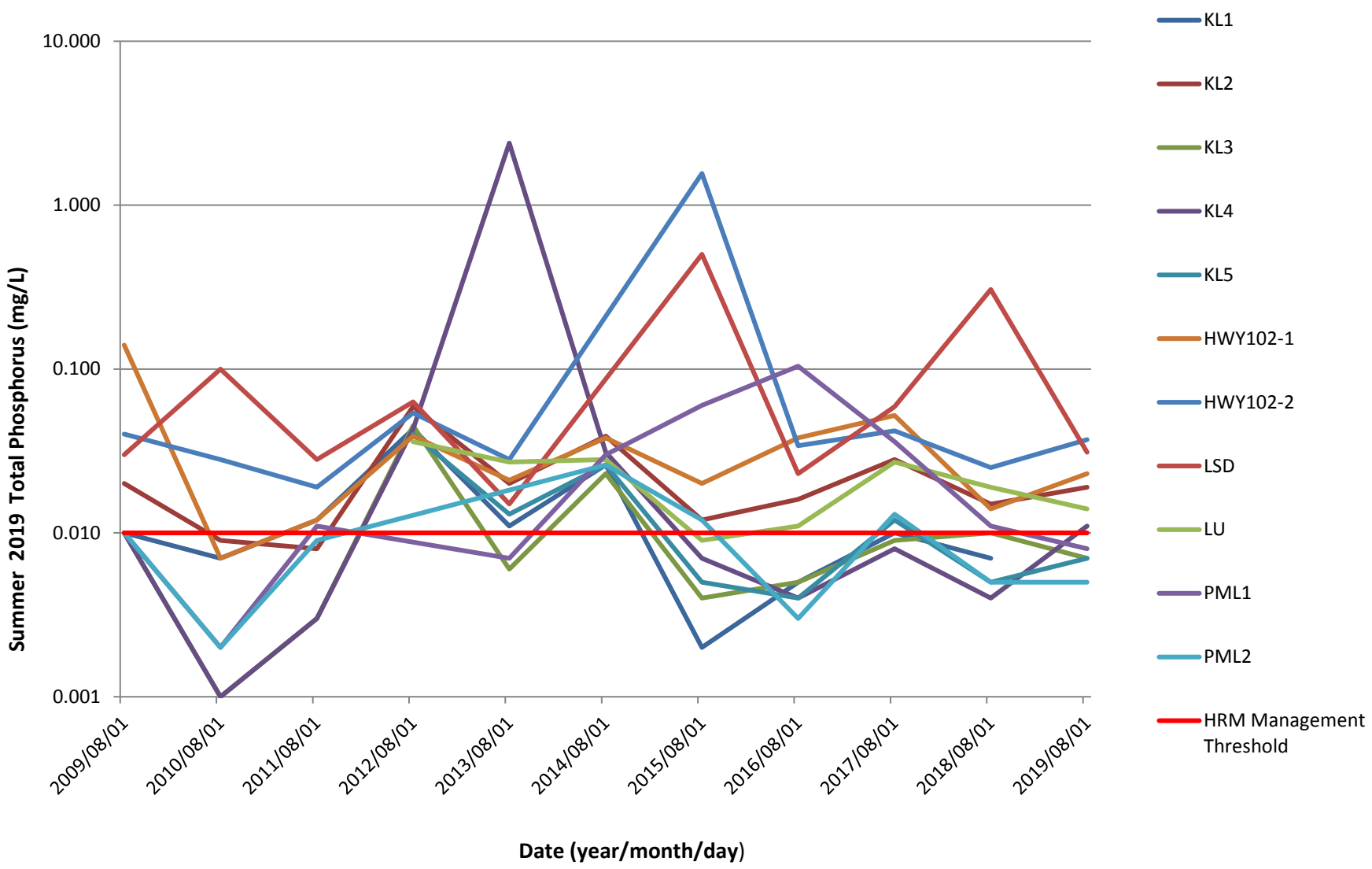


**Figure 8 – Seasonal Total Phosphorus Concentrations for Water Quality Monitoring Program.**

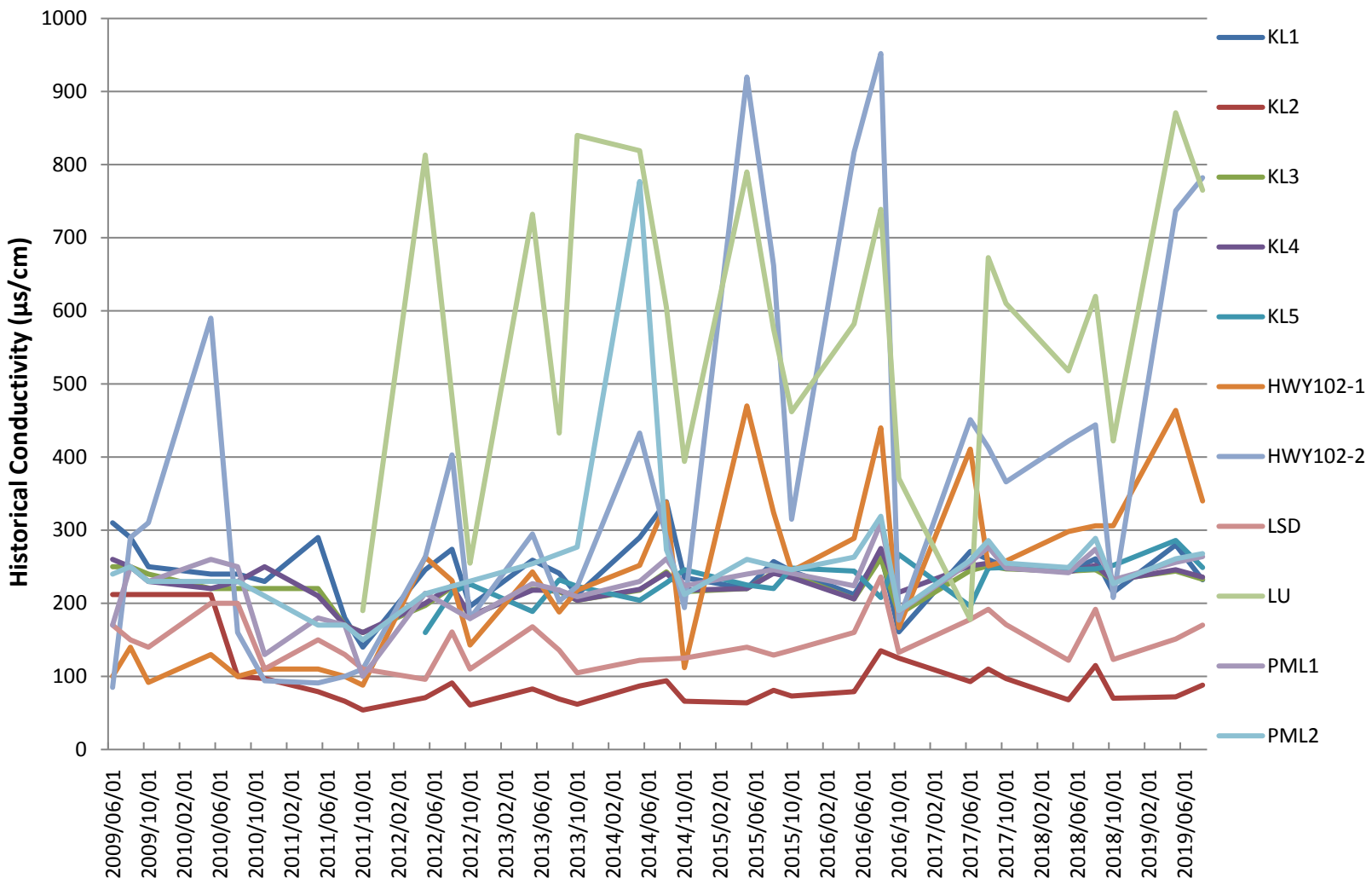


**Figure 9 – Historical Measurement of Conductivity for Water Quality Monitoring Program.**

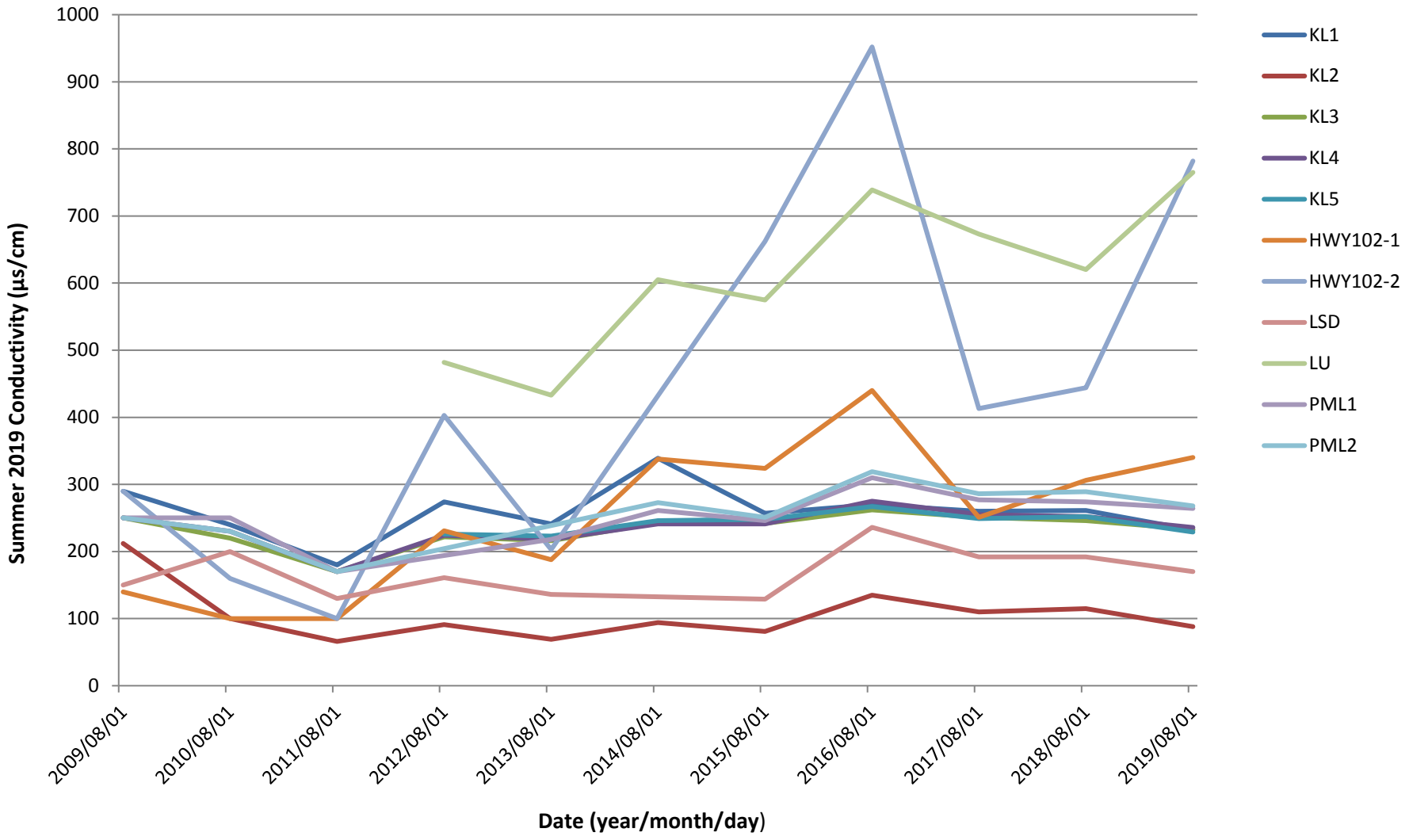


**Figure 10 – Seasonal Conductivity Measurements for Water Quality Monitoring Program.**

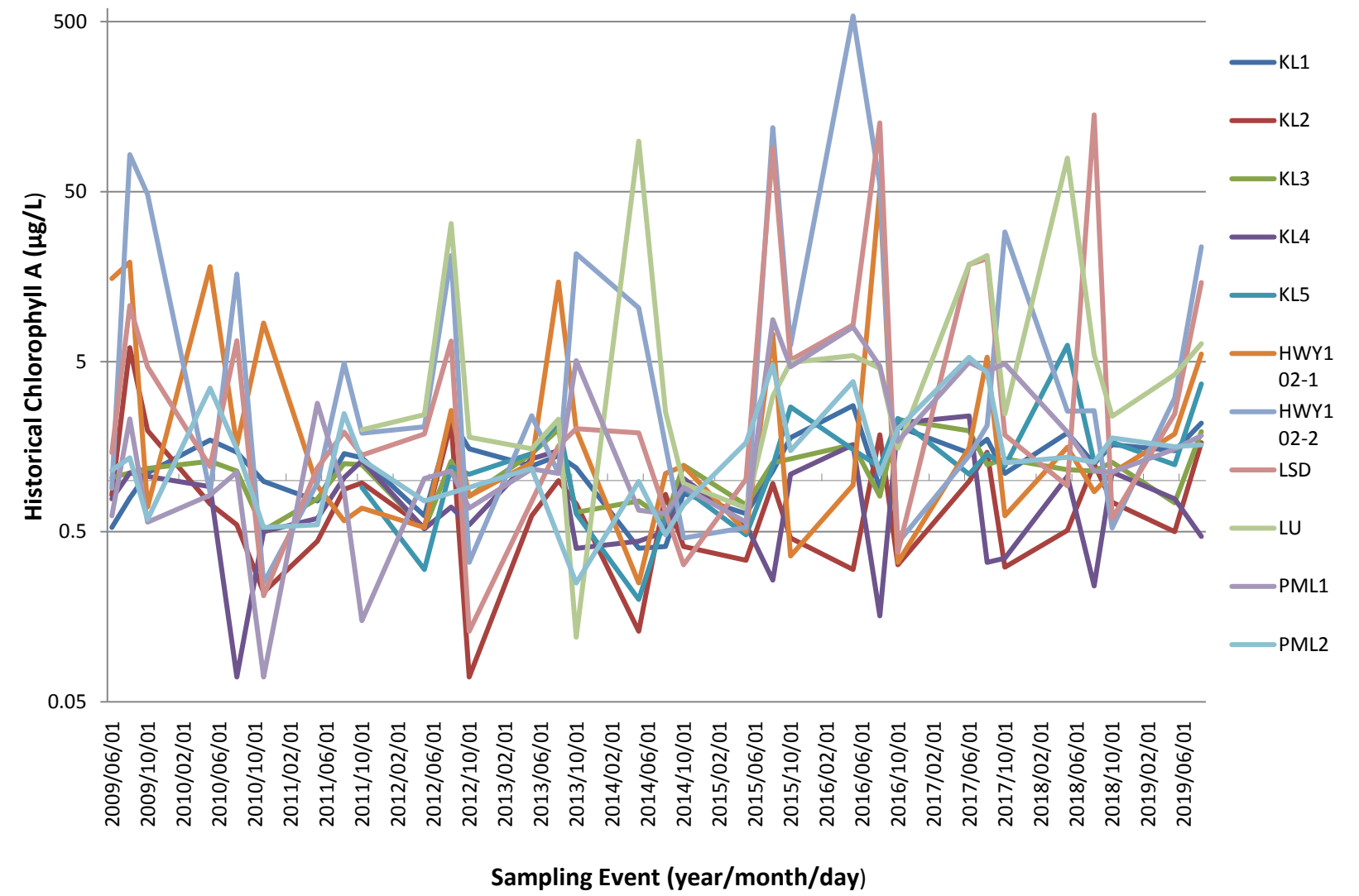


**Figure 11 – Historical Chlorophyll A Concentrations for Water Quality Monitoring Program.**

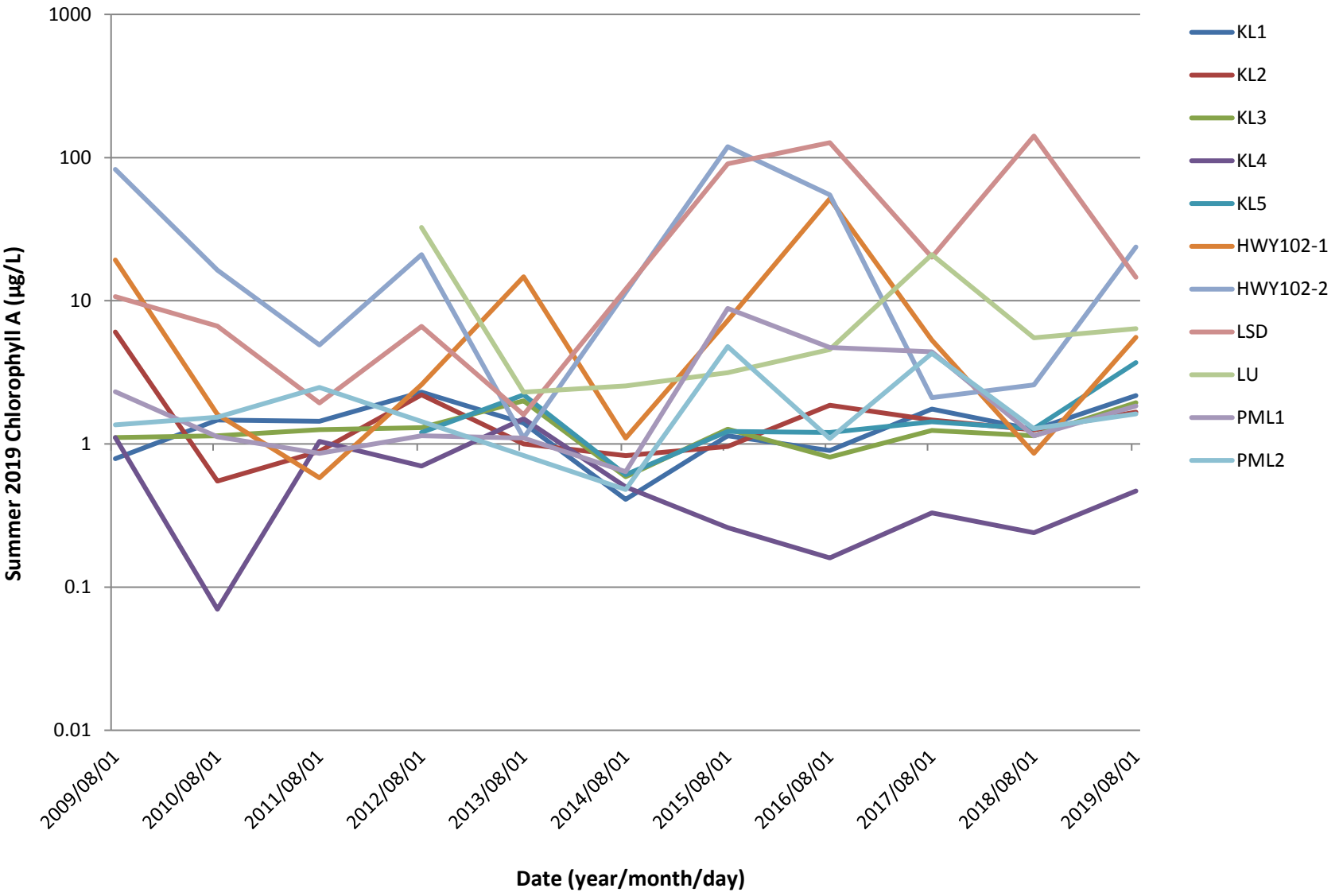


**Figure 12 – Seasonal Chlorophyll A Concentrations for Water Quality Monitoring Program.**



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December 13, 2019

SENT VIA EMAIL: deacofc@halifax.ca

**Halifax Regional Municipality**
Halifax, Nova Scotia

**Attention:** **Mr. Cameron Deacoff, MMM, PMP, CLP**
Water Resources Specialist
Planning and Development

Dear Mr. Deacoff:

**RE: Draft Report: Surface Water Quality Monitoring Program, 2019 Fall Sampling Event, Bedford West, Bedford, Nova Scotia**

SNC-Lavalin Inc. is pleased to submit one electronic copy of the draft report presenting the results of the 2019 fall surface water quality sampling event for the Bedford West Surface Water Quality Monitoring Program in Bedford, Nova Scotia.

If you have any questions, please contact the undersigned.

Yours truly,

**SNC♦LAVALIN INC.**

Michael Smith, *AScT, B.Tech, EP*
Area Lead, Environmental Engineering
*Infrastructure Engineering – Eastern Canada*
(709) 368-0118 Ext. 54957

631477-0001-T-4E-REP-000-0016-B01

# Surface Water Quality Monitoring Program, Bedford West

# Bedford West, Nova Scotia, Canada

Draft Report Fall 2019

2019/12/13


Prepared for:

**Halifax Regional Municipality**

Attention: Cameron Deacoff, MMM, PMP, CLP

Water Resources Specialist

Halifax, NS

PH: (902) 490-1926

Prepared by:

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# EXECUTIVE SUMMARY

On November 8, 2019 SNC-Lavalin Inc. (SNCL) completed the Bedford West Water Quality Monitoring program (2019 fall event) on behalf of Halifax Regional Municipality (HRM). The sampling program consisted of collecting surface water samples from eleven (11) water quality stations. Field parameters were recorded, and surface water samples were collected for laboratory analyses. The laboratory analyses included the following: inorganics, calculated parameters, standard elements and microbiological.

The applicable water quality assessment standards included:

- Canadian Council of Ministers of the Environment (CCME) guidelines for the Protection of Aquatic Life Freshwater (PAL-F);
- Health Canada guidelines for Canadian Recreational Water Quality (2012, Third Edition); and
- Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Surface Water, EQS for Contaminated Sites (NSE 2014) Table A2, Reference for Pathway Specific Standards for Surface Water – Fresh Water.

During the fall monitoring event, five (5) monitoring stations reported concentrations that exceeded the Total Phosphorous (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) listed in the HRM RFP14-338. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL2: 0.031 mg/L (equivalent to 31 µg/L);
- HWY-102-1: 0.026 mg/L (equivalent to 26 µg/L);
- HWY-102-2: 0.022 mg/L (equivalent to 22 µg/L);
- LU: 0.013 mg/L (equivalent to 13 µg/L); and
- KL5: 0.012 mg/L (equivalent to 12 µg/L).

In-situ readings of parameters such as pH, dissolved oxygen, water temperature and conductivity were recorded at all eleven (11) stations:

- Eleven (11) stations were within the acceptable pH ranges of 5.0 - 9.0 for Health Canada Recreational Water Quality. The following three (3) stations were found outside the recommended pH ranges of 6.5 - 9.0 for the CCME-PAL-F: KL2 (pH 6.11), HWY-102-1 (pH 6.37), LSD (pH 6.40).
- In-situ dissolved oxygen was outside of the CCME-PAL-F acceptable range of 5.5 – 9.5 mg/L at four (4) of the sampling stations including: KL4 (10.8 mg/L), HWY-102-2 (12.7 mg/L), LU (10.3 mg/L), PML-2 (9.8 mg/L).

- In-situ water temperature was recorded between 8.3°C and 12.8°C.
- In-situ water conductivity was recorded between 171.0 µs/cm to 216 µs/cm.
- Secchi depth readings were collected at three (3) stations. Recorded values meet the Health Canada reference guideline of minimum of 1.2 meters (m): KL1 (1.9 m); KL2 (1.2 m); and KL5 (2.2 m).

The following parameters reported concentrations above the recommended Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (CCME-PAL-F, edition 2015) and/or the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Surface Water, EQS for Contaminated Sites (NSE 2014) and/or the Health Canada guidelines for Recreational Water Quality:

- Nitrite concentrations were reported above the CCME-PAL-F limit of 0.06 mg/L at stations; LU (0.53 mg/L).
- Laboratory pH was reported at all eleven (11) stations within Health Canada pH range of 5.0-9.0 for Recreational Water Quality. The following three (3) stations were found outside the recommended pH ranges of 6.5 - 9.0 for the CCME-PAL-F: KL 2 (pH 5.89), HWY-102-1 (pH 5.73) and HWY-102-2 (pH 6.37).
- Aluminum concentrations exceeded the NSE EQS guideline of 5 µg/L at all of the sampling stations and seven (7) of those stations also exceeded the CCME-PAL-F limit of 100 µg/L including; KL1 (160.0 µg/L), KL2 (318.0 µg/L), HWY-102-1 (215.0 µg/L), HWY-102-2 (306.0 µg/L), LSD (154.0 µg/L), LU (169.0 µg/L), and PML-1 (133.0 µg/L).
- Iron concentrations exceeded the NSE EQS and CCME-PAL-F limit of 300 µg/L at two (2) of the sampling stations including: HWY-102-2 (506.0 µg/L), and LU (313.0 µg/L).
- Lead concentrations exceeded the NSE EQS and CCME-PAL-F limit of 1.0 µg/L at stations KL2 (1.6 µg/L) and HWY-102-2 (1.9 µg/L).

In terms of microbiological analyses, E. Coli was not found in exceedance of the Health Canada Guideline of 400 CFU/100 mL, at any of the eleven (11) sampling locations. There are no applicable Health Canada recreational water quality guidelines for Total Coliforms (TC); however, reported concentrations were above the laboratory RDL of 1 CFU/100mL at all eleven (11) stations. Reported TC concentrations ranged from 560 CFU/100ml to 1,240 CFU/100ml.

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Appendix A Field Reports

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Table B1 – 2019 Fall Results, Bedford West Water Quality Sampling Program

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Appendix C Laboratory Certificates of Analysis

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# 1. INTRODUCTION

SNC-Lavalin Inc. (SNCL) has prepared this report to provide Halifax Regional Municipality (HRM) with water quality data for eleven (11) surface water stations throughout the Bedford West development area.

Water quality monitoring in the Bedford West development area has been ongoing since 2009. SNCL was retained by HRM to complete water quality monitoring programs each spring, summer and autumn since 2015. The results of the 2019 fall monitoring program are detailed herein.

The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the Bedford West development in order to detect any impacts on and/or changes to water quality.

The 2019 fall sampling stations are summarized in Table 1 and shown in Drawing 1.

**Table 1: Bedford West Water Quality Sampling Stations**

| Water Course | Sample Location Name | Updated Coordinates (UTM NAD 83) | |
|---|---|---|---|
| | | Easting | Northing |
| Kearney Lake | KL-1 | 20T0445718E | 4948496N |
| Kearney Lake | KL-2 | 20T0443942E | 4949803N |
| Kearney Run | KL-3 | 20T0444390E | 4950406N |
| Kearney Run | KL-4 | 20T0444463E | 4950571N |
| Kearney Lake | KL-5 | 20T4949142E | 445280N |
| Creek Above Highway | HWY-102-1 | 20T0444708E | 4951644N |
| Creek Below Highway | HWY-102-2 | 20T0444829E | 4951778N |
| Lake Shore Drive | LSD | 20T0442583E | 4950431N |
| Larry Uteck Off-Ramp | LU | 20T0444954E | 4949891N |
| Paper Mill Lake | PML-1 | 20T0445129E | 4951154N |
| Paper Mill Lake | PML-2 | 20T0445363E | 4951740N |

N

HWY102-2

PML2

HWY102-1

PAPER MILL LAKE

PML1

KL4

LSD

KL3

KL2

LU

KEARNEY LAKE

KL5

KL1

## Legend

- Water Quality Monitoring Test Locations/Sample Identification

0 200 400 800 1,200 1,600

Meters

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Member of the SNC•LAVALIN Group

Certified ISO 9001

HALIFAX REGIONAL MUNICIPALITY

PROJECT: WATER QUALITY MONITORING WITHIN BEDFORD WEST

TITLE: WATER QUALITY MONITORING TEST LOCATIONS

| | |
|---|---|
| DESIGNED: | CH |
| DRAWN: | CH |
| CHECKED: | DH |
| SCALE: | AS SHOWN |
| DATE: | 21-09-2015 |
| PROJECT #: | 631477-0001 |
| DRAWING #: | 1 |

# 2. METHODOLOGY

The 2019 fall water quality sampling event included the measurements of Field Parameters (Group A) and collection of surface water for laboratory analysis of:

- Inorganics (Group B);
- Calculated Parameters (Group C);
- Standard Elements/Metals (Group D); and
- Microbiological Analyses (Group E).

Table 2 below summarizes the water quality parameters measured in the field or analyzed by the laboratory.

**Table 2: Analytical Parameter Groups**

| Field Parameters (A) | Inorganics (B) | Calculated Parameters (C) | Standard Metals (D) | Microbiological (E) |
|---|---|---|---|---|
| · pH<br>· TDS<br>· Dissolved Oxygen<br>· Temperature<br>· Secchi Depth<br>· Conductance<br>· Air Temperature<br>· Cloud Cover<br>· Incidental Wildlife Sightings | · Total Alkalinity (as $CaCO_3$)<br>· Dissolved Chloride<br>· Colour<br>· Total Kjeldahl Nitrogen<br>· Nitrate + Nitrite<br>· Nitrate<br>· Nitrite<br>· Nitrogen (as NH4)<br>· Total Organic Carbon<br>· Orthophosphate (P)<br>· pH<br>· Low Total Phosphorus<br>· Reactive Silica<br>· Total Suspended Solids<br>· Dissolved Sulphate<br>· Turbidity<br>· Conductivity | · Anion Sum<br>· Cation Sum<br>· Ion Balance<br>· Bicarbonate Alkalinity(as $CaCO_3$)<br>· Carbonate Alkalinity (as $CaCO_3$)<br>· Hardness<br>· Total Dissolved Solids<br>· Saturation pH (@4°C & 20°C)<br>· Langelier Index (@4°C & 20°C) | · Calcium<br>· Copper<br>· Iron<br>· Magnesium<br>· Manganese<br>· Potassium<br>· Sodium<br>· Zinc | · Chlorophyll A<br>· E. coli<br>· Most Probable Number (MPN) or CFU per 100 mL |

All surface water samples, associated field parameters and secchi depth measurements were collected on November 8, 2019.

Site conditions (i.e. weather, air temperature, cloud cover, site accessibility and wildlife sightings) and field

parameters for each sampling location were recorded on a field report sheet (See Appendix B, Field Reports). Each sample station was photographed during the sample event (See Appendix C, Site Photographs).

Surface water sampling followed SNCL's Standard Operating Procedures (SOP) for surface water sampling. A new pair of nitrile gloves was used at each sample location. Water samples and field parameter readings were collected within a depth of ≤1.0 m below surface (if possible). It should be noted that samples were collected from the shore at eleven (11) stations (KL1, KL2, KL3, KL4, KL5, HWY-102-1, HWY-102-2, LSD, LU, PML-1, and PML-2).

Surface water samples were collected and placed in clean laboratory-supplied bottles and stored in a chilled container together with a chain of custody record for transport to the laboratory. Laboratory analysis was completed by AGAT Laboratories located in Dartmouth, Nova Scotia. AGAT is an accredited laboratory by the Standard Council of Canada (SCC), Canadian Association for Laboratory Accreditation (CALA), and ISO 9001:2015.

# 3. APPLICABLE GUIDELINES

For this water quality monitoring program, the Federal and Provincial water quality guidelines being used for the assessment of surface water quality results are as follows, the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Aquatic Life – Freshwater (PAL-F) (Version 2015), the Health Canada (HC) guidelines for Canadian Recreational Water Quality (2012, Third Edition), and the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2, Reference for Pathway Specific Standards for Surface Water (µg/L) for Fresh Water. These guidelines were used to determine whether a tested parameter was in exceedance. Exceedances may be an indication of water quality impairment or conditions that will eventually lead to impairment. A detailed description of the guidelines is presented below:

### CCME Guidelines

- The CCME PAL-F guidelines were used for parameters such as dissolved oxygen, pH (in-situ and analytical), Chloride, Nitrate, Nitrite, Nitrogen, as well as for total metals such as Aluminum, Arsenic, Boron, Cadmium, Cooper, Iron, Lead, Molybdenum, Nickel, Selenium, Silver, Thallium, Uranium, and Zinc.
- There is no CCME recommended value for Total Suspended Solids (TSS), however the following CCME narrative for TSS at high flow was applied "maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L should not increase more than 10% of background levels when background is ≥ 250 mg/L".
- According to CCME, 10 µg/L of total phosphorous is the threshold between oligotrophic and mesotrophic classifications. In the Canadian framework, a trigger range is a desired concentration range for phosphorus; if the upper limit of the range is exceeded, it indicates potential for

environmental quality issues, which may trigger the need for further investigation. HRM defined a Total Phosphorous management threshold value of 10 µg/L or 0.01 mg/L for this monitoring program.

### HC Guidelines

- The HC guidelines for Canadian Recreational Water Quality was used for parameters such as secchi depth (i.e. visibility at a minimum depth of 1.2 metres), pH guideline of 5.0-9.0, turbidity (limit of 50 Nephelometric Turbidity Units), and E. coli (i.e. ≤400 E.Coli/100mL).

### NSE Guidelines

- The NSE EQS were used for assessment of total metals such as Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Uranium, Vanadium and Zinc.

# 4. FIELD OBSERVATIONS

The 2019 fall site conditions were recorded for all eleven (11) surface water quality monitoring stations and are included in the field data sheets in Appendix B. Site condition observations include weather, cloud cover, air temperature, wildlife sightings and site accessibility.

# 5. FIELD MEASUREMENTS

Field parameters such as in situ pH, dissolved oxygen, water temperature, conductivity and secchi depth (where applicable) were recorded on field data sheets. Collected data is enclosed in Appendix B.

Field measurements are also tabulated in Appendix D: Table D1 - Fall Results and Table D2 – Historical Results.

### In-situ pH

All eleven (11) stations were within the 5.0 - 9.0 pH Health Canada range for Recreational Water Quality. Three (3) sampling stations were found outside of the CCME-PAL-F recommended range of 6.5 - 9.0. at the following:

- KL2: pH 6.11;
- HWY-102-1: pH 6.37; and
- LSD: pH 6.40

### Dissolved Oxygen

In-situ dissolved oxygen was outside of the CCME-PAL-F acceptable range of 5.5 – 9.5 mg/L at four (4) of the sampling stations including:

- KL4 (10.80 mg/L);
- HWY-102-2 (12.70 mg/L);
- LU (10.30 mg/L); and
- PML-2 (9.80 mg/L).

### Water Temperature

There are no applicable Health Canada or NSE guidelines for recreation water temperature. Water temperature was recorded between 8.3°C and 12.8°C.

### Conductivity

There are no applicable Health Canada or NSE guidelines for recreation water conductivity. However, specific water conductivity was recorded between 171.0 µs/cm to 216.0 µs/cm.

### Secchi Disk Depth

Secchi depths were collected at three (3) monitoring stations. Secchi depth readings met the Health Canada reference guideline of minimum of 1.2 meters (m). Recorded values were as follows:

- KL1: 1.90 m;
- KL2: 1.20 m; and
- KL5: 2.20 m;

# 6. ANALYTICAL RESULTS

Analytical results of the 2019 fall monitoring event and applicable/reference guidelines are tabulated in Table D1 and enclosed in Appendix D. In addition, historical water quality results from 2009 - 2019 are summarized in Table D2 and enclosed in Appendix D.

Laboratory certificates of analysis for the 2019 fall event are in Appendix E.

## 6.1 Total Phosphorous

Five (5) monitoring stations reported concentrations that exceeded the Total Phosphorous (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) listed in the HRM RFP14-338. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL2: 0.031 mg/L (equivalent to 31 µg/L);
- HWY-102-1: 0.026 mg/L (equivalent to 26 µg/L);
- HWY-102-2: 0.022 mg/L (equivalent to 22 µg/L);
- LU: 0.013 mg/L (equivalent to 13 µg/L); and
- PML-1: 0.012 mg/L (equivalent to 12 µg/L).

## 6.2 General Chemistry

Of the tested inorganic parameters, only concentrations of nitrite and pH values were reported outside or above the applicable guidelines.

**Nitrite**

One (1) sampling stations reported nitrite concentrations above the CCME-PAL-F limit of 0.06 mg/L;

- LU: 0.53 mg/L.

**Laboratory pH**

All eleven (11) stations reported pH values well within Health Canada range of 5.0-9.0 for Recreational Water Quality. The following three (3) stations were found outside the recommended pH ranges of 6.5 - 9.0 for the CCME-PAL-F: KL 2 (pH 5.89), HWY-102-1 (pH 5.73) and HWY-102-2 (pH 6.37).

## 6.3 Metals

The following metals were analyzed during the fall 2019 monitoring event: aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, tin, titanium, uranium, vanadium and zinc. Of the tested metal parameters, exceedances were reported above the guidelines/reference limits for aluminum, iron, lead and manganese parameters. Exceedances were reported as follows:

### Aluminum

All eleven (11) sampling stations exceeded the NSE EQS aluminum guideline of 5 µg/L and seven (7) of those stations also exceeded the CCME-PAL-F limit of 100 µg/L:

- KL1: 160 µg/L (exceedance of NSE EQS and CCME-PAL-F);
- KL2: 318 µg/L (exceedance of NSE EQS and CCME-PAL-F);
- KL3: 80 µg/L;
- KL4: 92 µg/L;
- KL5: 97 µg/L;
- HWY-102-1: 215µg/L (exceedance of NSE EQS and CCME-PAL-F);
- HWY-102-2: 306 µg/L (exceedance of NSE EQS and CCME-PAL-F);
- LSD: 154 µg/L (exceedance of NSE EQS and CCME-PAL-F);
- LU: 169 µg/L (exceedance of NSE EQS and CCME-PAL-F);
- PML-1: 133 µg/L (exceedance of NSE EQS and CCME-PAL-F); and
- PML-2: 79 µg/L.

### Iron

Two (2) stations exceeded the NSE EQS iron guideline and CCME-PAL-F limit of 300 µg/L:

- HWY-102-2: 506 µg/L; and
- LU: 313 µg/L.

### Lead

Two (2) stations exceeded the NSE EQS lead guideline and CCME-PAL-F limit of 1.0 µg/L:

- KL2: 1.6 µg/L; and
- HWY-102-2: 1.9 µg/L.

## 6.4 Microbiological

There were no exceedances of the Heath Canada (HC) E.Coli Guideline of ≤ 400 CFU/100 mL.

HC does not have a recreational water quality guideline for Total Coliform (TC). All eleven (11) stations reported TC concentrations above the laboratory RDL of 1 CFU/100mL. Reported concentrations ranged from 560 CFU/100ml to 1,240 CFU/100ml.

# 7. STATISTICAL PRESENTATION

Statistics include water quality data from June 2009 to November 2019 of all eleven (11) water quality monitoring stations. Table 3 provides the fall seasonal statistics for the following six (6) key water quality parameters selected by HRM:

- Total phosphorus (mg/L);
- Dissolved chloride (mg/L);
- Laboratory measured pH;
- Total suspended solids (mg/L);
- Conductivity (µS/cm); and
- Chlorophyll A (µg/L).

Where analytical results were found to be less than the laboratory Reportable Detection Limit (<RDL), the statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory reportable detection limit (1/2 RDL value) as a conservative approach.

It should be noted that number of decimal places presented for each listed parameter is based on the decimal places of the RDL and reported Laboratory certificate of analysis.

**Table 3: Statistical Presentation of Key Water Quality Parameters for Fall**

| KL-1 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.008 | 0.001 | 0.013 | 0.008 | 0.008 |
| Chloride (mg/L) | 1 | 43 | 33 | 64 | 50 | 51 |
| Lab pH | N/A | 6.70 | 6.35 | 7.07 | 6.81 | 6.79 |
| Total Suspended Solids (mg/L) | 5 | 2.5 | 0.5 | 45 | 2.5 | 6.5 |
| Conductivity (µS/cm) | 1 | 129 | 129 | 250 | 215 | 206 |
| Chlorophyll-A Spectrophotometer (µg/L) | 0.25 | 1.26 | 0.84 | 2.08 | 1.26 | 1.35 |

| KL-2 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.031 | 0.004 | 0.031 | 0.013 | 0.016 |
| Chloride (mg/L) | 1 | 14 | 10 | 48 | 14 | 18 |
| Lab pH | N/A | 5.89 | 5.89 | 6.85 | 6.27 | 6.29 |
| Total Suspended Solids (mg/L) | 5 | 2.5 | 0.5 | 103 | 2.5 | 12.6 |
| Conductivity (µS/cm) | 1 | 45 | 45 | 212 | 70 | 87 |
| Chlorophyll-A Spectrophotometer (µg/L) | 0.25 | 0.125 | 0.07 | 1.97 | 0.41 | 0.58 |

| KL-3 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.007 | 0.002 | 0.148 | 0.007 | 0.019 |
| Chloride (mg/L) | 1 | 54 | 37 | 60 | 49 | 50 |
| Lab pH | N/A | 6.81 | 6.38 | 7.10 | 6.87 | 6.83 |
| Total Suspended Solids (mg/L) | 5 | 2.5 | 0.5 | 2.5 | 2.5 | 2 |
| Conductivity (µS/cm) | 1 | 160 | 160 | 247 | 216 | 208 |
| Chlorophyll-A Spectrophotometer (µg/L) | 0.25 | 0.47 | 0.47 | 2.29 | 1.23 | 1.12 |

| KL-4 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.005 | 0.001 | 0.026 | 0.006 | 0.009 |
| Chloride (mg/L) | 1 | 54 | 37 | 60 | 53 | 51 |
| Lab pH | N/A | 6.87 | 6.46 | 7.13 | 6.85 | 6.85 |
| Total Suspended Solids (mg/L) | 5 | 2.5 | 0.5 | 2.5 | 2.5 | 2.0 |
| Conductivity (µS/cm) | 1 | 158 | 158 | 250 | 218 | 212 |
| Chlorophyll-A Spectrophotometer (µg/L) | 0.25 | 0.32 | 0.32 | 2.18 | 1.03 | 0.90 |

| KL-5 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.005 | 0.003 | 0.135 | 0.005 | 0.020 |
| Chloride (mg/L) | 1 | 57 | 37 | 60 | 48 | 50 |
| Lab pH | N/A | 6.80 | 6.50 | 7.47 | 6.89 | 6.86 |
| Total Suspended Solids (mg/L) | 5 | 2.5 | 1.0 | 2.5 | 2.5 | 2.3 |
| Conductivity (µS/cm) | 1 | 160 | 160 | 286 | 204 | 212 |
| Chlorophyll-A Spectrophotometer (µg/L) | 0.25 | 0.32 | 0.32 | 2.71 | 1.09 | 1.31 |

| HWY-102-1 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.026 | 0.002 | 0.031 | 0.011 | 0.015 |
| Chloride (mg/L) | 1 | 92 | 12 | 92 | 35 | 39 |
| Lab pH | N/A | 5.73 | 5.31 | 6.94 | 6.45 | 6.29 |
| Total Suspended Solids (mg/L) | 5 | 2.5 | 0.5 | 2.5 | 2.5 | 2.1 |
| Conductivity (µS/cm) | 1 | 247 | 88 | 306 | 167 | 180 |
| Chlorophyll-A Spectrophotometer (µg/L) | 0.25 | 0.125 | 0.125 | 8.45 | 0.70 | 1.49 |

| HWY-102-2 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.022 | 0.003 | 0.201 | 0.022 | 0.053 |
| Chloride (mg/L) | 1 | 74 | 17 | 92 | 48 | 52 |
| Lab pH | N/A | 6.40 | 5.47 | 7.07 | 6.34 | 6.32 |
| Total Suspended Solids (mg/L) | 5 | 2.5 | 2.5 | 194 | 3 | 28.1 |
| Conductivity (µS/cm) | 1 | 204 | 94 | 366 | 204 | 216 |
| Chlorophyll-A Spectrophotometer (µg/L) | 0.25 | 0.32 | 0.25 | 48.17 | 0.53 | 9.93 |

| LSD | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.008 | 0.003 | 0.095 | 0.014 | 0.027 |
| Chloride (mg/L) | 1 | 20 | 20 | 36 | 23 | 25 |
| Lab pH | N/A | 6.60 | 6.38 | 7.01 | 6.68 | 6.71 |
| Total Suspended Solids (mg/L) | 5 | 2.5 | 2.5 | 69 | 7 | 13.5 |
| Conductivity (µS/cm) | 1 | 63 | 63 | 171 | 123 | 121 |
| Chlorophyll-A Spectrophotometer (µg/L) | 0.25 | 0.125 | 0.125 | 5.12 | 0.60 | 1.53 |

| LU | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.013 | 0.008 | 0.046 | 0.021 | 0.024 |
| Chloride (mg/L) | 1 | 75 | 34 | 258 | 75 | 99 |
| Lab pH | N/A | 7.00 | 6.41 | 7.29 | 7.00 | 6.90 |
| Total Suspended Solids (mg/L) | 5 | 2.5 | 2.5 | 13.0 | 2.5 | 4.1 |
| Conductivity (µS/cm) | 1 | 256 | 190 | 840 | 394 | 422 |
| Chlorophyll-A Spectrophotometer (µg/L) | 0.25 | 0.125 | 0.12 | 4.94 | 1.80 | 1.82 |

| PML-1 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.012 | 0.001 | 0.099 | 0.018 | 0.026 |
| Chloride (mg/L) | 1 | 53 | 18 | 59 | 48 | 46 |
| Lab pH | N/A | 6.90 | 6.58 | 7.16 | 6.80 | 6.81 |
| Total Suspended Solids (mg/L) | 5 | 2.5 | 0.50 | 104 | 6.0 | 16.3 |
| Conductivity (µS/cm) | 1 | 156 | 100 | 248 | 209 | 194 |
| Chlorophyll-A Spectrophotometer (µg/L) | 0.25 | 0.32 | 0.07 | 5.07 | 0.91 | 1.83 |

| PML-2 | RDL | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Total Phosphorous (mg/L) | 0.002 | 0.008 | 0.001 | 0.026 | 0.008 | 0.009 |
| Chloride (mg/L) | 1 | 64 | 34 | 64 | 53.5 | 52.2 |
| Lab pH | N/A | 6.90 | 6.60 | 7.05 | 6.87 | 6.86 |
| Total Suspended Solids (mg/L) | 5 | 2.5 | 0.5 | 11 | 2.5 | 3.0 |
| Conductivity (µS/cm) | 1 | 189 | 150 | 277 | 220 | 219 |
| Chlorophyll-A Spectrophotometer (µg/L) | 0.25 | 0.47 | 0.25 | 2.02 | 1.0 | 1.05 |

# 8. GRAPHS

Graphs were completed for all eleven (11) water quality monitoring stations including water quality data collected from June 2009 to November 2019. Appendix F presents seasonal and annual graphs that illustrate concentrations of the following six (6) key water quality parameters selected by HRM:

- Total phosphorus (mg/L);
- Dissolved chloride (mg/L);
- Laboratory measured pH;
- Total suspended solids (mg/L);
- Conductivity (µS/cm); and
- Chlorophyll A (µg/L).

The graphs allow for comparison between water quality sampling stations and identification of concentration increases (i.e. above applicable CCME guidelines). As many parameters show seasonal concentration fluctuations, the water quality data was also graphed showing only the concentrations for a given season.

It should be noted that where results were found to be less than the laboratory Reportable Detection Limit (<RDL), they were graphed as half the reportable detection limit (1/2 RDL value) as a conservative approach.

# 9. CONCLUSIONS

The 2019 fall water quality monitoring event included the collection of surface water samples at eleven (11) water quality sampling stations for the analysis of inorganics, calculated parameters, standard metals, microbiological analyses and additional metals. Additionally, field parameters collected at each station included in-situ pH, water temperature, dissolved oxygen, conductivity, Secchi depth (where applicable), air temperature, cloud cover and wildlife sightings.

## Total Phosphorous

The following five (5) monitoring stations reported total phosphorous concentrations above the HRM management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L):

- KL2: 0.031 mg/L (equivalent to 31 µg/L);
- HWY-102-1: 0.026 mg/L (equivalent to 26 µg/L);
- HWY-102-2: 0.022 mg/L (equivalent to 22 µg/L);
- LU: 0.013 mg/L (equivalent to 13 µg/L); and
- PML-1: 0.012 mg/L (equivalent to 12 µg/L).

## Field Measurements

- Eleven (11) stations were within the acceptable pH ranges of 5.0 - 9.0 for Health Canada Recreational Water Quality. The following three (3) stations were found outside the recommended

pH ranges of 6.5 - 9.0 for the CCME-PAL-F: KL2 (pH 6.11), HWY-102-1 (pH 6.37), and LSD (pH 6.40).

- In-situ dissolved oxygen was outside of the CCME-PAL-F acceptable range of 5.5 – 9.5 mg/L at four (4) of the sampling stations including: KL4 (10.80 mg/L), HWY-102-2 (12.70 mg/L), LU (10.30mg/L), and PML-2 (9.80 mg/L).
- In-situ water temperature was recorded between 8.3°C and 12.8°C.
- In-situ water conductivity was recorded between 171.0 µs/cm to 216.0 µs/cm.
- Secchi depth readings were collected at three (3) stations. Recorded values meet the Health Canada reference guideline of minimum of 1.2 meters (m): KL1 (1.90 m); KL2 (1.20 m); and KL5 (2.20 m).

## General Chemistry and Metals

The following parameters reported concentrations above the recommended Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (CCME-PAL-F, edition 2015) and/or the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Surface Water, EQS for Contaminated Sites (NSE 2014):

- Nitrite concentrations were reported above the CCME-PAL-F limit of 0.06 mg/L at station; LU (0.53 mg/L).
- Laboratory pH was reported at all eleven (11) stations within Health Canada pH range of 5.0-9.0 for Recreational Water Quality. The following three (3) stations were found outside the recommended pH ranges of 6.5 - 9.0 for the CCME-PAL-F: KL 2 (pH 5.89), HWY-102-1 (pH 5.73) and HWY-102-2 (pH 6.37).
- Aluminum concentrations exceeded the NSE EQS guideline of 5 µg/L at all of the sampling stations and seven (7) of those stations also exceeded the CCME-PAL-F limit of 100 µg/L including; KL1 (160.0 µg/L), KL2 (318.0 µg/L), HWY102-1 (215.0 µg/L), HWY102-2 (306.0 µg/L), LSD (154.0 µg/L), LU (169.0 µg/L), and PML-1 (133.0 µg/L).
- Iron concentrations exceeded the NSE EQS and CCME-PAL-F limit of 300 µg/L at two (2) of the sampling stations including: HWY-102-2 (506.0 µg/L), and LU (313.0 µg/L).
- Lead concentrations exceeded the NSE EQS and CCME-PAL-F limit of 1.0 µg/L at stations KL2 (1.6 µg/L) and HWY-102-2 (1.90 µg/L).

### Microbiological

The Heath Canada guideline of ≤ 400 CFU/100 mL of E.Coli was met at all eleven (11) stations monitored during the 2019 fall event.

There are no recreational water quality guidelines for Total Coliform (TC). All monitoring stations reported TC concentrations above the Lab RDL of 1 CFU/100mL. Reported TC concentrations ranged from 560 CFU/100ml to 1,240 CFU/100ml.

# 10. LIMITATION

This report has been prepared and the work referred to in this report has been undertaken by SNC-Lavalin Inc (SNCL) for Halifax Regional Municipality (HRM), hereafter referred to as the "Client". It is intended for the sole and exclusive use of Halifax Regional Municipality. The report has been prepared in accordance with the Scope of Work and agreement between SNCL and the Client. Other than by the Client and as set out herein, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of SNCL.

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This report was prepared by Mark Fortier, P. Eng, and reviewed and approved by Michael Smith, AScT, B.Tech, EP.

# 11. REFERENCES

*Canadian Environmental Quality Guidelines for the Protection of Aquatic Life, 2004, "Phosphorous: Canadian Guidance Framework for the Management of Freshwater Systems".*

*Canadian Council of Ministers of the Environment guidelines for the Protection of Aquatic Life Freshwater.*

*Health Canada guidelines for Canadian Recreational Water Quality, 2012, Third Edition.*

*Nova Scotia Environment, Notification of Contamination Protocol, Table 3 Tier 1 EQS for Surface Water, Revision July 2013*

# Appendix A

Field Reports

**FIELD REPORT –Fall 2019**

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality, Nova Scotia | |
| **Site:** Kearney Lake | | **Site ID: KL1** |
| **Watercourse:** Kearney Lake | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0445718E, 4948496N (UTM, NAD83) | |
| **SNC Field Personnel:** | Billy Shaw, Grant Currie | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy |
| Air Temperature: | 4 deg. Celsius |
| Cloud Cover : | 100% |
| Wildlife Sightings: | None |
| Site Accessibility: Yes, Accessible | Off Kearney Lake Road |
| Site Access Detail: | Sample taken off the end of dock at Kearney Lake beach. Parked in public parking of Hamshaw Dr. and walked down to beach area. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (year-month-day) | 2019-11-08 |
| Time (hh:mm): | 8:45 AM |
| Sample Depth (m): | 0.30 |
| pH: | 6.77 |
| Dissolved Oxygen (mg/L): | 8.9 |
| Secchi Depth (m): | 1.9 |
| Water Temperature (degrees Celsius): | 10.4 |
| Conductivity (µs/cm): | 194 |

**Additional Comments / Notes**


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**FIELD REPORT –Fall 2019**

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake | | **Site ID: KL2** |
| **Watercourse:** Kearney Lake | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0443942E, 4949803N (UTM, NAD83) | |
| **SNC Field Personnel:** | Billy Shaw, Grant Currie | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy |
| Air Temperature: | 4 |
| Cloud Cover: | 100% |
| Wildlife Sightings: | none |
| Site Accessibility: Yes, Accessible | Off Colin's Rd. |
| Site Access Detail: | Sample taken on the lake side of the culvert between residential buildings 20 and 28. Walked down rock to left of culvert. Note: Sample when standing downstream of bottle. |
| | |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (year-month-day): | 2019-11-08 |
| Time (hh:mm): | 10:45 AM |
| Sample Depth (m): | 0.2 |
| pH: | 6.11 |
| Dissolved Oxygen (mg/L): | 7.9 |
| Secchi Depth (m): | 1.2 |
| Water Temperature (degrees Celsius): | 10.1 |
| Conductivity (µs/cm): | 214 |

**Additional Comments / Notes**


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**FIELD REPORT –Fall 2019**

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake Run | | **Site ID: KL3** |
| **Watercourse:** Kearney Lake Run | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444390E, 4950406N (UTM, NAD83) | |
| **SNC Field Personnel:** | Billy Shaw, Grant Currie | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy |
| Air Temperature: | 5 |
| Cloud Cover: | 100% |
| Wildlife Sightings: | none |
| Site Accessibility: Yes, Accessible | Off walking trail from Amesbury Gate Rd. |
| Site Access Detail: | Access to site is via a walking path clearly evident off of Amesbury Gate Rd. (off Larry Uteck Blvd.) roughly 205m down road on left. Walk down path, follow gravel walkway down hill and take sample at the low point facing the dam. Look for large rock outcrop on right. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | 2019-11-08 |
| Time (hh:mm): | 11:45 |
| Sample Depth (m): | 0.20 |
| pH: | 6.61 |
| Dissolved Oxygen (mg/L): | 9.3 |
| Secchi Depth (m): | NA |
| Water Temperature (degrees Celsius): | 11.3 |
| Conductivity (µs/cm): | 183 |

**Additional Comments / Notes**


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**FIELD REPORT –Fall 2019**

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake Run | | **Site ID: KL4** |
| **Watercourse:** Kearney Lake Run | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444463E, 4950571N (UTM, NAD83) | |
| **SNC Field Personnel:** | Billy Shaw, Grant Currie | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy |
| Air Temperature: | 5 |
| Cloud Cover: | 100% |
| Wildlife Sightings: | none |
| Site Accessibility: Yes, Accessible | Via the extended road at the end of Weybridge Ln. |
| Site Access Detail: | At Weybridge, go to end of extended road on right and walk and take sample above the rocky area at the base of the wider, slow moving section of the river. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | 2019-11-08 |
| Time (hh:mm): | 12:15 AM |
| Sample Depth (m): | 0.25 |
| pH: | 6.81 |
| Dissolved Oxygen (mg/L): | 10.8 |
| Secchi Depth (m): | NA |
| Water Temperature (degrees Celsius): | 10.9 |
| Conductivity (µs/cm): | 188 |

**Additional Comments / Notes**


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**FIELD REPORT –Fall 2019**

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 9 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Kearney Lake | | **Site ID: KL5** |
| **Watercourse:** Kearney Lake | | **Location:** Kearney Lake Road |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 4949142E, 445280N (UTM, NAD83) | |
| **SNC Field Personnel:** | Billy Shaw, Grant Currie | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy |
| Air Temperature: | 5 |
| Cloud Cover: | 100% |
| Wildlife Sightings: | none |
| Site Accessibility: Yes, Accessible | Along Kearney Lake Road |
| Site Access Detail: | Easily accessible, sample location is directly off the Kearney Lake Road on a rocky outcrop supporting a power line pole (two pole structure). Slow truck down carefully, turn hazard lights on. Samples were taken on left front of outcrop facing lake. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | 2019-11-08 |
| Time (hh:mm): | 10:00 AM |
| Sample Depth (m): | 0.3 |
| pH: | 6.62 |
| Dissolved Oxygen (mg/L): | 8.1 |
| Secchi Depth (m): | 2.2 |
| Water Temperature (degrees Celsius): | 12.8 |
| Conductivity (µs/cm): | 216 |

**Additional Comments / Notes**


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**FIELD REPORT –Fall 2019**

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Highway 102 | | **Site ID: HWY 102-1** |
| **Watercourse:** Marsh area | | **Location:** Highway 102, south of exit 3 |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444708E, 4951644N (UTM, NAD83) | |
| **SNC Field Personnel:** | Billy Shaw, Grant Currie | |

**Site Conditions**

| | |
|---|---|
| Weather: | Light Rain |
| Air Temperature: | 5 |
| Cloud Cover: | 100% |
| Wildlife Sightings: | none |
| Site Accessibility: Yes, Accessible | Off Highway 102 Park before guardrail. |
| Site Access Detail: | Carefully slow truck down while pulling off highway 102. Park truck with hazard lights on before the start of the guardrail. Walk along outside of guardrail (for approximately 150m). Site is on right fed by a swampy bog area. Samples were taken in front of culvert. There is a concrete pad to step on to take samples. Sample while standing downstream. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | 2019-11-08 |
| Time (hh:mm): | 4:15 PM |
| Sample Depth (m): | 0.10 |
| pH: | 6.37 |
| Dissolved Oxygen (mg/L): | 7.8 |
| Secchi Depth (m): | NA |
| Water Temperature (degrees Celsius): | 9.7 |
| Conductivity (µs/cm): | 210 |

**Additional Comments / Notes**


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**FIELD REPORT –Fall 2019**

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Highway 102 | **Site ID: HWY 102-2** | |
| **Watercourse:** Marsh area | **Location:** HWY 102, south of exit 3 | |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444829E, 4951778N (UTM, NAD83) | |
| **SNC Field Personnel:** | Billy Shaw, Grant Currie | |

**Site Conditions**

| | |
|---|---|
| Weather: | Light Rain |
| Air Temperature: | 5 |
| Cloud Cover: | 100% |
| Wildlife Sightings: | none |
| Site Accessibility: Yes, Accessible | Off Highway 102 (Small gravel drive way- *Back in) |
| Site Access Detail: | Travel along Highway 102 toward Bedford NS. Site is on right easily to identify based on swamp/bog. Carefully slow truck down with hazard lights flashing. There is a small driveway to park truck. Pull a head of driveway and when lanes are clear back truck down into spot. Take samples in water body in front of culvert. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y: | 2019-11-08 |
| Time (hh:mm): | 4:30 PM |
| Sample Depth (m): | 0.10 |
| pH: | 6.98 |
| Dissolved Oxygen (mg/L): | 12.7 |
| Secchi Depth (m): | NA |
| Water Temperature (degrees Celsius): | 9.7 |
| Conductivity (µs/cm): | 202 |

**Additional Comments / Notes**


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**FIELD REPORT –Fall 2019**

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Lake Shore Drive | | **Site ID: LSD** |
| **Watercourse:** Marsh @ Lakeshore Dr. | | **Location:** Kingswood Subdivision |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0442583E, 4950431N (UTM, NAD83) | |
| **SNC Field Personnel:** | Billy Shaw, Grant Currie | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy |
| Air Temperature: | 5 |
| Cloud Cover: | 100% |
| Wildlife Sightings: | none |
| Site Accessibility: Yes, Accessible | Via Lakeshore Drive in Kingswood Subdivision |
| Site Access Detail: | Take Kingswood Drive off Hammonds Plains Road. Travel down to Diana Drive on left go to end and take a left on Lakeshore drive. Travel approximately 1.0 km. There will be a clearing on left down to power lines. Drive truck (4X4) down until larger clearing is reached and park. Continue (walk) down hill to ATV pathway on left. Follow pathway for approximately 250m. Sample location is on right (river with a lot of vegetation throughout) |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | 2019-11-08 |
| Time (hh:mm): | 1:45 PM |
| Sample Depth (m): | 0.10 |
| pH: | 6.4 |
| Dissolved Oxygen (mg/L): | 7.9 |
| Secchi Depth (m): | NA |
| Water Temperature (degrees Celsius): | 8.3 |
| Conductivity (µs/cm): | 171 |

**Additional Comments / Notes**


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**FIELD REPORT –Fall 2019**

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 9 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Larry Uteck Blvd. | | **Site ID: LU** |
| **Watercourse:** Pond | | **Location:** Larry Uteck off-ramp |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0444954E, 4949891N (UTM, NAD83) | |
| **SNC Field Personnel:** | Billy Shaw, Grant Currie | |

**Site Conditions**

| | |
|---|---|
| Weather: | |
| Air Temperature: | |
| Cloud Cover: | |
| Wildlife Sightings: | |
| Site Accessibility: Yes, Accessible | From Larry Uteck Blvd. |
| Site Access Detail: | Take Larry Uteck off ramp and continue down Larry Uteck Blvd. for approximately 320m. Park truck safely on grassy clearing on left. Sample location is at shore line of lake across road. Take walking pathway to wooded area and travel approximately 80m to lake shore. Avoid walking through the bog area on right. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | 2019-11-08 |
| Time (hh:mm): | 12:15 PM |
| Sample Depth (m): | 0.20 |
| pH: | 6.62 |
| Dissolved Oxygen (mg/L): | 10.3 |
| Secchi Depth (m): | NA |
| Water Temperature (degrees Celsius): | 10.8 |
| Conductivity (µs/cm): | 196 |

**Additional Comments / Notes**


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**FIELD REPORT –Fall 2019**

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Paper Mill Lake | | **Site ID: PML1** |
| **Watercourse:** Paper Mill Lake | | **Location:** Moirs Mill Subdivision |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0445129E, 4951154N (UTM, NAD83) | |
| **SNC Field Personnel:** | Billy Shaw, Grant Currie | |

**Site Conditions**

| | |
|---|---|
| Weather: | |
| Air Temperature: | |
| Cloud Cover: | |
| Wildlife Sightings: | |
| Site Accessibility: Yes, Accessible | Travel down Ahmadi Cr. approximately 340m (around second bend in road). Park truck in front of Halifax Water station and carefully walk down rock wall on left. At the bottom locate the small stream and continue along the left and side facing lake. Sample location is a small clearing to the left at the mouth of the river. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | 2019-11-08 |
| Time (hh:mm): | 2:45 PM |
| Sample Depth (m): | 0.30 |
| pH: | 7.05 |
| Dissolved Oxygen (mg/L): | 9.20 |
| Secchi Depth (m): | NA |
| Water Temperature (degrees Celsius): | 11.1 |
| Conductivity (µs/cm): | 201 |

**Additional Comments / Notes**


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**FIELD REPORT –Fall 2019**

| | | |
|---|---|---|
| **Project:** | Water Quality Monitoring - Bedford West | **Sub-Area(s):** 2, 3, 4, 5 |
| **Client:** | Halifax Regional Municipality | |
| **Site:** Paper Mill Lake | | **Site ID: PML2** |
| **Watercourse:** Paper Mill Lake | | **Location:** Moirs Mill Subdivision |
| Monitoring Well ☐Pumping Well ☒ Surface Water ☐Spring/Seep ☐Discharge Pipe ☐Other: | | |
| **GPS Coordinates:** | 20T 0445363E, 4951740N (UTM, NAD83) | |
| **SNC Field Personnel:** | Billy Shaw, Grant Currie | |

**Site Conditions**

| | |
|---|---|
| Weather: | |
| Air Temperature: | |
| Cloud Cover: | |
| Wildlife Sightings: | |
| Site Accessibility: Yes, Accessible | Via Lake Dr., off Hammonds Plains Rd. |
| Site Access Detail: | Follow pathway along lake bank to small clearing, use GPS to find exact sample location. Travel over small ridge to reach lake and sample at edge. |

**Field Parameter Data**

| | **Remarks** |
|---|---|
| Date (d.m.y): | 2019-11-08 |
| Time (hh:mm): | 3:15 PM |
| Sample Depth (m): | 0.20 |
| pH: | 7.40 |
| Dissolved Oxygen (mg/L): | 9.8 |
| Secchi Depth (m): | NA |
| Water Temperature (degrees Celsius): | 11.3 |
| Conductivity (µs/cm): | 193 |

**Additional Comments / Notes**


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# Appendix B

Summary Table Results (Seasonal and Historical)

# TABLE B1: 2019 Fall Results, Bedford West Water Quality Sampling Program

| Tested Parameters | | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | LSD | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | | | | | 2019/11/08 | 2019/11/08 | 2019/11/08 | 2019/11/08 | 2019/11/08 | 2019/11/08 | 2019/11/08 | 2019/11/08 | 2019/11/08 | 2019/11/08 | 2019/11/08 |
| Sampling Time | | | | | | 8:45 AM | 10:45 AM | 11:45 AM | 12:15 PM | 10:00 AM | 4:15 PM | 4:30 PM | 1:45 PM | 12:15 PM | 2:45 PM | 3:15 PM |
| Field Data (in Situ) | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | minimum of 1.2 | -- | 1.90 | 1.20 | N/A | N/A | 2.20 | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | 10.4 | 10.1 | 11.3 | 10.9 | 12.8 | 9.7 | 9.7 | 8.3 | 10.8 | 11.1 | 11.3 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | 8.90 | 7.90 | 9.30 | **10.80** | 8.10 | 7.80 | **12.70** | 7.90 | **10.30** | 9.20 | **9.80** |
| pH | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | 6.77 | **6.11** | 6.61 | 6.81 | 6.62 | **6.37** | 6.98 | **6.40** | 6.62 | 7.05 | 7.40 |
| Specific Conductance (µs/cm) | uS/cm | -- | -- | -- | -- | 194.0 | 214.0 | 183.0 | 188.0 | 216.0 | 210.0 | 202.0 | 171.0 | 196.0 | 201.0 | 193.0 |
| Inorganic Parameters | | | | | | | | | | | | | | | | |
| Alkalinity | mg/L | 5 | -- | -- | -- | <5 | <5 | 6.0 | 6.0 | 6.0 | <5 | <5 | <5 | 10.0 | 6.0 | 8.0 |
| Chloride | mg/L | 1 | -- | -- | 120 | 43 | 14 | 54.0 | 54.0 | 57.0 | 92.0 | 74.0 | 20.0 | 75.0 | 53.0 | 64.0 |
| True Color | TCU | 5 | -- | -- | -- | 19 | 77 | 21.0 | 17.0 | 19.0 | 28.0 | 45.0 | 38.0 | 16.0 | 21.0 | 19.0 |
| Nitrate + Nitrite as N | mg/L | 0.05 | -- | -- | -- | 0.32 | <0.05 | 0.3 | 0.3 | 0.4 | 0.1 | 0.6 | 0.1 | 1.8 | 0.5 | 0.4 |
| Nitrate as N | mg/L | 0.05 | -- | -- | 13 | 0.32 | <0.05 | 0.3 | 0.3 | 0.4 | 0.1 | 0.6 | 0.1 | 1.2 | 0.5 | 0.4 |
| Nitrite as N | mg/L | 0.05 | -- | -- | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | **0.530** | <0.05 | <0.05 |
| Ammonia as N | mg/L | 0.03 | -- | -- | 18 | 0.07 | 0.07 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | 3.00 | 2.70 | 2.0 | 0.6 | 0.6 | 0.9 | 1.2 | 1.6 | 0.7 | 0.7 | 1.9 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | 4.00 | 9.40 | 4.0 | 4.3 | 4.2 | 4.1 | 6.8 | 6.2 | 3.9 | 4.4 | 4.5 |
| Ortho-Phosphate as P | mg/L | 0.01 | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | | | -- | 5.0-9.0 | 6.5 - 9.0 | 6.70 | **5.89** | 6.81 | 6.87 | 6.8 | **5.73** | **6.37** | 6.6 | 7.0 | 6.9 | 6.9 |
| Calcium | mg/L | 0.1 | -- | -- | -- | 4.2 | 2.0 | 5.0 | 5.1 | 5.4 | 12.2 | 7.9 | 2.7 | 9.6 | 5.3 | 5.6 |
| Magnesium | mg/L | 0.1 | -- | -- | -- | 0.8 | 0.6 | 0.9 | 0.9 | 0.9 | 1.8 | 1.4 | 0.7 | 1.5 | 0.9 | 0.9 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | 0.01 | 0.008 | **0.031** | 0.007 | 0.005 | 0.005 | **0.026** | **0.022** | 0.008 | **0.013** | **0.012** | 0.008 |
| Potassium | mg/L | 0.1 | -- | -- | -- | 0.6 | 0.60 | 0.8 | 0.8 | 0.8 | 0.9 | 1.1 | 0.6 | 1.7 | 0.8 | 0.8 |
| Sodium | mg/L | 0.1 | -- | -- | -- | 23.4 | 7.5 | 30.1 | 23.4 | 30.6 | 38.3 | 31.7 | 9.8 | 44.0 | 27.8 | 29.9 |
| Reactive Silica as SiO2 | mg/L | 0.5 | -- | -- | -- | 1.6 | 3.5 | 2.2 | 2.2 | 2.0 | 4.8 | 4.4 | 3.5 | 4.4 | 2.5 | 2.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Sulphate | mg/L | 2 | -- | -- | -- | 9.0 | 4.0 | 9.0 | 9.0 | 9.0 | 8.0 | 9.0 | 5.0 | 23.0 | 10.0 | 11.0 |
| Turbidity | NTU | 0.1 | -- | 50 | -- | 2.9 | 1.3 | 1.1 | 1.1 | 0.8 | 1.5 | 4.4 | 1.2 | 3.8 | 1.7 | 2.2 |
| Conductivity | umho/cm | 1 | -- | -- | -- | 129 | 45 | 160.0 | 158.0 | 160.0 | 247.0 | 204.0 | 63.0 | 256.0 | 156.0 | 189.0 |
| Calculated Parameters | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | | -- | -- | -- | 1.4 | 0.5 | 1.9 | 1.9 | 1.9 | 2.8 | 2.3 | 0.7 | 2.9 | 1.9 | 2.2 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | <5 | <5 | 6.0 | 6.0 | 6.0 | <5 | <5 | <5 | 10.0 | 6.0 | 8.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | 83.0 | 29.0 | 105.0 | 98.0 | 109.0 | 154.0 | 129.0 | 39.0 | 169.0 | 104.0 | 119.0 |
| Carb. Alkalinity (as CaCO3) | mg/L | 10 | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation sum | me/L | -- | -- | -- | -- | 1.3 | 0.5 | 1.7 | 1.4 | 1.7 | 2.5 | 2.0 | 0.7 | 2.6 | 1.6 | 1.7 |
| Hardness | mg/L | -- | -- | -- | -- | 13.8 | 7.5 | 16.2 | 16.4 | 17.2 | 37.9 | 25.5 | 9.6 | 30.1 | 16.9 | 17.7 |
| % Difference/ Ion Balance (NS) | % | -- | -- | -- | -- | 3.1 | 6.4 | 5.2 | 14.5 | 6.3 | 5.3 | 8.0 | 1.0 | 5.8 | 7.7 | 13.6 |
| Langelier Index (@20C) | NA | -- | -- | -- | -- | -3.6 | -4.7 | -3.3 | -3.2 | -3.3 | -4.1 | -3.6 | -3.9 | -2.6 | -3.2 | -3.1 |
| Langelier Index (@ 4C) | NA | -- | -- | -- | -- | -3.9 | -5.0 | -3.6 | -3.6 | -3.6 | -4.4 | -4.0 | -4.2 | -2.9 | -3.6 | -3.4 |
| Saturation pH (@ 20C) | NA | -- | -- | -- | -- | 10.3 | 10.5 | 10.1 | 10.1 | 10.1 | 9.8 | 10.0 | 10.4 | 9.6 | 10.1 | 9.9 |
| Saturation pH (@ 4C) | NA | -- | -- | -- | -- | 10.6 | 10.9 | 10.4 | 10.4 | 10.4 | 10.1 | 10.3 | 10.7 | 10.0 | 10.4 | 10.3 |
| Metals (ICP-MS) | | | | | | | | | | | | | | | | |
| Total Aluminum | ug/L | 5 | 5 | -- | 100 ug/L (based on pH) | 160.00 | 318.00 | 80.00 | 92.00 | 97.00 | 215.00 | 306.00 | 154.00 | 169.00 | 133.00 | 79.00 |
| Total Antimony | ug/L | 2 | 20 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Arsenic | ug/L | 2 | 5.0 | -- | 5 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Barium | ug/L | 5 | 1000 | -- | -- | 8.0 | 9.0 | 15.0 | 17.0 | 15.0 | 197.0 | 100.0 | 7.0 | 63.0 | 17.0 | 17.0 |
| Total Beryllium | ug/L | 2 | 5.3 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Bismuth | ug/L | 2 | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Boron | ug/L | 5 | 1200 | -- | 1500 | 5.0 | 7.0 | 6.0 | 6.0 | 7.0 | 6.0 | 6.0 | 9.0 | 10.0 | 7.0 | 6.0 |
| Total Cadmium | ug/L | 0.09 | 0.01 | -- | 0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 |
| Total Chromium | ug/L | 1 | --- | -- | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Cobalt | ug/L | 1 | 10 | -- | -- | <1 | <1 | <1 | <1 | <1 | 2.0 | <1 | <1 | <1 | <1 | <1 |
| Total Copper | ug/L | 1 | 2 | -- | 2 ug/L (based on hardness) | 1.0 | 1.0 | <1 | 1.0 | 1.0 | 2.0 | 3.0 | 1.0 | 4.0 | 1.0 | 1.0 |
| Total Iron | ug/L | 50 | 300 | -- | 300 | 145.0 | 277.0 | <50 | <50 | <50 | 256.0 | **506.00** | 118.0 | **313.00** | 108.0 | <50 |
| Total Lead | ug/L | 0.5 | 1 | -- | 1 ug/L (base on hardness) | <0.5 | **1.50** | <0.5 | <0.5 | <0.5 | 0.9 | **1.90** | <0.5 | 0.8 | <0.5 | <0.5 |
| Total Manganese | ug/L | 2 | 820 | -- | -- | 23.0 | 23.0 | 18.0 | 19.0 | 17.0 | 125.0 | 50.0 | 8.0 | 33.0 | 28.0 | 30.0 |
| Total Molybdenum | ug/L | 2 | 73 | -- | 73 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Nickel | ug/L | 2 | 25 | -- | 25 ug/L (base on hardness) | 6.0 | <2 | 2.0 | <2 | <2 | 5.0 | 2.0 | 9.0 | 3.0 | <2 | <2 |
| Total Selenium | ug/L | 1 | 1.0 | -- | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Silver | ug/L | 0.1 | 0.1 | -- | 0.25 | <0.1 | <0.1 | <0.1 | <0.1 | 0.3 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Strontium | ug/L | 5 | 21000 | -- | -- | 27.0 | 13.0 | 31.0 | 31.0 | 33.0 | 67.0 | 49.0 | 15.0 | 58.0 | 30.0 | 27.0 |
| Total Thallium | ug/L | 0.1 | 0.8 | -- | 0.8 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin | ug/L | 2 | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Titanium | ug/L | 2 | -- | -- | -- | 3.0 | 2.0 | <2 | <2 | <2 | <2 | 7.0 | <2 | 4.0 | 2.0 | <2 |
| Total Uranium | ug/L | 0.1 | 300 | -- | 15 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Vanadium | ug/L | 2 | 6 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 2.0 | <2 | <2 |
| Total Zinc | ug/L | 5 | 30 | -- | 30 | 6.0 | 6.0 | <5 | 6.0 | 5.0 | 12.0 | 13.0 | <5 | 23.0 | <5 | <5 |
| Microbiological Parameters | | | | | | | | | | | | | | | | |
| Total Coliforms | CFU/100 mL | 1 to 10 | -- | -- | -- | 1,198 | 1,240 | 628 | 604 | 560 | 1,128 | 1,152 | 932 | 984 | 864 | 1,134 |
| E. Coli | ug/L | 1 to 10 | -- | 400 | -- | 26 | 12 | 6.0 | <1 | 8.0 | 2 | 14.0 | 12 | 8 | 14 | 20 |
| Chlorophyll A - Spectrophotometer | ug/L | 0.25 | -- | -- | -- | 1.26 | <0.25 | 0.47 | 0.32 | 0.32 | <0.25 | 0.32 | <0.25 | <0.25 | 0.32 | 0.47 |
| Chlorophyll A - Acidification Method | ug/L | 0.05 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer Method | ug/L | 0.05 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

(*) Chloroohyll A - Welschmever Method not completed due to laboratorv's instrument failure.
RDL = Reported Detection Limit (represents most recent sampling event)
(**) Dissolved oxygen field data removed - Post-calibration failure of field equipment for DO sensor.
" -- " = no guideline available / no parameter tested.
NDOGT- No Data Overgrown With Target
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
Health Canada Guidelines for
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated
CCME Phosphorus Trigger Range (Applied) of 0.01 mg/L
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness.
CCME PAL-F Guideline for Ammonia-N vary base on water pH and Temperature. The value is converted to mg/L total ammonia-N by multiplying by 0.8224
Comment 1: CCME PAL-F reference values between 25-250 mg/L, and >250 mg/L.

**Bold and Black Shaded** Concentration exceeds CCME FWAL applicable guideline.

Underlined and Black Shaded Concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality (Reference Guidelines)

## TABLE B2: Historical Data - Bedford West Water Quality Sampling Program

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KL1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/11 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 | 2019/11/08 |
| Sampling Time | hh:mm | -- | | | | | 08:00 | 11:45 | 08:30 | 11:00 | 13:10 | 12:00 | 11:00 | 14:30 | 14:00 | 8:30 | 11:20 | 9:50 | 10:20 | 11:10 | 13:30 | 10:30 | 14:15 | 14:55 | 08:30 | 14:54 | 12:30 | 9:30 | 7:50 | 13:20 | 8:30 | 9:30 AM | 9:35 AM | 9:15 AM | 7:50 AM | 9:00 AM | 8:40 AM | 9:15 AM | 8:45 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 4.1 | 4.2 | 5.0 | N/A | 5.0 | 4.9 | 2.4 | 3.2 | 2.4 | 2.4 | 5.4 | N/A | 2.5 | 2.0 | 2.9 | 2.4 | 2.7 | 2.5 | NCC | N/A | 2.2 | 1.8 | 2.1 | 2.5 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.5 | 2.5 | 2.7 | 1.9 |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.0 | 22.2 | 16.7 | 12.9 | 23.3 | 8.8 | 11.5 | 25.6 | 15.9 | 8.9 | 23.3 | 15.4 | 13.2 | 22.2 | 14.1 | 12.7 | 23.2 | 12.2 | 14.1 | 26.1 | 9.4 | 12.8 | 22.2 | 11.9 | 16.6 | 23.2 | 14.1 | 12.2 | 24.2 | 12.8 | 12.2 | 23.6 | 10.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 11.8 | 8.2 | 7.0 | 9.1 | 7.9 | 10.5 | 10.2 | 8.2 | 9.2 | 9.0 | 7.9 | 8.7 | 7.8 | 8.6 | 8.3 | 15.3 | 7.2 | 8.1 | 9.4 | 8.1 | 7.4 | 14.0 | 10.3 | 12.7 | 8.3 | 7.9 | 8.2 | 11.1 | 6.7 | 8.6 | ** | 7.10 | 8.90 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.20 | 6.76 | 6.67 | 7.23 | 7.32 | 6.61 | 6.60 | 6.16 | 6.04 | 8.67 | 6.91 | 6.32 | 6.32 | 8.24 | 6.35 | 6.74 | 7.46 | 6.44 | 8.33 | 6.95 | 7.02 | 8.29 | 4.60 | 6.23 | 7.47 | 7.00 | 7.84 | 7.85 | 7.51 | 6.84 | 9.70 | 7.41 | 6.77 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 263.0 | 299.0 | 261.0 | 248.0 | 242.0 | 218.7 | 288.0 | 178.6 | 146.3 | 277.0 | 279.0 | 198.1 | 243.0 | 216.5 | 217.9 | 547.0 | 341.0 | 223.0 | 0.2 | 298.3 | 238.5 | 239.0 | 298.0 | 212.4 | 240.0 | 292.0 | 312.0 | 203.1 | 288.2 | 253.7 | 205.0 | 160.0 | 194.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 8 | 8 | 7 | 8 | 6 | <5 | 9 | 7 | 24 | 7 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 | <5 | 9 | 7.0 | <5 | 7.0 | <5 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 81 | 74 | 64 | 62 | 60 | 55 | 73 | 45 | 33 | 66 | 70 | 50 | 66 | 59 | 48 | 80 | 76 | 46 | 60 | 62 | 58 | 55 | 57 | 45 | 71 | 73 | 60 | 53 | 54 | 55 | 75 | 59 | 43 |
| Colour | TCU | 5 | -- | -- | -- | | 18 | 18 | 16 | 26 | 8 | 21 | 28 | 40 | 45 | 50 | 11 | 20 | 11 | 37 | 20 | 13 | 8 | 23 | 37 | 8 | 22 | 31 | 17 | 18 | 15 | 14 | 12 | 42 | 16 | 18 | 41 | 21 | 19 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.18 | 0.09 | 0.12 | 0.21 | 0.16 | 0.23 | 0.20 | 0.11 | 0.13 | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.15 | 0.13 | 0.20 | 0.29 | 0.10 | 0.26 | 0.16 | 0.2 | 0.2 | 0.1 | 0.3 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.18 | -- | -- | 0.21 | 0.16 | -- | 0.20 | -- | -- | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.08 | 0.13 | 0.08 | 0.08 | 0.10 | 0.16 | 0.07 | 0.2 | 0.2 | 0.1 | 0.3 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | 0.07 | <0.05 | 0.12 | 0.21 | <0.05 | 0.10 | 0.09 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia-Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.04 | 0.03 | <0.03 | 0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | 0.09 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | 0.08 | 0.1 | <0.03 | 0.1 | 0.1 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.9 | 3.1 | 0.4 | -- | 0.7 | <0.4 | 1.1 | <0.4 | 0.4 | 0.2 | 4.5 | 0.4 | 0.7 | <0.4 | 0.6 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 0.6 | 3.0 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.4 | 2.9 | 4.7 | 3.3 | 3.2 | 3.1 | 3.4 | 5.9 | 5.5 | 5.4 | 2.9 | 5.2 | 4.4 | 4.1 | 4.3 | 4.6 | 2.4 | 4.4 | 3.0 | 5.3 | 5.5 | 4.3 | 3.4 | 7.3 | 4.5 | 4.6 | 4.8 | 5.1 | 3.1 | 4.0 | 4.3 | 4.2 | 4.0 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.94 | 6.65 | 6.68 | 6.91 | 7.00 | 6.79 | 6.52 | 6.51 | 6.52 | 6.70 | 7.20 | 6.90 | 6.78 | 6.93 | 6.85 | 6.72 | 7.06 | 6.93 | 6.62 | 6.95 | 6.99 | 6.64 | 7.23 | 6.81 | 6.64 | 7.07 | 7.00 | 6.71 | 7.31 | 7.07 | 6.70 | 6.95 | 6.70 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 9.2 | 8.5 | 7.2 | 7.7 | 8.7 | 8.3 | 7.2 | 4.8 | 5.3 | 6.8 | 8.4 | 6.3 | 7.5 | 6.6 | 6.5 | 8.1 | 11.0 | 6.0 | 6,400.0 | 7.9 | 6.1 | 6.8 | 8.0 | 6.3 | 8.6 | 7.1 | 8.3 | 5.8 | 7.2 | 6.9 | 7.0 | 7.8 | 4.2 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.5 | 1.4 | 1.2 | 1.4 | 1.4 | 1.3 | 1.3 | 0.9 | 1.1 | 1.1 | 1.5 | 1.5 | 1.1 | 1.2 | 1.2 | 1.6 | 1.6 | 1.6 | 0.9 | 920.0 | 1.3 | 0.9 | 1.1 | 1.2 | 1.3 | 1.2 | 1.3 | 1.0 | 1.2 | 1.3 | 1.2 | 1.2 | 0.8 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.020 | <0.020 | <0.002 | 0.009 | 0.007 | 0.005 | 0.008 | 0.012 | 0.009 | 0.037 | 0.043 | 0.007 | 0.007 | 0.011 | 0.008 | 0.021 | 0.026 | 0.013 | 0.008 | 0.002 | 0.021 | 0.024 | 0.005 | 0.008 | 0.010 | 0.010 | 0.005 | 0.012 | 0.007 | 0.008 | 0.011 | 0.005 | 0.008 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 0.9 | 1.3 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.8 | 0.7 | 1.1 | 1.6 | 0.7 | 680.0 | 0.9 | 0.7 | 0.7 | 0.9 | 0.8 | 1.0 | 0.9 | 1.2 | 0.7 | 1.0 | 0.8 | 0.8 | 1.0 | 0.6 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 51.0 | 46.0 | 37.0 | 31.8 | 35.2 | 33.8 | 43.7 | 22.8 | 19.8 | 40.1 | 42.0 | 29.8 | 35.8 | 26.2 | 31.6 | 50.2 | 54.2 | 37.6 | 33.0 | 43.3 | 39.8 | 35.5 | 32.2 | 31.0 | 44.9 | 50.3 | 35.7 | 36.4 | 34.7 | 31.7 | 46.3 | 43.9 | 23.4 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.6 | 2.2 | 2.3 | 2.9 | 2.7 | 2.9 | 2.8 | 1.9 | 2.3 | 2.4 | 1.3 | 2.2 | 2.5 | 1.8 | 2.2 | 2.0 | 1.5 | 1.8 | 2.5 | 1.8 | 2.7 | 2.8 | 2.0 | 1.6 | 2.0 | 1.6 | 1.8 | 2.6 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 1 | 1 | <1 | 4 | 17 | 3 | 2 | 2 | 3 | <5 | <5 | <5 | <5 | <5 | 5 | <5 | <5 | <5 | <5 | <5 | <5 | 38 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 14 | 13 | 12 | 11 | 11 | 11 | 12 | 10 | 8 | 8 | 9 | 9 | 11 | 9 | 9 | 12 | 11 | 7 | 9 | 10 | 8 | 10 | 10 | 10 | 11 | 9 | 10 | 8 | 7.0 | 9.0 | 10.0 | 9.0 | 9.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 0.8 | 1.0 | 1.3 | 0.6 | 1.0 | 1.0 | 1.0 | 0.9 | 2.4 | 0.8 | 1.3 | 1.6 | 3.3 | 0.5 | 2.9 | 0.7 | 1.9 | 0.8 | 1.9 | 1.1 | 10.6 | 0.9 | 2.6 | 1.4 | 1.1 | 0.8 | 1.3 | 0.7 | 2.1 | 0.9 | 3.2 | 2.9 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 310 | 290 | 250 | 240 | 240 | 230 | 290 | 180 | 140 | 246 | 274 | 196 | 259 | 241 | 212 | 290 | 339 | 235 | 220 | 257 | 244 | 212 | 270 | 161 | 271 | 260 | 249 | 243 | 261 | 215 | 280 | 232 | 129 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.72 | 2.52 | 2.23 | 2.12 | 2.08 | 1.91 | 2.33 | 1.66 | 1.27 | 2.52 | 2.31 | 1.60 | 2.10 | 1.86 | 1.71 | 3.11 | 2.66 | 1.45 | 1.98 | 2.09 | 1.95 | 1.87 | 1.99 | 1.61 | 2.25 | 2.43 | 2.11 | 1.68 | 1.86 | 1.9 | 2.3 | 2.0 | 1.42 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | 9 | -- | 6 | 8 | 8 | 7 | 8 | 6 | <1 | 9 | 7 | 24 | 7 | <5 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 | <5 | 9 | 7.0 | <5 | 7.0 | <5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 166 | 151 | 131 | 123 | 125 | 118 | 143 | 92 | 77 | 139 | 137 | 98 | 124 | 104 | 103 | 172 | 165 | 99 | 120 | 130 | 119 | 113 | 115 | 99 | 139 | 148 | 123 | 106 | 112 | 110.0 | 141.0 | 127.0 | 83.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.85 | 2.57 | 2.12 | 1.92 | 2.10 | 2.02 | 2.42 | 1.33 | 1.25 | 2.24 | 2.41 | 1.79 | 2.08 | 1.61 | 1.84 | 2.77 | 3.09 | 2.05 | 1.84 | 2.14 | 2.03 | 1.93 | 1.82 | 2.54 | 2.67 | 2.12 | 2.00 | 2.01 | 1.9 | 2.5 | 2.4 | 2.4 | 1.34 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 29.00 | 27.00 | 23.00 | 25.00 | 27.00 | 26.00 | 24.00 | 16.00 | 18.00 | 21.50 | 27.20 | 21.90 | 23.30 | 21.40 | 21.20 | 26.80 | 34.10 | 18.70 | 20.00 | 25.10 | 18.90 | 21.50 | 24.50 | 20.70 | 26.80 | 22.70 | 26.10 | 18.6 | 22.9 | 22.6 | 22.4 | 24.4 | 13.8 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 2.33 | 0.98 | 2.53 | 4.95 | 0.48 | 2.80 | 1.89 | 11.00 | 0.79 | 5.90 | 2.10 | 5.30 | 0.70 | 7.30 | 3.40 | 5.80 | 7.50 | 17.20 | 3.66 | 7.50 | 4.50 | 4.10 | 1.50 | 6.20 | 6.10 | 4.80 | 0.20 | 8.6 | 3.8 | 0.4 | 3.5 | 9.9 | 3.1 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.68 | -2.87 | -2.94 | -2.72 | -2.51 | -2.87 | NC | -3.18 | -3.21 | -2.09 | -2.63 | -3.19 | -3.24 | -3.14 | -3.02 | -2.51 | -2.36 | -3.76 | -3.21 | -2.97 | -2.97 | -3.42 | -2.56 | -3.20 | -3.33 | -2.78 | -2.68 | -3.42 | -2.47 | -2.8 | -3.4 | -2.9 | -3.6 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -2.93 | -3.12 | -3.19 | -2.97 | -2.76 | -3.12 | NC | -3.43 | -3.46 | -3.01 | -2.95 | -3.51 | -3.56 | -3.46 | -3.34 | -2.83 | -2.68 | -4.08 | -3.46 | -3.29 | -3.29 | -3.74 | -2.88 | -3.52 | -3.65 | -3.10 | -3.00 | -3.74 | -2.79 | -3.2 | -3.7 | -3.2 | -3.9 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.62 | 9.52 | 9.62 | 9.63 | 9.51 | 9.66 | NC | 9.69 | 9.73 | 9.39 | 9.83 | 10.10 | 10.00 | 10.10 | 9.87 | 9.23 | 9.42 | 10.10 | 9.83 | 9.92 | 9.96 | 10.10 | 9.79 | 10.00 | 9.97 | 9.85 | 9.68 | 10.1 | 9.78 | 9.9 | 10.1 | 9.9 | 10.3 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.87 | 9.77 | 9.87 | 9.88 | 9.76 | 9.91 | NC | 9.94 | 9.98 | 9.71 | 10.20 | 10.40 | 10.30 | 10.40 | 10.20 | 9.55 | 9.74 | 10.40 | 10.10 | 10.20 | 10.30 | 10.40 | 10.10 | 10.30 | 10.30 | 10.20 | 10.00 | 10.4 | 10.1 | 10.2 | 10.4 | 10.2 | 10.6 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 230 | -- | -- | 289 | 48 | -- | 338 | -- | -- | 321 | 43 | 168 | 191 | 120 | 56 | 229 | 42 | 155 | 100 | -- | 88 | 206 | -- | -- | 158 | 41 | 46 | 169 | 79 | -- | 145.0 | 49 | 160.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 16 | -- | -- | 19 | 16 | -- | 13 | -- | -- | 12 | 15 | 9 | 12 | 7 | 16 | 14 | 20 | 9 | 16 | -- | 17 | 14 | -- | -- | 16 | -- | 17 | 12 | 16 | -- | 14.0 | 15.0 | 8.0 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 8 | -- | -- | 11 | 9 | -- | <50 | -- | -- | <5 | 11 | 33 | 6 | 10 | 9 | 7 | 22 | 10 | <50 | 9 | <5 | 7 | -- | -- | <5 | -- | 26 | 5 | 10 | -- | 5.0 | 11.0 | 5.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.3 | -- | -- | 0.053 | <0.017 | -- | 0.036 | -- | -- | 0.032 | 0.027 | 0.021 | 0.020 | <0.017 | 0.017 | 0.037 | <0.017 | 0.025 | -- | -- | 0.187 | 0.029 | -- | -- | 0.058 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | -- | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | 6 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | 1 | -- | -- | 1 | <0.40 | -- | 1 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | -- | -- | 6 | <2.0 | <2.0 | 2 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | 1 | 1 | <1 | 1 | <2.0 | <1 | 2 | <1 | 1 | -- | <1 | 2 | 1 | <1 | 2.0 | <1 | 1.0 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 130 | -- | -- | 311 | 62 | 125 | 177 | 162 | 384 | 229 | 137 | 195 | 207 | 132 | 92 | 147 | 124 | 168 | 110 | 157 | 81 | 149 | 62 | 269 | 78 | 70 | 116 | 96 | 142 | 142.0 | 155.0 | 105.0 | 145.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 10.3 | <0.50 | -- | <0.50 | -- | -- | <0.5 | <0.5 | 1.9 | <0.5 | <0.5 | <0.5 | 5.1 | <0.5 | <0.5 | <0.50 | -- | <0.5 | <0.5 | -- | -- | 1.3 | -- | <0.5 | 1.3 | <0.5 | -- | <0.5 | <0.5 | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 100 | 65 | 68 | 79 | 57 | 59 | 78 | 52 | 56 | 48 | 65 | 68 | 73 | 48 | 24 | 48 | 115 | 42 | 39 | 41 | 22 | 47 | 23 | 45 | 46 | 31 | 17 | 28 | 49 | 28.0 | 42.0 | 23.0 | |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 5 | -- | -- | 3 | <2.0 | -- | 3 | -- | -- | <2 | <2 | 2 | 2 | <2 | <2 | 3 | <2 | 3 | <2.0 | -- | <2 | 3 | -- | -- | 15 | -- | <2 | <2 | <2 | -- | 2.0 | <2 | 6.0 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.5 | -- | -- | <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 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 46 | -- | -- | 39 | 38 | -- | 36 | -- | -- | 32 | 41 | 32 | 37 | 33 | 30 | 40 | 45 | 26 | 29 | -- | 19 | 30 | -- | -- | 38 | -- | 40 | 26 | 38 | -- | 36.0 | 33.0 | 27.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 11 | -- | -- | 6 | <2.0 | -- | 5 | -- | -- | 8 | <2 | 3 | 4 | 2 | <2 | 2 | <2 | 5 | 2 | -- | <2 | 2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | 3.0 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | 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 | -- | <0.1 | <0.1 | <0.1 | -- | 0.1 | <0.1 | 0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | 2 | -- | <2 | <2 | <2 | -- | 2.0 | <2 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 27 | -- | -- | 14 | 8 | 11 | 12 | 13 | 10 | 5 | <5 | 11 | 11 | 6 | 5 | 14 | <5 | 9 | 13 | 8 | <5 | 11 | <5 | 19 | 58 | <5 | 6 | 8 | <5 | 19.0 | 8.0 | <5 | 6.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 200 | 65 | -- | >250 | 63 | >250 | 91 | >250 | -- | 2,420 | >2420 | 1,120 | 1,200 | 866 | 488 | 525 | 1,550 | >2420 | --- | 980 | 122 | 866 | 548 | >2420 | 299 | 488 | 154 | 14 | 611 | 157.0 | 256 | NDOGT | 1198 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 39 | 24 | -- | 9 | 15 | 37 | 8 | >250 | <100 | 41 | 11 | 17 | 48 | 2 | 7 | <1 | 15 | 28 | 60 | 24 | 6 | 4 | 33 | 99 | 29 | 18 | 3 | 5 | 11 | 61.0 | <1 | 6 | 26 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.26 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.53 | 0.79 | 1.11 | 1.73 | 1.47 | 0.99 | 0.76 | 1.44 | 1.36 | 0.62 | 2.30 | 1.54 | 1.22 | 1.40 | 1.19 | 0.40 | 0.41 | 0.84 | 0.64 | 1.14 | 1.79 | 2.76 | 0.90 | 2.08 | 1.45 | 1.75 | 1.10 | 1.91 | 1.26 | 1.63 | 1.50 | 2.18 | |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.48 | 0.69 | 1.17 | 1.61 | 1.42 | 0.81 | 0.69 | 1.15 | 1.14 | 0.63 | 2.30 | 2.16 | 1.40 | 1.40 | 1.19 | 1.32 | 0.36 | 0.80 | 0.62 | 1.11 | 0.95 | 3.48 | 1.15 | 2.19 | 2.55 | 1.87 | 1.18 | 3.09 | -- | * | 1.46 | 1.89 | |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
Comment 1: CCME PAL-F reference values between 25-250 mg/L, and >250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.
**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality
Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

## TABLE B2: Historical Data - Bedford West Water Quality Sampling Program

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | |

## TABLE B2: Historical Data - Bedford West Water Quality Sampling Program

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KL3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 | 2019/11/08 |
| Sampling Time | hh:mm | -- | | | | | 09:00 | 11:00 | 09:30 | 11:30 | 14:12 | 11:40 | 10:30 | 12:20 | 12:00 | 10:26 | 12:20 | 11:20 | 9:50 | 10:00 | 14:00 | 11:00 | 11:50 | 14:25 | 10:35 | 11:45 | 10:40 | 11:00 | 11:30 | 11:00 | 9:36 | 10:15 | 10:15 | 10:30 | 9:10 | 11:30 AM | 10:00 AM | 10:00 AM | 11:45 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.0 | 21.6 | 17.3 | 14.7 | 23.1 | 9.9 | 10.3 | 21.1 | 15.5 | 9.0 | 24.5 | 15.6 | 11.7 | 21.5 | 13.6 | 11.0 | 22.7 | 12.8 | 14.7 | 25.0 | 8.4 | 12.1 | 21.7 | 12.5 | 16.1 | 22.5 | 13.8 | 12.1 | 23.8 | 12.4 | 9.6 | 23.3 | 11.3 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.2 | 8.0 | 8.0 | 9.3 | 7.8 | 10.4 | 11.1 | 8.4 | 9.6 | 8.9 | 8.2 | 7.7 | 10.2 | 9.2 | 8.9 | 5.9 | 7.9 | 8.1 | 8.0 | 9.2 | 8.7 | 9.3 | 7.7 | 11.4 | 9.0 | 7.4 | 8.2 | 7.3 | 6.9 | 8.6 | ** | 7.28 | 9.30 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.27 | 6.74 | 6.97 | 7.27 | 7.33 | 6.76 | 6.83 | 6.96 | 6.30 | 7.68 | 6.85 | 6.51 | 5.86 | 7.25 | 6.49 | 6.55 | 7.37 | 6.67 | 6.84 | 6.87 | 7.17 | 7.40 | 6.82 | 5.54 | 7.02 | 7.04 | 6.97 | 6.66 | 6.94 | 6.64 | 8.25 | 7.05 | 6.61 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 95.0 | 282.0 | 246.0 | 220.0 | 228.0 | 199.4 | 220.0 | 175.0 | 161.3 | 204.0 | 225.0 | 177.2 | 207.3 | 194.4 | 210.6 | 405.0 | 252.0 | 208.0 | 0.2 | 245.1 | 236.6 | 213.0 | 264.0 | 227.8 | 204.0 | 248.0 | 248.0 | 190.3 | 242.7 | 209.8 | 158.6 | 319.0 | 183.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 | 5 | 6 | <5.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 | <5 | 8 | 7.0 | <5 | 8.0 | 6.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 66 | 63 | 60 | 55 | 55 | 53 | 56 | 43 | 37 | 50 | 57 | 46 | 54 | 40 | 46 | 58 | 46 | 45 | 60 | 56 | 56 | 54 | 56 | 49 | 63 | 56 | 59 | 54 | 48 | 46 | 49 | 56 | 54 |
| Colour | TCU | 5 | -- | -- | -- | | 22 | 20 | 20 | 28 | 12 | 20 | 31 | 38 | 40 | 57 | 15 | 31 | 19 | 23 | 20 | 16 | 13 | 20 | 34 | 13 | 14 | 29 | 13 | 21 | 24 | 13 | 15 | 63 | 26 | 27 | 53 | 13 | 21 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.14 | 0.12 | 0.14 | 0.24 | 0.15 | 0.22 | 0.24 | 0.15 | 0.16 | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.13 | 0.10 | 0.24 | 0.30 | 0.24 | 0.17 | 0.06 | 0.1 | 0.1 | 0.10 | 0.29 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.14 | -- | -- | 0.24 | 0.15 | -- | 0.24 | -- | -- | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.06 | 0.10 | 0.13 | 0.17 | 0.24 | 0.17 | 0.06 | 0.1 | 0.1 | 0.10 | 0.29 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.07 | <0.05 | 0.11 | 0.11 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.04 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 | 0.03 | <0.03 | 0.04 | 0.03 | <0.03 | 0.08 | 0.07 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 2.8 | <0.4 | -- | 1.3 | <0.4 | 0.6 | 0.4 | 0.4 | 0.2 | 1.2 | 0.9 | <0.4 | <0.4 | 0.4 | <0.4 | 0.8 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 2.00 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.6 | 3.9 | 4.3 | 3.6 | 3.1 | 3.3 | 3.8 | 5.1 | 5.0 | 5.9 | 3.4 | 4.9 | 4.3 | 4.4 | 4.6 | 4.6 | 2.8 | 4.5 | 3.4 | 5.7 | 5.8 | 4.3 | 2.7 | 8.0 | 5.3 | 4.9 | 4.1 | 5.1 | 3.2 | 4.0 | 4.4 | 4.10 | 4.00 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.38 | 6.67 | 6.82 | 6.82 | 6.99 | 6.87 | 6.52 | 6.50 | 6.38 | 6.70 | 7.10 | 6.90 | 6.68 | 6.96 | 6.86 | 6.68 | 6.87 | 6.59 | 6.54 | 6.92 | 6.94 | 6.69 | 7.28 | 6.93 | 6.77 | 7.13 | 6.88 | 6.72 | 7.21 | 7.10 | 6.66 | 7.07 | 6.81 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.7 | 7.1 | 6.8 | 6.8 | 8.0 | 8.3 | 7.1 | 4.7 | 5.6 | 5.7 | 6.9 | 6.0 | 7.0 | 5.3 | 6.8 | 6.4 | 7.9 | 6.8 | 6,000.0 | 7.8 | 5.2 | 6.2 | 8.3 | 7.3 | 6.9 | 7.2 | 8.1 | 6.0 | 7.3 | 8.4 | 5.9 | 7.6 | 5.0 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.2 | 1.1 | 1.2 | 1.3 | 1.3 | 1.2 | 0.8 | 1.0 | 1.0 | 1.2 | 1.3 | 1.0 | 0.9 | 1.3 | 1.4 | 1.2 | 1.0 | 940.0 | 1.2 | 0.9 | 1.0 | 1.3 | 1.3 | 1.0 | 1.1 | 1.2 | 1.0 | 1.2 | 1.4 | 1.0 | 1.2 | 0.9 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | 0.005 | 0.005 | <0.002 | 0.003 | 0.008 | 0.003 | 0.012 | 0.019 | 0.045 | 0.007 | 0.006 | 0.006 | 0.012 | 0.009 | 0.023 | 0.148 | 0.004 | 0.004 | 0.002 | 0.008 | 0.005 | 0.004 | 0.006 | 0.009 | 0.007 | 0.010 | 0.010 | 0.006 | 0.011 | 0.007 | 0.007 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 1.1 | 0.9 | 0.8 | 0.8 | 1.0 | 0.9 | 0.7 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.6 | 1.2 | 0.8 | 1.1 | 0.9 | 770.0 | 0.9 | 0.7 | 0.7 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 | 0.7 | 1.0 | 1.1 | 0.7 | 1.0 | 0.8 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 38.0 | 38.0 | 35.0 | 28.3 | 33.1 | 33.0 | 33.0 | 20.8 | 21.3 | 31.2 | 34.5 | 26.4 | 35.1 | 20.1 | 32.1 | 36.4 | 39.0 | 35.3 | 34.0 | 40.0 | 27.1 | 32.1 | 37.2 | 32.8 | 44.0 | 41.4 | 35.9 | 35.9 | 36.6 | 39.9 | 44.3 | 38.9 | 30.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.7 | 2.6 | 2.6 | 3.2 | 2.9 | 3.2 | 2.9 | 2.5 | 2.6 | 2.7 | 2.0 | 2.6 | 2.9 | 2.6 | 2.7 | 2.6 | 1.9 | 2.4 | 2.5 | 2.4 | 2.6 | 2.6 | 1.8 | 2.5 | 2.2 | 1.6 | 1.9 | 2.6 | 1.7 | 1.9 | 2.1 | 1.4 | 2.2 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <1 | 1 | 1 | 2 | <2 | <1 | <1 | <1 | <1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 3 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 12 | 12 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 8 | 7 | 7 | 7 | 8 | 9 | 7 | 7 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 9 | 10 | 8 | 7.0 | 6.0 | 9.0 | 9.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 1.4 | 0.6 | 0.3 | 0.5 | 0.6 | 0.6 | 0.6 | 0.4 | 0.8 | 0.7 | 1.0 | 0.7 | 2.4 | 0.4 | 0.4 | 0.3 | 0.9 | 0.7 | 0.5 | 0.7 | 1.1 | 1.1 | 1.0 | 1.0 | 1.3 | 2.6 | 1.0 | 0.5 | 1.2 | 0.9 | 2.0 | 1.1 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 250 | 250 | 240 | 220 | 220 | 220 | 220 | 170 | 160 | 197 | 222 | 182 | 219 | 216 | 204 | 218 | 243 | 216 | 220 | 242 | 238 | 206 | 262 | 185 | 245 | 251 | 247 | 244 | 246 | 232 | 244 | 233 | 160 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.11 | 2.17 | 2.08 | 1.90 | 1.93 | 1.87 | 1.90 | 1.58 | 1.36 | 2.03 | 1.90 | 1.55 | 1.68 | 1.38 | 1.60 | 2.14 | 1.55 | 1.54 | 1.87 | 1.90 | 1.88 | 1.74 | 1.98 | 1.76 | 2.00 | 1.95 | 2.07 | 1.70 | 1.66 | 1.6 | 1.5 | 1.9 | 1.9 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 | 5 | 6 | <1.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 | <5 | 8 | <5 | <5 | 8.0 | 6.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 128 | 130 | 123 | 110 | 117 | 116 | 115 | 88 | 82 | 111 | 113 | 91 | 106 | 78 | 100 | 122 | 106 | 100 | 110 | 119 | 103 | 105 | 120 | 107 | 127 | 122 | 122 | 107 | 106 | 109.0 | 108.0 | 119.0 | 105.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Carbon Sum | me/L | N/A | -- | -- | -- | | 2.12 | 2.16 | 1.99 | 1.69 | 1.97 | 1.98 | 1.92 | 1.23 | 1.32 | 1.77 | 1.98 | 1.60 | 2.00 | 1.24 | 1.89 | 2.07 | 2.23 | 2.00 | 1.89 | 2.27 | 1.55 | 1.83 | 2.18 | 1.94 | 2.38 | 2.28 | 2.10 | 1.98 | 2.09 | 2.3 | 2.3 | 2.2 | 1.7 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 23.00 | 22.00 | 22.00 | 25.00 | 26.00 | 23.00 | 15.00 | 18.00 | 18.40 | 22.20 | 20.30 | 21.60 | 16.90 | 22.30 | 21.70 | 24.70 | 21.10 | 20.00 | 24.40 | 16.70 | 19.60 | 26.10 | 23.60 | 21.30 | 22.50 | 25.20 | 19.1 | 23.2 | 26.7 | 18.9 | 23.9 | 16.2 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 0.24 | 0.23 | 2.21 | 5.85 | 1.03 | 2.86 | 0.52 | 12.50 | 1.49 | 6.80 | 2.10 | 1.60 | 8.60 | 5.50 | 8.30 | 1.50 | 17.90 | 12.80 | 0.53 | 9.00 | 9.80 | 2.60 | 4.80 | 4.90 | 8.60 | 7.90 | 0.80 | 7.6 | 11.4 | 18.4 | 21.4 | 6.7 | 5.2 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | -3.00 | -2.89 | -2.92 | -2.60 | -2.73 | -3.23 | -3.33 | -3.35 | -2.77 | -2.88 | -3.21 | -3.37 | -3.19 | -3.05 | -2.93 | -3.12 | -3.39 | NC | -3.00 | -3.15 | -3.41 | -2.44 | -2.89 | -3.29 | -2.71 | -2.85 | -3.39 | -2.61 | -2.7 | -3.5 | -2.7 | -3.3 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | -3.25 | -3.14 | -3.17 | -2.85 | -2.99 | -3.49 | -3.58 | -3.60 | -3.09 | -3.20 | -3.53 | -3.69 | -3.51 | -3.37 | -3.25 | -3.44 | -3.71 | NC | -3.32 | -3.47 | -3.73 | -2.76 | -3.21 | -3.61 | -3.03 | -3.17 | -3.71 | -2.93 | -3.0 | -3.8 | -3.1 | -3.6 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | 9.67 | 9.71 | 9.74 | 9.59 | 9.60 | 9.75 | 9.83 | 9.73 | 9.47 | 9.98 | 10.10 | 10.00 | 10.20 | 9.91 | 9.61 | 9.99 | 9.98 | NC | 9.92 | 10.10 | 10.10 | 9.72 | 9.82 | 10.10 | 9.84 | 9.73 | 10.1 | 9.82 | 9.8 | 10.1 | 9.8 | 10.1 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | 9.92 | 9.96 | 9.99 | 9.84 | 9.86 | 10.00 | 10.10 | 9.98 | 9.79 | 10.30 | 10.40 | 10.40 | 10.50 | 10.20 | 9.93 | 10.30 | 10.30 | NC | 10.20 | 10.40 | 10.40 | 10.00 | 10.10 | 10.40 | 10.20 | 10.10 | 10.4 | 10.1 | 10.1 | 10.4 | 10.1 | 10.4 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 259 | 259 | -- | 124 | 54 | -- | 266 | -- | -- | 199 | 54 | 153 | 140 | 65 | 100 | 260 | 52 | 105 | 180 | -- | 90 | 163 | -- | -- | 128 | 36 | 43 | 164 | 26 | -- | 139.0 | 39 | 80.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 13 | 13 | -- | 16 | 13 | -- | 19 | -- | -- | 18 | 17 | 15 | 19 | 9 | 18 | 17 | 17 | 16 | 19 | -- | 19 | 15 | -- | -- | 17 | -- | 20 | 14 | 15 | -- | 17.0 | 16.0 | 15.0 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 9 | 9 | -- | 8 | 9 | -- | <50 | -- | -- | 5 | 9 | 17 | 7 | 10 | 8 | 10 | 12 | <50 | -- | <5 | 8 | -- | -- | 7 | -- | 12 | 5 | 10 | -- | 6.0 | 9.0 | 6.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | 0.019 | 0.019 | -- | 0.030 | <0.017 | -- | 0.046 | -- | -- | 0.019 | 0.021 | 0.027 | 0.028 | <0.017 | <0.017 | 0.017 | 0.038 | <0.017 | 0.017 | 0.033 | <0.017 | 0.021 | -- | -- | 0.020 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 7 | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | <1 | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | 2 | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | 1 | <1 | 2 | <2.0 | 1 | <1 | 2 | <1 | <1 | <1 | -- | <1 | 1 | <1 | 1.0 | <1 | 1.0 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 523 | 523 | -- | 73 | 133 | 58 | 136 | 104 | 154 | 137 | 136 | 119 | 131 | 71 | 172 | 137 | 96 | 118 | 120 | 165 | 115 | 112 | 117 | 99 | 125 | 83 | 130 | 81 | 148 | <50 | 123.0 | 93.0 | <50 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | <0.5 | -- | 0.6 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.7 | <0.5 | <0.5 | 0.9 | 3.6 | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 0.7 | <0.5 | -- | <0.5 | <0.5 | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 53 | 53 | -- | 37 | 67 | 32 | 42 | 33 | 33 | 25 | 47 | 46 | 37 | 20 | 92 | 41 | 45 | 27 | 36 | 48 | 24 | 31 | 41 | 20 | 30 | 35 | 54 | 21 | 50 | 22.0 | 26.0 | 44.0 | 18.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | -- | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | <2 | -- | 2 | <2.0 | -- | 2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 3.0 | <2 | 2.0 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.1 | <0.1 | -- | <0.10 | <0.10 | -- | <0.10 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 12 | 12 | -- | 34 | 36 | -- | 33 | -- | -- | 25 | 33 | 29 | 33 | 18 | 32 | 31 | 32 | 29 | 29 | -- | 21 | 28 | -- | -- | 33 | -- | 41 | 27 | 38 | -- | 30.0 | 34.0 | 31.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 2 | 2 | -- | <2.0 | <2.0 | -- | 5 | -- | -- | <2 | <2 | <2 | <2 | <2 | 2 | 3 | <2 | 2 | 3 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <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 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | <2 | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 | <2 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | <5 | <5 | -- | 10 | 7 | 6 | 9 | 7 | 9 | <5 | <5 | 8 | 10 | 5 | 7 | 10 | <5 | 6 | 9 | 7 | 8 | 8 | <5 | <5 | 6 | 6 | 6 | 6 | <5 | <5 | 16.0 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 120 | 24 | -- | 190 | 16 | 58 | 72 | 110 | -- | 291 | 1,553 | 178 | 345 | 2,420 | 1,300 | 86 | 1,730 | >2420 | --- | 2,420 | 285 | 548 | 1,990 | 2,420 | 687 | 2,420 | 411 | <1 | NDOGT | 5,020.0 | 103.0 | NDOGT | 628.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 1 | 17 | -- | 2 | <1 | 8 | 5 | 37 | <100 | 2 | <1 | 3 | 8 | 21 | <1 | <1 | <1 | 13 | <0.10 | 7 | 6 | 2 | 38 | 30 | 7 | 13 | 46 | <1 | 51 | 20.0 | 1.0 | 15.0 | 6.0 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.47 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.04 | 1.11 | 1.18 | 1.30 | 1.14 | 0.51 | 0.78 | 1.26 | 1.24 | 0.52 | 1.30 | 0.81 | 1.44 | 2.00 | 0.65 | 0.76 | 0.59 | 1.23 | 0.72 | 1.27 | 1.34 | 1.63 | 0.81 | 2.29 | 1.96 | 1.24 | 1.34 | 1.16 | 1.14 | 1.28 | 0.74 | 1.94 | |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.94 | 0.97 | 1.21 | 1.09 | 1.19 | 0.42 | 0.67 | 0.98 | 1.01 | 0.55 | 1.20 | 1.14 | 1.62 | 2.30 | 0.61 | 0.69 | 0.51 | 1.12 | 0.68 | 1.34 | 0.69 | 2.00 | 0.99 | 2.37 | 2.46 | 1.32 | 1.87 | 1.80 | -- | * | 0.74 | 1.73 | |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
"- -" = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environment Environmental Quality Standards for Surface Water (Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

## TABLE B2: Historical Data - Bedford West Water Quality Sampling Program

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KL4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 | 2019/11/08 |
| Sampling Time | hh:mm | -- | | | | | 10:00 | 11:30 | 10:00 | 11:20 | 13:50 | 11:15 | 10:10 | 11:40 | 11:40 | 10:16 | 12:00 | 11:40 | 9:41 | 10:30 | 14:20 | 11:15 | 11:35 | 14:35 | 10:25 | 11:02 | 11:15 | 11:30 | 12:00 | 11:11 | 9:25 | 10:45 AM | 10:05 AM | 10:45 AM | 9:00 AM | 11:45 AM | 9:43 AM | 9:43 AM | 12:15 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 13.4 | 21.9 | 17.3 | 14.5 | 21.9 | 9.8 | 10.1 | 21.2 | 15.3 | 9.0 | 24.4 | 15.7 | 11.7 | 20.4 | 13.5 | 11.0 | 21.8 | 12.5 | 14.8 | 24.7 | 9.5 | 12.2 | 20.6 | 12.3 | 16.5 | 22.4 | 13.8 | 12.7 | 23.1 | 12.7 | 9.9 | 23.4 | 10.9 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.9 | 8.1 | 8.3 | 9.0 | 6.3 | 10.3 | 11.0 | 8.4 | 9.2 | 8.7 | 7.3 | 8.9 | 11.1 | 8.9 | 9.6 | 14.5 | 5.9 | 7.9 | 8.8 | 9.1 | 8.8 | 8.3 | 5.5 | 10.1 | 8.3 | 6.4 | 7.3 | 11.2 | 4.7 | 8.5 | ** | 1.98 | 10.40 |
| pH (In Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 8.00 | 6.71 | 6.94 | 7.19 | 6.98 | 6.07 | 6.49 | 6.43 | 6.02 | 9.00 | 6.71 | 6.77 | 5.72 | 7.08 | 6.41 | 6.30 | 7.25 | 6.55 | 6.64 | 6.81 | 7.09 | 7.32 | 6.72 | 8.14 | 6.90 | 6.88 | 6.84 | 7.01 | 6.67 | 6.91 | 8.68 | 6.97 | 6.81 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 771.0 | 262.0 | 247.0 | 224.0 | 226.0 | 214.8 | 218.0 | 171.9 | 126.2 | 206.0 | 225.0 | 185.9 | 207.1 | 196.2 | 209.0 | 273.0 | 251.0 | 208.0 | 0.2 | 243.5 | 232.4 | 215.0 | 260.0 | 228.0 | 213.0 | 262.0 | 252.0 | 202.9 | 251.0 | 210.6 | 161.1 | 540.0 | 188.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <5.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 | 10 | <5 | 9 | 8.0 | <5 | 9.0 | 6 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 67 | 65 | 60 | 56 | 56 | 53 | 56 | 44 | 37 | 51 | 57 | 46 | 54 | 41 | 47 | 59 | 47 | 48 | 61 | 56 | 55 | 54 | 58 | 49 | 64 | 62 | 59 | 52 | 50 | 47 | 50 | 56 | 54 |
| Colour | TCU | 5 | -- | -- | -- | | 22 | 18 | 20 | 27 | 11 | 20 | 32 | 38 | 43 | 48 | 11 | 20 | 17 | 21 | 20 | 13 | 11 | 28 | 33 | 10 | 12 | 25 | 12 | 22 | 19 | 11 | 16 | 35 | 10 | 16 | 42 | <5 | 17 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.15 | 0.12 | 0.14 | 0.23 | 0.19 | 0.21 | 0.23 | 0.15 | 0.17 | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.14 | 0.10 | 0.15 | 0.12 | 0.15 | 0.17 | 0.13 | 0.1 | 0.2 | 0.18 | 0.29 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.15 | -- | -- | 0.23 | 0.19 | -- | 0.23 | -- | -- | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.14 | 0.10 | 0.15 | 0.12 | 0.15 | 0.17 | 0.13 | 0.1 | 0.2 | 0.18 | 0.29 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | 0.07 | <0.05 | 0.12 | <0.05 | <0.05 | <0.05 | 0.10 | 0.12 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.10 | <0.03 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 | 0.04 | <0.03 | 0.04 | 0.03 | <0.03 | 0.06 | 0.07 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | <0.4 | 0.7 | -- | 1.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.2 | 0.4 | 1.0 | <0.4 | <0.4 | 0.4 | <0.4 | 0.5 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 0.60 | 0.60 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.6 | 4.0 | 3.3 | 2.6 | 3.1 | 3.7 | 6.0 | 5.4 | 7.5 | 3.2 | 4.8 | 4.2 | 4.5 | 4.3 | 4.4 | 2.1 | 4.4 | 2.8 | 5.2 | 5.2 | 4.3 | 3.3 | 8.1 | 5.1 | 4.3 | 4.0 | 5.1 | 2.7 | 4.0 | 4.5 | 3.30 | 4.30 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.61 | 6.75 | 6.83 | 6.83 | 6.93 | 6.83 | 6.57 | 6.57 | 6.46 | 6.70 | 7.00 | 6.90 | 6.69 | 6.96 | 6.85 | 6.69 | 6.91 | 6.85 | 6.59 | 6.94 | 6.97 | 6.70 | 7.03 | 6.89 | 6.75 | 6.99 | 6.95 | 6.74 | 7.13 | 7.11 | 6.67 | 6.91 | 6.87 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.8 | 7.7 | 7.0 | 6.8 | 8.0 | 8.5 | 6.8 | 4.9 | 5.2 | 5.7 | 6.8 | 5.8 | 6.8 | 5.1 | 6.8 | 6.4 | 7.9 | 6.8 | 6,500.0 | 7.9 | 3.7 | 6.5 | 7.1 | 7.3 | 7.7 | 7.5 | 8.6 | 5.9 | 7.9 | 7.7 | 6.2 | 8.0 | 5.1 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.2 | 0.9 | 1.0 | 1.0 | 1.2 | 1.2 | 1.0 | 0.8 | 1.2 | 1.3 | 1.2 | 1.0 | 920.0 | 1.3 | 1.0 | 1.0 | 1.1 | 1.3 | 1.2 | 1.1 | 1.3 | 1.0 | 1.2 | 1.3 | 1.0 | 1.2 | 0.9 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | <0.002 | 0.004 | <0.002 | <0.002 | 0.007 | 0.003 | 0.026 | 0.022 | 0.043 | 0.007 | 0.006 | 2.390 | 0.016 | 0.022 | 0.031 | 0.015 | 0.006 | 0.007 | 0.003 | 0.007 | 0.004 | 0.007 | 0.020 | 0.008 | 0.006 | 0.024 | 0.004 | 0.004 | 0.009 | 0.011 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 | 0.8 | 0.7 | 1.1 | 0.7 | 1.0 | 0.9 | 0.8 | 0.6 | 1.2 | 0.8 | 1.1 | 0.9 | 760.0 | 0.9 | 0.7 | 0.7 | 0.9 | 1.0 | 0.8 | 0.9 | 1.1 | 0.7 | 1.0 | 1.0 | 0.8 | 1.1 | 0.8 |
| Total Sodium (Na) | mg/L | -- | -- | -- | -- | | 39.0 | 41.0 | 37.0 | 28.5 | 34.3 | 33.9 | 32.1 | 21.5 | 21.1 | 31.5 | 34.5 | 25.2 | 31.6 | 20.1 | 30.7 | 35.9 | 38.6 | 34.1 | 34.0 | 40.0 | 28.2 | 32.4 | 41.4 | 31.1 | 37.6 | 41.4 | 38.9 | 35.6 | 39.2 | 40.6 | 37.0 | 36.7 | 23.4 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.7 | 2.6 | 2.6 | 3.1 | 2.9 | 3.1 | 2.9 | 2.5 | 2.7 | 2.7 | 2.2 | 2.6 | 3.0 | 2.6 | 2.5 | 2.6 | 2.1 | 2.5 | 2.5 | 2.6 | 3.0 | 2.6 | 2.0 | 2.4 | 2.3 | 1.7 | 2.1 | 2.6 | 1.8 | 2.0 | 2.1 | 1.4 | 2.2 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <1 | 1 | <1 | <2 | <2 | <1 | 2 | <1 | <2 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <1.0 | 7 | <5 | 7 | <5 | 10 | 6 | <5 | <5 | <5 | <5 | <5 | <5 | 6.0 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 12 | 11 | 10 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 7 | 7 | 9 | 9 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 9 | 10 | 8 | 7.0 | 8.0 | 6.0 | 9.0 | 9.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.5 | 1.0 | 0.3 | 0.3 | 0.2 | 0.8 | 0.7 | 0.7 | 0.4 | 0.7 | 0.4 | 0.8 | 0.7 | 2.6 | 2.1 | 1.1 | 0.6 | 0.8 | 0.6 | 0.7 | 1.2 | 1.2 | 1.5 | 1.6 | 1.3 | 0.9 | 1.6 | 1.2 | 0.5 | 1.7 | 0.8 | 1.5 | 1.1 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 260 | 250 | 230 | 220 | 230 | 250 | 210 | 170 | 160 | 200 | 224 | 183 | 218 | 218 | 204 | 219 | 241 | 218 | 220 | 241 | 235 | 206 | 275 | 185 | 251 | 255 | 248 | 243 | 252 | 231 | 246 | 236 | 158 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.23 | 2.22 | 2.09 | 1.91 | 1.94 | 1.85 | 1.88 | 1.62 | 1.36 | 2.04 | 1.94 | 1.45 | 1.68 | 1.31 | 1.53 | 2.47 | 1.60 | 2.11 | 1.88 | 1.90 | 1.87 | 1.74 | 2.04 | 1.76 | 2.03 | 2.12 | 2.08 | 1.65 | 1.75 | 1.7 | 1.6 | 2.0 | 1.9 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <1.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 | 10 | <5 | 9 | 8.0 | <5 | 9.0 | 6.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 132 | 135 | 125 | 111 | 118 | 116 | 113 | 90 | 81 | 111 | 114 | 87 | 103 | 75 | 97 | 132 | 108 | 117 | 110 | 121 | 102 | 106 | 125 | 105 | 123 | 128 | 126 | 105 | 113 | 111.0 | 102.0 | 119.0 | 98.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | -- | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.16 | 2.32 | 2.07 | 1.70 | 2.02 | 2.03 | 1.86 | 1.28 | 1.30 | 1.78 | 1.97 | 1.53 | 1.84 | 1.24 | 1.23 | 2.04 | 2.21 | 1.92 | 1.94 | 1.91 | 2.15 | 1.53 | 1.86 | 2.28 | 1.87 | 2.17 | 2.31 | 2.27 | 1.96 | 2.24 | 2.3 | 2.0 | 2.1 | 1.4 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 25.00 | 22.00 | 22.00 | 25.00 | 27.00 | 22.00 | 16.00 | 17.00 | 18.40 | 21.90 | 19.40 | 21.10 | 16.00 | 21.90 | 21.30 | 24.70 | 21.10 | 20.00 | 25.10 | 13.40 | 20.30 | 22.30 | 23.60 | 24.20 | 23.30 | 26.80 | 18.9 | 24.7 | 24.6 | 19.6 | 24.9 | 16.4 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 1.59 | 2.20 | 0.48 | 5.82 | 2.02 | 4.64 | 0.53 | 11.70 | 2.26 | 6.60 | 0.80 | 2.80 | 4.50 | 3.20 | 9.20 | 9.50 | 15.80 | 4.20 | 0.79 | 10.70 | 10.10 | 3.40 | 5.50 | 3.00 | 3.20 | 4.10 | 4.30 | 8.6 | 12.1 | 16.2 | 13.8 | 4.4 | 14.5 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.21 | -2.89 | -2.84 | -2.92 | -2.64 | -2.75 | -3.22 | -3.18 | -3.31 | -2.79 | -2.86 | -3.22 | -3.37 | -3.21 | -3.21 | -2.63 | -3.08 | -2.89 | -2.45 | NC | -2.98 | -3.20 | -3.38 | -2.76 | -2.93 | -3.26 | -2.78 | -2.71 | -3.84 | -2.61 | -2.7 | -3.4 | -2.8 | -3.2 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.46 | -3.14 | -3.09 | -3.17 | -2.89 | -3.00 | -3.47 | -3.43 | -3.56 | -3.11 | -3.18 | -3.54 | -3.69 | -3.53 | -3.53 | -2.95 | -3.40 | -2.77 | NC | -3.30 | -3.52 | -3.70 | -3.08 | -3.25 | -3.58 | -3.10 | -3.03 | -3.70 | -2.93 | -3.0 | -3.8 | -3.2 | -3.6 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.82 | 9.64 | 9.67 | 9.75 | 9.57 | 9.58 | 9.79 | 9.75 | 9.77 | 9.49 | 9.86 | 10.10 | 10.10 | 10.20 | 10.10 | 9.32 | 9.99 | 9.30 | NC | 9.92 | 10.20 | 10.10 | 9.79 | 9.82 | 10.00 | 9.77 | 9.66 | 10.1 | 9.74 | 9.8 | 10.1 | 9.7 | 10.1 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.10 | 9.89 | 9.92 | 10.00 | 9.82 | 9.83 | 10.00 | 10.00 | 10.00 | 9.81 | 10.20 | 10.40 | 10.40 | 10.50 | 10.40 | 9.64 | 10.30 | 9.62 | NC | 10.20 | 10.50 | 10.40 | 10.10 | 10.10 | 10.30 | 10.10 | 9.98 | 10.4 | 10.1 | 10.1 | 10.4 | 10.1 | 10.4 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 150 | -- | -- | 125 | 29 | -- | 231 | -- | -- | 188 | 48 | 149 | 141 | 106 | 159 | 236 | 46 | 93 | 160 | -- | 84 | 172 | -- | -- | 180 | 89 | 55 | 157 | 27 | -- | 132.0 | 70 | 97.0 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 16 | -- | -- | 17 | 18 | -- | 18 | -- | -- | 18 | 17 | 16 | 18 | 10 | 19 | 17 | 19 | 16 | 20 | -- | 17 | 16 | -- | -- | 20 | -- | 20 | 15 | 19 | -- | 18.0 | 20.0 | 17.0 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 6 | -- | -- | 9 | 9 | -- | <50 | -- | -- | 6 | 9 | 16 | 7 | 6 | 9 | 8 | 11 | 11 | <50 | -- | <5 | 7 | -- | -- | <5 | -- | 11 | 6 | 10 | -- | 6.0 | 9.0 | 6.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.3 | -- | -- | 0.031 | <0.017 | -- | 0.035 | -- | -- | 0.021 | <0.017 | 0.027 | 0.027 | 0.017 | 0.050 | 0.027 | <0.017 | <0.017 | 0.033 | -- | <0.017 | 0.024 | -- | -- | 0.021 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | -- | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | 6 | <1 | <1 | <1 | 6 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.4 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | <2.0 | 2 | <2.0 | 2 | <2.0 | <2.0 | <2 | <2 | 4 | 3 | <1 | 1 | <1 | <1 | 2 | 7 | -- | 1 | 1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | 1.0 | <1 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 86 | -- | -- | 82 | 51 | 55 | 119 | 109 | 138 | 129 | 118 | 133 | 213 | 144 | 248 | 129 | 55 | 104 | 100 | 217 | 83 | 122 | 61 | 114 | 136 | 131 | 141 | 83 | 119 | 78.0 | 120.0 | 100.0 | <50 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 3.2 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.8 | 0.9 | <0.5 | <0.5 | 2.6 | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 1.4 | <0.5 | -- | <0.5 | <0.5 | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 51 | -- | -- | 35 | 64 | 29 | 39 | 27 | 30 | 23 | 34 | 38 | 77 | 30 | 34 | 29 | 24 | 25 | 78 | 34 | 34 | 58 | 29 | 74 | 76 | 48 | 19 | 84 | 43.0 | 24.0 | 85.0 | 19.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 3 | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | 5 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | 7 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | 3 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.5 | -- | -- | <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 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 34 | -- | -- | 33 | 37 | -- | 33 | -- | -- | 25 | 32 | 28 | 32 | 17 | 31 | 31 | 31 | 29 | 30 | -- | 20 | 28 | -- | -- | 33 | -- | 40 | 27 | 39 | -- | 33.0 | 35.0 | 31.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | 5 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | <2 | <2 | <2 | <2 | 3 | 2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 | <2 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 14 | -- | -- | 10 | 7 | 7 | 11 | 7 | 7 | <5 | <5 | 68 | 21 | <5 | 9 | 9 | <5 | <5 | 10 | 8 | 12 | 7 | <5 | <5 | 13 | 7 | <5 | 7 | <5 | 7.0 | 7.0 | 6.0 | 6.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 28 | 58 | -- | 100 | 16 | 75 | 83 | 95 | -- | 345 | >2420 | 921 | 548 | >2420 | 770 | 308 | 1,550 | >2420 | --- | >2420 | 281 | 488 | 1,730 | >2420 | 792 | >2420 | >2420 | 4 | NDOGT | 8,000.0 | 198.0 | 560.0 | 604.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 4 | 33 | -- | 1 | <1 | 2 | 5 | 39 | <100 | 4 | <1 | 4 | 6 | 38 | <1 | <1 | 1 | 8 | <10 | 5 | 1 | 2 | 35 | 29 | 15 | 1 | 3 | 2 | 19 | 12.0 | <1 | 1.0 | <1 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.32 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.78 | 1.11 | 1.06 | 0.92 | 0.07 | 0.50 | 0.60 | 1.04 | 1.31 | 0.52 | 0.70 | 0.55 | 1.34 | 1.50 | 0.40 | 0.44 | 0.50 | 1.03 | 0.55 | 0.26 | 1.09 | 1.62 | 0.16 | 2.18 | 2.40 | 0.33 | 0.35 | 1.06 | 0.24 | 1.12 | 0.78 | 0.47 | |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.69 | 0.96 | 1.11 | 0.77 | 0.07 | 0.41 | 0.55 | 0.82 | 1.07 | 0.55 | 0.70 | 0.74 | 1.48 | 1.70 | 0.39 | 0.40 | 0.57 | 0.95 | 0.51 | 0.31 | 0.55 | 2.09 | 0.21 | 2.15 | 3.04 | 0.39 | 0.43 | 1.71 | -- | * | 0.82 | 0.42 | |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environment Environmental Quality Standards for Surface Water (Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (Black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

## TABLE B2: Historical Data - Bedford West Water Quality Sampling Program

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KLS | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2011/10/17 | 2012/05/01 | 2012/08/14 | 2012/10/10 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/09 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 | 2019/11/08 |
| Sampling Time | hh:mm | -- | | | | | 9:40 | 10:52 | 13:10 | 12:10 | 10:03 | 10:50 | 13:45 | 11:30 | 13:55 | 10:45 | 09:00 | 12:04 | 12:00 | 10:00 | 8:00 | 13:05 | 9:00 | 9:45 | 9:50 | 9:30 | 8:20 | 9:30 AM | 9:10 AM | 9:27 AM | 10:00 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.7 | 2.1 | 5.3 | 4.2 | 2.1 | 4.6 | 2.7 | 3.1 | 3.01 | 3.8 | 3.1 | 3.70 | 2.20 |
| Water Temp | Celsius | -- | -- | -- | | | 14.7 | 10.5 | 26.1 | 16.6 | 13.3 | 22.7 | 14.7 | 13.7 | 22.9 | 12.8 | 14.1 | 25.4 | 9.4 | 12.2 | 22.2 | 12.7 | 16.8 | 21.0 | 14.6 | 12.7 | 24.5 | 13.1 | 11.2 | 23.8 | 12.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 9.4 | 7.9 | 7.9 | 8.2 | 7.2 | 8.9 | 8.6 | 10.8 | 7.6 | 7.9 | 8.3 | 8.8 | 7.6 | 10.5 | 8.4 | 7.2 | 8.7 | 7.1 | 7.2 | 10.62 | 6.42 | 7.6 | ** | 5.42 | 8.1 |
| pH (In Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.52 | 7.76 | 6.69 | 6.72 | 6.20 | 8.57 | 6.51 | 6.79 | 7.86 | 6.60 | 7.82 | 6.77 | 7.05 | 5.75 | 5.11 | 5.72 | 7.00 | 6.83 | 7.05 | 6.74 | 7.14 | 6.67 | 9.20 | 7.45 | 6.62 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 111.9 | 230.0 | 229.0 | 189.0 | 219.5 | 202.1 | 212.9 | 472.0 | 251.0 | 211.0 | 0.2 | 249.8 | 240.8 | 209.0 | 267.0 | 243.2 | 219.0 | 246.0 | 257.0 | 196.4 | 244.9 | 236.4 | 171.6 | 220.0 | 216.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 9 | 21 | 8 | <5 | <5 | 6 | 5 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26.0 | <5 | 7.0 | 6.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 37 | 55 | 57 | 48 | 58 | 44 | 46 | 61 | 47 | 47 | 59 | 58 | 58 | 54 | 56 | 53 | 65 | 58 | 60 | 56 | 49 | 47 | 51 | 55 | 57 |
| Colour | TCU | 5 | -- | -- | -- | | 35 | 43 | 10 | 27 | 10 | 22 | 18 | 14 | 11 | 22 | 35 | 8 | 19 | 27 | 13 | 17 | 18 | 14 | 14 | 34 | 14 | 12 | 38 | 16 | 19 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.17 | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.25 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.19 | 0.15 | 0.25 | 0.21 | 0.09 | 0.17 | 0.20 | 0.4 | 0.1 | 0.16 | 0.35 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | -- | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.20 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.09 | 0.15 | 0.13 | 0.07 | 0.09 | 0.17 | 0.09 | 0.4 | 0.1 | 0.16 | 0.35 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | -- | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.10 | <0.05 | 0.12 | 0.14 | <0.05 | <0.05 | 0.11 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.050 | <0.03 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | 0.05 | <0.03 | 0.06 | 0.06 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | <0.4 | 2.3 | 1.0 | -- | 0.6 | 1.1 | <0.4 | 0.5 | 1.1 | 0.3 | <0.4 | 1.8 | 0.5 | <0.4 | 0.7 | 0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 0.60 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 4.8 | 5.8 | 3.4 | 4.7 | 4.0 | 4.6 | 7.0 | 4.3 | 2.7 | 4.5 | 3.1 | 5.3 | 5.7 | 4.4 | 3.3 | 7.0 | 4.7 | 4.8 | 3.9 | 4.9 | 2.9 | 3.0 | 4.5 | 4.50 | 4.20 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.57 | 6.70 | 7.10 | 6.50 | 6.71 | 6.93 | 6.89 | 6.64 | 6.84 | 6.63 | 6.56 | 6.90 | 6.94 | 6.66 | 7.16 | 7.03 | 6.74 | 7.09 | 6.93 | 6.70 | 7.15 | 7.47 | 6.64 | 7.04 | 6.81 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 5.8 | 6.1 | 6.6 | 5.9 | 7.1 | 5.7 | 6.4 | 6.5 | 7.6 | 7.0 | 6,500.0 | 8.0 | 4.7 | 6.3 | 7.3 | 8.2 | 7.4 | 7.0 | 7.5 | 5.9 | 6.7 | 7.6 | 6.4 | 7.7 | 5.4 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | 0.010 | 1.1 | 1.0 | 1.1 | 1.2 | 1.0 | 1.0 | 1.1 | 1.4 | 1.2 | 1.0 | 930.0 | 1.3 | 0.9 | 1.0 | 1.1 | 1.3 | 1.2 | 1.0 | 1.1 | 1.0 | 1.1 | 1.2 | 1.1 | 1.2 | 0.9 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.009 | 0.018 | 0.040 | 0.006 | 0.005 | 0.013 | 0.010 | 0.010 | 0.026 | 0.133 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 | 0.003 | 0.010 | 0.012 | 0.005 | 0.031 | 0.005 | 0.005 | 0.011 | 0.007 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 0.7 | 0.9 | 0.8 | 0.8 | 0.7 | 1.1 | 0.8 | 1.1 | 0.9 | 720.0 | 0.1 | 0.7 | 0.7 | 0.9 | 1.0 | 0.9 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 1.0 | 0.8 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 22.0 | 34.6 | 32.0 | 27.7 | 33.6 | 19.2 | 31.3 | 37.5 | 40.3 | 38.3 | 33.0 | 42.6 | 28.3 | 32.5 | 33.1 | 33.5 | 38.9 | 42.4 | 37.2 | 37.2 | 38.5 | 41.7 | 43.8 | 37.7 | 30.6 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.7 | 2.0 | 2.4 | 2.7 | 2.5 | 2.5 | 2.7 | 2.1 | 2.5 | 3.3 | 1.9 | 2.2 | 2.7 | 2.0 | 2.3 | 2.1 | 1.6 | 1.7 | 2.4 | 1.7 | 3.4 | 2.1 | 1.4 | 2.0 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <1.0 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | 11 | -- | -- | | 9 | 7 | 8 | 8 | 8 | 7 | 8 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 8 | 10 | 8 | 7.0 | 11.0 | 6.0 | 8.0 | 9.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.9 | 1.1 | 0.7 | 0.9 | 0.7 | 0.8 | 0.4 | 1.1 | 0.4 | 0.8 | 0.7 | 1.0 | 1.0 | 0.7 | 1.3 | 1.2 | 0.9 | 0.9 | 0.9 | 1.4 | 0.4 | 0.7 | 0.9 | 2.0 | 0.8 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 160 | 215 | 226 | 189 | 232 | 223 | 204 | 228 | 246 | 225 | 220 | 248 | 244 | 208 | 267 | 196 | 248 | 249 | 246 | 247 | 247 | 286 | 249 | 229 | 160 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.42 | 2.13 | 1.95 | 1.58 | 1.82 | 1.52 | 1.58 | 2.56 | 1.50 | 1.50 | 1.94 | 1.95 | 1.96 | 1.74 | 1.94 | 1.89 | 2.06 | 1.96 | 2.09 | 1.76 | 1.68 | 2.1 | 1.6 | 1.9 | 1.9 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 9 | 21 | 8 | <5 | <5 | <5 | 6 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26.0 | <5 | 7.0 | 6.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 84 | 118 | 111 | 96 | 110 | 82 | 98 | 136 | 106 | 103 | 120 | 124 | 106 | 105 | 114 | 113 | 125 | 122 | 123 | 110 | 108 | 127.0 | 110.0 | 116.0 | 109.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.36 | 1.94 | 1.85 | 1.64 | 1.94 | 1.23 | 1.81 | 2.37 | 2.27 | 2.14 | 1.87 | 2.40 | 1.58 | 1.86 | 1.93 | 2.01 | 2.20 | 2.00 | 2.12 | 2.04 | 2.13 | 2.3 | 2.4 | 2.2 | 1.7 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 19.00 | 19.30 | 21.00 | 19.70 | 21.80 | 18.40 | 20.50 | 22.00 | 23.90 | 21.60 | 20.00 | 25.30 | 15.40 | 19.80 | 22.80 | 25.80 | 23.40 | 21.60 | 23.30 | 18.9 | 21.3 | 23.9 | 20.5 | 24.2 | 17.2 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 2.16 | 4.70 | 2.60 | 2.00 | 3.20 | 10.60 | 6.70 | 9.40 | 20.30 | 17.50 | 1.84 | 10.20 | 10.80 | 3.20 | 0.40 | 3.00 | 3.40 | 8.10 | 0.70 | 7.3 | 11.8 | 5.0 | 19.9 | 7.3 | 6.3 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.06 | -2.79 | -2.77 | -3.62 | -3.33 | -3.11 | -3.19 | -2.64 | -3.17 | -3.42 | -3.24 | -3.20 | -3.13 | -3.43 | -2.72 | -2.69 | -3.29 | -2.82 | -2.84 | -3.42 | -2.77 | -1.8 | -3.5 | -2.8 | -3.3 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.31 | -3.11 | -3.09 | -3.94 | -3.65 | -3.43 | -3.51 | -2.96 | -3.49 | -3.74 | -3.50 | -3.34 | -3.45 | -3.75 | -3.04 | -3.01 | -3.61 | -3.14 | -3.16 | -3.74 | -3.09 | -2.2 | -3.8 | -3.1 | -3.6 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.63 | 9.49 | 9.87 | 10.10 | 10.00 | 10.00 | 10.10 | 9.28 | 10.00 | 10.00 | 9.81 | 9.92 | 10.10 | 10.10 | 9.88 | 9.72 | 10.00 | 9.91 | 9.77 | 10.1 | 9.92 | 9.3 | 10.1 | 9.9 | 10.1 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.88 | 9.81 | 10.20 | 10.40 | 10.40 | 10.40 | 10.40 | 9.60 | 10.30 | 10.40 | 10.10 | 10.20 | 10.40 | 10.40 | 10.20 | 10.00 | 10.30 | 10.20 | 10.10 | 10.4 | 10.2 | 9.6 | 10.4 | 10.2 | 10.4 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | -- | 222 | 52 | 154 | 136 | 58 | 61 | 224 | 53 | 108 | 180 | --- | 79 | 163 | -- | -- | 156 | 45 | 44 | 172 | 20 | -- | 142.0 | 57 | 92.8 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | -- | 18 | 16 | 15 | 19 | 9 | 16 | 16 | 17 | 17 | 17 | --- | 19 | 14 | -- | -- | 17 | -- | 17 | 13 | 13 | -- | 17.0 | 16.0 | 15.0 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | --- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | -- | 6 | 9 | 15 | 7 | -- | 6 | 10 | <50 | --- | <5 | 7 | -- | -- | -- | -- | <5 | -- | 10 | 5 | 9 | -- | 6.0 | 9.0 | 7.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | -- | 0.022 | 0.027 | 0.029 | 0.024 | <0.017 | 0.034 | 0.036 | <0.017 | 0.024 | 0.035 | --- | 0.332 | 0.024 | -- | -- | 0.025 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | -- | <1 | <1 | 5 | <1 | <1 | <1 | 6 | <1 | <1 | <1.0 | --- | 7 | <1 | -- | -- | 2 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | <1 | <1 | 5 | <2.0 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | <1 | <1 | 1.0 | <1 | 1.0 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 175 | 160 | 78 | 120 | 111 | 70 | 79 | 111 | <50 | 119 | 100 | 123 | 158 | 96 | 55 | 88 | 59 | <50 | 106 | 80 | 81 | <50 | 121.0 | 63.0 | <50 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | -- | <0.5 | <0.5 | 0.6 | <0.5 | <0.5 | <0.5 | 1.9 | <0.5 | 0.5 | <0.5 | --- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 0.9 | <0.5 | -- | <0.5 | <0.5 | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 36 | 30 | 14 | 37 | 35 | 13 | 12 | 40 | 18 | 25 | 34 | 24 | 35 | 23 | 15 | 17 | 24 | 11 | 13 | 24 | 15 | 14.0 | 25.0 | 18.0 | 17.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | -- | <2 | <2 | 5 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | --- | 3 | 3 | -- | -- | 14 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | --- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | 0.3 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | -- | 27 | 31 | 29 | 31 | 18 | 31 | 31 | 30 | 30 | 29 | --- | 23 | 28 | -- | -- | 32 | -- | 38 | 28 | 35 | -- | 31.0 | 33.0 | 33.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | -- | <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 | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | --- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | --- | -- | -- | | -- | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | 2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | -- | 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 | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 | <2 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 9 | 5 | <5 | 64 | 11 | 7 | 5 | 10 | <5 | 10 | 14 | 6 | 12 | 10 | <5 | <5 | 11 | 8 | <5 | 8 | <5 | 7.0 | 7.0 | <5 | 5.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | -- | 461 | 613 | 93 | 461 | 308 | 461 | 42 | 629 | >2470 | --- | 356 | 163 | 179 | 517 | 2,420 | 260 | 577 | >2420 | 58 | 601 | 6,000.0 | 55.0 | 770.0 | 560.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 100 | 14 | 2 | 6 | 6 | 6 | 4 | <1 | 1 | 17 | <10 | 1 | 2 | <1 | 23 | 44 | <1 | 5 | 517 | 8 | 1 | 11.0 | 1.0 | <1 | 8.0 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | | | | | | | | | | | | | | | | | | | | | | | | | 0.32 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.91 | 0.30 | 1.20 | 1.09 | 1.44 | 2.20 | 0.64 | 0.20 | 0.61 | 0.90 | 0.48 | 1.22 | 2.71 | 1.52 | 1.20 | 2.32 | 1.09 | 1.43 | 1.22 | 6.25 | 1.28 | 1.68 | 1.24 | 3.70 | |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.85 | 0.33 | 1.00 | 1.41 | 1.59 | 2.40 | 0.62 | 0.20 | 0.54 | 0.84 | --- | 1.26 | 1.44 | 1.86 | 1.57 | 2.34 | 1.28 | 1.40 | 1.33 | 3.35 | -- | * | 1.19 | 3.00 | |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
"--" = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.
**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)
Nova Scotia Environment Environmental Quality Standards for Surface Water (Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) -
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

**Underlined (black shaded)** = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**TABLE B2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Highway 102 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | HWY102-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/15 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 | 2019/11/08 |
| Sampling Time | hh:mm | -- | | | | | 07:00 | 12:45 | 08:00 | 13:00 | 10:20 | 09:00 | 13:40 | 11:00 | 11:00 | 14:50 | 11:00 | 9:50 | 14:15 | 12:22 | 12:30 | 12:00 | 10:10 | 9:30 | 13:15 | 09:20 | 9:40 | 14:30 | 11:00 | 10:20 | 12:00 | 15:00 | 11:40 | 12:40 | 11:00 | 15:40:00 PM | 2:45 PM | 12:40 PM | 4:15 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 11.8 | 18.8 | 15.7 | 14.9 | 19.6 | 7.4 | 11.4 | 17.8 | 14.6 | 10.7 | 21.8 | 13.6 | 11.7 | 19.5 | 8.9 | 12.1 | 19.6 | 10.2 | 14.3 | 20.7 | 5.4 | 13.4 | 19.3 | 9.2 | 16.4 | 22.1 | 10.1 | 14.4 | 21.4 | 10.6 | 14.0 | 27.4 | 9.7 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 11.4 | 5.8 | 4.3 | 8.2 | 4.3 | 6.1 | 8.2 | 3.9 | 5.3 | 5.7 | 1.0 | 3.8 | 7.6 | 3.3 | 3.1 | 12.0 | 2.1 | 4.5 | 4.3 | 3.8 | 5.0 | 8.2 | 10.1 | 7.4 | 5.8 | 5.8 | 5.6 | 7.1 | 2.8 | 6.1 | ** | 6.27 | 7.80 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.98 | 5.35 | 5.25 | 6.31 | 5.26 | 5.62 | 5.75 | 5.77 | 5.99 | 8.76 | 5.73 | 6.38 | 6.19 | 7.10 | 6.79 | 6.02 | 6.63 | 5.12 | 6.35 | 6.24 | 6.92 | 7.34 | 6.14 | 5.69 | 6.40 | 7.76 | 6.32 | 6.13 | 6.13 | 6.70 | 7.20 | 6.09 | **6.37** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 194.0 | 153.0 | 103.8 | 135.0 | 106.0 | 108.6 | 114.1 | 107.6 | 88.6 | 288.0 | 225.0 | 155.5 | 226.0 | 173.2 | 234.0 | 880.0 | 337.0 | 109.0 | 0.4 | 335.8 | 251.2 | 289.0 | 353.0 | 208.9 | 354.0 | 257.0 | 266.0 | 232.2 | 280.5 | 189.4 | 330.0 | 383.0 | 210.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | <5 | <5 | <5 | <5 | <5 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 | 17 | 21 | 16 | 13 | 26 | 12.0 | 12.0 | 23.0 | <5 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 24 | 38 | 24 | 32 | 25 | 22 | 24 | 19 | 12 | 58 | 48 | 28 | 53 | 31 | 40 | 65 | 57 | 19 | 130 | 67 | 49 | 71 | 87 | 35 | 101 | 49 | 51 | 51 | 54 | 61 | 90 | 80 | 92 |
| Colour | TCU | 5 | -- | -- | -- | | 67 | 68 | 57 | 37 | 89 | 53 | 39 | 65 | 79 | 24 | 65 | 40 | 9 | 65 | 25 | 11 | 31 | 93 | 22 | 27 | 29 | 23 | 37 | 64 | 24 | 31 | 29 | 27 | 56 | 68 | 35 | 37 | 28 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | <0.05 | <0.05 | <0.05 | 0.69 | <0.05 | 1.20 | 0.69 | 0.25 | 1.20 | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | 0.13 | 0.53 | 0.35 | 0.71 | 0.58 | 0.37 | 0.11 | 0.2 | 0.6 | <0.05 | 0.12 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | <0.05 | -- | -- | 0.69 | <0.05 | -- | 0.69 | -- | -- | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | <0.05 | 0.53 | 0.18 | 0.50 | 0.58 | 0.37 | <0.05 | 0.2 | 0.3 | <0.05 | 0.12 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.13 | <0.05 | 0.17 | 0.21 | <0.05 | <0.05 | 0.11 | <0.05 | 0.25 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.29 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.10 | 0.07 | 0.31 | 0.19 | 0.04 | <0.03 | 0.05 | 0.06 | <0.03 | 0.04 | 0.03 | <0.050 | <0.03 | 0.04 | 0.06 | 0.06 | <0.03 | <0.03 | 0.10 | 0.07 | <0.03 | 0.07 | <0.03 | <0.03 | 0.06 | 0.06 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.1 | 1.3 | 0.6 | -- | 0.6 | 0.6 | 0.7 | 0.6 | <0.4 | 0.3 | 0.5 | 0.6 | 0.7 | 1.2 | 0.7 | 0.5 | 1.3 | 3.8 | 1.1 | 0.70 | <0.4 | <0.4 | 0.60 | 0.90 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 6.5 | 10.0 | 7.7 | 4.7 | 11.0 | 6.3 | 4.5 | 7.2 | 7.4 | 5.5 | 10.0 | 7.0 | 5.1 | 10.1 | 17.7 | 4.1 | 7.7 | 9.0 | 2.7 | 14.6 | 8.4 | 4.5 | 8.0 | 11.5 | 7.4 | 8.6 | 6.9 | 5.0 | 7.7 | 7.0 | 4.4 | 9.50 | 4.10 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 4.54 | 5.24 | 5.40 | 5.48 | 6.24 | 5.31 | 6.42 | 6.55 | 6.28 | 6.40 | 6.90 | 6.80 | 6.86 | 6.87 | 6.73 | 6.56 | 7.49 | 5.90 | 6.61 | 7.46 | 6.80 | 6.87 | 7.03 | 6.45 | 6.84 | 6.91 | 6.90 | 7.02 | 7.14 | 6.94 | 7.07 | 7.15 | **5.73** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 1.7 | 1.8 | 1.6 | 4.9 | 3.3 | 5.1 | 4.9 | 5.2 | 5.6 | 12.5 | 11.7 | 7.5 | 11.1 | 10.5 | 13.9 | 7.2 | 23.3 | 2.2 | 18,000.0 | 18.0 | 12.4 | 12.9 | 25.8 | 9.9 | 20.9 | 10.3 | 14.6 | 12.5 | 15.6 | 9.9 | 16.5 | 17.9 | 12.2 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.3 | 0.5 | 0.5 | 1.1 | 0.8 | 1.1 | 0.9 | 0.9 | 1.2 | 1.7 | 2.0 | 1.4 | 1.4 | 1.5 | 2.3 | 1.6 | 3.2 | 0.6 | 2,400.0 | 2.7 | 2.3 | 1.7 | 2.7 | 1.7 | 3.0 | 1.7 | 2.2 | 1.8 | 2.2 | 1.8 | 2.5 | 2.6 | 1.8 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.070 | 0.140 | 0.020 | 0.006 | 0.007 | 0.011 | 0.009 | 0.012 | 0.010 | 0.019 | 0.039 | 0.020 | 0.006 | 0.021 | 0.022 | 0.013 | 0.038 | 0.031 | 0.007 | 0.020 | 0.002 | 0.005 | 0.038 | 0.009 | 0.017 | 0.052 | 0.008 | 0.022 | 0.014 | 0.010 | 0.011 | 0.023 | **0.026** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.5 | 1.2 | 0.7 | 1.1 | 1.6 | 1.3 | 1.1 | 1.5 | 1.9 | 1.6 | 2.5 | 1.5 | 1.3 | 1.7 | 2.4 | 1.2 | 2.5 | 0.7 | 2,000.0 | 2.1 | 1.5 | 1.4 | 1.9 | 1.7 | 2.0 | 2.1 | 2.0 | 1.6 | 2.0 | 1.4 | 2.3 | 2.3 | 0.9 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 15.0 | 25.0 | 13.0 | 15.9 | 14.5 | 14.6 | 14.8 | 10.2 | 8.3 | 36.3 | 27.7 | 14.6 | 30.8 | 15.0 | 20.5 | 39.1 | 38.7 | 18.6 | 64.0 | 37.7 | 28.8 | 45.4 | 43.8 | 24.8 | 64.1 | 29.7 | 29.6 | 41.2 | 35.5 | 47.9 | 69.1 | 54.3 | 38.3 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.2 | 2.0 | 1.1 | 3.8 | 5.1 | 2.8 | 5.2 | 4.6 | 4.1 | 6.1 | 5.1 | 3.1 | 5.1 | 5.8 | 1.7 | 7.1 | 4.7 | 2.1 | 4.9 | 4.8 | 1.4 | 6.3 | 4.6 | 1.8 | 3.8 | 5.6 | 2.5 | 5.3 | 4.6 | 2.2 | 4.7 | 4.8 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 7 | 80 | 2 | <2 | 11 | <2 | <1 | 1 | <1 | 9 | 6 | <5 | <5 | <5 | <5 | 6 | <5 | <5 | <1.0 | <5 | <5 | <5 | 10 | <5 | <5 | 11 | <5 | <5 | <5 | <5 | <5 | 8.0 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 5 | 3 | 3 | 8 | <2 | 8 | 10 | 8 | 10 | 14 | 8 | 9 | 12 | 8 | 12 | 10 | 7 | 6 | 13 | 9 | 14 | 14 | 14 | 18 | 15 | 13 | 19 | 12 | 7.0 | 11.0 | 14.0 | 10.0 | 8.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 14.0 | 35.0 | 0.9 | 1.4 | 1.2 | 0.6 | 0.4 | 0.6 | 1.1 | 0.9 | 1.9 | 0.9 | 0.5 | 1.6 | 0.5 | 0.7 | 1.6 | 0.9 | 0.6 | 0.9 | 0.8 | 1.0 | 4.1 | 1.0 | 1.3 | 7.7 | 1.1 | 1.7 | 1.1 | 3.2 | 0.8 | 2.6 | 1.5 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 100 | 140 | 92 | 130 | 100 | 110 | 110 | 100 | 88 | 263 | 231 | 143 | 243 | 188 | 218 | 252 | 338 | 112 | 470 | 324 | 244 | 289 | 440 | 167 | 411 | 251 | 258 | 298 | 306 | 306 | 464 | 340 | 247 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 0.77 | 1.12 | 0.73 | 1.11 | 0.71 | 0.88 | 1.03 | 0.95 | 0.80 | 2.55 | 2.02 | 1.31 | 1.96 | 1.50 | 1.78 | 2.66 | 2.31 | 1.30 | 4.20 | 2.50 | 1.93 | 2.58 | 3.29 | 1.60 | 3.53 | 2.12 | 2.20 | 1.97 | 2.2 | 2.2 | 3.1 | 2.9 | 2.8 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 | 17 | 21 | 16 | 13 | 26 | 12.0 | 12.0 | 23.0 | <5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 50 | 73 | 45 | 67 | 50 | 63 | 65 | 58 | 54 | 150 | 117 | 73 | 117 | 83 | 104 | 143 | 150 | 68 | 240 | 151 | 116 | 155 | 193 | 100 | 218 | 127 | 131 | 130 | 133 | 142.0 | 204.0 | 182.0 | 154.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 0.84 | 1.32 | 0.74 | 1.06 | 0.93 | 1.02 | 1.00 | 0.83 | 0.80 | 2.43 | 6.04 | 1.19 | 2.06 | 1.40 | 1.87 | 2.25 | 3.22 | 1.04 | 3.94 | 2.88 | 2.11 | 2.81 | 3.51 | 1.79 | 4.14 | 2.22 | 2.28 | 2.62 | 2.6 | 2.8 | 4.1 | 3.6 | 2.5 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 6.00 | 6.00 | 6.00 | 17.00 | 12.00 | 17.00 | 16.00 | 17.00 | 19.00 | 38.20 | 37.50 | 24.50 | 33.50 | 32.40 | 44.20 | 24.60 | 71.40 | 8.00 | 55.00 | 56.10 | 40.40 | 39.20 | 75.50 | 31.70 | 64.50 | 32.70 | 45.50 | 38.6 | 48 | 32.1 | 51.5 | 55.4 | 37.9 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 4.35 | 8.20 | 0.68 | 2.30 | 13.40 | 7.37 | 1.48 | 6.74 | 0.00 | 2.60 | 1.90 | 4.60 | 2.40 | 3.50 | 2.60 | 8.40 | 16.40 | 11.20 | 3.19 | 7.10 | 4.70 | 4.40 | 3.10 | 5.70 | 8.00 | 2.20 | 1.80 | 14.0 | 8.3 | 12.1 | 13.8 | 10.0 | 5.3 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | -3.50 | -2.99 | -3.36 | -2.77 | -2.23 | -2.72 | -2.73 | -2.33 | -2.41 | -2.69 | -1.30 | -3.85 | -2.32 | -1.57 | -2.62 | -2.48 | -1.74 | -3.14 | -2.23 | -2.35 | -2.33 | -2.37 | -1.85 | -2.6 | -2.3 | -1.9 | -4.1 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | -3.75 | -3.25 | -3.61 | -3.09 | -2.55 | -3.04 | -3.05 | -2.65 | -2.73 | -3.01 | -1.62 | -4.17 | -2.57 | -1.89 | -2.94 | -2.80 | -2.06 | -3.46 | -2.55 | -2.67 | -2.65 | -2.69 | -2.17 | -2.9 | -2.6 | -2.2 | -4.4 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | 9.92 | 9.54 | 9.64 | 9.17 | 9.13 | 9.52 | 9.59 | 9.20 | 9.14 | 9.25 | 8.79 | 9.75 | 8.93 | 9.03 | 9.42 | 9.35 | 8.77 | 9.59 | 9.07 | 9.26 | 9.23 | 9.39 | 8.99 | 9.5 | 9.3 | 9.0 | 9.8 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | 10.20 | 9.80 | 9.89 | 9.49 | 9.45 | 9.84 | 9.91 | 9.52 | 9.46 | 9.57 | 9.11 | 10.10 | 9.18 | 9.35 | 9.74 | 9.67 | 9.09 | 9.91 | 9.39 | 9.58 | 9.55 | 9.71 | 9.31 | 9.9 | 9.6 | 9.3 | 10.1 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 510 | -- | -- | 169 | 192 | -- | 205 | -- | -- | 134 | 183 | 146 | 86 | 145 | 150 | 187 | 83 | 310 | 51 | -- | 52 | 81 | -- | -- | 69 | 450 | 100 | 72 | 80 | -- | 45.0 | 93.0 | **215.0** |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 22 | -- | -- | 53 | 37 | -- | 37 | -- | -- | 58 | 284 | 42 | 57 | 57 | 80 | 46 | 142 | 17 | 130 | -- | 86 | 79 | -- | -- | 130 | -- | 77 | 68 | 100 | -- | 108.0 | 104.0 | 197.0 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | <5 | -- | -- | 11 | 11 | -- | <50 | -- | -- | 12 | 18 | 13 | 10 | 10 | 11 | 9 | 14 | 11 | <50 | -- | <5 | 10 | -- | -- | <5 | -- | 24 | 11 | 14 | -- | 10.0 | 16.0 | 6.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | 0.043 | <0.017 | -- | 0.023 | -- | -- | 0.034 | 0.021 | <0.017 | <0.017 | <0.017 | 0.040 | 0.022 | <0.017 | 0.022 | 0.024 | -- | <0.017 | <0.017 | -- | -- | 0.032 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | 8 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | 1 | -- | 1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | 0 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | 2.0 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | -- | -- | 3 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | 3 | <2 | <1 | 2 | <1 | <1 | 2 | <2.0 | <1 | 1 | <1 | <1 | 2 | <1 | 4 | 1 | 1 | <1 | 3.0 | 1.0 | 2.0 | 2.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 720 | -- | -- | 146 | 637 | 150 | 107 | 209 | 219 | 102 | 1,380 | 255 | 111 | 938 | 446 | 147 | 820 | 290 | 140 | 1,280 | 138 | 144 | 766 | 228 | 151 | 3,960 | 281 | 85 | 634 | 403.0 | 122.0 | 896.0 | 256.0 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | 1.6 | -- | -- | 2.4 | 0.6 | -- | <0.5 | -- | -- | <0.5 | 0.7 | <0.5 | <0.5 | <0.5 | 0.6 | 2.6 | <0.5 | 0.6 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 0.8 | <0.5 | -- | <0.5 | 0.7 | 0.9 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 40 | -- | -- | 55 | 39 | 67 | 28 | 21 | 31 | 34 | 79 | 28 | 23 | 45 | 31 | 56 | 122 | 61 | 28 | 95 | 22 | 19 | 78 | 38 | 22 | 511 | 28 | 9 | 99 | 71.0 | 14.0 | 62.0 | 125.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | 12 | -- | <2 | 6 | <2 | -- | <2 | <2 | 5.0 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 11 | -- | -- | 29 | 20 | -- | 24 | -- | -- | 48 | 58 | 36 | 52 | 47 | 62 | 38 | 103 | 13 | 85 | -- | 39 | 58 | -- | -- | 92 | -- | 76 | 54 | 88 | -- | 93.0 | 88.0 | 67.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 6 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | 3 | <2 | <2 | <2 | 4 | 2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <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 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 | 2.0 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 21 | -- | -- | 16 | 7 | 7 | <5.0 | <5.0 | 7 | <5 | 6 | <5 | <5 | <5 | 10 | 10 | <5 | 7 | 11 | <5 | <5 | <5 | <5 | 6 | 9 | 37 | 8 | 6 | <5 | 12.0 | 5.0 | 8.0 | 12.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 84 | >250 | -- | >250 | >250 | 180 | 120 | 180 | -- | 687 | >2420 | >2420 | 1,550 | >2420 | 1,553 | 120 | >2420 | >2420 | --- | >2420 | 659 | >2420 | >2420 | | 914 | >2420 | >2420 | 105 | 9010 | 370.0 | 1,520.0 | 450.0 | 1,128.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 54 | >250 | -- | 12 | 17 | 5 | 1 | 78 | <100 | 3 | 68 | 145 | 4 | 9 | 5 | 3 | 179 | 3 | 20 | 25 | 2 | <1 | 86 | | 12 | 14 | 3 | <1 | 10 | 2.0 | 1.0 | 3.0 | 2.0 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | <0.25 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 15.40 | 19.29 | 0.70 | 18.12 | 1.61 | 8.45 | 0.93 | 0.58 | 0.69 | 0.53 | 2.59 | 0.81 | 1.27 | 14.70 | 1.99 | 0.25 | 1.10 | 1.22 | 0.50 | 7.27 | 0.36 | 0.94 | 51.51 | 0.33 | 1.56 | 5.32 | 0.62 | 1.57 | 0.86 | 1.11 | 1.88 | 5.55 | |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 17.50 | 19.60 | 0.84 | 17.62 | 1.68 | 7.52 | 0.84 | 0.56 | 0.65 | 0.59 | 2.89 | 1.05 | 1.45 | 15.80 | 2.20 | 0.82 | 1.11 | 1.38 | 0.55 | 6.79 | 0.23 | 1.30 | 60.68 | 0.43 | 2.04 | 5.48 | 0.99 | 2.62 | -- | * | 1.90 | 5.09 | |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.

Comment 1: CCME PAL-F reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**TABLE B2: Historical Data - Bedford West Water Quality Sampling Program**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) |
|---|---|---|---|---|---|---|
| Sample Sites | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | |
| Sampling Time | hh:mm | -- | | | | |
| **FIELD DATA** | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | |
| Water Temp | Celsius | -- | -- | -- | -- | |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | |
| Specific Conductance | uS/cm | -- | -- | -- | -- | |
| **INORGANICS** | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | |
| Colour | TCU | 5 | -- | -- | -- | |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | |
| **Calculated Parameters** | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | |
| Calculated TDS | mg/L | 1 | -- | -- | -- | |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | |
| Cation Sum | me/L | N/A | -- | -- | -- | |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | |
| **Metals (ICP-MS)** | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | |
| **MICROBIOLOGICAL** | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | |

| Tested Parameters | Highway 102 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | HWY102-2 | | | | | | | | | | | | | | | |
| Sampling Date | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/15 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/14 |
| Sampling Time | 12:30 | 12:15 | 12:30 | 12:40 | 09:30 | 12:30 | 11:20 | 15:00 | 15:30 | 11:20 | 12:20 | 10:35 | 10:40 | 10:00 | 10:22 | 12:15 |
| **FIELD DATA** | | | | | | | | | | | | | | | | |
| Secchi Depth | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | 16.7 | 19.2 | 16.4 | 17.2 | 17.0 | 8.7 | 10.8 | 24.2 | 15.1 | 7.8 | 23.7 | 14.3 | 11.5 | 22.0 | 10.7 | 11.4 |
| Dissolved Oxygen | 10.0 | 5.9 | 4.8 | 4.9 | 2.5 | 3.0 | 6.9 | 7.0 | 5.1 | 3.7 | 13.1 | 3.3 | 6.3 | 1.6 | 4.2 | 10.5 |
| pH (in Situ) | 6.57 | 5.71 | 5.40 | 6.33 | 5.86 | 5.64 | 6.22 | 5.89 | 5.29 | 7.30 | 6.37 | 6.72 | 6.01 | 6.92 | 5.40 | 5.40 |
| Specific Conductance | 37.0 | 457.0 | 162.1 | 415.0 | 167.0 | 101.2 | 92.2 | 123.1 | 96.0 | 225.0 | 226.0 | 159.1 | 288.0 | 188.5 | 204.4 | 204.4 |
| **INORGANICS** | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | <5 | <5 | 7 | 6 | 5 | <5 | <5 | 5 | <5 | 17 | 7 | <5 | 6 | 14 | 7 | 30 |
| Dissolved Chloride (Cl) | 21 | 82 | 83 | 170 | 41 | 18 | 21 | 21 | 17 | 63 | 109 | 45 | 71 | 50 | 52 | 113 |
| Colour | 120 | 190 | 91 | 96 | 160 | 68 | 65 | 98 | 77 | 32 | 100 | 70 | 11 | 61 | 36 | 13 |
| Nitrite + Nitrate | <0.05 | <0.05 | <0.05 | 0.10 | <0.05 | 0.62 | 0.26 | 1.80 | 3.20 | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 |
| Nitrate (N) | <0.05 | -- | -- | 0.10 | <0.05 | -- | 0.26 | -- | -- | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 |
| Nitrite (N) | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | <0.05 | 0.06 | <0.05 | <0.05 | 0.20 | <0.05 | <0.05 | 0.30 | 0.08 | 0.09 | <0.03 | <0.03 | <0.03 | 0.17 | 0.09 | <0.03 |
| Total Kjeldahl Nitrogen as N | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.6 | 1.1 | 0.5 | -- | 0.7 | 2.0 | 15.3 |
| Total Organic Carbon | 8.5 | 13.0 | 13.0 | 7.2 | 14.0 | 7.4 | 5.7 | 9.2 | 8.4 | 7.0 | 15.8 | 11.2 | 6.1 | 10.6 | 5.1 | 17.4 |
| Orthophosphate (as P) | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | 5.43 | 5.96 | 6.30 | 6.05 | 6.32 | 5.47 | 5.93 | 6.18 | 5.92 | 5.90 | 6.70 | 6.80 | 6.61 | 6.59 | 6.34 | 7.20 |
| Total Calcium (Ca) | 1.6 | 4.0 | 4.8 | 7.4 | 3.8 | 4.0 | 3.1 | 2.2 | 3.8 | 7.0 | 8.4 | 5.6 | 7.6 | 8.5 | 8.2 | 14.1 |
| Total Magnesium (Mg) | 0.4 | 0.7 | 0.9 | 1.0 | 0.6 | 1.0 | 0.7 | 0.7 | 1.4 | 1.2 | 1.4 | 1.2 | 1.2 | 1.3 | 2.2 | 3.1 |
| Total Phosphorus | <0.02 | 0.040 | 0.034 | 0.010 | 0.028 | 0.003 | 0.009 | 0.019 | 0.041 | 0.021 | 0.054 | 0.030 | 0.014 | 0.028 | 0.199 | 0.028 |
| Total Potassium (K) | 0.5 | 0.8 | 1.1 | 1.0 | 1.0 | 1.4 | 0.8 | 1.3 | 1.9 | 1.2 | 1.7 | 1.6 | 1.3 | 1.5 | 2.5 | 2.9 |
| Total Sodium (Na) | 15.0 | 51.0 | 55.0 | 83.7 | 32.0 | 12.1 | 13.3 | 13.1 | 13.3 | 41.5 | 63.6 | 20.4 | 39.0 | 19.1 | 34.5 | 69.6 |
| Reactive Silica (SiO2) | 2.2 | 4.4 | 4.0 | 3.0 | 6.4 | 5.4 | 2.5 | 6.5 | 6.7 | 4.1 | 6.9 | 5.8 | 1.6 | 6.2 | 6.6 | 1.6 |
| Total Suspended Solids | <2 | 58 | 62 | 34 | 27 | 3 | <1 | 10 | 14 | <5 | 39 | <5 | <5 | <5 | 194 | 34 |
| Dissolved Sulphate (SO4) | <2 | 3 | 8 | 11 | <2 | 7 | 5 | 5 | 8 | 12 | 6 | 10 | 10 | 9 | 10 | 12 |
| Turbidity (NTU) | 0.7 | 3.8 | 4.2 | 2.6 | 3.1 | 0.5 | 0.4 | 1.2 ( 1 ) | 3.9 | 0.6 | 10.8 | 2.0 | 1.5 | 3.3 | 144.0 | 1.1 |
| Conductivity (uS/cm) | 85 | 290 | 310 | 590 | 160 | 94 | 91 | 100 | 110 | 263 | 403 | 179 | 295 | 203 | 223 | 433 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | |
| Anion Sum | 0.60 | 2.37 | 2.62 | 5.13 | 1.27 | 0.70 | 0.73 | 0.91 | 0.86 | 2.48 | 3.34 | 1.49 | 2.34 | 1.88 | 1.81 | 4.04 |
| Bicarb. Alkalinity (calc. as CaCO3) | <1 | <1 | 7 | 6 | 5 | <1 | <1 | 5 | <1 | 17 | 7 | <5 | 6 | 14 | 7 | 30 |
| Calculated TDS | 42 | 150 | 165 | 282 | 93 | 52 | 48 | 62 | 67 | 143 | 200 | 86 | 135 | 100 | 145 | 235 |
| Carb. Alkalinity (calc. as CaCO3) | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | 0.81 | 2.65 | 2.89 | 4.17 | 1.81 | 0.86 | 0.82 | 0.83 | 0.97 | 2.32 | 2.10 | 1.40 | 2.24 | 1.50 | 3.50 | 4.17 |
| Hardness (CaCO3) | 6.00 | 13.00 | 16.00 | 23.00 | 12.00 | 14.00 | 11.00 | 8.00 | 15.00 | 22.40 | 26.70 | 18.90 | 23.90 | 26.60 | 29.50 | 48.00 |
| Ion Balance (% Difference) | 14.90 | 5.58 | 4.90 | 10.30 | 17.50 | 10.30 | 5.81 | 4.60 | 6.01 | 3.30 | 3.60 | 3.10 | 2.30 | 11.30 | 31.70 | 1.60 |
| Langelier Index (@ 20C) | NC | NC | -3.57 | -3.72 | -3.70 | NC | NC | -4.07 | NC | -3.63 | -3.15 | -3.34 | -3.33 | -2.92 | -3.50 | -1.80 |
| Langelier Index (@ 4C) | NC | NC | -3.82 | -3.97 | -3.95 | NC | NC | -4.32 | NC | -3.95 | -3.47 | -3.66 | -3.65 | -3.24 | -3.82 | -2.12 |
| Saturation pH (@ 20C) | NC | NC | 9.87 | 9.77 | 10.00 | NC | NC | 10.30 | NC | 9.53 | 9.85 | 10.10 | 9.94 | 9.51 | 9.84 | 9.00 |
| Saturation pH (@ 4C) | NC | NC | 10.10 | 10.00 | 10.30 | NC | NC | 10.50 | NC | 9.85 | 10.20 | 10.50 | 10.30 | 9.83 | 10.20 | 9.32 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | 270 | -- | -- | 189 | 368 | -- | 260 | -- | -- | 145 | 466 | 259 | 130 | 138 | 2,760 | 400 |
| Total Antimony (Sb) | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Arsenic (As) | <2 | -- | -- | <1.0 | 2 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | 6 | <2 |
| Total Barium (Ba) | 20 | -- | -- | 53 | 28 | -- | 27 | -- | -- | 49 | 74 | 33 | 44 | 43 | 213 | 381 |
| Total Beryllium (Be) | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Bismuth (Bi) | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Boron (B) | <5 | -- | -- | 8 | 8 | -- | <50 | -- | -- | 10 | 17 | 15 | 9 | 10 | 13 | 11 |
| Total Cadmium (Cd) | <0.300 | -- | -- | 0.051 | <0.017 | -- | <0.017 | -- | -- | 0.037 | 0.031 | 0.032 | 0.019 | <0.017 | 0.096 | 0.051 |
| Total Chromium (Cr) | <2 | -- | -- | <1.0 | 1 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | 1 | 9 | 2 |
| Total Cobalt (Co) | <1 | -- | -- | 1 | 1 | -- | <0.40 | -- | -- | <1 | 1 | 1 | <1 | 1 | 3 | 1 |
| Total Copper (Cu) | 2 | -- | -- | 2 | <2.0 | <2.0 | <2.0 | 3 | 3 | <2 | 3 | 3 | <2 | 1 | 12 | 4 |
| Total Iron (Fe) | 880 | -- | -- | 1,380 | 3,850 | 303 | 229 | 897 | 1,110 | 214 | 5,210 | 1,550 | 383 | 1,720 | 28,400 | 1,660 |
| Total Lead (Pb) | 1.9 | -- | -- | 1.6 | 2.7 | -- | 0.6 | -- | -- | <0.5 | 5.2 | 2.1 | 0.6 | 0.7 | 19.4 | 3.5 |
| Total Manganese (Mn) | 110 | -- | -- | 387 | 135 | 53 | 41 | 106 | 176 | 78 | 219 | 207 | 83 | 173 | 327 | 212 |
| Total Molybdenum (Mo) | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Nickel (Ni) | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | 4 | 2 |
| Total Selenium (Se) | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Silver (Ag) | <0.5 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Strontium (Sr) | 11 | -- | -- | 37 | 21 | -- | 17 | -- | -- | 33 | 45 | 31 | 39 | 40 | 45 | 75 |
| Total Thallium (Tl) | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin (Sn) | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Titanium (Ti) | 4 | -- | -- | <2 | 6 | -- | 5 | -- | -- | <2 | 10 | 4 | 4 | <2 | 60 | 9 |
| Total Uranium (U) | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 |
| Total Vanadium (V) | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | 2 | <2 | <2 | <2 | 11 | <2 |
| Total Zinc (Zn) | 12 | -- | -- | 14 | 12 | 9 | 6 | 9 | 13 | <5 | 7 | 12 | 12 | <5 | 46 | 36 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | |
| Total Coliform | 28 | >250 | -- | >250 | 75 | 41 | 110 | >250 | -- | 1,553 | >2420 | >2420 | 2,420 | 1,990 | >2420 | 687 |
| E. coli | 4 | 230 | -- | 9 | 5 | <1 | 7 | >250 | <100 | <1 | 16 | 50 | 111 | 9 | 4 | <1 |
| Chlorophyll A - Spectrophotometer | | | | | | | | | | | | | | | | |
| Chlorophyll A - Acidification method | 0.90 | 82.63 | 48.17 | 0.85 | 16.36 | 0.25 | 0.97 | 4.91 | 1.90 | 2.07 | 21.03 | 0.33 | 2.41 | 1.10 | 21.62 | 10.34 |
| Chlorophyll A - Welschmeyer method | 0.91 | 81.20 | 52.50 | 0.85 | 17.35 | 0.23 | 0.87 | 4.49 | 2.15 | 2.27 | 17.26 | 0.50 | 3.02 | 1.30 | 27.02 | 11.09 |

| Tested Parameters | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2107/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/09 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 | 2019/11/08 |
| Sampling Time | 10:07 | 11:00 | 12:58 | 14:30 | 12:50 | 12:45 | 10:40 | 11:45 | 15:25 | 12:25 | 12:30 | 11:30 | 14:15 PM | 3:55PM | 12:20PM | 16:30 |
| **FIELD DATA** | | | | | | | | | | | | | | | | |
| Secchi Depth | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | 10.4 | 12.7 | 23.7 | 9.3 | 13.4 | 20.4 | 10.2 | 13.0 | 22.4 | 15.2 | 14.9 | 18.3 | 10.6 | 11.4 | 23.1 | 9.7 |
| Dissolved Oxygen | 9.3 | 4.2 | 6.1 | 5.3 | 6.8 | 7.1 | 6.8 | 5.7 | 1.8 | 11.3 | 8.8 | 2.3 | 5.6 | ** | 3.81 | 12.70 |
| pH (in Situ) | 5.85 | 6.45 | 6.04 | 5.96 | 5.86 | 6.19 | 5.36 | 6.04 | 7.56 | 8.32 | 6.13 | 5.88 | 7.24 | 6.83 | 6.19 | 6.98 |
| Specific Conductance | 174.0 | 0.4 | 699.0 | 197.6 | 968.0 | 838.0 | 219.2 | 400.0 | 414.0 | 338.0 | 355.6 | 394.7 | 246.4 | 501.0 | 720.0 | 202.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | 8 | 8 | 5 | <5 | 13 | 21 | 6 | <5 | 22 | 11 | 9 | 21 | 13.0 | <5 | 17.0 | <5 |
| Dissolved Chloride (Cl) | 34 | 260 | 178 | 78 | 236 | 226 | 48 | 136 | 107 | 92 | 79 | 90 | 30 | 161 | 223 | 74 |
| Colour | 85 | 17 | 9 | 8 | 14 | 39 | 86 | 20 | 41 | 22 | 25 | 85 | 85 | 22 | 42 | 45 |
| Nitrite + Nitrate | 0.12 | <0.050 | <0.05 | 0.15 | 0.21 | 0.23 | 0.11 | 0.20 | 0.09 | 0.07 | 0.33 | 0.21 | 0.8 | 0.6 | 0.14 | 0.58 |
| Nitrate (N) | 0.12 | <0.050 | <0.05 | 0.15 | <0.05 | <0.05 | 0.11 | <0.05 | 0.09 | 0.07 | 0.16 | <0.05 | 0.8 | 0.2 | 0.07 | 0.58 |
| Nitrite (N) | <0.05 | <0.010 | <0.05 | <0.05 | 0.21 | 0.23 | <0.05 | 0.20 | <0.05 | <0.05 | 0.17 | 0.21 | <0.05 | 0.43 | 0.07 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | <0.03 | 0.06 | 0.19 | 0.05 | 0.14 | 0.37 | <0.03 | <0.03 | 0.09 | 0.14 | <0.03 | 0.24 | 0.06 | 0.04 | 0.29 | 0.05 |
| Total Kjeldahl Nitrogen as N | <0.4 | 0.3 | 62.6 | 2.0 | 24.3 | 2.1 | 0.6 | <0.4 | 0.7 | 0.6 | 1.4 | 0.90 | <0.4 | <0.4 | 0.70 | 1.20 |
| Total Organic Carbon | 8.0 | 3.0 | 29.0 | 9.9 | 79.3 | 11.1 | 13.4 | 5.4 | 9.2 | 5.9 | 5.6 | 7.5 | 8.0 | 3.2 | 8.20 | 6.80 |
| Orthophosphate (as P) | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | 6.40 | 6.12 | 6.64 | 6.18 | 6.46 | 6.80 | 6.15 | 6.22 | 6.73 | 6.51 | 6.79 | 6.79 | 7.07 | 6.36 | 6.67 | 6.37 |
| Total Calcium (Ca) | 9.5 | 20,000.0 | 33.3 | 9.8 | 23.9 | 23.8 | 8.6 | 13.3 | 14.7 | 14.7 | 11.5 | 12.5 | 16.5 | 22.8 | 17.2 | 7.9 |
| Total Magnesium (Mg) | 1.8 | 2,500.0 | 32.7 | 2.2 | 3.2 | 2.5 | 1.7 | 2.5 | 1.9 | 2.1 | 1.4 | 1.7 | 1.9 | 3.6 | 2.2 | 1.4 |
| Total Phosphorus | 0.201 | 0.010 | 1.560 | 0.012 | 0.222 | 0.034 | 0.012 | 0.013 | 0.042 | 0.011 | 0.034 | 0.025 | 0.014 | 0.006 | 0.037 | 0.022 |
| Total Potassium (K) | 1.7 | 1,900.0 | 12.5 | 1.1 | 4.0 | 2.1 | 1.4 | 1.1 | 1.6 | 1.6 | 1.3 | 1.6 | 1.7 | 2.2 | 2.1 | 1.1 |
| Total Sodium (Na) | 24.0 | 150.0 | 124.0 | 36.8 | 149.0 | 124.0 | 26.4 | 68.8 | 66.0 | 55.2 | 59.4 | 81.6 | 29.4 | 148.0 | 139.0 | 31.7 |
| Reactive Silica (SiO2) | 5.9 | 2.3 | 7.2 | 5.6 | 2.8 | 9.0 | 4.5 | 3.1 | 5.7 | 6.4 | 1.6 | 8.8 | 4.6 | 3.1 | 7.2 | 4.4 |
| Total Suspended Solids | <5 | 2 | 3,000 | 15 | 342 | 69 | <5 | 6 | 7 | 8 | 12 | <5 | <5 | <5 | 16.0 | <5 |
| Dissolved Sulphate (SO4) | 8 | 15 | 7 | 8 | 22 | 21 | 8 | 10 | 7 | 9 | 9 | 4.0 | 16.0 | 13.0 | 11.0 | 9.0 |
| Turbidity (NTU) | 1.1 | 1.2 | 1,490.0 | 9.9 | 131.0 | 54.2 | 1.1 | 2.4 | 9.9 | 12.5 | 7.0 | 13.8 | 1.1 | 1.2 | 26.8 | 4.4 |
| Conductivity (uS/cm) | 194 | 920 | 662 | 315 | 817 | 952 | 177 | 451 | 413 | 366 | 422 | 444 | 208 | 737 | 782 | 204 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | |
| Anion Sum | 1.29 | 7.88 | 5.27 | 2.38 | 7.39 | 7.25 | 1.65 | 4.06 | 3.61 | 3.01 | 2.62 | 3.06 | 1.5 | 4.9 | 6.9 | 2.3 |
| Bicarb. Alkalinity (calc. as CaCO3) | 8 | 8 | 5 | <5 | 13 | 21 | 6 | <5 | 22 | 11 | 9 | 21 | 13.0 | <5 | 17.0 | <5 |
| Calculated TDS | 85 | 460 | 712 | 138 | 473 | 422 | 99 | 233 | 215 | 187 | 170 | 209 | 107.0 | 354.0 | 415.0 | 129.0 |
| Carb. Alkalinity (calc. as CaCO3) | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | 1.76 | 7.87 | 29.10 | 2.35 | 9.27 | 7.23 | 1.80 | 3.92 | 3.93 | 3.60 | 3.36 | 4.53 | 2.3 | 8.0 | 7.5 | 2.0 |
| Hardness (CaCO3) | 31.10 | 59.00 | 218.00 | 33.50 | 72.90 | 69.70 | 28.50 | 43.50 | 44.50 | 45.40 | 34.5 | 38.2 | 49.0 | 71.8 | 52.0 | 25.5 |
| Ion Balance (% Difference) | 15.10 | 0.06 | 69.40 | 0.50 | 11.30 | 0.10 | 4.30 | 1.80 | 4.20 | 8.90 | 12.4 | 19.4 | 21.8 | 24.3 | 4.4 | 8.0 |
| Langelier Index (@ 20C) | -3.30 | -3.18 | -2.81 | -3.73 | -2.70 | -2.15 | -3.72 | -3.58 | -2.38 | -2.90 | -2.81 | -2.41 | -2.2 | -3.2 | -2.5 | -3.6 |
| Langelier Index (@ 4C) | -3.62 | -3.42 | -3.13 | -4.05 | -3.02 | -2.47 | -4.04 | -3.90 | -2.70 | -3.22 | -3.13 | -2.73 | -2.5 | -3.6 | -2.8 | -4.0 |
| Saturation pH (@ 20C) | 9.70 | 9.29 | 9.45 | 9.91 | 9.16 | 8.95 | 9.87 | 9.80 | 9.11 | 9.41 | 9.60 | 9.2 | 9.3 | 9.6 | 9.2 | 10.0 |
| Saturation pH (@ 4C) | 10.00 | 9.54 | 9.77 | 10.20 | 9.48 | 9.27 | 10.20 | 10.10 | 9.43 | 9.73 | 9.92 | 9.52 | 9.6 | 9.9 | 9.5 | 10.3 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | 216 | 100 | -- | 129 | 3,880 | -- | -- | 99 | 149 | 542 | 167 | 152 | -- | 126.0 | 194.0 | 306.0 |
| Total Antimony (Sb) | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Arsenic (As) | <2 | <1.0 | -- | <2 | 3 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | 4.0 | <2 |
| Total Barium (Ba) | 63 | 140 | -- | 147 | 762 | -- | -- | 151 | -- | 122 | 96 | 146 | -- | 272.0 | 138.0 | 100.0 |
| Total Beryllium (Be) | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Bismuth (Bi) | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Boron (B) | 12 | <50 | -- | <5 | 9 | -- | -- | <5 | -- | 12 | 7 | 11 | -- | 7.0 | 9.0 | 6.0 |
| Total Cadmium (Cd) | 0.019 | 0.100 | -- | <0.017 | 0.778 | -- | -- | 0.019 | -- | 0.048 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 |
| Total Chromium (Cr) | <1 | <1.0 | -- | <1 | 8 | -- | -- | <1 | -- | 2 | <1 | 2 | -- | <1 | 1.0 | <1 |
| Total Cobalt (Co) | <1 | 2 | -- | 3 | 4 | -- | -- | <1 | -- | 2 | <1 | 2 | -- | <1 | 3.0 | <1 |
| Total Copper (Cu) | 2 | <2.0 | 404 | 2 | 13 | <1 | 2 | <1 | 1 | 3 | 2 | 1 | 2.0 | 2.0 | 1.0 | 3.0 |
| Total Iron (Fe) | 485 | 960 | 217,000 | 714 | 21,300 | 7,380 | 375 | 369 | 2,650 | 4,760 | 870 | 3600 | 93.0 | 728.0 | 8,440.0 | 506.0 |
| Total Lead (Pb) | 1.0 | <0.50 | -- | 0.6 | 39.7 | -- | -- | <0.5 | -- | 3.3 | 2.3 | 1 | -- | 1.4 | 1.4 | 1.9 |
| Total Manganese (Mn) | 93 | 470 | 2,800 | 303 | 586 | 359 | 71 | 125 | 160 | 215 | 55 | 262 | 10.0 | 137.0 | 625.0 | 50.0 |
| Total Molybdenum (Mo) | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Nickel (Ni) | <2 | <2.0 | -- | <2 | 8 | -- | -- | 6 | -- | 3 | <2 | <2 | -- | 3.0 | <2 | 2.0 |
| Total Selenium (Se) | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Silver (Ag) | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Strontium (Sr) | 43 | 96 | -- | 38 | 96 | -- | -- | 72 | -- | 80 | 53 | 81 | -- | 129.0 | 95.0 | 49.0 |
| Total Thallium (Tl) | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Tin (Sn) | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Titanium (Ti) | 6 | <2 | -- | <2 | 41 | -- | -- | <2 | -- | 15 | 4 | 3 | -- | <2 | 3.0 | 7.0 |
| Total Uranium (U) | <0.1 | <0.1 | -- | <0.1 | 0.2 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Vanadium (V) | <2 | <2.0 | -- | <2 | 18 | -- | -- | 2 | -- | 3 | <2 | 2 | -- | 4.0 | 5.0 | <2 |
| Total Zinc (Zn) | 17 | 27 | 1,210 | 10 | 170 | 22 | 11 | 14 | 9 | 19 | 12 | 6 | 69.0 | 16.0 | 15.0 | 13.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | |
| Total Coliform | >2420 | --- | >2420 | 328 | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | 6 | 410 | 81.0 | 930.0 | NDOGT | 1,152.0 |
| E. coli | <1 | <10 | 201 | 2 | 1 | 20 | 11 | <1 | 8 | 41 | 1 | 26 | 3.0 | <10 | 30.0 | 18.0 |
| Chlorophyll A - Spectrophotometer | | | | | | | | | | | | | | | | 0.32 |
| Chlorophyll A - Acidification method | 0.46 | 0.53 | 119.14 | 6.24 | 539.78 | 54.98 | 0.43 | 1.40 | 2.11 | 28.94 | 2.56 | 2.58 | 0.53 | 3.06 | 23.70 | |
| Chlorophyll A - Welschmeyer method | 0.55 | 0.58 | 129.77 | 2.23 | 793.90 | 73.67 | 0.56 | 1.74 | 3.20 | 37.67 | 4.28 | -- | * | 3.04 | 20.50 | |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME PAL-F calculation equations). The largest guideline value for each respective element range was always used.

**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality
**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

## TABLE B2: Historical Data - Bedford West Water Quality Sampling Program

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Lake Shore Drive | | |

## TABLE B2: Historical Data - Bedford West Water Quality Sampling Program

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Larry Uteck Blvd | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | LU | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2011/10/17 | 2012/05/01 | 2012/08/15 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/15 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 | 2019/11/08 |
| Sampling Time | hh:mm | -- | | | | | 10:30 | 15:20 | 11:30 | 10:10 | 14:30 | 14:30 | 13:00 | 11:45 | 10:45 | 9:54 | 13:45 | 10:23 | 10:05 | 12:20 | 11:20 | 11:45 | 11:25 | 10:15 AM | 12:00 | 10:00 | 8:40 | 12:25 PM | 3:20PM | 11:45 AM | 12:15 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 11.3 | 12.8 | 27.3 | 14.6 | 13.9 | 18.3 | 10.9 | 15.0 | 22.8 | 10.2 | 16.1 | 23.4 | 8.2 | 13.3 | 21.9 | 11.6 | 18.2 | 22.4 | 13.3 | 14.3 | 23.1 | 12.4 | 13.8 | 25.8 | 10.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 4.2 | 6.2 | 8.2 | 9.0 | 10.2 | 8.3 | 4.5 | 12.0 | 8.1 | 7.6 | 7.3 | 9.5 | 8.5 | 8.8 | 16.6 | 9.7 | 9.6 | 8.3 | 7.4 | 11.3 | 6.8 | 9.8 | ** | 5.54 | **10.30** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.07 | 7.82 | 6.65 | 6.78 | 6.39 | 7.49 | 5.45 | 6.50 | 7.23 | 6.17 | 6.57 | 6.80 | 6.99 | 7.17 | 6.24 | 6.23 | 6.80 | 7.11 | 6.90 | 6.73 | 6.85 | 7.09 | 7.22 | 6.92 | 6.62 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 203.0 | 955.0 | 480.0 | 262.0 | 670.0 | 320.0 | 845.0 | 999.0 | 611.0 | 371.0 | 0.6 | 569.0 | 436.2 | 588.0 | 574.0 | 483.4 | 755.0 | 660.0 | 590.0 | 434.6 | 588.0 | 384.4 | 621.0 | 710.0 | 196.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 | 11 | 23 | 13.0 | 10.0 | 23.0 | 10.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 34 | 224 | 116 | 52 | 190 | 99 | 258 | 253 | 104 | 70 | 210 | 132 | 93 | 154 | 164 | 92 | 242 | 154 | 143 | 96 | 126 | 74 | 174 | 202 | 75 |
| Colour | TCU | 5 | -- | -- | -- | | 94 | 18 | 14 | 18 | 7 | 7 | 19 | 6 | 8 | 18 | 8 | 8 | 6 | 17 | 13 | 26 | 12 | 12 | 8 | 28 | 21 | 24 | 18 | 14 | 16 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.61 | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.47 | 2.61 | 1.35 | 0.87 | 1.72 | 1.01 | 0.41 | 1.3 | 1.3 | 0.37 | 1.77 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | -- | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.41 | 2.61 | 1.01 | 0.51 | 1.72 | 0.87 | 0.16 | 1.3 | 0.8 | 0.30 | 1.24 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.34 | 0.36 | <0.05 | 0.14 | 0.25 | <0.05 | 0.47 | 0.07 | **0.53** |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | 0.06 | 0.04 | 0.16 | <0.03 | <0.03 | 0.04 | 0.04 | 0.05 | <0.03 | <0.03 | <0.050 | 0.05 | <0.03 | 0.05 | 0.05 | <0.03 | <0.03 | 0.09 | 0.04 | <0.03 | 0.17 | <0.03 | <0.03 | 0.09 | 0.15 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | 0.4 | 4.2 | 0.7 | -- | 0.5 | <0.4 | 1.2 | 1.7 | <0.4 | 0.3 | 8.0 | 0.7 | 1.2 | 1.1 | 0.6 | 0.7 | 3.8 | 0.6 | 1.1 | 0.60 | <0.4 | 0.6 | <0.4 | 0.70 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 11.0 | 3.7 | 22.8 | 4.8 | 3.1 | 4.5 | 2.9 | 6.9 | 4.7 | 4.7 | 2.2 | 7.6 | 6.5 | 3.9 | 5.3 | 7.6 | 6.1 | 6.8 | 5.4 | 9.3 | 5.5 | 5.0 | 4.3 | 5.70 | 3.90 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.43 | 6.70 | 7.20 | 7.20 | 6.92 | 7.11 | 6.49 | 6.42 | 7.42 | 6.41 | 6.95 | 7.30 | 7.15 | 6.94 | 7.42 | 6.96 | 7.26 | 7.40 | 7.13 | 7.01 | 7.46 | 7.29 | 7.17 | 7.45 | 7.01 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 7.6 | 30.7 | 22.1 | 14.5 | 22.0 | 17.6 | 21.8 | 23.9 | 27.6 | 12.6 | 27,000.0 | 20.3 | 15.9 | 20.6 | 17.2 | 17.9 | 25.7 | 23.8 | 22.8 | 12.7 | 20.8 | 14.9 | 25.2 | 30.2 | 9.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 2.3 | 4.2 | 3.6 | 2.2 | 2.8 | 2.7 | 4.0 | 4.2 | 3.8 | 2.2 | 3,800.0 | 3.4 | 1.9 | 2.9 | 3.4 | 2.6 | 3.8 | 3.0 | 2.5 | 1.6 | 2.7 | 2.1 | 3.5 | 4.2 | 1.5 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.034 | 0.043 | 0.036 | 0.030 | 0.006 | 0.022 | 0.046 | 0.260 | 0.028 | 0.039 | 0.007 | 0.009 | 0.011 | 0.029 | 0.011 | 0.012 | 0.024 | 0.022 | 0.008 | 0.028 | 0.019 | 0.021 | 0.010 | 0.014 | **0.013** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 2.1 | 3.2 | 3.6 | 2.5 | 2.6 | 2.8 | 2.9 | 3.1 | 3.7 | 3.0 | 3,300.0 | 2.8 | 1.6 | 2.8 | 2.6 | 2.7 | 3.2 | 3.0 | 2.6 | 2.2 | 2.9 | 2.3 | 3.2 | 3.4 | 1.7 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 22.7 | 124.0 | 62.2 | 32.3 | 95.1 | 51.7 | 170.0 | 147.0 | 88.1 | 62.7 | 110.0 | 102.0 | 57.8 | 96.4 | 81.1 | 65.6 | 137.0 | 113.0 | 86.9 | 73.0 | 94.7 | 69.9 | 159.0 | 129.0 | 44.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 6.9 | 4.9 | 0.7 | 6.3 | 5.1 | 8.6 | 7.0 | 2.1 | 2.5 | 6.9 | 3.6 | 4.9 | 6.9 | 4.2 | 1.3 | 6.7 | 4.6 | 3.6 | 5.9 | 3.5 | 5.4 | 4.7 | 3.7 | 3.0 | 4.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 13 | 5 | 165 | <5 | <5 | <5 | <5 | 626 | <5 | <5 | <1.0 | <5 | 6 | 29 | <5 | <5 | 22 | 16 | <5 | 52 | 11 | <5 | 7.0 | 6.0 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 21 | 26 | 25 | 23 | 26 | 29 | 33 | 29 | 20 | 27 | 27 | 31 | 30 | 28 | 23 | 41 | 32 | 18 | 33 | 19 | 15.0 | 24.0 | 22.0 | 23.0 | 23.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 3.3 | 4.1 | 23.0 | 2.3 | 1.8 | 1.6 | 0.7 | 42.7 | 10.1 | 1.6 | 0.3 | 2.8 | 2.4 | 15.8 | 3.0 | 3.3 | 7.3 | 6.6 | 3.0 | 21.4 | 2.4 | 4.5 | 3.6 | 3.7 | 3.8 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 190 | 813 | 482 | 255 | 732 | 433 | 840 | 819 | 605 | 394 | 790 | 575 | 462 | 582 | 739 | 371 | 849 | 673 | 610 | 518 | 620 | 422 | 871 | 765 | 256 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.69 | 7.21 | 4.12 | 2.36 | 6.10 | 4.02 | 8.13 | 8.15 | 3.80 | 2.68 | 6.77 | 4.73 | 3.62 | 5.26 | 5.68 | 3.91 | 7.99 | 5.32 | 5.24 | 3.40 | 4.3 | 2.9 | 5.7 | 6.7 | 2.9 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 | 11 | 23 | 13.0 | 10.0 | 23.0 | 10.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 109 | 426 | 246 | 144 | 347 | 229 | 496 | 477 | 262 | 187 | 400 | 305 | 216 | 321 | 310 | 242 | 463 | 341 | 311 | 216 | 277 | 201.0 | 399.0 | 408.0 | 169.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.70 | 7.40 | 4.30 | 2.43 | 5.55 | 3.51 | 8.90 | 8.24 | 5.64 | 3.64 | 6.69 | 5.86 | 3.52 | 5.78 | 4.76 | 4.06 | 7.65 | 6.74 | 5.21 | 4.04 | 5.52 | 4.1 | 8.6 | 7.6 | 2.6 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 29.00 | 94.00 | 70.00 | 45.30 | 66.50 | 55.10 | 70.90 | 77.00 | 84.60 | 40.50 | 84.00 | 64.70 | 47.50 | 63.40 | 56.90 | 55.40 | 79.80 | 71.80 | 67.20 | 38.3 | 63.1 | 45.9 | 77.3 | 92.7 | 30.1 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 0.29 | 1.30 | 2.20 | 1.40 | 4.70 | 6.80 | 4.50 | 0.60 | 19.40 | 15.20 | 0.59 | 10.60 | 1.40 | 4.70 | 8.80 | 1.80 | 2.20 | 11.80 | 0.30 | 8.7 | 12.5 | 15.9 | 20.4 | 6.5 | 5.8 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.95 | -2.32 | -1.94 | -2.10 | -2.60 | -1.93 | -2.98 | -2.38 | -3.41 | -1.45 | -3.41 | -1.95 | -2.16 | -2.27 | -1.55 | -2.27 | -1.87 | -1.43 | -1.85 | -2.47 | -1.49 | -2.0 | -2.1 | -1.4 | -2.6 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.20 | -2.64 | -2.26 | -2.42 | -2.92 | -2.25 | -3.30 | -2.70 | -1.77 | -3.73 | -2.20 | -2.14 | -2.48 | -2.59 | -1.87 | -2.59 | -2.19 | -1.75 | -2.17 | -2.79 | -1.81 | -2.4 | -2.4 | -1.7 | -2.9 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.38 | 9.02 | 9.14 | 9.30 | 9.52 | 9.04 | 9.47 | 8.80 | 8.87 | 9.82 | 8.90 | 9.12 | 9.31 | 9.21 | 8.97 | 9.23 | 9.13 | 8.83 | 8.98 | 9.48 | 8.95 | 9.3 | 9.3 | 8.8 | 9.6 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.63 | 9.34 | 9.46 | 9.62 | 9.84 | 9.36 | 9.79 | 9.12 | 9.19 | 10.10 | 9.15 | 9.44 | 9.63 | 9.53 | 9.29 | 9.55 | 9.45 | 9.15 | 9.30 | 9.80 | 9.27 | 9.7 | 9.6 | 9.1 | 10.0 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | ug/L | 5 | 5 | -- | 5 - 100 | | -- | 218 | 227 | 252 | 107 | 447 | 31 | 1,400 | 46 | 109 | 53 | -- | 66 | 1,470 | -- | -- | 61 | 978 | 29 | 231 | 24 | -- | 84.0 | 310 | **169.0** |
| Total Antimony (Sb) | ug/L | 2 | 20 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Arsenic (As) | ug/L | 2 | 5 | -- | 5 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Barium (Ba) | ug/L | 5 | 1,000 | -- | -- | | -- | 225 | 201 | 116 | 133 | 134 | 119 | 185 | 157 | 80 | 150 | -- | 111 | 127 | -- | -- | 132 | -- | 111 | 110 | 143 | -- | 135.0 | 184.0 | 63.0 |
| Total Beryllium (Be) | ug/L | 2 | 5 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Bismuth (Bi) | ug/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Boron (B) | ug/L | 5 | 1,200 | -- | 1,500 | | -- | 11 | 17 | 22 | 10 | 22 | 18 | 22 | 20 | 21 | <50 | -- | 9 | 14 | -- | -- | <5 | -- | 19 | 9 | 16 | -- | 11.0 | 16.0 | 10.0 |
| Total Cadmium (Cd) | ug/L | 0.017 | 0.010 | -- | 0.090 | | -- | 0.538 | 0.171 | 0.168 | 0.300 | 0.236 | 0.148 | 0.171 | 0.031 | 0.079 | 0.150 | -- | 0.176 | 0.426 | -- | -- | 0.069 | -- | 0.052 | 0.14 | <0.09 | -- | 0.1 | <0.09 | <0.09 |
| Total Chromium (Cr) | ug/L | 1 | 1 | -- | 1 | | -- | <1 | <1 | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | 3 | -- | -- | <1 | -- | 1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Cobalt (Co) | ug/L | 1 | 10 | -- | -- | | -- | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | 2 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Copper (Cu) | ug/L | 1 | 2 | -- | 2 | | 3 | <2 | 3 | 16 | 2 | 6 | 2 | 2 | <1 | 4 | 2 | 3 | 3 | 10 | <1 | 3 | <1 | 14 | 3 | 4 | 2 | 5.0 | 3.0 | 2.0 | 4.0 |
| Total Iron (Fe) | ug/L | 50 | 300 | -- | 300 | | 2,150 | 347 | 1,320 | 500 | 194 | 890 | 157 | 2,000 | 207 | 229 | 170 | 671 | 171 | 1,940 | 374 | 223 | <50 | 3,540 | 289 | 494 | 1090 | 206.0 | 290.0 | 568.0 | **313.0** |
| Total Lead (Pb) | ug/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | -- | 0.8 | 0.7 | 1.0 | <0.5 | 1.4 | <0.5 | 1.8 | <0.5 | <0.5 | <0.5 | -- | <0.5 | 3.4 | -- | -- | <0.5 | -- | <0.5 | 1.3 | <0.5 | -- | <0.5 | <0.5 | 0.8 |
| Total Manganese (Mn) | ug/L | 2 | 820 | -- | -- | | 129 | 182 | 485 | 120 | 87 | 89 | 26 | 71 | 182 | 36 | 110 | 371 | 61 | 444 | 148 | 35 | 77 | 1,870 | 91 | 91 | 240 | 40.0 | 51.0 | 66.0 | 33.0 |
| Total Molybdenum (Mo) | ug/L | 2 | 73 | -- | 73 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Nickel (Ni) | ug/L | 2 | 25 | -- | 25 - 150 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | 3 | <2 | <2 | <2.0 | -- | <2 | 3 | -- | -- | <2 | -- | <2 | <2 | 2 | -- | 10.0 | <2 | 3.0 |
| Total Selenium (Se) | ug/L | 1 | 1 | -- | 1 | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Silver (Ag) | ug/L | 0.1 | 0.1 | -- | 0.3 | | -- | <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 | <0.1 | <0.1 |
| Total Strontium (Sr) | ug/L | 5 | 21,000 | -- | -- | | -- | 112 | 94 | 60 | 93 | 90 | 96 | 116 | 111 | 54 | 120 | -- | 43 | 89 | -- | -- | 104 | -- | 111 | 56 | 115 | -- | 107.0 | 134.0 | 58.0 |
| Total Thallium (Tl) | ug/L | 0.1 | 0.8 | -- | 0.8 | | -- | <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 | <0.1 | <0.1 |
| Total Tin (Sn) | ug/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Titanium (Ti) | ug/L | 2 | -- | -- | -- | | -- | 4 | 3 | 7 | 3 | 11 | 2 | 22 | <2 | 3 | <2 | -- | <2 | 31 | 4 | -- | <2 | <2 | <2 | 6 | 2 | -- | <2 | <2 | 4.0 |
| Total Uranium (U) | ug/L | 0.1 | 300.0 | -- | 15.0 | | -- | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | 0.2 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 |
| Total Vanadium (V) | ug/L | 2 | 6 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | 4 | -- | -- | 3 | -- | <2 | 2 | <2 | -- | 5.0 | <2 | 2.0 |
| Total Zinc (Zn) | ug/L | 5 | 30 | -- | 30 | | 9 | 79 | 92 | 39 | 57 | 49 | 26 | 17 | 8 | 23 | 27 | 17 | 16 | 64 | 7 | 52 | 21 | 120 | 22 | 41 | 13 | 38.0 | 27.0 | 8.0 | 23.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | -- | >2420 | >2420 | 2,420 | 866 | >2420 | 866 | >2420 | 961 | >2420 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | 488 | >2420 | 1,990 | 210 | 5020 | 330.0 | 540.0 | NDOGT | 984.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | <100 | <1 | 2 | 19 | 3 | 86 | <1 | <1 | 7 | 1,730 | <10 | 19 | 6 | <1 | 40 | 50 | 6 | 51 | 4 | <1 | 20 | 30.0 | <10 | 26.0 | 8.0 |
| Chlorophyll A - Spectrophotometer | ug/L | 0.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | <0.25 |
| Chlorophyll A - Acidification method | ug/L | 0.05 | -- | -- | -- | | 1.99 | 2.44 | 32.52 | 1.80 | 1.54 | 2.30 | 0.12 | 99.13 | 2.54 | 0.96 | 0.69 | 3.14 | 4.94 | 5.43 | 4.57 | 1.55 | 25.83 | 21.03 | 2.47 | 78.76 | 5.50 | 2.39 | 4.19 | 6.38 | |
| Chlorophyll A - Welschmeyer method | ug/L | 0.05 | -- | -- | -- | | 2.08 | 2.71 | 31.31 | 2.15 | 1.77 | 2.50 | 0.11 | 98.00 | 2.51 | 0.96 | 0.68 | 3.10 | 2.71 | 6.73 | 5.23 | 1.61 | 31.14 | 24.37 | 2.85 | 131.56 | -- | * | 4.24 | 6.19 | |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.

**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

| | |
|---|---|
| **Bold (black shaded)** | = Present Result - Parameter concentration exceeds CCME FWAL Guideline. |
| Underlined (black shaded) | = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality |
| Blue shaded | = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality |

## TABLE B2: Historical Data - Bedford West Water Quality Sampling Program

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Paper Mill Lake | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | PML1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/10/11 | 2013/05/15 | 2013/08/15 | 2013/10/16 | 2014/05/15 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/08 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 | 2019/11/08 | 2009/06/29 |
| Sampling Time | hh:mm | -- | | | | | 13:45 | 13:00 | 13:00 | 13:35 | 15:15 | 13:00 | 13:00 | 16:50 | 17:00 | 12:50 | 10:55 | 10:51 | 11:35 | 10:45 | 10:30 | 14:45 | 12:35 | 12:45 | 08:45 | 8:20 | 13:15 | 9:30 | 9:15 | 13:40 | 13:45 | 13:25 | 13:00 | 11:40 | 14:45 PM | 1:10PM | 4:20 PM | 2:45 PM | 13:15 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 3.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.9 | 2.7 | 4.2 | 3.8 | 4.1 | 4.7 | 3.9 | 4.1 | 2.4 | 2.9 | 1.9 | 4.30 | N/A | 2.8 |
| Water Temp | Celsius | -- | -- | -- | -- | | 15.7 | 17.1 | 16.2 | 13.2 | 22.7 | 9.1 | 10.3 | 22.1 | 13.6 | 8.3 | 14.9 | 11.6 | 22.5 | 12.3 | 12.1 | 23.6 | 12.4 | 15.1 | 24.0 | 9.3 | 12.8 | 21.6 | 12.1 | 17.2 | 23.0 | 14.4 | 14.4 | 24.7 | 12.3 | 12.0 | 28.1 | 11.1 | 14.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 10.6 | 8.1 | 6.9 | 8.8 | 7.8 | 10.4 | 10.4 | 8.2 | 9.5 | 8.4 | 8.6 | 10.0 | 7.7 | 9.9 | 12.1 | 7.5 | 8.1 | 7.2 | 8.0 | 8.6 | 8.8 | 6.5 | 13.0 | 7.0 | 7.8 | 8.2 | 9.4 | 5.6 | 8.4 | ** | 6.07 | 9.20 | 10.2 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.39 | 6.57 | 6.64 | 7.06 | 7.35 | 5.89 | 6.28 | 6.20 | 6.11 | 7.58 | 6.63 | 6.39 | 7.20 | 6.32 | 6.60 | 7.42 | 6.60 | 6.90 | 6.34 | 7.98 | 7.57 | 5.94 | 4.63 | 6.91 | 6.74 | 7.31 | 6.29 | 6.75 | 7.19 | 7.38 | 6.53 | 7.05 | 6.36 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 561.0 | 279.0 | 223.0 | 265.0 | 234.0 | 124.5 | 176.6 | 173.6 | 105.5 | 366.0 | 186.4 | 215.1 | 199.0 | 250.5 | 431.0 | 263.0 | 210.0 | 0.2 | 432.1 | 289.1 | 231.0 | 289.0 | 234.3 | 234.0 | 273.0 | 255.0 | 203.7 | 203.8 | 208.1 | 177.9 | 257.0 | 201.0 | 267.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 | <5 | 8 | 7 | <5 | 13 | 9 | <5 | 10 | 8.0 | <5 | 11.0 | 6.0 | 5 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 39 | 64 | 58 | 67 | 61 | 24 | 44 | 43 | 18 | 55 | 45 | 57 | 57 | 48 | 63 | 50 | 46 | 65 | 57 | 56 | 59 | 67 | 50 | 66 | 63 | 59 | 57 | 54 | 47 | 55 | 64 | 53 | 63 |
| Colour | TCU | 5 | -- | -- | -- | | 54 | 15 | 21 | 19 | 12 | 57 | 32 | 38 | 65 | 38 | 29 | 8 | 15 | 11 | 17 | 10 | 30 | 31 | 7 | 15 | 18 | 16 | 20 | 20 | 18 | 24 | 28 | 7 | 31 | 46 | 16 | 21 | 22 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.49 | 0.10 | 0.17 | 0.42 | 0.27 | 0.66 | 0.55 | 0.15 | 0.62 | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 | 0.19 | 0.09 | 0.16 | 0.28 | 0.28 | 0.20 | 0.51 | 0.15 | 0.2 | 0.2 | 0.05 | 0.49 | 0.14 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.49 | -- | -- | 0.42 | 0.27 | -- | 0.55 | -- | -- | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 | 0.19 | <0.05 | 0.16 | 0.17 | 0.13 | 0.20 | 0.40 | 0.05 | 0.2 | 0.2 | 0.05 | 0.49 | 0.14 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.09 | <0.05 | 0.11 | 0.15 | <0.05 | 0.11 | 0.10 | <0.05 | <0.05 | <0.05 | <0.05 | <0.01 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.06 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | <0.03 | <0.03 | <0.050 | <0.03 | 0.03 | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | 0.05 | <0.03 | 0.04 | <0.03 | <0.03 | 0.10 | 0.08 | <0.05 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 0.4 | -- | 0.4 | 0.8 | 0.4 | 0.4 | <5 | 0.5 | 1.2 | 6.0 | 2.6 | 3.4 | 0.4 | 0.5 | 0.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.6 | <0.4 | 0.70 | -- |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 6.5 | 3.6 | 4.7 | 0.7 | 3.3 | 6.7 | 4.6 | 5.0 | 8.3 | 5.7 | 5.3 | 4.2 | 4.1 | 5.1 | 4.0 | 2.0 | 4.4 | 2.7 | 5.4 | 5.8 | 7.1 | 6.1 | 8.7 | 5.7 | 4.7 | 6.3 | 4.9 | 3.2 | 4.0 | 4.2 | 4.20 | 4.40 | 3.6 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.36 | 6.75 | 6.79 | 6.63 | 7.04 | 6.58 | 6.54 | 6.83 | 6.67 | 6.60 | 6.80 | 6.71 | 6.92 | 6.88 | 6.66 | 7.00 | 6.64 | 6.67 | 6.95 | 6.84 | 6.36 | 6.86 | 6.87 | 6.80 | 7.15 | 6.75 | 6.84 | 7.28 | 7.16 | 6.78 | 7.22 | 6.85 | 6.50 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 4.5 | 6.9 | 6.4 | 8.4 | 9.0 | 5.9 | 6.0 | 5.0 | 4.6 | 6.0 | 6.0 | 6.8 | 6.6 | 6.9 | 6.9 | 9.1 | 7.0 | 6,900.0 | 7.8 | 4.8 | 7.9 | 10.5 | 7.6 | 8.0 | 8.2 | 9.5 | 6.3 | 8.7 | 8.4 | 7.0 | 8.3 | 5.3 | 6.1 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.6 | 1.1 | 1.0 | 1.3 | 1.2 | 0.8 | 1.0 | 0.9 | 0.8 | 1.0 | 1.1 | 1.0 | 0.9 | 1.5 | 1.3 | 1.4 | 1.0 | 970.0 | 1.4 | 0.9 | 1.5 | 1.8 | 1.3 | 1.3 | 1.2 | 1.5 | 1.1 | 1.4 | 1.4 | 1.2 | 1.3 | 0.9 | 1.1 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | 0.002 | 0.018 | 0.002 | <0.002 | 0.014 | 0.011 | 0.030 | 0.019 | 0.030 | 0.006 | 0.007 | 0.047 | 0.012 | 0.030 | 0.021 | 0.005 | 0.060 | 0.018 | 0.173 | 0.104 | 0.013 | 0.041 | 0.036 | 0.099 | 0.032 | 0.011 | 0.012 | 0.007 | 0.008 | **0.012** | <0.02 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 0.9 | 0.9 | 1.2 | 1.1 | 1.3 | 1.2 | 0.8 | 1.4 | 0.8 | 1.0 | 0.8 | 1.0 | 1.5 | 0.9 | 1.3 | 0.9 | 800.0 | 1.0 | 0.6 | 1.0 | 1.3 | 1.1 | 1.0 | 1.1 | 1.3 | 0.9 | 1.2 | 1.1 | 0.9 | 1.2 | 0.8 | 0.9 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 25.0 | 38.0 | 34.0 | 35.2 | 40.2 | 18.4 | 26.8 | 22.8 | 13.7 | 33.6 | 29.8 | 35.3 | 28.5 | 32.2 | 38.1 | 41.6 | 33.7 | 35.0 | 38.6 | 25.6 | 37.6 | 35.1 | 32.1 | 40.9 | 45.3 | 36.0 | 35.5 | 37.5 | 39.2 | 42.6 | 45.4 | 27.8 | 35.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 4.5 | 2.6 | 2.8 | 3.8 | 3.4 | 5.9 | 3.7 | 2.6 | 5.4 | 2.9 | 3.2 | 2.8 | 2.6 | 2.6 | 2.5 | 2.3 | 2.7 | 2.4 | 2.4 | 2.5 | 2.5 | 0.8 | 2.7 | 1.9 | 1.3 | 1.8 | 2.7 | 1.2 | 2.3 | 2.3 | 0.9 | 2.5 | 2.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <2 | 3 | 9 | 7 | <2 | <1 | 1 | <2 | 5 | 9 | 6 | <5 | <5 | 23 | 6 | <5 | <5 | 1 | 149 | 6 | 531 | 10 | 18 | 20 | 5 | 104 | <5 | <5 | <5 | <5 | <5 | <5 | 2 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 13 | 11 | 11 | 13 | 12 | 12 | 12 | 10 | 12 | 7 | 10 | 8 | 10 | 10 | 10 | 8 | 8 | 8 | 9 | 8 | 11 | 11 | 11 | 10 | 9 | 11 | 9 | 7.0 | 9.0 | 7.0 | 9.0 | 10.0 | 11 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.4 | 0.5 | 0.6 | 8.2 | 0.9 | 0.5 | 0.6 | 1.0 | 1.2 | 0.7 | 1.0 | 0.7 | 1.1 | 19.2 | 1.4 | 0.9 | 1.5 | 0.5 | 3.8 | 24.2 | 199.0 | 112.0 | 2.6 | 3.3 | 3.2 | 31.3 | 0.7 | 0.5 | 2.1 | 1.2 | 1.2 | 1.7 | 0.8 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 170 | 250 | 230 | 260 | 250 | 130 | 180 | 170 | 100 | 214 | 179 | 227 | 218 | 209 | 230 | 261 | 224 | 240 | 246 | 241 | 224 | 310 | 189 | 256 | 277 | 248 | 242 | 274 | 232 | 256 | 264 | 156 | 240 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.51 | 2.18 | 1.99 | 2.34 | 2.15 | 1.09 | 1.62 | 1.56 | 0.92 | 2.11 | 1.49 | 1.79 | 1.95 | 1.71 | 2.62 | 1.73 | 1.62 | 2.11 | 1.93 | 1.88 | 1.91 | 2.29 | 1.79 | 2.09 | 2.24 | 2.09 | 1.83 | 1.88 | 1.7 | 1.7 | 2.2 | 1.9 | 2.11 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 | <5 | 8 | 7 | <5 | 13 | 9 | <5 | 10 | 8.0 | <5 | 11.0 | 6.0 | 5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 93 | 129 | 118 | 137 | 134 | 75 | 100 | 90 | 63 | 117 | 95 | 110 | 109 | 115 | 140 | 117 | 102 | 120 | 126 | 109 | 141 | 148 | 108 | 129 | 137 | 142 | 112 | 117 | 112.0 | 115.0 | 136.0 | 104.0 | 123 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.40 | 2.11 | 1.89 | 2.11 | 2.33 | 1.20 | 1.58 | 1.35 | 0.95 | 1.89 | 1.78 | 2.00 | 1.69 | 2.56 | 2.18 | 2.45 | 1.94 | 1.98 | 2.61 | 1.93 | 3.54 | 3.33 | 1.93 | 2.35 | 2.53 | 3.15 | 1.99 | 2.23 | 2.3 | 2.4 | 2.6 | 1.6 | 1.94 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 14.00 | 22.00 | 20.00 | 26.00 | 28.00 | 18.00 | 19.00 | 16.00 | 15.00 | 19.10 | 19.50 | 21.10 | 20.20 | 23.40 | 22.60 | 28.50 | 21.60 | 21.00 | 25.20 | 15.70 | 25.90 | 33.60 | 24.30 | 25.30 | 25.40 | 29.90 | 20.3 | 27.5 | 26.7 | 22.4 | 26.1 | 16.9 | 20.00 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 3.78 | 1.63 | 2.58 | 5.17 | 4.02 | 4.80 | 1.25 | 7.22 | 1.60 | 5.50 | 9.00 | 5.50 | 7.00 | 19.80 | 9.20 | 17.00 | 9.20 | 3.18 | 15.20 | 1.20 | 30.00 | 18.60 | 3.80 | 5.80 | 6.10 | 20.30 | 4.2 | 8.4 | 14.9 | 15.7 | 6.9 | 7.7 | 4.20 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.57 | -2.90 | -2.94 | -2.96 | -2.43 | -3.25 | -3.27 | -2.94 | -3.13 | -2.91 | -3.31 | -3.35 | -3.07 | -3.03 | -2.61 | -2.79 | -3.26 | -3.13 | -2.98 | -3.29 | -3.65 | -2.82 | -2.99 | -3.20 | -2.42 | -2.92 | -3.26 | -2.37 | -2.6 | -3.3 | -2.4 | -3.2 | -3.33 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.82 | -3.15 | -3.19 | -3.21 | -2.68 | -3.50 | -3.53 | -3.19 | -3.38 | -3.23 | -3.63 | -3.67 | -3.39 | -3.35 | -2.93 | -3.11 | -3.58 | -3.38 | -3.30 | -3.61 | -3.97 | -3.14 | -3.31 | -3.52 | -2.74 | -3.24 | -3.58 | -2.69 | -2.9 | -3.6 | -2.7 | -3.6 | -3.59 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.93 | 9.65 | 9.73 | 9.59 | 9.47 | 9.83 | 9.81 | 9.77 | 9.80 | 9.51 | 10.10 | 10.10 | 9.99 | 9.91 | 9.27 | 9.79 | 9.90 | 9.80 | 9.93 | 10.10 | 10.00 | 9.68 | 9.86 | 10.00 | 9.57 | 9.67 | 10.1 | 9.65 | 9.8 | 10.1 | 9.6 | 10.1 | 9.83 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.20 | 9.90 | 9.98 | 9.84 | 9.72 | 10.10 | 10.10 | 10.00 | 10.10 | 9.83 | 10.40 | 10.40 | 10.30 | 10.20 | 9.59 | 10.10 | 10.20 | 10.10 | 10.20 | 10.50 | 10.30 | 10.00 | 10.20 | 10.30 | 9.89 | 9.99 | 10.4 | 9.97 | 10.1 | 10.4 | 10.0 | 10.4 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | 260 | -- | -- | 665 | 46 | -- | 233 | -- | -- | 177 | 306 | 141 | 103 | 3,920 | 305 | 129 | 142 | 140 | -- | 2,320 | 7,690 | -- | -- | 250 | 94 | 4,190 | 151 | 26 | -- | 139.0 | 25 | **133.0** | 130 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | 2 | <2 | <2 | <2 | <1.0 | -- | <2 | 4 | -- | -- | <2 | -- | 3 | <2 | <2 | -- | <2 | <2 | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 23 | -- | -- | 35 | 24 | -- | 27 | -- | -- | 22 | 19 | 20 | 12 | 40 | 23 | 23 | 18 | 21 | -- | 34 | 60 | -- | -- | 22 | -- | 58 | 19 | 12 | -- | 21.0 | 16.0 | 17.0 | 16 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | 8 | -- | -- | 11 | 9 | -- | <50 | -- | -- | 6 | 9 | 6 | 8 | 9 | 8 | 13 | 11 | <50 | -- | <5 | 10 | -- | -- | <5 | -- | 12 | 6 | 11 | -- | 7.0 | 10.0 | 7.0 | 5 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | 0.032 | <0.017 | -- | <0.017 | -- | -- | <0.017 | 0.066 | 0.021 | 0.018 | 0.430 | <0.017 | 0.020 | <0.017 | 0.025 | -- | 0.146 | 0.227 | -- | -- | 0.041 | -- | 0.179 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.300 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | 3 | <1 | <1 | <1 | <1.0 | -- | 2 | 6 | -- | -- | <1 | -- | 5 | <1 | <1 | -- | <1 | <1 | <1 | <2 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- | <1 | 2 | <1 | <1 | 9 | <1 | <1 | <1 | <0.40 | -- | 3 | 6 | -- | -- | <1 | -- | 6 | <1 | <1 | -- | <1 | <1 | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | 2 | <2.0 | <2.0 | 4 | <2.0 | 2 | <2 | <2 | <2 | 1 | 6 | 1 | <1 | 2 | <2.0 | 3 | 4 | 10 | <1 | <1 | <1 | <1 | 8 | <1 | <1 | 1.0 | 1.0 | <1 | 1.0 | <2 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 140 | -- | -- | 837 | 89 | 161 | 141 | 315 | 528 | 137 | 742 | 130 | 205 | 5,300 | 239 | 296 | 182 | 93 | 4,460 | 6,020 | 13,600 | 8,250 | 171 | 206 | 359 | 12,600 | 93 | 184 | 82.0 | 136.0 | 187.0 | 108.0 | 100 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | 1.7 | <0.5 | -- | <0.5 | -- | -- | <0.5 | 0.9 | <0.5 | <0.5 | 13.5 | 0.9 | <0.5 | <0.5 | <0.5 | -- | 6.3 | 13.9 | -- | -- | <0.5 | -- | 9.1 | 1.2 | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 17 | -- | -- | 142 | 69 | 41 | 14 | 128 | 62 | 48 | 214 | 33 | 58 | 693 | 54 | 260 | 49 | 34 | 296 | 278 | 424 | 281 | 53 | 64 | 125 | 894 | 21 | 64 | 22.0 | 26.0 | 115.0 | 28.0 | 58 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | 2 | <2 | <2 | 9 | <2 | <2 | <2 | <2.0 | -- | 5 | 7 | -- | -- | 22 | -- | 6 | 2 | <2 | -- | 5.0 | 2.0 | <2 | 2 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | 1 | 1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <2 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.5 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 18 | -- | -- | 36 | 37 | -- | 25 | -- | -- | 26 | 30 | 31 | 25 | 34 | 35 | 37 | 30 | 32 | -- | 22 | 40 | -- | -- | 34 | -- | 47 | 27 | 42 | -- | 35.0 | 37.0 | 30.0 | 30 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | 8 | <2.0 | -- | 4 | -- | -- | <2 | 4 | <2 | <2 | 65 | 4 | <2 | 3 | <2 | -- | 25 | 106 | -- | -- | 2 | -- | 75 | <2 | <2 | -- | <2 | <2 | 2.0 | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | 0.1 | <0.1 | <0.1 | <0.1 | 0.6 | <0.1 | <0.1 | <0.1 | <0.1 | -- | 0.6 | 0.9 | -- | -- | <0.1 | -- | 0.6 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | 10 | <2 | <2 | <2 | <2 | -- | 7 | 16 | -- | -- | <2 | -- | 12 | <2 | <2 | -- | 2.0 | <2 | <2 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 8 | -- | -- | 10 | 5 | 6 | 6 | 6 | 5 | <5 | 13 | 8 | <5 | 62 | <5 | <5 | 6 | 11 | 13 | 12 | 34 | 20 | <5 | 11 | <5 | 29 | 6 | 6 | <5 | 7.0 | <5 | <5 | 12 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 200 | 73 | -- | >250 | >250 | >250 | 85 | >250 | -- | 411 | 2,420 | 866 | 1,730 | 1,011 | 613 | 2,420 | >2420 | --- | >2420 | >2420 | >2420 | 1,410 | >2420 | 665 | >2420 | 166 | 9 | 400 | 4,000.0 | 128 | 500 | 864 | 49 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 33 | 45 | -- | 19 | >250 | 2 | 2 | 34 | <100 | 2 | 20 | 12 | 4 | 6 | 6 | 10 | 10 | <10 | 3 | 6 | >2420 | 34 | 10 | 6 | 2 | <1 | 1 | 10 | 13.0 | <1 | 4 | 14 | 10 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.32 | |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.62 | 2.31 | 0.57 | 0.82 | 1.12 | 0.07 | 2.85 | 0.86 | 0.15 | 1.03 | 0.69 | 1.17 | 1.10 | 5.07 | 0.67 | 0.64 | 0.91 | 0.57 | 8.84 | 4.67 | 8.00 | 4.71 | 1.70 | 4.97 | 4.40 | 4.86 | 1.93 | 1.14 | 1.12 | 1.53 | 1.84 | | 1.15 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.64 | 2.21 | 0.64 | 0.74 | 1.04 | 0.06 | 2.75 | 0.76 | 0.15 | 1.10 | 0.91 | 1.37 | 1.10 | 6.39 | 0.65 | 0.65 | 0.87 | 0.54 | 9.54 | 3.69 | 12.31 | 10.82 | 1.76 | 6.45 | 4.96 | 6.58 | 0.98 | -- | * | 1.44 | 1.56 | | 1.22 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.

**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009) (Referenced)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black sha** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (bla = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

Blue shaded = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

## TABLE B2: Historical Data - Bedford West Water Quality Sampling Program

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Paper Mill Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | PML2 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2013/05/15 | 2013/10/16 | 2014/05/15 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 | 2018/05/09 | 2018/08/17 | 2018/10/17 | 05/09/2019 | 08-20-19 | 2019/11/08 |
| Sampling Time | hh:mm | -- | | | | | 13:40 | 13:45 | 14:30 | 16:20 | 13:00 | 12:40 | 16:20 | 16:15 | 13:16 | 13:40 | 11:20 | 11:00 | 9:20 | 8:30 | 11:30 | 13:45 | 9:08 | 13:45 | 10:00 | 9:50 | 14:30 | 14:30 | 14:00 | 13:30 | 12:10 | 14:15 PM | 12:50PM | 3:40 PM | 3:15 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 2.2 | 2.3 | N/A | 3.0 | 2.0 | 2.2 | 2.3 | 2.2 | 2.4 | 3.2 | N/A | N/A | N/A | 3.1 | NCC | N/A | 2.4 | 2.7 | 2.3 | 2.6 | 2.5 | 2.5 | 2.9 | 2.9 | 3.0 | 2.2 | 2.4 | 2.20 | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 24.2 | 19.7 | 17.8 | 25.3 | 10.1 | 10.9 | 23.1 | 15.2 | 11.6 | 14.8 | 12.6 | 14.4 | 21.1 | 12.1 | 15.1 | 27.0 | 9.0 | 13.8 | 22.1 | 11.8 | 17.1 | 24.0 | 14.0 | 15.3 | 5.4 | 12.2 | 12.7 | 27.4 | 11.3 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 8.3 | 8.4 | 8.8 | 8.1 | 10.6 | 9.9 | 8.7 | 8.9 | 7.8 | 9.3 | 8.9 | 12.4 | 7.0 | 7.9 | 8.1 | 9.8 | 8.3 | 8.6 | 7.7 | 10.3 | 10.4 | 8.9 | 6.6 | 9.8 | 7.0 | 8.7 | ** | 6.06 | 9.80 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.82 | 6.84 | 7.09 | 7.39 | 6.53 | 6.31 | 6.67 | 6.13 | 8.61 | 6.49 | 6.13 | 6.50 | 7.22 | 5.92 | 6.56 | 6.76 | 7.25 | 7.57 | 5.93 | 5.37 | 6.73 | 7.01 | 6.87 | 6.33 | 24.70 | 7.00 | 6.76 | 6.39 | 7.40 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 264.0 | 241.0 | 237.0 | 234.0 | 200.5 | 158.7 | 173.2 | 155.9 | 231.0 | 234.0 | 250.5 | 966.0 | 266.0 | 215.0 | 0.2 | 255.6 | 454.9 | 264.0 | 298.0 | 230.3 | 242.0 | 285.0 | 252.0 | 214.4 | 293.8 | 297.3 | 6.1 | 239.0 | 193.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 7 | 7 | 6 | 8 | 7 | <5 | 8 | 7 | 21 | <5 | 8 | 32 | 10 | 26 | <5.0 | 5 | 7 | 7 | 10 | 8 | 5 | 12 | 11 | 5 | 11 | 8.0 | <5 | 11.0 | 8.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 63 | 58 | 62 | 58 | 50 | 44 | 43 | 34 | 55 | 63 | 64 | 245 | 50 | 42 | 69 | 59 | 57 | 67 | 67 | 50 | 67 | 72 | 60 | 46 | 55 | 43 | 50 | 64 | 64 |
| Colour | TCU | 5 | -- | -- | -- | | 17 | 19 | 20 | 13 | 23 | 35 | 38 | 48 | 39 | 18 | 8 | 6 | 7 | 31 | 26 | 10 | 9 | 22 | 13 | 22 | 18 | 7 | 19 | 31 | 21 | 21 | 43 | 14 | 19 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.07 | 0.09 | 0.19 | 0.11 | 0.23 | 0.33 | 0.14 | 0.22 | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.32 | 0.23 | 0.10 | 0.11 | 0.18 | 0.27 | 0.07 | 0.16 | 0.17 | 0.13 | 0.2 | 0.14 | 0.07 | 0.38 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | -- | -- | 0.19 | 0.11 | -- | 0.33 | -- | -- | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.17 | 0.23 | 0.10 | <0.05 | 0.18 | 0.16 | 0.07 | 0.16 | 0.17 | <0.05 | 0.2 | 0.14 | 0.07 | 0.38 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | 0.15 | <0.05 | <0.05 | 0.11 | <0.05 | 0.11 | <0.05 | <0.05 | <0.05 | 0.13 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.03 | 0.23 | 0.05 | 0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | 0.05 | 0.06 | 0.08 | 0.06 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | -- | 1.7 | <0.4 | 0.4 | <5 | 0.2 | 1.2 | 3.0 | 0.6 | <0.4 | 0.5 | 0.6 | 0.6 | <0.4 | <0.4 | <0.4 | <0.4 | 1.3 | <0.4 | 1.90 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.6 | 4.5 | 3.2 | 3.4 | 3.6 | 4.0 | 6.0 | 5.6 | 5.9 | 4.4 | 4.0 | 2.7 | 2.4 | 5.8 | 2.8 | 6.0 | 6.1 | 4.0 | 3.6 | 8.3 | 5.5 | 5.4 | 4.1 | 4.9 | 3.5 | 4.0 | 4.3 | 4.40 | 4.50 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.81 | 6.82 | 6.66 | 7.02 | 6.83 | 6.17 | 6.60 | 6.60 | 6.60 | 6.68 | 6.73 | 7.13 | 7.04 | 6.77 | 6.64 | 6.98 | 6.98 | 6.83 | 7.21 | 6.93 | 6.86 | 7.23 | 6.99 | 6.81 | 7.29 | 7.05 | 6.78 | 7.20 | 6.89 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 7.1 | 6.1 | 7.2 | 7.7 | 8.0 | 5.3 | 4.8 | 5.0 | 6.1 | 6.7 | 7.7 | 19.2 | 8.8 | 6.9 | 7,300.0 | 8.2 | 6.2 | 8.9 | 8.1 | 7.4 | 8.1 | 8.5 | 8.1 | 6.7 | 8.1 | 7.7 | 7.1 | 9.1 | 5.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.1 | 1.3 | 1.2 | 1.2 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 1.4 | 1.7 | 1.4 | 1.0 | 1,000.0 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.3 | 1.1 | 1.2 | 1.1 | 1.2 | 1.1 | 1.2 | 1.4 | 0.9 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | 0.002 | 0.010 | 0.002 | <0.002 | 0.009 | 0.009 | 0.007 | 0.025 | 0.006 | 0.026 | 0.011 | 0.026 | 0.018 | 0.008 | 0.012 | 0.008 | 0.012 | 0.003 | 0.005 | 0.018 | 0.013 | 0.006 | 0.047 | 0.005 | 0.012 | 0.008 | 0.005 | 0.008 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.0 | 0.9 | 1.0 | 0.9 | 1.0 | 0.9 | 0.8 | 1.0 | 0.8 | 0.8 | 1.3 | 1.4 | 1.2 | 1.1 | 830.0 | 1.0 | 0.9 | 1.0 | 1.0 | 1.1 | 0.9 | 1.4 | 1.1 | 0.9 | 1.1 | 1.1 | 0.9 | 1.2 | 0.8 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 40.0 | 34.0 | 31.1 | 35.1 | 30.8 | 25.7 | 21.3 | 20.9 | 34.6 | 37.5 | 42.0 | 133.0 | 42.6 | 33.9 | 38.0 | 43.3 | 31.3 | 42.9 | 37.5 | 32.1 | 41.5 | 47.2 | 35.5 | 37.5 | 37.7 | 39.6 | 42.9 | 46.7 | 29.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.3 | 2.6 | 2.3 | 3.3 | 2.9 | 2.5 | 3.0 | 2.8 | 2.7 | 4.2 | 2.4 | 2.3 | 2.9 | 1.9 | 1.8 | 2.8 | 2.3 | 0.6 | 2.6 | 1.7 | 0.8 | 2.0 | 2.5 | 1.0 | 2.3 | 2.0 | 0.9 | 2.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 3 | <1 | 15 | <2 | 11 | <1 | 8 | <1 | <5 | <5 | <5 | 16 | <5 | <5 | 1 | <5 | <5 | 45 | <5 | <5 | <5 | 14 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 11 | 10 | 10 | 10 | 9 | 10 | 9 | 7 | 9 | 11 | 27 | 7 | 7 | 8 | 9 | 9 | 12 | 7 | 10 | 10 | 8 | 11 | 7 | 7.0 | 8.0 | 7 | 9.0 | 11.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 0.6 | 1.0 | 0.8 | 0.4 | 0.4 | 0.4 | 0.5 | 0.7 | 1.0 | 3.3 | 2.6 | 0.7 | 1.0 | 0.9 | 1.9 | 1.3 | 9.4 | 1.1 | 1.4 | 1.9 | 1.9 | 1.8 | 1.4 | 0.7 | 1.2 | 1.0 | 1.2 | 2.2 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 250 | 230 | 230 | 230 | 210 | 170 | 170 | 150 | 213 | 254 | 277 | 777 | 273 | 212 | 260 | 251 | 246 | 263 | 319 | 190 | 259 | 286 | 255 | 249 | 289 | 227 | 261 | 268 | 189 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.17 | 1.99 | 2.07 | 2.01 | 1.77 | 1.46 | 1.58 | 1.30 | 2.13 | 1.98 | 2.19 | 8.12 | 1.77 | 1.86 | 2.13 | 1.97 | 1.95 | 2.29 | 2.24 | 1.79 | 2.22 | 2.44 | 2.15 | 1.56 | 1.93 | 1.6 | 1.57 | 2.2 | 2.2 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 7 | 7 | 6 | 8 | 7 | <1 | 8 | 7 | 21 | <5 | 8 | 32 | 10 | 26 | <1.0 | 5 | 7 | 7 | 10 | 8 | 5 | 12 | 11 | 5 | 11 | 8.0 | <5 | 11.0 | 8.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 131 | 117 | 120 | 120 | 110 | 91 | 89 | 79 | 119 | 119 | 137 | 448 | 118 | 109 | 130 | 127 | 112 | 139 | 129 | 108 | 133 | 146 | 124 | 103 | 118 | 107.0 | 110 | 139.0 | 119.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.23 | 1.88 | 1.88 | 2.03 | 1.86 | 1.48 | 1.28 | 1.27 | 1.94 | 2.09 | 2.55 | 6.96 | 2.47 | 1.95 | 2.14 | 2.44 | 1.84 | 2.53 | 2.17 | 1.92 | 2.37 | 2.62 | 2.09 | 2.10 | 2.19 | 2.3 | 2.37 | 2.7 | 1.7 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 20.00 | 23.00 | 24.00 | 25.00 | 17.00 | 15.00 | 16.00 | 19.30 | 20.80 | 25.00 | 54.90 | 27.70 | 21.30 | 23.00 | 25.80 | 20.40 | 27.20 | 25.20 | 23.80 | 25.60 | 25.80 | 25.20 | 21.3 | 25.2 | 24.6 | 22.70 | 28.5 | 17.7 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 1.36 | 2.84 | 4.81 | 0.50 | 2.48 | 0.68 | 10.50 | 1.17 | 4.80 | 2.80 | 7.50 | 7.70 | 16.50 | 2.20 | 0.23 | 10.60 | 3.00 | 5.10 | 1.70 | 3.40 | 3.20 | 3.50 | 1.60 | 14.9 | 6.4 | 18.7 | 20.40 | 9.0 | 13.6 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.83 | -2.93 | -3.06 | -2.55 | -2.80 | NC | -3.18 | -3.17 | -2.89 | -3.39 | -3.08 | -1.73 | -2.61 | -2.57 | NC | -3.00 | -2.97 | -2.98 | -2.46 | -2.89 | -3.13 | -2.37 | -2.66 | -3.25 | -2.35 | -2.8 | -3.26 | -2.4 | -3.1 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.08 | -3.18 | -3.31 | -2.80 | -3.05 | NC | -3.43 | -3.42 | -3.21 | -3.71 | -3.40 | -2.05 | -2.93 | -2.89 | NC | -3.32 | -3.29 | -3.30 | -2.78 | -3.21 | -3.45 | -2.69 | -2.98 | -3.57 | -2.67 | -3.1 | -3.58 | -2.7 | -3.4 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.64 | 9.75 | 9.72 | 9.57 | 9.63 | NC | 9.78 | 9.77 | 9.49 | 10.10 | 9.81 | 8.86 | 9.65 | 9.34 | NC | 9.98 | 9.95 | 9.81 | 9.69 | 9.82 | 9.99 | 9.60 | 9.65 | 10.1 | 9.64 | 9.8 | 10.00 | 9.6 | 9.9 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.89 | 10.00 | 9.97 | 9.82 | 9.88 | NC | 10.00 | 10.00 | 9.81 | 10.40 | 10.10 | 9.18 | 9.97 | 9.66 | NC | 10.30 | 10.30 | 10.10 | 10.00 | 10.10 | 10.30 | 9.92 | 9.97 | 10.4 | 9.96 | 10.1 | 10.40 | 9.9 | 10.3 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | -- | -- | 1,030 | 56 | -- | 202 | -- | -- | 189 | 131 | 107 | 181 | 52 | 122 | 130 | -- | 278 | 610 | -- | -- | 215 | 40 | 34 | 141 | 75 | -- | 134.0 | 27 | 2330 |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | -- | -- | 23 | 12 | -- | 23 | -- | -- | 22 | 22 | 37 | 50 | 27 | 19 | 25 | -- | 24 | 35 | -- | -- | 27 | -- | 23 | 21 | 8 | -- | 25.0 | 19.0 | 17.0 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | -- | -- | 8 | 9 | -- | <50 | -- | -- | 6 | 6 | 9 | 7 | 13 | 11 | <50 | -- | <5 | 8 | -- | -- | <5 | -- | 11 | 6 | 10 | -- | 6.0 | 11.0 | 6.0 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | -- | -- | 0.037 | <0.017 | -- | 0.028 | -- | -- | 0.023 | 0.039 | 0.060 | 0.062 | 0.019 | 0.018 | 0.023 | -- | 0.145 | 0.062 | -- | -- | <0.017 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- | <1 | <1 | 2 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | -- | -- | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 1,380 | 1 | <1 | 2 | <2.0 | 2 | 2 | <1 | <1 | 1 | <1 | <1 | 1 | <1 | <1 | 2.0 | <1 | 1.0 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | -- | -- | 1,090 | 151 | 76 | 143 | 699 | 181 | 178 | 181 | 1,760 | 264 | 316 | 134 | 170 | 334 | 368 | 647 | 174 | 123 | <50 | 203 | 145 | 104 | 163 | 165.0 | 128.0 | 258.0 | <50 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | -- | -- | 2.4 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 49.7 | 0.7 | <0.5 | <0.5 | <0.5 | -- | 0.5 | 3.1 | -- | -- | <0.5 | -- | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | -- | -- | 159 | 81 | 28 | 34 | 89 | 31 | 22 | 87 | 866 | 206 | 278 | 24 | 43 | 67 | 61 | 109 | 36 | 23 | 85 | 68 | 26 | 20 | 42 | 74.0 | 28.0 | 139.0 | 30.0 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2.0 | -- | 2 | <2 | -- | -- | 4 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | -- | -- | <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 | -- | <0.1 | <0.1 | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | -- | -- | 35 | 33 | -- | 26 | -- | -- | 27 | 31 | 35 | 68 | 37 | 29 | 34 | -- | 21 | 38 | -- | -- | 35 | -- | 39 | 29 | 38 | -- | 35.0 | 42.0 | 27.0 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | -- | -- | <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 | <0.1 | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | -- | -- | 21 | <2 | -- | 4 | -- | -- | <2 | <2 | 2 | 3 | <2 | <2 | 2 | -- | 4 | 7 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | -- | -- | 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 | <0.1 | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2.0 | <2 | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | -- | -- | 18 | <5.0 | 6 | 7 | 8 | 10 | 8 | 11 | 762 | <5 | <5 | 5 | 14 | <5 | 8 | 7 | <5 | <5 | 8 | 9 | 5 | 5 | <5 | 6.0 | 7.0 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 40 | -- | >250 | 46 | 97 | 64 | >250 | -- | 261 | 1,410 | 411 | 291 | 517 | >2420 | --- | >2420 | 1,120 | 687 | >2420 | >2420 | 1,990 | >2420 | 1,730 | 1 | 4000 | 3,030.0 | 106.0 | NDOGT | 1134 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 31 | -- | 69 | <1 | 6 | 17 | >210 | <100 | 1 | 12 | 2 | <1 | 3 | 16 | <0.10 | 5 | 2 | 4 | 47 | 30 | 1 | 11 | 5 | <1 | 1 | 30.0 | <1 | 3 | 20 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.47 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.36 | 0.59 | 3.50 | 1.54 | 0.53 | 0.55 | 2.48 | 1.33 | 0.76 | 1.18 | 0.25 | 0.99 | 0.48 | 0.72 | 1.67 | 4.79 | 1.50 | 3.82 | 1.09 | 2.02 | 5.31 | 4.30 | 1.27 | 1.37 | 1.28 | 1.78 | 1.58 | 1.62 | |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 1.33 | 0.66 | 3.39 | 1.51 | 0.42 | 0.51 | 2.26 | 1.13 | 0.76 | 1.34 | 0.27 | 1.13 | 0.44 | 0.70 | 1.56 | 4.59 | 0.74 | 5.04 | 1.42 | 2.12 | 6.60 | 4.23 | 1.47 | 2.22 | -- | * | 1.50 | 1.44 | |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME PAL-F Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME PAL-F Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.

**CCME PAL-F narrative for TSS: maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shad**
Underlined (blue
Blue shaded

# Appendix C

Laboratory Certificate of Analysis

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: SNC LAVALIN INC.
1090 TOPSAIL RD
MOUNT PEARL, NL A1N5E7
(709) 368-0118

ATTENTION TO: Mike Smith

PROJECT: 631477

AGAT WORK ORDER: 19X543022

WATER ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

DATE REPORTED: Nov 25, 2019

PAGES (INCLUDING COVER): 13

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

AGAT Laboratories

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# Certificate of Analysis

AGAT WORK ORDER: 19X543022

PROJECT: 631477

CLIENT NAME: SNC LAVALIN INC.

ATTENTION TO: Mike Smith

SAMPLING SITE:

SAMPLED BY:

## SNC-Lavalin Bedford West Custom Inorganics Package

DATE RECEIVED: 2019-11-13

DATE REPORTED: 2019-11-25

| | | SAMPLE DESCRIPTION: | | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 |
| Parameter | Unit | G / S | RDL | 709204 | 709214 | 709215 | 709216 | 709217 | 709218 | 709219 | 709220 |
| Alkalinity | mg/L | | 5 | <5 | <5 | 6 | 6 | 6 | <5 | <5 | <5 |
| Chloride | mg/L | | 1 | 43 | 14 | 54 | 54 | 57 | 92 | 74 | 20 |
| True Color | TCU | | 5 | 19 | 77 | 21 | 17 | 19 | 28 | 45 | 38 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.32 | <0.05 | 0.29 | 0.29 | 0.35 | 0.12 | 0.58 | 0.07 |
| Nitrate as N | mg/L | | 0.05 | 0.32 | <0.05 | 0.29 | 0.29 | 0.35 | 0.12 | 0.58 | 0.07 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | 0.07 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.05 | 0.06 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | | | | 6.70 | 5.89 | 6.81 | 6.87 | 6.81 | 5.73 | 6.37 | 6.55 |
| Total Calcium | mg/L | | 0.1 | 4.2 | 2.0 | 5.0 | 5.1 | 5.4 | 12.2 | 7.9 | 2.7 |
| Total Magnesium | mg/L | | 0.1 | 0.8 | 0.6 | 0.9 | 0.9 | 0.9 | 1.8 | 1.4 | 0.7 |
| Total Potassium | mg/L | | 0.1 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.9 | 1.1 | 0.6 |
| Total Sodium | mg/L | | 0.1 | 23.4 | 7.5 | 30.1 | 23.4 | 30.6 | 38.3 | 31.7 | 9.8 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 1.6 | 3.5 | 2.2 | 2.2 | 2.0 | 4.8 | 4.4 | 3.5 |
| Total Suspended Solids | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Sulphate | mg/L | | 2 | 9 | 4 | 9 | 9 | 9 | 8 | 9 | 5 |
| Turbidity | NTU | | 0.1 | 2.9 | 1.3 | 1.1 | 1.1 | 0.8 | 1.5 | 4.4 | 1.2 |
| Electrical Conductivity | umho/cm | | 1 | 129 | 45 | 160 | 158 | 160 | 247 | 204 | 63 |
| Anion Sum | me/L | | | 1.42 | 0.48 | 1.85 | 1.85 | 1.94 | 2.77 | 2.32 | 0.67 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | <5 | <5 | 6 | 6 | 6 | <5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 83 | 29 | 105 | 98 | 109 | 154 | 129 | 39 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation sum | me/L | | | 1.34 | 0.54 | 1.67 | 1.38 | 1.71 | 2.49 | 1.97 | 0.66 |
| Hardness | mg/L | | | 13.8 | 7.5 | 16.2 | 16.4 | 17.2 | 37.9 | 25.5 | 9.6 |
| % Difference/ Ion Balance | % | | | 3.1 | 6.4 | 5.2 | 14.5 | 6.3 | 5.3 | 8.0 | 1.0 |
| Langelier Index (@20C) | NA | | | -3.56 | -4.65 | -3.30 | -3.23 | -3.27 | -4.09 | -3.63 | -3.87 |
| Langelier Index (@ 4C) | NA | | | -3.88 | -4.97 | -3.62 | -3.55 | -3.59 | -4.41 | -3.95 | -4.19 |
| Saturation pH (@ 20C) | NA | | | 10.3 | 10.5 | 10.1 | 10.1 | 10.1 | 9.82 | 10.0 | 10.4 |
| Saturation pH (@ 4C) | NA | | | 10.6 | 10.9 | 10.4 | 10.4 | 10.4 | 10.1 | 10.3 | 10.7 |
| Total Aluminum | ug/L | | 5 | 160 | 318 | 80 | 92 | 97 | 215 | 306 | 154 |

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 19X543022

PROJECT: 631477

CLIENT NAME: SNC LAVALIN INC.

ATTENTION TO: Mike Smith

SAMPLING SITE:

SAMPLED BY:

## SNC-Lavalin Bedford West Custom Inorganics Package

DATE RECEIVED: 2019-11-13

DATE REPORTED: 2019-11-25

| | | SAMPLE DESCRIPTION: | | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 |
| Parameter | Unit | G / S | RDL | 709204 | 709214 | 709215 | 709216 | 709217 | 709218 | 709219 | 709220 |
| Total Antimony | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Arsenic | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Barium | ug/L | | 5 | 8 | 9 | 15 | 17 | 15 | 197 | 100 | 7 |
| Total Beryllium | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Bismuth | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Boron | ug/L | | 5 | 5 | 7 | 6 | 6 | 7 | 6 | 6 | 9 |
| Total Cadmium | ug/L | | 0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 | <0.09 |
| Total Chromium | ug/L | | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Cobalt | ug/L | | 1 | <1 | <1 | <1 | <1 | <1 | 2 | <1 | <1 |
| Total Copper | ug/L | | 1 | 1 | 1 | <1 | 1 | 1 | 2 | 3 | 1 |
| Total Iron | ug/L | | 50 | 145 | 277 | <50 | <50 | <50 | 256 | 506 | 118 |
| Total Lead | ug/L | | 0.5 | <0.5 | 1.6 | <0.5 | <0.5 | <0.5 | 0.9 | 1.9 | <0.5 |
| Total Manganese | ug/L | | 2 | 23 | 23 | 18 | 19 | 17 | 125 | 50 | 8 |
| Total Molybdenum | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Nickel | ug/L | | 2 | 6 | <2 | 2 | <2 | <2 | 5 | 2 | 9 |
| Total Selenium | ug/L | | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Silver | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.3 | <0.1 | <0.1 | <0.1 |
| Total Strontium | ug/L | | 5 | 27 | 13 | 31 | 31 | 33 | 67 | 49 | 15 |
| Total Thallium | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Titanium | ug/L | | 2 | 3 | 2 | <2 | <2 | <2 | <2 | 7 | <2 |
| Total Uranium | ug/L | | 0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Vanadium | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Zinc | ug/L | | 5 | 6 | 6 | <5 | 6 | 5 | 12 | 13 | <5 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | 3.0 | 2.7 | 2.0 | 0.6 | 0.6 | 0.9 | 1.2 | 1.6 |

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 19X543022

PROJECT: 631477

CLIENT NAME: SNC LAVALIN INC.

ATTENTION TO: Mike Smith

SAMPLING SITE:

SAMPLED BY:

## SNC-Lavalin Bedford West Custom Inorganics Package

DATE RECEIVED: 2019-11-13

DATE REPORTED: 2019-11-25

| | | SAMPLE DESCRIPTION: | | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-08 | 2019-11-08 | 2019-11-08 |
| Parameter | Unit | G / S | RDL | 709221 | 709222 | 709223 |
| Alkalinity | mg/L | | 5 | 10 | 6 | 8 |
| Chloride | mg/L | | 1 | 75 | 53 | 64 |
| True Color | TCU | | 5 | 16 | 21 | 19 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 1.77 | 0.49 | 0.38 |
| Nitrate as N | mg/L | | 0.05 | 1.24 | 0.49 | 0.38 |
| Nitrite as N | mg/L | | 0.05 | 0.53 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | 0.15 | 0.08 | 0.06 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 |
| pH | | | | 7.01 | 6.85 | 6.89 |
| Total Calcium | mg/L | | 0.1 | 9.6 | 5.3 | 5.6 |
| Total Magnesium | mg/L | | 0.1 | 1.5 | 0.9 | 0.9 |
| Total Potassium | mg/L | | 0.1 | 1.7 | 0.8 | 0.8 |
| Total Sodium | mg/L | | 0.1 | 44.0 | 27.8 | 29.9 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 4.4 | 2.5 | 2.4 |
| Total Suspended Solids | mg/L | | 5 | <5 | <5 | <5 |
| Sulphate | mg/L | | 2 | 23 | 10 | 11 |
| Turbidity | NTU | | 0.1 | 3.8 | 1.7 | 2.2 |
| Electrical Conductivity | umho/cm | | 1 | 256 | 156 | 189 |
| Anion Sum | me/L | | | 2.92 | 1.86 | 2.22 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 10 | 6 | 8 |
| Calculated TDS | mg/L | | 1 | 169 | 104 | 119 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 |
| Cation sum | me/L | | | 2.60 | 1.59 | 1.69 |
| Hardness | mg/L | | | 30.1 | 16.9 | 17.7 |
| % Difference/ Ion Balance | % | | | 5.8 | 7.7 | 13.6 |
| Langelier Index (@20C) | NA | | | -2.62 | -3.24 | -3.05 |
| Langelier Index (@ 4C) | NA | | | -2.94 | -3.56 | -3.37 |
| Saturation pH (@ 20C) | NA | | | 9.63 | 10.1 | 9.94 |
| Saturation pH (@ 4C) | NA | | | 9.95 | 10.4 | 10.3 |
| Total Aluminum | ug/L | | 5 | 169 | 133 | 79 |

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 19X543022

PROJECT: 631477

CLIENT NAME: SNC LAVALIN INC.

ATTENTION TO: Mike Smith

SAMPLING SITE:

SAMPLED BY:

## SNC-Lavalin Bedford West Custom Inorganics Package

DATE RECEIVED: 2019-11-13

DATE REPORTED: 2019-11-25

| | | SAMPLE DESCRIPTION: | | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-08 | 2019-11-08 | 2019-11-08 |
| Parameter | Unit | G / S | RDL | 709221 | 709222 | 709223 |
| Total Antimony | ug/L | | 2 | <2 | <2 | <2 |
| Total Arsenic | ug/L | | 2 | <2 | <2 | <2 |
| Total Barium | ug/L | | 5 | 63 | 17 | 17 |
| Total Beryllium | ug/L | | 2 | <2 | <2 | <2 |
| Total Bismuth | ug/L | | 2 | <2 | <2 | <2 |
| Total Boron | ug/L | | 5 | 10 | 7 | 6 |
| Total Cadmium | ug/L | | 0.09 | <0.09 | <0.09 | <0.09 |
| Total Chromium | ug/L | | 1 | <1 | <1 | <1 |
| Total Cobalt | ug/L | | 1 | <1 | <1 | <1 |
| Total Copper | ug/L | | 1 | 4 | 1 | 1 |
| Total Iron | ug/L | | 50 | 313 | 108 | <50 |
| Total Lead | ug/L | | 0.5 | 0.8 | <0.5 | <0.5 |
| Total Manganese | ug/L | | 2 | 33 | 28 | 30 |
| Total Molybdenum | ug/L | | 2 | <2 | <2 | <2 |
| Total Nickel | ug/L | | 2 | 3 | <2 | <2 |
| Total Selenium | ug/L | | 1 | <1 | <1 | <1 |
| Total Silver | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 |
| Total Strontium | ug/L | | 5 | 58 | 30 | 27 |
| Total Thallium | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin | ug/L | | 2 | <2 | <2 | <2 |
| Total Titanium | ug/L | | 2 | 4 | 2 | <2 |
| Total Uranium | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 |
| Total Vanadium | ug/L | | 2 | 2 | <2 | <2 |
| Total Zinc | ug/L | | 5 | 23 | <5 | <5 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | 0.7 | 0.7 | 1.9 |

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 19X543022

PROJECT: 631477

CLIENT NAME: SNC LAVALIN INC.

ATTENTION TO: Mike Smith

SAMPLING SITE:

SAMPLED BY:

## SNC-Lavalin Bedford West Custom Inorganics Package

DATE RECEIVED: 2019-11-13

DATE REPORTED: 2019-11-25

| Comments: | RDL - Reported Detection Limit; G / S - Guideline / Standard |
|---|---|
| 709204-709214 | Total Phosphorus was analysed at AGAT Mississauga. |
| 709215 | Total Phosphorus was analysed at AGAT Mississauga.<br>The cation and anion sums are at, or below, 1 me/L, therefore the acceptable criteria is a difference of less than 0.3me/L. |
| 709216 | Total Phosphorus was analysed at AGAT Mississauga.<br>Ion Balance is biased high, contributing parameters have been confirmed. |
| 709217-709219 | Total Phosphorus was analysed at AGAT Mississauga. |
| 709220 | Total Phosphorus was analysed at AGAT Mississauga.<br>The cation and anion sums are at, or below, 1 me/L, therefore the acceptable criteria is a difference of less than 0.3me/L. |
| 709221-709222 | Total Phosphorus was analysed at AGAT Mississauga. |
| 709223 | Total Phosphorus was analysed at AGAT Mississauga.<br>Ion Balance is biased high, contributing parameters have been confirmed. |

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 19X543022

PROJECT: 631477

CLIENT NAME: SNC LAVALIN INC.

ATTENTION TO: Mike Smith

SAMPLING SITE:

SAMPLED BY:

## TOC (Water)

DATE RECEIVED: 2019-11-13

DATE REPORTED: 2019-11-25

| | | SAMPLE DESCRIPTION: | | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 |
| Parameter | Unit | G / S | RDL | 709204 | 709214 | 709215 | 709216 | 709217 | 709218 | 709219 | 709220 |
| Total Organic Carbon | mg/L | | 0.5 | 4.0 | 9.4 | 4.0 | 4.3 | 4.2 | 4.1 | 6.8 | 6.2 |

| | | SAMPLE DESCRIPTION: | | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-08 | 2019-11-08 | 2019-11-08 |
| Parameter | Unit | G / S | RDL | 709221 | 709222 | 709223 |
| Total Organic Carbon | mg/L | | 0.5 | 3.9 | 4.4 | 4.5 |

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

Certified By: Marta Manka



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 19X543022

PROJECT: 631477

CLIENT NAME: SNC LAVALIN INC.

ATTENTION TO: Mike Smith

SAMPLING SITE:

SAMPLED BY:

## Total Phosphorus in Water (Low Level)

DATE RECEIVED: 2019-11-13

DATE REPORTED: 2019-11-25

| | | SAMPLE DESCRIPTION: | | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 | 2019-11-08 |
| Parameter | Unit | G / S | RDL | 709204 | 709214 | 709215 | 709216 | 709217 | 709218 | 709219 | 709220 |
| Total Phosphorus | mg/L | | 0.002 | 0.008 | 0.031 | 0.007 | 0.005 | 0.006 | 0.026 | 0.022 | 0.008 |

| | | SAMPLE DESCRIPTION: | | LU | PML-1 | PML-2 |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-08 | 2019-11-08 | 2019-11-08 |
| Parameter | Unit | G / S | RDL | 709221 | 709222 | 709223 |
| Total Phosphorus | mg/L | | 0.002 | 0.013 | 0.012 | 0.008 |

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Marta Manka



Results relate only to the items tested. Results apply to samples as received.

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# Quality Assurance

CLIENT NAME: SNC LAVALIN INC.
AGAT WORK ORDER: 19X543022
PROJECT: 631477
ATTENTION TO: Mike Smith
SAMPLING SITE:
SAMPLED BY:

## Water Analysis

| RPT Date: Nov 25, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| SNC-Lavalin Bedford West Custom Inorganics Package | | | | | | | | | | | | | | | |
| Alkalinity | 709204 | 709204 | <5 | <5 | NA | < 5 | 91% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Chloride | 709214 | 709214 | 14 | 15 | 3.8% | < 1 | 117% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| True Color | 726603 | 726603 | 7 | <5 | NA | < 5 | 100% | 80% | 120% | | | | | | |
| Nitrate as N | 709214 | 709214 | <0.05 | 0.05 | NA | < 0.05 | 107% | 80% | 120% | NA | 80% | 120% | 109% | 80% | 120% |
| Nitrite as N | 709214 | 709214 | <0.05 | <0.05 | NA | < 0.05 | 90% | 80% | 120% | NA | 80% | 120% | 118% | 80% | 120% |
| Ammonia as N | 709204 | 709204 | 0.07 | 0.07 | NA | < 0.03 | 101% | 80% | 120% | 108% | 80% | 120% | 99% | 80% | 120% |
| Ortho-Phosphate as P | 709204 | 709204 | <0.01 | <0.01 | NA | < 0.01 | 94% | 80% | 120% | 98% | 80% | 120% | 99% | 80% | 120% |
| pH | 709204 | 709204 | 6.70 | 6.70 | 0.0% | < | 101% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Calcium | 708885 | | 48.9 | 40.9 | 17.8% | < 0.1 | 98% | 80% | 120% | 99% | 80% | 120% | NA | 70% | 130% |
| Total Magnesium | 708885 | | 8.4 | 7.5 | 10.8% | < 0.1 | 95% | 80% | 120% | 93% | 80% | 120% | NA | 80% | 120% |
| Total Potassium | 708885 | | 0.7 | 0.8 | 17.1% | < 0.1 | 98% | 80% | 120% | 96% | 80% | 120% | 96% | 70% | 130% |
| Total Sodium | 708885 | | 8.7 | 7.5 | 14.8% | < 0.1 | 98% | 80% | 120% | 95% | 80% | 120% | NA | 70% | 130% |
| Reactive Silica as SiO2 | 709204 | 709204 | 1.6 | 1.6 | NA | < 0.5 | 98% | 80% | 120% | 108% | 80% | 120% | 101% | 80% | 120% |
| Total Suspended Solids | 709204 | 709204 | <5 | <5 | NA | < 5 | 99% | 80% | 120% | NA | | | 102% | 80% | 120% |
| Sulphate | 709214 | 709214 | 4 | 4 | NA | < 2 | 108% | 80% | 120% | NA | 80% | 120% | 114% | 80% | 120% |
| Turbidity | 726603 | 726603 | 0.3 | 0.3 | NA | < 0.1 | 96% | 80% | 120% | | | | | | |
| Electrical Conductivity | 709204 | 709204 | 129 | 130 | 0.6% | < 1 | 107% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Bicarb. Alkalinity (as CaCO3) | 709204 | 709204 | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 709204 | 709204 | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Aluminum | 708885 | | <5 | 6 | NA | < 5 | 97% | 80% | 120% | 96% | 80% | 120% | 88% | 70% | 130% |
| Total Antimony | 708885 | | <2 | <2 | NA | < 2 | 80% | 80% | 120% | 120% | 80% | 120% | 116% | 70% | 130% |
| Total Arsenic | 708885 | | <2 | <2 | NA | < 2 | 94% | 80% | 120% | 93% | 80% | 120% | 84% | 70% | 130% |
| Total Barium | 708885 | | 28 | 37 | NA | < 5 | 108% | 80% | 120% | 102% | 80% | 120% | NA | 70% | 130% |
| Total Beryllium | 708885 | | <2 | <2 | NA | < 2 | 109% | 80% | 120% | 99% | 80% | 120% | 87% | 70% | 130% |
| Total Bismuth | 708885 | | <2 | <2 | NA | < 2 | 113% | 80% | 120% | 118% | 80% | 120% | 99% | 70% | 130% |
| Total Boron | 708885 | | 31 | 36 | 15.2% | < 5 | 104% | 80% | 120% | 97% | 80% | 120% | 91% | 70% | 130% |
| Total Cadmium | 708885 | | <0.09 | <0.09 | NA | < 0.09 | 110% | 80% | 120% | 107% | 80% | 120% | 95% | 70% | 130% |
| Total Chromium | 708885 | | <1 | <1 | NA | < 1 | 114% | 80% | 120% | 107% | 80% | 120% | 101% | 70% | 130% |
| Total Cobalt | 708885 | | <1 | <1 | NA | < 1 | 118% | 80% | 120% | 114% | 80% | 120% | 96% | 70% | 130% |
| Total Copper | 708885 | | 2 | 3 | NA | < 1 | 118% | 80% | 120% | 113% | 80% | 120% | 96% | 70% | 130% |
| Total Iron | 708885 | | <50 | <50 | NA | < 50 | 120% | 80% | 120% | 99% | 80% | 120% | NA | 70% | 130% |
| Total Lead | 708885 | | <0.5 | 1.4 | NA | < 0.5 | 119% | 80% | 120% | 111% | 80% | 120% | 94% | 70% | 130% |
| Total Manganese | 708885 | | 51 | 43 | 17.9% | < 2 | 117% | 80% | 120% | 110% | 80% | 120% | NA | 70% | 130% |
| Total Molybdenum | 708885 | | <2 | <2 | NA | < 2 | 119% | 80% | 120% | 113% | 80% | 120% | 100% | 70% | 130% |
| Total Nickel | 708885 | | 2 | 3 | NA | < 2 | 120% | 80% | 120% | 117% | 80% | 120% | 107% | 70% | 130% |
| Total Selenium | 708885 | | <1 | <1 | NA | < 1 | 114% | 80% | 120% | 115% | 80% | 120% | 93% | 70% | 130% |
| Total Silver | 708885 | | <0.1 | <0.1 | NA | < 0.1 | 108% | 80% | 120% | 112% | 80% | 120% | 93% | 70% | 130% |
| Total Strontium | 708885 | | 190 | 158 | 17.9% | < 5 | 120% | 80% | 120% | 114% | 80% | 120% | NA | 70% | 130% |
| Total Thallium | 708885 | | <0.1 | <0.1 | NA | < 0.1 | 120% | 80% | 120% | 113% | 80% | 120% | 95% | 70% | 130% |



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Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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http://www.agatlabs.com

# Quality Assurance

CLIENT NAME: SNC LAVALIN INC.

AGAT WORK ORDER: 19X543022

PROJECT: 631477

ATTENTION TO: Mike Smith

SAMPLING SITE:

SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Nov 25, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Total Tin | 708885 | | <2 | <2 | NA | < 2 | 107% | 80% | 120% | 103% | 80% | 120% | 99% | 70% | 130% |
| Total Titanium | 708885 | | <2 | <2 | NA | < 2 | 96% | 80% | 120% | 92% | 80% | 120% | 83% | 70% | 130% |
| Total Uranium | 708885 | | 0.5 | 0.7 | NA | < 0.1 | 119% | 80% | 120% | 115% | 80% | 120% | 104% | 70% | 130% |
| Total Vanadium | 708885 | | <2 | <2 | NA | < 2 | 112% | 80% | 120% | 107% | 80% | 120% | 94% | 70% | 130% |
| Total Zinc | 708885 | | <5 | <5 | NA | < 5 | 119% | 80% | 120% | 112% | 80% | 120% | 90% | 70% | 130% |
| Total Kjeldahl Nitrogen as N | 709418 | | 2.3 | 2.4 | 4.8% | < 0.4 | 111% | 80% | 120% | 101% | 80% | 120% | NA | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

SNC-Lavalin Bedford West Custom Inorganics Package

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity | 709204 | 709204 | <5 | <5 | NA | < 5 | 94% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| pH | 709204 | 709204 | 6.70 | 6.70 | 0% | < | 101% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Electrical Conductivity | 709204 | 709204 | 129 | 130 | 0.6% | < 1 | 114% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Bicarb. Alkalinity (as CaCO3) | 709204 | 709204 | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 709204 | 709204 | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Total Phosphorus in Water (Low Level)

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Phosphorus | 709261 | 709261 | 0.061 | 0.063 | 3.2% | < 0.002 | 100% | 90% | 110% | 103% | 90% | 110% | 83% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

TOC (Water)

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon | 735303 | | 3.6 | 3.6 | 1.3% | < 0.5 | 92% | 90% | 110% | 97% | 90% | 110% | 89% | 80% | 120% |

TOC (Water)

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon | 709215 | 709215 | 4.0 | 4.0 | 0.2% | < 0.5 | 101% | 90% | 110% | 97% | 90% | 110% | 98% | 80% | 120% |

Certified By: Marta Manka



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# Method Summary

CLIENT NAME: SNC LAVALIN INC.

AGAT WORK ORDER: 19X543022

PROJECT: 631477

ATTENTION TO: Mike Smith

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| True Color | INOR-121-6014 | SM 2120 C | NEPHELOMETER |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Potassium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Anion Sum | CALCULATION | SM 1030E | CALCULATION |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Calculated TDS | | SM 1030E | CALCULATION |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Cation sum | CALCULATION | SM 1030E | CALCULATION |
| Hardness | CALCULATION | SM 2340B | CALCULATION |
| % Difference/ Ion Balance | CALCULATION | SM 1030E | CALCULATION |
| Langelier Index (@20C) | CALCULATION | CALCULATION | CALCULATION |
| Langelier Index (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 20C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Total Aluminum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Antimony | MET121-6104 & MET-121-6105 | SM 3125 | ICP-MS |
| Total Arsenic | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Barium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Beryllium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Bismuth | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Boron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cadmium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Chromium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |



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# Method Summary

CLIENT NAME: SNC LAVALIN INC.

AGAT WORK ORDER: 19X543022

PROJECT: 631477

ATTENTION TO: Mike Smith

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Total Cobalt | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Lead | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Molybdenum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Nickel | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Selenium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Silver | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Strontium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Thallium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Tin | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Titanium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Uranium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Vanadium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Kjeldahl Nitrogen as N | INOR-121-6020 | SM 4500-NORG D | COLORIMETER |
| Total Organic Carbon | INOR-93-6049 | EPA 415.1 & SM 5310 B | SHIMADZU CARBON ANALYZER |
| Total Phosphorus | INOR-93-6022 | SM 4500-P B & E | SPECTROPHOTOMETER |



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# AGAT Laboratories

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www.agatlabs.com

**Laboratory use Only**
Arrival Condition: ☐ Good ☐ Poor (complete 'notes') AGAT Job Number: 19X543022
Arrival Temperature: 7.6, 7.1, 7.1
Notes: Chlorophyll and TC+EC-mF past hold time

Drinking Water Sample (y/n): _____ Reg. No. _____
Waterworks Number: _____

**Report To:**
Company: SNC Lavalin
Contact: Michael Smith
Address: 5657 Spring Garden Road
Halifax, NS B3J 3R4
Phone: 902-492-4544 FAX:
PO#:
AGAT Quotation: 15-1718
Client Project #: 631477

**Invoice to:** Same (Y/N) - Circle
Company: SNC Lavalin
Contact: payables@snclavalin.com
Address:
Phone: Fax:
PO#/Credit Card #:

**Report Information**
1. Name: Michael Smith
Email: michael.smith@snclavalin.com
2. Name: Cally Baxter
Email: cally.baxter@snclavalin.com

**Regulatory Requirements (Check):**
☐ List Guidelines on Report ☐ Do Not List Guidelines on Report
☐ PIRI
☐ Teir 1 ☐ Res. ☐ Pol. ☐ Coarse
☐ Teir 2 ☐ Com ☐ N/Pot. ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Ind ☐ NSDFOSP
☐ Com ☐ HRM 101
☐ Res/P Storm Water
☐ Ag ☐ HRM 101
☐ FWAL Waste Water
☐ Sediment
☐ Other

**Report Format**
☐ Single PDF sample per page
■ Multiple PDF samples per page
■ Excel Format Included

**Turnaround Time (TAT) Business Days**
**Regular TAT:** ■ 5 - 7 days
**Rush TAT:** ☐ 1 day ☐ 2 days ☐ 3 - 4 days
Date Required:
Time Required:

| SAMPLE IDENTIFICATION | DATE / TIME SAMPLED | SAMPLE MATRIX | # OF CONTAINERS | COMMENTS - Site/Sample Info, Sample Containment | Field Filtered/ Preserved | Standard Water Analysis | Metals (Spring Quarterly Only) | (Circle-Total, Diss or Available) | Mercury | TKN | pH | TSS | TP- Low Level 0.002mg/L - Mississauga | Anions | Total Phosphorus | Phenols | TPH/BTEX (PIRI) Teir 1 | TPH/BTEX-Fractionation Teir 2 | VOC | THM | PAH | Chlorophyll A | E. coli by MF | Hazardous (Y/N) | Lab Sample # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KL1 | 2019-11-08 | water | 8 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| KL2 | " | water | 8 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| KL3 | " | water | 8 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| KL4 | " | water | 8 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| KL5 | " | water | 8 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| HWY-102-1 | " | water | 8 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| HWY-102-2 | " | water | 8 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| LSD | " | water | 8 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| LU | " | water | 8 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| PML-1 | " | water | 8 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| PML-2 | " | water | 8 | | | X | | T | | X | | X | X | | | | | | | | | X | X | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

Sample Relinquished By (print name & sign): William Parker
Date/Time: 2019-11-12
Samples Received By (print name and sign):
Date/Time: NOV 13
Special Instructions

Sample Relinquished By (print name & sign):
Date/Time:
Samples Received By (print name and sign):
Date/Time: 9:15
SNC Bedford West Package

Page of

AGAT Laboratories

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CLIENT NAME: SNC Lavalin Inc.
5657 SPRING GARDEN RD, SUITE 200
HALIFAX , NS B3J3R4
(902) 492-4544

ATTENTION TO: Michael Smith

PROJECT: 631477

AGAT WORK ORDER: 19X548643

MICROBIOLOGY ANALYSIS REVIEWED BY: Michelle Hildebrand, Inorganics Analyst, B.Sc, P.Chem

WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

DATE REPORTED: Dec 11, 2019

PAGES (INCLUDING COVER): 6

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*NOTES
VERSION 2:Version 2.0-Supersedes Version 1.0-Complete Results-Chlorophyll A included.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request

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# Certificate of Analysis

AGAT WORK ORDER: 19X548643

PROJECT: 631477

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2019-11-26

DATE REPORTED: 2019-12-11

| | | SAMPLE DESCRIPTION: | | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | PML-1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-26 | 2019-11-26 | 2019-11-26 | 2019-11-26 | 2019-11-26 | 2019-11-26 | 2019-11-26 | 2019-11-26 |
| Parameter | Unit | G / S | RDL | 748759 | 748770 | 748771 | 748772 | 748773 | 748774 | 748775 | 748776 |
| Total Coliforms (MF) | CFU/100 mL | | 1 | 1198 | 1240 | 628 | 604 | 560 | 1128 | 1152 | 864 |
| E. Coli (MF) | CFU/100 mL | | 1 | 26 | 12 | 6 | <1 | 8 | 2 | 18 | 14 |

| | | SAMPLE DESCRIPTION: | | PML-2 | LU | LSD |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-26 | 2019-11-26 | 2019-11-26 |
| Parameter | Unit | G / S | RDL | 748777 | 748778 | 748779 |
| Total Coliforms (MF) | CFU/100 mL | | 1 | 1134 | 984 | 932 |
| E. Coli (MF) | CFU/100 mL | | 1 | 20 | 8 | 12 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2019-05
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.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Michelle Hildebrand



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# Certificate of Analysis

AGAT WORK ORDER: 19X548643

PROJECT: 631477

CLIENT NAME: SNC Lavalin Inc.

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## Chlorophyll-a in Water

DATE RECEIVED: 2019-11-26

DATE REPORTED: 2019-12-11

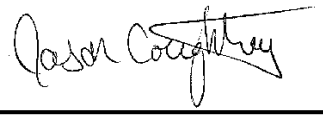
| | | SAMPLE DESCRIPTION: | | KL1 | KL2 | KL3 | KL4 | KL5 | HWY-102-1 | HWY-102-2 | PML-1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-26 | 2019-11-26 | 2019-11-26 | 2019-11-26 | 2019-11-26 | 2019-11-26 | 2019-11-26 | 2019-11-26 |
| Parameter | Unit | G / S | RDL | 748759 | 748770 | 748771 | 748772 | 748773 | 748774 | 748775 | 748776 |
| Chlorophyll-a | µg/L | | 0.25 | 1.26 | <0.25 | 0.47 | 0.32 | 0.32 | <0.25 | 0.32 | 0.32 |

| | | SAMPLE DESCRIPTION: | | PML-2 | LU | LSD |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2019-11-26 | 2019-11-26 | 2019-11-26 |
| Parameter | Unit | G / S | RDL | 748777 | 748778 | 748779 |
| Chlorophyll-a | µg/L | | 0.25 | 0.47 | <0.25 | <0.25 |

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

Analysis performed at AGAT Vancouver (unless marked by *)

Certified By:





Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

# Quality Assurance

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 19X548643

PROJECT: 631477

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

## Water Analysis

| RPT Date: Dec 11, 2019 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Chlorophyll-a in Water | | | | | | | | | | | | | | | |
| Chlorophyll-a | 748759 | BS | 1100 | 1020 | 7.5% | < 0.25 | 97% | 85% | 115% | | | | | | |

Certified By:



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.

Results relate only to the items tested. Results apply to samples as received.

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FAX (902)468-8924
http://www.agatlabs.com

# Method Summary

CLIENT NAME: SNC Lavalin Inc.

AGAT WORK ORDER: 19X548643

PROJECT: 631477

ATTENTION TO: Michael Smith

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MF) | MIC-121-7002 | Sm 9222 H | MF/INCUBATOR |
| E. Coli (MF) | MIC-121-7002 | SM 9222 H | MF/INCUBATOR |
| Water Analysis | | | |
| Chlorophyll-a | | SM 10200 H | SPECTROPHOTOMETER |



Results relate only to the items tested. Results apply to samples as received.

# AGAT Laboratories

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Dartmouth, Nova Scotia
B3B 1M2
http://webearth.agatlabs.com

Phone: 902-468-8718
Fax: 902-468-8924
www.agatlabs.com

**Laboratory use Only**
Arrival Condition: ☐ Good ☐ Poor (complete 'notes') 19X548643
Arrival Temperature: _____ AGAT Job Number:
Notes: No COC was attached. Sampled same day.

Drinking Water Sample (y/n): _____ Reg. No. _____
Waterworks Number: _____

**Report To:**
Company: SNC Lavalin
Contact: Michael Smith
Address: 5657 Spring Garden Road
Halifax, NS B3J 3R4
Phone: 902-492-4544 FAX:
PO#:
AGAT Quotation: 15-1718
Client Project #: 631477

**Invoice to:** Same (Y/N) - Circle
Company: SNC Lavalin
Contact: payables@snclavalin.com
Address:
Phone: Fax:
PO#/Credit Card #:

**Report Information**
1. Name: Michael Smith
Email: michael.smith@snclavalin.com
2. Name:
Email:

**Regulatory Requirements (Check):**
☐ List Guidelines on Report ☐ Do Not List Guidelines on Report
☐ PIRI
☐ Teir 1 ☐ Res. ☐ Pot. ☐ Coarse
☐ Teir 2 ☐ Com ☐ N/Pot. ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Ind ☐ NSDFOSP
☐ Com ☐ HRM 101
☐ Res/P Storm Water
☐ Ag ☐ HRM 101
☐ FWAL Waste Water
☐ Sediment
☐ Other

Site Info (check all that apply):

**Report Format**
☐ Single PDF sample per page
■ Multiple PDF samples per page
■ Excel Format Included

**Turnaround Time (TAT) Business Days**
**Regular TAT:**
■ 5 - 7 days
**Rush TAT:**
☐ 1 day ☐ 2 days
☐ 3 - 4 days
Date Required:
Time Required:

| SAMPLE IDENTIFICATION | DATE / TIME SAMPLED | SAMPLE MATRIX | # OF CONTAINERS | COMMENTS - Site/Sample Info, Sample Containment | Field Filtered/ Preserved | Standard Water Analysis | Metals (Spring Quarterly Only) | (circle-Total, Diss or Available) | Mercury | TKN | pH | TSS | TP- Low Level 0.002mg/L- Mississauga | Anions | Total Phosphorus | Phenols | TPH/BTEX (PIRI) Teir 1 | TPH/BTEX-Fractionation Teir 2 | VOC | THM | PAH | Chlorophyll A | E. coli by MF | Hazardous (Y/N) | Lab Sample # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KL1 | 26-11-2019 | water | 3 | | | | | | | | | | | | | | | | | | | X | X | | |
| KL2 | 26-11-2019 | water | 3 | | | | | | | | | | | | | | | | | | | X | X | | |
| KL3 | 26-11-2019 | water | 3 | | | | | | | | | | | | | | | | | | | X | X | | |
| KL4 | 26-11-2019 | water | 3 | | | | | | | | | | | | | | | | | | | X | X | | |
| KL5 | 26-11-2019 | water | 3 | | | | | | | | | | | | | | | | | | | X | X | | |
| HWY-102-1 | 26-11-2019 | water | 3 | | | | | | | | | | | | | | | | | | | X | X | | |
| HWY-102-2 | 26-11-2019 | water | 3 | | | | | | | | | | | | | | | | | | | X | X | | |
| LSD | 26-11-2019 | water | 3 | | | | | | | | | | | | | | | | | | | X | X | | |
| LU | 26-11-2019 | water | 3 | | | | | | | | | | | | | | | | | | | X | X | | |
| PML-1 | 26-11-2019 | water | 3 | | | | | | | | | | | | | | | | | | | X | X | | |
| PML-2 | 26-11-2019 | water | 3 | | | | | | | | | | | | | | | | | | | X | X | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

| Sample Relinquished By (print name & sign) | Date/Time | Samples Received By (print name and sign) | Date/Time | Special Instructions |
|---|---|---|---|---|
| Mike Smith | | Ryan MacDonald | | |
| Sample Relinquished By (print name & sign) | Date/Time | Samples Received By (print name and sign) | Date/Time | SNC Bedford West Package |
| | | | | Page 1 1 |

# Appendix D

Graphs (Seasonal and Historical)

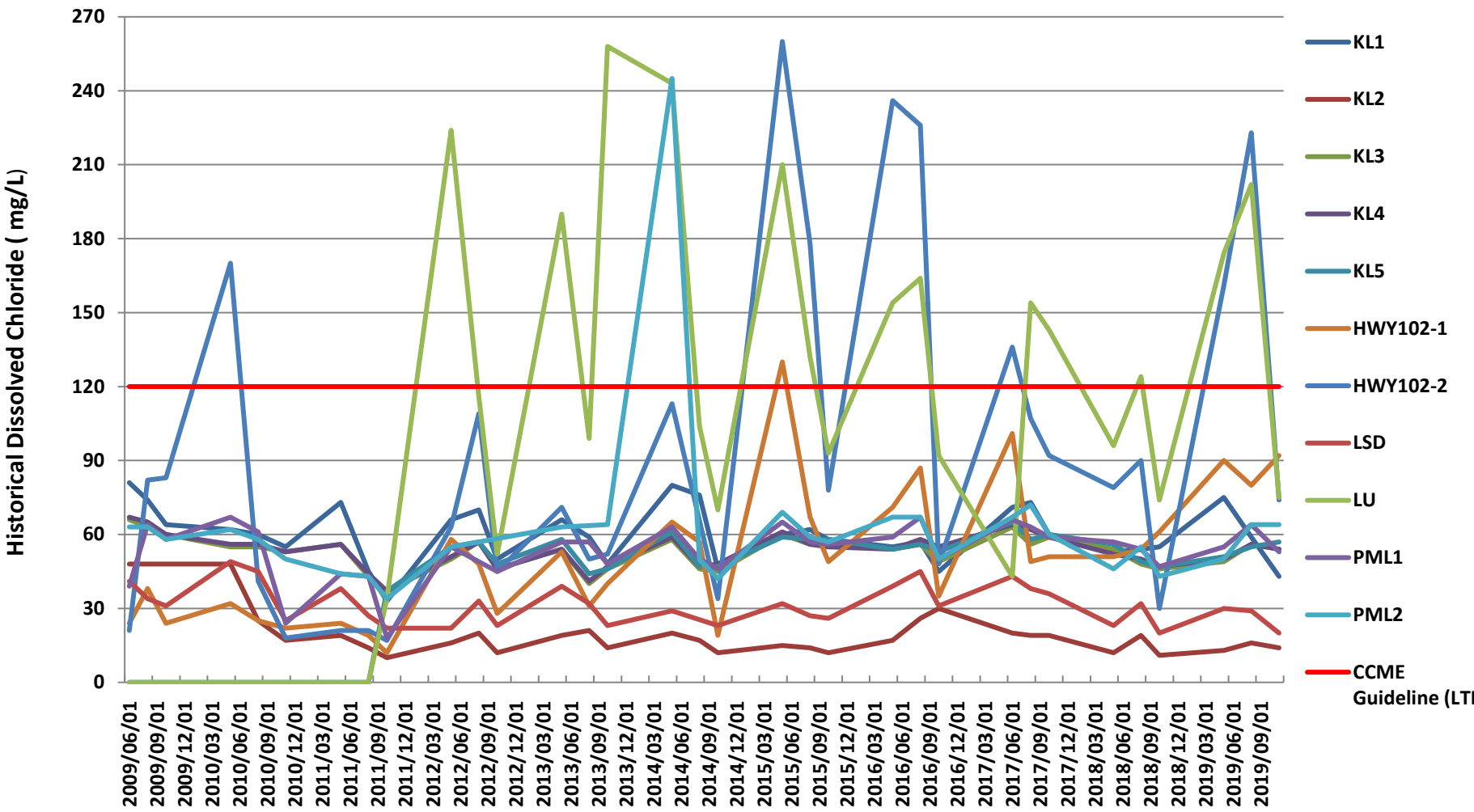


**Figure 1 - Historical Dissolved Chloride Concentrations for Water Quality Monitoring Program.**

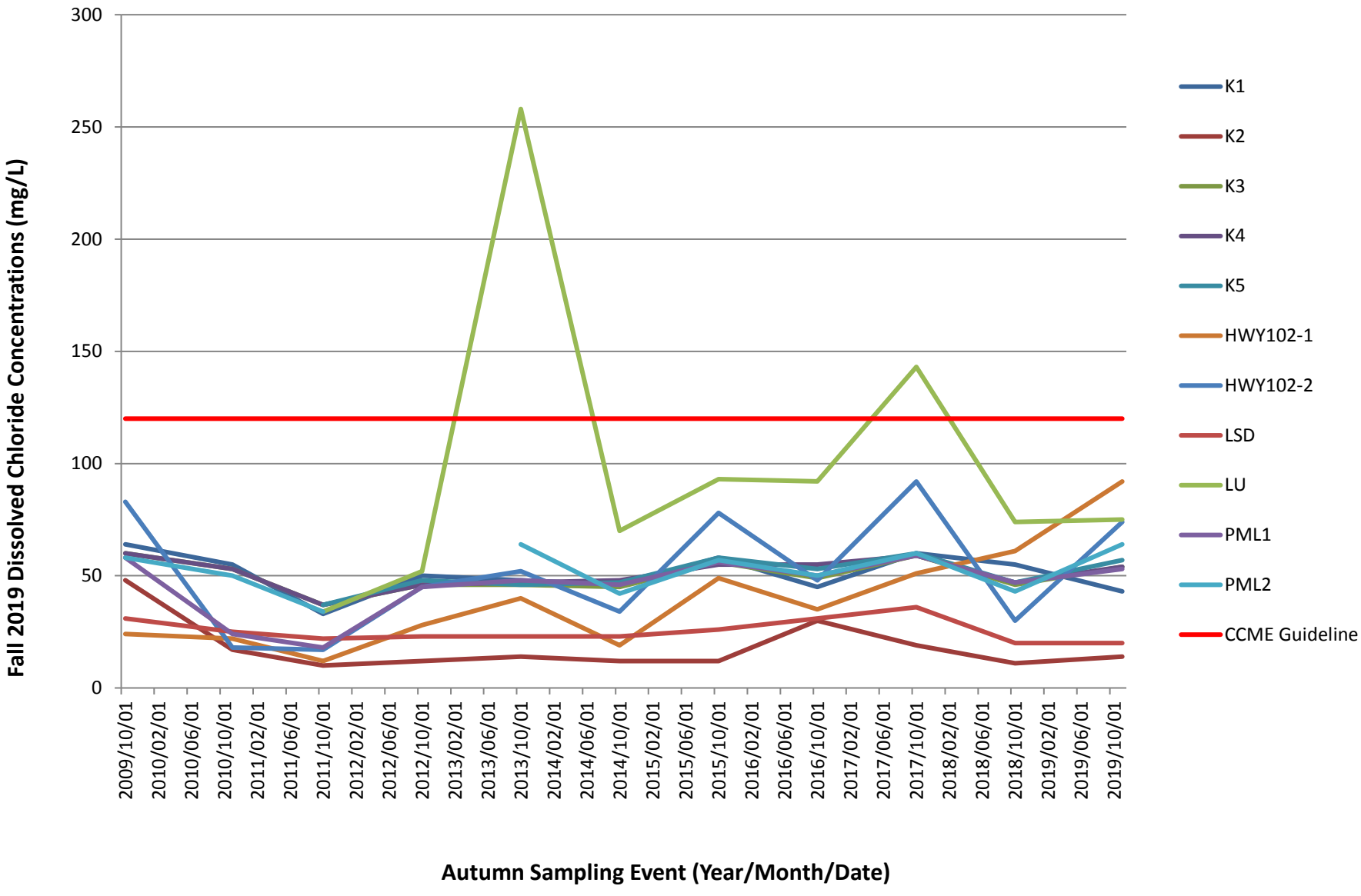


**Figure 2 – Seasonal Dissolved Chloride Concentrations for Water Quality Monitoring Program.**

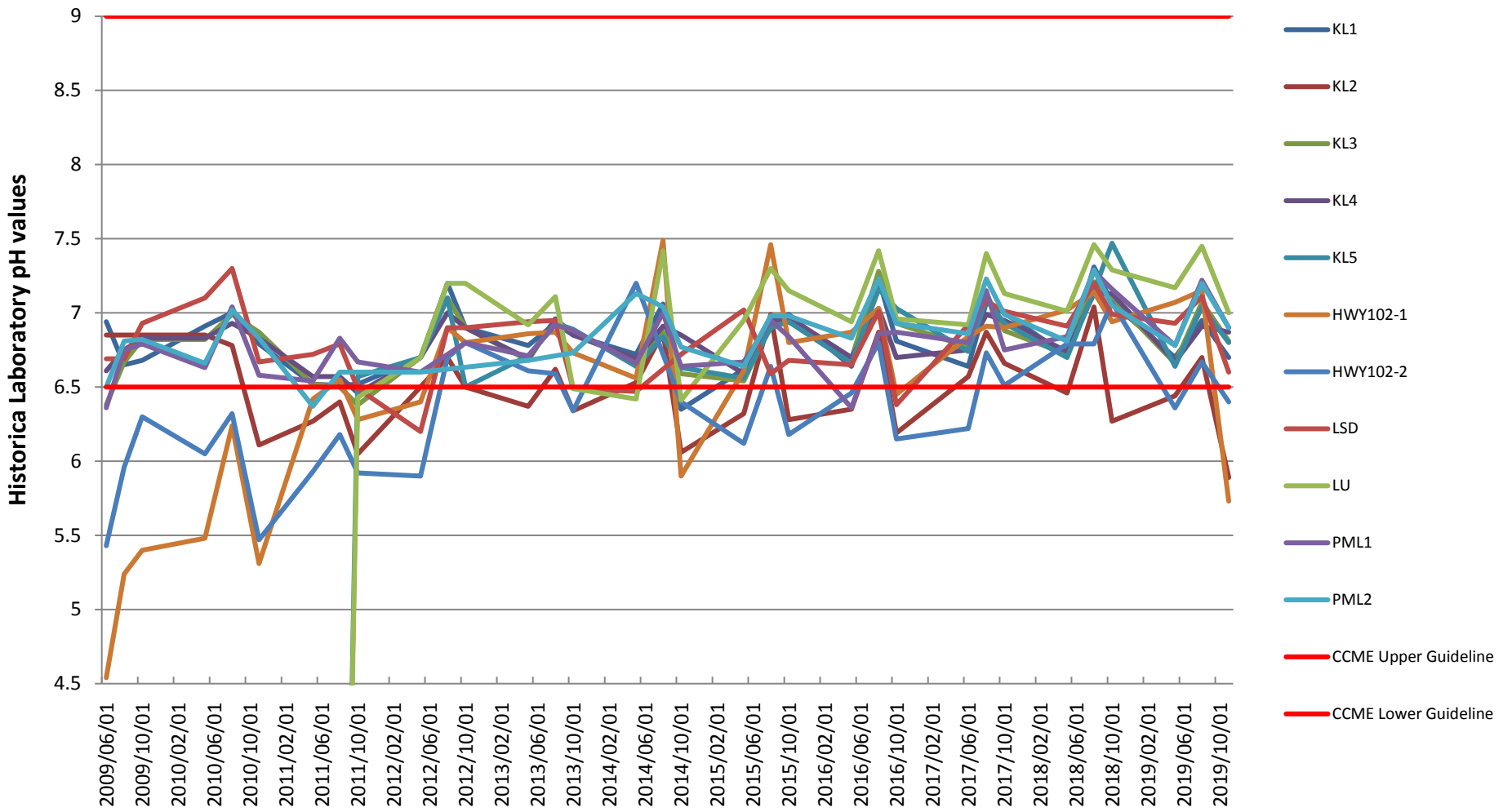


**Figure 3 –Historical pH Measurements for Water Quality Monitoring Program**

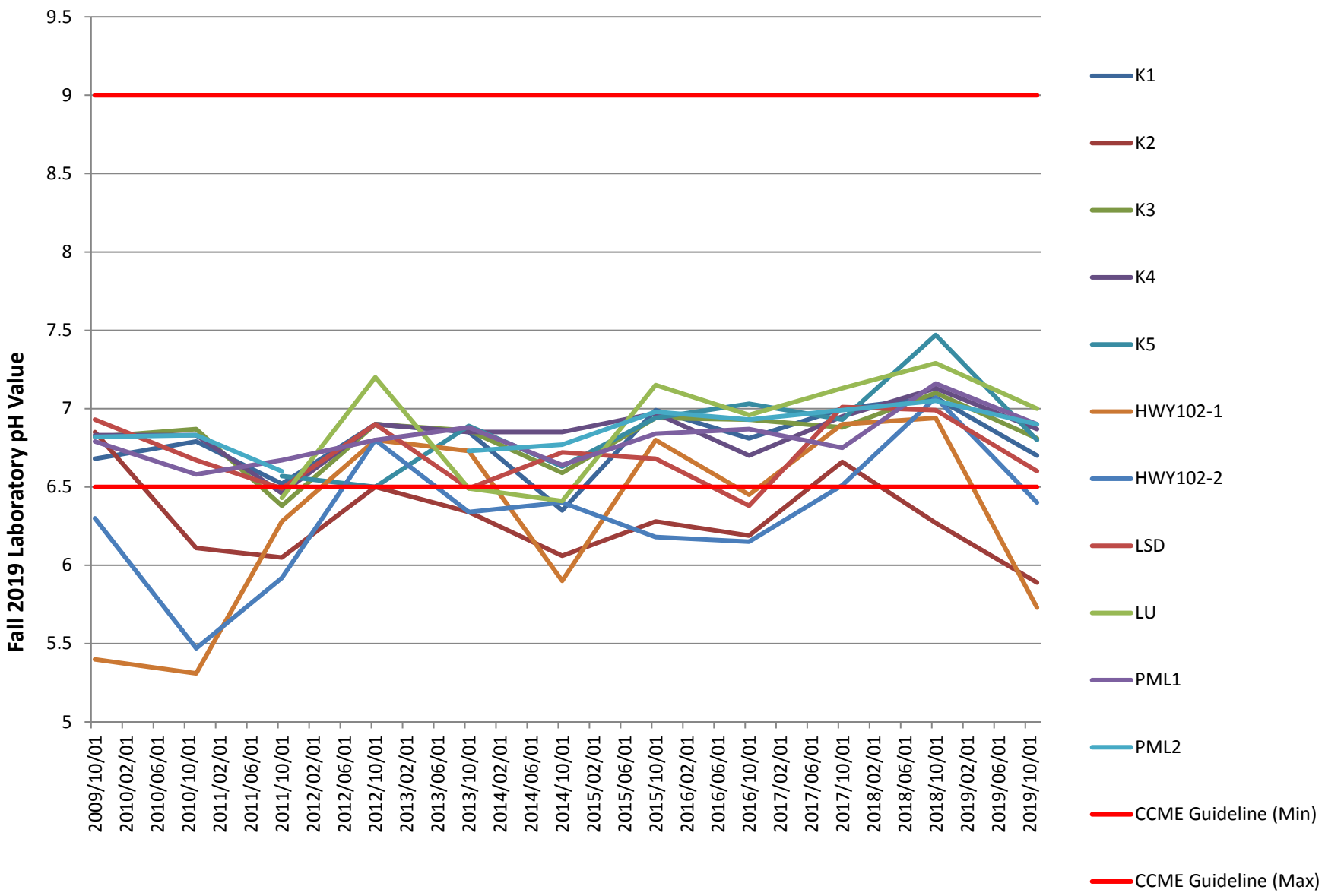


**Figure 4 – Seasonal pH Measurements for Water Quality Monitoring Program.**

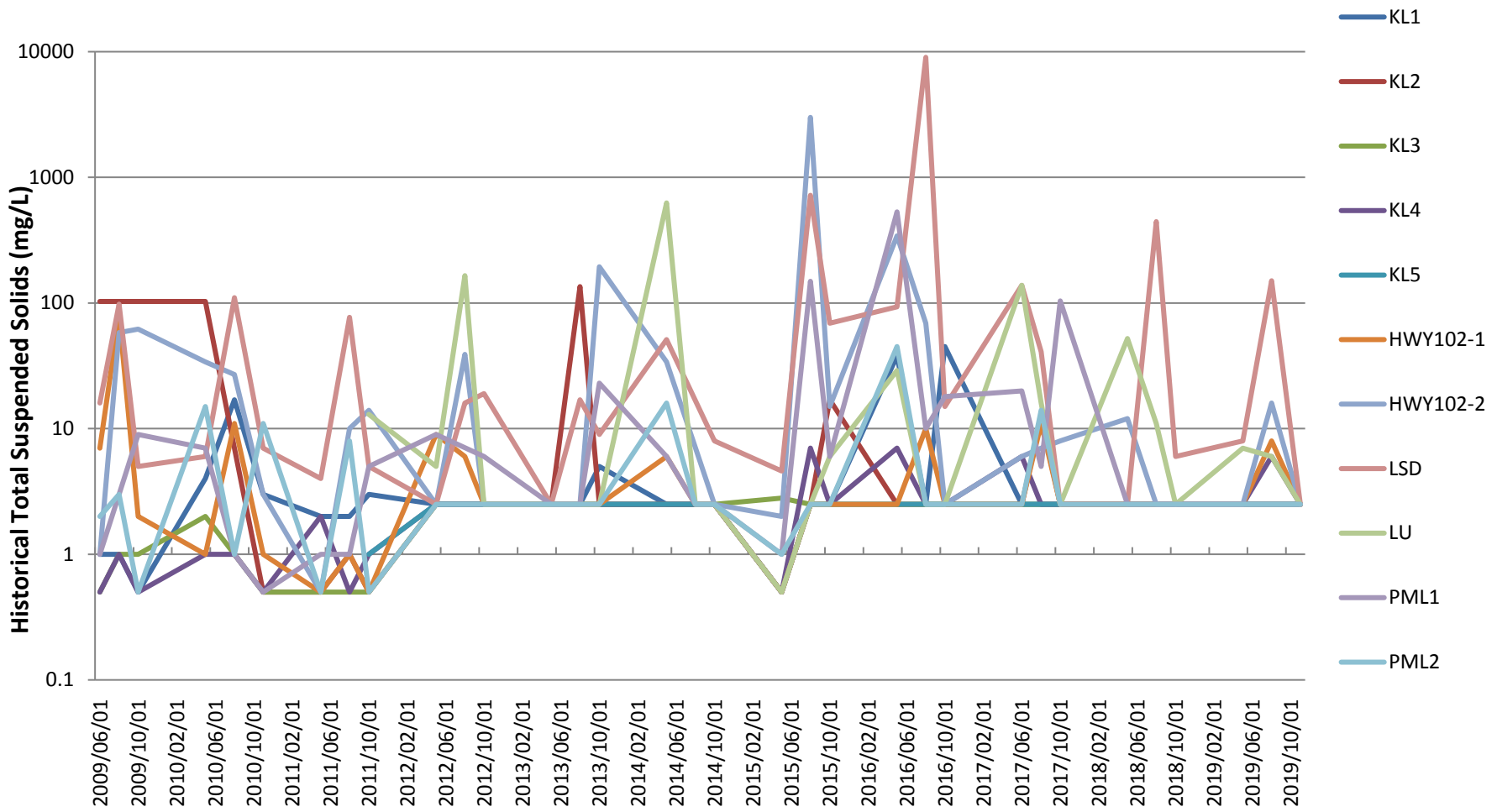


**Figure 5 – Historical Total Suspended Solids Concentrations for Water Quality Monitoring Program.**

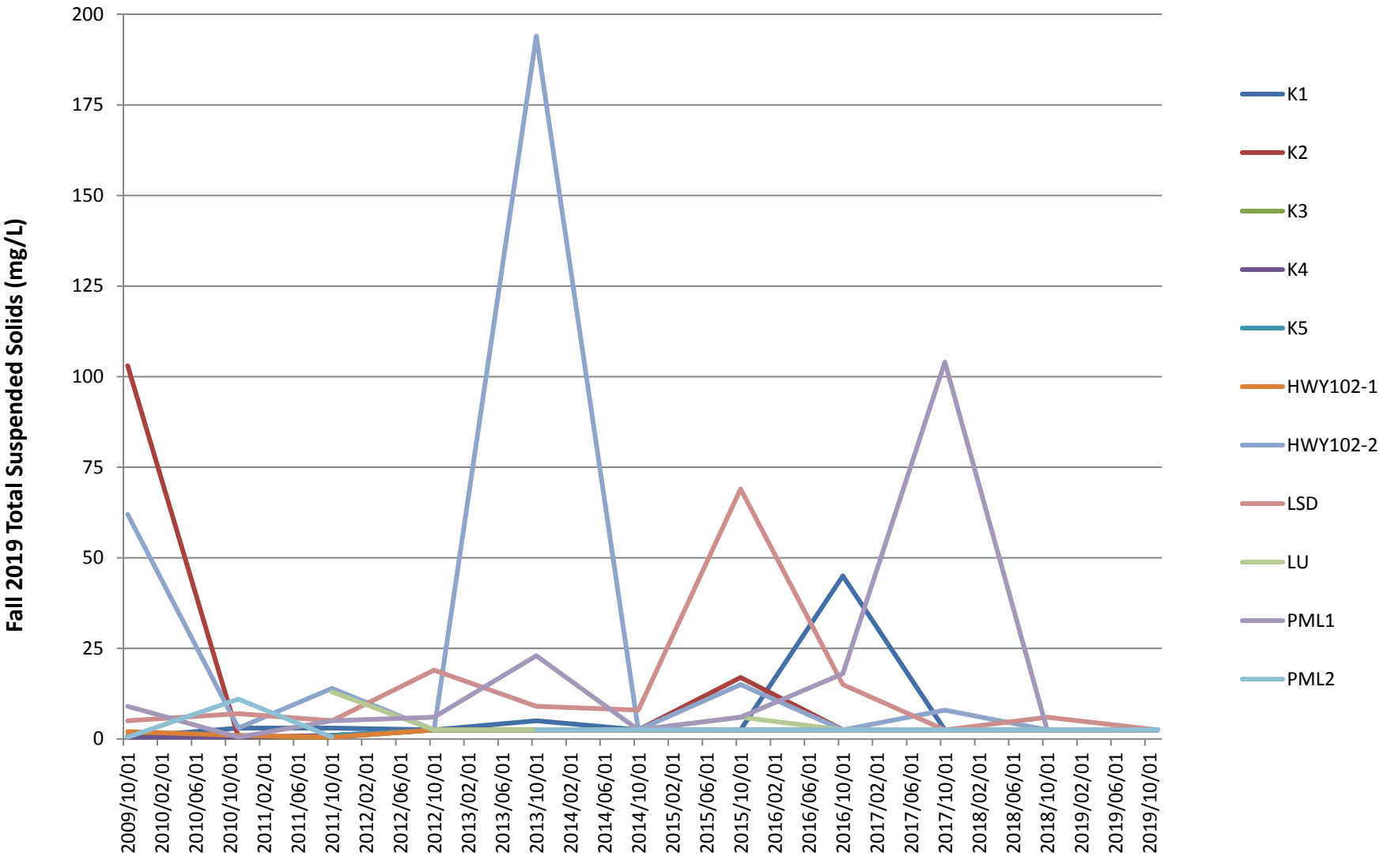


**Figure 6 – Seasonal Total Suspended Solids Concentrations for Water Quality Monitoring Program.**

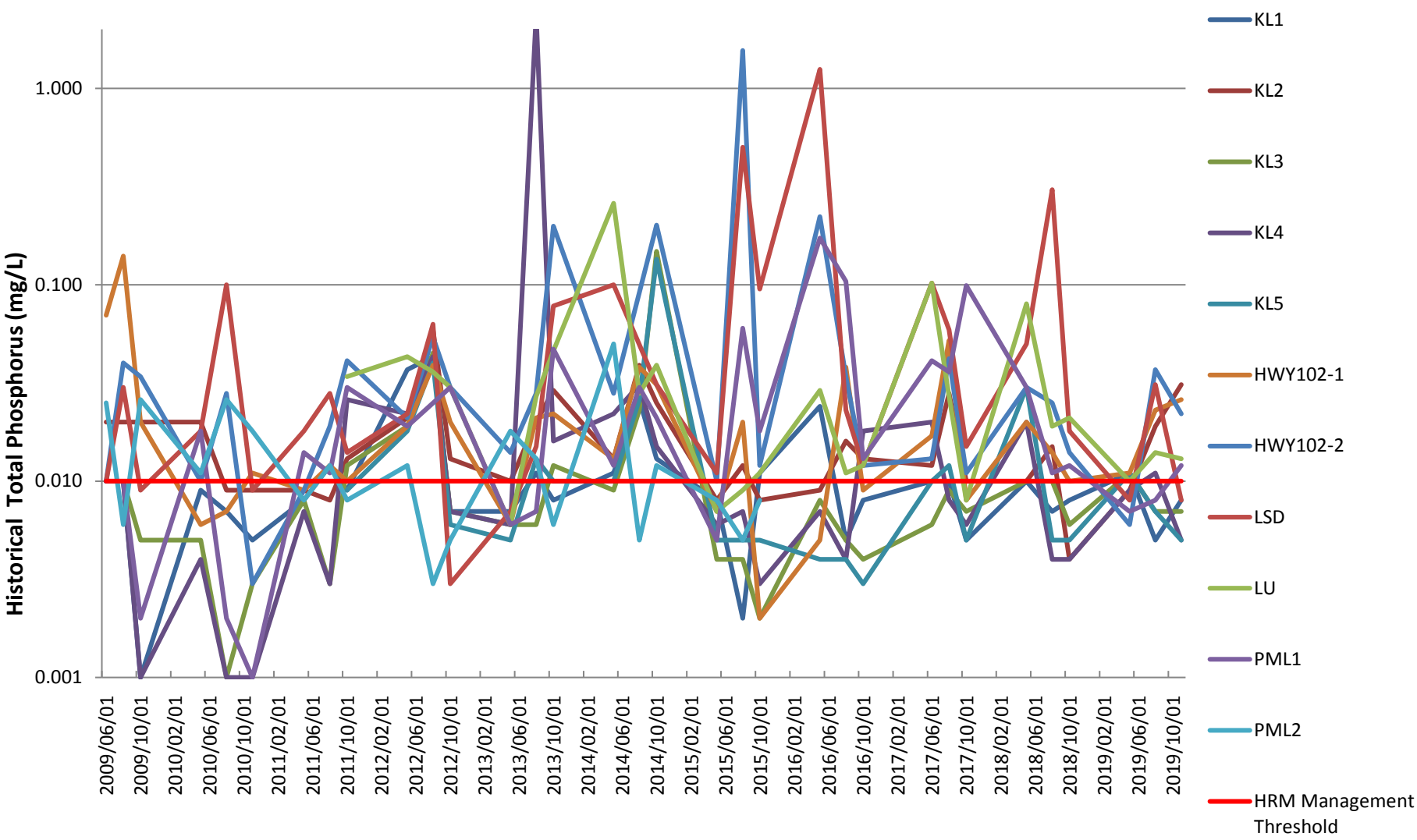


**Figure 7 – Historical Total Phosphorus Concentrations for Water Quality Monitoring Program.**

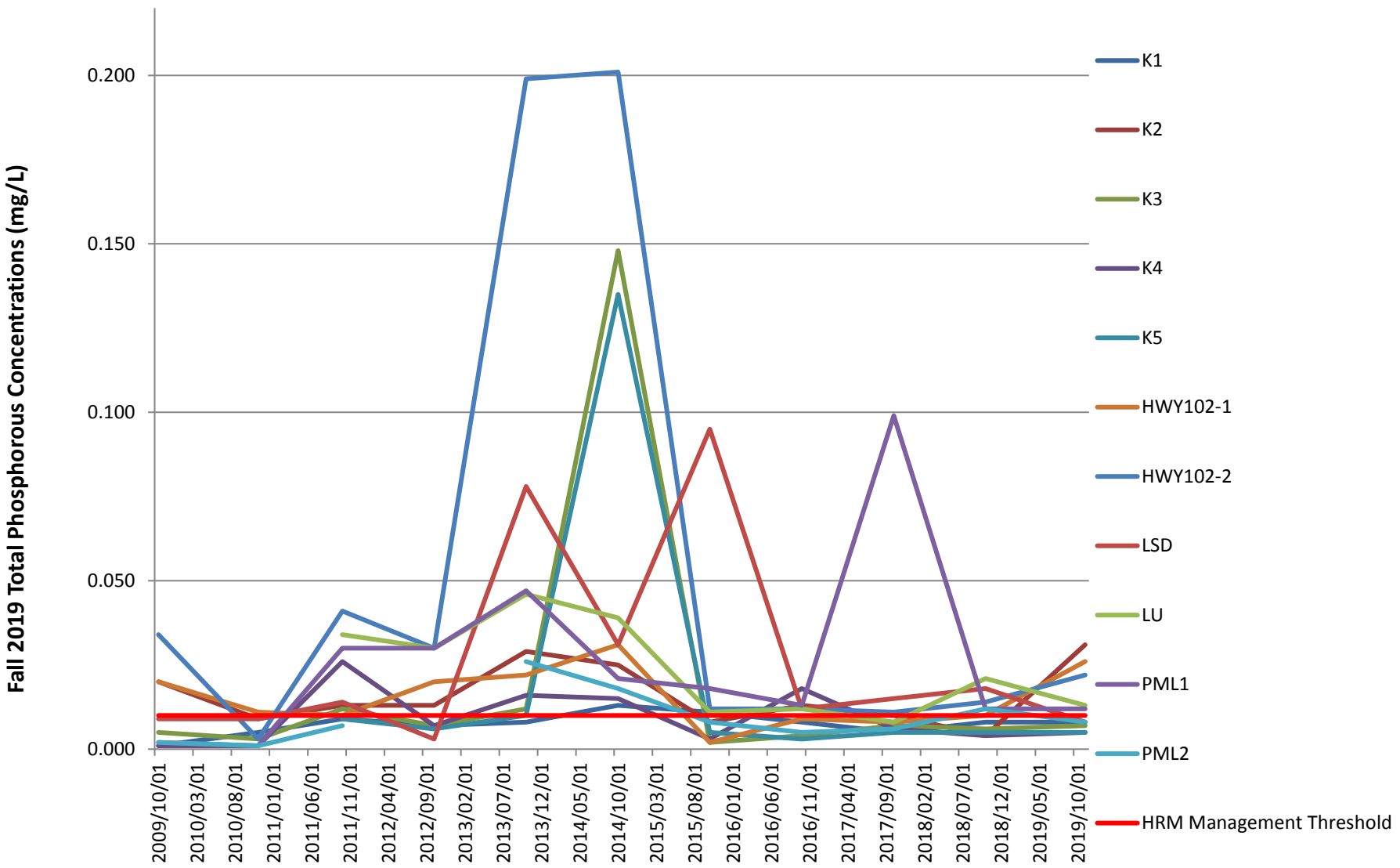


**Figure 8 – Seasonal Total Phosphorus Concentrations for Water Quality Monitoring Program.**

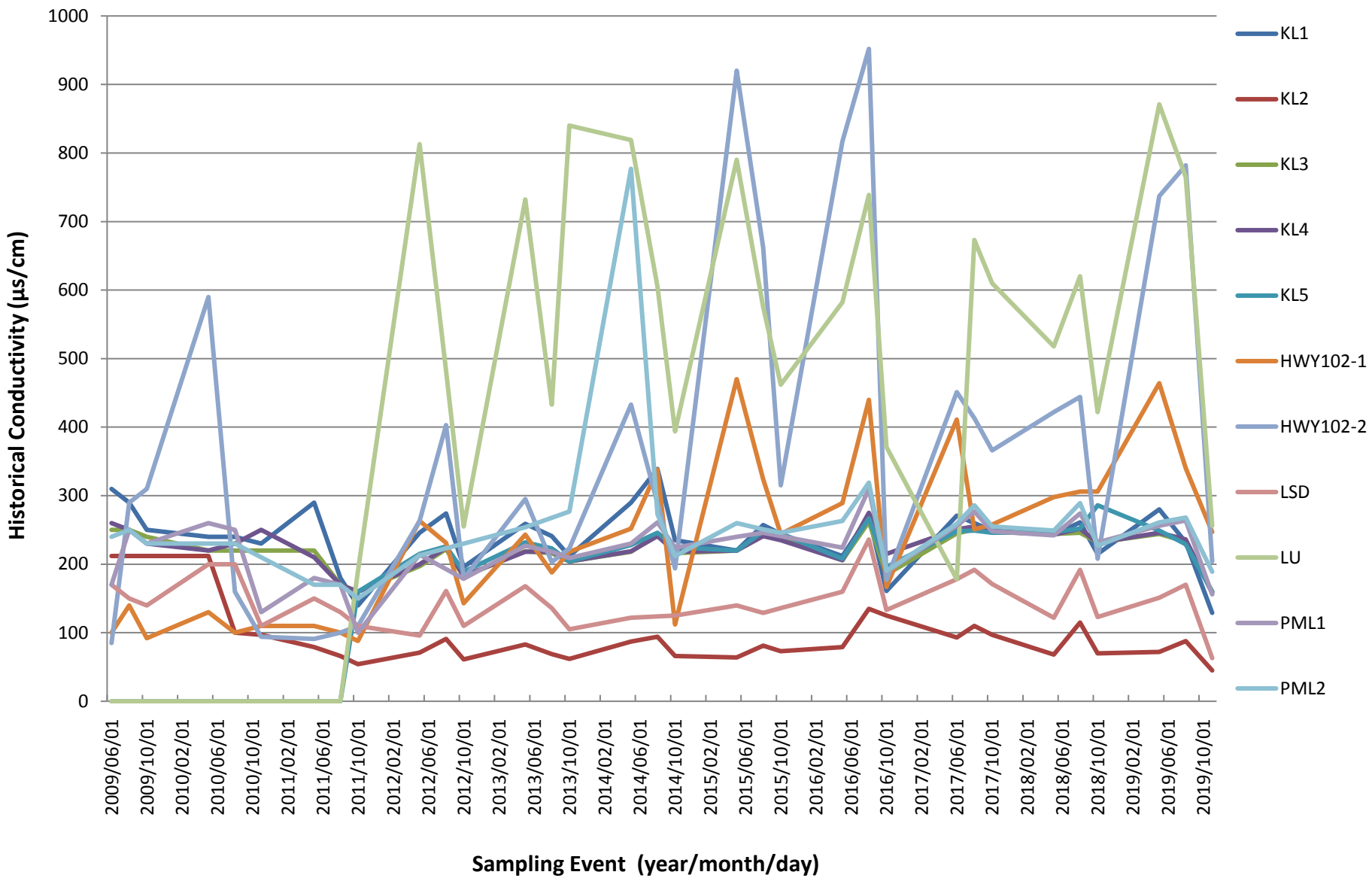


**Figure 9 – Historical Measurement of Conductivity for Water Quality Monitoring Program.**

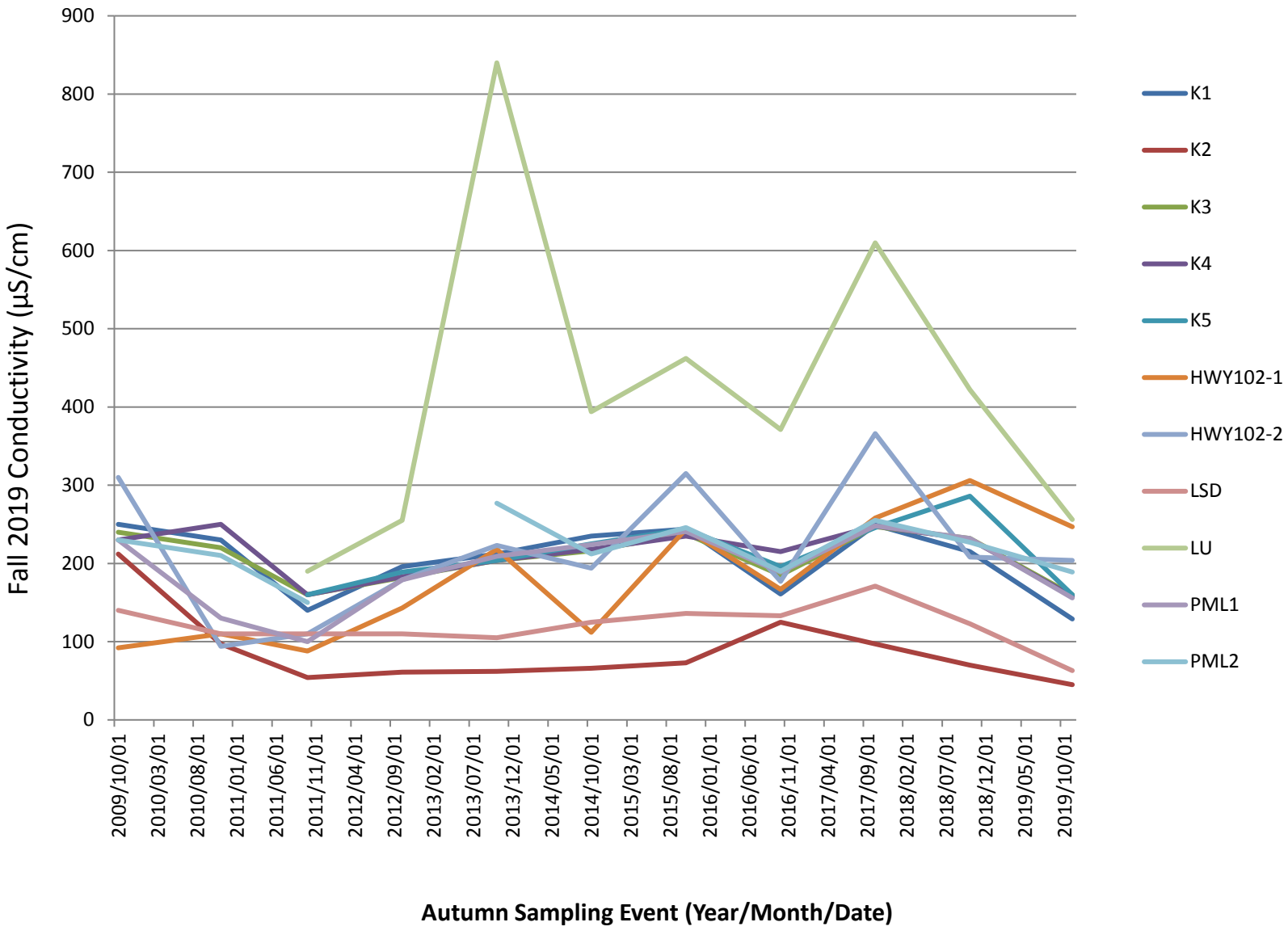


**Figure 10 – Seasonal Conductivity Measurements for Water Quality Monitoring Program.**

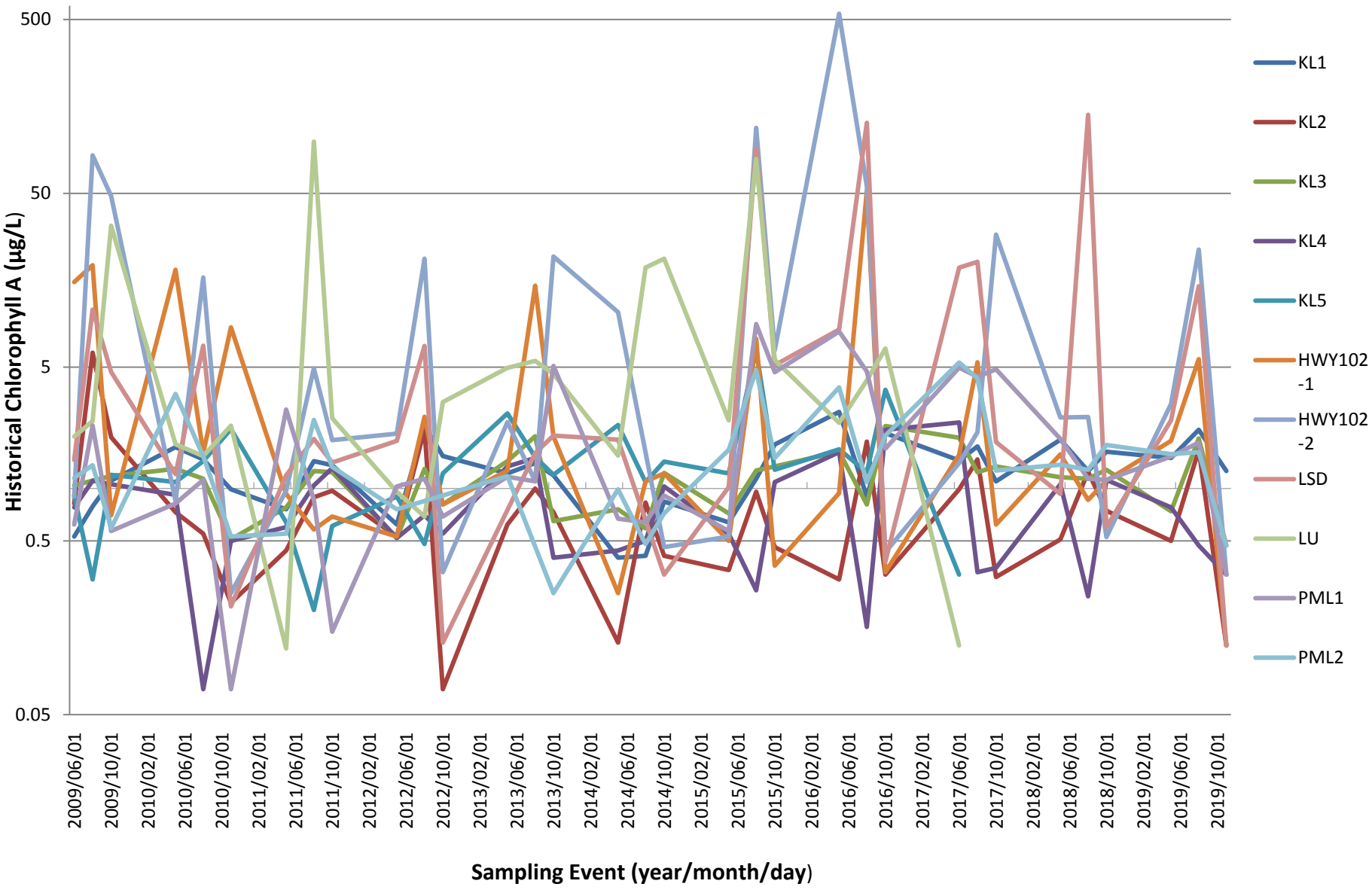


**Figure 11 – Historical Chlorophyll A Concentrations for Water Quality Monitoring Program.**

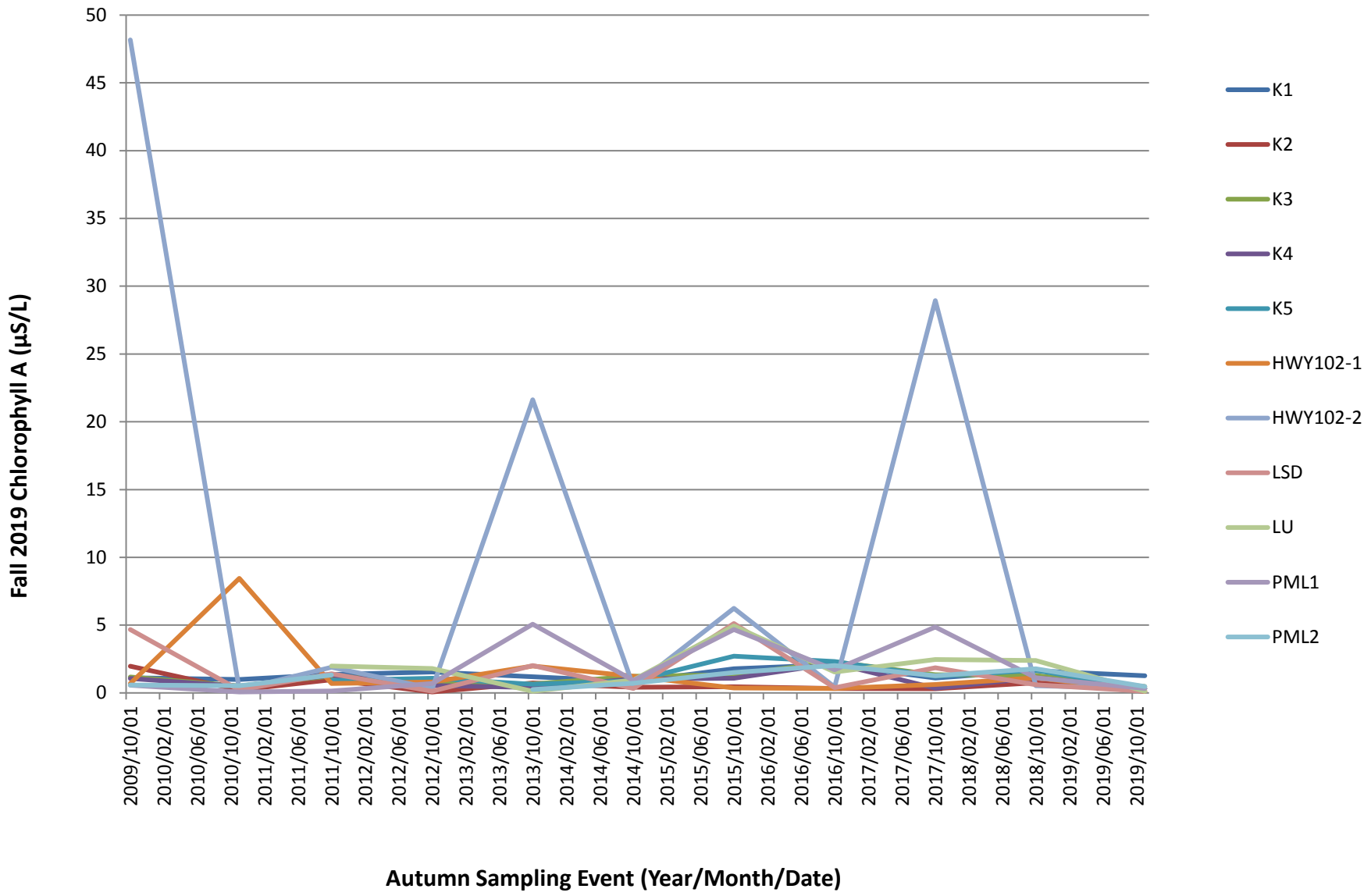


**Figure 12 – Seasonal Chlorophyll A Concentrations for Water Quality Monitoring Program.**



SNC·LAVALIN

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# HRM Water Quality Monitoring Program – Bedford West

Final Report
Bedford West Subdivision and Papermill Lake Watershed
Project #TE201017

Prepared for:

**Halifax Regional Municipality**
40 Alderney Drive, Dartmouth, NS, B2Y 2N5

1-Jun-21

# HRM Water Quality Monitoring Program – Bedford West

## Final Report

## Bedford West Subdivision and Papermill Lake Watershed

**Project #TE201017**

**Prepared for:**
Halifax Regional Municipality
40 Alderney Drive, Dartmouth, NS, B2Y 2N5

**Prepared by:**
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**1-Jun-21**

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# Executive summary

Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood) has prepared this report to provide Halifax Regional Municipality (HRM) with water quality data for thirteen (13) surface water stations throughout the Bedford West development area. Water quality monitoring in the Bedford West development area has been ongoing since 2009 and in June 2020 Wood was retained by HRM to complete water quality monitoring programs each spring, summer, and fall for three years beginning in July 2020. The HRM Bedford West Water Quality Monitoring contract between HRM and Wood was signed in June 2020, thus sample collection in 2020 was completed during early summer (July), late summer (August), and fall events (October). The results of the 2020 surface water monitoring program are detailed herein. The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the development projects within the Papermill and Bedford West Watersheds in order to detect any impacts on and/or changes to water quality.

The 2020 water quality monitoring event included the collection of surface water samples at eleven water quality sampling stations for the analysis of inorganics, calculated parameters, standard metals, microbiological and additional metals. Additionally, field parameters collected at each station included in-situ pH, water temperature, dissolved oxygen, conductivity, Secchi depth, air temperature, cloud cover and wildlife sightings.

### 2020 Bedford West Water Quality Monitoring Program Results

#### *Total Phosphorus*

The following eleven (11) monitoring stations reported concentrations of Total Phosphorus above HRM's management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L):

- KL-1: Late Summer 0.036 mg/L, Fall 0.029 mg/L
- KL-2: Early Summer 0.014 mg/L, Late Summer 0.027 mg/L, Fall 0.16 mg/L
- KL-3: Late Summer 0.014 mg/L, Fall 0.023 mg/L
- KL-4: Late Summer 0.014 mg/L
- KL-5: Late Summer 0.028 mg/L
- HWY-102-1: Early Summer 0.012 mg/L, Late Summer 0.016 mg/L
- HWY-102-2: Early Summer 0.018 mg/L, Fall 0.013 mg/L
- LSD: Early Summer 0.028 mg/L, Late Summer 0.084 mg/L
- LU: Early Summer 0.011 mg/L, Late Summer 0.013 mg/L, Fall 0.16 mg/L
- PML-1: Late Summer 0.011 mg/L, Fall 0.020 mg/L, and
- PML-2: Late Summer 0.017 mg/L.

#### *Field Measurements*

- All eleven (11) stations were within the 5.0 – 9.0 pH Health Canada range for Recreational Water Quality during the Early Summer, Late Summer and Fall monitoring events. The two additional stations, KL-D1 and DKL-D2 were also within the 5.0 – 9.0 pH Health Canada range for Recreational Water Quality during the Late Summer monitoring event. All thirteen (13) sampling stations were found outside the CCME-FWAL recommended range of 6.5-9.0 during specific Early Summer, Late Summer and Fall events, ranging from 5.56 to 6.49.

- In-situ dissolved oxygen was outside of the CCME FWAL acceptable range of 5.5-9.5 mg/L at ten (10) of the sampling stations, including: KL-1: Fall 9.69 mg/L; KL-2: Early Summer 5.10 mg/L, Late Summer 4.96 mg/L, Fall 9.84 mg/L; KL-3: Early Summer 5.09 mg/L; KL-4: Early Summer 3.49 mg/L, Late Summer 4.73 mg/L; HWY-102-1: Early Summer 3.27 mg/L, Late Summer 2.61 mg/L; HWY-102-2: Early Summer 4.92 mg/L, Fall 5.45 mg/L; LSD: Early Summer 2.66 mg/L, Late Summer 3.24 mg/L, Fall 11.40 mg/L; LU: Early Summer 3.53 mg/L; PML-1: Fall 10.80 mg/L ; and. PML-2: Fall 10.16 mg/L.
- In-situ water temperature was recorded between 21.2°C and 26.5°C during the Early Summer event, between 15.9°C and 23.7°C during the Late Summer event, and 6.2°C to 12.2°C during the Fall event.
- In-situ water conductivity was recorded between 81 and 945 µs/cm during the Early Summer event, between 89 and 710 µs/cm during the Late Summer event, and 81 and 512 µs/cm during the Fall event.
- Secchi depths were collected at one (1) monitoring station, KL-2 in the Early Summer (1.35 m) and Late Summer (1.60 m) meeting the Health Canada reference value of 1.2 metres.

### *General Chemistry and Metals*

- Three (3) sampling stations reported chloride concentrations above the CCME FWAL limit of 120 mg/L: HWY-102-1: Early Summer 137 mg/L; HWY-102-2: Early Summer 172 mg/L, Late Summer 200 mg/L, and LU: Early Summer 297 mg/L, Late Summer 221 mg/L, Fall 147 mg/L.
- All eleven (11) stations reported pH values well within Health Canada range of 5.0-9.0 for Recreational Water Quality. The following (1) station was found outside the recommended pH ranges of 6.5 – 9.0 for the CCME FWAL: KL-2: Fall pH 6.49.
- All eleven (11) stations exceeded the NSE EQS aluminum guideline of 5 µg/L and four (4) of those stations also exceeded the CCME FWAL limit of 100 µg/L (KL-1, KL-2, HWY-102-1, LSD) during the Early Summer monitoring event.
- Four (4) stations exceeded the NSE EQS cadmium guideline of 0.01 µg/L: KL-1, KL-4, KL-5, and LU during the Early Summer monitoring event..
- Two (2) stations exceeded the NSE EQS copper guideline of 2 µg/L and the CCME FWAL guideline of 2-2.41 µg/L: HWY-102-2: Early Summer 3 µg/L, Late Summer 4 µg/L, and LU: Fall 3 µg/L.
- Five (5) stations exceeded the NSE EQS iron guideline and CCME FWAL limit of 300 µg/L: KL-2: Early Summer 486 µg/L, Late Summer 1040 µg/L, Fall 659 µg/L; HWY-102-1: Early Summer 429 µg/L, Late Summer 528 µg/L; HWY-102-2: Early Summer 3260 µg/L, Late Summer 7640 µg/L, Fall 1030 µg/L; LSD: Early Summer 3510 µg/L, Late Summer 4550 µg/L, Fall 378 µg/L; and LSD: Early Summer 1210 µg/L, Late Summer 429 µg/L, Fall 432 µg/L.
- One (1) station exceeded the NSE EQS molybdenum guideline of 820 µg/L: LSD: Early Summer 2840 µg/L, Late Summer 1190 µg/L.

### *Microbiology*

- There were no exceedances of the HC E. coli Guidelines of 400 CFU/100 mL (maximum allowable concentration).
- HC does not have a recreational water quality guideline for Total Coliform. All eleven (11) stations reported Total Coliform concentrations above the laboratory RDL of 1 CFU/100 mL. Reported concentrations ranged from 130 CFU/100mL to >2420 CFU/100 mL.

The statements made in this Executive Summary are subject to the same limitations included in Section 10.0 (Closure) and are to be read in conjunction with the remainder of this report.

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Appendix D Laboratory Certificates of Analysis
Appendix E Graphs

# 1.0 Introduction

Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood) has prepared this report to provide Halifax Regional Municipality (HRM) with water quality data for thirteen (13) surface water stations throughout the Bedford West development area. Water quality monitoring in the Bedford West development area has been ongoing since 2009 and in June 2020 Wood was retained by HRM to complete water quality monitoring programs each spring, summer, and fall for three years beginning in July 2020. The HRM Bedford West Water Quality Monitoring contract between HRM and Wood was signed in June 2020, thus sample collection in 2020 was completed during early summer (July), late summer (August), and fall events (October). The results of the 2020 surface water monitoring program are detailed herein. The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the development projects within the Papermill and Bedford West Watersheds in order to detect any impacts on and/or changes to water quality.

## 1.1 Background

HRM has designated the Bedford West area as one of the primary locations for urban growth through 2031. The Bedford West Secondary Planning Strategy (SPS) was approved by Regional Council in 2006 and divides the Bedford West area into 12 sub-areas. The SPS provides direction for land use, environmental protection and other activities, across the area. It also enables development primarily through the development agreement (DA) process. DAs for eight of the 12 Sub-Areas (2, 3+4, 5, 7+8, 9, 10) have been approved by Council; DAs for the remaining areas are anticipated to be negotiated and approved at various points between 2020 and 2030.

Environmental protection policy in the SPS requires water quality testing to determine the impact of development on the Papermill Lake watershed. Each DA approved under the SPS identifies specific requirements for water quality monitoring, including the location of testing sites and required testing parameters. Water quality monitoring in the Bedford West area has been reportedly ongoing since 2009.

The goal of this contract is to fulfill the legislative requirement for water quality monitoring in Bedford West for a period of three years, to determine the potential impact of development activities within the affected watershed, in accordance with the terms of applicable DAs.

Water quality monitoring is required by HRM in spring (May), summer (August), and fall (October) from the 11 locations identified on the Bedford West Sampling Location Map included in Appendix A. As noted above, sample collection in 2020 was completed during early summer (July), late summer (August), and fall events (October).

## 1.2 Purpose

The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the development project in order to detect any impacts on and/or changes to water quality.

The 2020 sampling stations are summarized in Table 1 and shown in Figure 1.

**Table 1: Bedford West Water Quality Sampling Stations**

| Water Course | Sampling Location Name | Updated Coordinates (UTM NAD 83) | |
|---|---|---|---|
| | | Easting | Northing |
| Kearney Lake | KL-1 | 20T0445718E | 4948496N |
| Kearney Lake | KL-2 | 20T0443942E | 4949803N |
| Kearney Run | KL-3 | 20T0444390E | 4950406N |
| Kearney Run | KL-4 | 20T0444463E | 4950571N |
| Kearney Lake | KL-5 | 20T0445280E | 4949142N |
| Creek Above Highway | HWY-102-1 | 20T0444708E | 4951644N |
| Creek Below Highway | HWY-102-2 | 20T0444829E | 4951778N |
| Lake Shore Drive | LSD | 20T0442583E | 4950431N |
| Larry Uteck Off-Ramp | LU | 20T0442583E | 4949891N |
| Paper Mill Lake | PML-1 | 20T0445129E | 4951154N |
| Paper Mill Lake | PML-2 | 20T0445363E | 4951740N |

At the request of HRM, Wood added two additional monitoring stations in the Late Summer of 2020 to document field observations (Secchi depth, water temperature, dissolved oxygen, pH, and specific conductivity and collect samples for the analysis of Total Suspended Solids and microbiological (Total coliforms and E. coli).

**Table 2: Additional Bedford West Water Quality Sampling Stations – Late Summer 2020**

| Water Course | Sampling Location Name | Updated Coordinates (UTM NAD 83) | |
|---|---|---|---|
| | | Easting | Northing |
| Kearney Lake | KL-D1 | 20T0444228E | 4950380N |
| Kearney Lake | KL-D2 | 20T0444236E | 4950303N |

# 2.0 Methodology

The 2020 water quality sampling events included measurements of Field Parameters (Group A) and collection of surface water for laboratory analysis of:

- Inorganics (Group B)
- Calculated Parameters (Group C);
- Standard Elements/Metals (Group D); and
- Microbiological Analyses (Group E).

Table 3 below summarizes the water quality parameters measured in the field or analyzed by the laboratory.

**Table 3. Analytical Parameter Groups**

| Field Parameters (A) | Inorganics (B) | Calculated Parameters (C) | Standard Metals (D) | Microbiology (E) |
|---|---|---|---|---|
| • pH<br>• TDS<br>• Dissolved Oxygen<br>• Temperature<br>• Secchi Depth<br>• Conductance<br>• Air Temperature<br>• Cloud Cover<br>• Incidental Wildlife Sightings | • Total Alkalinity (as CaCO3)<br>• Dissolved Chloride<br>• Total Kjeldahl Nitrogen<br>• Nitrate + Nitrite<br>• Nitrate<br>• Nitrite<br>• Nitrogen (as NH4)<br>• Total Organic Carbon<br>• Orthophosphate (P)<br>• pH<br>• Low Total Phosphorus<br>• Reactive Silica<br>• Total Suspended Solids<br>• Dissolved Sulphate<br>• Turbidity<br>• Conductivity | • Anion Sum<br>• Cation Sum<br>• Ion Balance<br>• Bicarbonate Alkalinity (as CaCO3)<br>• Carbonate Alkalinity (as CaCO3)<br>• Hardness<br>• Total Dissolved Solids<br>• Saturation pH (@4°C & 20°C)<br>• Langelier Index (@4°C & 20°C) | • Calcium<br>• Copper<br>• Iron<br>• Magnesium<br>• Manganese<br>• Potassium<br>• Sodium<br>• Zinc | • Chlorophyll-A<br>• E. coli<br>• Most Probable Number (MPN) or CFU per 100 mL |

Due to the award of this contract being in late June, the Early Summer water quality monitoring event at Bedford West was completed on 2 July 2020, followed by the Late Summer monitoring event on 17 August 2020, and the Fall event on 29 October 2020.

Field measurements of pH, dissolved oxygen, specific conductance and water temperature were taken at each station using a YSI Professional Plus multi metre probe. Calibration logs for the YSI metre are included in Appendix F. Field measurements and documentation of cloud cover, wildlife sightings, and wind and wave observations were recorded on Standard Project Field Reports, which are included in Appendix B. It should be noted that samples were collected from the shore at eight (8) stations (KL-2, KL-3, KL-4, KL-5, HWY-102-1, HWY-102-2, LSD, and LU); however, a non-motorized boat was used to access three (3) stations KL-1, PML-1, and PML-2.

Surface water sampling followed Wood's Standard Operating Procedures (SOP) for surface water sampling. A new pair of nitrile gloves was used at each sampling location. Water samples and field parameter readings were collected within a depth of ≤ 1.0 m below surface (if possible). Surface water grab samples were

collected and placed in clean laboratory-supplied bottles and stored in a chilled container together with a chain of custody record for transport to the laboratory. Samples were sent to AGAT Laboratories located in Dartmouth, Nova Scotia. AGAT is an accredited laboratory by the Standard Council of Canada (SCC). Canadian Association of Laboratory Accreditation (CALA) and ISO9011:2015.

# 3.0 Applicable Guidelines

For this water quality program, the Federal and Provincial Water Quality Guidelines being used for the assessment of surface water quality results are as follows: the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Aquatic Life – freshwater (FWAL) (Version, 2015), the Health Canada (HC) guidelines for Canadian Recreational Water Quality (2012, Third Edition), and the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Contaminated Sites (NSE, 2020) Table A2. Reference for Pathway Specific Standards for Surface Water (µg/L) for Fresh Water. These guidelines were to gauge whether a tested parameter was an exceedance. Exceedances may be an indication of water quality impairment or conditions that will eventually lead to impairment. A detailed description of the guidelines is presented below.

### *CCME Guidelines*

The CCME FWAL guidelines were used for parameters such as dissolved oxygen, pH (in-situ and analytical), chloride, nitrate, nitrite, nitrogen, as well as for total metals such as aluminum, arsenic, boron, cadmium, copper, iron, lead, molybdenum, nickel, selenium, silver, thallium, uranium, and zinc.

There is no CCME recommended value for Total Suspended Solids (TSS); however, the following CCME narrative for TSS as high flow was applied "maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L should not increase more than 10% of background levels when background is ≥ 250 mg/L".

According to CCME, 10 µg/L of total phosphorus is the threshold between oligotrophic and mesotrophic classification. In the Canadian framework, a trigger range is a desired concentration range for phosphorus; if the upper limit of the range is exceeded, it indicates potential for environmental quality issues, which may trigger the need for further investigation. HRM defined a Total Phosphorus management threshold value of 10 µg/L or 0.01 mg/L for this monitoring program.

### *HC Guidelines*

The HC guidelines for Canadian Recreational Quality was used for parameters such as Secchi depth (i.e. visibility at a minimum depth of 1.2 metres), pH guidelines of 5.0-9.0, turbidity (limit of 50 Nephelometric Turbidity Units), and E. coli (i.e. maximum allowable concentration of 400 E. Coli/100 mL). The maximum allowable concentration guideline of 400 E. Coli/100 mL is also the guideline used by the HRM Beach Monitoring Program to assess compliance.

### *NSE Guidelines*

The NSE EQS were used for assessment of total metals such as aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, strontium, thallium, uranium, vanadium, and zinc.

# 4.0 Field Observations

The 2020 site conditions were recorded for all eleven (11) surface water quality monitoring stations during the Early Summer, Late Summer and Fall monitoring events and are included in the field data sheets in

Appendix B. Site condition observations include weather, cloud cover, air temperature, wildlife sightings and site accessibility.

# 5.0 Field Measurements

Field parameters such as in situ pH, dissolved oxygen, water temperature, conductivity and Secchi depth (where applicable) were recorded on field data sheets. Field collected data is included in Appendix B.

Field measurements are also tabulated in Appendix C: Table C1 – 2020 Results ad Table C2: Historical Results.

### *In-situ pH*

All eleven (11) stations were within the 5.0 – 9.0 pH Health Canada range for Recreational Water Quality during the Early Summer, Late Summer and Fall monitoring events. The two additional stations, KL-D1 and DKL-D2 were also within the 5.0 – 9.0 pH Health Canada range for Recreational Water Quality during the Summer monitoring event. All thirteen (13) sampling stations were found outside the CCME-FWAL recommended range of 6.5-9.0 during specific events:

- KL-1: Early Summer pH 6.43
- KL-2: Early Summer pH 6.07, Late Summer pH 5.98, Fall pH 6.16
- KL-3: Late Summer pH 6.21
- KL-4: Early Summer pH 6.30, Late Summer pH 5.78
- KL-5: Late Summer pH 6.49
- KL-D1: Late Summer pH 6.26
- KL-D2: Late Summer pH 6.03
- HWY-102-1: Early Summer pH 6.20, Late Summer pH 6.22, Fall pH 6.49
- HWY-102-2: Early Summer pH 5.99, Late Summer pH 5.56, Fall pH 6.18
- LSD: Early Summer pH 6.31, Late Summer pH 6.05, Fall pH 6.41
- LU: Early Summer pH 6.36, Late Summer pH 6.24, Fall pH 6.27
- PML-1: Early Summer pH 5.77, Late Summer pH 5.62; and,
- PML-2: Early Summer pH 6.07, Late Summer pH 6.08.

### *Dissolved Oxygen*

In-situ dissolved oxygen was outside of the CCME FWAL acceptable range of 5.5-9.5 mg/L at ten (10) of the sampling stations, including:

- KL-1: Fall 9.69 mg/L
- KL-2: Early Summer 5.10 mg/L, Late Summer 4.96 mg/L, Fall 9.84 mg/L
- KL-3: Early Summer 5.09 mg/L
- KL-4: Early Summer 3.49 mg/L, Late Summer 4.73 mg/L
- HWY-102-1: Early Summer 3.27 mg/L, Late Summer 2.61 mg/L

- HWY-102-2: Early Summer 4.92 mg/L, Fall 5.45 mg/L
- LSD: Early Summer 2.66 mg/L, Late Summer 3.24 mg/L, Fall 11.40 mg/L
- LU: Early Summer 3.53 mg/L
- PML-1: Fall 10.80 mg/L
- PML-2: Fall 10.16 mg/L

#### *Water Temperature*

There are no applicable CCME, HC or NSE guidelines for recreational water temperature. Water temperature was recorded between 6.2°C during the Fall event (HWY102-1) and 26.5°C during the Early Summer event (LSD).

#### *Conductivity*

There are no applicable CCME, HC or NSE guidelines for recreational water conductivity. However, specific water conductivity was recorded between 80.8 µs/cm at KL-2 during the Early Summer event to 945.0 µs/cm at LU during the Early Summer event.

#### *Secchi Depth*

Secchi depths were collected at one (1) monitoring station, KL-2 Secchi depth readings met the Health Canada reference guidelines of minimum 1.2 metres (m) Recorded values were as follows:

- KL-2: Early Summer 1.35 m, Late Summer 1.60 m

# 6.0 Analytical Results

Analytical results of the 2019 fall monitoring program event and applicable/reference guidelines are tabulated in Table C1 and enclosed in Appendix C. In addition, historical water quality results from 2009 – 2019 are summarized in Table C2 and including in Appendix C.

Laboratory certificates of analysis for the 2019 fall vent are in appendix D.

## 6.1 Total Phosphorus

All eleven (11) monitoring stations reported concentrations that exceeded the Total Phosphorus (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) listed in the HRM RFP14-338 during at least one monitoring event in 2020. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL-1: Late Summer 0.036 mg/L, Fall 0.029 mg/L
- KL-2: Early Summer 0.014 mg/L, Late Summer 0.027 mg/L, Fall 0.16 mg/L
- KL-3: Late Summer 0.014 mg/L, Fall 0.023 mg/L
- KL-4: Late Summer 0.014 mg/L
- KL-5: Late Summer 0.028 mg/L
- HWY-102-1: Early Summer 0.012 mg/L, Late Summer 0.016 mg/L
- HWY-102-2: Early Summer 0.018 mg/L, Fall 0.013 mg/L
- LSD: Early Summer 0.028 mg/L, Late Summer 0.084 mg/L

- LU: Early Summer 0.011 mg/L, Late Summer 0.013 mg/L, Fall 0.16 mg/L
- PML-1: Late Summer 0.011 mg/L, Fall 0.020 mg/L, and
- PML-2: Late Summer 0.017 mg/L.

## 6.2 General Chemistry

Of the tested inorganic parameters (Column B, Table 3) and calculated parameters (Column C, Table 3), only concentrations of chloride and pH values were reported outside or above the applicable guidelines.

### *Chloride*

Three (3) sampling stations reported chloride concentrations above the CCME FWAL limit of 120 mg/L:

- HWY-102-1: Early Summer 137 mg/L
- HWY-102-2: Early Summer 172 mg/L, Late Summer 200 mg/L, and
- LU: Early Summer 297 mg/L, Late Summer 221 mg/L, Fall 147 mg/L

### *Laboratory pH*

All eleven (11) stations reported pH values well within Health Canada range of 5.0-9.0 for Recreational Water Quality. The following (1) station was found outside the recommended pH ranges of 6.5 – 9.0 for the CCME FWAL:

- KL-2: pH 6.49

## 6.3 Metals

The following metals were analyzed during the Early Summer 2020 monitoring event: aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, tin, titanium, uranium, vanadium, and zinc. The following metals were analyzed during the Late Summer and Fall 2020 monitoring events: calcium, copper, iron, lead, manganese, magnesium, potassium, sodium, and zinc. During the 2020 monitoring events, exceedances were reported well above the guidelines/reference limits for aluminum, cadmium, copper, iron, and molybdenum parameters. Exceedances were reported as follows:

### *Aluminum*

All eleven (11) stations exceeded the NSE EQS aluminum guideline of 5 µg/L and four (4) of those stations also exceeded the CCME FWAL limit of 100 µg/L.

- KL-1: Early Summer 136 µg/L (CCME and NSE Exceedance)
- KL-2: Early Summer 227 µg/L (CCME and NSE Exceedance)
- KL-3: Early Summer 60 µg/L (NSE EQS Exceedance)
- KL-4: Early Summer 52 µg/L (NSE EQS Exceedance)
- KL-5: Early Summer 75 µg/L (NSE EQS Exceedance)
- HWY-102-1: Early Summer 107 µg/L (CCME and NSE Exceedance)
- HWY-102-2: Early Summer 99 µg/L (NSE EQS Exceedance)

- LSD: Early Summer 248 µg/L (CCME and NSE Exceedance)
- LU: Early Summer 32 µg/L (NSE EQS Exceedance)
- PML-1: Early Summer 35 µg/L, and (NSE EQS Exceedance),
- PML-2: Early Summer 36 µg/L (NSE EQS Exceedance)

### *Cadmium*

Cadmium concentrations at the eleven stations did not exceed the CCME guideline of 0.4-0.16 µg/L. Four (4) stations exceeded the NSE EQS cadmium guideline of 0.01 µg/L:

- KL-1: Early Summer 0.024 µg/L
- KL-4: Early Summer 0.020 µg/L
- KL-5: Early Summer 0.026 µg/L, and
- LU: Early Summer 0.025 µg/L

### *Copper*

Two (2) stations exceeded the NSE EQS copper guideline of 2 µg/L and the CCME FWAL guideline of 2-2.41 µg/L:

- HWY-102-2: Early Summer 3 µg/L, Late Summer 4 µg/L, and)
- LU: Fall 3 µg/L

### *Iron*

Five (5) stations exceeded the NSE EQS iron guideline and CCME FWAL limit of 300 µg/L:

- KL-2: Early Summer 486 µg/L, Late Summer 1040 µg/L, Fall 659 µg/L
- HWY-102-1: Early Summer 429 µg/L, Late Summer 528 µg/L
- HWY-102-2: Early Summer 3260 µg/L, Late Summer 7640 µg/L, Fall 1030 µg/L
- LSD: Early Summer 3510 µg/L, Late Summer 4550 µg/L, Fall 378 µg/L
- LSD: Early Summer 1210 µg/L, Late Summer 429 µg/L, Fall 432 µg/L

### *Manganese*

One (1) station exceeded the NSE EQS manganese guideline of 820 µg/L:

- LSD: Early Summer 2840 µg/L, Late Summer 1190 µg/L

## 6.4 Microbiological

There were no exceedances of the HC E. coli Guidelines of 400 CFU/100 mL (maximum allowable concentration).

HC does not have a recreational water quality guideline for Total Coliform. All eleven (11) stations reported Total Coliform concentrations above the laboratory RDL of 1 CFU/100 mL. Reported concentrations ranged from 130 CFU/100mL to >2420 CFU/100 mL.

# 7.0 Statistical Presentation

Statistics water quality data from June 2009 to October 2020 of all eleven (11) water quality monitoring stations. Table 4 below for each of the stations provides the seasonal statistics for the following six (6) key water quality parameters selected by HRM:

- Total Phosphorus (mg/L);
- Dissolved Oxygen (mg/L);
- Laboratory measured pH;
- Total Suspended Solids (mg/L);
- Conductivity (µs/cm); and,
- Chlorophyll-A (µg/L).

Where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL), the statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) as a conservative approach. It should be noted that the number of decimal places presented for each listed parameter is based on the decimal places of the RDL and reported laboratory Certificate of Analysis.

The method of detection for Chlorophyll-A for this report was Spectrophotometer, which was changed from 2018 which used acidification by fluorometric (Holm-Hansen) and non-acidification by fluorometric (Welschmeyer). For the graphical representation of Chlorophyll-A, the results from the Welschmeyer method were graphed until August 2019, afterwards Spectrophotometer results were graphed.

**Table 4: Statistical Presentation of Key Water Quality Parameters - KL-1**

| KL-1 | RDL (2020) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 0.006 | 0.008 | 0.007 | 0.037 | 0.010 | 0.011 |
| Late Summer 2020 | 0.006 | 0.036 | 0.002 | 0.043 | 0.010 | 0.010 |
| Fall 2020 | 0.006 | 0.029 | 0.001 | 0.029 | 0.008 | 0.007 |
| **Chloride (mg/L)** | | | | | | |
| Early Summer 2020 | 1 | 65 | 53 | 81 | 66 | 67 |
| Late Summer 2020 | 1 | 59 | 45 | 76 | 60 | 62 |
| Fall 2020 | 1 | 60 | 33 | 64 | 53 | 51 |
| **Lab pH** | | | | | | |
| Early Summer 2020 | N/A | 6.82 | 6.52 | 6.94 | 6.71 | 6.72 |
| Late Summer 2020 | N/A | 6.94 | 6.51 | 7.31 | 6.98 | 6.98 |
| Fall 2020 | N/A | 6.79 | 6.35 | 7.07 | 6.80 | 6.78 |
| **Total Suspended Solids (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 5 | 6 | 1 | 38 | 3 | 3 |
| Late Summer 2020 | 5 | <5 | 1 | 17 | 3 | 3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Fall 2020 | 5 | <5 | 1 | 5 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Early Summer 2020 | 1 | 266 | 212 | 310 | 263 | 259 |
| Late Summer 2020 | 1 | 275 | 180 | 339 | 261 | 257 |
| Fall 2020 | 1 | 239 | 129 | 250 | 223 | 204 |
| **Chlorophyll-A Spectrophotometer (µg/L)[2]** | | | | | | |
| Early Summer 2020 | 0.25 | 4.42 | 4.42 | 4.42 | 4.42 | 4.42 |
| Late Summer 2020 | 0.25 | 1.73 | 1.73 | 1.73 | 1.73 | 1.73 |
| Fall 2020 | 0.25 | 0.95 | 0.95 | 1.73 | 1.50 | 1.09 |

**Notes:**

1 **The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.**

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2020, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters - KL-2**

| KL-2 | RDL (2020) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Early Summer 2020 | 0.006 | 0.014 | 0.008 | 0.021 | 0.013 | 0.013 |
| Late Summer 2020 | 0.006 | 0.027 | 0.008 | 0.059 | 0.020 | 0.019 |
| Fall 2020 | 0.006 | 0.016 | 0.004 | 0.031 | 0.013 | 0.014 |
| **Chloride (mg/L)** | | | | | | |
| Early Summer 2020 | 1 | 17 | 12 | 48 | 18 | 20 |
| Late Summer 2020 | 1 | 21 | 14 | 48 | 20 | 20 |
| Fall 2020 | 1 | 15 | 10 | 48 | 14 | 16 |
| **Lab pH** | | | | | | |
| Early Summer 2020 | N/A | 6.60 | 6.27 | 6.85 | 6.48 | 6.51 |
| Late Summer 2020 | N/A | 7.01 | 6.40 | 7.04 | 6.86 | 6.81 |
| Fall 2020 | N/A | 6.49 | 5.89 | 6.85 | 6.28 | 6.30 |
| **Total Suspended Solids (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 5 | <5 | 1 | 103 | 3 | 4 |
| Late Summer 2020 | 5 | <5 | 1 | 135 | 3 | 5 |
| Fall 2020 | 5 | 5 | 1 | 103 | 3 | 3 |
| **Conductivity (µS/cm)** | | | | | | |
| Early Summer 2020 | 1 | 95 | 64 | 212 | 81 | 93 |
| Late Summer 2020 | 1 | 128 | 66 | 212 | 97 | 102 |
| Fall 2020 | 1 | 88 | 45 | 212 | 72 | 80 |
| **Chlorophyll-A Spectrophotometer (µg/L)[1, 2]** | | | | | | |
| Early Summer 2020 | 0.42 | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 |
| Late Summer 2020 | 0.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 |
| Fall 2020 | 0.25 | 3.15 | 0.13 | 3.15 | 1.64 | 0.63 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for total suspended solids and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2020, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters - KL-3**

| KL-3 | RDL (2020) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 0.006 | 0.010 | 0.004 | 0.019 | 0.009 | 0.008 |
| Late Summer 2020 | 0.006 | 0.014 | 0.001 | 0.045 | 0.008 | 0.008 |
| Fall 2020 | 0.006 | 0.023 | 0.002 | 0.148 | 0.007 | 0.008 |
| **Chloride (mg/L)** | | | | | | |
| Early Summer 2020 | 1 | 69 | 49 | 69 | 56 | 57 |
| Late Summer 2020 | 1 | 65 | 40 | 65 | 56 | 53 |
| Fall 2020 | 1 | 59 | 37 | 60 | 51 | 50 |
| **Lab pH** | | | | | | |
| Early Summer 2020 | N/A | 6.89 | 6.38 | 6.89 | 6.69 | 6.67 |
| Late Summer 2020 | N/A | 7.02 | 6.50 | 7.28 | 7.01 | 6.97 |
| Fall 2020 | N/A | 6.83 | 6.38 | 7.10 | 6.87 | 6.82 |
| **Total Suspended Solids (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 5 | <5 | 1 | 3 | 3 | 2 |
| Late Summer 2020 | 5 | <5 | 1 | 3 | 3 | 2 |
| Fall 2020 | 5 | <5 | 1 | 3 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Early Summer 2020 | 1 | 275 | 197 | 275 | 220 | 229 |
| Late Summer 2020 | 1 | 288 | 170 | 288 | 243 | 235 |
| Fall 2020 | 1 | 240 | 160 | 247 | 218 | 208 |
| **Chlorophyll-A Spectrophotometer (µg/L)[2]** | | | | | | |
| Early Summer 2020 | 0.25 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 |
| Late Summer 2020 | 0.25 | 1.41 | 1.41 | 1.41 | 1.41 | 1.41 |
| Fall 2020 | 0.25 | 0.64 | 0.47 | 0.64 | 0.56 | 0.55 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2020, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters - KL-4**

| KL-4 | RDL (2020) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)**[1] | | | | | | |
| Early Summer 2020 | 0.006 | <0.006 | 0.003 | 0.024 | 0.008 | 0.009 |
| Late Summer 2020 | 0.006 | 0.014 | 0.001 | 2.39 | 0.009 | 0.012 |
| Fall 2020 | 0.006 | 0.003 | 0.001 | 0.026 | 0.006 | 0.005 |
| **Chloride (mg/L)** | | | | | | |
| Early Summer 2020 | 1.0 | 72 | 50 | 72 | 56 | 58 |
| Late Summer 2020 | 1.0 | 73 | 41 | 73 | 56 | 55 |
| Fall 2020 | 1.0 | 91 | 37 | 91 | 51 | 53 |
| **Lab pH** | | | | | | |
| Early Summer 2020 | N/A | 6.77 | 6.57 | 6.83 | 6.70 | 6.69 |
| Late Summer 2020 | N/A | 7.08 | 6.57 | 7.13 | 6.95 | 6.93 |
| Fall 2020 | N/A | 6.86 | 6.46 | 7.13 | 6.87 | 6.86 |
| **Total Suspended Solids (mg/L)**[1] | | | | | | |
| Early Summer 2020 | 5 | <5 | 0.50 | 7 | 3 | 2 |
| Late Summer 2020 | 5 | <5 | 0.50 | 7 | 3 | 2 |
| Fall 2020 | 5 | <5 | 0.50 | 10 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Early Summer 2020 | 1 | 288 | 200 | 288 | 220 | 230 |
| Late Summer 2020 | 1 | 297 | 170 | 297 | 241 | 239 |
| Fall 2020 | 1 | 240 | 158 | 250 | 224 | 209 |
| **Chlorophyll-A Spectrophotometer (µg/L)**[1,2] | | | | | | |
| Early Summer 2020 | 0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 |
| Late Summer 2020 | 0.25 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 |
| Fall 2020 | 0.25 | 0.63 | 0.32 | 0.63 | 0.48 | 0.45 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus, total suspended solids, and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2020, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters - KL-5**

| KL-5 | RDL (2020) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)**[1] | | | | | | |
| Early Summer 2020 | 0.006 | <0.006 | 0.003 | 0.031 | 0.010 | 0.008 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Late Summer 2020 | 0.006 | 0.028 | 0.004 | 0.040 | 0.012 | 0.011 |
| Fall 2020 | 0.006 | 0.004 | 0.003 | 0.135 | 0.005 | 0.007 |
| **Chloride (mg/L)** | | | | | | |
| Early Summer 2020 | 1 | 67 | 51 | 67 | 58 | 58 |
| Late Summer 2020 | 1 | 62 | 44 | 62 | 56 | 54 |
| Fall 2020 | 1 | 61 | 37 | 61 | 51 | 51 |
| **Lab pH** | | | | | | |
| Early Summer 2020 | N/A | 6.88 | 6.56 | 6.88 | 6.70 | 6.69 |
| Late Summer 2020 | N/A | 6.95 | 6.84 | 7.16 | 7.04 | 7.02 |
| Fall 2020 | N/A | 6.81 | 6.50 | 7.47 | 6.85 | 6.85 |
| **Total Suspended Solids (mg/L)**[1] | | | | | | |
| Early Summer 2020 | 5 | <5 | 1 | 3 | 3 | 2 |
| Late Summer 2020 | 5 | <5 | 3 | 3 | 3 | 3 |
| Fall 2020 | 5 | <5 | 1 | 3 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Early Summer 2020 | 1 | 269 | 208 | 269 | 232 | 234 |
| Late Summer 2020 | 1 | 272 | 223 | 272 | 247 | 245 |
| Fall 2020 | 1 | 248 | 160 | 286 | 215 | 212 |
| **Chlorophyll-A Spectrophotometer (µg/L)**[1,2] | | | | | | |
| Early Summer 2020 | 0.25 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 |
| Late Summer 2020 | 0.25 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Fall 2020 | 0.25 | 0.83 | 0.32 | 0.83 | 0.58 | 0.52 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus, total suspended solids, and Chlorophyll-A.
2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2020, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – HWY-102-1**

| HWY-102-1 | RDL (2020) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Early Summer 2020 | 0.006 | 0.012 | 0.005 | 0.07 | 0.012 | 0.012 |
| Late Summer 2020 | 0.006 | 0.016 | 0.007 | 0.14 | 0.022 | 0.025 |
| Fall 2020 | 0.006 | 0.007 | 0.002 | 0.031 | 0.011 | 0.012 |
| **Chloride (mg/L)** | | | | | | |
| Early Summer 2020 | 1.0 | 137 | 24 | 137 | 62 | 60 |
| Late Summer 2020 | 1.0 | 100 | 19 | 100 | 52 | 49 |
| Fall 2020 | 1.0 | 72 | 12 | 92 | 38 | 36 |
| **Lab pH** | | | | | | |
| Early Summer 2020 | N/A | 7.10 | 5 | 7.10 | 6.73 | 6.43 |
| Late Summer 2020 | N/A | 7.16 | 5 | 7.49 | 6.97 | 6.82 |
| Fall 2020 | N/A | 6.95 | 5 | 6.95 | 6.59 | 6.32 |
| **Total Suspended Solids (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 5 | <5 | 1 | 9 | 3 | 3 |
| Late Summer 2020 | 5 | <5 | 1 | 80 | 7 | 6 |
| Fall 2020 | 5 | <5 | 2 | 3 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Early Summer 2020 | 1 | 517 | 100 | 517 | 276 | 259 |
| Late Summer 2020 | 1 | 469 | 100 | 469 | 279 | 240 |
| Fall 2020 | 1 | 339 | 88 | 339 | 193 | 175 |
| **Chlorophyll-A Spectrophotometer (µg/L)[2]** | | | | | | |
| Early Summer 2020 | 0.31 | 4.93 | 4.93 | 4.93 | 4.93 | 4.93 |
| Late Summer 2020 | 0.25 | 1.57 | 1.57 | 1.57 | 1.57 | 1.57 |
| Fall 2020 | 0.25 | 0.63 | 0.13 | 0.63 | 0.38 | 0.28 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for total suspended solids.
2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2020, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – HWY-102-2**

| HWY-102-2 | RDL (2020) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 0.006 | 0.018 | 0.006 | 0.222 | 0.014 | 0.017 |
| Late Summer 2020 | 0.006 | 0.008 | 0.008 | 1.56 | 0.034 | 0.041 |
| Fall 2020 | 0.006 | 0.013 | 0.003 | 0.201 | 0.018 | 0.024 |
| **Chloride (mg/L)** | | | | | | |
| Early Summer 2020 | 1.0 | 172 | 21 | 260 | 125 | 97 |
| Late Summer 2020 | 1.0 | 200 | 21 | 226 | 107 | 96 |
| Fall 2020 | 1.0 | 99 | 17 | 99 | 50 | 48 |
| **Lab pH** | | | | | | |
| Early Summer 2020 | N/A | 6.86 | 5.43 | 7.20 | 6.29 | 6.31 |
| Late Summer 2020 | N/A | 6.86 | 5.96 | 6.86 | 6.67 | 6.56 |
| Fall 2020 | N/A | 6.77 | 5.47 | 7.07 | 6.36 | 6.34 |
| **Total Suspended Solids (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 5 | <5 | 1 | 342 | 3 | 6 |
| Late Summer 2020 | 5 | 57 | 3 | 3000 | 27 | 27 |
| Fall 2020 | 5 | <5 | 3 | 194 | 3 | 7 |
| **Conductivity (µS/cm)** | | | | | | |
| Early Summer 2020 | 1 | 629 | 85 | 920 | 442 | 384 |
| Late Summer 2020 | 1 | 742 | 100 | 952 | 413 | 382 |
| Fall 2020 | 1 | 412 | 94 | 412 | 206 | 213 |
| **Chlorophyll-A Spectrophotometer (µg/L)[1,2]** | | | | | | |
| Early Summer 2020 | 0.42 | 2.89 | 2.89 | 2.89 | 2.89 | 2.89 |
| Late Summer 2020 | 0.70 | 206.00 | 206.00 | 206.00 | 206.00 | 206.00 |
| Fall 2020 | 0.25 | 0.81 | 0.32 | 0.81 | 0.57 | 0.51 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus, total suspended solids, and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2020, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – LSD**

| LSD | RDL (2020) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 0.006 | 0.028 | 0.007 | 1.25 | 0.020 | 0.031 |
| Late Summer 2020 | 0.006 | 0.084 | 0.015 | 0.501 | 0.059 | 0.061 |
| Fall 2020 | 0.006 | 0.01 | 0.003 | 0.095 | 0.013 | 0.016 |
| **Chloride (mg/L)** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Early Summer 2020 | 1.0 | 35 | 20 | 36 | 24 | 26 |
| Late Summer 2020 | 1.0 | 35 | 27 | 45 | 33 | 34 |
| Fall 2020 | 1.0 | 32 | 20 | 36 | 24 | 26 |
| **Lab pH** | | | | | | |
| Early Summer 2020 | N/A | 7.19 | 6.20 | 7.19 | 6.92 | 6.81 |
| Late Summer 2020 | N/A | 7.04 | 6.59 | 7.30 | 7.01 | 6.97 |
| Fall 2020 | N/A | 6.75 | 6.38 | 7.01 | 6.70 | 6.71 |
| **Total Suspended Solids (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 5 | 56 | 3 | 138 | 7 | 12 |
| Late Summer 2020 | 5 | 132 | 16 | 9020 | 110 | 143 |
| Fall 2020 | 5 | 3 | 3 | 69 | 7 | 7 |
| **Conductivity (µS/cm)** | | | | | | |
| Early Summer 2020 | 1 | 197 | 96 | 200 | 156 | 151 |
| Late Summer 2020 | 1 | 193 | 129 | 236 | 170 | 169 |
| Fall 2020 | 1 | 150 | 63 | 171 | 124 | 120 |
| **Chlorophyll-A Spectrophotometer (µg/L)[2]** | | | | | | |
| Early Summer 2020 | 0.50 | 4.42 | 4.42 | 4.42 | 4.42 | 4.42 |
| Late Summer 2020 | 0.86 | 12.50 | 12.50 | 12.50 | 12.50 | 12.50 |
| Fall 2020 | 0.25 | 0.32 | 0.13 | 0.32 | 0.22 | 0.20 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2020, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – LU**

| LU | RDL (2020) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Early Summer 2020 | 0.006 | 0.011 | 0.006 | 0.26 | 0.024 | 0.024 |
| Late Summer 2020 | 0.006 | 0.013 | 0.009 | 0.036 | 0.019 | 0.018 |
| Fall 2020 | 0.006 | 0.16 | 0.008 | 0.16 | 0.026 | 0.025 |
| **Chloride (mg/L)** | | | | | | |
| Early Summer 2020 | 1.0 | 297 | 96 | 297 | 210 | 195 |
| Late Summer 2020 | 1.0 | 221 | 99 | 221 | 132 | 141 |
| Fall 2020 | 1.0 | 147 | 34 | 258 | 84 | 89 |
| **Lab pH** | | | | | | |
| Early Summer 2020 | N/A | 7.37 | 6.42 | 7.37 | 6.95 | 6.97 |
| Late Summer 2020 | N/A | 7.28 | 7.11 | 7.46 | 7.40 | 7.34 |
| Fall 2020 | N/A | 7.19 | 6.41 | 7.29 | 7.07 | 6.92 |
| **Total Suspended Solids (mg/L)[1]** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Early Summer 2020 | 5 | <5 | 1 | 626 | 7 | 11 |
| Late Summer 2020 | 5 | <5 | 3 | 165 | 3 | 6 |
| Fall 2020 | 5 | <5 | 3 | 13 | 3 | 3 |
| **Conductivity (µS/cm)** | | | | | | |
| Early Summer 2020 | 1 | 1030 | 518 | 1030 | 813 | 764 |
| Late Summer 2020 | 1 | 928 | 433 | 928 | 620 | 631 |
| Fall 2020 | 1 | 558 | 190 | 840 | 408 | 399 |
| **Chlorophyll-A Spectrophotometer (µg/L)[2]** | | | | | | |
| Early Summer 2020 | 0.25 | 2.41 | 2.41 | 2.41 | 2.41 | 2.41 |
| Late Summer 2020 | 0.25 | 4.41 | 4.41 | 4.41 | 4.41 | 4.41 |
| Fall 2020 | 0.25 | 3.78 | 0.13 | 3.78 | 1.95 | 0.69 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for total suspended solids and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2020, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – PML-1**

| PML-1 | RDL (2020) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 0.006 | 0.003 | 0.003 | 0.173 | 0.013 | 0.014 |
| Late Summer 2020 | 0.006 | 0.011 | 0.002 | 0.104 | 0.011 | 0.015 |
| Fall 2020 | 0.006 | 0.02 | 0.001 | 0.099 | 0.019 | 0.015 |
| **Chloride (mg/L)** | | | | | | |
| Early Summer 2020 | 1.0 | 74 | 39 | 74 | 58 | 58 |
| Late Summer 2020 | 1.0 | 72 | 43 | 72 | 61 | 59 |
| Fall 2020 | 1.0 | 60 | 18 | 60 | 49 | 45 |
| **Lab pH** | | | | | | |
| Early Summer 2020 | N/A | 7.01 | 6.36 | 7.01 | 6.67 | 6.66 |
| Late Summer 2020 | N/A | 7.11 | 6.75 | 7.28 | 7.00 | 7.01 |
| Fall 2020 | N/A | 6.85 | 6.58 | 7.16 | 6.82 | 6.81 |
| **Total Suspended Solids (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 5 | <5 | 1 | 531 | 3 | 5 |
| Late Summer 2020 | 5 | <5 | 1 | 149 | 3 | 4 |
| Fall 2020 | 5 | <5 | 1 | 104 | 6 | 6 |
| **Conductivity (µS/cm)** | | | | | | |
| Early Summer 2020 | 1 | 298 | 170 | 298 | 235 | 231 |
| Late Summer 2020 | 1 | 334 | 170 | 334 | 261 | 256 |
| Fall 2020 | 1 | 243 | 100 | 248 | 217 | 192 |
| **Chlorophyll-A Spectrophotometer (µg/L)[2]** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Early Summer 2020 | 0.25 | 1.89 | 1.89 | 1.89 | 1.89 | 1.89 |
| Late Summer 2020 | 0.25 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| Fall 2020 | 0.25 | 0.63 | 0.32 | 0.63 | 0.48 | 0.45 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2020, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – PML-2**

| PML-2 | RDL (2020) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 0.006 | 0.003 | 0.003 | 0.047 | 0.010 | 0.011 |
| Late Summer 2020 | 0.006 | 0.017 | 0.002 | 0.026 | 0.010 | 0.008 |
| Fall 2020 | 0.006 | 0.004 | 0.001 | 0.026 | 0.007 | 0.006 |
| **Chloride (mg/L)** | | | | | | |
| Early Summer 2020 | 1.0 | 76 | 44 | 245 | 63 | 67 |
| Late Summer 2020 | 1.0 | 72 | 43 | 72 | 61 | 60 |
| Fall 2020 | 1.0 | 61 | 34 | 64 | 57 | 52 |
| **Lab pH** | | | | | | |
| Early Summer 2020 | N/A | 7.00 | 6.37 | 7.13 | 6.73 | 6.74 |
| Late Summer 2020 | N/A | 7.11 | 6.60 | 7.29 | 7.08 | 7.05 |
| Fall 2020 | N/A | 6.85 | 6.60 | 7.05 | 6.85 | 6.86 |
| **Total Suspended Solids (mg/L)[1]** | | | | | | |
| Early Summer 2020 | 5 | <5 | 1 | 45 | 3 | 3 |
| Late Summer 2020 | 5 | <5 | 1 | 14 | 3 | 3 |
| Fall 2020 | 5 | <5 | 1 | 11 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Early Summer 2020 | 1 | 302 | 170 | 777 | 257 | 268 |
| Late Summer 2020 | 1 | 335 | 170 | 335 | 271 | 263 |
| Fall 2020 | 1 | 249 | 150 | 277 | 227 | 218 |
| **Chlorophyll-A Spectrophotometer (µg/L)[2]** | | | | | | |
| Early Summer 2020 | 0.25 | 1.89 | 1.89 | 1.89 | 1.89 | 1.89 |
| Late Summer 2020 | 0.25 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| Fall 2020 | 0.25 | 0.95 | 0.47 | 0.95 | 0.71 | 0.67 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2020, since the method of detection was changed to Spectrophotometer.

# 8.0 Graphs

Graphs were completed for all eleven (11) water quality monitoring stations including all historical data collected from June 2009 to November 2019. Appendix E presents seasonal and annual graphs that illustrate concentrations of the following six (6) key water quality parameters previously selected by HRM:

- Total Phosphorus (mg/L)
- Dissolved chloride (mg/L)
- Laboratory pH
- Total Suspended Solids (mg/L)
- Conductivity (µS/cm), and
- Chlorophyll-A (µg/L).

The graphs allow for comparison between water quality sampling stations and identification of concentration increases and associated guideline exceedances. As many parameters show seasonal concentration fluctuations, the water quality data was also graphed showing only the concentrations for a given season. It should be noted that where results were found to be less than the laboratory Reportable Detection Limit (<RDL), results were graphed as half the reportable detection limit (1/2 RDL value) as a conservative approach.

# 9.0 Conclusions

The 2020 water quality monitoring event included the collection of surface water samples at eleven water quality sampling stations for the analysis of inorganics, calculated parameters, standard metals, microbiological and additional metals. Additionally, field parameters collected at each station included in-situ pH, water temperature, dissolved oxygen, conductivity, Secchi depth, air temperature, cloud cover and wildlife sightings.

### *Total Phosphorus*

The following eleven (11) monitoring stations reported concentrations of Total Phosphorus above HRM's management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L):

- KL-1: Late Summer 0.036 mg/L, Fall 0.029 mg/L
- KL-2: Early Summer 0.014 mg/L, Late Summer 0.027 mg/L, Fall 0.16 mg/L
- KL-3: Late Summer 0.014 mg/L, Fall 0.023 mg/L
- KL-4: Late Summer 0.014 mg/L
- KL-5: Late Summer 0.028 mg/L
- HWY-102-1: Early Summer 0.012 mg/L, Late Summer 0.016 mg/L
- HWY-102-2: Early Summer 0.018 mg/L, Fall 0.013 mg/L
- LSD: Early Summer 0.028 mg/L, Late Summer 0.084 mg/L
- LU: Early Summer 0.011 mg/L, Late Summer 0.013 mg/L, Fall 0.16 mg/L
- PML-1: Late Summer 0.011 mg/L, Fall 0.020 mg/L, and
- PML-2: Late Summer 0.017 mg/L.

### *Field Measurements*

- All eleven (11) stations were within the 5.0 – 9.0 pH Health Canada range for Recreational Water Quality during the Early Summer, Late Summer and Fall monitoring events. The two additional stations, KL-D1 and DKL-D2 were also within the 5.0 – 9.0 pH Health Canada range for Recreational Water Quality during the Late Summer monitoring event. All thirteen (13) sampling stations were found outside the CCME-FWAL recommended range of 6.5-9.0 during specific Early Summer, Late Summer and Fall events, ranging from 5.56 to 6.49.
- In-situ dissolved oxygen was outside of the CCME FWAL acceptable range of 5.5-9.5 mg/L at ten (10) of the sampling stations, including: KL-1: Fall 9.69 mg/L; KL-2: Early Summer 5.10 mg/L, Late Summer 4.96 mg/L, Fall 9.84 mg/L; KL-3: Early Summer 5.09 mg/L; KL-4: Early Summer 3.49 mg/L, Late Summer 4.73 mg/L; HWY-102-1: Early Summer 3.27 mg/L, Late Summer 2.61 mg/L; HWY-102-2: Early Summer 4.92 mg/L, Fall 5.45 mg/L; LSD: Early Summer 2.66 mg/L, Late Summer 3.24 mg/L, Fall 11.40 mg/L; LU: Early Summer 3.53 mg/L; PML-1: Fall 10.80 mg/L ; and. PML-2: Fall 10.16 mg/L.
- In-situ water temperature was recorded between 21.2°C and 26.5°C during the Early Summer event, between 15.9°C and 23.7°C during the Late Summer event, and 6.2°C to 12.2°C during the Fall event.
- In-situ water conductivity was recorded between 81 and 945 µs/cm during the Early Summer event, between 89 and 710 µs/cm during the Late Summer event, and 81 and 512 µs/cm during the Fall event.
- Secchi depths were collected at one (1) monitoring station, KL-2 in the Early Summer (1.35 m) and Late Summer (1.60 m) meeting the Health Canada reference value of 1.2 metres.

### *General Chemistry and Metals*

- Three (3) sampling stations reported chloride concentrations above the CCME FWAL limit of 120 mg/L: HWY-102-1: Early Summer 137 mg/L; HWY-102-2: Early Summer 172 mg/L, Late Summer 200 mg/L, and LU: Early Summer 297 mg/L, Late Summer 221 mg/L, Fall 147 mg/L.
- All eleven (11) stations reported pH values well within Health Canada range of 5.0-9.0 for Recreational Water Quality. The following (1) station was found outside the recommended pH ranges of 6.5 – 9.0 for the CCME FWAL: KL-2: Fall pH 6.49.
- All eleven (11) stations exceeded the NSE EQS aluminum guideline of 5 µg/L and four (4) of those stations also exceeded the CCME FWAL limit of 100 µg/L (KL-1, KL-2, HWY-102-1, LSD) during the Early Summer monitoring event.
- Four (4) stations exceeded the NSE EQS cadmium guideline of 0.01 µg/L: KL-1, KL-4, KL-5, and LU during the Early Summer monitoring event..
- Two (2) stations exceeded the NSE EQS copper guideline of 2 µg/L and the CCME FWAL guideline of 2-2.41 µg/L: HWY-102-2: Early Summer 3 µg/L, Late Summer 4 µg/L, and LU: Fall 3 µg/L.
- Five (5) stations exceeded the NSE EQS iron guideline and CCME FWAL limit of 300 µg/L: KL-2: Early Summer 486 µg/L, Late Summer 1040 µg/L, Fall 659 µg/L; HWY-102-1: Early Summer 429 µg/L, Late Summer 528 µg/L; HWY-102-2: Early Summer 3260 µg/L, Late Summer 7640 µg/L, Fall 1030 µg/L; LSD: Early Summer 3510 µg/L, Late Summer 4550 µg/L, Fall 378 µg/L; and LSD: Early Summer 1210 µg/L, Late Summer 429 µg/L, Fall 432 µg/L.
- One (1) station exceeded the NSE EQS molybdenum guideline of 820 µg/L: LSD: Early Summer 2840 µg/L, Late Summer 1190 µg/L.

### *Microbiology*

- There were no exceedances of the HC E. coli Guidelines of 400 CFU/100 mL (maximum allowable concentration).
- HC does not have a recreational water quality guideline for Total Coliform. All eleven (11) stations reported Total Coliform concentrations above the laboratory RDL of 1 CFU/100 mL. Reported concentrations ranged from 130 CFU/100mL to >2420 CFU/100 mL.

# 10.0 Closure

This report was prepared for the exclusive use of Halifax Regional Municipality and is intended to provide a water quality results for the program. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Wood will be required. With respect to third parties, Wood has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The report is based on data and information collected during the 2020 Bedford West Water Quality Monitoring Program conducted by Wood. It is based solely on the conditions of the Site encountered during field investigations conducted in July, August, and October 2020. Except as otherwise maybe specified, Wood disclaims any obligation to update this report for events taking place, or with respect to information that becomes available to Wood after the time during which Wood conducted the Water Quality Monitoring program.

Wood makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

**Wood Environment & Infrastructure Solutions,**
**a Division of Wood Canada Limited**

**Prepared by:**



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**Environmental Scientist**

**Reviewed by:**



**Charlotte Clark, P.Eng.**
**Environmental Engineer**

# 11.0 References

Canadian Environmental Quality Guidelines for the Protection of Aquatic Life, 2003, "Phosphorus Canadian Guidance Framework for the Management of Freshwater Systems".

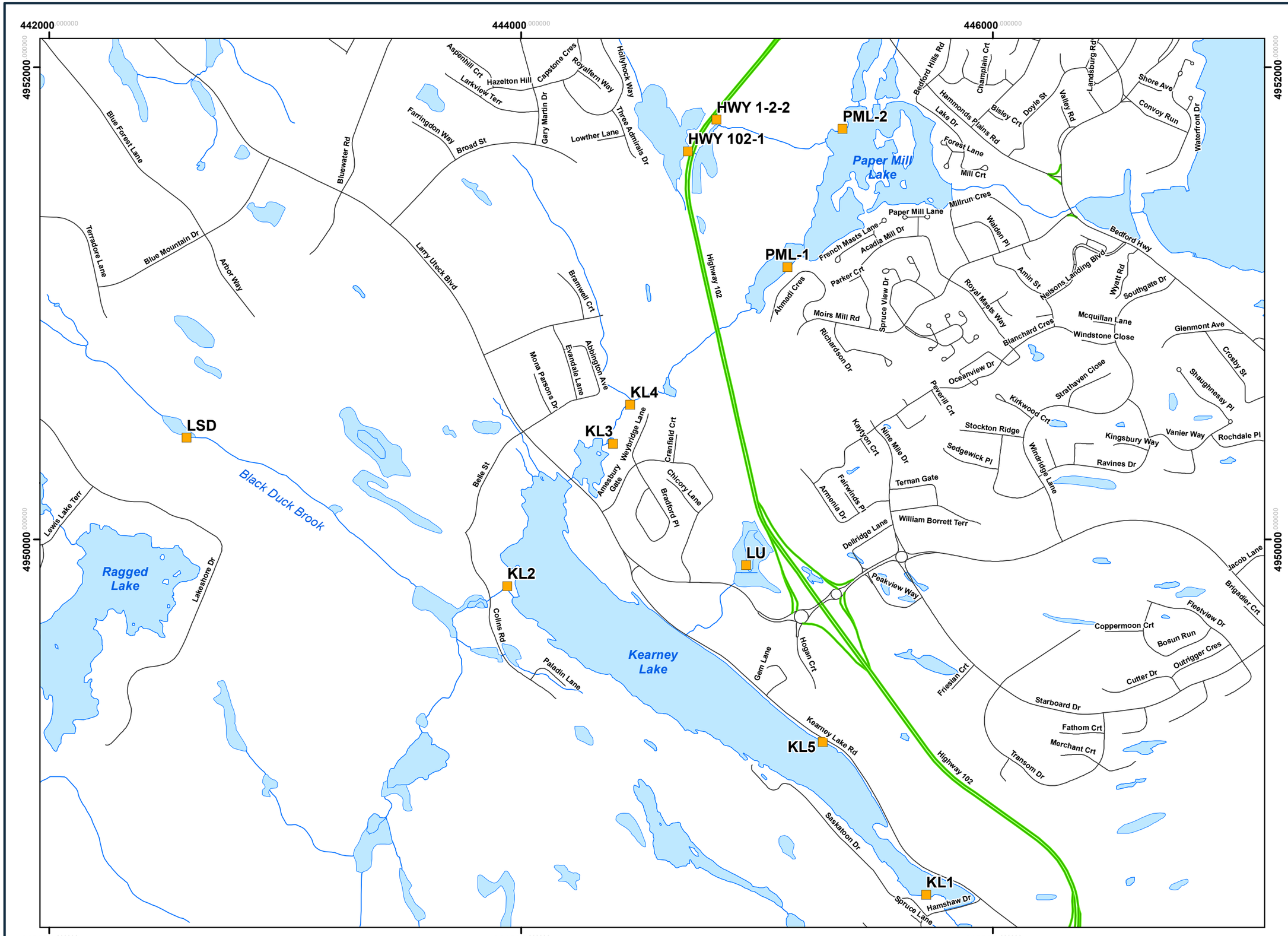
Canadian Council of Ministers of the Environment, 2015. Guidelines for the Protection of Aquatic Life – Freshwater.

Health Canada, 2012. Canadian Guidelines for Recreation Water Quality, Third Edition.

Nova Scotia Environment, 2020. Environmental Quality Standards for Surface Water (Notification of Contamination Protocol 100, Table 3).

# Appendix A

# Water Quality Sampling Locations




LEGEND:

- Bedford West Water Quality Monitoring Locations
- Highway
- Local Road
- Rivers/Streams
- Lakes/Bedford Basin

CLIENT:

HALIFAX

wood.

TITLE:

**BEDFOR WEST WATER QUALITY MONITORING LOCATIONS**

PROJECT:

**HRM BEDFORD WEST WATER QUALITY MONITORING PROGRAM**

| PROJECT NO: | DATE: |
|---|---|
| TE201017 | MAY 2021 |
| REV NO: | DWN/CHK'D BY: |
| 0 | CM / CC |
| DATUM: | PROJECTION: |
| NAD83 | UTM ZONE 20 N |

FIGURE: **FIGURE 1**

SCALE: 1:15,000

0 125 250 500

Metres

Path: G:\5290 PROJECTS\2020\TE201017_HRM_Bedford_West_Water_Quality_Monitoring\GIS\MXD\TE201017_FIGURE_1_WaterQualityMonitoringLocations.mxd User: candace.macdonald Date: 5/12/2021

# Appendix B

# Field Reports

**HRM Bedford West - Field Report** Event: Spring

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | Kearney Lake | Site ID: | KL1 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny |
| Air Temperature: | 25°C |
| Cloud Cover: | Clear 0% |
| Wildlife Sightings: | |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 2 July 20 |
| Time (hh:mm): | 15:05 |
| Sample Depth (m): 0.2m | n/a clear to bottom |
| pH: | 6.43 |
| Dissolved Oxygen (mg/L): | 79.8%, 6.55 mg/L |
| Secchi Depth (m): | |
| Water Temp (degrees C): | 25.41°C |
| Conductivity (µs/cm): | 245 µs/cm, 0.243 ms/cm |
| TDS | 0.158 g/L |

**Additional Comments/Notes**

no odour

**HRM Bedford West - Field Report** Event: Spring

| | | | |
|---|---|---|---|
| Project: TE 201017 | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: HRM | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL2 |
| Watercourse: | Kearney Lake | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny, slight wind 10 km/hr |
| Air Temperature: | 23°C |
| Cloud Cover: | partly Cloudy |
| Wildlife Sightings: | odonates |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 2 July '20 |
| Time (hh:mm): | 13:10 |
| Sample Depth (m): | 0.3 m |
| pH: | 6.07 |
| Dissolved Oxygen (mg/L): | 60.0% 5.10 mg/L 1.2, 1.5 = |
| Secchi Depth (m): | ~~n/a, too shallow, Low water levels~~ |
| Water Temp (degrees C): | 21.52 °C |
| Conductivity (µs/cm): | 81 µs/cm 0.086 µs/cm |

**Additional Comments/Notes**

tannin water colour, quite turbid

**HRM Bedford West - Field Report** Event: Spring

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | upstream of KL | Site ID: | KL3 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny, slight wind |
| Air Temperature: | 25°c |
| Cloud Cover: | 0%, clear |
| Wildlife Sightings: | |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 2 July '20 |
| Time (hh:mm): | 15:30 |
| Sample Depth (m): | 0.3m |
| pH: | 6.61 |
| Dissolved Oxygen (mg/L): | 62.0 %, 5.09 mg/L |
| Secchi Depth (m): | n/a - clear to bottom |
| Water Temp (degrees C): | 25.23 °c |
| Conductivity (µs/cm): | 253 ms/cm, 0.252 ms/cm° |
| TDS | 0.164 g/L |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: Spring

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | Upstream KL | Site ID: | KL4 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny, hot slight wind 14km/hr |
| Air Temperature: | 26°C |
| Cloud Cover: | 0% clear |
| Wildlife Sightings: | fish noted |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 2 July 20 |
| Time (hh:mm): | 16:06 |
| Sample Depth (m): | 0.3m |
| pH: | 6.30 |
| Dissolved Oxygen (mg/L): | 41.8%, 3.49 mg/L |
| Secchi Depth (m): | N/a from shore – Bottom visible, need boat |
| Water Temp (degrees C): | 23.60°C |
| Conductivity (µs/cm): | 259 us/cm 0.265 ms/cm TDS 0.172 g/L |

**Additional Comments/Notes**

soft bottom, lots of organics visible. not disturbed - bottom vis. clear, no odour

**HRM Bedford West - Field Report**

Event: Spring

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | Kearney Lake | Site ID: | KL5 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | HOT, sunny, slight breeze |
| Air Temperature: | 25°C |
| Cloud Cover: | Sunny 5% cloud cover |
| Wildlife Sightings: | |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 2 July '20 |
| Time (hh:mm): | 14:40 |
| Sample Depth (m): | 0.5m |
| pH: | 6.49 |
| Dissolved Oxygen (mg/L): | 84.1%, 6.85 mg/L |
| Secchi Depth (m): | N/A - Lake bottom clear to 3m, |
| Water Temp (degrees C): | 25.6 °C |
| Conductivity (µs/cm): | 245 µS/cm, 0.243 ms/cm |
| TDS | 0.158 g/L |

**Additional Comments/Notes**

no odour

**HRM Bedford West - Field Report** Event: spring

| | | | |
|---|---|---|---|
| Project: TE201017 | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: HRM | Halifax Regional Munipality | | |
| Site: HWY102 | | Site ID: | HWY-102-1 |
| Watercourse: | | Location: | HWY102 |
| Sample Type: SW | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: LD + ER | | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny, slight wind 5km/hr |
| Air Temperature: | 19°C |
| Cloud Cover: | partially cloudy 70%. |
| Wildlife Sightings: | odonates (dragonflies, damselflies), sparrows |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 2 July 20 |
| Time (hh:mm): | 10:22 |
| Sample Depth (m): | 0.10 - 0.15 m |
| pH: | 6.20 |
| Dissolved Oxygen (mg/L): | 3.27 mg/L, 36.6% |
| Secchi Depth (m): | n/a too shallow |
| Water Temp (degrees C): | 21.16 °C |
| Conductivity (µs/cm): | 446 µs/cm 0.481 ms/cm |
| TDS | 0.313g/L |

**Additional Comments/Notes**

collected from deadwater/stillwater by culvert.
dense algae growth (thick mats of chara)
sample - no odour, translucent yellow tinge.
no flow visible
odour along highway from garbage.
suspended solids noted in sample.

**HRM Bedford West - Field Report** Event: Spring

| | | | |
|---|---|---|---|
| Project: TE201017 | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: HRM | Halifax Regional Munipality | | |
| Site: HWY102 | | Site ID: | HWY-102-2 |
| Watercourse: Stream / marsh area | | Location: | HWY102 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: ER & LD | | | |

**Site Conditions**

| | |
|---|---|
| Weather: | overcast |
| Air Temperature: | 18°C |
| Cloud Cover: | mostly cloudy (90%) |
| Wildlife Sightings: | Frog |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 02 Jul 2020 |
| Time (hh:mm): | 10:00AM |
| Sample Depth (m): | 0.10 m |
| pH: | 5.99 |
| Dissolved Oxygen (mg/L): | 53.6% 4.92 mg/L |
| Secchi Depth (m): | N/a shallow still water in swamp |
| Water Temp (degrees C): | 18.75 °C |
| Conductivity (µs/cm): | 410 µS/cm 0.523 ms/cm C |
| TDS | 0.341 g/L |

**Additional Comments/Notes**

manganese sheen, sulphur odour
moved sample point down from culvert to find a representative sample - very shallow, no flowing water

**HRM Bedford West - Field Report** Event: Spring

| | | | |
|---|---|---|---|
| Project: TE201017 | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: HRM | Halifax Regional Munipality | | |
| Site: | | Site ID: | LSD |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | ER LD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny, partly cloudy Slight breeze 6km/hr |
| Air Temperature: | 22°C |
| Cloud Cover: | 80%. Cloudy |
| Wildlife Sightings: | odonates (white tailed skimmer) |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 2 July 20 |
| Time (hh:mm): | 12:15 |
| Sample Depth (m): | 0.1 m |
| pH: | 6.31 |
| Dissolved Oxygen (mg/L): | 33.2%, 2.66 mg/L |
| Secchi Depth (m): | n/a — too shallow |
| Water Temp (degrees C): | 26.54°C |
| Conductivity (µs/cm): | 195 µs/cm 0.199 ms/cm |

TDS g/L 0.122

**Additional Comments/Notes**

Strong odour — sulphur odour.
watercourse is soft bottom organics.
sample has SS - impossible to avoid.
turbid water

**HRM Bedford West - Field Report** Event: Spring

| | | | |
|---|---|---|---|
| Project: TE201017 | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: HRM | Halifax Regional Munipality | | |
| Site: LW | | Site ID: | LW |
| Watercourse: | | Location: | |
| Sample Type: SW | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: LD ER | | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny, slight breeze 5 km/hr |
| Air Temperature: | 21°C |
| Cloud Cover: | partly cloudy 20% cover |
| Wildlife Sightings: | Osprey, odonates |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 2 July 2020 |
| Time (hh:mm): | 11:00 |
| Sample Depth (m): | 0.2 m |
| pH: | 6.36 |
| Dissolved Oxygen (mg/L): | 42.5% 3.53 mg/L |
| Secchi Depth (m): | N/a |
| Water Temp (degrees C): | 24.52°C |
| Conductivity (µs/cm): | 945 µs/cm 0.954 ms/cm 0.621 TDS g/L |

**Additional Comments/Notes**

no odour, clear, organics visible on bottom

**HRM Bedford West - Field Report** Event: Spring

| | | | |
|---|---|---|---|
| Project: TE201017 | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: HRM | Halifax Regional Munipality | | |
| Site: PML-1 | | Site ID: | PML-1 |
| Watercourse: Papermill lake | | Location: | |
| Sample Type: SW | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: LD ER | | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, calm |
| Air Temperature: | 16°C 6 km/hr winds |
| Cloud Cover: | Overcast |
| Wildlife Sightings: | Cardinals, mallard duck, AMCR, squirrel |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 2 July '20 |
| Time (hh:mm): | 9:20 |
| Sample Depth (m): | 0.3 m |
| pH: | 5.77 |
| Dissolved Oxygen (mg/L): | 97.7%, 8.35 mg/L |
| Secchi Depth (m): | NA - depth to bottom = 2.1m (secchi depth still visible) |
| Water Temp (degrees C): | 23.07 °C |
| Conductivity (µs/cm): | 267 µs/cm |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: Spring

| | | | |
|---|---|---|---|
| Project: TE201017 | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: HRM | Halifax Regional Munipality | | |
| Site: PML-2 | | Site ID: | PML-2 |
| Watercourse: Papermill Lake | | Location: | |
| Sample Type: SW | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: LDA | ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | ↓17°C (w 3 km/hr) calm, humid, |
| Air Temperature: | |
| Cloud Cover: | Mostly cloudy |
| Wildlife Sightings: | |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 2 Jul '20 |
| Time (hh:mm): | 8:50 |
| Sample Depth (m): | 0.3 m |
| pH: | 6.07 |
| Dissolved Oxygen (mg/L): | 92.8 %, 7.79 mg/L |
| Secchi Depth (m): | NA - Secchi disc still visible @ bottom (2.5m) |
| Water Temp (degrees C): | 23.87°C |
| Conductivity (µs/cm): | 275 µS/cm |

TDS g/L 0.183

**Additional Comments/Notes**

Sample clear - no odour

**HRM Bedford West - Field Report** Event: summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-1 |
| Watercourse: | tearney Lake beach | Location: | KL-1 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | See kml | | |
| Wood Field Personnel: | ER MD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, intermittent Rain |
| Air Temperature: | 17°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | songbirds |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17 Aug 20 |
| Time (hh:mm): | 11:40 am |
| Sample Depth (m): | 0.20 m |
| pH: | 6.67 |
| Dissolved Oxygen (mg/L): | 8.04 mg/L / 92.7% |
| Secchi Depth (m): | n/a - too clear, bottom visible |
| Water Temp (degrees C): | 22.60°C |
| Conductivity (µs/cm): | 0.219 ms/cm 219 uS/cm |

252.0 ORP 0.149 g/L TDS

**Additional Comments/Notes**

Sample clear - no odour, no sheen

| HRM Bedford West - Field Report | | Event: Summer | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL 2 | Site ID: | KL 2 |
| Watercourse: | outlet of stream to KL | Location: | KL 2 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see KML | | |
| Wood Field Personnel: | ER MD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Rainy |
| Air Temperature: | 17°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | n/a |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 7 Aug 20 |
| Time (hh:mm): | 16:05 |
| Sample Depth (m): | 0.20 |
| pH: | 5.98 |
| Dissolved Oxygen (mg/L): | 4.96 mg/L 51.3% |
| Secchi Depth (m): | 1.5, 1.7 m = (1.6m) |
| Water Temp (degrees C): | 19.26°C |
| Conductivity (µs/cm): | 0.101 ms/cm (101 µs/cm) |

191.9 ORP 0.073 g/L TDS

**Additional Comments/Notes**

sample clear, no odour, no sheen

**HRM Bedford West - Field Report**

Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-3 | Site ID: | KL-3 |
| Watercourse: | upstream of KL | Location: | KL-3 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see trip 2 | | |
| Wood Field Personnel: | ER/MD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | overcast, rain |
| Air Temperature: | 16°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | None |
| Site Accessibility: | - |
| Site Access Detail : | - |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17 Aug 2020 |
| Time (hh:mm): | 15:30 |
| Sample Depth (m): | 0.3 m |
| pH: | 6.21 |
| Dissolved Oxygen (mg/L): | 6.94 (78.6%) |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 21.83°C |
| Conductivity (µs/cm): | 0.217 ms/cm (217 µs/cm) |

ORP = 200.5, TDS = 0.151 g/L

**Additional Comments/Notes**

shallow, could not collect secchi depth
no odour, sheen
clear

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-4 | Site ID: | KL-4 |
| Watercourse: | Upstream KL | Location: | KL-4 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | ER, MD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | overcast |
| Air Temperature: | 16°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | Brook Trout ~12 individuals, osprey x2 in vicinity |
| Site Accessibility: | — |
| Site Access Detail : | — |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17Aug20 |
| Time (hh:mm): | 15:09 |
| Sample Depth (m): | 0.2 |
| pH: | 5.78 |
| Dissolved Oxygen (mg/L): | 4.73 mg/L (48.2%) |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 20.05 |
| Conductivity (µs/cm): | 0.221 mS/cm (221 mS/cm) |

ORP = 194.5, TDS = 0.157 g/L

**Additional Comments/Notes**

- Clear, no ~~odour~~ sheen or odour
- Shallow, Secchi depth not collected

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL 5 |
| Watercourse: | Kearney Lake | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | See KML | | |
| Wood Field Personnel: | ER MD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | overcast, intermittent rain |
| Air Temperature: | 17°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | Songbirds |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17 Aug 20 |
| Time (hh:mm): | 11:27 am |
| Sample Depth (m): | 0.20m |
| pH: | 6.73 |
| Dissolved Oxygen (mg/L): | 7.43 mg/L 87.4% |
| Secchi Depth (m): | n/a too clear / shallow |
| Water Temp (degrees C): | 22.94 |
| Conductivity (µs/cm): 0.221 mS/cm | 221 µs/cm |

0.149g/L TDS 241.7 ORP

**Additional Comments/Notes**

Clear sample - no sheen no odour

**HRM Bedford West - Field Report** Event: Summer.

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | additional sample | Site ID: | KL-D1 |
| Watercourse: | KL drainage # 1 | Location: | KL-D1 |
| Sample Type: | Surface Water | No. of bottles: | 3 |
| GPS Coordinates: | See kml | | |
| Wood Field Personnel: | ER MD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Rain |
| Air Temperature: | 17°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | / |
| Site Accessibility: | |
| Site Access Detail : | walk down ROW to outfall @ KL |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17 Aug 20 |
| Time (hh:mm): | 17:00 |
| Sample Depth (m): | 0.15 |
| pH: | 6.26 |
| Dissolved Oxygen (mg/L): | 7.88 mg/L 79.0% |
| Secchi Depth (m): | n/a too shallow |
| Water Temp (degrees C): | ~~15~~ 15.89°C |
| Conductivity (µs/cm): | 0.089 ms/cm 89 µg/cm |

211.4 ORP 0.068 g/L TDS

**Additional Comments/Notes**

Clear, no sheen, no odor

mill yellow

Discharge area

| HRM Bedford West - Field Report | | Event: | Summer |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | additional sample site | Site ID: | KL-D2 |
| Watercourse: | KL drainage # 2 | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 3 |
| GPS Coordinates: | See EMC | | |
| ~~Wood Field Personnel:~~ | ER MD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Rain |
| Air Temperature: | 17°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | bunnies (2x) |
| Site Accessibility: | |
| Site Access Detail : | follow drainage ROW to outfall @ KL |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17 AUG 20 |
| Time (hh:mm): | 16:37 |
| Sample Depth (m): | 0.25 |
| pH: | 6.03 |
| Dissolved Oxygen (mg/L): | 8.61 mg/L 96.7 % |
| Secchi Depth (m): | n/a too shallow |
| Water Temp (degrees C): | 21.48°C |
| Conductivity (µs/cm): | 0.184 mS/cm (184 µS/cm) |

**Additional Comments/Notes**

225.1 ORP 0.125 TDS g/L

clear, no odour, no sheen

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | Hwy 102-1 | Site ID: | Hwy 102-1 |
| Watercourse: | ~~Yes~~ | Location: | Hwy 102-1 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see kml | | |
| Wood Field Personnel: | Elizabeth Robinson / Midori Depante | | |

**Site Conditions**

| | |
|---|---|
| Weather: | overcast |
| Air Temperature: | 16°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | None |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17 Aug 2020 |
| Time (hh:mm): | 10:34 |
| Sample Depth (m): | 0.1m |
| pH: | 6.22 |
| Dissolved Oxygen (mg/L): | ~~3.46~~ 2.61 mg/L (28.5%) |
| Secchi Depth (m): | N/A |
| Water Temp (degrees C): | 19.68 °C |
| Conductivity (µs/cm): | 345 µs/cm (0.345 ms/cm) |

TDS = 0.250 g/L, ORP = 245.7 ~~mV~~

**Additional Comments/Notes**

- ~~Hydrocarbon~~ sheen observed
- shallow water, could not collect secchi depth
- No odour
- clear, slightly yellow
- collected from same location as spring
- algae present in area

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | HWY 102 | Site ID: | HWY-102-2 |
| Watercourse: | stream/marsh area | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | ER, MD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Rainy, overcast |
| Air Temperature: | 17C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | |
| Site Accessibility: | |
| Site Access Detail : | / |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17 Aug 20 |
| Time (hh:mm): | 13:54 |
| Sample Depth (m): | 0.10 |
| pH: | 5.56 |
| Dissolved Oxygen (mg/L): | ~~14.11 mg/L~~ 7.96 mg/L 82.8% |
| Secchi Depth (m): | n/a too shallow |
| Water Temp (degrees C): | 17.70 °C |
| Conductivity (µs/cm): | 472 µs/cm (0.472 ms/cm) |

**Additional Comments/Notes** 119.1 ORP 0.357 g/L TDS

extensive green algae mats present (photo)
too shallow for secchi, moved upstream for flow

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | Black Duck Brook | Site ID: | LSD |
| Watercourse: | stream | Location: | LSD |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see KML | | |
| Wood Field Personnel: | ER MD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 18°C |
| Cloud Cover: | 100 %. |
| Wildlife Sightings: | amphibians, sparrows |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17 Aug 20 |
| Time (hh:mm): | 13:08 |
| Sample Depth (m): ~~7cm~~ | 0.10 0.07 |
| pH: | 6.05 |
| Dissolved Oxygen (mg/L): | 3.24 mg/L 32.0 % |
| Secchi Depth (m): | n/a too shallow |
| Water Temp (degrees C): | 18.32 |
| Conductivity (µs/cm): | 158 µs/cm (0.158 ms/cm) 86.1 ORP 0.117 g/L TDS |

**Additional Comments/Notes**

Sample unavoidably turbid. slightly yellow
no odour no sheen

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | LU | Site ID: | LU |
| Watercourse: | stream/river through Fern | Location: | LU |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see KML | | |
| Wood Field Personnel: | ER, MD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | overcast |
| Air Temperature: | 17°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | osprey |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17 AUG 2020 |
| Time (hh:mm): | 1100 |
| Sample Depth (m): | 0.2m |
| pH: | 6.24 |
| Dissolved Oxygen (mg/L): | 6.44 mg/L (70.4 %) |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 21.56 °C |
| Conductivity (µs/cm): | 710 ms/cm (0-710 ms/cm) |

ORP - 225.1, TDS = 0.496 g/L

**Additional Comments/Notes**

- slight sulfur odour, no sheen
- clear
- shallow, could not collect secchi depth

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: PML-1 | Papermill lake | Site ID: | PML-1 |
| Watercourse: | Papermill Lake | Location: | PML-1 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see KML file | | |
| Wood Field Personnel: | E. Robinson, M. Depante | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Rain, mild |
| Air Temperature: | ~~20°C~~ 17°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | 3 Blue herons, American Crow, Red squirrel |
| Site Accessibility: | / |
| Site Access Detail : | / |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17 Aug 20 |
| Time (hh:mm): | 9:07 am |
| Sample Depth (m): | 20cm 0.20m |
| pH: | 5.62 |
| Dissolved Oxygen (mg/L): | 6.72 mg/L 78.8% |
| Secchi Depth (m): | n/a - too shallow |
| Water Temp (degrees C): | 23.46 °C |
| Conductivity (µs/cm): | 0.271 ms/cm (271 µs/cm) |

258.8 ORP 0.181 g/L TDS

**Additional Comments/Notes**

too shallow to perform secchi measurement.

sample clear, no odour, no sheen

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | PML-2 | Site ID: | PML-2 |
| Watercourse: | Papermill Lake | Location: | PML-2 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see EML | | |
| Wood Field Personnel: | ER MD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast (stopped raining) |
| Air Temperature: | ~~20°C~~ 17°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | Red squirrel, songbirds |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 17 Aug 20 |
| Time (hh:mm): | 9:27 |
| Sample Depth (m): | 20 cm 0.20 m |
| pH: | 6.08 |
| Dissolved Oxygen (mg/L): | 7.58 mg/L, 88.6 % |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 23.67 °C |
| Conductivity (µs/cm): | 0.270 mS/cm (270 uS/cm) 0.180 TDS g/L 275.8 ORP |

**Additional Comments/Notes** Too shallow for secchi reading sample location only 1m deep

Sample clear, no odor, no sheen.

**HRM Bedford West - Field Report** Event: Fall

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL1 |
| Watercourse: | Kearney Lake | Location: | KL1 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see ipad | | |
| Wood Field Personnel: | ER, MA | | |

**Site Conditions**

| | |
|---|---|
| Weather: | overcast |
| Air Temperature: | 9°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | ≠ crows |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 29 Oct 2020 |
| Time (hh:mm): | 12:59 pm |
| Sample Depth (m): | 0.2m |
| pH: | 6.54 |
| Dissolved Oxygen (mg/L): | 90.0% 9.69 mg/L |
| Secchi Depth (m): | n/a too shallow/clear see bottom |
| Water Temp (degrees C): | 11.6°C |
| Conductivity (µs/cm): | 219.6 µS/cm SPC, 162.6 µS/cm C |

**Additional Comments/Notes** 142.35 mg/L TDS, 242.7 mV ORP
clear, no odour
photos taken

**HRM Bedford West - Field Report** Event: Fall

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL2 |
| Watercourse: | | Location: | KL2 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see pad | | |
| Wood Field Personnel: | ER MA | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 9°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | red squirrel |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 29 Oct 20 |
| Time (hh:mm): | 13:22 |
| Sample Depth (m): | 0.2 m |
| pH: | 6.16 |
| Dissolved Oxygen (mg/L): | 85.6% 9.84 mg/L |
| Secchi Depth (m): | n/a - can see on bottom |
| Water Temp (degrees C): | 8.4°C |
| Conductivity (µs/cm): | 80.8 µS/cm SPC 55.0 µS/cm C |

52.65 mg/L TDS 252.1 mV ORP

**Additional Comments/Notes**

Tanin coloured translucent/clear.
Some suspended particulate
photos taken

**HRM Bedford West - Field Report** Event: FALL

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL3 | Site ID: | KL3 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | IPAD | | |
| Wood Field Personnel: | ER MA | | |

**Site Conditions**

| | |
|---|---|
| Weather: | cloudy |
| Air Temperature: | |
| Cloud Cover: | 100% |
| Wildlife Sightings: | |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 29 OCT 20 |
| Time (hh:mm): | 1342 |
| Sample Depth (m): | 0.2 |
| pH: | 6.51 |
| Dissolved Oxygen (mg/L): | 8.84 mg/L 81.3% |
| Secchi Depth (m): | N/A too shallow |
| Water Temp (degrees C): | 11.5°C |
| Conductivity (µs/cm): | 219.9 µs/cm SPC 163.1 µs/cm C<br>143.00 mg/L TDS 238.0 mV ORP |

**Additional Comments/Notes**

- clear, some susp. particulate
- No odour

**HRM Bedford West - Field Report** Event: Fall

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL4 |
| Watercourse: | | Location: | KL4 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Sunny. | | |
| Wood Field Personnel: | ER MA | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 9°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | Nuthatches. |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 29 Oct 2020 |
| Time (hh:mm): | 13:59 |
| Sample Depth (m): | 0.1 m |
| pH: | 6.68 |
| Dissolved Oxygen (mg/L): | 85.4 %DO 9.22 mg/L DO |
| Secchi Depth (m): | Na clear |
| Water Temp (degrees C): | 11.4°C |
| Conductivity (µs/cm): | 220.6 SPC µS/cm 163.6 ~~mg/L~~ C<br>253.2 mV ORP 143.65 mg/L TDS |

**Additional Comments/Notes**

clear, no odour, minor particulate
photos taken

**HRM Bedford West - Field Report** Event:

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL5 | Site ID: | KL5 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | IPAD | | |
| Wood Field Personnel: | ERMA | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy |
| Air Temperature: | 9°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | 2 x BLIA |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 29 Oct 20 |
| Time (hh:mm): | 12:45 |
| Sample Depth (m): | 0.1m |
| pH: | 6.73 |
| Dissolved Oxygen (mg/L): | 8.02 mg/L 74.5% |
| Secchi Depth (m): | N/A too shallow |
| Water Temp (degrees C): | 12.2°C |
| Conductivity (µs/cm): | 224 µs/cm SPC 169.6 µs/cm 146.25 mg/L TDS 246.1 mV ORP |

**Additional Comments/Notes**

- clear, small amounts of susp. particulate
- No odour

**HRM Bedford West - Field Report** Event: Fall

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | HWY 102, PML outflow to KL | Site ID: | HWY102-1 |
| Watercourse: | | Location: | HWY 102-1 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see ipad- | | |
| Wood Field Personnel: | E. Robinson, M. Aikens | | |

**Site Conditions**

| | |
|---|---|
| Weather: | sunny, overcast |
| Air Temperature: | 1°C |
| Cloud Cover: | 80% |
| Wildlife Sightings: | ducks - mallards, blue jay |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 29 Oct 2020 |
| Time (hh:mm): | 8:40 am |
| Sample Depth (m): | 0.10m |
| pH: | 6.49 |
| Dissolved Oxygen (mg/L): | 99.3% DO, 6.05 mg/L DO |
| Secchi Depth (m): | N/A |
| Water Temp (degrees C): | 6.2°C |
| Conductivity (µs/cm): | 318.2 us/cm SPC 203.8 us/cm C 206.7 mg/L TDS 261.2 mV ORP |

**Additional Comments/Notes**

SW - clear, some suspended solids, slightly yellow no odour.

photos taken.

**HRM Bedford West - Field Report** Event: Fall

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | HW4102-2 |
| Watercourse: | | Location: | HW4102-2 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see ipad. | | |
| Wood Field Personnel: | ER MA | | |

**Site Conditions**

| | |
|---|---|
| Weather: | ~~oo~~ Sunny, overcast |
| Air Temperature: | 1°C ✓ |
| Cloud Cover: | 80% |
| Wildlife Sightings: | chickadees |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 29 Oct 2020 |
| Time (hh:mm): | 9:01 am |
| Sample Depth (m): | 0.10m |
| pH: | 6.18 |
| Dissolved Oxygen (mg/L): | 5.45 mg/L, 44.3% |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 7.5°C |
| Conductivity (µs/cm): | 399 µS/cm SPC 266.0 µS/cm C |
| | 259.35 mg/L TDS 133.3 mV ORP |

**Additional Comments/Notes**

SW sample- suspended solids

photos taken.

**HRM Bedford West - Field Report** Event: Fall

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | LSD | Site ID: | LSD |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | ipad | | |
| Wood Field Personnel: | ER MA | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 8°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | — |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 29 Oct 2020 |
| Time (hh:mm): | 11:22 |
| Sample Depth (m): | 0,10 m |
| pH: | 6.41 |
| Dissolved Oxygen (mg/L): | 94.7% 11.40mg/L |
| Secchi Depth (m): | n/a too shallow |
| Water Temp (degrees C): | 6.8°C |
| Conductivity (µs/cm): | 145.7 SPL us/cm, 95.2 C us/cm |

94.90 mg/L TDS. 234.1 mV ORP

**Additional Comments/Notes**

photos taken

sw - fairly clear, no odour

**HRM Bedford West - Field Report** Event:

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | LU | Site ID: | LU |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | n/a | | |
| Wood Field Personnel: | ER MA | | |

**Site Conditions**

| | |
|---|---|
| Weather: | cloudy |
| Air Temperature: | 8°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | 25 CEWA, 1 BWA, 2 HERG |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 29 Oct 20 |
| Time (hh:mm): | 12:20 pm |
| Sample Depth (m): | 0.1m |
| pH: | 6.27 |
| Dissolved Oxygen (mg/L): | 8.12 mg/L 71.3 |
| Secchi Depth (m): | N/A |
| Water Temp (degrees C): | 10.2°C |
| Conductivity (µs/cm): | 511.8 SpC µS/cm 332.80 mg/L TDS 367.4 µS/cm C 248.5 mV ORP |

**Additional Comments/Notes**

- lots of Algae
- sulphur odour
- sample mostly clear but w some susp. particulates

| HRM Bedford West - Field Report | | Event: Fall | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | Papermill Lake | Site ID: | PM1-1 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see ipad | | |
| Wood Field Personnel: | EP MA | | |

**Site Conditions**

| | |
|---|---|
| Weather: | |
| Air Temperature: | 6°C |
| Cloud Cover: | Sunny Overcast 90% |
| Wildlife Sightings: | cormorants, crows, bluejays, chickadees |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 29 Oct 20 |
| Time (hh:mm): | 10:02 |
| Sample Depth (m): | 0.1m |
| pH: | 6.56 |
| Dissolved Oxygen (mg/L): | 102.1 % 10.8 mg/L |
| Secchi Depth (m): | N/A - too shallow |
| Water Temp (degrees C): | 10.5°C |
| Conductivity (µs/cm): | 224.5 µS/cm SPC 162.6 µS/cm °C |

145.60 TDS mg/L 179.9 ORP mV

**Additional Comments/Notes**

SW sample - clear, slight particulate no odour

**HRM Bedford West - Field Report** Event: Fall

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | Papermill lake | Site ID: | PML-2 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see ipad | | |
| Wood Field Personnel: | FR MA | | |

**Site Conditions**

| | |
|---|---|
| Weather: | cloudy |
| Air Temperature: | 6°C |
| Cloud Cover: | 90% |
| Wildlife Sightings: | BLJA(x4) AMCR (x3) |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 29 Oct 20 |
| Time (hh:mm): | 10:25 |
| Sample Depth (m): | 0.20m |
| pH: | 6.64 |
| Dissolved Oxygen (mg/L): | 10.16 mg/L 91% |
| Secchi Depth (m): | N/A |
| Water Temp (degrees C): | 10.4°C |
| Conductivity (µs/cm): | 228.7 us/cm SPC 164.7 us/cm C |

**Additional Comments/Notes** 148.85 mg/L TDS
214.5 mV ORP

photos taken

# Appendix C

# Summary Table Reports

**Table C1: Bedford West Water Quality Sampling Program - 2020 Results**

| Tested Parameters | Units | RDL (2020) | NSE ESQs for Surface Water [1] | Health Canada Guideline for Recreational Water Quality [2] | CCME Guideline FAL [3] | KL-1 | | | KL-2 | | | KL-3 | | | KL-4 | | | KL-5 | | | KL-D1 | KL-D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Event | | | | | | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Summer | Summer |
| Sampling Date | | | | | | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 17-Aug-20 | 17-Aug-20 |
| Sampling Time | | | | | | 3:05 PM | 11:40 AM | 12:59 PM | 1:10 PM | 4:05 PM | 13.22 PM | 3:30 PM | 3:30 PM | 13:42 PM | 4:06 PM | 3:09 PM | 13:59 PM | 2:40 PM | 11:27 AM | 12:45 PM | 5:00 PM | 4:37 PM |
| Field Data (in Situ) | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | meters | -- | -- | minimum of 1.2 | -- | NA* | NA* | NA* | 1.35 | 1.60 | NA* | NA* | NA* | NA* | NA** | NA* | NA* | NA** | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | 25.4 | 22.6 | 11.6 | 21.5 | 19.3 | 8.4 | 25.2 | 21.8 | 11.5 | 23.6 | 20.7 | 11.4 | 25.6 | 22.9 | 12.2 | 15.9 | 21.5 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | 6.55 | 8.04 | **9.69** | **5.10** | **4.96** | **9.84** | **5.09** | 6.94 | 8.84 | **3.49** | **4.73** | 9.22 | 6.85 | 7.43 | 8.02 | 7.88 | 8.61 |
| pH | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | **6.43** | 6.67 | 6.54 | **6.07** | **5.98** | **6.16** | 6.61 | **6.21** | 6.51 | **6.30** | **5.78** | 6.68 | **6.49** | 6.73 | 6.73 | **6.26** | **6.03** |
| Specific Conductance (µs/cm) | uS/cm | -- | -- | -- | -- | 245.0 | 219.0 | 219.6 | 81.0 | 101.0 | 80.8 | 253.0 | 217.0 | 219.9 | 259.0 | 221.0 | 220.6 | 245.0 | 221.0 | 224.0 | 89.0 | 184.0 |
| Inorganic Parameters | | | | | | | | | | | | | | | | | | | | | | |
| Alkalinity | mg/L | 5 | -- | -- | -- | <5 | 8.0 | 7.0 | 9.0 | 14.0 | 7.0 | 7.0 | 8.0 | 8.0 | 7.0 | 12.0 | 5.0 | 6.0 | 7.0 | 8.0 | - | - |
| Chloride | mg/L | 1 | -- | -- | 120 | 65 | 59 | 60 | 17 | 21 | 15 | 69 | 65 | 59 | 72 | 73 | 91 | 67 | 62 | 61 | - | - |
| True Color | TCU | 5 | -- | -- | -- | 22 | 11 | 16 | 59 | 40 | 81 | 25 | 12 | 12 | 22 | <5 | 16 | 28 | 17 | 15 | - | - |
| Nitrate + Nitrite as N | mg/L | 0.05 | -- | -- | -- | 0.10 | 0.06 | 0.17 | 0.12 | 0.10 | 0.08 | 0.18 | <0.05 | 0.18 | 0.24 | 0.19 | 0.17 | 0.38 | 0.08 | 0.17 | - | - |
| Nitrate as N | mg/L | 0.05 | -- | -- | 13 | 0.10 | 0.06 | 0.17 | 0.12 | 0.10 | 0.08 | 0.18 | <0.05 | 0.18 | 0.24 | 0.19 | 0.17 | 0.38 | 0.08 | 0.17 | - | - |
| Nitrite as N | mg/L | 0.05 | -- | -- | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | - | - |
| Ammonia as N | mg/L | 0.03 | -- | -- | 1.15 note [4] | <0.03 | 0.08 | <0.03 | 0.07 | 0.09 | <0.03 | <0.03 | 0.08 | <0.03 | <0.03 | 0.10 | <0.03 | <0.03 | 0.06 | <0.03 | - | - |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | <0.4 | 0.60 | 1.70 | <0.4 | 1.70 | 0.60 | 0.40 | 0.70 | 0.80 | <0.4 | 0.40 | 0.80 | 1.50 | 0.80 | 8.10 | - | - |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | 3.20 | 3.90 | 12.10 | 5.80 | 2.50 | 4.20 | 3.30 | <0.5 | 4.10 | 2.60 | 2.90 | 2.10 | 3.20 | 3.80 | 4.00 | - | - |
| Ortho-Phosphate as P | mg/L | 0.01 | -- | -- | -- | <0.01 | 0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 1.04 | <0.01 | 0.01 | <0.01 | 0.02 | <0.01 | 0.01 | 0.01 | - | - |
| pH | | | -- | 5.0-9.0 | 6.5 - 9.0 | 6.82 | 6.94 | 6.79 | 6.60 | 7.01 | **6.49** | 6.89 | 7.02 | 6.83 | 6.77 | 7.08 | 6.86 | 6.88 | 6.95 | 6.81 | - | - |
| Total Calcium | mg/L | 0.1 | -- | -- | -- | 6.8 | 5.4 | 6.4 | 3.8 | 5.7 | 3.0 | 7.6 | 7.7 | 7.3 | 8.1 | 8.6 | 7.1 | 6.8 | 5.5 | 7.0 | - | - |
| Total Magnesium | mg/L | 0.1 | -- | -- | -- | 1.1 | 20.0 | 1.0 | 1.0 | 1.4 | 0.8 | 1.2 | 1.1 | 1.2 | 1.3 | 1.3 | 1.2 | 1.1 | 4.0 | 1.1 | - | - |
| Total Phosphorus | mg/L | 0.006 | -- | -- | 0.01 note [5] | 0.008 | **0.036** | **0.029** | **0.014** | **0.027** | **0.016** | 0.010 | **0.014** | **0.023** | <0.006 | **0.014** | 0.003 | <0.006 | **0.028** | 0.004 | - | - |
| Total Potassium | mg/L | 0.1 | -- | -- | -- | 0.9 | 0.7 | 0.8 | 0.6 | 0.9 | 0.7 | 0.9 | 0.9 | 1.0 | 1.0 | 1.1 | 1.0 | 0.8 | 0.8 | 1.0 | - | - |
| Total Sodium | mg/L | 0.1 | -- | -- | -- | 36.0 | 44.4 | 40.3 | 10.1 | 14.8 | 7.8 | 36.9 | 42.2 | 39.4 | 37.4 | 39.4 | 39.6 | 35.4 | 39.7 | 38.0 | - | - |
| Reactive Silica as SiO2 | mg/L | 0.5 | -- | -- | -- | 1.7 | 1.3 | 2.0 | 2.6 | 3.4 | 4.7 | 1.6 | 1.3 | 2.1 | 1.8 | 1.7 | 2.1 | 1.8 | 1.5 | 1.9 | - | - |
| Total Suspended Solids | mg/L | 5 | -- | -- | note [6] | 6.0 | <5 | <5 | <5 | <5 | 5.0 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 15.0 | <5 |
| Sulphate | mg/L | 2 | -- | -- | -- | 9.0 | 8.0 | 9.0 | 3.0 | 4.0 | 5.0 | 9.0 | 8.0 | 9.0 | 9.0 | 9.0 | 13.0 | 9.0 | 8.0 | 9.0 | - | - |
| Turbidity | NTU | 0.1 | -- | 50 | -- | 3.4 | 0.8 | 0.7 | 1.3 | 1.8 | 2.9 | 1.0 | 0.8 | 0.7 | 1.0 | 0.8 | 1.1 | 0.9 | 1.2 | 0.9 | - | - |
| Conductivity | umho/cm | 1 | -- | -- | -- | 266 | 275 | 239 | 95 | 128 | 88 | 275 | 288 | 240 | 288 | 297 | 240 | 269 | 272 | 248 | - | - |
| Calculated Parameters | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | | -- | -- | -- | 2.03 | 2.00 | 2.03 | 0.73 | 0.96 | 0.67 | 2.29 | 2.16 | 2.02 | 2.38 | 2.50 | 2.95 | 2.22 | 2.06 | 2.08 | - | - |
| Bicarb. Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | <5 | 8 | 7 | 9 | 14 | 7 | 7 | 8 | 8 | 7 | 12 | 5 | 6 | 7 | 8 | - | - |
| Calculated TDS | mg/L | 1 | -- | -- | -- | 120 | 124 | 123 | 42 | 58 | 38 | 130 | 130 | 123 | 135 | 141 | 157 | 125 | 122 | 123 | - | - |
| Carb. Alkalinity (as CaCO3) | mg/L | 10 | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | - | - |
| Cation sum | me/L | -- | -- | -- | -- | 2.05 | 2.33 | 2.19 | 0.78 | 1.13 | 0.64 | 2.14 | 2.35 | 2.22 | 2.18 | 2.31 | 2.21 | 2.00 | 2.12 | 2.13 | - | - |
| Hardness | mg/L | -- | -- | -- | -- | 21.5 | 18.0 | 20.1 | 13.6 | 20.0 | 10.8 | 24.7 | 23.8 | 23.2 | 25.6 | 26.8 | 22.7 | 21.5 | 17.9 | 22.0 | - | - |
| % Difference/ Ion Balance (NS) | % | -- | -- | -- | -- | 0.5 | 7.7 | 3.7 | 3.1 | 8.2 | 2.6 | 3.3 | 4.2 | 4.5 | 4.2 | 4.1 | 14.3 | 5.3 | 1.3 | 1.2 | - | - |
| Langelier Index (@20C) | NA | -- | -- | -- | -- | -3.24 | -3.02 | -3.15 | -3.42 | -2.65 | -3.73 | -2.97 | -2.79 | -3.00 | -3.08 | -2.51 | -3.20 | -3.11 | -3.06 | -3.04 | - | - |
| Langelier Index (@ 4C) | NA | -- | -- | -- | -- | -3.56 | -3.34 | -3.47 | -3.74 | -2.97 | -4.05 | -3.29 | -3.11 | -3.32 | -3.40 | -2.83 | -3.52 | -3.43 | -3.38 | -3.36 | - | - |
| Saturation pH (@ 20C) | NA | -- | -- | -- | -- | 10.10 | 9.96 | 9.94 | 10.00 | 9.66 | 10.20 | 9.86 | 9.81 | 9.83 | 9.85 | 9.59 | 10.10 | 9.99 | 10.00 | 9.85 | - | - |
| Saturation pH (@ 4C) | NA | -- | -- | -- | -- | 10.4 | 10.3 | 10.3 | 10.3 | 10.0 | 10.5 | 10.2 | 10.1 | 10.1 | 10.2 | 9.9 | 10.4 | 10.3 | 10.3 | 10.2 | - | - |
| Metals (ICP-MS) | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum | ug/L | 5 | 5 | -- | 100 (pH based) | **136** | - | - | **227** | - | - | **60** | - | - | **52** | - | - | **75** | - | - | - | - |
| Total Antimony | ug/L | 2 | 20 | -- | -- | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | - | - |
| Total Arsenic | ug/L | 2 | 5.0 | -- | 5 | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | - | - |
| Total Barium | ug/L | 5 | 1000 | -- | -- | 18.0 | - | - | 15.0 | - | - | 21.0 | - | - | 21.0 | - | - | 15.0 | - | - | - | - |
| Total Beryllium | ug/L | 2 | 5.3 | -- | -- | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | - | - |
| Total Bismuth | ug/L | 2 | -- | -- | -- | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | - | - |
| Total Boron | ug/L | 5 | 1200 | -- | 1500 | 9.0 | - | - | 14.0 | - | - | 8.0 | - | - | 7.0 | - | - | 8.0 | - | - | - | - |
| Total Cadmium | ug/L | 0.017 | 0.01 | -- | 0.04 - 0.16 note [7] | **0.024** | - | - | <0.017 | - | - | <0.017 | - | - | **0.020** | - | - | **0.026** | - | - | - | - |
| Total Chromium | ug/L | 1 | --- | -- | -- | <1 | - | - | <1 | - | - | 2.0 | - | - | <1 | - | - | <1 | - | - | - | - |
| Total Cobalt | ug/L | 1 | 10 | -- | -- | <1 | - | - | <1 | - | - | <1 | - | - | <1 | - | - | <1 | - | - | - | - |
| Total Copper | ug/L | 1 | 2 | -- | 2 - 2.41 note [7] | 2.0 | <1 | 1.0 | <1 | <1 | 1.0 | 1.0 | <1 | 1.0 | 2.0 | <1 | 1.0 | 1.0 | <1 | <1 | - | - |
| Total Iron | ug/L | 50 | 300 | -- | 300 | 264 | 135 | 88 | **486** | **1,040** | **659** | 274 | 180 | 105 | 177 | 139 | 102 | <50 | 72 | 111 | - | - |
| Total Lead | ug/L | 0.5 | 1 | -- | 1 - 3.26 note [7] | <0.5 | - | - | <0.5 | - | - | <0.5 | - | - | <0.5 | - | - | <0.5 | - | - | - | - |
| Total Manganese | ug/L | 2 | 820 | -- | -- | 85 | 20 | 15 | 98 | 260 | 168 | 137 | 80 | 19 | 209 | 357 | 18 | 28 | 4 | 25 | - | - |
| Total Molybdenum | ug/L | 2 | 73 | -- | 73 | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | - | - |
| Total Nickel | ug/L | 2 | 25 | -- | 25 - 97.03 note [7] | <2 | - | - | <2 | - | - | 2.0 | - | - | <2 | - | - | <2 | - | - | - | - |
| Total Selenium | ug/L | 1 | 1.0 | -- | 1 | <1 | - | - | <1 | - | - | <1 | - | - | <1 | - | - | <1 | - | - | - | - |
| Total Silver | ug/L | 0.1 | 0.1 | -- | 0.25 | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | - | - |
| Total Strontium | ug/L | 5 | 21000 | -- | -- | 45.0 | - | - | 17.0 | - | - | 49.0 | - | - | 45.0 | - | - | 28.0 | - | - | - | - |
| Total Thallium | ug/L | 0.1 | 0.8 | -- | 0.8 | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | - | - |
| Total Tin | ug/L | 2 | -- | -- | -- | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | - | - |
| Total Titanium | ug/L | 2 | -- | -- | -- | <2 | - | - | 3.0 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | - | - |
| Total Uranium | ug/L | 0.1 | 300 | -- | 15 | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | - | - |
| Total Vanadium | ug/L | 2 | 6 | -- | -- | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | - | - |
| Total Zinc | ug/L | 5 | 30 | -- | 30 | 6.0 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 5.0 | <5 | <5 | - | - |
| Microbiological Parameters | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliforms | MPN/100 mL | 1 | -- | -- | -- | >2420 | 345 | 158 | >2420 | >2420 | 1730 | >2420 | 1990 | 130 | 2,420 | >2420 | 172 | >2420 | 291 | 159 | >2420 | 687 |
| E. Coli | MPN/100 mL | 1 | -- | 400/ 100 mL | -- | 59 | 11 | 1 | 31 | 58 | 4 | 44 | 61 | <1 | 48 | 133 | 5 | 6 | 122 | <1 | 179 | 37 |
| Chlorophyll A - Spectrophotometer | ug/L | 0.25-0.50 | -- | -- | -- | 4.42 | 1.73 | 0.95 | 0.53 | 4.25 | 3.15 | 0.47 | 1.41 | 0.64 | <0.25 | 0.60 | 0.63 | 0.47 | 0.95 | 0.83 | - | - |

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.
[2] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).
[3] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater
[4] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.
[5] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.
[6] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.
[7] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

* Secchi depth measurement not possible, disc visible at bottom of the watercourse or the sample location was too shallow for secchi depth use (KL4, KL5, HWY-102 locations, and LSD).
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / no parameter tested.

| | |
|---|---|
| **Bold and Black Shaded** | Concentration exceeds CCME FWAL applicable guideline. |
| Underlined and Black Shaded | Concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality (Reference Guidelines) |

**Table C1: Bedford West Water Quality Sampling Program - 2020 Results**

| Tested Parameters | Units | RDL (2020) | NSE ESQs for Surface Water [1] | Health Canada Guideline for Recreational Water Quality [2] | CCME Guideline FAL [3] | HWY-102-1 | | | HWY-102-2 | | | LSD | | | LU | | | PML-1 | | | PML-2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Event | | | | | | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall |
| Sampling Date | | | | | | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | | | | | | 10:22 AM | 10:34 AM | 8:40 AM | 10:00 AM | 1:54 PM | 9:01 AM | 12:15 PM | 1:08 PM | 11:22 AM | 11:00 AM | 11:00 AM | 12:22 PM | 8:20 AM | 9:07 AM | 10:02 AM | 8:50 AM | 9:27 AM | 10:25 AM |
| Field Data (in Situ) | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | meters | -- | -- | minimum of 1.2 | -- | NA** | NA* | NA* | NA** | NA* | NA* | NA** | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | 21.2 | 19.7 | 6.2 | 18.8 | 17.7 | 7.5 | 26.5 | 18.3 | 6.8 | 24.5 | 21.6 | 10.2 | 23.1 | 23.5 | 10.5 | 23.9 | 23.7 | 10.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | **3.27** | **2.61** | 6.05 | **4.92** | 7.96 | **5.45** | **2.66** | **3.24** | **11.40** | **3.53** | 6.44 | 8.12 | 8.35 | 6.72 | **10.80** | 7.79 | 7.58 | **10.16** |
| pH | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | **6.20** | **6.22** | **6.49** | **5.99** | **5.56** | **6.18** | **6.31** | **6.05** | **6.41** | **6.36** | **6.24** | **6.27** | **5.77** | **5.62** | 6.56 | **6.07** | **6.08** | 6.64 |
| Specific Conductance (µs/cm) | uS/cm | -- | -- | -- | -- | 446.0 | 345.0 | 318.2 | 461.0 | 472.0 | 399.0 | 195.0 | 158.0 | 145.8 | 945.0 | 710.0 | 511.8 | 267.0 | 271.0 | 224.5 | 275.0 | 270.0 | 228.+H11:AP117 |
| Inorganic Parameters | | | | | | | | | | | | | | | | | | | | | | | |
| Alkalinity | mg/L | 5 | -- | -- | -- | 23.0 | 27.0 | 14.0 | 18.0 | 11.0 | 11.0 | 30.0 | 21.0 | 13.0 | 26.0 | 21.0 | 17.0 | 8.0 | 9.0 | 5.0 | 9.0 | 10.0 | 7.0 |
| Chloride | mg/L | 1 | -- | -- | 120 | **137** | 100 | 72 | **172** | **200** | 99 | 35 | 35 | 32 | **297** | **221** | **147** | 74 | 72 | 60 | 76 | 72 | 61 |
| True Color | TCU | 5 | -- | -- | -- | 30 | 32 | 24 | 27 | 56 | 26 | 56 | 60 | 30 | 17 | 16 | 11 | 14 | 15 | 14 | <5 | 12 | 15 |
| Nitrate + Nitrite as N | mg/L | 0.05 | -- | -- | -- | 0.05 | <0.05 | 0.50 | 0.08 | <0.05 | 0.30 | <0.05 | <0.05 | 0.05 | 0.20 | 0.24 | 1.23 | 0.13 | <0.05 | 0.19 | <0.05 | <0.05 | 0.18 |
| Nitrate as N | mg/L | 0.05 | -- | -- | 13 | 0.05 | <0.05 | 0.50 | 0.08 | <0.05 | 0.30 | <0.05 | <0.05 | 0.05 | 0.20 | 0.24 | 1.23 | 0.13 | <0.05 | 0.19 | <0.05 | <0.05 | 0.18 |
| Nitrite as N | mg/L | 0.05 | -- | -- | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | 0.03 | -- | -- | 1.15 note [4] | 0.24 | 0.17 | <0.03 | 0.25 | 0.31 | <0.03 | 0.60 | 0.68 | <0.03 | 0.24 | 0.11 | <0.03 | 0.07 | 0.10 | <0.03 | 0.06 | 0.08 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | <0.4 | 0.90 | 3.80 | <0.4 | 4.10 | 9.80 | 0.70 | 4.10 | 0.60 | <0.4 | 1.60 | 6.40 | <0.4 | 1.00 | 0.60 | <0.4 | 1.40 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | 6.00 | 9.00 | 6.20 | 4.90 | 21.20 | 6.30 | 7.50 | 8.70 | 6.90 | 4.80 | 6.60 | 3.90 | 3.10 | 4.10 | 4.30 | 3.00 | 4.10 | 4.20 |
| Ortho-Phosphate as P | mg/L | 0.01 | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | | | -- | 5.0-9.0 | 6.5 - 9.0 | 7.10 | 7.16 | 6.95 | 6.86 | 6.86 | 6.77 | 7.19 | 7.04 | 6.75 | 7.37 | 7.28 | 7.19 | 7.01 | 7.11 | 6.85 | 7.00 | 7.11 | 6.85 |
| Total Calcium | mg/L | 0.1 | -- | -- | -- | 22.5 | 23.7 | 17.8 | 23.2 | 9.8 | 19.2 | 8.4 | 4.5 | 6.3 | 33.4 | 33.7 | 16.7 | 8.8 | 8.2 | 7.4 | 8.6 | 7.2 | 8.3 |
| Total Magnesium | mg/L | 0.1 | -- | -- | -- | 3.0 | 41.0 | 2.4 | 3.1 | 340.0 | 2.8 | 1.8 | 1,190.0 | 1.5 | 4.6 | 18.0 | 2.3 | 1.3 | 61.0 | 1.1 | 1.3 | 40.0 | 1.3 |
| Total Phosphorus | mg/L | 0.006 | -- | -- | 0.01 note [5] | **0.012** | **0.016** | 0.007 | **0.018** | 0.008 | **0.013** | **0.028** | **0.084** | 0.010 | **0.011** | **0.013** | **0.160** | <0.006 | **0.011** | **0.020** | <0.006 | **0.017** | 0.004 |
| Total Potassium | mg/L | 0.1 | -- | -- | -- | 2.4 | 2.9 | 2.3 | 2.1 | 3.7 | 2.1 | 1.2 | 0.9 | 1.2 | 3.4 | 3.2 | 2.5 | 0.9 | 1.1 | 1.0 | 0.9 | 1.1 | 1.2 |
| Total Sodium | mg/L | 0.1 | -- | -- | -- | 68.7 | 60.3 | 41.7 | 96.7 | 118.0 | 57.8 | 21.4 | 25.1 | 21.9 | 183.0 | 150.0 | 86.1 | 41.6 | 8.2 | 36.3 | 40.7 | 50.2 | 39.6 |
| Reactive Silica as SiO2 | mg/L | 0.5 | -- | -- | -- | 4.3 | 5.9 | 6.2 | 5.7 | 7.6 | 6.7 | 3.9 | 2.0 | 3.9 | 3.8 | 1.8 | 5.2 | 0.9 | 0.7 | 2.3 | 0.9 | 0.6 | 2.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | note [6] | <5 | <5 | <5 | <5 | 57.0 | <5 | 56.0 | 132.0 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Sulphate | mg/L | 2 | -- | -- | -- | 13.0 | 8.0 | 20.0 | 12.0 | 10.0 | 16.0 | 3.0 | 3.0 | 5.0 | 21.0 | 23.0 | 30.0 | 9.0 | 19.0 | 10.0 | 9.0 | 8.0 | 10.0 |
| Turbidity | NTU | 0.1 | -- | 50 | -- | 1.2 | 1.5 | 1.0 | 9.7 | 32.9 | 3.0 | 6.4 | 18.2 | 0.7 | 3.6 | 2.4 | 1.7 | 1.1 | 1.0 | 0.6 | 1.1 | 0.8 | 0.7 |
| Conductivity | umho/cm | 1 | -- | -- | -- | 517 | 469 | 339 | 629 | 742 | 412 | 197 | 193 | 150 | 1,030 | 928 | 558 | 298 | 334 | 243 | 302 | 335 | 249 |
| Calculated Parameters | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | | -- | -- | -- | 4.60 | 3.53 | 2.76 | 5.47 | 6.07 | 3.37 | 1.65 | 1.47 | 1.27 | 9.35 | 7.15 | 5.20 | 2.44 | 2.61 | 2.01 | 2.51 | 2.40 | 2.08 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | 23 | 27 | 14 | 18 | 11 | 11 | 30 | 21 | 13 | 26 | 21 | 17 | 8 | 9 | 5 | 9 | 10 | 7 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | 262 | 215 | 167 | 324 | 359 | 206 | 96 | 90 | 77 | 561 | 449 | 301 | 141 | 156 | 120 | 142 | 146 | 127 |
| Carb. Alkalinity (as CaCO3) | mg/L | 10 | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation sum | me/L | -- | -- | -- | -- | 4.46 | 4.15 | 2.97 | 5.83 | 6.25 | 3.81 | 1.83 | 1.76 | 1.45 | 10.20 | 8.61 | 4.86 | 2.40 | 2.68 | 2.08 | 2.35 | 2.69 | 2.29 |
| Hardness | mg/L | -- | -- | -- | -- | 68.5 | 70.3 | 54.3 | 70.7 | 33.1 | 59.5 | 28.4 | 17.0 | 21.9 | 102.0 | 99.0 | 51.2 | 27.3 | 26.7 | 23.0 | 26.8 | 22.9 | 26.1 |
| % Difference/ Ion Balance (NS) | % | -- | -- | -- | -- | 1.5 | 8.1 | 3.7 | 3.2 | 1.5 | 6.2 | 5.1 | 9.0 | 6.6 | 4.2 | 9.3 | 3.4 | 0.9 | 1.4 | 1.5 | 3.3 | 5.7 | 4.7 |
| Langelier Index (@20C) | NA | -- | -- | -- | -- | -1.82 | -1.65 | -2.26 | -2.16 | -2.75 | -2.52 | -1.99 | -2.57 | -2.91 | -1.35 | -1.52 | -1.99 | -2.74 | -2.63 | -3.18 | -2.71 | -2.64 | -2.98 |
| Langelier Index (@ 4C) | NA | -- | -- | -- | -- | -2.14 | -1.97 | -2.58 | -2.48 | -3.07 | -2.84 | -2.31 | -2.89 | -3.23 | -1.67 | -1.84 | -2.31 | -3.06 | -2.95 | -3.50 | -3.03 | -2.96 | -3.30 |
| Saturation pH (@ 20C) | NA | -- | -- | -- | -- | 8.92 | 8.81 | 9.21 | 9.02 | 9.61 | 9.29 | 9.18 | 9.61 | 9.66 | 8.72 | 8.80 | 9.18 | 9.75 | 9.74 | 10.00 | 9.71 | 9.75 | 9.83 |
| Saturation pH (@ 4C) | NA | -- | -- | -- | -- | 9.2 | 9.1 | 9.5 | 9.3 | 9.9 | 9.6 | 9.5 | 9.9 | 10.0 | 9.0 | 9.1 | 9.5 | 10.1 | 10.1 | 10.3 | 10.0 | 10.1 | 10.2 |
| Metals (ICP-MS) | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum | ug/L | 5 | 5 | -- | 100 (pH based) | **107** | - | - | **99** | - | - | **248** | - | - | **32** | - | - | **35** | - | - | **36** | - | - |
| Total Antimony | ug/L | 2 | 20 | -- | -- | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - |
| Total Arsenic | ug/L | 2 | 5.0 | -- | 5 | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - |
| Total Barium | ug/L | 5 | 1000 | -- | -- | 141.0 | - | - | 266.0 | - | - | 42.0 | - | - | 350.0 | - | - | 25.0 | - | - | 28.0 | - | - |
| Total Beryllium | ug/L | 2 | 5.3 | -- | -- | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - |
| Total Bismuth | ug/L | 2 | -- | -- | -- | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - |
| Total Boron | ug/L | 5 | 1200 | -- | 1500 | 11.0 | - | - | 11.0 | - | - | 18.0 | - | - | 13.0 | - | - | 8.0 | - | - | 8.0 | - | - |
| Total Cadmium | ug/L | 0.017 | 0.01 | -- | 0.04 - 0.16 note [7] | <0.017 | - | - | <0.017 | - | - | <0.017 | - | - | **0.025** | - | - | <0.017 | - | - | <0.017 | - | - |
| Total Chromium | ug/L | 1 | --- | -- | -- | <1 | - | - | <1 | - | - | <1 | - | - | <1 | - | - | <1 | - | - | <1 | - | - |
| Total Cobalt | ug/L | 1 | 10 | -- | -- | <1 | - | - | <1 | - | - | 2.0 | - | - | <1 | - | - | <1 | - | - | <1 | - | - |
| Total Copper | ug/L | 1 | 2 | -- | 2 - 2.41 note [7] | <1 | <1 | 2.0 | **3.0** | **4.0** | 2.0 | <1 | 1.0 | 1.0 | <1 | 1.0 | **3.0** | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Iron | ug/L | 50 | 300 | -- | 300 | **429** | **528** | 196 | **3,260** | **7,640** | **1,030** | **3,510** | **4,550** | **378** | **1,210** | **429** | **432** | 164 | 224 | 108 | 172 | 224 | 124 |
| Total Lead | ug/L | 0.5 | 1 | -- | 1 - 3.26 note [7] | <0.5 | - | - | 0.7 | - | - | 0.8 | - | - | <0.5 | - | - | <0.5 | - | - | <0.5 | - | - |
| Total Manganese | ug/L | 2 | 820 | -- | -- | 33 | 41 | 8 | 341 | 340 | 99 | **2,840** | **1,190** | 102 | 291 | 18 | 63 | 220 | 61 | 21 | 192 | 40 | 32 |
| Total Molybdenum | ug/L | 2 | 73 | -- | 73 | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - |
| Total Nickel | ug/L | 2 | 25 | -- | 25 - 97.03 note [7] | <2 | - | - | <2 | - | - | <2 | - | - | 3.0 | - | - | <2 | - | - | <2 | - | - |
| Total Selenium | ug/L | 1 | 1.0 | -- | 1 | <1 | - | - | <1 | - | - | <1 | - | - | <1 | - | - | <1 | - | - | <1 | - | - |
| Total Silver | ug/L | 0.1 | 0.1 | -- | 0.25 | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - |
| Total Strontium | ug/L | 5 | 21000 | -- | -- | 102.0 | - | - | 112.0 | - | - | 32.0 | - | - | 146.0 | - | - | 38.0 | - | - | 40.0 | - | - |
| Total Thallium | ug/L | 0.1 | 0.8 | -- | 0.8 | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - |
| Total Tin | ug/L | 2 | -- | -- | -- | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - | <2 | - | - |
| Total Titanium | ug/L | 2 | -- | -- | -- | <2 | - | - | 2.0 | - | - | 5.0 | - | - | 2.0 | - | - | <2 | - | - | <2 | - | - |
| Total Uranium | ug/L | 0.1 | 300 | -- | 15 | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - | <0.1 | - | - |
| Total Vanadium | ug/L | 2 | 6 | -- | -- | <2 | - | - | <2 | - | - | <2 | - | - | 2.0 | - | - | <2 | - | - | <2 | - | - |
| Total Zinc | ug/L | 5 | 30 | -- | 30 | <5 | <5 | <5 | <5 | 24.0 | 7.0 | <5 | <5 | <5 | 6.0 | 5 | 22.0 | <5 | <5 | <5 | <5 | <5 | <5 |
| Microbiological Parameters | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliforms | MPN/100 mL | 1 | -- | -- | -- | >2420 | >2420 | 1,200 | >2420 | >2420 | 816 | >2420 | >2420 | 1,200 | >2420 | >2420 | 921 | 166 | 548 | 250 | 249 | 192 | 285 |
| E. Coli | MPN/100 mL | 1 | -- | 400/ 100 mL | -- | 70 | 33 | 3 | 365 | 172 | <1 | 12 | 172 | 2 | 11 | 2 | <1 | 3 | 10 | 2 | 2 | 7 | 2 |
| Chlorophyll A - Spectrophotometer | ug/L | 0.25-0.50 | -- | -- | -- | 4.93 | 1.57 | 0.63 | 2.89 | 206 | 0.81 | 4.42 | 12.5 | 0.32 | 2.41 | 4.41 | 3.78 | 1.89 | 1.1 | 0.63 | 1.89 | 1.1 | 0.95 |

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific S
[2] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).
[3] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater
[4] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculat
[5] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.
[6] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.
[7] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guide

* Secchi depth measurement not possible, disc visible at bottom of the watercourse or the sample location was too shallow for se
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / no parameter tested.

| | |
|---|---|
| **Bold and Black Shaded** | Concentration exceeds CCME FWAL applicable guideline. |
| Underlined and Black Shaded | Concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada G |

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-1**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | HC Guideline for Recreational Water Quality (Reference) | CCME Guideline FWAL (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site (KL-1) | | | | | | | KL-1 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/16/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | | | | | | 08:00 | 11:45 | 08:30 | 11:00 | 13:10 | 12:00 | 11:00 | 14:30 | 14:00 | 8:30 | 11:20 | 9:50 | 10:20 | 11:10 | 13:30 | 10:30 | 14:15 | 14:55 | 08:30 | 14:54 | 12:30 | 9:30 | 7:50 | 13:20 | 8:30 | 9:30 AM | 9:35 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 4.1 | 4.2 | 5.0 | N/A | 5.0 | 4.9 | 2.4 | 3.2 | 2.4 | 2.4 | 5.4 | N/A | 2.5 | 2.0 | 2.9 | 2.4 | 2.7 | 2.5 | NCC | N/A | 2.2 | 1.8 | 2.1 | 2.5 | 2.1 | 2.2 | 2.2 |
| Water Temp | Celsius | -- | -- | -- | | | 14.0 | 22.2 | 16.7 | 12.9 | 23.3 | 8.8 | 11.5 | 25.6 | 15.9 | 8.9 | 23.3 | 15.4 | 13.2 | 22.2 | 14.1 | 12.7 | 23.2 | 12.2 | 14.1 | 26.1 | 9.4 | 12.8 | 22.2 | 11.9 | 16.6 | 23.2 | 14.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **10.77** | 8.20 | 7.00 | 9.13 | 7.86 | **10.48** | **10.69** | 8.22 | 9.22 | 8.98 | 7.93 | 8.72 | **9.76** | 8.57 | 8.30 | **15.29** | 7.22 | 8.12 | **9.55** | 8.13 | 7.38 | **14.02** | **10.33** | **12.06** | 8.27 | 7.91 | 8.22 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | **6.20** | 6.76 | 6.67 | 7.23 | 7.32 | 6.61 | 6.60 | **6.16** | **6.04** | 8.67 | 6.91 | **6.32** | **6.32** | 8.24 | **6.35** | 6.74 | 7.46 | **6.44** | 8.33 | 6.95 | 7.02 | 8.29 | **4.60** | **6.23** | 7.47 | 7.00 | 7.84 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 263.0 | 299.0 | 261.0 | 248.0 | 242.0 | 218.7 | 288.0 | 178.6 | 146.3 | 277.0 | 279.0 | 198.1 | 243.0 | 216.5 | 217.9 | 547.0 | 341.0 | 223.0 | 0.2 | 298.3 | 238.5 | 239.0 | 298.0 | 212.4 | 240.0 | 292.0 | 312.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 8 | 8 | 7 | 8 | 6 | <5 | 9 | 7 | 24 | 7 | <5 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 81 | 74 | 64 | 62 | 60 | 55 | 73 | 45 | 33 | 66 | 70 | 50 | 66 | 59 | 48 | 80 | 76 | 46 | 60 | 62 | 58 | 55 | 57 | 45 | 71 | 73 | 60 |
| Colour | TCU | 5 | -- | -- | -- | | 18 | 18 | 16 | 26 | 8 | 21 | 28 | 40 | 45 | 50 | 11 | 20 | 11 | 37 | 20 | 13 | 8 | 23 | 37 | 8 | 22 | 31 | 17 | 18 | 15 | 14 | 12 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.18 | 0.09 | 0.12 | 0.21 | 0.16 | 0.23 | 0.20 | 0.11 | 0.13 | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.15 | 0.13 | 0.20 | 0.29 | 0.10 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.18 | -- | -- | 0.21 | 0.16 | -- | 0.20 | -- | -- | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.08 | 0.13 | 0.08 | 0.08 | 0.10 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.07** | <0.05 | **0.12** | **0.21** | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.04 | 0.03 | <0.03 | 0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | 0.09 | <0.03 | <0.03 | <0.03 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.9 | 3.1 | 0.4 | -- | 0.7 | <0.4 | 1.1 | <0.4 | 0.4 | 0.2 | 4.5 | 0.4 | 0.7 | <0.4 | 0.6 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.4 | 2.9 | 4.7 | 3.3 | 3.2 | 3.1 | 3.4 | 5.9 | 5.5 | 5.4 | 2.9 | 5.2 | 4.4 | 4.1 | 4.3 | 4.6 | 2.4 | 4.4 | 3.0 | 5.3 | 5.5 | 4.3 | 3.4 | 7.3 | 4.5 | 4.6 | 4.8 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.94 | 6.65 | 6.68 | 6.91 | 7.00 | 6.79 | 6.52 | 6.51 | 6.52 | 6.70 | 7.20 | 6.90 | 6.78 | 6.93 | 6.85 | 6.72 | 7.06 | **6.35** | 6.62 | 6.95 | 6.99 | 6.64 | 7.23 | 6.81 | 6.64 | 7.07 | 7.00 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 9.2 | 8.5 | 7.2 | 7.7 | 8.7 | 8.3 | 7.7 | 4.8 | 5.3 | 6.8 | 8.4 | 6.3 | 7.5 | 6.6 | 6.5 | 8.1 | 11.0 | 6.0 | 6,400.0 | 7.9 | 6.1 | 6.8 | 8.0 | 6.3 | 8.6 | 7.1 | 8.3 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.5 | 1.4 | 1.2 | 1.4 | 1.4 | 1.3 | 1.3 | 0.9 | 1.1 | 1.1 | 1.5 | 1.5 | 1.1 | 1.2 | 1.2 | 1.6 | 1.6 | 0.9 | 920.0 | 1.3 | 0.9 | 1.1 | 1.1 | 1.2 | 1.3 | 1.2 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.020 | <0.020 | <0.002 | 0.009 | 0.007 | 0.005 | 0.008 | **0.012** | 0.009 | **0.037** | **0.043** | 0.007 | 0.007 | **0.011** | 0.008 | **0.011** | **0.026** | **0.013** | 0.008 | 0.002 | **0.011** | **0.024** | 0.005 | 0.008 | 0.010 | 0.010 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 0.9 | 1.3 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.7 | 1.1 | 0.9 | 1.6 | 0.7 | 680.0 | 0.9 | 0.7 | 0.7 | 0.9 | 0.8 | 1.0 | 0.9 | 1.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 51.0 | 46.0 | 37.0 | 31.8 | 35.2 | 33.8 | 43.7 | 22.8 | 19.8 | 40.1 | 42.0 | 29.8 | 35.8 | 26.2 | 31.6 | 50.2 | 54.2 | 37.6 | 33.0 | 43.3 | 39.8 | 35.5 | 32.2 | 31.0 | 44.9 | 50.3 | 35.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.6 | 2.2 | 2.3 | 2.9 | 2.7 | 2.9 | 2.8 | 1.9 | 2.3 | 2.4 | 1.3 | 2.2 | 2.5 | 1.8 | 2.2 | 2.0 | 1.5 | 1.8 | 2.5 | 1.8 | 2.7 | 2.8 | 2.0 | 1.6 | 2.0 | 1.6 | 1.8 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 1 | 1 | <1 | 4 | 17 | 3 | 2 | 2 | 3 | <5 | <5 | <5 | 5 | <5 | 5 | <5 | <5 | <5 | 14 | <5 | <5 | 38 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 14 | 13 | 12 | 11 | 11 | 11 | 12 | 10 | 8 | 8 | 9 | 9 | 11 | 9 | 9 | 12 | 11 | 7 | 9 | 10 | 8 | 10 | 10 | 10 | 11 | 9 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 0.8 | 1.0 | 1.3 | 0.6 | 1.0 | 1.0 | 1.0 | 0.9 | 2.4 | 0.8 | 1.3 | 1.6 | 3.3 | 0.5 | 2.9 | 0.7 | 1.9 | 0.8 | 1.9 | 1.1 | 10.6 | 0.9 | 2.6 | 1.4 | 1.1 | 0.8 |
| Conductivity (uS/cm) | uS/cm | 1 | -- | -- | -- | | 310 | 290 | 250 | 240 | 240 | 230 | 290 | 180 | 140 | 246 | 274 | 196 | 259 | 241 | 212 | 290 | 339 | 235 | 220 | 257 | 244 | 212 | 270 | 161 | 271 | 260 | 249 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.72 | 2.52 | 2.23 | 2.12 | 2.08 | 1.91 | 2.33 | 1.66 | 1.27 | 2.52 | 2.31 | 1.60 | 2.10 | 1.86 | 1.71 | 3.11 | 2.66 | 1.45 | 1.98 | 2.09 | 1.95 | 1.87 | 1.99 | 1.61 | 2.25 | 2.43 | 2.11 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 8 | 8 | 7 | 8 | 6 | <1 | 9 | 7 | 24 | 7 | <5 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 166 | 151 | 131 | 123 | 125 | 118 | 143 | 92 | 77 | 139 | 137 | 98 | 124 | 104 | 103 | 172 | 165 | 99 | 120 | 130 | 119 | 113 | 115 | 99 | 139 | 148 | 123 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.85 | 2.57 | 2.12 | 1.92 | 2.10 | 2.02 | 2.42 | 1.33 | 1.25 | 2.24 | 2.41 | 1.79 | 2.08 | 1.61 | 1.84 | 2.77 | 3.09 | 2.05 | 1.84 | 2.43 | 2.14 | 2.03 | 1.93 | 1.82 | 2.54 | 2.67 | 2.12 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 29.00 | 27.00 | 23.00 | 25.00 | 27.00 | 26.00 | 24.00 | 16.00 | 18.00 | 21.50 | 27.20 | 21.90 | 23.30 | 21.40 | 21.20 | 26.80 | 34.10 | 18.70 | 20.00 | 25.10 | 18.90 | 21.50 | 24.50 | 20.70 | 26.80 | 22.70 | 26.10 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 2.33 | 0.98 | 2.53 | 4.95 | 0.48 | 2.80 | 1.89 | 11.00 | 0.79 | 5.90 | 2.10 | 5.30 | 0.70 | 7.30 | 3.40 | 5.80 | 7.50 | 17.20 | 3.66 | 7.50 | 4.50 | 4.10 | 1.50 | 6.20 | 6.10 | 4.80 | 0.20 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.68 | -2.87 | -2.94 | -2.72 | -2.51 | -2.87 | NC | -3.18 | -3.21 | -2.69 | -2.63 | -3.19 | -3.24 | -3.14 | -3.02 | -2.51 | -2.36 | -3.76 | -3.21 | -2.97 | -2.97 | -3.42 | -2.56 | -3.20 | -3.33 | -2.78 | -2.68 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -2.93 | -3.12 | -3.19 | -2.97 | -2.76 | -3.12 | NC | -3.43 | -3.46 | -3.01 | -2.95 | -3.51 | -3.56 | -3.46 | -3.34 | -2.83 | -2.68 | -4.08 | -3.46 | -3.29 | -3.29 | -3.74 | -2.88 | -3.52 | -3.65 | -3.10 | -3.00 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.62 | 9.52 | 9.62 | 9.63 | 9.51 | 9.66 | NC | 9.69 | 9.73 | 9.39 | 9.83 | 10.10 | 10.00 | 10.10 | 9.87 | 9.23 | 9.42 | 10.10 | 9.83 | 9.92 | 9.96 | 10.10 | 9.79 | 10.00 | 9.97 | 9.85 | 9.68 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.87 | 9.77 | 9.87 | 9.88 | 9.76 | 9.91 | NC | 9.94 | 9.98 | 9.71 | 10.20 | 10.40 | 10.30 | 10.40 | 10.20 | 9.55 | 9.74 | 10.40 | 10.10 | 10.20 | 10.30 | 10.40 | 10.10 | 10.30 | 10.30 | 10.20 | 10.00 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **230** | -- | -- | **289** | **48** | -- | **338** | -- | -- | **321** | **43** | **168** | **191** | **120** | **56** | **229** | **42** | **155** | **100** | -- | **88** | **206** | -- | -- | **158** | **41** | **46** |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 16 | -- | -- | 19 | 16 | -- | 13 | -- | -- | 12 | 15 | 9 | 12 | 7 | 16 | 14 | 20 | 9 | 16 | -- | 17 | 14 | -- | -- | 16 | -- | 17 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 8 | -- | -- | 11 | 9 | -- | <50 | -- | -- | <5 | 11 | 33 | 6 | 10 | 9 | 7 | 22 | 10 | <50 | -- | <5 | 8 | -- | -- | <5 | -- | 26 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.3 | -- | -- | **0.053** | <0.017 | -- | **0.056** | -- | -- | **0.032** | **0.027** | **0.021** | **0.020** | <0.017 | **0.017** | **0.037** | <0.017 | **0.025** | -- | -- | **0.187** | **0.029** | -- | -- | **0.058** | -- | <0.017 |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | **6** | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | 1 | -- | -- | 1 | <0.40 | -- | 1 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | **6** | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | 1 | <1 | 1 | <2.0 | <1 | 2 | <1 | <1 | 1 | <1 | 2 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 130 | -- | -- | **313** | 62 | 125 | 177 | 162 | **384** | 229 | 137 | 195 | 207 | 132 | 92 | 147 | 124 | 168 | 110 | 157 | 81 | 149 | 62 | 269 | 78 | 70 | 116 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | **10.3** | <0.50 | -- | <0.50 | -- | -- | <0.5 | <0.5 | **1.9** | <0.5 | <0.5 | <0.5 | **5.1** | <0.5 | <0.5 | <0.50 | -- | <0.5 | <0.5 | -- | -- | **1.3** | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 100 | -- | -- | 79 | 57 | 59 | 78 | 52 | 56 | 48 | 65 | 68 | 73 | 48 | 24 | 48 | 115 | 42 | 39 | 41 | 22 | 47 | 23 | 45 | 46 | 31 | 17 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | -- | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 5 | -- | -- | 3 | <2.0 | -- | 3 | -- | -- | <2 | <2 | 2 | 2 | <2 | <2 | 3 | <2 | 3 | <2.0 | -- | <2 | 3 | -- | -- | 15 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.5 | -- | -- | <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 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 46 | -- | -- | 39 | 38 | -- | 36 | -- | -- | 32 | 41 | 32 | 37 | 33 | 30 | 40 | 45 | 26 | 29 | -- | 19 | 30 | -- | -- | 38 | -- | 40 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.3 | -- | -- | <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 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 11 | -- | -- | 6 | <2.0 | -- | 5 | -- | -- | 8 | <2 | 3 | 4 | 2 | <2 | 2 | <2 | 5 | 2 | -- | <2 | 2 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | 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 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | 2 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 27 | -- | -- | 14 | 8 | 11 | 12 | 13 | 10 | 5 | <5 | 11 | 11 | 6 | 5 | 14 | <5 | 9 | 13 | 8 | <5 | 11 | <5 | 19 | **58** | <5 | 6 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 200 | 65 | -- | >250 | 63 | >250 | 91 | >250 | -- | 2,420 | >2420 | 1,120 | 1,200 | 866 | 488 | 525 | 1,550 | >2420 | --- | 980 | 122 | 866 | 548 | >2420 | 299 | 488 | 154 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 39 | 24 | -- | 9 | 15 | 37 | 8 | **>250** | <100 | 41 | 11 | 17 | 48 | 2 | 7 | <1 | 15 | 28 | 60 | 24 | 6 | 4 | 33 | 99 | 29 | 18 | 3 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.53 | 0.79 | 1.11 | 1.73 | 1.47 | 0.99 | 0.76 | 1.44 | 1.36 | 0.62 | 2.30 | 1.54 | 1.22 | 1.40 | 1.19 | 0.40 | 0.41 | 0.84 | 0.64 | 1.14 | 1.79 | 2.76 | 0.90 | 2.08 | 1.45 | 1.75 | 1.10 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.48 | 0.69 | 1.17 | 1.61 | 1.42 | 0.81 | 0.69 | 1.15 | 1.14 | 0.63 | 2.30 | 2.16 | 1.40 | 1.40 | 1.19 | 1.32 | 0.36 | 0.80 | 0.62 | 1.11 | 0.95 | 3.48 | 1.15 | 2.19 | 2.55 | 1.87 | 1.18 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-1**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | HC Guideline for Recreational Water Quality (Reference) | CCME Guideline FWAL (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site (KL-1) | | | | | | | | | | KL-1 | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | hh:mm | | | | | | 9:15 AM | 7:50 AM | 9:00 AM | 8:40 AM | 9:15 AM | 8:45 AM | 3:05 PM | 11:40 AM | 12:59 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 2.1 | 2.1 | 2.5 | 2.5 | 2.7 | 1.9 | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | | 12.2 | 24.2 | 12.8 | 12.2 | 23.6 | 10.4 | 25.4 | 22.6 | 11.6 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **11.13** | 6.72 | 8.61 | ** | 7.10 | 8.90 | 6.55 | 8.04 | **9.69** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.85 | 7.51 | 6.84 | **9.70** | 7.41 | 6.77 | **6.43** | 6.67 | 6.54 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 203.1 | 288.2 | 253.7 | 205.0 | 160.0 | 194.0 | 245.0 | 219.0 | 219.6 |
| **INORGANICS** | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 9 | 7.0 | <5 | 7.0 | <5 | <5 | 8.0 | 7.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 53 | 54 | 55 | 75 | 59 | 43 | 65 | 59 | 60 |
| Colour | TCU | 5 | -- | -- | -- | | 42 | 16 | 18 | 41 | 21 | 19 | 22 | 11 | 16 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.26 | 0.16 | 0.2 | 0.2 | 0.1 | 0.3 | 0.10 | 0.06 | 0.17 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.16 | 0.07 | 0.2 | 0.2 | 0.1 | 0.3 | 0.10 | 0.06 | 0.17 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | **0.10** | **0.09** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.03 | 0.08 | 0.1 | <0.03 | 0.1 | 0.1 | <0.03 | 0.08 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | <0.4 | <0.4 | <0.4 | <0.4 | 0.6 | 3.0 | <0.4 | 0.60 | 1.70 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 5.1 | 3.1 | 4.0 | 4.3 | 4.2 | 4.0 | 3.20 | 3.90 | 12.10 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.71 | 7.31 | 7.07 | 6.70 | 6.95 | 6.70 | 6.82 | 6.94 | 6.79 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 5.8 | 7.2 | 6.9 | 7.0 | 7.8 | 4.2 | 6.8 | 5.4 | 6.4 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.0 | 1.2 | 1.3 | 1.2 | 1.2 | 0.8 | 1.1 | 20.0 | 1.0 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.012** | 0.007 | 0.008 | **0.011** | 0.005 | 0.008 | 0.008 | **0.036** | **0.029** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.7 | 1.0 | 0.8 | 0.8 | 1.0 | 0.6 | 0.9 | 0.7 | 0.8 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 36.4 | 34.7 | 31.7 | 46.3 | 43.9 | 23.4 | 36.0 | 44.4 | 40.3 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.6 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.7 | 1.3 | 2.0 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <5 | <5 | <5 | <5 | <5 | <5 | 6.0 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 8 | 7.0 | 9.0 | 10.0 | 9.0 | 9.0 | 9.0 | 8.0 | 9.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 1.3 | 0.7 | 2.1 | 0.9 | 3.2 | 2.9 | 3.4 | 0.8 | 0.7 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 243 | 261 | 215 | 280 | 232 | 129 | 266 | 275 | 239 |
| **Calculated Parameters** | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.68 | 1.86 | 1.9 | 2.3 | 2.0 | 1.42 | 2.03 | 2.00 | 2.03 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 9 | 7.0 | <5 | 7.0 | <5 | <5 | 8 | 7 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 106 | 112 | 110.0 | 141.0 | 127.0 | 83.0 | 120 | 124 | 123 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.00 | 2.01 | 1.9 | 2.5 | 2.4 | 1.34 | 2.05 | 2.33 | 2.19 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 18.6 | 22.9 | 22.6 | 22.4 | 24.4 | 13.8 | 21.5 | 18.0 | 20.1 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 8.6 | 3.8 | 0.4 | 3.5 | 9.9 | 3.1 | 0.5 | 7.7 | 3.7 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.42 | -2.47 | -2.8 | -3.4 | -2.9 | -3.6 | -3.24 | -3.02 | -3.15 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.74 | -2.79 | -3.2 | -3.7 | -3.2 | -3.9 | -3.56 | -3.34 | -3.47 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 10.1 | 9.78 | 9.9 | 10.1 | 9.9 | 10.3 | 10.10 | 9.96 | 9.94 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.4 | 10.1 | 10.2 | 10.4 | 10.2 | 10.6 | 10.4 | 10.3 | 10.3 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **169** | **29** | -- | **145** | **49** | **160** | **136** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 12 | 16 | -- | 14.0 | 15.0 | 8.0 | 18.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 5 | 10 | -- | 5.0 | 11.0 | 5.0 | 9.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | **0.024** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <1 | <1 | 2.0 | <1 | 1.0 | 1.0 | 2.0 | <1 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 96 | 142 | 142 | 155 | 105 | 145 | 264 | 135 | 88 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | **1.3** | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 28 | 49 | 28.0 | 42.0 | 32.0 | 23.0 | 85 | 20 | 15 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | <2 | -- | 2.0 | <2 | 6.0 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 26 | 38 | -- | 36.0 | 33.0 | 27.0 | 45.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | 3.0 | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <0.1 | <0.1 | -- | 0.1 | <0.1 | 0.1 | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | <2 | -- | 2.0 | <2 | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 8 | <5 | 19.0 | 8.0 | <5 | 6.0 | 6.0 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 14 | 611 | 157.0 | 256 | NDOGT | 1198 | >2420 | 345 | 158 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 5 | 11 | 61.0 | <1 | 6 | 26 | 59 | 11 | 1 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | -- | -- | -- | -- | -- | 1.26 | 4.42 | 1.73 | 0.95 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.91 | 1.26 | 1.63 | 1.50 | 2.18 | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 3.09 | -- | * | 1.46 | 1.89 | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations;

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surfa

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or N

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-2**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - KL-2 | | | | | | | KL-2 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | | | | | | 11:00 | 10:30 | 10:45 | 10:15 | 12:25 | 10:50 | 09:30 | 14:00 | 13:15 | 9:50 | 10:30 | 10:20 | 09:10 | 16:10 | 14:30 | 10:45 | 9:20 | 14:04 | 09:15 | 13:29 | 13:05 | 10:30 | 8:30 | 12:50 | 10:47 | 11:15 AM | 10:30 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 1.3 | 2.1 | 1.8 | 1.9 | 2.0 | 1.5 | 1.2 |
| Water Temp | Celsius | -- | -- | -- | -- | | 16.8 | 18.2 | 15.4 | 13.5 | 20.4 | 8.0 | 9.9 | 19.1 | 14.1 | 7.6 | 21.8 | 12.3 | 10.1 | 22.9 | 9.7 | 11.7 | 21.1 | 10.8 | 13.1 | 24.7 | 8.1 | 10.7 | 20.3 | 10.2 | 15.7 | 21.2 | 10.6 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **10.16** | 8.50 | 5.70 | 6.28 | **4.66** | **9.58** | **9.66** | 7.06 | 8.43 | 6.47 | 5.82 | 7.63 | 9.37 | 6.38 | 7.40 | **14.90** | 6.95 | 7.70 | 8.41 | 7.28 | 7.14 | 7.88 | **4.21** | **9.65** | **9.72** | 6.61 | 6.23 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | **6.33** | **6.35** | **6.19** | 6.61 | 6.96 | **6.25** | 6.77 | **5.90** | **5.62** | 7.72 | **6.41** | **6.29** | **5.75** | 7.47 | **5.57** | 6.60 | 7.22 | **5.79** | **6.36** | **5.88** | **6.43** | 7.64 | **5.97** | **5.54** | 6.69 | **6.00** | **6.29** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 46.0 | 106.0 | 89.2 | 198.5 | 104.0 | 75.1 | 79.7 | 66.7 | 54.3 | 58.0 | 96.6 | 61.1 | 77.9 | 65.3 | 64.5 | 188.0 | 266.0 | 63.0 | 0.1 | 107.9 | 73.6 | 82.0 | 117.0 | 103.7 | 78.0 | 114.0 | 109.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 8 | 8 | 8 | 8 | 7 | <5 | <5 | 7 | <5 | 20 | <5 | 8 | <5 | <5 | <5 | 29 | 7 | 28 | <5.0 | 7 | <5 | <5 | 10 | 6 | 5 | 12 | 9 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 48 | 48 | 48 | 48 | 25 | 17 | 19 | 14 | 10 | 16 | 20 | 12 | 19 | 21 | 14 | 20 | 17 | 12 | 15 | 14 | 12 | 17 | 26 | 30 | 20 | 19 | 19 |
| Colour | TCU | 5 | -- | -- | -- | | 20 | 20 | 20 | 20 | 63 | 95 | 80 | 110 | 120 | 52 | 60 | 94 | 37 | 90 | 71 | 25 | 44 | 168 | 50 | 63 | 61 | 47 | 48 | 93 | 46 | 46 | 57 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.19 | 0.19 | 0.19 | 0.19 | 0.07 | 0.06 | 0.12 | 0.07 | <0.05 | 0.11 | 0.08 | <0.05 | 0.12 | <0.05 | <0.05 | 0.08 | <0.05 | <0.05 | 0.06 | 0.08 | <0.05 | <0.05 | 0.06 | 0.19 | 0.05 | 0.08 | <0.05 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.19 | 0.19 | 0.19 | 0.19 | 0.07 | -- | 0.12 | -- | -- | 0.11 | 0.08 | <0.05 | 0.12 | <0.05 | <0.05 | 0.08 | <0.05 | <0.05 | 0.06 | 0.08 | <0.05 | <0.05 | <0.05 | 0.19 | <0.05 | 0.08 | <0.05 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | <0.03 | 0.04 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | 0.06 | <0.03 | <0.03 | 0.03 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 2.2 | 0.7 | -- | 1.1 | <0.4 | <0.4 | 0.4 | <0.4 | 0.4 | 0.8 | 0.8 | 0.4 | 0.9 | 0.5 | <0.4 | 0.5 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 4.3 | 4.3 | 4.3 | 4.3 | 6.6 | 9.7 | 6.5 | 10.0 | 12.0 | 8.1 | 7.1 | 10.9 | 7.5 | 11.1 | 10.9 | 6.2 | 6.6 | 12.9 | 4.0 | 13.3 | 14.0 | 6.2 | 7.0 | 13.2 | 8.5 | 8.2 | 8.5 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | 0.09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.85 | 6.85 | 6.85 | 6.85 | 6.78 | **6.11** | **6.27** | **6.40** | **6.05** | 6.50 | 6.70 | 6.50 | **6.37** | 6.62 | **6.34** | 6.53 | 6.87 | **6.06** | **6.32** | 6.99 | **6.28** | **6.35** | 6.87 | **6.19** | 6.57 | 6.87 | 6.66 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.5 | 6.5 | 6.5 | 6.5 | 4.1 | 3.6 | 2.5 | 2.5 | 2.2 | 2.4 | 3.6 | 2.9 | 2.7 | 2.5 | 2.4 | 3.4 | 4.0 | 2.4 | 2,600.0 | 3.4 | 1.1 | 2.9 | 4.5 | 5.6 | 3.6 | 4.3 | 3.9 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.2 | 1.2 | 1.2 | 1.0 | 0.8 | 0.6 | 0.6 | 0.4 | 0.7 | 1.0 | 1.0 | 0.7 | 0.5 | 0.8 | 1.1 | 1.0 | 0.6 | 640.0 | 0.9 | 0.7 | 0.7 | 1.1 | 1.5 | 1.0 | 1.2 | 0.9 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.020** | **0.020** | **0.020** | **0.020** | 0.009 | 0.009 | 0.009 | 0.008 | **0.013** | **0.021** | **0.059** | **0.013** | 0.010 | **0.020** | **0.029** | **0.013** | **0.039** | **0.025** | 0.008 | **0.012** | 0.008 | 0.009 | **0.016** | **0.013** | **0.012** | **0.028** | 0.010 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.1 | 1.1 | 1.1 | 0.6 | 0.8 | 0.5 | 0.5 | 0.7 | 0.5 | 0.7 | 0.8 | 0.5 | 0.5 | 0.7 | 0.7 | 0.9 | 0.7 | 540.0 | 0.7 | 0.6 | 0.9 | 0.8 | 1.1 | 0.8 | 0.8 | 0.7 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 31.6 | 31.6 | 31.6 | 31.6 | 14.7 | 10.6 | 11.1 | 7.8 | 6.9 | 9.8 | 14.2 | 9.5 | 8.9 | 7.0 | 7.9 | 17.5 | 14.0 | 7.6 | 8.4 | 11.5 | 6.6 | 11.5 | 16.1 | 17.7 | 13.8 | 15.4 | 13.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.2 | 2.2 | 2.2 | 2.2 | 4.2 | 4.7 | 2.7 | 4.3 | 4.0 | 2.6 | 4.0 | 4.9 | 2.8 | 4.4 | 4.9 | 2.4 | 3.3 | 4.6 | 2.0 | 3.7 | 5.1 | 2.0 | 2.3 | 4.5 | 1.3 | 2.2 | 4.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 103 | 103 | 103 | 103 | 7 | <1 | <1 | <2 | <1 | <5 | <5 | <5 | <5 | 135 | <5 | <5 | <5 | <5 | <1.0 | <5 | <5 | <5 | <5 | <5 | <5 | 12 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 9 | 9 | 9 | 9 | <2 | <2 | <2 | <2 | <2 | 3 | 3 | 2 | 4 | 5 | 4 | 4 | 2 | 3 | 3 | <2 | 3 | 4 | 3 | 7 | 3 | 2 | 3 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.5 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 | 0.4 | 0.7 | 0.6 | 0.5 | 1.1 | 1.0 | 1.9 | 2.2 | 1.0 | 0.9 | 0.8 | 1.2 | <1.0 | 1.6 | 6.2 | 0.7 | 2.0 | 1.9 | 0.8 | 4.4 | 1.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 212 | 212 | 212 | 212 | 100 | 97 | 79 | 66 | 54 | 71 | 91 | 61 | 83 | 69 | 62 | 87 | 94 | 66 | 64 | 81 | 73 | 79 | 135 | 125 | 93 | 110 | 97 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 0.49 | 0.82 | 0.45 | 0.77 | 0.85 | 0.49 | 0.53 | 0.53 | 0.28 | 0.92 | 0.63 | 0.54 | 0.63 | 0.70 | 0.48 | 1.23 | 0.66 | 0.96 | 0.48 | 0.54 | 0.40 | 0.56 | 1.00 | 1.13 | 0.73 | 0.82 | 0.78 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | 8 | <1 | 5 | 7 | <1 | <1 | 7 | <1 | 20 | <5 | 8 | <5 | <5 | <5 | 29 | 7 | 28 | <1.0 | 7 | <5 | <5 | 10 | 6 | 5 | 12 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 36 | 55 | 35 | 46 | 55 | 38 | 37 | 34 | 25 | 45 | 44 | 34 | 37 | 37 | 31 | 65 | 44 | 44 | 32 | 36 | 25 | 38 | 59 | 68 | 46 | 51 | 47 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 0.71 | 0.99 | 0.67 | 0.74 | 0.95 | 0.74 | 0.68 | 0.55 | 0.49 | 0.65 | 0.94 | 0.73 | 0.63 | 0.54 | 0.60 | 1.07 | 0.97 | 0.57 | 0.57 | 0.82 | 0.47 | 0.76 | 1.09 | 1.25 | 0.91 | 1.05 | 0.90 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 10.00 | 15.00 | 10.00 | 12.00 | 14.00 | 12.00 | 9.00 | 9.00 | 8.00 | 8.90 | 13.10 | 11.40 | 9.60 | 8.30 | 9.30 | 13.00 | 14.10 | 8.50 | 9.10 | 12.20 | 5.60 | 10.10 | 15.80 | 20.20 | 13.10 | 15.70 | 13.40 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 18.30 | 9.39 | 19.60 | 1.99 | 5.56 | 20.30 | 12.40 | 1.85 | 27.30 | 17.60 | 19.70 | 15.10 | 0.30 | 12.90 | 11.00 | 7.10 | 19.10 | 25.70 | 8.57 | 20.50 | 7.50 | 14.90 | 4.50 | 5.30 | 11.00 | 12.30 | 7.50 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | -3.20 | NC | -3.44 | -3.05 | NC | NC | -3.66 | NC | -3.37 | -3.60 | -3.68 | -4.05 | -3.83 | -4.12 | -3.04 | -3.23 | -3.66 | NC | -3.18 | -4.51 | -4.04 | -3.04 | -3.85 | -3.73 | -2.98 | -3.35 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | -3.45 | NC | -3.70 | -3.30 | NC | NC | -3.91 | NC | -3.69 | -3.92 | -4.00 | -4.37 | -4.15 | -4.44 | -3.36 | -3.55 | -3.98 | NC | -3.50 | -4.83 | -4.36 | -3.36 | -4.17 | -4.05 | -3.30 | -3.67 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | 9.78 | NC | 10.00 | 9.83 | NC | NC | 10.10 | NC | 9.87 | 10.30 | 10.20 | 10.40 | 10.50 | 10.50 | 9.57 | 10.10 | 9.72 | NC | 10.20 | 10.80 | 10.40 | 9.91 | 10.00 | 10.30 | 9.85 | 10.00 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | 10.00 | NC | 10.30 | 10.10 | NC | NC | 10.30 | NC | 10.20 | 10.60 | 10.50 | 10.70 | 10.80 | 10.80 | 9.89 | 10.40 | 10.00 | NC | 10.50 | 11.10 | 10.70 | 10.20 | 10.40 | 10.60 | 10.20 | 10.30 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **290** | -- | -- | **175** | **151** | -- | **271** | -- | -- | **209** | **205** | **338** | **256** | **270** | **259** | **205** | **236** | **340** | **180** | -- | **284** | **187** | -- | -- | **185** | **150** | **240** |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 9 | -- | -- | 12 | 14 | -- | 10 | -- | -- | 9 | 11 | 10 | 8 | <5 | 13 | 13 | 18 | 9 | 9 | -- | 9 | 10 | -- | -- | 10 | -- | 14 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 8 | -- | -- | 15 | 13 | -- | <50 | -- | -- | 6 | 14 | 22 | 6 | 11 | 9 | 11 | 12 | 12 | <50 | -- | <5 | 9 | -- | -- | <5 | -- | 17 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.3 | -- | -- | **0.018** | <0.017 | -- | <0.017 | -- | -- | <0.017 | <0.017 | <0.017 | <0.017 | <0.017 | **0.019** | <0.017 | <0.017 | **0.018** | **0.014** | -- | **0.176** | <0.017 | -- | -- | **0.041** | -- | <0.017 |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | **9** | <1 | <1 | <1.0 | -- | <1 | 1 | -- | -- | <1 | -- | 1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | 2 | <1 | <1 | **4** | <2.0 | <1 | <1 | <1 | <1 | 2 | <1 | 1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 250 | -- | -- | 227 | **403** | 238 | 202 | **418** | **358** | 154 | **541** | **813** | 269 | **528** | **523** | 174 | **723** | **305** | 250 | **641** | **478** | 232 | **1,000** | 290 | 168 | **759** | **572** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | **1.0** | <0.50 | -- | <0.50 | -- | -- | <0.5 | <0.5 | **1.1** | <0.5 | 0.5 | <0.5 | **5.8** | <0.5 | 0.5 | <0.5 | -- | 0.6 | <0.5 | -- | -- | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 26 | -- | -- | 43 | 83 | 35 | 12 | 68 | 23 | 17 | 90 | 114 | 24 | 67 | 53 | 33 | 146 | 25 | 47 | 120 | 57 | 21 | 109 | 39 | 39 | 96 | 64 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <2 | -- | -- | <1 | <1 | -- | <1 | -- | -- | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.5 | -- | -- | **0.420** | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 14 | -- | -- | 18 | 20 | -- | 12 | -- | -- | 10 | 18 | 15 | 12 | 9 | 12 | 16 | 17 | 12 | 12 | -- | 8 | 12 | -- | -- | 15 | -- | 20 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 2 | -- | -- | <2 | <2 | -- | 3 | -- | -- | <2 | 2 | 3 | 4 | <2 | 2 | 2 | <2 | 3 | 3 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <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 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 8 | -- | -- | 5 | 5 | 7 | <5.0 | <5.0 | <5.0 | <5 | <5 | <5 | 7 | <5 | <5 | <5 | <5 | <5 | <5.0 | <5 | <5 | <5 | <5 | 8 | <5 | 8 | 6 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 1,800 | 170 | -- | >250 | 11 | >250 | 59 | >250 | -- | >2420 | 1,986 | >2420 | >2420 | >2420 | >2420 | 525 | >2420 | >2420 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | 659 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | **1,500** | 100 | -- | **>250** | 6 | 6 | 2 | **>250** | <100 | 3 | 7 | 3 | 12 | 6 | 2 | <1 | 18 | 11 | 30 | 11 | 5 | 4 | 15 | 25 | 31 | 16 | 3 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.82 | 6.05 | 1.97 | 0.73 | 0.55 | 0.22 | 0.44 | 0.89 | 0.97 | 0.53 | 2.20 | 0.07 | 0.62 | 1.00 | 0.73 | 0.13 | 0.83 | 0.41 | 0.34 | 0.96 | 0.46 | 0.30 | 1.86 | 0.32 | 0.99 | 1.47 | 0.31 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.87 | 5.97 | 1.95 | 0.66 | 0.54 | 0.21 | 0.42 | 0.73 | 0.82 | 0.56 | 2.20 | 0.12 | 0.72 | 1.00 | 0.74 | 0.14 | 0.86 | 0.41 | --- | 1.26 | 0.26 | 0.43 | 2.43 | 0.36 | 1.86 | 1.81 | 0.49 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-2**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - KL-2 | | | | | | | KL-2 | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | hh:mm | | | | | | 11:00 AM | 10:10 AM | 10:00 AM | 10:44 AM | 3:01 PM | 10:45 AM | 1:10 PM | 4:05 PM | 13.22 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 2.1 | 1.4 | 1.4 | 2.2 | 1.80 | 1.20 | 1.35 | 1.60 | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | | 11.7 | 21.6 | 10.3 | 10.3 | 26.4 | 10.1 | 21.5 | 19.3 | 8.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 9.41 | **4.17** | 7.54 | ** | **2.58** | 7.90 | **5.10** | **4.96** | **9.84** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | **6.21** | **5.16** | **5.84** | 8.50 | **5.18** | **6.11** | **6.07** | **5.98** | **6.16** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 57.4 | 109.9 | 67.2 | 48.3 | 119.0 | 214.0 | 81.0 | 101.0 | 80.8 |
| **INORGANICS** | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 11 | <5 | <5 | 9.0 | <5 | 9.0 | 14.0 | 7.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 12 | 19 | 11 | 13 | 16 | 14 | 17 | 21 | 15 |
| Colour | TCU | 5 | -- | -- | -- | | 82 | 59 | 123 | 76 | 106 | 77 | 59 | 40 | 81 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.07 | 0.05 | <0.05 | 0.1 | 0.05 | <0.05 | 0.12 | 0.10 | 0.08 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.07 | <0.05 | <0.05 | 0.06 | 0.05 | <0.05 | 0.12 | 0.10 | 0.08 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | 0.04 | 0.06 | 0.05 | <0.03 | 0.12 | 0.07 | 0.07 | 0.09 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | <0.4 | <0.4 | <0.4 | 0.5 | 0.80 | 2.70 | <0.4 | 1.70 | 0.60 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 9.0 | 6.6 | 14.0 | 6.9 | 12.10 | 9.40 | 5.80 | 2.50 | 4.20 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | **6.46** | 7.04 | **6.27** | **6.44** | 6.70 | **5.89** | 6.60 | 7.01 | **6.49** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 2.3 | 4.2 | 2.9 | 2.3 | 4.3 | 2.0 | 3.8 | 5.7 | 3.0 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.7 | 1.1 | 0.8 | 0.7 | 1.1 | 0.6 | 1.0 | 1.4 | 0.8 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.014** | **0.015** | 0.004 | 0.009 | **0.019** | **0.031** | **0.014** | **0.027** | **0.016** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.5 | 0.8 | 0.6 | 0.6 | 0.8 | 0.6 | 0.6 | 0.9 | 0.7 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 9.2 | 13.9 | 11.8 | 11.9 | 10.0 | 7.5 | 10.1 | 14.8 | 7.8 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.3 | 2.8 | 3.6 | 1.7 | 3.7 | 3.5 | 2.6 | 3.4 | 4.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 5.0 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 3 | <2 | 3.0 | 3.0 | <2 | 4.0 | 3.0 | 4.0 | 5.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.9 | 1.2 | 1.1 | 0.6 | 3.5 | 1.3 | 1.3 | 1.8 | 2.9 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 68 | 115 | 70 | 72 | 88 | 45 | 95 | 128 | 88 |
| **Calculated Parameters** | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 0.41 | 0.76 | 0.4 | 0.4 | 0.6 | 0.5 | 0.73 | 0.96 | 0.67 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 11 | <5 | <5 | 9.0 | <5 | 9 | 14 | 7 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 28 | 47 | 31.0 | 32.0 | 40.0 | 29.0 | 42 | 58 | 38 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 0.62 | 0.97 | 0.8 | 0.7 | 0.9 | 0.5 | 0.78 | 1.13 | 0.64 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 8.6 | 15 | 10.5 | 8.6 | 15.3 | 7.5 | 13.6 | 20.0 | 10.8 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 20.8 | 12.4 | 36.7 | 25.6 | 14.6 | 6.4 | 3.1 | 8.2 | 2.6 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -4.02 | -2.85 | -4.1 | -4.0 | -3.3 | -4.7 | -3.42 | -2.65 | -3.73 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -4.34 | -3.17 | -4.4 | -4.4 | -3.6 | -5.0 | -3.74 | -2.97 | -4.05 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 10.5 | 9.89 | 10.4 | 10.5 | 10.0 | 10.5 | 10.00 | 9.66 | 10.20 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.8 | 10.2 | 10.7 | 10.8 | 10.3 | 10.9 | 10.3 | 10.0 | 10.5 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **228** | **123** | -- | **156** | **257** | **318** | **227** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 7 | 14 | -- | 10 | 37 | 9 | 15.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 7 | 13 | -- | 7 | 11 | 7 | 14.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | <1 | -- | <1 | 1 | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <1 | <1 | 1 | <1 | <1 | 1 | <1 | <1 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 148 | **783** | **336** | 227 | **1,210** | 277 | **486** | **1,040** | **659** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | **1.2** | <0.5 | -- | <0.5 | 1.0 | **1.6** | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 17 | 78 | 29 | 28 | 295 | 23 | 98 | 260 | 168 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 10 | 24 | -- | 13 | 24 | 13 | 17.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | 2 | 2 | 3.0 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | <5 | <5 | 20 | <5 | 9 | 6 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 10 | 2420 | 140.0 | 1960 | 630 | 1240 | >2420 | >2420 | 1730 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 4 | 20 | 50 | <10 | 2 | 12 | 31 | 58 | 4 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | -- | -- | -- | -- | -- | <0.25 | 0.53 | 4.25 | 3.15 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.51 | 1.25 | 0.75 | 0.47 | 1.67 | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.91 | -- | * | 0.49 | 1.50 | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surfa

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Site

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-3**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-3 | | | | | | | KL-3 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/16/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | | | | | | 09:00 | 11:00 | 09:30 | 11:30 | 14:12 | 11:40 | 10:30 | 12:20 | 12:00 | 10:26 | 12:20 | 11:20 | 9:50 | 10:00 | 14:00 | 11:00 | 11:50 | 14:25 | 10:35 | 11:45 | 10:40 | 11:00 | 11:30 | 11:00 | 9:36 | 10:15 | 10:15 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.0 | 21.6 | 17.3 | 14.7 | 23.1 | 9.9 | 10.3 | 21.1 | 15.5 | 9.0 | 24.5 | 15.6 | 11.7 | 21.5 | 13.6 | 11.0 | 22.7 | 12.8 | 14.7 | 25.0 | 8.4 | 12.1 | 21.7 | 12.5 | 16.1 | 22.5 | 13.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **10.79** | 8.00 | 8.00 | 9.26 | 7.83 | **10.35** | **11.06** | 8.42 | **9.60** | 8.89 | 8.17 | 7.72 | **10.20** | 9.20 | 8.90 | 5.90 | 7.87 | 8.12 | 8.02 | **9.91** | 8.65 | 9.34 | 7.72 | **11.41** | 9.00 | 7.40 | 8.17 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.27 | 6.74 | 6.97 | 7.27 | 7.33 | 6.76 | 6.83 | 6.96 | **6.30** | 7.68 | 6.85 | 6.51 | **5.86** | 7.25 | **6.49** | 6.55 | 7.37 | 6.67 | 6.84 | 6.87 | 7.17 | 7.40 | 6.82 | **5.58** | 7.02 | 7.04 | 6.97 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 95.0 | 282.0 | 246.0 | 220.0 | 228.0 | 199.4 | 220.0 | 175.0 | 161.3 | 204.0 | 225.0 | 177.2 | 207.3 | 194.4 | 210.6 | 405.0 | 252.0 | 208.0 | 0.2 | 245.1 | 236.6 | 213.0 | 264.0 | 227.8 | 204.0 | 248.0 | 248.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 | 5 | 6 | <5.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 66 | 63 | 60 | 55 | 55 | 53 | 56 | 43 | 37 | 50 | 57 | 46 | 54 | 40 | 46 | 58 | 46 | 45 | 60 | 56 | 56 | 54 | 56 | 49 | 63 | 56 | 59 |
| Colour | TCU | 5 | -- | -- | -- | | 22 | 20 | 20 | 28 | 12 | 20 | 31 | 38 | 40 | 57 | 15 | 31 | 19 | 23 | 20 | 16 | 13 | 20 | 34 | 13 | 14 | 29 | 13 | 21 | 24 | 13 | 15 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.14 | 0.12 | 0.14 | 0.24 | 0.15 | 0.22 | 0.24 | 0.15 | 0.16 | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.13 | 0.10 | 0.24 | 0.30 | 0.24 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.14 | -- | -- | 0.24 | 0.15 | -- | 0.24 | -- | -- | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.06 | 0.10 | 0.13 | 0.17 | 0.24 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.07** | <0.05 | **0.11** | **0.13** | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.04 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 | 0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 2.8 | <0.4 | -- | 1.3 | <0.4 | 0.6 | 0.4 | 0.4 | 0.2 | 1.2 | 0.9 | <0.4 | <0.4 | 0.4 | <0.4 | 0.8 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.6 | 3.9 | 4.3 | 3.6 | 3.1 | 3.3 | 3.8 | 5.1 | 5.0 | 5.9 | 3.4 | 4.9 | 4.3 | 4.4 | 4.6 | 4.6 | 2.8 | 4.5 | 3.4 | 5.7 | 5.8 | 4.3 | 2.7 | 8.0 | 5.3 | 4.9 | 4.1 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | **6.38** | 6.67 | 6.82 | 6.82 | 6.99 | 6.87 | 6.52 | 6.50 | **6.38** | 6.70 | 7.10 | 6.90 | 6.68 | 6.96 | 6.86 | 6.68 | 6.87 | 6.59 | 6.54 | 6.92 | 6.94 | 6.69 | 7.28 | 6.93 | 6.77 | 7.13 | 6.88 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.7 | 7.1 | 6.8 | 6.8 | 8.0 | 8.3 | 7.1 | 4.7 | 5.6 | 5.7 | 6.9 | 6.0 | 7.0 | 5.3 | 6.8 | 6.4 | 7.9 | 6.8 | 6,600.0 | 7.8 | 5.2 | 6.2 | 8.3 | 7.3 | 6.9 | 7.2 | 8.1 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.2 | 1.1 | 1.2 | 1.3 | 1.3 | 1.2 | 0.8 | 1.0 | 1.0 | 1.2 | 1.3 | 1.0 | 0.9 | 1.3 | 1.4 | 1.2 | 1.0 | 940.0 | 1.2 | 0.9 | 1.0 | 1.3 | 1.3 | 1.0 | 1.1 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.03 | 0.005 | 0.005 | <0.002 | 0.003 | 0.008 | 0.003 | **0.012** | **0.019** | **0.045** | 0.007 | 0.006 | 0.006 | **0.012** | 0.009 | **0.023** | **0.148** | 0.004 | 0.004 | 0.002 | 0.008 | 0.005 | 0.004 | 0.006 | 0.009 | 0.007 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 1.1 | 0.9 | 0.8 | 0.8 | 1.0 | 0.9 | 0.7 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.6 | 1.2 | 0.8 | 1.1 | 0.9 | 770.0 | 0.9 | 0.7 | 0.7 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 38.0 | 38.0 | 35.0 | 28.3 | 33.1 | 33.0 | 33.0 | 20.8 | 21.3 | 31.2 | 34.5 | 26.4 | 35.1 | 20.1 | 32.1 | 36.4 | 39.0 | 35.3 | 34.0 | 40.0 | 27.1 | 32.1 | 37.2 | 32.8 | 44.0 | 41.4 | 35.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.7 | 2.6 | 2.6 | 3.2 | 2.9 | 3.2 | 2.9 | 2.5 | 2.6 | 2.7 | 2.0 | 2.6 | 2.9 | 2.6 | 2.7 | 2.6 | 1.9 | 2.4 | 2.5 | 2.4 | 2.6 | 2.6 | 1.8 | 2.5 | 2.2 | 1.6 | 1.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <5 | 1 | 1 | 2 | <2 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 3 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 12 | 12 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 8 | 7 | 7 | 7 | 8 | 9 | 7 | 7 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 9 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 1.4 | 0.6 | 0.3 | 0.5 | 0.6 | 0.6 | 0.6 | 0.4 | 0.8 | 0.7 | 1.0 | 0.7 | 2.4 | 0.4 | 0.4 | 0.3 | 0.9 | 0.7 | 0.5 | 0.7 | 1.1 | 1.1 | 1.0 | 1.0 | 1.3 | 2.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 250 | 250 | 240 | 220 | 220 | 220 | 220 | 170 | 160 | 197 | 222 | 182 | 219 | 216 | 204 | 218 | 243 | 216 | 220 | 242 | 238 | 206 | 262 | 185 | 245 | 251 | 247 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.11 | 2.17 | 2.08 | 1.90 | 1.93 | 1.87 | 1.90 | 1.58 | 1.36 | 2.03 | 1.90 | 1.55 | 1.68 | 1.38 | 1.60 | 2.14 | 1.55 | 1.54 | 1.87 | 1.90 | 1.88 | 1.74 | 1.98 | 1.76 | 2.00 | 1.95 | 2.07 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 | 5 | 6 | <1.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 128 | 130 | 123 | 110 | 117 | 116 | 115 | 88 | 82 | 111 | 113 | 91 | 106 | 78 | 100 | 122 | 106 | 100 | 110 | 119 | 103 | 105 | 120 | 107 | 127 | 122 | 122 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.12 | 2.16 | 1.99 | 1.69 | 1.97 | 1.98 | 1.92 | 1.23 | 1.32 | 1.77 | 1.98 | 1.60 | 2.00 | 1.24 | 1.89 | 2.07 | 2.23 | 2.00 | 1.89 | 2.27 | 1.55 | 1.83 | 2.18 | 1.94 | 2.38 | 2.28 | 2.10 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 23.00 | 22.00 | 22.00 | 25.00 | 26.00 | 23.00 | 15.00 | 18.00 | 18.40 | 22.20 | 20.30 | 21.60 | 16.90 | 22.30 | 21.70 | 24.70 | 21.10 | 20.00 | 24.40 | 16.70 | 19.60 | 26.10 | 23.60 | 21.30 | 22.50 | 25.20 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 0.24 | 0.23 | 2.21 | 5.85 | 1.03 | 2.86 | 0.52 | 12.50 | 1.49 | 6.80 | 2.10 | 1.60 | 8.60 | 5.50 | 8.30 | 1.50 | 17.90 | 12.80 | 0.53 | 9.00 | 9.80 | 2.60 | 4.80 | 4.90 | 8.60 | 7.90 | 0.80 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | -3.00 | -2.89 | -2.92 | -2.60 | -2.73 | -3.23 | -3.33 | -3.35 | -2.77 | -2.88 | -3.21 | -3.37 | -3.19 | -3.05 | -2.93 | -3.12 | -3.39 | NC | -3.00 | -3.15 | -3.41 | -2.44 | -2.89 | -3.29 | -2.71 | -2.85 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | -3.25 | -3.14 | -3.17 | -2.85 | -2.99 | -3.49 | -3.58 | -3.60 | -3.09 | -3.20 | -3.53 | -3.69 | -3.51 | -3.37 | -3.25 | -3.44 | -3.71 | NC | -3.32 | -3.47 | -3.73 | -2.76 | -3.21 | -3.61 | -3.03 | -3.17 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | 9.67 | 9.71 | 9.74 | 9.59 | 9.60 | 9.75 | 9.83 | 9.73 | 9.47 | 9.98 | 10.10 | 10.00 | 10.20 | 9.91 | 9.61 | 9.99 | 9.98 | NC | 9.92 | 10.10 | 10.10 | 9.72 | 9.82 | 10.10 | 9.84 | 9.73 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | 9.92 | 9.96 | 9.99 | 9.84 | 9.86 | 10.00 | 10.10 | 9.98 | 9.79 | 10.30 | 10.40 | 10.40 | 10.50 | 10.20 | 9.93 | 10.30 | 10.30 | NC | 10.20 | 10.40 | 10.40 | 10.00 | 10.10 | 10.40 | 10.20 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **259** | **259** | -- | **124** | **54** | -- | **266** | -- | -- | **199** | **54** | **153** | **140** | **65** | **100** | **260** | **52** | **105** | **180** | -- | **90** | **163** | -- | -- | **128** | **36** | **43** |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 13 | 13 | -- | 16 | 13 | -- | 19 | -- | -- | 18 | 17 | 15 | 19 | 9 | 18 | 17 | 17 | 16 | 19 | -- | 19 | 15 | -- | -- | 17 | -- | 20 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 9 | 9 | -- | 8 | 9 | -- | <50 | -- | -- | 5 | 9 | 17 | 7 | 7 | 10 | 8 | 10 | 12 | <50 | -- | <5 | 8 | -- | -- | 7 | -- | 12 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | **0.019** | **0.019** | -- | **0.030** | <0.017 | -- | **0.046** | -- | -- | **0.019** | **0.021** | **0.027** | **0.028** | <0.017 | <0.017 | **0.038** | <0.017 | **0.017** | **0.033** | -- | <0.017 | **0.021** | -- | -- | **0.020** | -- | <0.017 |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | **7** | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | <1 | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | 2 | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | 1 | <1 | 2 | <2.0 | 1 | <1 | 2 | <1 | <1 | <1 | <1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | **523** | **523** | -- | 73 | 133 | 58 | 136 | 104 | 154 | 137 | 136 | 119 | 131 | 71 | 172 | 137 | 96 | 118 | 120 | 165 | 115 | 112 | 117 | 99 | 125 | 83 | 130 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | <0.5 | -- | 0.6 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.7 | <0.5 | <0.5 | 0.9 | **3.6** | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 53 | 53 | -- | 37 | 67 | 32 | 42 | 33 | 33 | 25 | 47 | 46 | 37 | 20 | 92 | 41 | 45 | 27 | 36 | 48 | 24 | 31 | 41 | 20 | 30 | 35 | 54 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | <2 | -- | 2 | <2.0 | -- | 2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.1 | <0.1 | -- | <0.10 | <0.10 | -- | <0.10 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 12 | 12 | -- | 34 | 36 | -- | 33 | -- | -- | 25 | 33 | 29 | 33 | 18 | 32 | 31 | 32 | 29 | 29 | -- | 21 | 28 | -- | -- | 33 | -- | 41 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | -- | <0.1 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 2 | 2 | -- | <2.0 | <2.0 | -- | 5 | -- | -- | <2 | <2 | <2 | <2 | <2 | 2 | 3 | <2 | 2 | 3 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <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 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | <2 | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | <5 | <5 | -- | 10 | 7 | 6 | 9 | 7 | 9 | <5 | <5 | 8 | 10 | 5 | 7 | 10 | <5 | 6 | 9 | 7 | 8 | 8 | <5 | <5 | 6 | 6 | 6 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 120 | 24 | -- | 190 | 16 | 58 | 72 | 110 | -- | 291 | 1,553 | 178 | 345 | 2,420 | 1,300 | 86 | 1,730 | >2420 | --- | 2,420 | 285 | 548 | 1,990 | 2,420 | 687 | 2,420 | 411 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 1 | 17 | -- | 2 | <1 | 8 | 5 | 37 | <100 | 2 | <1 | 3 | 8 | 21 | <1 | <1 | <1 | 13 | <0.10 | 7 | 6 | 2 | 38 | 30 | 7 | 13 | 46 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.04 | 1.11 | 1.18 | 1.30 | 1.14 | 0.51 | 0.78 | 1.26 | 1.24 | 0.52 | 1.30 | 0.81 | 1.44 | 2.00 | 0.65 | 0.76 | 0.59 | 1.23 | 0.72 | 1.27 | 1.34 | 1.63 | 0.81 | 2.29 | 1.96 | 1.24 | 1.34 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.94 | 0.97 | 1.21 | 1.09 | 1.19 | 0.42 | 0.67 | 0.98 | 1.01 | 0.55 | 1.20 | 1.14 | 1.62 | 2.30 | 0.61 | 0.69 | 0.51 | 1.12 | 0.68 | 1.34 | 0.69 | 2.00 | 0.99 | 2.37 | 2.46 | 1.32 | 1.87 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-3**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-3 | | | | | | | KL-3 | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | hh:mm | | | | | | 10:30 | 9:10 | 11:30 AM | 10:00 AM | 10:00 AM | 11:45 AM | 3:30 PM | 3:30 PM | 13:42 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | | 12.1 | 23.8 | 12.4 | 9.6 | 23.3 | 11.3 | 25.2 | 21.8 | 11.5 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 7.33 | 6.90 | 8.64 | ** | 7.28 | 9.30 | **5.09** | 6.94 | 8.84 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.66 | 6.94 | 6.64 | 8.25 | 7.05 | 6.61 | 6.61 | **6.21** | 6.51 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 190.3 | 242.7 | 209.8 | 158.6 | 319.0 | 183.0 | 253.0 | 217.0 | 219.9 |
| **INORGANICS** | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 8 | 7 | <5 | 8 | 6 | 7.0 | 8.0 | 8.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 54 | 48 | 46 | 49 | 56 | 54 | 69 | 65 | 59 |
| Colour | TCU | 5 | -- | -- | -- | | 63 | 26 | 27 | 53 | 13 | 21 | 25 | 12 | 12 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.17 | 0.06 | 0.13 | 0.14 | 0.10 | 0.29 | 0.18 | <0.05 | 0.18 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.17 | 0.06 | 0.13 | 0.14 | 0.10 | 0.29 | 0.18 | <0.05 | 0.18 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.03 | 0.04 | 0.03 | <0.03 | 0.08 | **0.07** | <0.03 | 0.08 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 2.0 | 0.40 | 0.70 | 0.80 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 5.1 | 3.2 | 4.0 | 4.4 | 4.1 | 4.0 | 3.30 | <0.5 | 4.10 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 1.04 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.72 | 7.21 | 7.10 | 6.66 | 7.07 | 6.81 | 6.89 | 7.02 | 6.83 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.0 | 7.3 | 8.4 | 5.9 | 7.6 | 5.0 | 7.6 | 7.7 | 7.3 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.0 | 1.2 | 1.4 | 1.0 | 1.2 | 0.9 | 1.2 | 1.1 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.010 | 0.010 | 0.006 | **0.011** | 0.007 | 0.007 | 0.010 | **0.014** | **0.023** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.7 | 1.0 | 1.1 | 0.7 | 1.0 | 0.8 | 0.9 | 0.9 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 35.9 | 36.6 | 39.9 | 44.3 | 38.9 | 30.1 | 36.9 | 42.2 | 39.4 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.6 | 1.7 | 1.9 | 2.1 | 1.4 | 2.2 | 1.6 | 1.3 | 2.1 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 8 | 7 | 7 | 6 | 9 | 9 | 9.0 | 8.0 | 9.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 1.0 | 0.5 | 1.2 | 0.9 | 2.0 | 1.1 | 1.0 | 0.8 | 0.7 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 244 | 246 | 232 | 244 | 233 | 160 | 275 | 288 | 240 |
| **Calculated Parameters** | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.70 | 1.66 | 1.6 | 1.5 | 1.9 | 1.9 | 2.29 | 2.16 | 2.02 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 8 | <5 | <5 | 8.0 | 6.0 | 7 | 8 | 8 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 107 | 106 | 109.0 | 108.0 | 119.0 | 105.0 | 130 | 130 | 123 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.98 | 2.09 | 2.3 | 2.3 | 2.2 | 1.7 | 2.14 | 2.35 | 2.22 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 19.1 | 23.2 | 26.7 | 18.9 | 23.9 | 16.2 | 24.7 | 23.8 | 23.2 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 7.6 | 11.4 | 18.4 | 21.4 | 6.7 | 5.2 | 3.3 | 4.2 | 4.5 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.39 | -2.61 | -2.7 | -3.5 | -2.7 | -3.3 | -2.97 | -2.79 | -3.00 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.71 | -2.93 | -3.0 | -3.8 | -3.1 | -3.6 | -3.29 | -3.11 | -3.32 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 10.1 | 9.82 | 9.8 | 10.1 | 9.8 | 10.1 | 9.86 | 9.81 | 9.83 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.4 | 10.1 | 10.1 | 10.4 | 10.1 | 10.4 | 10.2 | 10.1 | 10.1 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **164** | **26** | -- | **139** | **39** | **80** | **60** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 14 | 15 | -- | 17 | 16 | 15 | 21.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 5 | 10 | -- | 6 | 9 | 6 | 8.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <1 | <1 | -- | <1 | <1 | <1 | 2.0 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <1 | <1 | 1 | <1 | 1 | <1 | 1.0 | <1 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 81 | 148 | <50 | 123 | 93 | <50 | 274 | 180 | 105 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | 0.7 | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 21 | 50 | 22 | 26 | 44 | 18 | 137 | 80 | 19 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | <2 | -- | 3 | <2 | 2 | 2.0 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 27 | 38 | -- | 30 | 34 | 31 | 49.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 6 | <5 | <5 | 16 | <5 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | <1 | NDOGT | 5,020.0 | 103.0 | NDOGT | 628.0 | >2420 | 1990 | 130 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | <1 | 51 | 20 | 1 | 15 | 6 | 44 | 61 | <1 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | -- | -- | -- | -- | -- | 0.47 | 0.47 | 1.41 | 0.64 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.16 | 1.14 | 1.28 | 0.74 | 1.94 | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 1.80 | -- | * | 0.74 | 1.73 | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surfa

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Site

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-4**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-4 | | | | | | | KL-4 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/16/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | | | | | | 10:00 | 11:30 | 10:00 | 11:20 | 13:50 | 11:15 | 10:10 | 11:40 | 11:40 | 10:16 | 12:00 | 11:40 | 9:41 | 10:30 | 14:20 | 11:15 | 11:35 | 14:35 | 10:25 | 11:02 | 11:15 | 11:30 | 12:00 | 11:11 | 9:25 | 10:45 AM | 10:05 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 13.4 | 21.9 | 17.3 | 14.5 | 21.9 | 9.8 | 10.1 | 21.2 | 15.3 | 9.0 | 24.4 | 15.7 | 11.7 | 20.4 | 13.5 | 11.0 | 21.8 | 12.5 | 14.8 | 24.7 | 9.5 | 12.2 | 20.6 | 12.3 | 16.5 | 22.4 | 13.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **10.87** | 8.10 | 8.30 | 9.01 | 6.27 | **10.89** | **10.99** | 8.55 | **9.65** | 8.70 | 7.32 | 8.87 | **10.09** | 8.89 | **9.60** | **14.50** | 5.92 | 7.52 | **9.81** | 9.09 | 8.80 | 8.27 | 5.50 | **10.11** | 8.33 | 6.41 | 7.32 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 8.00 | 6.71 | 6.94 | 7.19 | 6.98 | **6.07** | **6.49** | **6.43** | **6.02** | 9.00 | 6.71 | 6.77 | **5.72** | 7.08 | **6.41** | **6.30** | 7.25 | 6.55 | 6.64 | 6.81 | 7.09 | 7.32 | 6.72 | **6.14** | 6.90 | 6.88 | 6.84 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 771.0 | 262.0 | 247.0 | 224.0 | 226.0 | 214.8 | 218.0 | 171.9 | 126.2 | 206.0 | 225.0 | 185.9 | 207.1 | 196.2 | 209.0 | 273.0 | 251.0 | 208.0 | 0.2 | 243.5 | 232.4 | 215.0 | 260.0 | 228.0 | 213.0 | 262.0 | 252.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <5.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 | 10 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 67 | 65 | 60 | 56 | 56 | 53 | 56 | 44 | 37 | 51 | 57 | 46 | 54 | 41 | 47 | 59 | 47 | 48 | 61 | 56 | 55 | 54 | 58 | 49 | 64 | 62 | 59 |
| Colour | TCU | 5 | -- | -- | -- | | 22 | 18 | 20 | 27 | 11 | 20 | 32 | 38 | 43 | 48 | 11 | 20 | 17 | 21 | 20 | 13 | 11 | 28 | 33 | 10 | 12 | 25 | 12 | 22 | 19 | 11 | 16 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.15 | 0.12 | 0.14 | 0.23 | 0.19 | 0.21 | 0.23 | 0.15 | 0.17 | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.21 | 0.10 | 0.27 | 0.12 | 0.15 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.15 | -- | -- | 0.23 | 0.19 | -- | 0.23 | -- | -- | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.14 | 0.10 | 0.15 | 0.12 | 0.15 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.07** | <0.05 | **0.12** | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.10 | <0.03 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | <0.4 | 0.7 | -- | 1.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.2 | 0.4 | 1.0 | <0.4 | <0.4 | 0.4 | <0.4 | 0.5 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.6 | 4.0 | 3.3 | 2.6 | 3.1 | 3.7 | 6.0 | 5.4 | 7.5 | 3.2 | 4.8 | 4.2 | 4.5 | 4.3 | 4.4 | 2.1 | 4.4 | 2.8 | 5.2 | 5.7 | 4.3 | 3.3 | 8.1 | 5.1 | 4.3 | 4.0 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.61 | 6.75 | 6.83 | 6.83 | 6.93 | 6.83 | 6.57 | 6.57 | **6.46** | 6.70 | 7.00 | 6.90 | 6.69 | 6.96 | 6.85 | 6.69 | 6.91 | 6.85 | 6.59 | 6.94 | 6.97 | 6.70 | 7.03 | 6.89 | 6.75 | 6.99 | 6.95 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.8 | 7.7 | 7.0 | 6.8 | 8.0 | 8.5 | 6.8 | 4.9 | 5.2 | 5.7 | 6.8 | 5.8 | 6.8 | 5.1 | 6.8 | 6.4 | 7.9 | 6.8 | 6,500.0 | 7.9 | 3.7 | 6.5 | 7.1 | 7.3 | 7.7 | 7.5 | 8.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.2 | 0.9 | 1.0 | 1.0 | 1.2 | 1.2 | 1.0 | 0.8 | 1.2 | 1.3 | 1.2 | 1.0 | 920.0 | 1.3 | 1.0 | 1.0 | 1.1 | 1.3 | 1.2 | 1.1 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | <0.002 | 0.004 | <0.002 | <0.002 | 0.007 | 0.003 | **0.026** | **0.022** | **0.043** | 0.007 | 0.006 | **2.390** | **0.016** | **0.022** | **0.031** | **0.015** | 0.006 | 0.007 | 0.003 | 0.007 | 0.004 | 0.007 | **0.020** | 0.008 | 0.006 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 | 0.8 | 0.7 | 1.1 | 0.7 | 1.0 | 0.8 | 0.9 | 0.6 | 1.2 | 0.8 | 1.1 | 0.9 | 760.0 | 0.9 | 0.7 | 0.7 | 0.9 | 1.0 | 0.8 | 0.9 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 39.0 | 41.0 | 37.0 | 28.5 | 34.3 | 33.9 | 32.1 | 21.5 | 21.1 | 31.5 | 34.5 | 25.2 | 31.6 | 20.1 | 30.7 | 35.9 | 38.6 | 34.1 | 34.0 | 40.0 | 28.2 | 32.4 | 41.4 | 31.1 | 37.6 | 41.4 | 38.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.7 | 2.6 | 2.6 | 3.1 | 2.9 | 3.1 | 2.9 | 2.5 | 2.7 | 2.7 | 2.2 | 2.6 | 3.0 | 2.6 | 2.5 | 2.6 | 2.1 | 2.5 | 2.5 | 2.6 | 3.0 | 2.6 | 2.0 | 2.4 | 2.3 | 1.7 | 2.1 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <1 | 1 | <1 | <2 | <2 | <1 | 2 | <1 | <2 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <1.0 | 7 | 7 | <5 | <5 | 10 | 6 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 12 | 11 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 8 | 7 | 7 | 7 | 9 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 9 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.5 | 1.0 | 0.3 | 0.3 | 0.2 | 0.8 | 0.7 | 0.7 | 0.4 | 0.7 | 0.4 | 0.8 | 0.7 | 2.6 | 2.1 | 1.1 | 0.6 | 0.8 | 0.6 | 0.7 | 1.2 | 1.2 | 1.5 | 1.6 | 1.3 | 0.9 | 1.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 260 | 250 | 230 | 220 | 230 | 250 | 210 | 170 | 160 | 200 | 224 | 183 | 218 | 218 | 204 | 219 | 241 | 218 | 220 | 241 | 235 | 206 | 275 | 185 | 251 | 255 | 248 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.23 | 2.22 | 2.09 | 1.91 | 1.94 | 1.85 | 1.88 | 1.62 | 1.36 | 2.04 | 1.94 | 1.45 | 1.68 | 1.31 | 1.53 | 2.47 | 1.60 | 2.11 | 1.88 | 1.90 | 1.87 | 1.74 | 2.04 | 1.76 | 2.03 | 2.12 | 2.08 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <1.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 | 10 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 132 | 135 | 125 | 111 | 118 | 116 | 113 | 90 | 81 | 111 | 114 | 87 | 103 | 75 | 97 | 132 | 108 | 117 | 110 | 121 | 102 | 106 | 125 | 105 | 123 | 128 | 126 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.16 | 2.32 | 2.07 | 1.70 | 2.02 | 2.03 | 1.86 | 1.28 | 1.30 | 1.78 | 1.97 | 1.53 | 1.84 | 1.23 | 1.84 | 2.04 | 2.21 | 1.94 | 1.91 | 2.35 | 1.53 | 1.86 | 2.28 | 1.87 | 2.17 | 2.31 | 2.27 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 25.00 | 22.00 | 22.00 | 25.00 | 27.00 | 22.00 | 16.00 | 17.00 | 18.40 | 21.90 | 19.40 | 21.10 | 16.00 | 21.90 | 21.30 | 24.70 | 21.10 | 20.00 | 25.10 | 13.40 | 20.30 | 22.30 | 23.60 | 24.20 | 23.30 | 26.80 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 1.59 | 2.20 | 0.48 | 5.82 | 2.02 | 4.64 | 0.53 | 11.70 | 2.26 | 6.60 | 0.80 | 2.80 | 4.50 | 3.20 | 9.20 | 9.50 | 15.80 | 4.20 | 0.79 | 10.70 | 10.10 | 3.40 | 5.50 | 3.00 | 3.20 | 4.10 | 4.30 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.21 | -2.89 | -2.84 | -2.92 | -2.64 | -2.75 | -3.22 | -3.18 | -3.31 | -2.79 | -2.86 | -3.22 | -3.37 | -3.21 | -3.21 | -2.63 | -3.08 | -2.45 | NC | -2.98 | -3.20 | -3.38 | -2.76 | -2.93 | -3.26 | -2.78 | -2.71 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.46 | -3.14 | -3.09 | -3.17 | -2.89 | -3.00 | -3.47 | -3.43 | -3.56 | -3.11 | -3.18 | -3.54 | -3.69 | -3.53 | -3.53 | -2.95 | -3.40 | -2.77 | NC | -3.30 | -3.52 | -3.70 | -3.08 | -3.25 | -3.58 | -3.10 | -3.03 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.82 | 9.64 | 9.67 | 9.75 | 9.57 | 9.58 | 9.79 | 9.75 | 9.77 | 9.49 | 9.86 | 10.10 | 10.10 | 10.20 | 10.10 | 9.32 | 9.99 | 9.30 | NC | 9.92 | 10.20 | 10.10 | 9.79 | 9.82 | 10.00 | 9.77 | 9.66 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.10 | 9.89 | 9.92 | 10.00 | 9.82 | 9.83 | 10.00 | 10.00 | 10.00 | 9.81 | 10.20 | 10.40 | 10.40 | 10.50 | 10.40 | 9.64 | 10.30 | 9.62 | NC | 10.20 | 10.50 | 10.40 | 10.10 | 10.10 | 10.30 | 10.10 | 9.98 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **150** | -- | -- | **125** | **29** | -- | **231** | -- | -- | **188** | **48** | **149** | **141** | **106** | **159** | **236** | **46** | **93** | **160** | -- | **84** | **172** | -- | -- | **180** | **89** | **55** |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 16 | -- | -- | 17 | 18 | -- | 18 | -- | -- | 18 | 17 | 16 | 18 | 10 | 19 | 17 | 19 | 16 | 20 | -- | 17 | 16 | -- | -- | 20 | -- | 20 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 6 | -- | -- | 9 | 9 | -- | <50 | -- | -- | 6 | 9 | 16 | 7 | 6 | 9 | 8 | 11 | 11 | <50 | -- | <5 | 7 | -- | -- | <5 | -- | 11 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.3 | -- | -- | **0.031** | <0.017 | -- | **0.035** | -- | -- | **0.021** | <0.017 | **0.027** | **0.027** | <0.017 | **0.050** | **0.027** | <0.017 | <0.017 | **0.033** | -- | <0.017 | **0.024** | -- | -- | **0.021** | -- | <0.017 |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | **6** | <1 | <1 | <1 | **6** | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.4 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | <2.0 | **2** | <2.0 | **2** | <2.0 | <2.0 | <2 | <2 | **4** | **9** | <1 | 1 | <1 | <1 | 2 | **7** | 1 | 1 | 1 | <1 | <1 | <1 | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 86 | -- | -- | 82 | 51 | 55 | 119 | 109 | 138 | 129 | 118 | 133 | 213 | 144 | 248 | 129 | 55 | 104 | 100 | 217 | 83 | 122 | 61 | 114 | 136 | 131 | 141 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | **3.2** | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.8 | 0.9 | <0.5 | <0.5 | **2.6** | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 51 | -- | -- | 35 | 64 | 29 | 39 | 27 | 30 | 23 | 34 | 38 | 34 | 77 | 130 | 34 | 29 | 24 | 25 | 78 | 34 | 34 | 58 | 29 | 74 | 76 | 48 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 3 | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | 5 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | 7 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | **3** | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.5 | -- | -- | <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 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 34 | -- | -- | 33 | 37 | -- | 33 | -- | -- | 25 | 32 | 28 | 32 | 17 | 31 | 31 | 31 | 29 | 30 | -- | 20 | 28 | -- | -- | 33 | -- | 40 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | 5 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | <2 | <2 | <2 | <2 | 3 | 2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <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 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 14 | -- | -- | 10 | 7 | 7 | 11 | 7 | 7 | <5 | <5 | **68** | 21 | <5 | 9 | 9 | <5 | <5 | 10 | 8 | 12 | 7 | <5 | <5 | 13 | 7 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 28 | 58 | -- | 100 | 16 | 75 | 83 | 95 | -- | 345 | >2420 | 921 | 548 | >2420 | 770 | 308 | 1,550 | >2420 | --- | >2420 | 281 | 488 | 1,730 | >2420 | 792 | >2420 | >2420 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 4 | 33 | -- | 1 | <1 | 2 | 5 | 39 | <100 | 4 | <1 | 4 | 6 | 38 | <1 | <1 | 1 | 8 | <10 | 5 | 1 | 2 | 35 | 29 | 15 | 1 | 3 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.78 | 1.11 | 1.06 | 0.92 | 0.07 | 0.50 | 0.60 | 1.04 | 1.31 | 0.52 | 0.70 | 0.55 | 1.34 | 1.50 | 0.40 | 0.44 | 0.50 | 1.03 | 0.55 | 0.26 | 1.09 | 1.62 | 0.16 | 2.18 | 2.40 | 0.33 | 0.35 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.69 | 0.96 | 1.11 | 0.77 | 0.07 | 0.41 | 0.55 | 0.82 | 1.07 | 0.55 | 0.70 | 0.74 | 1.48 | 1.70 | 0.39 | 0.40 | 0.57 | 0.95 | 0.51 | 0.31 | 0.55 | 2.09 | 0.21 | 2.15 | 3.04 | 0.39 | 0.43 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-4**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-4 | | | | | | | KL-4 | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | hh:mm | | | | | | 10:45 AM | 9:00 AM | 11:45 AM | 9:43 AM | 9:43 AM | 12:15 PM | 4:06 PM | 3:09 PM | 13:59 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | NA** | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | | 12.7 | 23.1 | 12.7 | 9.9 | 23.4 | 10.9 | 23.6 | 20.7 | 11.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **11.01** | **4.70** | 8.46 | ** | **2.98** | **10.80** | **3.49** | **4.73** | 9.22 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.01 | 6.67 | 6.91 | 8.68 | 6.97 | 6.81 | **6.30** | **5.78** | 6.68 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 202.9 | 251.0 | 210.6 | 161.1 | 540.0 | 188.0 | 259.0 | 221.0 | 220.6 |
| **INORGANICS** | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 9 | 8 | <5 | 9 | 6 | 7.0 | 12.0 | 5.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 52 | 50 | 47 | 50 | 56 | 54 | 72 | 73 | 91 |
| Colour | TCU | 5 | -- | -- | -- | | 35 | 10 | 16 | 42 | <5 | 17 | 22 | <5 | 16 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.27 | 0.25 | 0.13 | 0.15 | 0.18 | 0.29 | 0.24 | 0.19 | 0.17 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.17 | 0.13 | 0.13 | 0.15 | 0.18 | 0.29 | 0.24 | 0.19 | 0.17 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | **0.10** | **0.12** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.03 | 0.04 | 0.03 | <0.03 | 0.06 | 0.07 | <0.03 | 0.10 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | <0.4 | <0.4 | <0.4 | <0.4 | 0.6 | 0.6 | <0.4 | 0.40 | 0.80 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 5.1 | 2.7 | 4.0 | 4.5 | 3.3 | 4.3 | 2.60 | 2.90 | 2.10 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | 0.02 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.74 | 7.13 | 7.13 | 6.67 | 6.91 | 6.87 | 6.77 | 7.08 | 6.86 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 5.9 | 7.9 | 7.7 | 6.2 | 8.0 | 5.1 | 8.1 | 8.6 | 7.1 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.0 | 1.2 | 1.3 | 1.0 | 1.2 | 0.9 | 1.3 | 1.3 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.024** | 0.004 | 0.004 | 0.009 | **0.011** | 0.005 | <0.005 | **0.014** | 0.003 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.7 | 1.0 | 1.0 | 0.8 | 1.1 | 0.8 | 1.0 | 1.1 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 35.6 | 39.2 | 40.6 | 37.0 | 36.7 | 23.4 | 37.4 | 39.4 | 39.6 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.6 | 1.8 | 2.0 | 2.1 | 1.4 | 2.2 | 1.8 | 1.7 | 2.1 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <5 | <5 | <5 | <5 | 6 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 8 | 7 | 8 | 6 | 9 | 9 | 9.0 | 9.0 | 13.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 1.2 | 0.5 | 1.7 | 0.8 | 1.5 | 1.1 | 1.0 | 0.8 | 1.1 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 243 | 252 | 231 | 246 | 236 | 158 | 288 | 297 | 240 |
| **Calculated Parameters** | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.65 | 1.75 | 1.7 | 1.6 | 2.0 | 1.9 | 2.38 | 2.50 | 2.95 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 9 | 8.0 | <5 | 9.0 | 6.0 | 7 | 12 | 5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 105 | 113 | 111.0 | 102.0 | 119.0 | 98.0 | 135 | 141 | 157 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.96 | 2.24 | 2.3 | 2.0 | 2.1 | 1.4 | 2.18 | 2.31 | 2.21 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 18.9 | 24.7 | 24.6 | 19.6 | 24.9 | 16.4 | 25.6 | 26.8 | 22.7 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 8.6 | 12.1 | 16.2 | 13.8 | 4.4 | 14.5 | 4.2 | 4.1 | 14.3 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.38 | -2.61 | -2.7 | -3.4 | -2.8 | -3.2 | -3.08 | -2.51 | -3.20 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.70 | -2.93 | -3.0 | -3.8 | -3.2 | -3.6 | -3.40 | -2.83 | -3.52 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 10.1 | 9.74 | 9.8 | 10.1 | 9.7 | 10.1 | 9.85 | 9.59 | 10.10 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.4 | 10.1 | 10.1 | 10.4 | 10.1 | 10.4 | 10.2 | 9.9 | 10.4 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **157** | **32** | -- | **132** | **70** | **92** | **52** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 15 | 19 | -- | 18 | 20 | 17 | 21.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 6 | 10 | -- | 6 | 9 | 6 | 7.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | **0.020** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <1 | <1 | 1 | <1 | 1 | 1 | 2.0 | <1 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 83 | 119 | 78 | 120 | 100 | <50 | 177 | 139 | 102 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | **1.4** | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 19 | 84 | 43 | 24 | 85 | 19 | 209 | 357 | 18 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 27 | 39 | -- | 33 | 35 | 31 | 45.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 7 | <5 | 7 | 7 | 6 | 6 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 4 | NDOGT | 8,000.0 | 198.0 | 560.0 | 604.0 | 2,420 | >2420 | 172 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 2 | 19 | 12 | <1 | 1 | <1 | 48 | 133 | 5 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | -- | -- | -- | -- | -- | 0.32 | <0.25 | 0.60 | 0.63 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.06 | 0.24 | 1.12 | 0.78 | 0.47 | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 1.71 | -- | * | 0.82 | 0.42 | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surfa

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Site

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or

**Table C2: Statistical Presentation of Key Water Quality Parameters**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Kearney Lake | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | KL-5 | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 2011/10/17 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/16/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 |
| Sampling Time | hh:mm | | | | | | 9:40 | 10:52 | 13:10 | 12:10 | 10:03 | 10:50 | 13:45 | 11:30 | 13:55 | 10:45 | 09:00 | 12:04 | 12:00 | 10:00 | 8:00 | 13:05 | 9:00 | 9:45 | 9:50 | 9:30 | 8:20 | 9:30 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.7 | 2.1 | 5.3 | 4.2 | 2.1 | 4.6 | 2.7 | 3.1 | 3.01 | 3.8 |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.7 | 10.5 | 26.1 | 16.6 | 13.3 | 22.7 | 14.7 | 13.7 | 22.9 | 12.8 | 14.1 | 25.4 | 9.4 | 12.2 | 22.2 | 12.7 | 16.8 | 21.0 | 14.6 | 12.7 | 24.5 | 13.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 9.38 | 7.88 | 7.90 | 8.16 | **9.67** | 8.89 | 8.60 | **15.83** | 7.64 | 7.91 | 8.32 | 8.75 | 7.63 | **10.47** | 8.39 | **9.92** | 8.70 | 7.07 | 7.17 | **10.42** | 6.42 | 7.58 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.52 | 7.76 | 6.69 | 6.72 | **6.20** | 8.57 | 6.51 | 6.79 | 7.86 | 6.60 | 7.82 | 6.77 | 7.05 | **5.75** | **5.11** | **5.72** | 7.00 | 6.83 | 7.05 | 6.74 | 7.14 | 6.67 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 111.9 | 230.0 | 229.0 | 189.0 | 219.5 | 202.1 | 212.9 | 472.0 | 251.0 | 211.0 | 0.2 | 249.8 | 240.8 | 209.0 | 267.0 | 243.2 | 219.0 | 246.0 | 257.0 | 196.4 | 244.9 | 236.4 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 9 | 21 | 8 | <5 | <5 | 6 | 5 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 37 | 55 | 57 | 48 | 58 | 44 | 46 | 61 | 47 | 47 | 59 | 58 | 58 | 54 | 56 | 53 | 65 | 58 | 60 | 56 | 49 | 47 |
| Colour | TCU | 5 | -- | -- | -- | | 35 | 43 | 10 | 27 | 10 | 22 | 18 | 14 | 11 | 22 | 35 | 8 | 19 | 27 | 13 | 17 | 18 | 14 | 14 | 34 | 14 | 12 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.17 | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.25 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.19 | 0.15 | 0.25 | 0.21 | 0.09 | 0.17 | 0.20 | 0.42 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | -- | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.20 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.09 | 0.15 | 0.13 | 0.07 | 0.09 | 0.17 | 0.09 | 0.42 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.10** | <0.05 | **0.12** | **0.14** | <0.05 | <0.05 | **0.11** | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.06 | <0.050 | <0.03 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | 0.05 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | <0.4 | 2.3 | 1.0 | -- | 0.6 | 1.1 | <0.4 | 0.5 | 1.1 | 0.3 | <0.4 | 1.8 | 0.5 | <0.4 | 0.7 | 0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 4.8 | 5.8 | 3.4 | 4.7 | 4.0 | 4.6 | 7.0 | 4.3 | 2.7 | 4.5 | 3.1 | 5.3 | 5.7 | 4.4 | 3.3 | 7.0 | 4.7 | 4.8 | 3.9 | 4.9 | 2.9 | 3.0 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.57 | 6.70 | 7.10 | 6.50 | 6.71 | 6.93 | 6.89 | 6.64 | 6.84 | 6.63 | 6.56 | 6.90 | 6.94 | 6.66 | 7.16 | 7.03 | 6.74 | 7.09 | 6.93 | 6.70 | 7.15 | 7.47 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 5.8 | 6.1 | 6.6 | 5.9 | 7.1 | 5.7 | 6.4 | 6.5 | 7.6 | 7.0 | 6,500.0 | 8.0 | 4.7 | 6.3 | 7.3 | 8.2 | 7.4 | 7.0 | 7.5 | 5.9 | 6.7 | 7.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.0 | 1.1 | 1.2 | 1.0 | 1.0 | 1.1 | 1.4 | 1.2 | 1.0 | 930.0 | 1.3 | 0.9 | 1.0 | 1.1 | 1.3 | 1.2 | 1.0 | 1.1 | 1.0 | 1.1 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.009 | 0.018 | 0.040 | 0.006 | 0.005 | 0.013 | 0.010 | 0.010 | 0.026 | 0.135 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 | 0.003 | 0.010 | 0.012 | 0.005 | 0.031 | 0.005 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 0.7 | 0.9 | 0.8 | 0.8 | 0.7 | 1.1 | 0.8 | 1.1 | 0.9 | 720.0 | 0.1 | 0.7 | 0.7 | 0.9 | 1.0 | 0.9 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 22.0 | 34.6 | 32.0 | 27.7 | 33.6 | 19.2 | 31.3 | 37.5 | 40.3 | 38.3 | 33.0 | 42.6 | 28.3 | 32.5 | 33.1 | 33.5 | 38.9 | 42.4 | 37.2 | 37.2 | 38.5 | 41.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.7 | 2.0 | 2.4 | 2.7 | 2.5 | 2.5 | 2.7 | 2.1 | 2.5 | 3.3 | 1.9 | 2.2 | 2.7 | 2.0 | 2.3 | 2.1 | 1.6 | 1.7 | 2.4 | 1.7 | 3.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 9 | 7 | 8 | 8 | 8 | 7 | 8 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 8 | 10 | 8 | 7 | 11 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.9 | 1.1 | 0.7 | 0.9 | 0.7 | 0.8 | 0.4 | 1.1 | 0.4 | 0.8 | 0.7 | 1.0 | 1.0 | 0.7 | 1.3 | 1.2 | 0.9 | 0.9 | 0.9 | 1.4 | 0.4 | 0.7 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 160 | 215 | 226 | 189 | 232 | 223 | 204 | 228 | 246 | 225 | 220 | 248 | 244 | 208 | 267 | 196 | 248 | 249 | 246 | 247 | 247 | 286 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.42 | 2.13 | 1.95 | 1.58 | 1.82 | 1.52 | 1.58 | 2.56 | 1.50 | 1.50 | 1.94 | 1.95 | 1.96 | 1.74 | 1.94 | 1.89 | 2.06 | 1.96 | 2.09 | 1.76 | 1.68 | 2.1 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 9 | 21 | 8 | <5 | <5 | 6 | 5 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 84 | 118 | 111 | 96 | 110 | 82 | 98 | 136 | 106 | 103 | 120 | 124 | 106 | 105 | 114 | 113 | 125 | 122 | 123 | 110 | 108 | 127.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.36 | 1.94 | 1.85 | 1.64 | 1.94 | 1.23 | 1.81 | 2.12 | 2.27 | 2.14 | 1.87 | 2.40 | 1.58 | 1.86 | 1.93 | 2.01 | 2.20 | 2.30 | 2.12 | 2.04 | 2.13 | 2.3 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 19.00 | 19.30 | 21.00 | 19.70 | 21.80 | 18.40 | 20.50 | 22.00 | 23.90 | 21.60 | 20.00 | 25.30 | 15.40 | 19.80 | 22.80 | 25.80 | 23.40 | 21.60 | 23.30 | 18.9 | 21.3 | 23.9 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 2.16 | 4.70 | 2.60 | 2.00 | 3.20 | 10.60 | 6.70 | 9.40 | 20.30 | 17.50 | 1.84 | 10.20 | 10.80 | 3.20 | 0.40 | 3.00 | 3.40 | 8.10 | 0.70 | 7.3 | 11.8 | 5.0 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.06 | -2.79 | -2.77 | -3.62 | -3.33 | -3.11 | -3.19 | -2.64 | -3.17 | -3.42 | -3.24 | -3.20 | -3.13 | -3.43 | -2.72 | -2.69 | -3.29 | -2.82 | -2.84 | -3.42 | -2.77 | -1.8 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.31 | -3.11 | -3.09 | -3.94 | -3.65 | -3.43 | -3.51 | -2.96 | -3.49 | -3.74 | -3.50 | -3.34 | -3.45 | -3.75 | -3.04 | -3.01 | -3.61 | -3.14 | -3.16 | -3.74 | -3.09 | -2.2 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.63 | 9.49 | 9.87 | 10.10 | 10.00 | 10.00 | 10.10 | 9.28 | 10.00 | 10.00 | 9.81 | 9.92 | 10.10 | 10.10 | 9.88 | 9.72 | 10.00 | 9.91 | 9.77 | 10.1 | 9.92 | 9.3 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.88 | 9.81 | 10.20 | 10.40 | 10.40 | 10.40 | 10.40 | 9.60 | 10.30 | 10.40 | 10.10 | 10.20 | 10.40 | 10.40 | 10.20 | 10.00 | 10.30 | 10.20 | 10.10 | 10.4 | 10.2 | 9.6 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | -- | **222** | **52** | **154** | **136** | **58** | **61** | **224** | **53** | **108** | **180** | --- | **79** | **163** | -- | -- | **156** | **45** | **44** | **172** | **30** | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | -- | 18 | 16 | 15 | 19 | 9 | 16 | 16 | 17 | 17 | 17 | --- | 19 | 14 | -- | -- | 17 | -- | 17 | 13 | 13 | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | -- | 6 | 9 | 15 | 7 | 7 | 9 | 7 | 6 | 10 | <50 | --- | <5 | 7 | -- | -- | <5 | -- | 10 | 5 | 9 | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | -- | **0.022** | **0.027** | **0.029** | **0.024** | <0.017 | **0.034** | **0.036** | <0.017 | **0.024** | **0.035** | --- | **0.332** | **0.024** | -- | -- | **0.025** | -- | <0.017 | <0.09 | <0.09 | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | -- | <1 | <1 | **5** | <1 | <1 | <1 | **6** | <1 | <1 | <1.0 | --- | **7** | <1 | -- | -- | **2** | -- | <1 | <1 | <1 | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | <1 | <1 | **5** | <2.0 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | <1 | <1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 175 | 160 | 78 | 120 | 111 | 70 | 79 | 111 | <50 | 119 | 100 | 123 | 158 | 96 | 55 | 88 | 59 | <50 | 106 | 80 | 81 | <50 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | -- | <0.5 | <0.5 | 0.6 | <0.5 | <0.5 | <0.5 | **1.9** | <0.5 | 0.5 | <0.5 | --- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 0.9 | <0.5 | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 36 | 30 | 14 | 37 | 35 | 13 | 12 | 40 | 18 | 25 | 34 | 24 | 35 | 23 | 15 | 17 | 24 | 11 | 13 | 24 | 15 | 14 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | -- | <2 | <2 | 5 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | --- | 3 | 3 | -- | -- | 14 | -- | <2 | <2 | <2 | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | --- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | -- | 27 | 31 | 29 | 31 | 18 | 31 | 31 | 30 | 30 | 29 | --- | 23 | 28 | -- | -- | 32 | -- | 38 | 28 | 35 | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | -- | <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 | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | -- | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | 2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | -- | 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 | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 9 | 5 | <5 | **64** | 11 | 7 | 5 | 10 | <5 | 10 | 14 | 6 | 12 | 10 | <5 | <5 | 11 | 8 | <5 | 8 | <5 | 7 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | -- | 461 | 613 | 93 | 461 | 308 | 461 | 42 | 629 | >2470 | --- | 356 | 163 | 179 | 517 | 2,420 | 260 | 577 | >2420 | 58 | 601 | 6,000.0 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 100 | 14 | 2 | 6 | 6 | 6 | 4 | <1 | 1 | 17 | <10 | 1 | 2 | <1 | 23 | 44 | <1 | 5 | **517** | 8 | 1 | 11 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.91 | 0.30 | 1.20 | 1.09 | 1.44 | 2.20 | 0.64 | 0.20 | 0.61 | 0.90 | 0.48 | 1.22 | 2.71 | 1.52 | 1.20 | 2.32 | 1.09 | 1.43 | 1.22 | 6.25 | 1.28 | 1.68 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.85 | 0.33 | 1.00 | 1.41 | 1.59 | 2.40 | 0.62 | 0.20 | 0.54 | 0.84 | --- | 1.26 | 1.44 | 1.86 | 1.57 | 2.34 | 1.28 | 1.40 | 1.33 | 3.35 | -- | * |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference) | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | hh:mm | | | | | | 9:10 AM | 9:27 AM | 10:00 AM | 2:40 PM | 11:27 AM | 12:45 PM |
| **FIELD DATA** | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 3.1 | 3.70 | 2.20 | NA** | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | | 11.2 | 23.8 | 12.8 | 25.6 | 22.9 | 12.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | ** | **5.46** | 8.10 | 6.85 | 7.43 | 8.02 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | **9.20** | 7.45 | 6.62 | **6.49** | 6.73 | 6.73 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 171.6 | 220.0 | 216.0 | 245.0 | 221.0 | 224.0 |
| **INORGANICS** | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 7 | 6 | 6.0 | 7.0 | 8.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 51 | 55 | 57 | 67 | 62 | 61 |
| Colour | TCU | 5 | -- | -- | -- | | 38 | 16 | 19 | 28 | 17 | 15 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.14 | 0.16 | 0.35 | 0.38 | 0.08 | 0.17 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.14 | 0.16 | 0.35 | 0.38 | 0.08 | 0.17 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | 18 | | <0.03 | 0.06 | 0.06 | <0.03 | 0.06 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | <0.4 | <0.4 | 0.6 | 1.50 | 0.80 | 8.10 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 4.5 | 4.5 | 4.2 | 3.20 | 3.80 | 4.00 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 |
| pH (Lab) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.64 | 7.04 | 6.81 | 6.88 | 6.95 | 6.81 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.4 | 7.7 | 5.4 | 6.8 | 5.5 | 7.0 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.2 | 0.9 | 1.1 | 4.0 | 1.1 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | 0.011 | 0.007 | 0.005 | <0.006 | **0.028** | 0.004 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.8 | 1.0 | 0.8 | 0.8 | 0.8 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 43.8 | 37.7 | 30.6 | 35.4 | 39.7 | 38.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.1 | 1.4 | 2.0 | 1.8 | 1.5 | 1.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 6 | 8 | 9 | 9.0 | 8.0 | 9.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.9 | 2.0 | 0.8 | 0.9 | 1.2 | 0.9 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 249 | 229 | 160 | 269 | 272 | 248 |
| **Calculated Parameters** | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.6 | 1.9 | 1.9 | 2.22 | 2.06 | 2.08 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 7.0 | 6.0 | 6 | 7 | 8 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 110.0 | 116.0 | 109.0 | 125 | 122 | 123 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.4 | 2.2 | 1.7 | 2.00 | 2.12 | 2.13 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 20.5 | 24.2 | 17.2 | 21.5 | 17.9 | 22.0 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 19.9 | 7.3 | 6.3 | 5.3 | 1.3 | 1.2 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.5 | -2.8 | -3.3 | -3.11 | -3.06 | -3.04 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.8 | -3.1 | -3.6 | -3.43 | -3.38 | -3.36 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 10.1 | 9.9 | 10.1 | 9.99 | 10.00 | 9.85 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.4 | 10.2 | 10.4 | 10.3 | 10.3 | 10.2 |
| **Metals (ICP-MS)** | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **142** | **57** | **97** | **75** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | <2 | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | -- | 5 | | <2 | <2 | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | -- | -- | | 17 | 16 | 15 | 15.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | -- | -- | | <2 | <2 | <2 | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | <2 | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | -- | 1500 | | 6 | 9 | 7 | 8.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | -- | 0.09 | | <0.09 | <0.09 | <0.09 | **0.026** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | -- | 1 | | <1 | <1 | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | <1 | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <1 | 1 | 1 | 1.0 | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 121 | 63 | <50 | <50 | 72 | 111 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | -- | 1.0 - 7.0 | | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 25 | 18 | 17 | 28 | 4 | 25 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | <2 | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | <2 | <2 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | -- | 1 | | <1 | <1 | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.25 | | <0.1 | <0.1 | **0.300** | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | -- | -- | | 31 | 33 | 33 | 28.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | <2 | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | <2 | <2 | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | -- | 15 | | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | 2 | <2 | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 7 | <5 | 5 | 5.0 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 55.0 | 770.0 | 560.0 | >2420 | 291 | 159 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 1 | <1 | 8 | 6 | 122 | <1 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | | -- | -- | 0.32 | 0.47 | 0.95 | 0.83 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.24 | 3.70 | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 1.19 | 3.00 | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surfa

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Site

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-1**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Highway 102-1 | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | HWY102-1 | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 6/29/2009 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 2013/08/15 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 |
| Sampling Time | hh:mm | | | | | | 07:00 | 12:45 | 08:00 | 13:00 | 10:20 | 09:00 | 13:40 | 11:00 | 11:00 | 14:50 | 11:00 | 9:50 | 14:15 | 12:22 | 12:30 | 12:00 | 10:10 | 9:30 | 13:15 | 09:20 | 9:40 | 14:30 | 11:00 | 10:20 | 12:00 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 11.8 | 18.8 | 15.7 | 14.9 | 19.6 | 7.4 | 11.4 | 17.8 | 14.6 | 10.7 | 21.8 | 13.6 | 11.7 | 19.5 | 8.9 | 12.1 | 19.6 | 10.2 | 14.3 | 20.7 | 5.4 | 13.4 | 19.3 | 9.2 | 16.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **11.44** | 5.80 | **4.34** | 8.18 | **4.25** | 6.05 | 8.15 | **3.88** | **5.34** | 5.65 | **1.03** | **3.83** | 7.55 | **3.32** | **3.10** | **12.03** | **2.09** | **4.54** | **4.27** | **3.82** | **5.03** | 8.18 | **10.14** | 7.35 | 5.77 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.98 | **5.35** | **5.25** | **6.31** | **5.26** | **5.62** | **5.75** | **5.77** | **5.99** | 8.76 | **5.73** | **6.38** | **6.19** | 7.10 | 6.79 | **6.02** | 6.63 | **5.12** | **6.35** | **6.24** | 6.92 | 7.34 | **6.14** | **5.69** | **6.40** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 194.0 | 153.0 | 103.8 | 135.0 | 106.0 | 108.6 | 114.1 | 107.6 | 88.6 | 288.0 | 225.0 | 155.5 | 226.0 | 173.2 | 234.0 | 880.0 | 337.0 | 109.0 | 0.4 | 335.8 | 251.2 | 289.0 | 353.0 | 208.9 | 354.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | <5 | <5 | <5 | <5 | <5 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 | 17 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 24 | 38 | 24 | 32 | 25 | 22 | 24 | 19 | 12 | 58 | 48 | 28 | 53 | 31 | 40 | 65 | 57 | 19 | **130** | 67 | 49 | 71 | 87 | 35 | 101 |
| Colour | TCU | 5 | -- | -- | -- | | 67 | 68 | 57 | 37 | 89 | 53 | 39 | 65 | 79 | 24 | 65 | 40 | 9 | 65 | 25 | 11 | 31 | 93 | 22 | 27 | 29 | 23 | 37 | 64 | 24 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | <0.05 | <0.05 | <0.05 | 0.69 | <0.05 | 1.20 | 0.69 | 0.25 | 1.20 | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | 0.13 | 0.53 | 0.35 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | <0.05 | -- | -- | 0.69 | <0.05 | -- | 0.69 | -- | -- | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | <0.05 | 0.53 | 0.18 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.13** | <0.05 | **0.17** |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.29 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.10 | 0.07 | 0.31 | 0.19 | 0.04 | <0.03 | 0.05 | 0.06 | <0.03 | 0.04 | 0.03 | <0.050 | <0.03 | 0.04 | 0.06 | 0.06 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.1 | 1.3 | 0.6 | -- | 0.6 | 0.6 | 0.7 | 0.6 | <0.4 | 0.3 | 0.5 | 0.6 | 0.7 | 1.2 | 0.7 | 0.5 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 6.5 | 10.0 | 7.7 | 4.7 | 11.0 | 6.3 | 4.5 | 7.2 | 7.4 | 5.5 | 10.0 | 7.0 | 5.1 | 10.1 | 17.7 | 4.1 | 7.7 | 9.0 | 2.7 | 14.6 | 8.4 | 4.5 | 8.0 | 11.5 | 7.4 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | **4.54** | **5.24** | **5.40** | **5.48** | **6.24** | **5.31** | **6.42** | 6.55 | **6.28** | **6.40** | 6.90 | 6.80 | 6.86 | 6.87 | 6.73 | 6.56 | 7.49 | **5.90** | 6.61 | 7.46 | 6.80 | 6.87 | 7.03 | **6.45** | 6.84 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 1.7 | 1.8 | 1.6 | 4.9 | 3.3 | 5.1 | 4.9 | 5.2 | 5.6 | 12.5 | 11.7 | 7.5 | 11.1 | 10.5 | 13.9 | 7.2 | 23.3 | 2.2 | 18,000.0 | 18.0 | 12.4 | 12.9 | 25.8 | 9.9 | 20.9 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.3 | 0.5 | 0.5 | 1.1 | 0.8 | 1.1 | 0.9 | 0.9 | 1.2 | 1.7 | 2.0 | 1.4 | 1.4 | 1.5 | 2.3 | 1.6 | 3.2 | 0.6 | 2,400.0 | 2.7 | 2.3 | 1.7 | 2.7 | 1.7 | 3.0 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.070** | **0.140** | **0.020** | 0.006 | 0.007 | **0.011** | 0.009 | **0.012** | 0.010 | **0.019** | **0.039** | **0.020** | 0.006 | **0.021** | **0.022** | **0.013** | **0.038** | **0.031** | 0.007 | **0.020** | 0.002 | 0.005 | **0.038** | 0.009 | **0.017** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.5 | 1.2 | 0.7 | 1.1 | 1.6 | 1.3 | 1.1 | 1.5 | 1.9 | 1.6 | 2.5 | 1.5 | 1.3 | 1.7 | 2.4 | 1.2 | 2.5 | 0.7 | 2,000.0 | 2.1 | 1.5 | 1.4 | 1.9 | 1.7 | 2.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 15.0 | 25.0 | 13.0 | 15.9 | 14.5 | 14.6 | 14.8 | 10.2 | 8.3 | 36.3 | 27.7 | 14.6 | 30.8 | 15.0 | 20.5 | 39.1 | 38.7 | 18.6 | 64.0 | 37.7 | 28.8 | 45.4 | 43.8 | 24.8 | 64.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.5 | 2.2 | 2.0 | 1.1 | 3.8 | 5.1 | 2.8 | 5.2 | 4.6 | 4.1 | 6.1 | 5.1 | 3.1 | 5.1 | 5.8 | 1.7 | 7.1 | 4.7 | 2.1 | 4.9 | 4.8 | 1.4 | 6.3 | 4.6 | 1.8 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 7 | 80 | 2 | <2 | 11 | <2 | <1 | 1 | <1 | 9 | 6 | <5 | <5 | <5 | <5 | 6 | <5 | <5 | <1.0 | <5 | <5 | <5 | 10 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 5 | 3 | 3 | 8 | <2 | 8 | 10 | 8 | 10 | 14 | 8 | 9 | 12 | 8 | 12 | 10 | 7 | 6 | 13 | 9 | 14 | 14 | 14 | 18 | 15 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 14.0 | 35.0 | 0.9 | 1.4 | 1.2 | 0.6 | 0.4 | 0.6 | 1.1 | 0.9 | 1.9 | 0.9 | 0.5 | 1.6 | 0.5 | 0.7 | 1.6 | 0.9 | 0.6 | 0.9 | 0.8 | 1.0 | 4.1 | 1.0 | 1.3 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 100 | 140 | 92 | 130 | 100 | 110 | 110 | 100 | 88 | 263 | 231 | 143 | 243 | 188 | 218 | 252 | 338 | 112 | 470 | 324 | 244 | 289 | 440 | 167 | 411 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 0.77 | 1.12 | 0.73 | 1.11 | 0.71 | 0.88 | 1.03 | 0.95 | 0.80 | 2.55 | 2.02 | 1.31 | 1.96 | 1.50 | 1.78 | 2.66 | 2.31 | 1.30 | 4.20 | 2.50 | 1.93 | 2.58 | 3.29 | 1.60 | 3.53 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 | 17 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 50 | 73 | 45 | 67 | 50 | 63 | 65 | 58 | 54 | 150 | 117 | 73 | 117 | 83 | 104 | 143 | 150 | 68 | 240 | 151 | 116 | 155 | 193 | 100 | 218 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 0.84 | 1.32 | 0.74 | 1.06 | 0.93 | 1.02 | 1.00 | 0.83 | 0.80 | 2.43 | 6.04 | 1.19 | 2.06 | 1.40 | 1.87 | 2.25 | 3.22 | 1.04 | 3.94 | 2.88 | 2.11 | 2.81 | 3.51 | 1.79 | 4.14 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 6.00 | 6.00 | 6.00 | 17.00 | 12.00 | 17.00 | 16.00 | 17.00 | 19.00 | 38.20 | 37.50 | 24.50 | 33.50 | 32.40 | 44.20 | 24.60 | 71.40 | 8.00 | 55.00 | 56.10 | 40.40 | 39.20 | 75.50 | 31.70 | 64.50 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 4.35 | 8.20 | 0.68 | 2.30 | 13.40 | 7.37 | 1.48 | 6.74 | 0.00 | 2.60 | 1.90 | 4.60 | 2.40 | 3.50 | 2.60 | 8.40 | 16.40 | 11.20 | 3.19 | 7.10 | 4.70 | 4.40 | 3.10 | 5.70 | 8.00 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | -3.50 | -2.99 | -3.36 | -2.77 | -2.23 | -2.72 | -2.73 | -2.33 | -2.41 | -2.69 | -1.30 | -3.85 | -2.32 | -1.57 | -2.62 | -2.48 | -1.74 | -3.14 | -2.23 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | -3.75 | -3.25 | -3.61 | -3.09 | -2.55 | -3.04 | -3.05 | -2.65 | -2.73 | -3.01 | -1.62 | -4.17 | -2.57 | -1.89 | -2.94 | -2.80 | -2.06 | -3.46 | -2.55 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | 9.92 | 9.54 | 9.64 | 9.17 | 9.13 | 9.52 | 9.59 | 9.20 | 9.14 | 9.25 | 8.79 | 9.75 | 8.93 | 9.03 | 9.42 | 9.35 | 8.77 | 9.59 | 9.07 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | NC | NC | NC | NC | 10.20 | 9.80 | 9.89 | 9.49 | 9.45 | 9.84 | 9.91 | 9.52 | 9.46 | 9.57 | 9.11 | 10.10 | 9.18 | 9.35 | 9.74 | 9.67 | 9.09 | 9.91 | 9.39 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **510** | -- | -- | **169** | **192** | -- | **205** | -- | -- | **134** | **183** | **146** | **86** | **145** | **150** | **187** | **83** | **310** | **51** | -- | **52** | **81** | -- | -- | **69** |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 22 | -- | -- | 53 | 37 | -- | 37 | -- | -- | 58 | 284 | 42 | 57 | 57 | 80 | 46 | 142 | 17 | 130 | -- | 86 | 79 | -- | -- | 130 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | <5 | -- | -- | 11 | 11 | -- | <50 | -- | -- | 12 | 18 | 13 | 10 | 10 | 11 | 9 | 14 | 11 | <50 | -- | <5 | 10 | -- | -- | <5 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | **0.043** | <0.017 | -- | **0.023** | -- | -- | **0.034** | **0.021** | <0.017 | <0.017 | <0.017 | **0.040** | **0.022** | <0.017 | **0.022** | **0.024** | -- | <0.017 | <0.017 | -- | -- | **0.032** |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | **8** | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | 1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | 0 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | -- | -- | **3** | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | **3** | <2 | <1 | 2 | <1 | <1 | 2 | <2.0 | <2 | 1 | <1 | <1 | 2 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | **720** | -- | -- | 146 | **637** | 150 | 107 | 209 | 219 | 102 | **1,380** | 255 | 111 | **938** | **446** | 147 | **820** | 290 | 140 | **1,280** | 138 | 144 | **766** | 228 | 151 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | **1.6** | -- | -- | **2.4** | 0.6 | -- | <0.5 | -- | -- | <0.5 | 0.7 | <0.5 | <0.5 | <0.5 | 0.6 | **2.6** | <0.5 | 0.6 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 40 | -- | -- | 55 | 39 | 67 | 28 | 21 | 31 | 34 | 79 | 28 | 23 | 45 | 31 | 56 | 122 | 61 | 28 | 95 | 22 | 19 | 78 | 38 | 22 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | 12 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 11 | -- | -- | 29 | 20 | -- | 24 | -- | -- | 48 | 58 | 36 | 52 | 47 | 62 | 38 | 103 | 13 | 85 | -- | 39 | 58 | -- | -- | 92 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 6 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | 3 | <2 | <2 | <2 | 4 | 2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <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 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 21 | -- | -- | 16 | 7 | 7 | <5.0 | <5.0 | 7 | <5 | 6 | <5 | <5 | <5 | 10 | 10 | <5 | 7 | 11 | <5 | <5 | <5 | <5 | 6 | 9 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 84 | >250 | -- | >250 | >250 | 180 | 120 | 180 | -- | 687 | >2420 | >2420 | 1,550 | >2420 | 1,553 | 120 | >2420 | >2420 | --- | >2420 | 659 | >2420 | >2420 | -- | 914 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 54 | **>250** | -- | 12 | 17 | 5 | 1 | 78 | <100 | 3 | 68 | 145 | 4 | 9 | 5 | 3 | 179 | 3 | 20 | 25 | 2 | <1 | 86 | -- | 12 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 15.40 | 19.29 | 0.70 | 18.12 | 1.61 | 8.45 | 0.93 | 0.58 | 0.69 | 0.53 | 2.59 | 0.81 | 1.27 | 14.70 | 1.99 | 0.25 | 1.10 | 1.22 | 0.50 | 7.27 | 0.36 | 0.94 | 51.51 | 0.33 | 1.56 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 17.50 | 19.60 | 0.84 | 17.62 | 1.68 | 7.52 | 0.84 | 0.56 | 0.65 | 0.59 | 2.89 | 1.05 | 1.45 | 15.80 | 2.20 | 0.82 | 1.11 | 1.38 | 0.55 | 6.79 | 0.23 | 1.30 | 60.68 | 0.43 | 2.04 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.

Comment 1: CCME FWAL reference values between 25-250 mg/L and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-1**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Highway 102-1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | HWY102-1 | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 8/15/2017 | 10/18/2017 | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | hh:mm | | | | | | 15:00 | 11:40 | 12:40 | 11:00 | 15:40:00 PM | 2:45 PM | 12:40 PM | 4:15 PM | 10:22 AM | 10:34 AM | 8:40 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA** | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | | 22.1 | 10.1 | 14.4 | 21.4 | 10.6 | 14.0 | 27.4 | 9.7 | 21.2 | 19.7 | 6.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 5.77 | 5.56 | 7.09 | **2.78** | 6.06 | ** | 6.27 | 7.80 | **3.27** | **2.61** | 6.05 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.76 | **6.32** | **6.13** | **6.13** | 6.70 | 7.20 | **6.09** | **6.37** | **6.20** | **6.22** | **6.49** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 257.0 | 266.0 | 232.2 | 280.5 | 189.4 | 330.0 | 383.0 | 210.0 | 446.0 | 345.0 | 318.2 |
| **INORGANICS** | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 21 | 16 | 13 | 26 | 12 | 12 | 23 | <5 | 23.0 | 27.0 | 14.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 49 | 51 | 51 | 54 | 61 | 90 | 80 | 92 | **137** | 100 | 72 |
| Colour | TCU | 5 | -- | -- | -- | | 31 | 29 | 27 | 56 | 68 | 35 | 37 | 28 | 30 | 32 | 24 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.71 | 0.58 | 0.37 | 0.11 | 0.19 | 0.57 | <0.05 | 0.12 | 0.05 | <0.05 | 0.50 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.50 | 0.58 | 0.37 | <0.05 | 0.19 | 0.32 | <0.05 | 0.12 | 0.05 | <0.05 | 0.50 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | **0.21** | <0.05 | <0.05 | **0.11** | <0.05 | **0.25** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | 0.10 | 0.07 | <0.03 | 0.07 | <0.03 | <0.03 | 0.06 | 0.06 | 0.24 | 0.17 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | 1.3 | 3.8 | 1.1 | 0.7 | <0.4 | <0.4 | 0.6 | 0.9 | <0.4 | 0.90 | 3.80 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 8.6 | 6.9 | 5.0 | 7.7 | 7.0 | 4.4 | 9.5 | 4.1 | 6.00 | 9.00 | 6.20 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.91 | 6.90 | 7.02 | 7.14 | 6.94 | 7.07 | 7.15 | **5.73** | 7.10 | 7.16 | 6.95 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 10.3 | 14.6 | 12.5 | 15.6 | 9.9 | 16.5 | 17.9 | 12.2 | 22.5 | 23.7 | 17.8 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.7 | 2.2 | 1.8 | 2.2 | 1.8 | 2.5 | 2.6 | 1.8 | 3.0 | 41.0 | 2.4 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.052** | 0.008 | **0.022** | **0.014** | 0.010 | **0.011** | **0.023** | **0.026** | **0.012** | **0.016** | 0.007 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 2.1 | 2.0 | 1.6 | 2.0 | 1.4 | 2.3 | 2.3 | 0.9 | 2.4 | 2.9 | 2.3 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 29.7 | 29.6 | 41.2 | 35.5 | 47.9 | 69.1 | 54.3 | 38.3 | 68.7 | 60.3 | 41.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 3.8 | 5.6 | 2.5 | 5.3 | 4.6 | 2.2 | 4.7 | 4.8 | 4.3 | 5.9 | 6.2 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 11 | <5 | <5 | <5 | <5 | <5 | 8 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 13 | 19 | 12 | 7 | 11 | 14 | 10 | 8 | 13.0 | 8.0 | 20.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 7.7 | 1.1 | 1.7 | 1.1 | 3.2 | 0.8 | 2.6 | 1.5 | 1.2 | 1.5 | 1.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 251 | 258 | 298 | 306 | 306 | 464 | 340 | 247 | 517 | 469 | 339 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.12 | 2.20 | 1.97 | 2.2 | 2.2 | 3.1 | 2.9 | 2.8 | 4.60 | 3.53 | 2.76 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 21 | 16 | 13 | 26 | 12.0 | 12.0 | 23.0 | <5 | 23 | 27 | 14 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 127 | 131 | 130 | 133 | 142.0 | 204.0 | 182.0 | 154.0 | 262 | 215 | 167 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.22 | 2.28 | 2.62 | 2.6 | 2.8 | 4.1 | 3.6 | 2.5 | 4.46 | 4.15 | 2.97 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 32.70 | 45.50 | 38.6 | 48 | 32.1 | 51.5 | 55.4 | 37.9 | 68.5 | 70.3 | 54.3 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 2.20 | 1.80 | 14.0 | 8.3 | 12.1 | 13.8 | 10.0 | 5.3 | 1.5 | 8.1 | 3.7 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.35 | -2.33 | -2.37 | -1.85 | -2.6 | -2.3 | -1.9 | -4.1 | -1.82 | -1.65 | -2.26 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -2.67 | -2.65 | -2.69 | -2.17 | -2.9 | -2.6 | -2.2 | -4.4 | -2.14 | -1.97 | -2.58 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.26 | 9.23 | 9.39 | 8.99 | 9.5 | 9.3 | 9.0 | 9.8 | 8.92 | 8.81 | 9.21 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.58 | 9.55 | 9.71 | 9.31 | 9.9 | 9.6 | 9.3 | 10.1 | 9.2 | 9.1 | 9.5 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **450** | **100** | **72** | **80** | -- | **45** | **93** | **215** | **<u>107</u>** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | -- | 77 | 68 | 100 | -- | 108 | 104 | 197 | 141.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | -- | 24 | 11 | 14 | -- | 10 | 16 | 6 | 11.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | -- | 1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | -- | <1 | <1 | <1 | -- | <1 | <1 | 2 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | **4** | 1 | 1 | <1 | **3** | 1 | 2 | 2 | <1 | <1 | 2.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | **3,960** | 281 | 85 | **634** | **403** | 122 | **896** | 256 | **<u>429</u>** | **<u>528</u>** | 196 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | -- | <0.5 | 0.8 | <0.5 | -- | <0.5 | 0.7 | 0.9 | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 511 | 28 | 9 | 99 | 71 | 14 | 62 | 125 | 33 | 41 | 8 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | -- | <2 | 6 | <2 | -- | <2 | <2 | 5 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | -- | 76 | 54 | 88 | -- | 93 | 88 | 67 | 102.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | -- | <2 | <2 | <2 | -- | 2 | 2 | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | **37** | 8 | 6 | <5 | 12 | 5 | 8 | 12 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | >2420 | >2420 | 105 | 9010 | 370.0 | 1,520.0 | 450.0 | 1,128.0 | >2420 | >2420 | 1,200 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 14 | 3 | <1 | 10 | 2 | 1 | 3 | 2 | 70 | 33 | 3 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | -- | -- | -- | -- | -- | -- | -- | <0.25 | 4.93 | 1.57 | 0.63 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 5.32 | 0.62 | 1.57 | 0.86 | 1.11 | 1.88 | 5.55 | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 5.48 | 0.99 | 2.62 | -- | * | 1.90 | 5.09 | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2(

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calcula

Comment 1: CCME FWAL reference values between 25-250 mg/L and >250 mg/L

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Stan

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Gui

<u>Underlined (black shaded)</u> = Present Result - Parameter concentration exceeds NSE EQS Contam

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideli

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-2**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Highway 102 | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site HWY102-2 | | | | | | | HWY102-2 | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | 12:30 | 12:15 | 12:30 | 12:40 | 09:30 | 12:30 | 11:20 | 15:00 | 15:30 | 11:20 | 12:20 | 10:35 | 10:40 | 10:00 | 10:22 | 12:15 | 10:07 | 11:00 | 12:58 | 14:30 | 12:50 | 12:45 | 10:40 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 16.7 | 19.2 | 16.4 | 17.2 | 17.0 | 8.7 | 10.8 | 24.2 | 15.1 | 7.8 | 23.7 | 14.3 | 11.5 | 22.0 | 10.7 | 11.4 | 10.4 | 12.7 | 23.7 | 9.3 | 13.4 | 20.4 | 10.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **10.01** | 5.90 | **4.80** | **4.91** | **2.45** | **2.99** | 6.92 | 7.03 | **5.09** | **3.73** | **13.10** | **3.28** | 6.30 | **1.57** | **4.20** | **10.50** | 9.25 | **4.24** | 6.11 | **5.28** | 6.77 | 7.06 | 6.80 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.57 | **5.71** | **5.40** | **6.33** | **5.86** | **5.64** | **6.22** | **5.89** | **5.29** | 7.30 | **6.37** | 6.72 | **6.01** | 6.92 | **5.40** | **5.40** | **5.85** | **6.45** | **6.04** | **5.96** | **5.86** | **6.19** | **5.36** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 37.0 | 457.0 | 162.1 | 415.0 | 167.0 | 101.2 | 92.2 | 123.1 | 96.0 | 225.0 | 226.0 | 159.1 | 288.0 | 188.5 | 204.4 | 204.4 | 174.0 | 0.4 | 699.0 | 197.6 | 968.0 | 838.0 | 219.2 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | <5 | 7 | 6 | 5 | <5 | <5 | 5 | <5 | 17 | 7 | <5 | 6 | 14 | 7 | 30 | 8 | 8 | 5 | <5 | 13 | 21 | 6 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 21 | 82 | 83 | **170** | 41 | 18 | 21 | 21 | 17 | 63 | 109 | 45 | 71 | 50 | 52 | 113 | 34 | **260** | **178** | 78 | **236** | **226** | 48 |
| Colour | TCU | 5 | -- | -- | -- | | 120 | 190 | 91 | 96 | 160 | 68 | 65 | 98 | 77 | 32 | 100 | 70 | 11 | 61 | 36 | 13 | 85 | 17 | 9 | 8 | 14 | 39 | 86 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | <0.05 | <0.05 | <0.05 | 0.10 | <0.05 | 0.62 | 0.26 | 1.80 | 3.20 | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 | 0.12 | <0.050 | <0.05 | 0.15 | 0.21 | 0.23 | 0.11 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | <0.05 | -- | -- | 0.10 | <0.05 | -- | 0.26 | -- | -- | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 | 0.12 | <0.050 | <0.05 | 0.15 | <0.05 | <0.05 | 0.11 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | **0.21** | **0.23** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.06 | <0.05 | <0.05 | 0.20 | <0.05 | <0.05 | 0.30 | 0.08 | 0.09 | <0.03 | <0.03 | <0.03 | 0.17 | 0.09 | <0.03 | <0.03 | 0.06 | 0.19 | 0.05 | 0.14 | 0.37 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.6 | 1.1 | 0.5 | -- | 0.7 | 2.0 | 15.3 | <0.4 | 0.3 | 62.6 | 2.0 | 24.3 | 2.1 | 0.6 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 8.5 | 13.0 | 13.0 | 7.2 | 14.0 | 7.4 | 5.7 | 9.2 | 8.4 | 7.0 | 15.8 | 11.2 | 6.1 | 10.6 | 5.1 | 17.4 | 8.0 | 3.0 | 29.0 | 9.9 | 79.3 | 11.1 | 13.4 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | **5.43** | **5.96** | **6.30** | **6.05** | **6.32** | **5.47** | **5.93** | **6.18** | **5.92** | **5.90** | 6.70 | 6.80 | 6.61 | 6.59 | **6.34** | 7.20 | **6.40** | **6.12** | 6.64 | **6.18** | **6.46** | 6.80 | **6.15** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 1.6 | 4.0 | 4.8 | 7.4 | 3.8 | 4.0 | 3.1 | 2.2 | 3.8 | 7.0 | 8.4 | 5.6 | 7.6 | 8.5 | 8.2 | 14.1 | 9.5 | 20,000.0 | 33.3 | 9.8 | 23.9 | 23.8 | 8.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.4 | 0.7 | 0.9 | 1.0 | 0.6 | 1.0 | 0.7 | 0.7 | 1.4 | 1.2 | 1.4 | 1.2 | 1.2 | 1.3 | 2.2 | 3.1 | 1.8 | 2,500.0 | 32.7 | 2.2 | 3.2 | 2.5 | 1.7 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | **0.040** | **0.034** | 0.010 | **0.028** | 0.003 | 0.009 | **0.019** | **0.041** | **0.021** | **0.054** | **0.030** | **0.014** | **0.028** | **0.199** | **0.028** | **0.201** | 0.010 | **1.560** | **0.012** | **0.222** | **0.034** | **0.012** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.5 | 0.8 | 1.1 | 1.0 | 1.0 | 1.4 | 0.8 | 1.3 | 1.9 | 1.2 | 1.7 | 1.6 | 1.3 | 1.5 | 2.5 | 2.9 | 1.7 | 1,900.0 | 12.5 | 1.1 | 4.0 | 2.1 | 1.4 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 15.0 | 51.0 | 55.0 | 83.7 | 32.0 | 12.1 | 13.3 | 13.1 | 13.3 | 41.5 | 63.6 | 20.4 | 39.0 | 19.1 | 34.5 | 69.6 | 24.0 | 150.0 | 124.0 | 36.8 | 149.0 | 124.0 | 26.4 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.2 | 4.4 | 4.0 | 3.0 | 6.4 | 5.4 | 2.5 | 6.5 | 6.7 | 4.1 | 6.9 | 5.8 | 1.6 | 6.2 | 6.6 | 1.6 | 5.9 | 2.3 | 7.2 | 5.6 | 2.8 | 9.0 | 4.5 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <2 | 58 | 62 | 34 | 27 | 3 | <1 | 10 | 14 | <5 | 39 | <5 | <5 | <5 | 194 | 34 | <5 | 2 | **3,000** | 15 | **342** | 69 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | <2 | 3 | 8 | 11 | <2 | 7 | 5 | 5 | 8 | 12 | 6 | 10 | 10 | 9 | 10 | 12 | 8 | 15 | 7 | 8 | 22 | 21 | 8 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.7 | 3.8 | 4.2 | 2.6 | 3.1 | 0.5 | 0.4 | **1.2 ( 1 )** | 3.9 | 0.6 | 10.8 | 2.0 | 1.5 | 3.3 | **144.0** | 1.1 | 1.1 | 1.2 | **1,490.0** | 9.9 | **131.0** | **54.2** | 1.1 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 85 | 290 | 310 | 590 | 160 | 94 | 91 | 100 | 110 | 263 | 403 | 179 | 295 | 203 | 223 | 433 | 194 | 920 | 662 | 315 | 817 | 952 | 177 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 0.60 | 2.37 | 2.62 | 5.13 | 1.27 | 0.70 | 0.73 | 0.91 | 0.86 | 2.48 | 3.34 | 1.49 | 2.34 | 1.88 | 1.81 | 4.04 | 1.29 | 7.88 | 5.27 | 2.38 | 7.39 | 7.25 | 1.65 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <1 | <1 | 7 | 6 | 5 | <1 | <1 | 5 | <1 | 17 | 7 | <5 | 6 | 14 | 7 | 30 | 8 | 8 | 5 | <5 | 13 | 21 | 6 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 42 | 150 | 165 | 282 | 93 | 52 | 48 | 62 | 67 | 143 | 200 | 86 | 135 | 100 | 145 | 235 | 85 | 460 | 712 | 138 | 473 | 422 | 99 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 0.81 | 2.65 | 2.89 | 4.17 | 1.81 | 0.86 | 0.82 | 0.83 | 0.97 | 2.32 | 2.10 | 1.40 | 2.24 | 1.50 | 3.50 | 4.17 | 1.76 | 7.87 | 29.10 | 2.35 | 9.27 | 7.23 | 1.80 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 6.00 | 13.00 | 16.00 | 23.00 | 12.00 | 14.00 | 11.00 | 8.00 | 15.00 | 22.40 | 26.70 | 18.90 | 23.90 | 26.60 | 29.50 | 48.00 | 31.10 | 59.00 | 218.00 | 33.50 | 72.90 | 69.70 | 28.50 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 14.90 | 5.58 | 4.90 | 10.30 | 17.50 | 10.30 | 5.81 | 4.60 | 6.01 | 3.30 | 3.60 | 3.10 | 2.30 | 11.30 | 31.70 | 1.60 | 15.10 | 0.06 | 69.40 | 0.50 | 11.30 | 0.10 | 4.30 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | -3.57 | -3.72 | -3.70 | NC | NC | -4.07 | NC | -3.63 | -3.15 | -3.34 | -3.33 | -2.92 | -3.50 | -1.80 | -3.30 | -3.18 | -2.81 | -3.73 | -2.70 | -2.15 | -3.72 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | -3.82 | -3.97 | -3.95 | NC | NC | -4.32 | NC | -3.95 | -3.47 | -3.66 | -3.65 | -3.24 | -3.82 | -2.12 | -3.62 | -3.42 | -3.13 | -4.05 | -3.02 | -2.47 | -4.04 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | NC | NC | 9.87 | 9.77 | 10.00 | NC | NC | 10.30 | NC | 9.53 | 9.85 | 10.10 | 9.94 | 9.51 | 9.84 | 9.00 | 9.70 | 9.29 | 9.45 | 9.91 | 9.16 | 8.95 | 9.87 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | NC | NC | 10.10 | 10.00 | 10.30 | NC | NC | 10.50 | NC | 9.85 | 10.20 | 10.50 | 10.30 | 9.83 | 10.20 | 9.32 | 10.00 | 9.54 | 9.77 | 10.20 | 9.48 | 9.27 | 10.20 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **270** | -- | -- | **189** | **368** | -- | **260** | -- | -- | **145** | **466** | **259** | **130** | **138** | **2,760** | **400** | **216** | **100** | -- | **129** | **3,880** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | 2 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | **6** | <2 | <2 | <1.0 | -- | <2 | 3 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 20 | -- | -- | 53 | 28 | -- | 27 | -- | -- | 49 | 74 | 33 | 44 | 43 | 213 | 381 | 63 | 140 | -- | 147 | 762 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | <5 | -- | -- | 8 | 8 | -- | <50 | -- | -- | 10 | 17 | 15 | 9 | 10 | 13 | 11 | 12 | <50 | -- | <5 | 9 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | **0.051** | <0.017 | -- | <0.017 | -- | -- | **0.037** | **0.031** | **0.032** | **0.019** | <0.017 | **0.096** | **0.051** | **0.019** | **0.100** | -- | <0.017 | **0.778** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | 1 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | 1 | **9** | **2** | <1 | <1.0 | -- | <1 | **8** | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | 1 | -- | <0.40 | -- | -- | <1 | 1 | 1 | <1 | 1 | 3 | 1 | <1 | 2 | -- | 3 | 4 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | 2 | -- | -- | 2 | <2.0 | <2.0 | <2.0 | **3** | **3** | <2 | **3** | **3** | <2 | 1 | **12** | **4** | 2 | <2.0 | **404** | 2 | **13** | <1 | 2 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | **880** | -- | -- | **1,380** | **3,850** | **303** | 229 | **897** | **1,110** | 214 | **5,210** | **1,550** | **383** | **1,720** | **28,400** | **1,660** | **485** | **960** | **217,000** | **714** | **21,300** | **7,380** | **375** |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | **1.9** | -- | -- | **1.6** | **2.7** | -- | 0.6 | -- | -- | <0.5 | **5.2** | **2.1** | 0.6 | 0.7 | **19.4** | **3.5** | 1.0 | <0.50 | -- | 0.6 | **39.7** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 110 | -- | -- | 387 | 135 | 53 | 41 | 106 | 176 | 78 | 219 | 207 | 83 | 173 | 327 | 212 | 93 | 470 | **2,800** | 303 | 586 | 359 | 71 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | 4 | 2 | <2 | <2.0 | -- | <2 | 8 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 11 | -- | -- | 37 | 21 | -- | 17 | -- | -- | 33 | 45 | 31 | 39 | 40 | 45 | 75 | 43 | 96 | -- | 38 | 96 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 4 | -- | -- | <2 | 6 | -- | 5 | -- | -- | <2 | 10 | 4 | 4 | <2 | 60 | 9 | 6 | <2 | -- | <2 | 41 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <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 | 0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | 2 | <2 | <2 | <2 | **11** | <2 | <2 | <2.0 | -- | <2 | **18** | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 12 | -- | -- | 14 | 12 | 9 | 6 | 9 | 13 | <5 | 7 | 12 | 12 | <5 | **46** | **36** | 17 | 27 | **1,210** | 10 | **170** | 22 | 11 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 28 | >250 | -- | >250 | 75 | 41 | 110 | >250 | -- | 1,553 | >2420 | >2420 | 2,420 | 1,990 | >2420 | 687 | >2420 | --- | >2420 | 328 | >2420 | >2420 | >2420 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 4 | 230 | -- | 9 | 5 | <1 | 7 | **>250** | <100 | <1 | 16 | 50 | 111 | 9 | 4 | <1 | <1 | <10 | 201 | 2 | 1 | 20 | 11 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.90 | 82.63 | 48.17 | 0.85 | 16.36 | 0.25 | 0.97 | 4.91 | 1.90 | 2.07 | 21.03 | 0.33 | 2.41 | 1.10 | 21.62 | 10.34 | 0.46 | 0.53 | 119.14 | 6.24 | 539.78 | 54.98 | 0.43 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.91 | 81.20 | 52.50 | 0.85 | 17.35 | 0.23 | 0.87 | 4.49 | 2.15 | 2.27 | 17.26 | 0.50 | 3.02 | 1.30 | 27.02 | 11.09 | 0.55 | 0.58 | 129.77 | 2.23 | 793.90 | 73.67 | 0.56 |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.
Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-2**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Highway 102 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site HWY102-2 | | | | | | | HWY102-2 | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 6/8/2107 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | hh:mm | | | | | | 11:45 | 15:25 | 12:25 | 12:30 | 11:30 | 14:15 PM | 3:55PM | 12:20PM | 16:30 | 10:00 AM | 1:54 PM | 9:01 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA** | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | | 13.0 | 22.4 | 15.2 | 14.9 | 18.3 | 10.6 | 11.4 | 23.1 | 9.7 | 18.8 | 17.7 | 7.5 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 5.68 | **1.81** | **11.32** | 8.75 | **2.29** | 5.62 | ** | **3.81** | **12.70** | **4.92** | 7.96 | **5.45** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | **6.04** | 7.56 | 8.32 | **6.13** | **5.88** | 7.24 | 6.83 | **6.19** | 6.98 | **5.99** | **5.56** | **6.18** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 400.0 | 414.0 | 338.0 | 355.6 | 394.7 | 246.4 | 501.0 | 720.0 | 202.0 | 461.0 | 472.0 | 399.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 22 | 11 | 9 | 21 | 13 | <5 | 17 | <5 | 18.0 | 11.0 | 11.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | **136** | 107 | 92 | 79 | 90 | 30 | **161** | **223** | 74 | **172** | **200** | 99 |
| Colour | TCU | 5 | -- | -- | -- | | 20 | 41 | 22 | 25 | 85 | 85 | 22 | 42 | 45 | 27 | 56 | 26 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.20 | 0.09 | 0.07 | 0.33 | 0.21 | 0.76 | 0.60 | 0.14 | 0.58 | 0.08 | <0.05 | 0.30 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | <0.05 | 0.09 | 0.07 | 0.16 | <0.05 | 0.76 | 0.17 | 0.07 | 0.58 | 0.08 | <0.05 | 0.30 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | **0.20** | <0.05 | <0.05 | **0.17** | **0.21** | <0.05 | **0.43** | **0.07** | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.03 | 0.09 | 0.14 | <0.03 | 0.24 | 0.06 | 0.04 | 0.29 | 0.05 | 0.25 | 0.31 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | <0.4 | 0.7 | 0.6 | 1.4 | 0.9 | <0.4 | <0.4 | 0.7 | 1.2 | <0.4 | 4.10 | 9.80 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 5.4 | 9.2 | 5.9 | 5.6 | 7.5 | 8.0 | 3.2 | 8.2 | 6.8 | 4.90 | 21.20 | 6.30 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | **6.22** | 6.73 | 6.51 | 6.79 | 6.79 | 7.07 | **6.36** | 6.67 | **6.37** | 6.86 | 6.86 | 6.77 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 13.3 | 14.7 | 14.7 | 11.5 | 12.5 | 16.5 | 22.8 | 17.2 | 7.9 | 23.2 | 9.8 | 19.2 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 2.5 | 1.9 | 2.1 | 1.4 | 1.7 | 1.9 | 3.6 | 2.2 | 1.4 | 3.1 | 340.0 | 2.8 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.013** | **0.042** | **0.011** | **0.034** | **0.025** | **0.014** | 0.006 | **0.037** | **0.022** | **0.018** | 0.008 | **0.013** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.6 | 1.6 | 1.3 | 1.6 | 1.7 | 2.2 | 2.1 | 1.1 | 2.1 | 3.7 | 2.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 68.8 | 66.0 | 55.2 | 59.4 | 81.6 | 29.4 | 148.0 | 139.0 | 31.7 | 96.7 | 118.0 | 57.8 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 3.1 | 5.7 | 6.4 | 1.6 | 8.8 | 4.6 | 3.1 | 7.2 | 4.4 | 5.7 | 7.6 | 6.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 6 | 7 | 8 | 12 | <5 | <5 | <5 | 16 | <5 | <5 | 57.0 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 10 | 7 | 9 | 9 | 4 | 16 | 13 | 11 | 9 | 12.0 | 10.0 | 16.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 2.4 | 9.9 | 12.5 | 7.0 | 13.8 | 1.1 | 1.2 | 26.8 | 4.4 | 9.7 | 32.9 | 3.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 451 | 413 | 366 | 422 | 444 | 208 | 737 | 782 | 204 | 629 | 742 | 412 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 4.06 | 3.61 | 3.01 | 2.62 | 3.06 | 1.5 | 4.9 | 6.9 | 2.3 | 5.47 | 6.07 | 3.37 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 22 | 11 | 9 | 21 | 13.0 | <5 | 17.0 | <5 | 18 | 11 | 11 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 233 | 215 | 187 | 170 | 209 | 107.0 | 354.0 | 415.0 | 129.0 | 324 | 359 | 206 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 3.92 | 3.93 | 3.60 | 3.36 | 4.53 | 2.3 | 8.0 | 7.5 | 2.0 | 5.83 | 6.25 | 3.81 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 43.50 | 44.50 | 45.40 | 34.5 | 38.2 | 49.0 | 71.8 | 52.0 | 25.5 | 70.7 | 33.1 | 59.5 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 1.80 | 4.20 | 8.90 | 12.4 | 19.4 | 21.8 | 24.3 | 4.4 | 8.0 | 3.2 | 1.5 | 6.2 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.58 | -2.38 | -2.90 | -2.81 | -2.41 | -2.2 | -3.2 | -2.5 | -3.6 | -2.16 | -2.75 | -2.52 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.90 | -2.70 | -3.22 | -3.13 | -2.73 | -2.5 | -3.6 | -2.8 | -4.0 | -2.48 | -3.07 | -2.84 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.80 | 9.11 | 9.41 | 9.60 | 9.2 | 9.3 | 9.6 | 9.2 | 10.0 | 9.02 | 9.61 | 9.29 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.10 | 9.43 | 9.73 | 9.92 | 9.52 | 9.6 | 9.9 | 9.5 | 10.3 | 9.3 | 9.9 | 9.6 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **99** | **149** | **542** | **167** | **152** | -- | **126** | **194** | **306** | **99** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | <2 | <2 | <2 | -- | <2 | 4 | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 151 | -- | 122 | 96 | 146 | -- | 272 | 138 | 100 | 266.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | <5 | -- | 12 | 7 | 11 | -- | 7 | 9 | 6 | 11.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | **0.019** | -- | **0.048** | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <1 | -- | **2** | <1 | **2** | -- | <1 | 1 | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | 2 | <1 | 2 | -- | <1 | 3 | <1 | -- | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <1 | 1 | **3** | 2 | 1 | 2 | 2 | 1 | **3** | **3.0** | **4.0** | 2.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | **369** | **2,650** | **4,760** | **870** | **3,600** | 93 | **728** | **8,440** | **506** | **3,260** | **7,640** | **1,030** |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | <0.5 | -- | **3.3** | **2.3** | 1.0 | -- | **1.4** | **1.4** | **1.9** | 0.7 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 125 | 160 | 215 | 55 | 262 | 10 | 137 | 625 | 50 | 341 | 340 | 99 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 6 | -- | 3 | <2 | <2 | -- | 3 | <2 | 2 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 72 | -- | 80 | 53 | 81 | -- | 129 | 95 | 49 | 112.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | 15 | 4 | 3 | -- | <2 | 3 | 7 | 2.0 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | 2 | -- | 3 | <2 | 2 | -- | 4 | 5 | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 14 | 9 | 19 | 12 | 6 | **69** | 16 | 15 | 13 | <5 | 24.0 | 7.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | >2420 | >2420 | >2420 | 6 | 410 | 81.0 | 930.0 | NDOGT | 1,152.0 | >2420 | >2420 | 816 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | <1 | 8 | 41 | 1 | 26 | 3 | <10 | 30 | 18 | 365 | 172 | <1 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | -- | -- | -- | -- | -- | -- | -- | -- | 0.32 | 2.89 | 206 | 0.81 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.40 | 2.11 | 28.94 | 2.56 | 2.58 | 0.53 | 3.06 | 23.70 | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 1.74 | 3.20 | 37.67 | 4.28 | -- | * | 3.04 | 20.50 | -- | -- | -- | -- |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" --" = no guideline available / Not Tested.
CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2(
CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calcula
Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.
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(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Gui
Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contan
**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideli

**Table C2: Statistical Presentation of Key Water Quality Parameters - LSD**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Lake Shore Drive | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LSD | | | | | | | LSD | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/17/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/15/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | -- | | | | | 12:00 | 09:30 | 11:45 | 09:00 | 11:28 | 10:00 | 08:45 | 13:20 | 9:00 | 9:15 | 13:00 | 9:10 | 08:40 | 15:30 | 11:55 | 9:30 | 13:30 | 09:50 | 16:02 | 13:40 | 15:00 | 12:10 | 12:25 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 13.1 | 16.7 | 15.3 | 13.4 | 21.3 | 7.3 | 10.2 | 21.0 | 12.0 | 5.7 | 25.7 | 13.4 | 7.7 | 20.2 | 8.8 | 8.9 | 10.5 | 12.5 | 24.3 | 5.8 | 13.2 | 24.0 | 9.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **10.84** | 5.70 | 5.50 | 8.60 | **5.41** | 8.47 | 9.44 | 7.87 | 8.16 | **4.06** | **2.69** | 7.58 | 8.77 | 7.26 | 7.60 | **14.78** | 7.22 | 6.26 | 7.25 | 7.21 | 8.22 | **1.86** | 8.67 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.88 | 6.74 | **6.34** | **6.42** | 6.64 | **6.17** | 7.09 | 6.88 | 6.63 | 8.22 | 7.16 | 6.92 | **5.19** | 7.28 | **6.23** | 7.02 | **6.31** | 6.88 | **6.34** | **6.48** | 6.63 | **6.16** | **6.25** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 723.0 | 210.0 | 167.7 | 217.8 | 203.2 | 110.3 | 145.9 | 126.4 | 111.9 | 62.0 | 177.5 | 116.7 | 123.6 | 132.5 | 147.8 | 180.0 | 111.0 | 0.1 | 155.3 | 132.3 | 162.0 | 254.0 | 162.2 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 13 | 16 | 12 | 13 | 21 | 9 | 9 | 15 | 12 | 21 | 14 | 11 | 8 | 20 | 11 | 35 | 10 | 11 | 7 | 9 | 11 | 22 | 8 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 41 | 34 | 31 | 49 | 45 | 25 | 38 | 27 | 22 | 22 | 33 | 23 | 39 | 32 | 23 | 29 | 23 | 32 | 27 | 26 | 39 | 45 | 31 |
| Colour | TCU | 5 | -- | -- | -- | | 32 | 27 | 37 | 20 | 26 | 33 | 32 | 41 | 49 | 13 | 20 | 40 | 10 | 21 | 25 | 9 | 31 | 20 | 11 | 26 | 25 | 26 | 24 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.14 | 0.14 | 0.06 | 0.23 | 0.10 | 0.12 | 0.25 | 0.17 | 0.09 | 0.13 | 0.80 | <0.05 | 0.18 | 0.20 | <0.05 | 0.09 | 0.11 | 0.15 | 0.25 | 0.30 | 0.08 | 0.08 | <0.05 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.14 | -- | -- | 0.23 | 0.10 | -- | 0.25 | -- | -- | 0.13 | 0.80 | <0.05 | 0.18 | 0.20 | <0.05 | 0.09 | 0.11 | 0.15 | 0.16 | 0.30 | 0.08 | 0.08 | <0.05 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | **0.09** | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.06 | 0.03 | <0.03 | <0.03 | <0.03 | 0.03 | 0.03 | 0.04 | <0.03 | <0.050 | 0.11 | <0.03 | 0.06 | 0.10 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | 3.5 | 0.5 | -- | 0.7 | 3.0 | 1.0 | <0.4 | 0.3 | 77.4 | 2.8 | 2.2 | 11.8 | 0.5 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 5.0 | 3.8 | 6.8 | 3.7 | 6.0 | 5.3 | 4.7 | 7.1 | 7.5 | 3.1 | 8.0 | 7.7 | 4.7 | 6.3 | 6.9 | 5.2 | 8.1 | 3.2 | 14.1 | 9.9 | 5.5 | 14.0 | 8.9 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.69 | 6.69 | 6.93 | 7.10 | 7.30 | 6.67 | 6.72 | 6.79 | **6.49** | **6.20** | 6.90 | 6.90 | 6.94 | 6.95 | **6.49** | **6.47** | 6.72 | 7.02 | 6.59 | 6.68 | 6.65 | 7.01 | **6.38** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.5 | 6.9 | 5.4 | 8.0 | 10.5 | 5.3 | 5.9 | 5.1 | 5.0 | 2.6 | 18.1 | 5.1 | 6.4 | 6.0 | 5.6 | 5.4 | 5.1 | 6,100.0 | 52.2 | 5.4 | 6.6 | 9.9 | 4.8 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.4 | 1.6 | 1.3 | 2.0 | 2.1 | 1.2 | 1.3 | 1.2 | 1.2 | 0.7 | 3.3 | 1.4 | 1.2 | 1.4 | 1.6 | 1.5 | 1.1 | 1,300.0 | 23.0 | 1.5 | 1.4 | 1.8 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | **0.030** | 0.009 | **0.018** | **0.100** | 0.009 | **0.018** | **0.028** | **0.014** | **0.022** | **0.063** | 0.003 | 0.007 | **0.015** | **0.078** | **0.100** | **0.031** | **0.011** | **0.501** | **0.095** | **1.250** | **0.023** | **0.012** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.2 | 1.1 | 1.3 | 1.2 | 1.2 | 1.0 | 1.1 | 1.0 | 1.2 | 0.6 | 1.9 | 1.3 | 1.2 | 1.1 | 1.4 | 1.1 | 1.1 | 1,100.0 | 9.7 | 1.0 | 1.2 | 1.3 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 24.0 | 21.0 | 18.0 | 24.8 | 26.9 | 15.2 | 23.2 | 14.3 | 13.8 | 11.3 | 18.6 | 15.2 | 21.9 | 26.6 | 14.6 | 23.4 | 18.1 | 19.0 | 24.4 | 13.4 | 25.1 | 23.4 | 19.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 3.1 | 4.2 | 4.0 | 3.2 | 3.4 | 4.3 | 2.6 | 3.9 | 3.8 | 3.1 | 2.9 | 4.9 | 2.6 | 3.9 | 5.0 | 2.9 | 4.2 | 2.4 | 4.2 | 4.4 | 1.6 | 3.3 | 3.5 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 16 | 98 | 5 | 6 | 110 | 7 | 4 | 77 | 5 | <5 | 16 | 19 | <5 | 17 | 9 | 51 | 8 | 5 | **719** | 69 | 93 | **9,020** | 15 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 6 | 4 | 5 | 7 | 3 | 4 | 6 | 4 | 4 | 5 | 5 | 5 | 6 | 7 | 5 | 5 | 4 | 5 | <2 | 3 | 5 | 6 | 7 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.6 | 12.0 | 2.5 | 12.0 | 6.2 | 1.0 | 0.6 | 2.5 | 1.7 | 6.7 | **283.0** | 2.1 | 1.1 | 31.6 | **82.6** | 6.6 | 1.4 | 1.2 | **4,430.0** | 5.4 | **65.3** | **206.0** | 7.9 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 170 | 150 | 140 | 200 | 200 | 110 | 150 | 130 | 110 | 96 | 161 | 110 | 168 | 136 | 105 | 122 | 125 | 140 | 129 | 136 | 160 | 236 | 133 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.56 | 0.82 | 1.22 | 1.80 | 1.77 | 0.97 | 1.39 | 1.14 | 0.96 | 1.15 | 1.37 | 0.97 | 1.40 | 1.46 | 0.97 | 1.63 | 0.94 | 1.22 | 0.92 | 1.00 | 1.43 | 1.84 | 1.18 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 13 | 8 | 12 | 13 | 21 | 9 | 9 | 15 | 12 | 21 | 14 | 11 | 8 | 20 | 11 | 35 | 10 | 11 | 7 | 9 | 11 | 22 | 8 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 92 | 55 | 74 | 104 | 107 | 62 | 84 | 66 | 60 | 56 | 163 | 58 | 82 | 87 | 66 | 88 | 59 | 74 | 498 | 65 | 91 | 107 | 70 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.53 | 0.99 | 1.20 | 1.69 | 1.94 | 1.05 | 1.44 | 1.02 | 1.00 | 0.76 | 3.59 | 1.10 | 1.43 | 1.62 | 1.62 | 1.52 | 1.19 | 1.28 | 31.00 | 1.42 | 1.94 | 2.04 | 1.27 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 22.00 | 15.00 | 19.00 | 28.00 | 35.00 | 18.00 | 20.00 | 18.00 | 18.00 | 9.40 | 58.80 | 18.50 | 20.90 | 20.70 | 20.60 | 19.70 | 17.30 | 21.00 | 225.00 | 19.70 | 22.20 | 32.10 | 17.30 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 0.97 | 9.39 | 0.83 | 3.15 | 4.58 | 3.96 | 1.77 | 5.56 | 2.04 | 20.70 | 63.00 | 6.10 | 1.00 | 5.20 | 25.00 | 3.40 | 11.80 | 2.40 | 94.20 | 17.50 | 15.20 | 5.30 | 3.80 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.74 | -3.20 | -2.60 | -2.22 | -1.71 | -2.99 | -2.88 | -2.64 | -3.05 | -3.62 | -2.30 | -2.91 | -2.93 | -2.55 | -3.29 | -2.84 | -3.14 | -2.50 | -2.50 | -3.20 | -2.97 | -2.24 | -3.61 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -2.99 | -3.45 | -2.85 | -2.47 | -1.96 | -3.24 | -3.13 | -2.89 | -3.31 | -3.94 | -2.62 | -3.23 | -3.25 | -2.87 | -3.61 | -3.16 | -3.46 | -2.75 | -2.82 | -3.52 | -3.29 | -2.56 | -3.93 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.43 | 9.78 | 9.53 | 9.32 | 9.01 | 9.66 | 9.60 | 9.43 | 9.54 | 9.82 | 9.20 | 9.81 | 9.87 | 9.50 | 9.78 | 9.31 | 9.86 | 9.51 | 9.09 | 9.88 | 9.72 | 9.25 | 9.99 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.68 | 10.00 | 9.78 | 9.57 | 9.26 | 9.91 | 9.85 | 9.68 | 9.80 | 10.10 | 9.52 | 10.10 | 10.20 | 9.82 | 10.10 | 9.63 | 10.20 | 9.77 | 9.41 | 10.20 | 10.00 | 9.57 | 10.30 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **259** | -- | -- | **349** | **189** | -- | **217** | -- | -- | **490** | **19,200** | **186** | **131** | **93** | **3,420** | **487** | **141** | **120** | -- | **1,960** | **2,150** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | **8** | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 13 | -- | -- | 15 | 19 | -- | 14 | -- | -- | 11 | 86 | 12 | 12 | 7 | 24 | 15 | 11 | 12 | -- | 27 | 34 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | 2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | 9 | -- | -- | 41 | 22 | -- | <50 | -- | -- | 6 | 24 | 16 | 10 | 15 | 15 | 14 | 16 | <50 | -- | <5 | 12 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | **0.019** | -- | -- | **0.018** | <0.017 | -- | <0.017 | -- | -- | **0.029** | **1.050** | **0.023** | <0.017 | <0.017 | **0.073** | **0.032** | <0.017 | **0.011** | -- | <0.017 | **0.120** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <1 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | **11** | <1 | <1 | <1 | **2** | <1 | <1 | <1.0 | -- | **3** | **2** | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | <0.40 | 1 | -- | <0.40 | -- | -- | <1 | 34 | <1 | <1 | <1 | 1 | <1 | <1 | <0.40 | -- | 4 | 4 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | **2** | -- | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | **22** | 2 | <2 | 1 | **12** | 2 | **3** | <2.0 | **183** | **6** | **3** | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | **523** | -- | -- | **554** | **965** | 120 | 211 | **388** | **384** | 161 | **38,900** | **312** | 236 | 254 | **4,200** | **593** | **363** | 230 | **176,000** | **4,570** | **2,790** | **2,190** | **303** |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | **3.0** | 0.5 | -- | <0.5 | -- | -- | 0.6 | **82.4** | <0.5 | <0.5 | <0.5 | **5.2** | 0.5 | <0.5 | <0.5 | -- | **5.9** | **4.3** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 53 | -- | -- | 113 | 632 | 23 | 30 | 53 | 39 | 26 | **13,200** | 67 | 71 | 81 | 124 | 140 | 60 | 130 | **13,800** | **985** | **921** | **2,420** | 75 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | 13 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | -- | 5 | 2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <1 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | **2** | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 0.100 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 12 | -- | -- | 36 | 42 | -- | 24 | -- | -- | 12 | 82 | 22 | 24 | 24 | 25 | 26 | 19 | 25 | -- | 16 | 29 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 2 | -- | -- | 7 | 4 | -- | 5 | -- | -- | 3 | 405 | 4 | <2 | 2 | 36 | 6 | 3 | 3 | -- | 41 | 30 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 1.6 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | -- | 0.2 | 0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | **30** | <2 | <2 | <2 | 2 | <2 | <2 | <2 | -- | 6 | 4 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | <5 | -- | -- | 7 | 7 | <5.0 | <5.0 | <5.0 | 5 | <5 | **110** | 7 | 6 | <5 | 15 | <5 | <5 | <5.0 | **799** | 11 | 17 | 14 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 53 | >250 | -- | >250 | >250 | 280 | 85 | >250 | -- | 1,414 | >2420 | >2420 | 1,990 | >2420 | >2420 | 1,203 | 8 | --- | >2420 | >2420 | >2420 | >2420 | >2420 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 22 | 24 | -- | 4 | 45 | 6 | 10 | **>250** | <100 | 2 | 26 | 10 | 10 | 20 | 2 | <1 | **>2420** | <10 | 16 | 17 | 9 | 30 | 16 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.46 | 10.70 | 4.68 | 1.21 | 6.64 | 0.21 | 1.19 | 1.93 | 1.41 | 1.88 | 6.62 | 0.13 | <0.50 | 1.60 | 2.02 | 1.91 | 0.32 | 1.02 | 90.33 | 5.12 | 8.22 | 127.14 | 0.38 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 1.85 | 11.10 | 5.62 | 1.32 | 7.71 | 0.19 | 1.07 | 1.73 | 1.18 | 2.28 | 7.58 | 0.22 | <0.50 | 2.00 | 2.98 | 1.91 | 0.33 | 1.07 | 121.83 | 4.62 | 13.77 | 185.98 | 0.48 |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" --" = no guideline available / Not Tested.
CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.
Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - LSD**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Lake Shore Drive | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LSD | | | | | | | LSD | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | hh:mm | -- | | | | | 10:20 | 11:55 | 11:05 | 11:30 | 10:30 | 10:50 AM | 11:26 AM | 10:44 AM | 1:45 PM | 12:15 PM | 1:08 PM | 11:22 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA | NA** | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | | 15.6 | 23.0 | 9.7 | 14.4 | 22.4 | 9.3 | 10.2 | 25.0 | 8.3 | 26.5 | 18.3 | 6.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **11.35** | 6.95 | **5.34** | 9.08 | 6.85 | 7.24 | ** | **4.93** | 7.90 | **2.66** | **3.24** | **11.40** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.78 | 6.57 | **5.91** | **5.82** | **6.41** | **5.90** | 7.01 | 6.51 | **6.40** | **6.31** | **6.05** | **6.41** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 150.0 | 188.0 | 92.0 | 75.0 | 182.9 | 108.1 | 99.7 | 368.0 | 171.0 | 195.0 | 158.0 | 145.8 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 12 | 26 | 20 | 9 | 27 | 9 | 12 | 33 | <5 | 30.0 | 21.0 | 13.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 43 | 38 | 36 | 23 | 32 | 20 | 30 | 29 | 20 | 35 | 35 | 32 |
| Colour | TCU | 5 | -- | -- | -- | | 25 | 31 | 21 | 36 | 40 | 65 | 39 | 86 | 38 | 56 | 60 | 30 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.19 | 0.48 | 0.22 | 0.32 | <0.05 | 0.10 | 0.08 | 0.07 | 0.07 | <0.05 | <0.05 | 0.05 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.10 | 0.39 | 0.22 | 0.32 | <0.05 | 0.10 | 0.08 | 0.07 | 0.07 | <0.05 | <0.05 | 0.05 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | **0.09** | **0.09** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.03 | 0.08 | 0.04 | <0.03 | 0.06 | <0.03 | <0.03 | 0.53 | 0.06 | 0.60 | 0.68 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | 1.0 | 34.5 | 10.0 | <0.4 | 1.7 | <0.4 | <0.4 | 1.6 | 1.6 | 0.70 | 4.10 | 0.60 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 7.7 | 8.1 | 6.9 | 5.8 | 5.8 | 8.0 | 5.9 | 12.1 | 6.2 | 7.50 | 8.70 | 6.90 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.92 | 7.08 | 7.01 | 6.91 | 7.20 | 6.99 | 6.93 | 7.11 | 6.55 | 7.19 | 7.04 | 6.75 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 7.1 | 8.0 | 6.7 | 4.4 | 10.2 | 3.5 | 6.0 | 9.6 | 2.7 | 8.4 | 4.5 | 6.3 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.6 | 1.7 | 1.6 | 1.1 | 2.3 | 0.9 | 1.5 | 2.6 | 0.7 | 1.8 | 1,190.0 | 1.5 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.102** | **0.059** | **0.015** | **0.052** | **0.305** | **0.018** | 0.008 | **0.031** | 0.008 | **0.028** | **0.084** | 0.010 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.3 | 1.4 | 1.2 | 0.9 | 1.6 | 0.8 | 1.3 | 1.7 | 0.6 | 1.2 | 0.9 | 1.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 25.2 | 26.0 | 23.0 | 16.5 | 21.7 | 15.4 | 24.4 | 20.7 | 9.8 | 21.4 | 25.1 | 21.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 1.1 | 2.7 | 4.0 | 2.4 | 2.4 | 3.3 | 1.7 | 4.2 | 3.5 | 3.9 | 2.0 | 3.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 138 | 41 | <5 | <5 | **444** | 6 | 8 | 150 | <5 | 56.0 | 132.0 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 4 | 3 | 4 | 5 | <2 | 5 | 4 | <2 | 5 | 3.0 | 3.0 | 5.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | **53.8** | 21.3 | 15.1 | 2.0 | **72.2** | 2.5 | 5.0 | 44.4 | 1.2 | 6.4 | 18.2 | 0.7 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 178 | 192 | 171 | 122 | 192 | 123 | 151 | 170 | 63 | 197 | 193 | 150 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.55 | 1.69 | 1.51 | 0.96 | 1.44 | 0.9 | 1.2 | 1.5 | 0.7 | 1.65 | 1.47 | 1.27 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 12 | 26 | 20 | 9 | 27 | 9.0 | 12.0 | 33.0 | <5 | 30 | 21 | 13 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 92 | 97 | 87 | 58 | 95 | 52.0 | 76.0 | 96.0 | 39.0 | 96 | 90 | 77 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.75 | 1.74 | 1.59 | 1.08 | 2.27 | 1.0 | 1.6 | 2.1 | 0.7 | 1.83 | 1.76 | 1.45 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 24.30 | 27.00 | 23.30 | 15.5 | 34.9 | 12.4 | 21.2 | 34.7 | 9.6 | 28.4 | 17.0 | 21.9 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 6.10 | 1.40 | 2.30 | 6.0 | 22.2 | 6.6 | 14.2 | 17.9 | 1.0 | 5.1 | 9.0 | 6.6 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.73 | -2.19 | -2.44 | -3.06 | -1.94 | -3.1 | -2.8 | -2.0 | -3.9 | -1.99 | -2.57 | -2.91 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.05 | -2.51 | -2.76 | -3.38 | -2.26 | -3.4 | -3.1 | -2.3 | -4.2 | -2.31 | -2.89 | -3.23 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.65 | 9.27 | 9.45 | 9.97 | 9.14 | 10.1 | 9.7 | 9.1 | 10.4 | 9.18 | 9.61 | 9.66 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.97 | 9.59 | 9.77 | 10.3 | 9.46 | 10.4 | 10.0 | 9.4 | 10.7 | 9.5 | 9.9 | 10.0 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **731** | **48** | **401** | **142** | **2,590** | -- | **124** | **665** | **154** | **248** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | <2 | <2 | <2 | -- | <2 | 3 | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 32 | -- | 11 | 8 | 53 | -- | 13 | 53 | 7 | 42.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | <5 | -- | 20 | 10 | 20 | -- | 9 | 21 | 9 | 18.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | **0.031** | -- | <0.017 | <0.09 | **0.130** | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <1 | -- | 1 | <1 | **2** | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | 1 | -- | <1 | <1 | 6 | -- | <1 | 6 | <1 | 2.0 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <1 | -- | 1 | <1 | **4** | 1 | <1 | 2 | 1 | 1.0 | 1.0 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | **1,080** | **375** | **874** | 239 | **5,460** | 164 | **560** | **5,530** | 118 | **3,510** | **4,550** | **378** |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | 0.6 | -- | 0.7 | 0.7 | **4.3** | -- | <0.5 | **3.2** | <0.5 | 0.8 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 436 | 212 | 250 | 55 | **2,630** | 58 | 368 | **5,050** | 8 | **2,840** | **1,190** | 102 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | <2 | <2 | 4 | -- | <2 | <2 | 9 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | **0.200** | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 28 | -- | 31 | 17 | 54 | -- | 27 | 56 | 15 | 32.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 14 | -- | 7 | 3 | 36 | -- | <2 | 6 | <2 | 5.0 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <0.1 | -- | <0.1 | <0.1 | 0.2 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | <2 | <2 | 4 | -- | <2 | 2 | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 8 | <5 | 7 | <5 | 23 | <5 | <5 | 10 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 534 | >2420 | 641 | 46 | 3020 | 2,380.0 | 1120 | NDOGT | 932 | >2420 | >2420 | 1,200 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 1 | **479** | 1 | 23 | 20 | 20 | 7 | 50 | 12 | 12 | 172 | 2 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | -- | -- | -- | -- | -- | -- | -- | -- | <0.25 | 4.42 | 12.5 | 0.32 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 18.67 | 20.15 | 1.85 | 0.93 | 141.49 | 0.60 | 2.47 | 14.60 | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 25.84 | 24.37 | 2.89 | 1.60 | -- | * | 2.51 | 15.40 | -- | -- | -- | -- |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" --" = no guideline available / Not Tested.
CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2(
CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calcula
Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Stan
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Gui
Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contan
**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideli

**Table C2: Statistical Presentation of Key Water Quality Parameters - LU**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Larry Uteck Blvd | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LU | | | | | | | LU | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 10/17/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/15/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | -- | | | | | 10:30 | 15:20 | 11:30 | 10:10 | 14:30 | 14:30 | 13:00 | 11:45 | 10:45 | 9:54 | 13:45 | 10:23 | 10:05 | 12:20 | 11:20 | 11:45 | 11:25 | 10:15 AM | 12:00 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | | 11.3 | 12.8 | 27.3 | 14.6 | 13.9 | 18.3 | 10.9 | 15.0 | 22.8 | 10.2 | 16.1 | 23.4 | 8.2 | 13.3 | 21.9 | 11.6 | 18.2 | 22.4 | 13.3 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **4.24** | 6.17 | 8.20 | 9.04 | **10.15** | 8.29 | **4.50** | **11.96** | 8.08 | 7.55 | 7.28 | 9.49 | 8.50 | 8.75 | **16.62** | **9.68** | **9.56** | 8.34 | 7.43 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | **6.07** | 7.82 | 6.65 | 6.78 | **6.39** | 7.49 | **5.45** | 6.50 | 7.23 | **6.17** | 6.57 | 6.80 | 6.99 | 7.17 | **6.24** | **6.23** | 6.80 | 7.11 | 6.90 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 203.0 | 955.0 | 480.0 | 262.0 | 670.0 | 320.0 | 845.0 | 999.0 | 611.0 | 371.0 | 0.6 | 569.0 | 436.2 | 588.0 | 574.0 | 483.4 | 755.0 | 660.0 | 590.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 34 | **224** | 116 | 52 | **190** | 99 | **258** | **243** | 104 | 70 | **210** | **132** | 93 | **154** | **164** | 92 | **247** | **154** | **143** |
| Colour | TCU | 5 | -- | -- | -- | | 94 | 18 | 14 | 18 | 7 | 7 | 19 | 6 | 8 | 18 | 8 | 8 | 6 | 17 | 13 | 26 | 12 | 12 | 8 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.61 | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.47 | 2.61 | 1.35 | 0.87 | 1.72 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | -- | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.41 | 2.61 | 1.01 | 0.51 | 1.72 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | **0.34** | **0.36** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | 0.06 | 0.04 | 0.16 | <0.03 | <0.03 | 0.04 | 0.04 | 0.05 | <0.03 | <0.03 | <0.050 | 0.05 | <0.03 | 0.05 | 0.05 | <0.03 | <0.03 | 0.09 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | 0.4 | 4.2 | 0.7 | -- | 0.5 | <0.4 | 1.2 | 1.7 | <0.4 | 0.3 | 8.0 | 0.7 | 1.2 | 1.1 | 0.6 | 0.7 | 3.8 | 0.6 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 11.0 | 3.7 | 22.8 | 4.8 | 3.1 | 4.5 | 2.9 | 6.9 | 4.7 | 4.7 | 2.2 | 7.6 | 6.5 | 3.9 | 5.3 | 7.6 | 6.1 | 6.8 | 5.4 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | **6.43** | 6.70 | 7.20 | 7.20 | 6.92 | 7.11 | **6.49** | **6.42** | 7.42 | **6.41** | 6.95 | 7.30 | 7.15 | 6.94 | 7.42 | 6.96 | 7.26 | 7.40 | 7.13 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 7.6 | 30.7 | 22.1 | 14.5 | 22.0 | 17.6 | 21.8 | 23.9 | 27.6 | 12.6 | 27,000.0 | 20.3 | 15.9 | 20.6 | 17.2 | 17.9 | 25.7 | 23.8 | 22.8 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 2.3 | 4.2 | 3.6 | 2.2 | 2.8 | 2.7 | 4.0 | 4.2 | 3.8 | 2.2 | 3,800.0 | 3.4 | 1.9 | 2.9 | 3.4 | 2.6 | 3.8 | 3.0 | 2.5 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.034** | **0.043** | **0.036** | **0.030** | 0.006 | **0.027** | **0.046** | **0.260** | **0.028** | **0.039** | 0.007 | 0.009 | **0.011** | **0.029** | **0.011** | **0.012** | **0.024** | **0.027** | 0.008 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 2.1 | 3.2 | 3.6 | 2.5 | 2.6 | 2.8 | 2.9 | 3.1 | 3.7 | 3.0 | 3,300.0 | 2.8 | 1.6 | 2.8 | 2.6 | 2.7 | 3.2 | 3.0 | 2.6 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 22.7 | 124.0 | 62.2 | 32.3 | 95.1 | 51.7 | 170.0 | 147.0 | 88.1 | 62.7 | 110.0 | 102.0 | 57.8 | 96.4 | 81.1 | 65.6 | 137.0 | 113.0 | 86.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 6.9 | 4.9 | 0.7 | 6.3 | 5.1 | 8.6 | 7.0 | 2.1 | 2.5 | 6.9 | 3.6 | 4.9 | 6.9 | 4.2 | 1.3 | 6.7 | 4.6 | 3.6 | 5.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 13 | 5 | 165 | <5 | <5 | <5 | <5 | **626** | >5 | >5 | <1.0 | <5 | 6 | 29 | >5 | <5 | 22 | 16 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 21 | 26 | 25 | 23 | 26 | 29 | 33 | 29 | 20 | 27 | 27 | 31 | 30 | 28 | 23 | 41 | 32 | 18 | 33 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 3.3 | 4.1 | 23.0 | 2.3 | 1.8 | 1.6 | 0.7 | 42.7 | 10.1 | 1.6 | 0.3 | 2.8 | 2.4 | 15.8 | 3.0 | 3.3 | 7.3 | 6.6 | 3.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 190 | 813 | 482 | 255 | 732 | 433 | 840 | 819 | 605 | 394 | 790 | 575 | 462 | 582 | 739 | 371 | 849 | 673 | 610 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.69 | 7.21 | 4.12 | 2.36 | 6.10 | 4.02 | 8.13 | 8.15 | 3.80 | 2.68 | 6.77 | 4.73 | 3.62 | 5.26 | 5.68 | 3.91 | 7.99 | 5.32 | 5.24 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 109 | 426 | 246 | 144 | 347 | 229 | 496 | 477 | 262 | 187 | 400 | 305 | 216 | 321 | 310 | 242 | 463 | 341 | 311 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.70 | 7.40 | 4.30 | 2.43 | 5.55 | 3.51 | 8.90 | 8.24 | 5.64 | 3.64 | 6.69 | 5.86 | 3.52 | 5.78 | 4.76 | 4.06 | 7.65 | 6.74 | 5.21 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 29.00 | 94.00 | 70.00 | 45.30 | 66.50 | 55.10 | 70.90 | 77.00 | 84.60 | 40.50 | 84.00 | 64.70 | 47.50 | 63.40 | 56.90 | 55.40 | 79.80 | 71.80 | 67.20 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 0.29 | 1.30 | 2.20 | 1.40 | 4.70 | 6.80 | 4.50 | 0.60 | 19.40 | 15.20 | 0.59 | 10.60 | 1.40 | 4.70 | 8.80 | 1.80 | 2.20 | 11.80 | 0.30 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.95 | -2.32 | -1.94 | -2.10 | -2.60 | -1.93 | -2.98 | -2.38 | -1.45 | -3.41 | -1.95 | -1.82 | -2.16 | -2.27 | -1.55 | -2.27 | -1.87 | -1.43 | -1.85 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.20 | -2.64 | -2.26 | -2.42 | -2.92 | -2.25 | -3.30 | -2.70 | -1.77 | -3.73 | -2.20 | -2.14 | -2.48 | -2.59 | -1.87 | -2.59 | -2.19 | -1.75 | -2.17 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.38 | 9.02 | 9.14 | 9.30 | 9.52 | 9.04 | 9.47 | 8.80 | 8.87 | 9.82 | 8.90 | 9.12 | 9.31 | 9.21 | 8.97 | 9.23 | 9.13 | 8.83 | 8.98 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.63 | 9.34 | 9.46 | 9.62 | 9.84 | 9.36 | 9.79 | 9.12 | 9.19 | 10.10 | 9.15 | 9.44 | 9.63 | 9.53 | 9.29 | 9.55 | 9.45 | 9.15 | 9.30 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | -- | **218** | **227** | **252** | **107** | **447** | **31** | **1,400** | **46** | **109** | **59** | -- | **66** | **1,420** | -- | -- | **61** | **978** | **29** |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | -- | 225 | 201 | 116 | 133 | 134 | 119 | 185 | 157 | 80 | 150 | -- | 111 | 127 | -- | -- | 132 | -- | 111 |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | -- | 11 | 17 | 22 | 10 | 22 | 18 | 22 | 20 | 21 | <50 | -- | 9 | 14 | -- | -- | <5 | -- | 19 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | -- | **0.538** | **0.171** | **0.168** | **0.300** | **0.236** | **0.148** | **0.171** | **0.031** | **0.079** | **0.150** | -- | **0.176** | **0.426** | -- | -- | **0.069** | -- | **0.052** |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | -- | <1 | <1 | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | **3** | -- | -- | <1 | -- | 1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | -- | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | 2 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | **3** | <3 | **3** | **16** | 2 | **6** | 2 | 2 | <1 | **4** | **2** | **3** | **3** | **10** | <1 | **3** | <1 | **14** | **3** |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | **2,150** | **347** | **1,320** | **500** | 194 | **890** | 157 | **2,000** | 207 | 229 | 170 | **671** | 171 | **1,940** | **374** | 223 | <50 | **3,540** | 289 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | -- | 0.8 | 0.7 | 1.0 | <0.5 | **1.4** | <0.5 | **1.8** | <0.5 | <0.5 | <0.5 | -- | <0.5 | **3.4** | -- | -- | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 129 | 182 | 485 | 120 | 87 | 89 | 26 | 71 | 182 | 36 | 110 | 371 | 61 | 444 | 148 | 35 | 77 | **1,870** | 91 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | -- | <2 | <2 | <2 | <2 | <2 | <2 | 3 | <2 | <2 | <2.0 | -- | <2 | 3 | -- | -- | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | -- | <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 |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | -- | 112 | 94 | 60 | 93 | 90 | 96 | 116 | 111 | 54 | 120 | -- | 43 | 89 | -- | -- | 104 | -- | 111 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | -- | <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 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | -- | 4 | 3 | 7 | 3 | 11 | 2 | 22 | <2 | 3 | <2 | -- | <2 | 31 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | -- | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | 0.2 | -- | -- | <0.1 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | 4 | -- | -- | 3 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 9 | **79** | **92** | **39** | **57** | **49** | 26 | 17 | 8 | 23 | 27 | 17 | 16 | **64** | 7 | **52** | 21 | **120** | 22 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | -- | >2420 | >2420 | 2,420 | 866 | >2420 | 866 | >2420 | 961 | >2420 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | 488 | >2420 | 1,990 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | <100 | <1 | 2 | 19 | 3 | 86 | <1 | <1 | 7 | **1,730** | <10 | 19 | 6 | <1 | 40 | 50 | 6 | 51 | 4 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.99 | 2.44 | 32.52 | 1.80 | 1.54 | 2.30 | 0.12 | 99.13 | 2.54 | 0.96 | 0.69 | 3.14 | 4.94 | 5.43 | 4.57 | 1.55 | 25.83 | 21.03 | 2.47 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 2.08 | 2.71 | 31.31 | 2.15 | 1.77 | 2.50 | 0.11 | 98.00 | 2.51 | 0.96 | 0.68 | 3.10 | 2.71 | 6.73 | 5.23 | 1.61 | 31.14 | 24.37 | 2.85 |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.
Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - LU**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference ) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Larry Uteck Blvd | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LU | | | | | | | LU | | | | | | | | |
| Sampling Date | yyyy-mm-dd | -- | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | hh:mm | -- | | | | | 10:00 | 8:40 | 12:25 PM | 3:20PM | 11:45 AM | 12:15 PM | 11:00 AM | 11:00 AM | 12:22 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | N/A | N/A | N/A | N/A | N/A | N/A | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.3 | 23.1 | 12.4 | 13.8 | 25.8 | 10.8 | 24.5 | 21.6 | 10.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **11.34** | 6.76 | **9.79** | ** | 5.54 | **10.30** | **3.53** | 6.44 | 8.12 |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.73 | 6.85 | 7.09 | 7.22 | 6.92 | 6.62 | **6.36** | **6.24** | **6.27** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 434.6 | 588.0 | 384.4 | 621.0 | 710.0 | 196.0 | 945.0 | 710.0 | 511.8 |
| **INORGANICS** | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 11 | 23 | 13 | 10 | 23 | 10 | 26.0 | 21.0 | 17.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 96 | **124** | 74 | **174** | **202** | 75 | **297** | **221** | **147** |
| Colour | TCU | 5 | -- | -- | -- | | 28 | 21 | 24 | 18 | 14 | 16 | 17 | 16 | 11 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 1.01 | 0.41 | 1.26 | 1.27 | 0.37 | 1.77 | 0.20 | 0.24 | 1.23 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.87 | 0.16 | 1.26 | 0.80 | 0.30 | 1.24 | 0.20 | 0.24 | 1.23 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | **0.14** | **0.25** | <0.05 | **0.47** | **0.07** | **0.53** | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.03 | 0.17 | <0.03 | <0.03 | 0.09 | 0.15 | 0.24 | 0.11 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | 1.1 | 0.6 | <0.4 | 0.6 | <0.4 | 0.7 | <0.4 | 1.60 | 6.40 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 9.3 | 5.5 | 5.0 | 4.3 | 5.7 | 3.9 | 4.80 | 6.60 | 3.90 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.01 | 7.46 | 7.29 | 7.17 | 7.45 | 7.01 | 7.37 | 7.28 | 7.19 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 12.7 | 20.8 | 14.9 | 25.2 | 30.2 | 9.6 | 33.4 | 33.7 | 16.7 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.6 | 2.7 | 2.1 | 3.5 | 4.2 | 1.5 | 4.6 | 18.0 | 2.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.078** | **0.019** | **0.021** | 0.010 | **0.014** | **0.013** | **0.011** | **0.013** | **0.160** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 2.2 | 2.9 | 2.3 | 3.2 | 3.4 | 1.7 | 3.4 | 3.2 | 2.5 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 73.0 | 94.7 | 69.9 | 159.0 | 129.0 | 44.0 | 183.0 | 150.0 | 86.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 3.5 | 5.4 | 4.7 | 3.7 | 3.0 | 4.4 | 3.8 | 1.8 | 5.2 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 52 | 11 | <5 | 7 | 6 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 19 | 15 | 24 | 22 | 23 | 23 | 21.0 | 23.0 | 30.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 21.4 | 2.4 | 4.5 | 3.6 | 3.7 | 3.8 | 3.6 | 2.4 | 1.7 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 518 | 620 | 422 | 871 | 765 | 256 | 1,030 | 928 | 558 |
| **Calculated Parameters** | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 3.40 | 4.3 | 2.9 | 5.7 | 6.7 | 2.9 | 9.35 | 7.15 | 5.20 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 11 | 23 | 13.0 | 10.0 | 23.0 | 10.0 | 26 | 21 | 17 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 216 | 277 | 201.0 | 399.0 | 408.0 | 169.0 | 561 | 449 | 301 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 4.04 | 5.52 | 4.1 | 8.6 | 7.6 | 2.6 | 10.20 | 8.61 | 4.86 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 38.3 | 63.1 | 45.9 | 77.3 | 92.7 | 30.1 | 102.0 | 99.0 | 51.2 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 8.7 | 12.5 | 15.9 | 20.4 | 6.5 | 5.8 | 4.2 | 9.3 | 3.4 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -2.47 | -1.49 | -2.0 | -2.1 | -1.4 | -2.6 | -1.35 | -1.52 | -1.99 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -2.79 | -1.81 | -2.4 | -2.4 | -1.7 | -2.9 | -1.67 | -1.84 | -2.31 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.48 | 8.95 | 9.3 | 9.3 | 8.8 | 9.6 | 8.72 | 8.80 | 9.18 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 9.80 | 9.27 | 9.7 | 9.6 | 9.1 | 10.0 | 9.0 | 9.1 | 9.5 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **231** | **94** | -- | **84** | **31** | **169** | **32** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 110 | 143 | -- | 135 | 184 | 63 | 350.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | 9 | 16 | -- | 11 | 16 | 10 | 13.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | **0.140** | <0.09 | -- | **0.120** | <0.09 | <0.09 | **0.025** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | **4** | 2 | **5** | **3** | 2 | **4** | <1 | 1.0 | **3.0** |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | **494** | **1,090** | 206 | 290 | **556** | **313** | **1,210** | **429** | **432** |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | **1.3** | <0.5 | -- | <0.5 | <0.5 | 0.8 | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 91 | 240 | 40 | 51 | 66 | 33 | 291 | 18 | 63 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | 2 | -- | 10 | <2 | 3 | 3.0 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 56 | 115 | -- | 107 | 134 | 58 | 146.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 6 | 2 | -- | <2 | <2 | 4 | 2.0 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | 2 | <2 | -- | 5 | <2 | 2 | 2.0 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | **41** | 13 | **38** | 27 | 8 | 23 | 6.0 | 5 | 22.0 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 210 | 5020 | 330.0 | 540.0 | NDOGT | 984.0 | >2420 | >2420 | 921 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | <1 | 20 | 30 | <10 | 26 | 8 | 11 | 2 | <1 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | -- | -- | -- | -- | -- | <0.25 | 2.41 | 4.41 | 3.78 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 78.76 | 5.50 | 2.39 | 4.19 | 6.38 | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 131.56 | -- | * | 4.24 | 6.19 | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" --" = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2(

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calcula

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Stan

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Gui

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contan

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideli

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-1**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Paper Mill Lake | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - PML-1 | | | | | | | PML-1 | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/15/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | 13:45 | 13:00 | 13:00 | 13:35 | 15:15 | 13:00 | 13:00 | 16:50 | 17:00 | 12:50 | 10:55 | 10:51 | 11:35 | 10:45 | 10:30 | 14:45 | 12:35 | 12:45 | 08:45 | 8:20 | 13:15 | 9:30 | 9:15 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 3.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.9 | 2.7 | 4.2 | 3.8 |
| Water Temp | Celsius | -- | -- | -- | -- | | 15.7 | 17.1 | 16.2 | 13.2 | 22.7 | 9.1 | 10.3 | 22.1 | 13.6 | 8.3 | 14.9 | 11.6 | 22.5 | 12.3 | 12.1 | 23.6 | 12.4 | 15.1 | 24.0 | 9.3 | 12.8 | 21.6 | 12.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **10.56** | 8.10 | 6.90 | 8.76 | 7.83 | **10.43** | **10.39** | 8.17 | **9.54** | 8.41 | 8.60 | **9.98** | 7.65 | **9.90** | **12.08** | 7.49 | 8.06 | 7.16 | 8.04 | 8.63 | 8.84 | 6.53 | **12.96** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 7.39 | 6.57 | 6.64 | 7.06 | 7.35 | **5.89** | **6.28** | **6.20** | **6.11** | 7.58 | 6.63 | **6.39** | 7.20 | **6.32** | 6.60 | 7.42 | 6.60 | 6.90 | **6.34** | 7.98 | 7.57 | **5.94** | **4.63** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 561.0 | 279.0 | 223.0 | 265.0 | 234.0 | 124.5 | 176.6 | 173.6 | 105.5 | 366.0 | 186.4 | 215.1 | 199.0 | 250.5 | 431.0 | 263.0 | 210.0 | 0.2 | 432.1 | 289.1 | 231.0 | 289.0 | 234.3 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 | <5 | 8 | 7 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 39 | 64 | 58 | 67 | 61 | 24 | 44 | 43 | 18 | 55 | 45 | 57 | 57 | 48 | 63 | 50 | 46 | 65 | 57 | 56 | 59 | 67 | 50 |
| Colour | TCU | 5 | -- | -- | -- | | 54 | 15 | 21 | 19 | 12 | 57 | 32 | 38 | 65 | 38 | 29 | 8 | 15 | 11 | 17 | 10 | 30 | 31 | 7 | 15 | 18 | 16 | 20 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.49 | 0.10 | 0.17 | 0.42 | 0.27 | 0.66 | 0.55 | 0.15 | 0.62 | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 | 0.19 | 0.09 | 0.16 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.49 | -- | -- | 0.42 | 0.27 | -- | 0.55 | -- | -- | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 | 0.19 | <0.05 | 0.16 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.09** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.06 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | <0.03 | <0.03 | <0.050 | <0.03 | 0.03 | 0.06 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 0.4 | -- | 0.4 | 0.8 | 0.4 | 0.4 | <5 | 0.5 | 1.2 | 6.0 | 2.6 | 3.4 | 0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 6.5 | 3.6 | 4.7 | 0.7 | 3.3 | 6.7 | 4.6 | 5.0 | 8.3 | 5.7 | 5.3 | 4.2 | 4.1 | 5.1 | 4.0 | 2.0 | 4.4 | 2.7 | 5.4 | 5.8 | 7.1 | 6.1 | 8.7 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | **6.36** | 6.75 | 6.79 | 6.63 | 7.04 | 6.58 | 6.54 | 6.83 | 6.67 | 6.60 | 6.80 | 6.71 | 6.92 | 6.88 | 6.66 | 7.00 | 6.64 | 6.67 | 6.95 | 6.84 | **6.36** | 6.86 | 6.87 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 4.5 | 6.9 | 6.4 | 8.4 | 9.0 | 5.9 | 6.0 | 5.0 | 4.6 | 6.0 | 6.0 | 6.8 | 6.6 | 6.9 | 6.9 | 9.1 | 7.0 | 6,900.0 | 7.8 | 4.8 | 7.9 | 10.5 | 7.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 0.6 | 1.1 | 1.0 | 1.3 | 1.2 | 0.8 | 1.0 | 0.9 | 0.8 | 1.0 | 1.1 | 1.0 | 0.9 | 1.5 | 1.3 | 1.4 | 1.0 | 970.0 | 1.4 | 0.9 | 1.5 | 1.8 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | 0.002 | **0.018** | 0.002 | <0.002 | **0.014** | **0.011** | **0.030** | **0.019** | **0.030** | 0.006 | 0.007 | **0.047** | **0.012** | **0.030** | **0.021** | 0.005 | **0.060** | **0.018** | **0.173** | **0.104** | **0.013** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 0.9 | 0.9 | 1.2 | 1.1 | 1.3 | 1.2 | 0.8 | 1.4 | 0.8 | 1.0 | 0.8 | 1.0 | 1.5 | 0.9 | 1.3 | 0.9 | 800.0 | 1.0 | 0.6 | 1.0 | 1.3 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 25.0 | 38.0 | 34.0 | 35.2 | 40.2 | 18.4 | 26.8 | 22.8 | 13.7 | 33.6 | 29.8 | 35.3 | 28.5 | 32.2 | 38.1 | 41.6 | 33.7 | 35.0 | 38.6 | 25.6 | 37.6 | 35.1 | 32.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 4.5 | 2.6 | 2.8 | 3.8 | 3.4 | 5.9 | 3.7 | 2.6 | 5.4 | 2.9 | 3.2 | 2.8 | 2.6 | 2.6 | 2.5 | 2.3 | 2.7 | 2.4 | 2.4 | 2.5 | 2.5 | 0.8 | 2.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <2 | 3 | 9 | 7 | <2 | <1 | 1 | <2 | 5 | 9 | 6 | <5 | <5 | 23 | 6 | <5 | <5 | 1 | 149 | 6 | **531** | 10 | 18 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 13 | 11 | 11 | 13 | 12 | 12 | 12 | 10 | 12 | 7 | 10 | 8 | 10 | 10 | 10 | 8 | 8 | 8 | 9 | 8 | 11 | 11 | 11 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.4 | 0.5 | 0.6 | 8.2 | 0.9 | 0.5 | 0.6 | 1.0 | 1.2 | 0.7 | 1.0 | 0.7 | 1.1 | 19.2 | 1.4 | 0.9 | 1.5 | 0.5 | 3.8 | 24.2 | **199.0** | **112.0** | 2.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 170 | 250 | 230 | 260 | 250 | 130 | 180 | 170 | 100 | 214 | 179 | 227 | 218 | 209 | 230 | 261 | 224 | 240 | 246 | 241 | 224 | 310 | 189 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 1.51 | 2.18 | 1.99 | 2.34 | 2.15 | 1.09 | 1.62 | 1.56 | 0.92 | 2.11 | 1.49 | 1.79 | 1.95 | 1.71 | 2.62 | 1.73 | 1.62 | 2.11 | 1.93 | 1.88 | 1.91 | 2.29 | 1.79 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 | <5 | 8 | 7 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 93 | 129 | 118 | 137 | 134 | 75 | 100 | 90 | 63 | 117 | 95 | 110 | 109 | 115 | 140 | 117 | 102 | 120 | 126 | 109 | 141 | 148 | 108 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.40 | 2.11 | 1.89 | 2.11 | 2.33 | 1.20 | 1.58 | 1.35 | 0.95 | 1.89 | 1.78 | 2.00 | 1.69 | 2.56 | 2.18 | 2.45 | 1.94 | 1.98 | 2.61 | 1.93 | 3.54 | 3.33 | 1.93 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 14.00 | 22.00 | 20.00 | 26.00 | 28.00 | 18.00 | 19.00 | 16.00 | 15.00 | 19.10 | 19.50 | 21.10 | 20.20 | 23.40 | 22.60 | 28.50 | 21.60 | 21.00 | 25.20 | 15.70 | 25.90 | 33.60 | 24.30 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 3.78 | 1.63 | 2.58 | 5.17 | 4.02 | 4.80 | 1.25 | 7.22 | 1.60 | 5.50 | 9.00 | 5.50 | 7.00 | 19.80 | 9.20 | 17.00 | 9.20 | 3.18 | 15.20 | 1.20 | 30.00 | 18.60 | 3.80 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.57 | -2.90 | -2.94 | -2.96 | -2.43 | -3.25 | -3.27 | -2.94 | -3.13 | -2.91 | -3.31 | -3.35 | -3.07 | -3.03 | -2.61 | -2.79 | -3.26 | -3.13 | -2.98 | -3.29 | -3.65 | -2.82 | -2.99 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.82 | -3.15 | -3.19 | -3.21 | -2.68 | -3.50 | -3.53 | -3.19 | -3.38 | -3.23 | -3.63 | -3.67 | -3.39 | -3.35 | -2.93 | -3.11 | -3.58 | -3.38 | -3.30 | -3.61 | -3.97 | -3.14 | -3.31 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.93 | 9.65 | 9.73 | 9.59 | 9.47 | 9.83 | 9.81 | 9.77 | 9.80 | 9.51 | 10.10 | 10.10 | 9.99 | 9.91 | 9.27 | 9.79 | 9.90 | 9.80 | 9.93 | 10.10 | 10.00 | 9.68 | 9.86 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.20 | 9.90 | 9.98 | 9.84 | 9.72 | 10.10 | 10.10 | 10.00 | 10.10 | 9.83 | 10.40 | 10.40 | 10.30 | 10.20 | 9.59 | 10.10 | 10.20 | 10.10 | 10.20 | 10.50 | 10.30 | 10.00 | 10.20 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **260** | -- | -- | **665** | **46** | -- | **233** | -- | -- | **177** | **306** | **141** | **103** | **3,920** | **305** | **129** | **142** | **140** | -- | **2,320** | **7,690** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | 2 | <2 | <2 | <2 | <1.0 | -- | <2 | 4 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 23 | -- | -- | 35 | 24 | -- | 27 | -- | -- | 22 | 19 | 20 | 12 | 40 | 23 | 23 | 18 | 21 | -- | 34 | 60 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | 8 | -- | -- | 11 | 9 | -- | <50 | -- | -- | 6 | 9 | 6 | 8 | 9 | 8 | 13 | 11 | <50 | -- | <5 | 10 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | **0.032** | <0.017 | -- | <0.017 | -- | -- | <0.017 | **0.066** | **0.021** | **0.018** | **0.430** | <0.017 | **0.020** | <0.017 | **0.025** | -- | **0.146** | **0.227** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | **3** | <1 | <1 | <1 | <1.0 | -- | **2** | **6** | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- | <1 | 2 | <1 | <1 | 9 | <1 | <1 | <1 | <0.40 | -- | 3 | 6 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | 2 | <2.0 | <2.0 | **4** | <2.0 | **2** | <2 | <2 | <2 | 1 | **6** | 1 | <1 | 2 | <2.0 | **3** | **4** | **10** | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 140 | -- | -- | **837** | 89 | 161 | 141 | **315** | **528** | 137 | **742** | 130 | 205 | **5,300** | 239 | 296 | 182 | 93 | **4,460** | **6,020** | **13,600** | **8,250** | 171 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | **1.7** | <0.5 | -- | <0.5 | -- | -- | <0.5 | 0.9 | <0.5 | <0.5 | **13.5** | 0.9 | <0.5 | <0.5 | <0.5 | -- | **6.3** | **13.9** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 17 | -- | -- | 142 | 69 | 41 | 14 | 128 | 62 | 48 | 214 | 33 | 58 | 693 | 54 | 260 | 49 | 34 | 296 | 278 | 424 | 281 | 53 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | 2 | <2 | <2 | 9 | <2 | <2 | <2 | <2.0 | -- | 5 | 7 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | 1 | 1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <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 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 18 | -- | -- | 36 | 37 | -- | 25 | -- | -- | 26 | 30 | 31 | 25 | 34 | 35 | 37 | 30 | 32 | -- | 22 | 40 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | 8 | <2.0 | -- | 4 | -- | -- | <2 | 4 | <2 | <2 | 65 | 4 | <2 | 3 | <2 | -- | 25 | 106 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | 0.1 | <0.1 | <0.1 | <0.1 | 0.6 | <0.1 | <0.1 | <0.1 | <0.1 | -- | 0.6 | 0.9 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | **10** | <2 | <2 | <2 | <2 | -- | **7** | **16** | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 8 | -- | -- | 10 | 5 | 6 | 6 | 6 | 5 | <5 | 13 | 8 | <5 | **62** | <5 | <5 | 6 | 11 | 13 | 12 | **34** | 20 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 200 | 73 | -- | >250 | >250 | >250 | 85 | >250 | -- | 411 | 2,420 | 866 | 1,730 | 1,011 | 613 | 2,420 | >2420 | --- | **>2420** | >2420 | >2420 | 1,410 | >2420 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 33 | 45 | -- | 19 | **>250** | 2 | 2 | 34 | <100 | 2 | 20 | 12 | 4 | 6 | 6 | 10 | 10 | <10 | 3 | 6 | **>2420** | 34 | 10 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 0.62 | 2.31 | 0.57 | 0.82 | 1.12 | 0.07 | 2.85 | 0.86 | 0.15 | 1.03 | 0.69 | 1.17 | 1.10 | 5.07 | 0.67 | 0.64 | 0.91 | 0.57 | 8.84 | 4.67 | 8.00 | 4.71 | 1.70 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 0.64 | 2.21 | 0.64 | 0.74 | 1.04 | 0.06 | 2.75 | 0.76 | 0.15 | 1.10 | 0.91 | 1.37 | 1.10 | 6.39 | 0.65 | 0.65 | 0.87 | 0.54 | 9.54 | 3.69 | 12.31 | 10.82 | 1.76 |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.
Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-1**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference ) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Paper Mill Lake | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - PML-1 | | | | | | | PML-1 | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | hh:mm | | | | | | 13:40 | 13:45 | 13:25 | 13:00 | 11:40 | 14:45 PM | 1:10PM | 4:20 PM | 2:45 PM | 8:20 AM | 9:07 AM | 10:02 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 4.1 | 4.7 | 3.9 | 4.1 | 2.4 | 2.9 | 1.9 | 4.30 | N/A | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | | 17.2 | 23.0 | 14.4 | 14.4 | 24.7 | 12.3 | 12.0 | 28.1 | 11.1 | 23.1 | 23.5 | 10.5 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | 6.97 | 7.76 | 8.19 | 9.44 | 5.57 | 8.36 | ** | 6.07 | 9.20 | 8.35 | 6.72 | **10.80** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.91 | 6.74 | 7.31 | **6.29** | 6.75 | 7.19 | 7.38 | 6.53 | 7.05 | **5.77** | **5.62** | 6.56 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 234.0 | 273.0 | 255.0 | 203.7 | 203.8 | 208.1 | 177.9 | 257.0 | 201.0 | 267.0 | 271.0 | 224.5 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 13 | 9 | <5 | 10 | 8 | <5 | 11 | 6 | 8.0 | 9.0 | 5.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 66 | 63 | 59 | 57 | 54 | 47 | 55 | 64 | 53 | 74 | 72 | 60 |
| Colour | TCU | 5 | -- | -- | -- | | 20 | 18 | 24 | 28 | 7 | 31 | 46 | 16 | 21 | 14 | 15 | 14 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.28 | 0.28 | 0.20 | 0.51 | 0.15 | 0.24 | 0.18 | 0.05 | 0.49 | 0.13 | <0.05 | 0.19 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.17 | 0.13 | 0.20 | 0.40 | 0.05 | 0.24 | 0.18 | 0.05 | 0.49 | 0.13 | <0.05 | 0.19 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | **0.11** | **0.15** | <0.05 | **0.11** | **0.10** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.03 | <0.03 | 0.05 | <0.03 | 0.04 | <0.03 | <0.03 | 0.10 | 0.08 | 0.07 | 0.10 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | 0.5 | 0.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.6 | <0.4 | 0.7 | <0.4 | 1.00 | 0.60 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 5.7 | 4.7 | 6.3 | 4.9 | 3.2 | 4.0 | 4.2 | 4.2 | 4.4 | 3.10 | 4.10 | 4.30 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.80 | 7.15 | 6.75 | 6.84 | 7.28 | 7.16 | 6.78 | 7.22 | 6.85 | 7.01 | 7.11 | 6.85 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 8.0 | 8.2 | 9.5 | 6.3 | 8.7 | 8.4 | 7.0 | 8.3 | 5.3 | 8.8 | 8.2 | 7.4 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.3 | 1.2 | 1.5 | 1.1 | 1.4 | 1.4 | 1.2 | 1.3 | 0.9 | 1.3 | 61.0 | 1.1 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.041** | **0.036** | **0.099** | **0.032** | **0.011** | **0.012** | 0.007 | 0.008 | **0.012** | <0.006 | **0.011** | **0.020** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 1.0 | 1.1 | 1.3 | 0.9 | 1.2 | 1.1 | 0.9 | 1.2 | 0.8 | 0.9 | 1.1 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 40.9 | 45.3 | 36.0 | 35.5 | 37.5 | 39.2 | 42.6 | 45.4 | 27.8 | 41.6 | 8.2 | 36.3 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 1.9 | 1.3 | 1.8 | 2.7 | 1.2 | 2.3 | 2.3 | 0.9 | 2.5 | 0.9 | 0.7 | 2.3 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 20 | 5 | 104 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 10 | 9 | 11 | 9 | 7 | 9 | 7 | 9 | 10 | 9.0 | 19.0 | 10.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 3.3 | 3.2 | 31.3 | 0.7 | 0.5 | 2.1 | 1.2 | 1.2 | 1.7 | 1.1 | 1.0 | 0.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 256 | 277 | 248 | 242 | 274 | 232 | 256 | 264 | 156 | 298 | 334 | 243 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.09 | 2.24 | 2.09 | 1.83 | 1.88 | 1.7 | 1.7 | 2.2 | 1.9 | 2.44 | 2.61 | 2.01 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | <5 | 13 | 9 | <5 | 10 | 8.0 | <5 | 11.0 | 6.0 | 8 | 9 | 5 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 129 | 137 | 142 | 112 | 117 | 112.0 | 115.0 | 136.0 | 104.0 | 141 | 156 | 120 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.35 | 2.53 | 3.15 | 1.99 | 2.23 | 2.3 | 2.4 | 2.6 | 1.6 | 2.40 | 2.68 | 2.08 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 25.30 | 25.40 | 29.90 | 20.3 | 27.5 | 26.7 | 22.4 | 26.1 | 16.9 | 27.3 | 26.7 | 23.0 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 5.80 | 6.10 | 20.30 | 4.2 | 8.4 | 14.9 | 15.7 | 6.9 | 7.7 | 0.9 | 1.4 | 1.5 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.20 | -2.42 | -2.92 | -3.26 | -2.37 | -2.6 | -3.3 | -2.4 | -3.2 | -2.74 | -2.63 | -3.18 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.52 | -2.74 | -3.24 | -3.58 | -2.69 | -2.9 | -3.6 | -2.7 | -3.6 | -3.06 | -2.95 | -3.50 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 10.00 | 9.57 | 9.67 | 10.1 | 9.65 | 9.8 | 10.1 | 9.6 | 10.1 | 9.75 | 9.74 | 10.00 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.30 | 9.89 | 9.99 | 10.4 | 9.97 | 10.1 | 10.4 | 10.0 | 10.4 | 10.1 | 10.1 | 10.3 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **250** | **94** | **4,190** | **151** | **26** | -- | **139** | **25** | **133** | **35** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | 3 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 22 | -- | 58 | 19 | 12 | -- | 21 | 16 | 17 | 25.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | <5 | -- | 12 | 6 | 11 | -- | 7 | 10 | 7 | 8.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | **0.041** | -- | **0.179** | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <1 | -- | **5** | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | 6 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <1 | <1 | **8** | <1 | <1 | 1 | 1 | <1 | 1 | <1 | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 206 | **359** | **12,600** | 93 | 184 | 82 | 136 | 187 | 108 | 164 | 224 | 108 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | <0.5 | -- | **9.1** | **1.2** | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 64 | 125 | **894** | 21 | 64 | 22 | 26 | 115 | 28 | 220 | 61 | 21 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 22 | -- | 6 | 2 | <2 | -- | 5 | 2 | <2 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 34 | -- | 47 | 27 | 42 | -- | 35 | 37 | 30 | 38.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | 2 | -- | 75 | <2 | <2 | -- | <2 | <2 | 2 | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <0.1 | -- | 0.6 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | **12** | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 11 | <5 | 29 | 6 | 6 | <5 | 7 | <5 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 665 | >2420 | 166 | 9 | 400 | 4,000.0 | 128 | 500 | 864 | 166 | 548 | 250 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 6 | 2 | <1 | 1 | 10 | 13 | <1 | 4 | 14 | 3 | 10 | 2 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | -- | -- | -- | -- | -- | -- | -- | -- | 0.32 | 1.89 | 1.1 | 0.63 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 4.97 | 4.40 | 4.86 | 1.93 | 1.14 | 1.12 | 1.53 | 1.84 | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 6.45 | 4.96 | 6.58 | 0.98 | -- | * | 1.44 | 1.56 | -- | -- | -- | -- |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2(
CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calcula
Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Stan
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Gui
Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contan
**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideli

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-2**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | Paper Mill Lake | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site PML-2 | | | | | | | PML-2 | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 5/15/2013 | 10/16/2013 | 5/15/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | 13:15 | 13:40 | 13:45 | 14:30 | 16:20 | 13:00 | 12:40 | 16:20 | 16:15 | 13:16 | 13:40 | 11:20 | 11:00 | 9:20 | 8:30 | 11:30 | 13:45 | 9:08 | 13:45 | 10:00 | 9:50 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 2.8 | 2.2 | 2.3 | N/A | 3.0 | 2.0 | 2.2 | 2.3 | 2.2 | 2.4 | 3.2 | N/A | N/A | N/A | 3.1 | NCC | N/A | 2.4 | 2.7 | 2.3 | 2.6 |
| Water Temp | Celsius | -- | -- | -- | -- | | 14.8 | 24.2 | 19.7 | 17.8 | 25.3 | 10.1 | 10.9 | 23.1 | 15.2 | 11.6 | 14.8 | 12.6 | 14.4 | 21.1 | 12.1 | 15.1 | 27.0 | 9.0 | 13.8 | 22.1 | 11.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **10.20** | 8.30 | 8.40 | 8.78 | 8.09 | **10.58** | **9.88** | 8.70 | 8.94 | 7.75 | 9.26 | 8.90 | **12.44** | 6.95 | 7.92 | 8.06 | **9.76** | 8.28 | 8.55 | 7.69 | **10.31** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | **6.36** | 6.82 | 6.84 | 7.09 | 7.39 | 6.53 | **6.31** | 6.67 | **6.13** | 8.61 | **6.49** | **6.13** | 6.50 | 7.22 | **5.92** | 6.56 | 6.76 | 7.25 | 7.57 | **5.93** | **5.37** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 267.0 | 264.0 | 241.0 | 237.0 | 234.0 | 200.5 | 158.7 | 173.2 | 155.9 | 231.0 | 234.0 | 250.5 | 966.0 | 266.0 | 215.0 | 0.2 | 255.6 | 454.9 | 264.0 | 298.0 | 230.3 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | <5 | 8 | 7 | 21 | <5 | 8 | 32 | 10 | 26 | <5.0 | 5 | 7 | 7 | 10 | 8 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 63 | 63 | 58 | 62 | 58 | 50 | 44 | 43 | 34 | 55 | 63 | 64 | **245** | 50 | 42 | 69 | 59 | 57 | 67 | 67 | 50 |
| Colour | TCU | 5 | -- | -- | -- | | 22 | 17 | 19 | 20 | 13 | 23 | 35 | 38 | 48 | 39 | 18 | 8 | 6 | 7 | 31 | 26 | 10 | 9 | 22 | 13 | 22 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.14 | 0.07 | 0.09 | 0.19 | 0.11 | 0.23 | 0.33 | 0.14 | 0.22 | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.32 | 0.23 | 0.10 | 0.11 | 0.18 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.14 | -- | -- | 0.19 | 0.11 | -- | 0.33 | -- | -- | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.17 | 0.23 | 0.10 | <0.05 | 0.18 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | **0.15** | <0.05 | <0.05 | **0.11** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.03 | 0.23 | 0.05 | 0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | -- | 1.7 | <0.4 | 0.4 | <5 | 0.2 | 1.2 | 3.0 | 0.6 | <0.4 | 0.5 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 3.6 | 2.6 | 4.5 | 3.2 | 3.4 | 3.6 | 4.0 | 6.0 | 5.6 | 5.9 | 4.4 | 4.0 | 2.7 | 2.4 | 5.8 | 2.8 | 6.0 | 6.1 | 4.0 | 3.6 | 8.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.50 | 6.81 | 6.82 | 6.66 | 7.02 | 6.83 | **6.37** | 6.60 | 6.60 | 6.60 | 6.68 | 6.73 | 7.13 | 7.04 | 6.77 | 6.64 | 6.98 | 6.98 | 6.83 | 7.23 | 6.93 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 6.1 | 7.1 | 6.1 | 7.2 | 7.7 | 8.0 | 5.3 | 4.8 | 5.0 | 6.1 | 6.7 | 7.7 | 19.2 | 8.8 | 6.9 | 7,300.0 | 8.2 | 6.2 | 8.9 | 8.1 | 7.4 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.1 | 1.1 | 1.1 | 1.3 | 1.2 | 1.2 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 1.4 | 1.7 | 1.4 | 1.0 | 1,000.0 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | <0.02 | <0.02 | 0.002 | 0.010 | 0.002 | <0.002 | 0.009 | 0.009 | 0.007 | **0.025** | 0.006 | **0.026** | **0.011** | **0.026** | **0.018** | 0.008 | **0.012** | 0.008 | **0.012** | 0.003 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 1.0 | 0.9 | 1.0 | 0.9 | 1.0 | 0.9 | 0.8 | 1.0 | 0.8 | 0.8 | 1.3 | 1.4 | 1.2 | 1.1 | 830.0 | 1.0 | 0.9 | 1.0 | 1.0 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 35.0 | 40.0 | 34.0 | 31.1 | 35.1 | 30.8 | 25.7 | 21.3 | 20.9 | 34.6 | 37.5 | 42.0 | 133.0 | 42.6 | 33.9 | 38.0 | 43.3 | 31.3 | 42.9 | 37.5 | 32.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 2.6 | 2.5 | 2.3 | 2.6 | 2.3 | 3.3 | 2.9 | 2.5 | 3.0 | 2.8 | 2.7 | 4.2 | 2.4 | 2.3 | 2.9 | 1.9 | 1.8 | 2.8 | 2.3 | 0.6 | 2.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | 2 | 3 | <1 | 15 | <2 | 11 | <1 | 8 | <1 | <5 | <5 | <5 | 16 | <5 | <5 | 1 | <5 | <5 | 45 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 11 | 11 | 11 | 10 | 10 | 10 | 9 | 10 | 9 | 7 | 9 | 11 | 27 | 7 | 7 | 8 | 9 | 9 | 12 | 7 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 0.8 | 0.7 | 0.6 | 1.0 | 0.8 | 0.4 | 0.4 | 3.4 | 0.5 | 0.7 | 1.0 | 3.3 | 2.6 | 0.7 | 1.0 | 0.9 | 1.9 | 1.3 | 9.4 | 1.1 | 1.4 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 240 | 250 | 230 | 230 | 230 | 210 | 170 | 170 | 150 | 213 | 254 | 277 | 777 | 273 | 212 | 260 | 251 | 246 | 263 | 319 | 190 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.11 | 2.17 | 1.99 | 2.07 | 2.01 | 1.77 | 1.46 | 1.58 | 1.30 | 2.13 | 1.98 | 2.19 | 8.12 | 1.77 | 1.86 | 2.13 | 1.97 | 1.95 | 2.29 | 2.24 | 1.79 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 7 | 7 | 6 | 8 | 7 | <1 | 8 | 7 | 21 | <5 | 8 | 32 | 10 | 26 | <1.0 | 5 | 7 | 7 | 10 | 8 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 123 | 131 | 117 | 120 | 120 | 110 | 91 | 89 | 79 | 119 | 119 | 137 | 448 | 118 | 109 | 130 | 127 | 112 | 139 | 129 | 108 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 1.94 | 2.23 | 1.88 | 1.88 | 2.03 | 1.86 | 1.48 | 1.28 | 1.27 | 1.94 | 2.09 | 2.55 | 6.96 | 2.47 | 1.95 | 2.14 | 2.44 | 1.84 | 2.53 | 2.17 | 1.92 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 20.00 | 22.00 | 20.00 | 23.00 | 24.00 | 25.00 | 17.00 | 15.00 | 16.00 | 19.30 | 20.80 | 25.00 | 54.90 | 27.70 | 21.30 | 23.00 | 25.80 | 20.40 | 27.20 | 25.20 | 23.80 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 4.20 | 1.36 | 2.84 | 4.81 | 0.50 | 2.48 | 0.68 | 10.50 | 1.17 | 4.80 | 2.80 | 7.50 | 7.70 | 16.50 | 2.20 | 0.23 | 10.60 | 3.00 | 5.10 | 1.70 | 3.40 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.33 | -2.83 | -2.93 | -3.06 | -2.55 | -2.80 | NC | -3.18 | -3.17 | -2.89 | -3.39 | -3.08 | -1.73 | -2.61 | -2.57 | NC | -3.00 | -2.97 | -2.98 | -2.46 | -2.89 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.59 | -3.08 | -3.18 | -3.31 | -2.80 | -3.05 | NC | -3.43 | -3.42 | -3.21 | -3.71 | -3.40 | -2.05 | -2.93 | -2.89 | NC | -3.32 | -3.29 | -3.30 | -2.78 | -3.21 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.83 | 9.64 | 9.75 | 9.72 | 9.57 | 9.63 | NC | 9.78 | 9.77 | 9.49 | 10.10 | 9.81 | 8.86 | 9.65 | 9.34 | NC | 9.98 | 9.95 | 9.81 | 9.69 | 9.82 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.10 | 9.89 | 10.00 | 9.97 | 9.82 | 9.88 | NC | 10.00 | 10.00 | 9.81 | 10.40 | 10.10 | 9.18 | 9.97 | 9.66 | NC | 10.30 | 10.30 | 10.10 | 10.00 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **130** | -- | -- | **1,030** | **56** | -- | **202** | -- | -- | **189** | **131** | **107** | **181** | **52** | **122** | **130** | -- | **278** | **610** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 16 | -- | -- | 23 | 12 | -- | 23 | -- | -- | 22 | 22 | 37 | 50 | 27 | 19 | 25 | -- | 24 | 35 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | 5 | -- | -- | 8 | 9 | -- | <50 | -- | -- | 6 | 6 | 9 | 7 | 13 | 11 | <50 | -- | <5 | 8 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.300 | -- | -- | **0.037** | <0.017 | -- | **0.028** | -- | -- | **0.023** | **0.039** | **0.060** | **0.062** | **0.019** | **0.018** | **0.023** | -- | **0.145** | **0.042** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- | <1 | <1 | 2 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <2 | -- | -- | **3** | <2 | <2 | <2 | <2 | <2 | <2 | <2 | **1,380** | 1 | <1 | 2 | <2.0 | 2 | 2 | <1 | <1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | 100 | -- | -- | **1,090** | 151 | 76 | 143 | **699** | 181 | 178 | 181 | **1,760** | 264 | **316** | 134 | 170 | **334** | **368** | **647** | 174 | 123 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | <0.5 | -- | -- | **2.4** | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | **49.7** | 0.7 | <0.5 | <0.5 | <0.5 | -- | 0.5 | **1.1** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 58 | -- | -- | 159 | 81 | 28 | 34 | 89 | 31 | 22 | 87 | **866** | 206 | 278 | 24 | 43 | 67 | 61 | 109 | 36 | 23 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 2 | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2.0 | -- | 2 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.5 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | 0.100 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 30 | -- | -- | 35 | 33 | -- | 26 | -- | -- | 27 | 31 | 35 | 68 | 37 | 29 | 34 | -- | 21 | 38 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <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 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | -- | 21 | <2 | -- | 4 | -- | -- | <2 | <2 | 2 | 3 | <2 | <2 | 2 | -- | 4 | 7 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <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 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 12 | -- | -- | 18 | <5.0 | 6 | 7 | 8 | 10 | 8 | 11 | **762** | <5 | <5 | 5 | 14 | <5 | 8 | 7 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 49 | 40 | -- | >250 | 46 | 97 | 64 | >250 | -- | 261 | 1,410 | 411 | 291 | 517 | >2420 | --- | >2420 | 1,120 | 687 | >2420 | >2420 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 10 | 31 | -- | 69 | <1 | 6 | 17 | **>250** | <100 | 1 | 12 | 2 | <1 | 3 | 16 | <0.10 | 5 | 2 | 4 | 47 | 30 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 1.15 | 1.36 | 0.59 | 3.50 | 1.54 | 0.53 | 0.55 | 2.48 | 1.33 | 0.76 | 1.18 | 0.25 | 0.99 | 0.48 | 0.72 | 1.67 | 4.79 | 1.50 | 3.82 | 1.09 | 2.02 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 1.22 | 1.33 | 0.66 | 3.39 | 1.51 | 0.42 | 0.51 | 2.26 | 1.13 | 0.76 | 1.34 | 0.27 | 1.13 | 0.44 | 0.70 | 1.56 | 4.59 | 0.74 | 5.04 | 1.42 | 2.12 |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2011)
CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calculation equations). The largest guideline value for each respective element range was always used.
Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.
Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)
Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-2**

| Tested Parameters | Units | RDL (2019) | NSE ESQs for Surface Water (Reference ) | Health Canada Guideline for Recreational Water Quality (Reference | CCME Guideline PAL-F (Applied) | HRM Phosphorus Trigger Range (Applied) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site PML-2 | | | | | | | PML-2 | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 |
| Sampling Time | hh:mm | | | | | | 14:30 | 14:30 | 14:00 | 13:30 | 12:10 | 14:15 PM | 12:50PM | 3:40 PM | 3:15 PM | 8:50 AM | 9:27 AM | 10:25 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | 1.2 | -- | | 2.5 | 2.5 | 2.9 | 2.9 | 3.0 | 2.2 | 2.4 | 2.20 | N/A | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | | 17.1 | 24.0 | 14.0 | 15.3 | 5.4 | 12.2 | 12.7 | 27.4 | 11.3 | 23.9 | 23.7 | 10.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | 5.5 - 9.5 | | **10.44** | 8.89 | 6.56 | **9.91** | 6.97 | 8.70 | ** | 6.06 | **9.80** | 7.79 | 7.58 | **10.16** |
| pH (in Situ) | pH | -- | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.73 | 7.01 | 6.87 | **6.33** | **24.70** | 7.00 | 6.76 | **6.39** | 7.40 | **6.07** | **6.08** | 6.64 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | | 242.0 | 285.0 | 252.0 | 214.4 | 293.8 | 297.3 | 6.1 | 239.0 | 193.0 | 275.0 | 270.0 | 228.7 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 12 | 11 | 5 | 11 | 8 | <5 | 11 | 8 | 9.0 | 10.0 | 7.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | -- | 120 | | 67 | 72 | 60 | 46 | 55 | 43 | 50 | 64 | 64 | 76 | 72 | 61 |
| Colour | TCU | 5 | -- | -- | -- | | 18 | 7 | 19 | 31 | 21 | 21 | 43 | 14 | 19 | <5 | 12 | 15 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | | 0.27 | 0.07 | 0.16 | 0.17 | 0.13 | 0.20 | 0.14 | 0.07 | 0.38 | <0.05 | <0.05 | 0.18 |
| Nitrate (N) | mg/L | 0.05 | -- | -- | 13 | | 0.16 | 0.07 | 0.16 | 0.17 | <0.05 | 0.20 | 0.14 | 0.07 | 0.38 | <0.05 | <0.05 | 0.18 |
| Nitrite (N) | mg/L | 0.05 | -- | -- | 0.06 | | **0.11** | <0.05 | <0.05 | <0.05 | **0.13** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | 18 | | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | 0.05 | 0.06 | 0.08 | 0.06 | 0.06 | 0.08 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | | 0.6 | 0.6 | <0.4 | <0.4 | <0.4 | <0.4 | 1.3 | <0.4 | 1.9 | <0.4 | 1.40 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | | 5.5 | 5.4 | 4.1 | 4.9 | 3.5 | 4.0 | 4.3 | 4.4 | 4.5 | 3.00 | 4.10 | 4.20 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 5.0-9.0 | 6.5 - 9.0 | | 6.86 | 7.23 | 6.99 | 6.81 | 7.29 | 7.05 | 6.78 | 7.20 | 6.89 | 7.00 | 7.11 | 6.85 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | | 8.1 | 8.5 | 8.1 | 6.7 | 8.1 | 7.7 | 7.1 | 9.1 | 5.6 | 8.6 | 7.2 | 8.3 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | | 1.3 | 1.1 | 1.2 | 1.1 | 1.2 | 1.3 | 1.2 | 1.4 | 0.9 | 1.3 | 40.0 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.010 | **0.018** | **0.013** | 0.006 | **0.047** | 0.005 | **0.012** | 0.008 | 0.005 | 0.008 | <0.006 | **0.017** | 0.004 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | | 0.9 | 1.4 | 1.1 | 0.9 | 1.1 | 1.1 | 0.9 | 1.2 | 0.8 | 0.9 | 1.1 | 1.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | | 41.5 | 47.2 | 35.5 | 37.5 | 37.7 | 39.6 | 42.9 | 46.7 | 29.9 | 40.7 | 50.2 | 39.6 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | | 1.7 | 0.8 | 2.0 | 2.5 | 1.0 | 2.3 | 2.0 | 0.9 | 2.4 | 0.9 | 0.6 | 2.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | Comment 1 | | <5 | 14 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | -- | -- | | 10 | 8 | 11 | 7 | 7 | 8 | 7 | 9 | 11 | 9.0 | 8.0 | 10.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | 50 | -- | | 1.9 | 1.9 | 1.8 | 1.4 | 0.7 | 1.2 | 1.0 | 1.2 | 2.2 | 1.1 | 0.8 | 0.7 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | | 259 | 286 | 255 | 249 | 289 | 227 | 261 | 268 | 189 | 302 | 335 | 249 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | | 2.22 | 2.44 | 2.15 | 1.56 | 1.93 | 1.6 | 1.57 | 2.2 | 2.2 | 2.51 | 2.40 | 2.08 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | | 5 | 12 | 11 | 5 | 11 | 8.0 | <5 | 11.0 | 8.0 | 9 | 10 | 7 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | | 133 | 146 | 124 | 103 | 118 | 107.0 | 110 | 139.0 | 119.0 | 142 | 146 | 127 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | | 2.37 | 2.62 | 2.09 | 2.10 | 2.19 | 2.3 | 2.37 | 2.7 | 1.7 | 2.35 | 2.69 | 2.29 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | | 25.60 | 25.80 | 25.20 | 21.3 | 25.2 | 24.6 | 22.70 | 28.5 | 17.7 | 26.8 | 22.9 | 26.1 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | | 3.20 | 3.50 | 1.60 | 14.9 | 6.4 | 18.7 | 20.40 | 9.0 | 13.6 | 3.3 | 5.7 | 4.7 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | | -3.13 | -2.37 | -2.66 | -3.25 | -2.35 | -2.8 | -3.26 | -2.4 | -3.1 | -2.71 | -2.64 | -2.98 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | | -3.45 | -2.69 | -2.98 | -3.57 | -2.67 | -3.1 | -3.58 | -2.7 | -3.4 | -3.03 | -2.96 | -3.30 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | | 9.99 | 9.60 | 9.65 | 10.1 | 9.64 | 9.8 | 10.00 | 9.6 | 9.9 | 9.71 | 9.75 | 9.83 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | | 10.30 | 9.92 | 9.97 | 10.4 | 9.96 | 10.1 | 10.40 | 9.9 | 10.3 | 10.0 | 10.1 | 10.2 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | -- | 5 - 100 | | **215** | **40** | **34** | **141** | **75** | -- | **134** | **27** | **79** | **36** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5 | -- | 5 | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1,000 | -- | -- | | 27 | -- | 23 | 21 | 8 | -- | 25 | 19 | 17 | 28.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5 | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1,200 | -- | 1,500 | | <5 | -- | 11 | 6 | 10 | -- | 6 | 11 | 6 | 8.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.010 | -- | 0.090 | | <0.017 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | 1 | -- | 1 | | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | -- | -- | | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | -- | 2 | | <1 | <1 | 1 | <1 | <1 | 2 | <1 | 1 | 1 | <1 | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | -- | 300 | | <50 | 203 | 145 | 104 | 163 | 165 | 128 | 258 | <50 | 172 | 224 | 124 |
| Total Lead (Pb) | µg/L | 0.5 | 1.0 | -- | 1.0 - 7.0 | | <0.5 | -- | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | -- | -- | | 85 | 68 | 26 | 20 | 42 | 74 | 28 | 139 | 30 | 192 | 40 | 32 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | -- | 73 | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | -- | 25 - 150 | | 4 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1 | -- | 1 | | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | -- | 0.3 | | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21,000 | -- | -- | | 35 | -- | 39 | 29 | 38 | -- | 35 | 42 | 27 | 40.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | -- | 0.8 | | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300.0 | -- | 15.0 | | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | -- | -- | | <2 | -- | <2 | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | -- | 30 | | 8 | 9 | 5 | 5 | <5 | 6 | 7 | <5 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | | 1,990 | >2420 | 1,730 | 1 | 4000 | 3,030.0 | 106.0 | NDOGT | 1134 | 249 | 192 | 285 |
| E. coli | MPN/100mL | 1 | -- | 400 | -- | | 1 | 11 | 5 | <1 | 1 | 30 | <1 | 3 | 20 | 2 | 7 | 2 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | | | | | -- | -- | -- | -- | -- | -- | -- | -- | 0.47 | 1.89 | 1.1 | 0.95 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | | 5.31 | 4.30 | 1.27 | 1.37 | 1.28 | 1.78 | 1.58 | 1.62 | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | | 6.60 | 4.23 | 1.47 | 2.22 | -- | * | 1.50 | 1.44 | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

CCME FWAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (updated 2(

CCME FWAL Guidelines for Aluminum, Lead, Copper and Nickel vary based on reported pH and water hardness (CCME FWAL calcula

Comment 1: CCME FWAL reference values between 25-250 mg/L, and >250 mg/L.

Health Canada Guidelines for Canadian Recreational Water Quality - Draft (September 2009)

Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2014) Table A2 Reference for Pathway Specific Stan

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Gui

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contan

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideli

# Appendix D

# Laboratory Certificates of Analysis

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848

ATTENTION TO: Leah Darche

PROJECT: Bedford West

AGAT WORK ORDER: 20X620010

MICROBIOLOGY ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

DATE REPORTED: Jul 15, 2020

PAGES (INCLUDING COVER): 17

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.
- 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.



Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

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# Certificate of Analysis

AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli (MPN)

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | Hwy102-2 | Hwy102-1 | L4 | LSD | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 08:20 | 2020-07-02 08:50 | 2020-07-02 10:00 | 2020-07-02 10:22 | 2020-07-02 11:00 | 2020-07-02 12:15 | 2020-07-02 13:10 |
| Parameter | Unit | G / S | RDL | | 1238134 | 1238138 | 1238139 | 1238140 | 1238141 | 1238142 | 1238143 |
| Total Coliforms (MPN) | MPN/100 mL | | 1 | | 166 | 249 | >2420 | >2420 | >2420 | >2420 | >2420 |
| E. Coli (MPN) | MPN/100 mL | | 1 | | 3 | 2 | 365 | 70 | 11 | 12 | 31 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Cations in Water (ICP-OES)

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | Hwy102-2 | Hwy102-1 | L4 | LSD | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 08:20 | 2020-07-02 08:50 | 2020-07-02 10:00 | 2020-07-02 10:22 | 2020-07-02 11:00 | 2020-07-02 12:15 | 2020-07-02 13:10 |
| Parameter | Unit | G / S | RDL | | 1238134 | 1238138 | 1238139 | 1238140 | 1238141 | 1238142 | 1238143 |
| Calcium, Total | mg/L | | 0.1 | | 8.8 | 8.6 | 23.2 | 22.5 | 33.4 | 8.4 | 3.8 |
| Total Magnesium | mg/L | | 0.1 | | 1.3 | 1.3 | 3.1 | 3.0 | 4.6 | 1.8 | 1.0 |
| Potassium, Total | mg/L | | 0.1 | | 0.9 | 0.9 | 2.1 | 2.4 | 3.4 | 1.2 | 0.6 |
| Sodium, Total | mg/L | | 0.1 | | 41.6 | 40.7 | 96.7 | 68.7 | 183 | 21.4 | 10.1 |
| Total Phosphorus | mg/L | | 0.1 | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Chlorophyll-a in Water

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | SAMPLE DESCRIPTION: | | PML-1 | PML-2 | | Hwy102-2 | | Hwy102-1 | | L4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | | Water | | Water | | Water |
| | | DATE SAMPLED: | | 2020-07-02 08:20 | 2020-07-02 08:50 | | 2020-07-02 10:00 | | 2020-07-02 10:22 | | 2020-07-02 11:00 |
| Parameter | Unit | G / S | RDL | 1238134 | 1238138 | RDL | 1238139 | RDL | 1238140 | RDL | 1238141 |
| Chlorophyll-a | µg/L | | 0.25 | 1.89 | 1.89 | 0.42 | 2.89 | 0.31 | 4.93 | 0.29 | 2.41 |

| | | SAMPLE DESCRIPTION: | | LSD | | KL-2 |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water |
| | | DATE SAMPLED: | | 2020-07-02 12:15 | | 2020-07-02 13:10 |
| Parameter | Unit | G / S | RDL | 1238142 | RDL | 1238143 |
| Chlorophyll-a | µg/L | | 0.5 | 4.42 | 0.42 | 0.53 |

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

1238139 Only 600 mL sample filtered; detection limit raised accordingly.

1238140 Only 800 mL sample filtered; detection limit raised accordingly.

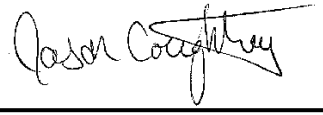
1238141 Only 850 mL sample filtered; detection limit raised accordingly.

1238142 Only 500 mL sample filtered; detection limit raised accordingly.

1238143 Only 600 mL sample filtered; detection limit raised accordingly.

Analysis performed at AGAT Vancouver (unless marked by *)

Certified By:





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# Certificate of Analysis

AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Phaeophytin in Water

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | Hwy102-2 | Hwy102-1 | L4 | LSD | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 08:20 | 2020-07-02 08:50 | 2020-07-02 10:00 | 2020-07-02 10:22 | 2020-07-02 11:00 | 2020-07-02 12:15 | 2020-07-02 13:10 |
| Parameter | Unit | G / S | RDL | | 1238134 | 1238138 | 1238139 | 1238140 | 1238141 | 1238142 | 1238143 |
| Phaeophytin | µg/L | | 0.5 | | 1.1 | <0.5 | 0.8 | 1.8 | 0.7 | 6.0 | <0.5 |

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

Analysis performed at AGAT Vancouver (unless marked by *)

Certified By:



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Dartmouth, Nova Scotia
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# Certificate of Analysis

AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | Hwy102-2 | Hwy102-1 | L4 | LSD | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2020-07-02 08:20 | 2020-07-02 08:50 | 2020-07-02 10:00 | 2020-07-02 10:22 | 2020-07-02 11:00 | 2020-07-02 12:15 | 2020-07-02 13:10 |
| Parameter | Unit | G / S | RDL | 1238134 | 1238138 | 1238139 | 1238140 | 1238141 | 1238142 | 1238143 |
| pH | | | | 7.01 | 7.00 | 6.86 | 7.10 | 7.37 | 7.19 | 6.60 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 0.9 | 0.9 | 5.7 | 4.3 | 3.8 | 3.9 | 2.6 |
| Chloride | mg/L | | 1 | 74 | 76 | 172 | 137 | 297 | 35 | 17 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | <0.12 | <0.12 | <0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 9 | 9 | 12 | 13 | 21 | 3 | 3 |
| Alkalinity | mg/L | | 5 | 8 | 9 | 18 | 23 | 26 | 30 | 9 |
| True Color | TCU | | 5 | 14 | <5 | 27 | 30 | 17 | 56 | 59 |
| Turbidity | NTU | | 0.1 | 1.1 | 1.1 | 9.7 | 1.2 | 3.6 | 6.4 | 1.3 |
| Electrical Conductivity | umho/cm | | 1 | 298 | 302 | 629 | 517 | 1030 | 197 | 95 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.13 | <0.05 | 0.08 | 0.05 | 0.20 | <0.05 | 0.12 |
| Nitrate as N | mg/L | | 0.05 | 0.13 | <0.05 | 0.08 | 0.05 | 0.20 | <0.05 | 0.12 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | 0.07 | 0.06 | 0.25 | 0.24 | 0.24 | 0.60 | 0.07 |
| Total Organic Carbon | mg/L | | 0.5 | 3.1 | 3.0 | 4.9 | 6.0 | 4.8 | 7.5 | 5.8 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 8 | 9 | 18 | 23 | 26 | 30 | 9 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 141 | 142 | 324 | 262 | 561 | 96 | 42 |
| Hardness | mg/L | | | 27.3 | 26.8 | 70.7 | 68.5 | 102 | 28.4 | 13.6 |
| Langelier Index (@20C) | NA | | | -2.74 | -2.71 | -2.16 | -1.82 | -1.35 | -1.99 | -3.42 |
| Langelier Index (@ 4C) | NA | | | -3.06 | -3.03 | -2.48 | -2.14 | -1.67 | -2.31 | -3.74 |
| Saturation pH (@ 20C) | NA | | | 9.75 | 9.71 | 9.02 | 8.92 | 8.72 | 9.18 | 10.0 |
| Saturation pH (@ 4C) | NA | | | 10.1 | 10.0 | 9.34 | 9.24 | 9.04 | 9.50 | 10.3 |
| Anion Sum | me/L | | | 2.44 | 2.51 | 5.47 | 4.60 | 9.35 | 1.65 | 0.73 |
| Cation sum | me/L | | | 2.40 | 2.35 | 5.83 | 4.46 | 10.2 | 1.83 | 0.78 |
| % Difference/ Ion Balance | % | | | 0.9 | 3.3 | 3.2 | 1.5 | 4.2 | 5.1 | 3.1 |
| Total Aluminum | ug/L | | 5 | 35 | 36 | 99 | 107 | 32 | 248 | 227 |
| Total Antimony | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2020-07-02

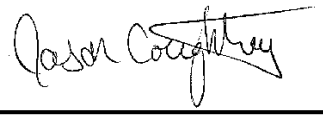
DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | Hwy102-2 | Hwy102-1 | L4 | LSD | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 08:20 | 2020-07-02 08:50 | 2020-07-02 10:00 | 2020-07-02 10:22 | 2020-07-02 11:00 | 2020-07-02 12:15 | 2020-07-02 13:10 |
| Parameter | Unit | G / S | RDL | | 1238134 | 1238138 | 1238139 | 1238140 | 1238141 | 1238142 | 1238143 |
| Total Arsenic | ug/L | | 2 | | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Barium | ug/L | | 5 | | 25 | 28 | 266 | 141 | 350 | 42 | 15 |
| Total Beryllium | ug/L | | 2 | | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Bismuth | ug/L | | 2 | | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Boron | ug/L | | 5 | | 8 | 8 | 11 | 11 | 13 | 18 | 14 |
| Total Cadmium | ug/L | | 0.017 | | <0.017 | <0.017 | <0.017 | <0.017 | 0.025 | <0.017 | <0.017 |
| Total Chromium | ug/L | | 1 | | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Cobalt | ug/L | | 1 | | <1 | <1 | <1 | <1 | <1 | 2 | <1 |
| Total Copper | ug/L | | 1 | | <1 | <1 | 3 | <1 | <1 | <1 | <1 |
| Total Iron | ug/L | | 50 | | 164 | 172 | 3260 | 429 | 1210 | 3510 | 486 |
| Total Lead | ug/L | | 0.5 | | <0.5 | <0.5 | 0.7 | <0.5 | <0.5 | 0.8 | <0.5 |
| Total Manganese | ug/L | | 2 | | 220 | 192 | 341 | 33 | 291 | 2840 | 98 |
| Total Molybdenum | ug/L | | 2 | | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Nickel | ug/L | | 2 | | <2 | <2 | <2 | <2 | 3 | <2 | <2 |
| Total Selenium | ug/L | | 1 | | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Silver | ug/L | | 0.1 | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Strontium | ug/L | | 5 | | 38 | 40 | 112 | 102 | 146 | 32 | 17 |
| Total Thallium | ug/L | | 0.1 | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin | ug/L | | 2 | | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Titanium | ug/L | | 2 | | <2 | <2 | 2 | <2 | 2 | 5 | 3 |
| Total Uranium | ug/L | | 0.1 | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Vanadium | ug/L | | 2 | | <2 | <2 | <2 | <2 | 2 | <2 | <2 |
| Total Zinc | ug/L | | 5 | | <5 | <5 | <5 | <5 | 6 | <5 | <5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:





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ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Total Phosphorus in Water (Low Level)

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | Hwy102-2 | Hwy102-1 | L4 | LSD | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 08:20 | 2020-07-02 08:50 | 2020-07-02 10:00 | 2020-07-02 10:22 | 2020-07-02 11:00 | 2020-07-02 12:15 | 2020-07-02 13:10 |
| Parameter | Unit | G / S | RDL | | 1238134 | 1238138 | 1238139 | 1238140 | 1238141 | 1238142 | 1238143 |
| Total Phosphorus | mg/L | | 0.006 | | <0.006 | <0.006 | 0.018 | 0.012 | 0.011 | 0.028 | 0.014 |

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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http://www.agatlabs.com

# Certificate of Analysis

AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Various Inorganics (Water)

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | Hwy102-2 | Hwy102-1 | L4 | LSD | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 08:20 | 2020-07-02 08:50 | 2020-07-02 10:00 | 2020-07-02 10:22 | 2020-07-02 11:00 | 2020-07-02 12:15 | 2020-07-02 13:10 |
| Parameter | Unit | G / S | RDL | | 1238134 | 1238138 | 1238139 | 1238140 | 1238141 | 1238142 | 1238143 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 0.7 | <0.4 |
| Total Suspended Solids | mg/L | | 5 | | <5 | <5 | <5 | <5 | <5 | 56 | <5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Water Analysis

RPT Date: Jul 15, 2020

| PARAMETER | Batch | Sample Id | DUPLICATE Dup #1 | DUPLICATE Dup #2 | DUPLICATE RPD | Method Blank | REFERENCE MATERIAL Measured Value | REFERENCE MATERIAL Acceptable Limits Lower | REFERENCE MATERIAL Acceptable Limits Upper | METHOD BLANK SPIKE Recovery | METHOD BLANK SPIKE Acceptable Limits Lower | METHOD BLANK SPIKE Acceptable Limits Upper | MATRIX SPIKE Recovery | MATRIX SPIKE Acceptable Limits Lower | MATRIX SPIKE Acceptable Limits Upper |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard Water Analysis + Total Metals | | | | | | | | | | | | | | | |
| pH | 1237508 | | 8.05 | 8.06 | 0.1% | < | 100% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Reactive Silica as SiO2 | 1234128 | | 13.4 | 14.0 | 4.5% | < 0.5 | 105% | 80% | 120% | 106% | 80% | 120% | 108% | 80% | 120% |
| Chloride | 1238143 | 1238143 | 17 | 18 | 1.8% | < 1 | 90% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Fluoride | 1238143 | 1238143 | <0.12 | <0.12 | NA | < 0.12 | 106% | 80% | 120% | NA | 80% | 120% | 84% | 70% | 130% |
| Sulphate | 1238143 | 1238143 | 3 | 3 | NA | < 2 | 100% | 80% | 120% | NA | 80% | 120% | 98% | 70% | 130% |
| Alkalinity | 1237508 | | 458 | 460 | 0.4% | < 5 | 94% | 80% | 120% | NA | | | NA | | |
| True Color | 1248786 | | 8 | 10 | NA | < 5 | 95% | 80% | 120% | NA | | | NA | | |
| Turbidity | 1248786 | | 3.0 | 3.1 | 1.6% | 0.1 | 96% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 1237508 | | 975 | 979 | 0.4% | < 1 | 105% | 90% | 110% | NA | | | NA | | |
| Nitrate as N | 1238143 | 1238143 | 0.12 | 0.12 | NA | < 0.05 | 90% | 80% | 120% | NA | 80% | 120% | 82% | 70% | 130% |
| Nitrite as N | 1238143 | 1238143 | <0.05 | <0.05 | NA | < 0.05 | 80% | 80% | 120% | NA | 80% | 120% | 117% | 70% | 130% |
| Ammonia as N | 1234800 | | 0.06 | 0.06 | NA | 0.05 | 92% | 80% | 120% | 94% | 80% | 120% | 104% | 70% | 130% |
| Total Organic Carbon | 1235117 | | 6.4 | 6.9 | 7.3% | < 0.5 | 89% | 80% | 120% | NA | 80% | 120% | 97% | 80% | 120% |
| Ortho-Phosphate as P | 1234128 | | 0.09 | 0.08 | 5.4% | < 0.01 | 96% | 80% | 120% | 104% | 80% | 120% | 108% | 80% | 120% |
| Bicarb. Alkalinity (as CaCO3) | 1237508 | | 458 | 460 | 0.4% | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 1237508 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Hydroxide | 1237508 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Aluminum | 1247068 | | 44 | 42 | 2.7% | < 5 | 110% | 80% | 120% | 112% | 80% | 120% | 117% | 70% | 130% |
| Total Antimony | 1247068 | | <2 | <2 | NA | < 2 | 97% | 80% | 120% | 101% | 80% | 120% | 102% | 70% | 130% |
| Total Arsenic | 1247068 | | <2 | <2 | NA | < 2 | 97% | 80% | 120% | 101% | 80% | 120% | 98% | 70% | 130% |
| Total Barium | 1247068 | | 7 | 7 | NA | < 5 | 103% | 80% | 120% | 108% | 80% | 120% | 115% | 70% | 130% |
| Total Beryllium | 1247068 | | <2 | <2 | NA | < 2 | 111% | 80% | 120% | 113% | 80% | 120% | 98% | 70% | 130% |
| Total Bismuth | 1247068 | | <2 | <2 | NA | < 2 | 135% | 80% | 120% | 144% | 80% | 120% | 133% | 70% | 130% |
| Total Boron | 1247068 | | 13 | 13 | NA | < 5 | 111% | 80% | 120% | 110% | 80% | 120% | 103% | 70% | 130% |
| Total Cadmium | 1247068 | | <0.017 | 0.018 | NA | < 0.017 | 96% | 80% | 120% | 101% | 80% | 120% | 101% | 70% | 130% |
| Total Chromium | 1247068 | | <1 | <1 | NA | < 1 | 105% | 80% | 120% | 108% | 80% | 120% | 103% | 70% | 130% |
| Total Cobalt | 1247068 | | <1 | <1 | NA | < 1 | 105% | 80% | 120% | 108% | 80% | 120% | 103% | 70% | 130% |
| Total Copper | 1247068 | | 98 | 95 | 2.8% | < 1 | 108% | 80% | 120% | 108% | 80% | 120% | NA | 70% | 130% |
| Total Iron | 1247068 | | 377 | 358 | 5.3% | < 50 | 104% | 80% | 120% | 97% | 80% | 120% | NA | 70% | 130% |
| Total Lead | 1247068 | | 10.3 | 10.3 | 0.2% | < 0.5 | 97% | 80% | 120% | 97% | 80% | 120% | 126% | 70% | 130% |
| Total Manganese | 1247068 | | 133 | 133 | 0.1% | < 2 | 91% | 80% | 120% | 94% | 80% | 120% | NA | 70% | 130% |
| Total Molybdenum | 1247068 | | <2 | <2 | NA | < 2 | 98% | 80% | 120% | 103% | 80% | 120% | 97% | 70% | 130% |
| Total Nickel | 1247068 | | <2 | <2 | NA | < 2 | 105% | 80% | 120% | 107% | 80% | 120% | 99% | 70% | 130% |
| Total Selenium | 1247068 | | <1 | <1 | NA | < 1 | 108% | 80% | 120% | 101% | 80% | 120% | 82% | 70% | 130% |
| Total Silver | 1247068 | | <0.1 | <0.1 | NA | < 0.1 | 105% | 80% | 120% | 106% | 80% | 120% | 98% | 70% | 130% |
| Total Strontium | 1247068 | | 32 | 31 | 5.2% | < 5 | 88% | 80% | 120% | 91% | 80% | 120% | NA | 70% | 130% |
| Total Thallium | 1247068 | | <0.1 | <0.1 | NA | < 0.1 | 105% | 80% | 120% | 144% | 80% | 120% | 141% | 70% | 130% |
| Total Tin | 1247068 | | <2 | <2 | NA | < 2 | 95% | 80% | 120% | 102% | 80% | 120% | 105% | 70% | 130% |
| Total Titanium | 1247068 | | <2 | <2 | NA | < 2 | 106% | 80% | 120% | 107% | 80% | 120% | 100% | 70% | 130% |



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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of
AGAT WORK ORDER: 20X620010
PROJECT: Bedford West
ATTENTION TO: Leah Darche
SAMPLING SITE:
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Jul 15, 2020 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Total Uranium | 1247068 | | 1.1 | 1.1 | 1.0% | < 0.1 | 120% | 80% | 120% | 101% | 80% | 120% | 120% | 70% | 130% |
| Total Vanadium | 1247068 | | <2 | <2 | NA | < 2 | 98% | 80% | 120% | 103% | 80% | 120% | 100% | 70% | 130% |
| Total Zinc | 1247068 | | 19 | 18 | NA | < 5 | 102% | 80% | 120% | 105% | 80% | 120% | 87% | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.
Reference Material: Less than 10% of elements not within acceptance limits.
Blank spike: Less than 10% of elements not within acceptance limits.
Matrix spike: Less than 10% of elements not within acceptance limits.

Various Inorganics (Water)

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Kjeldahl Nitrogen as N | 1233081 | | 1.8 | 1.4 | NA | < 0.4 | 99% | 80% | 120% | 99% | 80% | 120% | NA | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Standard Water Analysis + Total Metals

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| pH | 1239872 | | 6.77 | 6.80 | 0.4% | < | 101% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Alkalinity | 1239872 | | 7 | 6 | NA | < 5 | 94% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 1239872 | | 288 | 291 | 1.1% | 3 | 105% | 90% | 110% | NA | | | NA | | |
| Ammonia as N | 1231820 | | <0.03 | <0.03 | NA | 0.05 | 90% | 80% | 120% | 85% | 80% | 120% | 109% | 70% | 130% |
| Bicarb. Alkalinity (as CaCO3) | 1239872 | | 7 | 6 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 1239872 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Hydroxide | 1239872 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Various Inorganics (Water)

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Kjeldahl Nitrogen as N | 1238139 | 1238139 | <0.4 | <0.4 | NA | < 0.4 | 94% | 80% | 120% | 99% | 80% | 120% | 87% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Total Phosphorus in Water (Low Level)

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Phosphorus | 1238134 | 1238134 | <0.006 | <0.006 | NA | < 0.006 | 100% | 70% | 130% | 100% | 80% | 120% | 91% | 70% | 130% |

Comments: NA signifies Not Applicable.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Cations in Water (ICP-OES)

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium, Total | 1247068 | | 11.9 | 11.6 | 2.5% | < 0.1 | 95% | 80% | 120% | 103% | 80% | 120% | 99% | 70% | 130% |
| Total Magnesium | 1247068 | | 2.6 | 2.5 | 1.3% | < 0.1 | 93% | 80% | 120% | 100% | 80% | 120% | 93% | 70% | 130% |
| Potassium, Total | 1247068 | | 0.4 | 0.5 | NA | < 0.1 | 89% | 80% | 120% | 96% | 80% | 120% | 95% | 70% | 130% |
| Sodium, Total | 1247068 | | 7.8 | 7.6 | 3.2% | < 0.1 | 89% | 80% | 120% | 96% | 80% | 120% | 94% | 70% | 130% |
| Total Phosphorus | 1247068 | | <0.1 | <0.1 | NA | < 0.1 | 90% | 80% | 120% | 91% | 80% | 120% | 88% | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Chlorophyll-a in Water

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chlorophyll-a | 1239860 | BS | 1040 | 1150 | 10.0% | < 0.25 | 90% | 85% | 115% | | | | | | |



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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Jul 15, 2020 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |

Certified By:



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# QA Violation

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

ATTENTION TO: Leah Darche

RPT Date: Jul 15, 2020

| PARAMETER | Sample Id | Sample Description | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Standard Water Analysis + Total Metals | | | | | | | | | | | |
| Total Bismuth | | PML-1 | 135% | 80% | 120% | 144% | 80% | 120% | 133% | 70% | 130% |
| Total Thallium | | PML-1 | 105% | 80% | 120% | 144% | 80% | 120% | 141% | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.
Reference Material: Less than 10% of elements not within acceptance limits.
Blank spike: Less than 10% of elements not within acceptance limits.
Matrix spike: Less than 10% of elements not within acceptance limits.



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MPN) | MIC-121-7000 | Based on SM 9223B | INCUBATOR |
| E. Coli (MPN) | MIC-121-7000 | Based on SM 9223B | INCUBATOR |



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# Method Summary

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AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Calcium, Total | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Total Magnesium | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Potassium, Total | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Sodium, Total | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Total Phosphorus | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Chlorophyll-a | | SM 10200 H | SPECTROPHOTOMETER |
| Phaeophytin | | SM 10200 H | SPECTROPHOTOMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Fluoride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| True Color | INOR-121-6014 | SM 2120 C | NEPHELOMETER |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Hydroxide | INORG-121-6001 | SM 2320 B | PC-TITRATE |
| Calculated TDS | CALCULATION | SM 1030E | CALCULATION |
| Hardness | CALCULATION | SM 2340B | CALCULATION |
| Langelier Index (@20C) | CALCULATION | CALCULATION | CALCULATION |
| Langelier Index (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 20C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Anion Sum | CALCULATION | SM 1030E | CALCULATION |
| Cation sum | CALCULATION | SM 1030E | CALCULATION |
| % Difference/ Ion Balance | CALCULATION | SM 1030E | CALCULATION |
| Total Aluminum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Antimony | MET121-6104 & MET-121-6105 | SM 3125 | ICP-MS |
| Total Arsenic | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Barium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Beryllium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Bismuth | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |



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AGAT Laboratories

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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X620010

PROJECT: Bedford West

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Total Boron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cadmium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Chromium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cobalt | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Lead | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Molybdenum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Nickel | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Selenium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Silver | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Strontium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Thallium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Tin | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Titanium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Uranium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Vanadium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorus | INOR-93-6022 | modified from SM 4500-P B and SM 4500-P E | SPECTROPHOTOMETER |
| Total Kjeldahl Nitrogen as N | INOR-121-6020 | SM 4500-NORG D | COLORIMETER |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |



Results relate only to the items tested. Results apply to samples as received.

# AGAT Laboratories

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B3B 1M2
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## Chain of Custody Record

**Laboratory Use Only**
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 11.1, 9.1, 8.8
Hold Time:
AGAT Job Number: 20X620010
Notes: '20 JUL 2 2:15PM

**Report Information**
Company: Wood-Dartmouth
Contact: Leah Darche
Address: 50 Troop Ave, Unit 300
Dartmouth, NS
Phone: 902-468-2848 Fax: 902 468 1314
Client Project #: Bedford West
AGAT Quotation: 335022Bp
Please Note: If quotation number is not provided client will be billed full price for analysis.

**Report Information** (Please print):
1. Name: Leah Darche
Email: leah.darche@woodplc.com
2. Name:
Email:

**Report Format**
☑ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

**Turnaround Time Required (TAT)**
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

**Invoice To** Same Yes ☑ No ☐
Company: Wood-Dartmouth
Contact: Denise Hurtle
Address:
Phone: Fax:
PO/Credit Card#:

**Regulatory Requirements** (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial
☐ Res/Park ☐ HRM 101
☐ Agricultural ☐ Storm Water
☐ FWAL ☐ Waste Water
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☑ No Salt Water Sample ☐ Yes ☑ No
Reg. No.:

| Sample Identification | Date/Time Sampled | Sample Matrix | # Containers | Comments – Site/Sample Info. Sample Containment | SWA + Total Metals | Low Level Total Phosphorous i | Solids, Total Suspended (TSS) | Nitrogen, Total Kjeldahl (TKN) i | Total Coliforms, E. Coli (MPN) | Chlorophyll A & Pheophytin |
|---|---|---|---|---|---|---|---|---|---|---|
| PML-1 | 2 July 2020 8:20 | SW | 7 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PML-2 | 2 July 2020 8:50 | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| HW102-2 | 10:00 | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| HW102-1 | 10:22 | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| LU | 11:00 | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| LSO | 12:15 | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| KL-2 | 13:10 | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| Samples Relinquished By (Print Name): | Date/Time | Samples Received By (Print Name): | Date/Time |
|---|---|---|---|
| Leah Darche | 2 July 2020 | | July 2 |
| Samples Relinquished By (Sign): | Date/Time | Samples Received By (Sign): | Date/Time |
| Leah Darche | 2:13pm | | 2:15 |

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page 1 of 1
No:

AGAT Laboratories

11 Morris Drive, Unit 122
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FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848

ATTENTION TO: Leah Darche

PROJECT: Bedford West

AGAT WORK ORDER: 20X620183

MICROBIOLOGY ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

DATE REPORTED: Jul 15, 2020

PAGES (INCLUDING COVER): 16

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.
- 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.



Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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# Certificate of Analysis

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli (MPN)

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | KL-5 | KL-1 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 14:40 | 2020-07-02 15:05 | 2020-07-02 15:30 | 2020-07-02 16:00 |
| Parameter | Unit | G / S | RDL | | 1239860 | 1239870 | 1239871 | 1239872 |
| Total Coliforms (MPN) | MPN/100 mL | | 1 | | >2420 | >2420 | >2420 | 2420 |
| E. Coli (MPN) | MPN/100 mL | | 1 | | 6 | 59 | 44 | 48 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Cations in Water (ICP-OES)

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | KL-5 | KL-1 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 14:40 | 2020-07-02 15:05 | 2020-07-02 15:30 | 2020-07-02 16:00 |
| Parameter | Unit | G / S | RDL | | 1239860 | 1239870 | 1239871 | 1239872 |
| Calcium, Total | mg/L | | 0.1 | | 6.8 | 6.8 | 7.6 | 8.1 |
| Total Magnesium | mg/L | | 0.1 | | 1.1 | 1.1 | 1.2 | 1.3 |
| Potassium, Total | mg/L | | 0.1 | | 0.8 | 0.9 | 0.9 | 1.0 |
| Sodium, Total | mg/L | | 0.1 | | 35.4 | 36.0 | 36.9 | 37.4 |
| Total Phosphorus | mg/L | | 0.1 | | <0.1 | <0.1 | <0.1 | <0.1 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Chlorophyll-a in Water

DATE RECEIVED: 2020-07-02

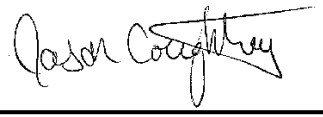
DATE REPORTED: 2020-07-15

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | KL-5 | KL-1 | KL-3 | KL-4 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2020-07-02 14:40 | 2020-07-02 15:05 | 2020-07-02 15:30 | 2020-07-02 16:00 |
| Parameter | Unit | G / S | RDL | 1239860 | 1239870 | 1239871 | 1239872 |
| Chlorophyll-a | µg/L | | 0.25 | 0.47 | 4.42 | 0.47 | <0.25 |

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

Analysis performed at AGAT Vancouver (unless marked by *)

Certified By:





Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Phaeophytin in Water

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | KL-5 | KL-1 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 14:40 | 2020-07-02 15:05 | 2020-07-02 15:30 | 2020-07-02 16:00 |
| Parameter | Unit | G / S | RDL | | 1239860 | 1239870 | 1239871 | 1239872 |
| Phaeophytin | µg/L | | 0.5 | | <0.5 | 3.1 | <0.5 | <0.5 |

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

Analysis performed at AGAT Vancouver (unless marked by *)

Certified By:



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | SAMPLE DESCRIPTION: | | KL-5 | KL-1 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2020-07-02 14:40 | 2020-07-02 15:05 | 2020-07-02 15:30 | 2020-07-02 16:00 |
| Parameter | Unit | G / S | RDL | 1239860 | 1239870 | 1239871 | 1239872 |
| pH | | | | 6.88 | 6.82 | 6.89 | 6.77 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 1.8 | 1.7 | 1.6 | 1.8 |
| Chloride | mg/L | | 1 | 67 | 65 | 69 | 72 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 9 | 9 | 9 | 9 |
| Alkalinity | mg/L | | 5 | 6 | <5 | 7 | 7 |
| True Color | TCU | | 5 | 28 | 22 | 25 | 22 |
| Turbidity | NTU | | 0.1 | 0.9 | 3.4 | 1.0 | 1.0 |
| Electrical Conductivity | umho/cm | | 1 | 269 | 266 | 275 | 288 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.38 | 0.10 | 0.18 | 0.24 |
| Nitrate as N | mg/L | | 0.05 | 0.38 | 0.10 | 0.18 | 0.24 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 3.2 | 3.2 | 3.3 | 2.6 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | 0.01 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 6 | <5 | 7 | 7 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 125 | 120 | 130 | 135 |
| Hardness | mg/L | | | 21.5 | 21.5 | 24.7 | 25.6 |
| Langelier Index (@20C) | NA | | | -3.11 | -3.24 | -2.97 | -3.08 |
| Langelier Index (@ 4C) | NA | | | -3.43 | -3.56 | -3.29 | -3.40 |
| Saturation pH (@ 20C) | NA | | | 9.99 | 10.1 | 9.86 | 9.85 |
| Saturation pH (@ 4C) | NA | | | 10.3 | 10.4 | 10.2 | 10.2 |
| Anion Sum | me/L | | | 2.22 | 2.03 | 2.29 | 2.38 |
| Cation sum | me/L | | | 2.00 | 2.05 | 2.14 | 2.18 |
| % Difference/ Ion Balance | % | | | 5.3 | 0.5 | 3.3 | 4.2 |
| Total Aluminum | ug/L | | 5 | 75 | 136 | 60 | 52 |
| Total Antimony | ug/L | | 2 | <2 | <2 | <2 | <2 |

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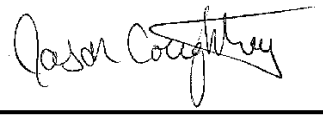



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# Certificate of Analysis

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2020-07-02

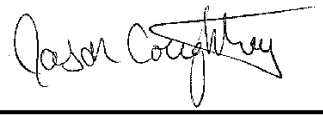
DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | KL-5 | KL-1 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 14:40 | 2020-07-02 15:05 | 2020-07-02 15:30 | 2020-07-02 16:00 |
| Parameter | Unit | G / S | RDL | | 1239860 | 1239870 | 1239871 | 1239872 |
| Total Arsenic | ug/L | | 2 | | <2 | <2 | <2 | <2 |
| Total Barium | ug/L | | 5 | | 15 | 18 | 21 | 21 |
| Total Beryllium | ug/L | | 2 | | <2 | <2 | <2 | <2 |
| Total Bismuth | ug/L | | 2 | | <2 | <2 | <2 | <2 |
| Total Boron | ug/L | | 5 | | 8 | 9 | 8 | 7 |
| Total Cadmium | ug/L | | 0.017 | | 0.026 | 0.024 | <0.017 | 0.020 |
| Total Chromium | ug/L | | 1 | | <1 | <1 | 2 | <1 |
| Total Cobalt | ug/L | | 1 | | <1 | <1 | <1 | <1 |
| Total Copper | ug/L | | 1 | | 1 | 2 | 1 | 2 |
| Total Iron | ug/L | | 50 | | <50 | 264 | 274 | 177 |
| Total Lead | ug/L | | 0.5 | | <0.5 | <0.5 | <0.5 | <0.5 |
| Total Manganese | ug/L | | 2 | | 28 | 85 | 137 | 209 |
| Total Molybdenum | ug/L | | 2 | | <2 | <2 | <2 | <2 |
| Total Nickel | ug/L | | 2 | | <2 | <2 | 2 | <2 |
| Total Selenium | ug/L | | 1 | | <1 | <1 | <1 | <1 |
| Total Silver | ug/L | | 0.1 | | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Strontium | ug/L | | 5 | | 28 | 45 | 49 | 45 |
| Total Thallium | ug/L | | 0.1 | | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin | ug/L | | 2 | | <2 | <2 | <2 | <2 |
| Total Titanium | ug/L | | 2 | | <2 | <2 | <2 | <2 |
| Total Uranium | ug/L | | 0.1 | | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Vanadium | ug/L | | 2 | | <2 | <2 | <2 | <2 |
| Total Zinc | ug/L | | 5 | | 5 | 6 | <5 | <5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:





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# Certificate of Analysis

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Total Phosphorus in Water (Low Level)

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | KL-5 | KL-1 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 14:40 | 2020-07-02 15:05 | 2020-07-02 15:30 | 2020-07-02 16:00 |
| Parameter | Unit | G / S | RDL | | 1239860 | 1239870 | 1239871 | 1239872 |
| Total Phosphorus | mg/L | | 0.006 | | <0.006 | 0.008 | 0.010 | <0.006 |

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Various Inorganics (Water)

DATE RECEIVED: 2020-07-02

DATE REPORTED: 2020-07-15

| | | | | SAMPLE DESCRIPTION: | KL-5 | KL-1 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-07-02 14:40 | 2020-07-02 15:05 | 2020-07-02 15:30 | 2020-07-02 16:00 |
| Parameter | Unit | G / S | RDL | | 1239860 | 1239870 | 1239871 | 1239872 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | | 1.5 | <0.4 | 0.4 | <0.4 |
| Total Suspended Solids | mg/L | | 5 | | <5 | 6 | <5 | <5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories
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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of
AGAT WORK ORDER: 20X620183
PROJECT: Bedford West
ATTENTION TO: Leah Darche
SAMPLING SITE:
SAMPLED BY:

## Water Analysis

| RPT Date: Jul 15, 2020 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Standard Water Analysis + Total Metals | | | | | | | | | | | | | | | |
| pH | 1239872 | 1239872 | 6.77 | 6.80 | 0.4% | < | 101% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Reactive Silica as SiO2 | 1234128 | | 13.4 | 14.0 | 4.5% | < 0.5 | 105% | 80% | 120% | 106% | 80% | 120% | 108% | 80% | 120% |
| Chloride | 1248730 | | 1 | 1 | NA | < 1 | 103% | 80% | 120% | NA | 80% | 120% | 89% | 70% | 130% |
| Fluoride | 1248730 | | <0.12 | <0.12 | NA | < 0.12 | 101% | 80% | 120% | NA | 80% | 120% | 83% | 70% | 130% |
| Sulphate | 1248730 | | 8 | 8 | NA | < 2 | 104% | 80% | 120% | NA | 80% | 120% | 92% | 70% | 130% |
| Alkalinity | 1239872 | 1239872 | 7 | 6 | NA | < 5 | 94% | 80% | 120% | NA | | | NA | | |
| True Color | 1248752 | | 6 | <5 | NA | < 5 | 110% | 80% | 120% | NA | | | NA | | |
| Turbidity | 1248752 | | 2320 | 2120 | 9.1% | 0.2 | 97% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 1239872 | 1239872 | 288 | 291 | 1.1% | 3 | 105% | 90% | 110% | NA | | | NA | | |
| Nitrate as N | 1248730 | | 0.36 | 0.40 | 10.1% | < 0.05 | 90% | 80% | 120% | NA | 80% | 120% | 81% | 70% | 130% |
| Nitrite as N | 1248730 | | <0.05 | <0.05 | NA | < 0.05 | 80% | 80% | 120% | NA | 80% | 120% | 108% | 70% | 130% |
| Ammonia as N | 1237977 | | <0.03 | <0.03 | NA | 0.05 | 94% | 80% | 120% | 85% | 80% | 120% | NA | 70% | 130% |
| Total Organic Carbon | 1253267 | | 1.9 | 1.7 | NA | < 0.5 | 88% | 80% | 120% | NA | 80% | 120% | 86% | 80% | 120% |
| Ortho-Phosphate as P | 1234128 | | 0.09 | 0.08 | 5.4% | < 0.01 | 96% | 80% | 120% | 104% | 80% | 120% | 108% | 80% | 120% |
| Bicarb. Alkalinity (as CaCO3) | 1239872 | 1239872 | 7 | 6 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 1239872 | 1239872 | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Hydroxide | 1239872 | 1239872 | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Aluminum | 1246700 | | 19 | 20 | NA | < 5 | 95% | 80% | 120% | 107% | 80% | 120% | 75% | 70% | 130% |
| Total Antimony | 1246700 | | <2 | <2 | NA | < 2 | 84% | 80% | 120% | 111% | 80% | 120% | 93% | 70% | 130% |
| Total Arsenic | 1246700 | | 83 | 68 | 19.9% | < 2 | 80% | 80% | 120% | 93% | 80% | 120% | NA | 70% | 130% |
| Total Barium | 1246700 | | <5 | <5 | NA | < 5 | 96% | 80% | 120% | 111% | 80% | 120% | 80% | 70% | 130% |
| Total Beryllium | 1246700 | | <2 | <2 | NA | < 2 | 92% | 80% | 120% | 100% | 80% | 120% | 88% | 70% | 130% |
| Total Bismuth | 1246700 | | <2 | <2 | NA | < 2 | 110% | 80% | 120% | 125% | 80% | 120% | 77% | 70% | 130% |
| Total Boron | 1246700 | | 47 | 51 | 8.5% | < 5 | 93% | 80% | 120% | 104% | 80% | 120% | NA | 70% | 130% |
| Total Cadmium | 1246700 | | 0.077 | 0.084 | NA | < 0.017 | 92% | 80% | 120% | 104% | 80% | 120% | 85% | 70% | 130% |
| Total Chromium | 1246700 | | <1 | 1 | NA | < 1 | 85% | 80% | 120% | 101% | 80% | 120% | 75% | 70% | 130% |
| Total Cobalt | 1246700 | | <1 | <1 | NA | < 1 | 87% | 80% | 120% | 103% | 80% | 120% | 102% | 70% | 130% |
| Total Copper | 1246700 | | 611 | 447 | 31.0% | < 1 | 91% | 80% | 120% | 104% | 80% | 120% | NA | 70% | 130% |
| Total Iron | 1246700 | | 74 | 97 | NA | < 50 | 83% | 80% | 120% | 106% | 80% | 120% | 102% | 70% | 130% |
| Total Lead | 1246700 | | 17.1 | 18.0 | 5.4% | < 0.5 | 110% | 80% | 120% | 87% | 80% | 120% | NA | 70% | 130% |
| Total Manganese | 1246700 | | 82 | 89 | 8.9% | < 2 | 86% | 80% | 120% | 101% | 80% | 120% | NA | 70% | 130% |
| Total Molybdenum | 1246700 | | <2 | <2 | NA | < 2 | 84% | 80% | 120% | 102% | 80% | 120% | 120% | 70% | 130% |
| Total Nickel | 1246700 | | 15 | 16 | 9.6% | < 2 | 86% | 80% | 120% | 105% | 80% | 120% | NA | 70% | 130% |
| Total Selenium | 1246700 | | <1 | <1 | NA | < 1 | 88% | 80% | 120% | 98% | 80% | 120% | 24% | 70% | 130% |
| Total Silver | 1246700 | | <0.1 | <0.1 | NA | < 0.1 | 86% | 80% | 120% | 104% | 80% | 120% | 95% | 70% | 130% |
| Total Strontium | 1246700 | | <5 | <5 | NA | < 5 | 84% | 80% | 120% | 99% | 80% | 120% | 117% | 70% | 130% |
| Total Thallium | 1246700 | | <0.1 | <0.1 | NA | < 0.1 | 113% | 80% | 120% | 129% | 80% | 120% | 64% | 70% | 130% |
| Total Tin | 1246700 | | 41 | 47 | 13.6% | < 2 | 88% | 80% | 120% | 108% | 80% | 120% | NA | 70% | 130% |
| Total Titanium | 1246700 | | <2 | <2 | NA | < 2 | 91% | 80% | 120% | 100% | 80% | 120% | 77% | 70% | 130% |



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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Jul 15, 2020 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Total Uranium | 1246700 | | <0.1 | <0.1 | NA | < 0.1 | 106% | 80% | 120% | 87% | 80% | 120% | 71% | 70% | 130% |
| Total Vanadium | 1246700 | | <2 | <2 | NA | < 2 | 84% | 80% | 120% | 101% | 80% | 120% | 100% | 70% | 130% |
| Total Zinc | 1246700 | | 2290 | 1690 | 30.2% | < 5 | 88% | 80% | 120% | 105% | 80% | 120% | NA | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.
Reference Material: Less than 10% of elements not within acceptance limits.
Blank spike: Less than 10% of elements not within acceptance limits.
Matrix spike: Less than 10% of elements not within acceptance limits.

| Various Inorganics (Water) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Kjeldahl Nitrogen as N | 1238139 | | <0.4 | <0.4 | NA | < 0.4 | 94% | 80% | 120% | 99% | 80% | 120% | 87% | 80% | 120% |
| Total Suspended Solids | 1238523 | | <5 | <5 | NA | < 5 | 102% | 80% | 120% | NA | | | 115% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| Standard Water Analysis + Total Metals | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Silica as SiO2 | 1239872 | 1239872 | 1.8 | 1.8 | NA | < 0.5 | 101% | 80% | 120% | 98% | 80% | 120% | 98% | 80% | 120% |
| Ortho-Phosphate as P | 1239872 | 1239872 | 0.01 | <0.01 | NA | < 0.01 | 96% | 80% | 120% | 103% | 80% | 120% | 98% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| Total Phosphorus in Water (Low Level) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Phosphorus | 1238134 | | <0.006 | <0.006 | NA | < 0.006 | 100% | 70% | 130% | 100% | 80% | 120% | 91% | 70% | 130% |

Comments: NA signifies Not Applicable.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| Chlorophyll-a in Water | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chlorophyll-a | 1239860 | BS | 1040 | 1150 | 10.0% | < 0.25 | 90% | 85% | 115% | | | | | | |

| Cations in Water (ICP-OES) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium, Total | 1242465 | | 30.9 | 30.3 | 1.9% | < 0.1 | 92% | 80% | 120% | 101% | 80% | 120% | 102% | 70% | 130% |
| Total Magnesium | 1242465 | | 10.8 | 10.7 | 0.9% | < 0.1 | 91% | 80% | 120% | 96% | 80% | 120% | 107% | 70% | 130% |
| Potassium, Total | 1242465 | | 2.3 | 2.2 | 5.8% | 0.2 | 93% | 80% | 120% | 96% | 80% | 120% | 101% | 70% | 130% |
| Sodium, Total | 1242465 | | 40.2 | 38.8 | 3.5% | < 0.1 | 103% | 80% | 120% | 99% | 80% | 120% | 99% | 70% | 130% |
| Total Phosphorus | 1242465 | | <0.1 | <0.1 | NA | < 0.1 | 84% | 80% | 120% | 83% | 80% | 120% | 92% | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

If matrix spike recovery is NA, the concentration of the spike is less than 2x the native sample concentration.

Certified By:





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# QA Violation

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

ATTENTION TO: Leah Darche

RPT Date: Jul 15, 2020

| PARAMETER | Sample Id | Sample Description | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Standard Water Analysis + Total Metals | | | | | | | | | | | |
| Total Bismuth | | KL-5 | 110% | 80% | 120% | 125% | 80% | 120% | 77% | 70% | 130% |
| Total Selenium | | KL-5 | 88% | 80% | 120% | 98% | 80% | 120% | 24% | 70% | 130% |
| Total Thallium | | KL-5 | 113% | 80% | 120% | 129% | 80% | 120% | 64% | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.
Reference Material: Less than 10% of elements not within acceptance limits.
Blank spike: Less than 10% of elements not within acceptance limits.
Matrix spike: Less than 10% of elements not within acceptance limits.



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MPN) | MIC-121-7000 | Based on SM 9223B | INCUBATOR |
| E. Coli (MPN) | MIC-121-7000 | Based on SM 9223B | INCUBATOR |



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AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Calcium, Total | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Total Magnesium | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Potassium, Total | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Sodium, Total | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Total Phosphorus | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Chlorophyll-a | | SM 10200 H | SPECTROPHOTOMETER |
| Phaeophytin | | SM 10200 H | SPECTROPHOTOMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Fluoride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| True Color | INOR-121-6014 | SM 2120 C | NEPHELOMETER |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Hydroxide | INORG-121-6001 | SM 2320 B | PC-TITRATE |
| Calculated TDS | CALCULATION | SM 1030E | CALCULATION |
| Hardness | CALCULATION | SM 2340B | CALCULATION |
| Langelier Index (@20C) | CALCULATION | CALCULATION | CALCULATION |
| Langelier Index (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 20C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Anion Sum | CALCULATION | SM 1030E | CALCULATION |
| Cation sum | CALCULATION | SM 1030E | CALCULATION |
| % Difference/ Ion Balance | CALCULATION | SM 1030E | CALCULATION |
| Total Aluminum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Antimony | MET121-6104 & MET-121-6105 | SM 3125 | ICP-MS |
| Total Arsenic | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Barium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Beryllium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Bismuth | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X620183

PROJECT: Bedford West

ATTENTION TO: Leah Darche

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Total Boron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cadmium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Chromium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cobalt | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Lead | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Molybdenum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Nickel | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Selenium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Silver | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Strontium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Thallium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Tin | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Titanium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Uranium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Vanadium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorus | INOR-93-6022 | modified from SM 4500-P B and SM 4500-P E | SPECTROPHOTOMETER |
| Total Kjeldahl Nitrogen as N | INOR-121-6020 | SM 4500-NORG D | COLORIMETER |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |



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# AGAT Laboratories

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## Chain of Custody Record

**Laboratory Use Only**
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 7.9, 5.6, 16.6
Hold Time:
AGAT Job Number: 20X620183
Notes:

**Report Information**
Company: Wood-Dartmouth
Contact: Leah Darche
Address: 50 Troop Ave, Unit 300
Dartmouth, NS
Phone: 9024682848 Fax: 9024681043
Client Project #: Bedford West
AGAT Quotation: 335022Bp
Please Note: If quotation number is not provided client will be billed full price for analysis.

**Report Information** (Please print):
1. Name: Leah Darche
Email: leah.darche@woodplc.com
2. Name:
Email:

**Report Format**
☐ Single Sample per page
☑ Multiple Samples per page
☐ Excel Format Included
☐ Export

**Turnaround Time Required (TAT)**
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
20 JUL 2 4:50PM
Date Required:

**Invoice To** Same Yes ☑ / No ☐
Company: Wood-Dartmouth
Contact: Denise Hurtle
Address:
Phone: Fax:
PO/Credit Card#:

**Regulatory Requirements** (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

**Drinking Water Sample:** ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

| Sample Identification | Date/Time Sampled | Sample Matrix | # Containers | Comments – Site/Sample Info. Sample Containment | SWA + Total Metals | Low Level Total Phosphorous i | Solids, Total Suspended (TSS) | Nitrogen, Total Kjeldahl (TKN) i | Total Coliforms, E. Coli (MPN) | Chlorophyll A & Pheophytin |
|---|---|---|---|---|---|---|---|---|---|---|
| KL-5 | 2 July 2020 / 1440 | SW | 7 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| KL-1 | 1505 | | | | | | | | | |
| KL-3 | 1530 | | | | | | | | | |
| KL-4 | 1600 | | | | | | | | | |

| Samples Relinquished By (Print Name): | Date/Time | Samples Received By (Print Name): | Date/Time |
|---|---|---|---|
| Leah Darche | 2 July 2020 | | July 2 |
| Samples Relinquished By (Sign): | Date/Time | Samples Received By (Sign): | Date/Time |
| | 1650 | | 16:50 |

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1
N°:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848

ATTENTION TO: Charlotte Clark

PROJECT: TE201017 - August Event

AGAT WORK ORDER: 20X638653

MICROBIOLOGY ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

WATER ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

DATE REPORTED: Aug 26, 2020

PAGES (INCLUDING COVER): 15

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.
- 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.



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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

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# Certificate of Analysis

AGAT WORK ORDER: 20X638653

PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli (MPN)

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-26

| | | | | SAMPLE DESCRIPTION: | PML - 1 | PML - 2 | Hwy 102 - 1 | LU | KL - 5 | KL - 1 | LSD | Hwy 102 - 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-08-17 09:07 | 2020-08-17 09:27 | 2020-08-17 10:34 | 2020-08-17 11:00 | 2020-08-17 11:27 | 2020-08-17 11:40 | 2020-08-17 13:08 | 2020-08-17 13:54 |
| Parameter | Unit | G / S | RDL | | 1359902 | 1359975 | 1359976 | 1359977 | 1359978 | 1359979 | 1359980 | 1359981 |
| Total Coliforms (MPN) | MPN/100 mL | | 1 | | 548 | 192 | >2420 | >2420 | 291 | 345 | >2420 | >2420 |
| E. Coli (MPN) | MPN/100 mL | | 1 | | 10 | 7 | 33 | 2 | 122 | 11 | 172 | 172 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 20X638653

PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Chlorophyll-a and Phaeophytin in Water

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-26

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | PML - 1 | PML - 2 | Hwy 102 - 1 | LU | KL - 5 | KL - 1 | | LSD |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | | Water |
| DATE SAMPLED: | | | | 2020-08-17 09:07 | 2020-08-17 09:27 | 2020-08-17 10:34 | 2020-08-17 11:00 | 2020-08-17 11:27 | 2020-08-17 11:40 | | 2020-08-17 13:08 |
| Parameter | Unit | G / S | RDL | 1359902 | 1359975 | 1359976 | 1359977 | 1359978 | 1359979 | RDL | 1359980 |
| Chlorophyll-a | µg/L | | 0.25 | 1.10 | 1.10 | 1.57 | 4.41 | 0.95 | 1.73 | 0.86 | 12.5 |
| Phaeophytin | µg/L | | 0.5 | <0.5 | <0.5 | 0.962 | 0.773 | <0.5 | <0.5 | 0.5 | 18.3 |

| | | | | |
|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | Hwy 102 - 2 |
| SAMPLE TYPE: | | | | Water |
| DATE SAMPLED: | | | | 2020-08-17 13:54 |
| Parameter | Unit | G / S | RDL | 1359981 |
| Chlorophyll-a | µg/L | | 0.7 | 206 |
| Phaeophytin | µg/L | | 0.5 | 73.5 |

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

1359980 290ml of sample filtered, detection limit raised accordingly

1359981 350mL of sample filtered, detection limit changed accordingly

Analysis performed at AGAT Vancouver (unless marked by *)

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 20X638653

PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Low Level Total Phosphorous- 0.002mg/L

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-26

| | | | | SAMPLE DESCRIPTION: | PML - 1 | PML - 2 | Hwy 102 - 1 | LU | KL - 5 | KL - 1 | LSD | Hwy 102 - 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-08-17 09:07 | 2020-08-17 09:27 | 2020-08-17 10:34 | 2020-08-17 11:00 | 2020-08-17 11:27 | 2020-08-17 11:40 | 2020-08-17 13:08 | 2020-08-17 13:54 |
| Parameter | Unit | G / S | RDL | | 1359902 | 1359975 | 1359976 | 1359977 | 1359978 | 1359979 | 1359980 | 1359981 |
| Total Phosphorus | mg/L | | 0.002 | | 0.011 | 0.017 | 0.016 | 0.013 | 0.028 | 0.036 | 0.084 | 0.008 |

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

1359902-1359981 Total Phosphorous RDL is the calculated MDL.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 20X638653

PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-26

| | | SAMPLE DESCRIPTION: | | PML - 1 | PML - 2 | Hwy 102 - 1 | | LU | | KL - 5 | KL - 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | | Water | | Water | Water |
| | | DATE SAMPLED: | | 2020-08-17 09:07 | 2020-08-17 09:27 | 2020-08-17 10:34 | | 2020-08-17 11:00 | | 2020-08-17 11:27 | 2020-08-17 11:40 |
| Parameter | Unit | G / S | RDL | 1359902 | 1359975 | 1359976 | RDL | 1359977 | RDL | 1359978 | 1359979 |
| pH | | | | 7.11 | 7.11 | 7.16 | | 7.28 | | 6.95 | 6.94 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 0.7 | 0.6 | 5.9 | 0.5 | 1.8 | 0.5 | 1.5 | 1.3 |
| Chloride | mg/L | | 1 | 72 | 72 | 100 | 5 | 221 | 1 | 62 | 59 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | 0.16 | 0.12 | <0.12 | 0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 19 | 8 | 8 | 2 | 23 | 2 | 8 | 8 |
| Alkalinity | mg/L | | 5 | 9 | 10 | 27 | 5 | 21 | 5 | 7 | 8 |
| True Color | TCU | | 5 | 15 | 12 | 32 | 5 | 16 | 5 | 17 | 11 |
| Turbidity | NTU | | 0.5 | 1.0 | 0.8 | 1.5 | 0.5 | 2.4 | 0.5 | 1.2 | 0.8 |
| Electrical Conductivity | umho/cm | | 1 | 334 | 335 | 469 | 1 | 928 | 1 | 272 | 275 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.24 | 0.05 | 0.08 | 0.06 |
| Nitrate as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.24 | 0.05 | 0.08 | 0.06 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | 0.10 | 0.08 | 0.17 | 0.03 | 0.11 | 0.03 | 0.06 | 0.08 |
| Total Organic Carbon | mg/L | | 0.5 | 4.1 | 4.1 | 9.0 | 0.5 | 6.6 | 0.5 | 3.8 | 3.9 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | 0.01 | 0.01 | 0.01 |
| Total Sodium | mg/L | | 0.1 | 48.2 | 50.2 | 60.3 | 0.1 | 150 | 0.1 | 39.7 | 44.4 |
| Total Calcium | mg/L | | 0.1 | 8.2 | 7.2 | 23.7 | 0.1 | 33.7 | 0.1 | 5.5 | 5.4 |
| Total Magnesium | mg/L | | 0.1 | 1.5 | 1.2 | 2.7 | 0.1 | 3.6 | 0.1 | 1.0 | 1.1 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 9 | 10 | 27 | 5 | 21 | 5 | 7 | 8 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | 10 | <10 | 10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 | 5 | <5 | 5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 156 | 146 | 215 | 1 | 449 | 1 | 122 | 124 |
| Hardness | mg/L | | | 26.7 | 22.9 | 70.3 | | 99.0 | | 17.9 | 18.0 |
| Langelier Index (@20C) | NA | | | -2.63 | -2.64 | -1.65 | | -1.52 | | -3.06 | -3.02 |
| Langelier Index (@ 4C) | NA | | | -2.95 | -2.96 | -1.97 | | -1.84 | | -3.38 | -3.34 |
| Saturation pH (@ 20C) | NA | | | 9.74 | 9.75 | 8.81 | | 8.80 | | 10.0 | 9.96 |
| Saturation pH (@ 4C) | NA | | | 10.1 | 10.1 | 9.13 | | 9.12 | | 10.3 | 10.3 |
| Anion Sum | me/L | | | 2.61 | 2.40 | 3.53 | | 7.15 | | 2.06 | 2.00 |
| Cation sum | me/L | | | 2.68 | 2.69 | 4.15 | | 8.61 | | 2.12 | 2.33 |

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 20X638653

PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-26

| SAMPLE DESCRIPTION: | | | | PML - 1 | PML - 2 | Hwy 102 - 1 | | LU | | KL - 5 | KL - 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | Water | | Water | | Water | Water |
| DATE SAMPLED: | | | | 2020-08-17 09:07 | 2020-08-17 09:27 | 2020-08-17 10:34 | | 2020-08-17 11:00 | | 2020-08-17 11:27 | 2020-08-17 11:40 |
| Parameter | Unit | G / S | RDL | 1359902 | 1359975 | 1359976 | RDL | 1359977 | RDL | 1359978 | 1359979 |
| % Difference/ Ion Balance | % | | | 1.4 | 5.7 | 8.1 | | 9.3 | | 1.3 | 7.7 |
| Total Copper | ug/L | | 1 | <1 | <1 | <1 | 1 | 1 | 1 | <1 | <1 |
| Total Iron | ug/L | | 50 | 224 | 224 | 528 | 50 | 429 | 50 | 72 | 135 |
| Total Manganese | ug/L | | 2 | 61 | 40 | 41 | 2 | 18 | 2 | 4 | 20 |
| Total Phosphorus | mg/L | | 0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | 0.1 | <0.1 | <0.1 |
| Total Zinc | ug/L | | 5 | <5 | <5 | <5 | 5 | 5 | 5 | <5 | <5 |
| Potassium, Total | mg/L | | 0.1 | 1.1 | 1.1 | 2.9 | 0.1 | 3.2 | 0.1 | 0.8 | 0.7 |

Certified By: Marta Manka



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PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-26

| | | SAMPLE DESCRIPTION: | | LSD | Hwy 102 - 2 |
|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water |
| | | DATE SAMPLED: | | 2020-08-17 13:08 | 2020-08-17 13:54 |
| Parameter | Unit | G / S | RDL | 1359980 | 1359981 |
| pH | | | | 7.04 | 6.86 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 2.0 | 7.6 |
| Chloride | mg/L | | 1 | 35 | 200 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 3 | 10 |
| Alkalinity | mg/L | | 5 | 21 | 11 |
| True Color | TCU | | 5 | 60 | 56 |
| Turbidity | NTU | | 0.5 | 18.2 | 32.9 |
| Electrical Conductivity | umho/cm | | 1 | 193 | 742 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 |
| Nitrate as N | mg/L | | 0.05 | <0.05 | <0.05 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | 0.68 | 0.31 |
| Total Organic Carbon | mg/L | | 0.5 | 8.7 | 21.2 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | 0.01 |
| Total Sodium | mg/L | | 0.1 | 25.1 | 118 |
| Total Calcium | mg/L | | 0.1 | 4.5 | 9.8 |
| Total Magnesium | mg/L | | 0.1 | 1.4 | 2.1 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 21 | 11 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 90 | 359 |
| Hardness | mg/L | | | 17.0 | 33.1 |
| Langelier Index (@20C) | NA | | | -2.57 | -2.75 |
| Langelier Index (@ 4C) | NA | | | -2.89 | -3.07 |
| Saturation pH (@ 20C) | NA | | | 9.61 | 9.61 |
| Saturation pH (@ 4C) | NA | | | 9.93 | 9.93 |
| Anion Sum | me/L | | | 1.47 | 6.07 |
| Cation sum | me/L | | | 1.76 | 6.25 |

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 20X638653

PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-26

| | | | | SAMPLE DESCRIPTION: | LSD | Hwy 102 - 2 |
|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water |
| | | | | DATE SAMPLED: | 2020-08-17 13:08 | 2020-08-17 13:54 |
| Parameter | Unit | G / S | RDL | | 1359980 | 1359981 |
| % Difference/ Ion Balance | % | | | | 9.0 | 1.5 |
| Total Copper | ug/L | | 1 | | 1 | 4 |
| Total Iron | ug/L | | 50 | | 4550 | 7640 |
| Total Manganese | ug/L | | 2 | | 1190 | 340 |
| Total Phosphorus | mg/L | | 0.1 | | <0.1 | 0.3 |
| Total Zinc | ug/L | | 5 | | <5 | 24 |
| Potassium, Total | mg/L | | 0.1 | | 0.9 | 3.7 |

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

1359902-1359981 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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# Certificate of Analysis

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PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TKN

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-26

| | | | | SAMPLE DESCRIPTION: | PML - 1 | PML - 2 | Hwy 102 - 1 | LU | KL - 5 | KL - 1 | LSD | Hwy 102 - 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-08-17 09:07 | 2020-08-17 09:27 | 2020-08-17 10:34 | 2020-08-17 11:00 | 2020-08-17 11:27 | 2020-08-17 11:40 | 2020-08-17 13:08 | 2020-08-17 13:54 |
| Parameter | Unit | G / S | RDL | | 1359902 | 1359975 | 1359976 | 1359977 | 1359978 | 1359979 | 1359980 | 1359981 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | | 1.0 | 1.4 | 0.9 | 1.6 | 0.8 | 0.6 | 4.1 | 4.1 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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PROJECT: TE201017 - August Event

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ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TSS

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-26

| | | | | SAMPLE DESCRIPTION: | PML - 1 | PML - 2 | Hwy 102 - 1 | LU | KL - 5 | KL - 1 | LSD | Hwy 102 - 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-08-17 09:07 | 2020-08-17 09:27 | 2020-08-17 10:34 | 2020-08-17 11:00 | 2020-08-17 11:27 | 2020-08-17 11:40 | 2020-08-17 13:08 | 2020-08-17 13:54 |
| Parameter | Unit | G / S | RDL | | 1359902 | 1359975 | 1359976 | 1359977 | 1359978 | 1359979 | 1359980 | 1359981 |
| Total Suspended Solids | mg/L | | 5 | | <5 | <5 | <5 | <5 | <5 | <5 | 132 | 57 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of
AGAT WORK ORDER: 20X638653
PROJECT: TE201017 - August Event
ATTENTION TO: Charlotte Clark
SAMPLING SITE:
SAMPLED BY:

## Water Analysis

RPT Date: Aug 26, 2020

| PARAMETER | Batch | Sample Id | DUPLICATE Dup #1 | Dup #2 | RPD | Method Blank | REFERENCE MATERIAL Measured Value | Acceptable Limits Lower | Upper | METHOD BLANK SPIKE Recovery | Acceptable Limits Lower | Upper | MATRIX SPIKE Recovery | Acceptable Limits Lower | Upper |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| pH | 1350491 | | 6.65 | 6.62 | 0.5% | < | 100% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Reactive Silica as SiO2 | 1353262 | | 10.6 | 11.4 | 7.7% | < 0.5 | 101% | 80% | 120% | 95% | 80% | 120% | 105% | 80% | 120% |
| Chloride | 1359980 | 1359980 | 35 | 39 | 9.8% | < 1 | 95% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Fluoride | 1359980 | 1359980 | <0.12 | <0.12 | NA | < 0.12 | 110% | 80% | 120% | NA | 80% | 120% | 115% | 70% | 130% |
| Sulphate | 1359980 | 1359980 | 3 | 4 | NA | < 2 | 105% | 80% | 120% | NA | 80% | 120% | 95% | 70% | 130% |
| Alkalinity | 1350491 | | 22 | 22 | NA | < 5 | 95% | 80% | 120% | NA | | | NA | | |
| True Color | 1353355 | | 116 | 111 | 4.4% | < 5 | 110% | 80% | 120% | NA | | | NA | | |
| Turbidity | 1353355 | | 23.9 | 23.4 | 2.1% | < 0.5 | 92% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 1350491 | | 359 | 359 | 0.0% | < 1 | 103% | 90% | 110% | NA | | | NA | | |
| Nitrate as N | 1359980 | 1359980 | <0.05 | <0.05 | NA | < 0.05 | 103% | 80% | 120% | NA | 80% | 120% | 90% | 70% | 130% |
| Nitrite as N | 1359980 | 1359980 | <0.05 | <0.05 | NA | < 0.05 | 91% | 80% | 120% | NA | 80% | 120% | 115% | 70% | 130% |
| Ammonia as N | 1350491 | | <0.03 | <0.03 | NA | < 0.03 | 103% | 80% | 120% | 98% | 80% | 120% | 94% | 70% | 130% |
| Total Organic Carbon | 1347990 | | 4.7 | 4.7 | 0.2% | < 0.5 | 103% | 80% | 120% | NA | 80% | 120% | 100% | 80% | 120% |
| Ortho-Phosphate as P | 1353262 | | 0.02 | 0.01 | NA | < 0.01 | 96% | 80% | 120% | 99% | 80% | 120% | 98% | 80% | 120% |
| Total Sodium | 1369704 | | 9.2 | 8.4 | 8.3% | < 0.1 | 102% | 80% | 120% | 110% | 80% | 120% | NA | 70% | 130% |
| Total Calcium | 1369704 | | 4.3 | 3.4 | 23.5% | < 0.1 | 98% | 80% | 120% | 102% | 80% | 120% | NA | 70% | 130% |
| Total Magnesium | 1369704 | | 1.6 | 1.3 | 16.9% | < 0.1 | 102% | 80% | 120% | 110% | 80% | 120% | NA | 70% | 130% |
| Bicarb. Alkalinity (as CaCO3) | 1350491 | | 22 | 22 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 1350491 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Hydroxide | 1350491 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Copper | 1369704 | | 8 | 7 | 17.5% | < 1 | 96% | 80% | 120% | 100% | 80% | 120% | 116% | 70% | 130% |
| Total Iron | 1369704 | | 114 | <50 | NA | < 50 | 99% | 80% | 120% | 100% | 80% | 120% | 97% | 70% | 130% |
| Total Manganese | 1369704 | | 94 | 80 | 16.7% | < 2 | 97% | 80% | 120% | 106% | 80% | 120% | NA | 70% | 130% |
| Total Phosphorus | 1366135 | | <0.1 | <0.1 | NA | < 0.1 | 91% | 80% | 120% | 91% | 80% | 120% | 103% | 70% | 130% |
| Total Zinc | 1369704 | | 16 | 13 | NA | < 5 | 93% | 80% | 120% | 97% | 80% | 120% | 110% | 70% | 130% |
| Potassium, Total | 1366135 | | 17.2 | 18.6 | 8.1% | < 0.1 | 90% | 80% | 120% | 94% | 80% | 120% | NA | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.
Duplicates: Less than 10% of elements not within acceptance limits

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TSS | | | | | | | | | | | | | | | |
| Total Suspended Solids | 1353682 | | <5 | <5 | NA | < 5 | 102% | 80% | 120% | NA | | | 109% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TKN | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | 1366695 | | 1.0 | 0.8 | NA | < 0.4 | 113% | 80% | 120% | 103% | 80% | 120% | 117% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| Reactive Silica as SiO2 | 1359978 | 1359978 | 1.5 | 1.5 | NA | < 0.5 | 104% | 80% | 120% | 94% | 80% | 120% | 97% | 80% | 120% |
| Ammonia as N | 1359979 | 1359979 | 0.08 | 0.08 | NA | < 0.03 | 99% | 80% | 120% | 98% | 80% | 120% | 102% | 70% | 130% |



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Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of
PROJECT: TE201017 - August Event
SAMPLING SITE:

AGAT WORK ORDER: 20X638653
ATTENTION TO: Charlotte Clark
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Aug 26, 2020 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Ortho-Phosphate as P | 1359978 | 1359978 | 0.01 | <0.01 | NA | < 0.01 | 94% | 80% | 120% | 99% | 80% | 120% | 95% | 80% | 120% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| Low Level Total Phosphorous- 0.002mg/L | | | | | | | | | | | | | | | |
| Total Phosphorus | 1359902 | 1359902 | 0.011 | 0.012 | 8.7% | < 0.002 | 98% | 70% | 130% | 108% | 80% | 120% | 108% | 70% | 130% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| Chlorophyll-a and Phaeophytin in Water | | | | | | | | | | | | | | | |
| Chlorophyll-a | 1136077 | BS | 834 | 867 | 3.9% | < 0.25 | 93% | 85% | 115% | | | | | | |

Certified By: Marta Manka



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X638653

PROJECT: TE201017 - August Event

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MPN) | MIC-121-7000 | Based on SM 9223B | INCUBATOR |
| E. Coli (MPN) | MIC-121-7000 | Based on SM 9223B | INCUBATOR |



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X638653

PROJECT: TE201017 - August Event

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Chlorophyll-a | | SM 10200 H | SPECTROPHOTOMETER |
| Phaeophytin | | SM 10200 H | SPECTROPHOTOMETER |
| Total Phosphorus | INOR-93-6022 | modified from SM 4500-P B and SM 4500-P E | SPECTROPHOTOMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Fluoride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| True Color | INOR-121-6014 | SM 2120 C | NEPHELOMETER |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Hydroxide | INORG-121-6001 | SM 2320 B | PC-TITRATE |
| Calculated TDS | | SM 1030E | CALCULATION |
| Hardness | | SM 2340B | CALCULATION |
| Langelier Index (@20C) | | | CALCULATION |
| Langelier Index (@ 4C) | | | CALCULATION |
| Saturation pH (@ 20C) | | | CALCULATION |
| Saturation pH (@ 4C) | | | CALCULATION |
| Anion Sum | | SM 1030E | CALCULATION |
| Cation sum | | SM 1030E | CALCULATION |
| % Difference/ Ion Balance | | SM 1030E | CALCULATION |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorus | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Potassium, Total | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Total Kjeldahl Nitrogen as N | INOR-121-6020 | SM 4500-NORG D | COLORIMETER |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |



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# Chain of Custody Record

**Laboratory Use Only**
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 7.6, 12.1, 5.4
Hold Time:
AGAT Job Number: 20X638653
Notes:

**Report Information**
Company: Wood
Contact: Charlotte Clark
Address: 50 Troop Ave, Unit 300, Dartmouth, NS
Phone: 902-468-2848 Fax:
Client Project #: TE201017 - August Event
AGAT Quotation: 335022BP
Please Note: If quotation number is not provided client will be billed full price for analysis.

**Report Information** (Please print):
1. Name: Leah Darche
Email: Leah.Darche@woodplc.com
2. Name: Charlotte Clark
Email: charlotte.clark@woodplc.com

**Report Format**
☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

**Turnaround Time Required (TAT)**
Regular TAT ☒ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required: 20AG017 2:32PM

**Invoice To** Same Yes ☐ / No ☐
Company: Wood
Contact: Rhonda MacDonald/ Denise Hirtle
Address:
Phone: Fax:
PO/Credit Card#:

**Regulatory Requirements** (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

**Drinking Water Sample:** ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

| Sample Identification | Date/Time Sampled | Sample Matrix | # Containers | Comments – Site/Sample Info. Sample Containment | Standard Water Analysis | Low Level Total Phosphorus | TSS | TKN | Total Coliforms, E. Coli (MPN) | Chlorophyll A & Pheophytin |
|---|---|---|---|---|---|---|---|---|---|---|
| PML-1 | 17Aug20 9:07 | SW | 7 | | X | X | X | X | X | X |
| PML-2 | 17Aug20 9:27 | SW | 7 | | X | X | X | X | X | X |
| HWY102-1 | " 10:34 | SW | 7 | | X | X | X | X | X | X |
| LU | " 11:00 | SW | 7 | | X | X | X | X | X | X |
| KL-5 | " 11:27 | SW | 7 | | X | X | X | X | X | X |
| KL-1 | " 11:40 | SW | 7 | | X | X | X | X | X | X |
| LSD | " 13:08 | SW | 7 | | X | X | X | X | X | X |
| HWY102-2 | " 13:54 | SW | 7 | | X | X | X | X | X | X |

Samples Relinquished By (Print Name): Elizabeth Robinson
Date/Time: 17Aug20
Samples Relinquished By (Sign):
Date/Time: 14:29
Samples Received By (Print Name):
Date/Time: Aug 17
Samples Received By (Sign):
Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page 1 of 1
No:

AGAT Laboratories

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CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848

ATTENTION TO: Charlotte Clark

PROJECT: TE201017 - August Event

AGAT WORK ORDER: 20X638776

MICROBIOLOGY ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

WATER ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

DATE REPORTED: Aug 27, 2020

PAGES (INCLUDING COVER): 14

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.
- 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.
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- The test results reported herewith relate only to the samples as received by the laboratory.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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# Certificate of Analysis

AGAT WORK ORDER: 20X638776

PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli (MPN)

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-27

| | | | | SAMPLE DESCRIPTION: | KL - 4 | KL - 3 | KL - 2 | KL - D2 | KL - D1 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-08-17 15:09 | 2020-08-17 15:30 | 2020-08-17 16:05 | 2020-08-17 16:37 | 2020-08-17 17:00 |
| Parameter | Unit | G / S | RDL | | 1360770 | 1360979 | 1360980 | 1361082 | 1361091 |
| Total Coliforms (MPN) | MPN/100 mL | | 1 | | >2420 | 1990 | >2420 | 687 | >2420 |
| E. Coli (MPN) | MPN/100 mL | | 1 | | 133 | 61 | 58 | 37 | 179 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



Results relate only to the items tested. Results apply to samples as received.

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ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Chlorophyll-a and Phaeophytin in Water

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-27

| | | | | SAMPLE DESCRIPTION: | KL - 4 | KL - 3 | KL - 2 |
|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-08-17 15:09 | 2020-08-17 15:30 | 2020-08-17 16:05 |
| Parameter | Unit | G / S | RDL | | 1360770 | 1360979 | 1360980 |
| Chlorophyll-a | µg/L | | 0.25 | | 0.6 | 1.41 | 4.25 |
| Phaeophytin | µg/L | | 0.5 | | <0.5 | 0.8 | 1.3 |

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

Analysis performed at AGAT Vancouver (unless marked by *)

Certified By: Marta Manka



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 20X638776

PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Low Level Total Phosphorous- 0.002mg/L

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-27

| | | | | SAMPLE DESCRIPTION: | KL - 4 | KL - 3 | KL - 2 | KL - D2 | KL - D1 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-08-17 15:09 | 2020-08-17 15:30 | 2020-08-17 16:05 | 2020-08-17 16:37 | 2020-08-17 17:00 |
| Parameter | Unit | G / S | RDL | | 1360770 | 1360979 | 1360980 | 1361082 | 1361091 |
| Total Phosphorus | mg/L | | 0.002 | | 0.014 | 0.014 | 0.027 | 0.005 | 0.073 |

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

1360770-1361091 Total Phosphorous RDL is the calculated MDL.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Marta Manka



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CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-27

| | | SAMPLE DESCRIPTION: | | KL - 4 | KL - 3 | KL - 2 |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2020-08-17 15:09 | 2020-08-17 15:30 | 2020-08-17 16:05 |
| Parameter | Unit | G / S | RDL | 1360770 | 1360979 | 1360980 |
| pH | | | | 7.08 | 7.02 | 7.01 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 1.7 | 1.3 | 3.4 |
| Chloride | mg/L | | 1 | 73 | 65 | 21 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 9 | 8 | 4 |
| Alkalinity | mg/L | | 5 | 12 | 8 | 14 |
| True Color | TCU | | 5 | <5 | 12 | 40 |
| Turbidity | NTU | | 0.5 | 0.8 | 0.8 | 1.8 |
| Electrical Conductivity | umho/cm | | 1 | 297 | 288 | 128 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.19 | <0.05 | 0.10 |
| Nitrate as N | mg/L | | 0.05 | 0.19 | <0.05 | 0.10 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | 0.10 | 0.08 | 0.09 |
| Total Organic Carbon | mg/L | | 0.5 | 2.9 | <0.5 | 2.5 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | 1.04 | <0.01 |
| Total Sodium | mg/L | | 0.1 | 39.4 | 42.2 | 14.8 |
| Total Potassium | mg/L | | 0.1 | 1.1 | 0.9 | 0.9 |
| Total Calcium | mg/L | | 0.1 | 8.6 | 7.7 | 5.7 |
| Total Magnesium | mg/L | | 0.1 | 1.3 | 1.1 | 1.4 |
| Potassium, Total | mg/L | | 0.1 | 1.1 | 0.9 | 0.9 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 12 | 8 | 14 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 141 | 130 | 58 |
| Hardness | mg/L | | | 26.8 | 23.8 | 20.0 |
| Langelier Index (@20C) | NA | | | -2.51 | -2.79 | -2.65 |
| Langelier Index (@ 4C) | NA | | | -2.83 | -3.11 | -2.97 |
| Saturation pH (@ 20C) | NA | | | 9.59 | 9.81 | 9.66 |
| Saturation pH (@ 4C) | NA | | | 9.91 | 10.1 | 9.98 |

Certified By: Marta Manka



Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories
11 Morris Drive, Unit 122
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http://www.agatlabs.com

# Certificate of Analysis

AGAT WORK ORDER: 20X638776

PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-27

| | | | | SAMPLE DESCRIPTION: | KL - 4 | KL - 3 | KL - 2 |
|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-08-17 15:09 | 2020-08-17 15:30 | 2020-08-17 16:05 |
| Parameter | Unit | G / S | RDL | | 1360770 | 1360979 | 1360980 |
| Anion Sum | me/L | | | | 2.50 | 2.16 | 0.96 |
| Cation sum | me/L | | | | 2.31 | 2.35 | 1.13 |
| % Difference/ Ion Balance | % | | | | 4.1 | 4.2 | 8.2 |
| Total Copper | ug/L | | 1 | | <1 | <1 | <1 |
| Total Iron | ug/L | | 50 | | 139 | 180 | 1040 |
| Total Manganese | ug/L | | 2 | | 357 | 80 | 260 |
| Total Phosphorus | mg/L | | 0.1 | | <0.1 | <0.1 | <0.1 |
| Total Zinc | ug/L | | 5 | | <5 | <5 | <5 |

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

1360770-1360980 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 20X638776

PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TKN

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-27

| | | | | SAMPLE DESCRIPTION: | KL - 4 | KL - 3 | KL - 2 |
|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-08-17 15:09 | 2020-08-17 15:30 | 2020-08-17 16:05 |
| Parameter | Unit | G / S | RDL | | 1360770 | 1360979 | 1360980 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | | 0.4 | 0.7 | 1.7 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 20X638776

PROJECT: TE201017 - August Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TSS

DATE RECEIVED: 2020-08-17

DATE REPORTED: 2020-08-27

| | | | | SAMPLE DESCRIPTION: | KL - 4 | KL - 3 | KL - 2 | KL - D2 | KL - D1 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-08-17 15:09 | 2020-08-17 15:30 | 2020-08-17 16:05 | 2020-08-17 16:37 | 2020-08-17 17:00 |
| Parameter | Unit | G / S | RDL | | 1360770 | 1360979 | 1360980 | 1361082 | 1361091 |
| Total Suspended Solids | mg/L | | 5 | | <5 | <5 | <5 | <5 | 15 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of
PROJECT: TE201017 - August Event
SAMPLING SITE:

AGAT WORK ORDER: 20X638776
ATTENTION TO: Charlotte Clark
SAMPLED BY:

## Water Analysis

RPT Date: Aug 27, 2020

| PARAMETER | Batch | Sample Id | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| TSS | | | | | | | | | | | | | | | |
| Total Suspended Solids | 1360770 | 1360770 | <5 | <5 | NA | < 5 | 99% | 80% | 120% | NA | | | 103% | 80% | 120% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| pH | 1359984 | | 6.89 | 6.88 | 0.1% | < | 100% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Reactive Silica as SiO2 | 1359978 | | 1.5 | 1.5 | NA | < 0.5 | 104% | 80% | 120% | 94% | 80% | 120% | 97% | 80% | 120% |
| Chloride | 1359980 | | 35 | 39 | 9.8% | < 1 | 95% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Fluoride | 1359980 | | <0.12 | <0.12 | NA | < 0.12 | 110% | 80% | 120% | NA | 80% | 120% | 115% | 70% | 130% |
| Sulphate | 1359980 | | 3 | 4 | NA | < 2 | 105% | 80% | 120% | NA | 80% | 120% | 95% | 70% | 130% |
| Alkalinity | 1359984 | | 21 | 21 | NA | < 5 | 95% | 80% | 120% | NA | | | NA | | |
| True Color | 1361568 | | 22 | 21 | NA | < 5 | 110% | 80% | 120% | NA | | | NA | | |
| Turbidity | 1361568 | | 0.7 | 0.7 | NA | < 0.5 | 91% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 1359984 | | 193 | 193 | 0.2% | < 1 | 103% | 90% | 110% | NA | | | NA | | |
| Nitrate as N | 1359980 | | <0.05 | <0.05 | NA | < 0.05 | 103% | 80% | 120% | NA | 80% | 120% | 90% | 70% | 130% |
| Nitrite as N | 1359980 | | <0.05 | <0.05 | NA | < 0.05 | 91% | 80% | 120% | NA | 80% | 120% | 115% | 70% | 130% |
| Ammonia as N | 1359979 | | 0.08 | 0.08 | NA | < 0.03 | 99% | 80% | 120% | 98% | 80% | 120% | 102% | 70% | 130% |
| Total Organic Carbon | 1361568 | | 4.5 | 4.5 | 0.2% | < 0.5 | 108% | 80% | 120% | NA | 80% | 120% | 99% | 80% | 120% |
| Ortho-Phosphate as P | 1359978 | | 0.01 | <0.01 | NA | < 0.01 | 94% | 80% | 120% | 99% | 80% | 120% | 95% | 80% | 120% |
| Total Sodium | 1372919 | | 34.1 | 34.5 | 1.2% | < 0.1 | 99% | 80% | 120% | 103% | 80% | 120% | NA | 70% | 130% |
| Total Calcium | 1372919 | | <0.1 | <0.1 | NA | < 0.1 | 99% | 80% | 120% | 101% | 80% | 120% | 83% | 70% | 130% |
| Total Magnesium | 1372919 | | <0.1 | <0.1 | NA | < 0.1 | 98% | 80% | 120% | 101% | 80% | 120% | 92% | 70% | 130% |
| Potassium, Total | 1362537 | | 0.3 | 0.3 | NA | < 0.1 | 98% | 80% | 120% | 101% | 80% | 120% | 97% | 70% | 130% |
| Bicarb. Alkalinity (as CaCO3) | 1359984 | | 21 | 21 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 1359984 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Hydroxide | 1359984 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Copper | 1372919 | | 1 | 1 | NA | < 1 | 101% | 80% | 120% | 104% | 80% | 120% | 122% | 70% | 130% |
| Total Iron | 1372919 | | <50 | 67 | NA | < 50 | 100% | 80% | 120% | 103% | 80% | 120% | 116% | 70% | 130% |
| Total Manganese | 1372919 | | <2 | <2 | NA | < 2 | 97% | 80% | 120% | 100% | 80% | 120% | 106% | 70% | 130% |
| Total Phosphorus | 1362537 | | 0.3 | 0.3 | NA | < 0.1 | 103% | 80% | 120% | 101% | 80% | 120% | 100% | 70% | 130% |
| Total Zinc | 1372919 | | <5 | <5 | NA | < 5 | 99% | 80% | 120% | 101% | 80% | 120% | 103% | 70% | 130% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| TKN | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | 1366695 | | 1.0 | 0.8 | NA | < 0.4 | 113% | 80% | 120% | 103% | 80% | 120% | 117% | 80% | 120% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| Low Level Total Phosphorous- 0.002mg/L | | | | | | | | | | | | | | | |
| Total Phosphorus | 1361082 | 1361082 | 0.005 | 0.006 | NA | < 0.002 | 102% | 70% | 130% | 103% | 80% | 120% | 107% | 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.

Results relate only to the items tested. Results apply to samples as received.

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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X638776

PROJECT: TE201017 - August Event

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Aug 27, 2020 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Low Level Total Phosphorous- 0.002mg/L | | | | | | | | | | | | | | | |
| Total Phosphorus | 1360979 | 1360979 | 0.014 | 0.013 | 7.6% | < 0.002 | 98% | 70% | 130% | 108% | 80% | 120% | 110% | 70% | 130% |
| Chlorophyll-a and Phaeophytin in Water | | | | | | | | | | | | | | | |
| Chlorophyll-a | 1360770 | BS | 834 | 867 | 3.9% | < 0.25 | 93% | 85% | 115% | | | | | | |

Certified By: Marta Manka



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X638776

PROJECT: TE201017 - August Event

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MPN) | MIC-121-7000 | Based on SM 9223B | INCUBATOR |
| E. Coli (MPN) | MIC-121-7000 | Based on SM 9223B | INCUBATOR |



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# Method Summary

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AGAT WORK ORDER: 20X638776

PROJECT: TE201017 - August Event

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Chlorophyll-a | | SM 10200 H | SPECTROPHOTOMETER |
| Phaeophytin | | SM 10200 H | SPECTROPHOTOMETER |
| Total Phosphorus | INOR-93-6022 | modified from SM 4500-P B and SM 4500-P E | SPECTROPHOTOMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Fluoride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| True Color | INOR-121-6014 | SM 2120 C | NEPHELOMETER |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Potassium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Potassium, Total | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Hydroxide | INORG-121-6001 | SM 2320 B | PC-TITRATE |
| Calculated TDS | | SM 1030E | CALCULATION |
| Hardness | | SM 2340B | CALCULATION |
| Langelier Index (@20C) | | | CALCULATION |
| Langelier Index (@ 4C) | | | CALCULATION |
| Saturation pH (@ 20C) | | | CALCULATION |
| Saturation pH (@ 4C) | | | CALCULATION |
| Anion Sum | | SM 1030E | CALCULATION |
| Cation sum | | SM 1030E | CALCULATION |
| % Difference/ Ion Balance | | SM 1030E | CALCULATION |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorus | MET-121-6104 and MET-121-6113 | SM 3120B | ICP/OES |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X638776

PROJECT: TE201017 - August Event

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Total Kjeldahl Nitrogen as N | INOR-121-6020 | SM 4500-NORG D | COLORIMETER |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |



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## Chain of Custody Record

**Laboratory Use Only**
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 16.3, 14.5, 15.7
Hold Time:
AGAT Job Number: 20X638776
Notes:

**Report Information**
Company: Wood
Contact: Charlotte Clark
Address: 50 Troop Ave, Unit 300, Dartmouth, NS
Phone: 902-468-2848 Fax:
Client Project #: TE201017 - August Event
AGAT Quotation: 335022BP
Please Note: If quotation number is not provided client will be billed full price for analysis.

**Report Information** (Please print):
1. Name: Leah Darche
Email: leah.darche@woodplc.com
2. Name: Charlotte Clark
Email: charlotte.clark@woodplc.com

**Report Format**
☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

**Turnaround Time Required (TAT)**
Regular TAT ☒ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:
20 AUG 17 5:45PM

**Invoice To** Same Yes ☐ / No ☐
Company: Wood
Contact: Rhonda MacDonald/ Denise Hirtle
Address:
Phone: Fax:
PO/Credit Card#:

**Regulatory Requirements** (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

**Drinking Water Sample:** ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

| Sample Identification | Date/Time Sampled | Sample Matrix | # Containers | Comments – Site/Sample Info. Sample Containment | Standard Water Analysis | Low Level Total Phosphorus | TSS | TKN | Total Coliforms, E. Coli (MPN) | Chlorophyll A & Pheophytin |
|---|---|---|---|---|---|---|---|---|---|---|
| KL-4 | 17Aug20 15:09 | SW | 7 | | X | X | X | X | X | X |
| KL-3 | 17Aug20 15:30 | SW | 7 | | X | X | X | X | X | X |
| KL-2 | 17Aug20 16:05 | SW | 7 | | X | X | X | X | X | X |
| KL-D2 | 17Aug20 16:37 | SW | 3 | | | X | X | | X | |
| KL-D1 | 17Aug20 17:00 | SW | 3 | | | X | X | | X | |

| Samples Relinquished By (Print Name): | Date/Time | Samples Received By (Print Name): | Date/Time |
|---|---|---|---|
| Elizabeth Robinson | 17Aug20 | | Aug17 |
| **Samples Relinquished By (Sign):** | **Date/Time** | **Samples Received By (Sign):** | **Date/Time** |
| | 17:40 | | |

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1
N°:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848

ATTENTION TO: Charlotte Clark

PROJECT: TE201017 - Fall Event

AGAT WORK ORDER: 20X670982

MICROBIOLOGY ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

WATER ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

DATE REPORTED: Nov 09, 2020

PAGES (INCLUDING COVER): 14

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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# Certificate of Analysis

AGAT WORK ORDER: 20X670982

PROJECT: TE201017 - Fall Event

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SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli (MPN)

DATE RECEIVED: 2020-10-29

DATE REPORTED: 2020-11-09

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | Hwy 102-1 | Hwy 102-2 | PML-1 | PML-2 | LSD | LU | KL-5 | KL-1 |
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | 1618748 | 1618749 | 1618750 | 1618751 | 1618752 | 1618753 | 1618754 | 1618755 |
| Total Coliforms (MPN) | MPN/100 mL | | 1 | 1200 | 816 | 250 | 285 | 1200 | 921 | 159 | 158 |
| E. Coli (MPN) | MPN/100 mL | | 1 | 3 | <1 | 2 | 2 | 2 | <1 | <1 | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | KL-2 | KL-3 | KL-4 |
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | 1618756 | 1618757 | 1618758 |
| Total Coliforms (MPN) | MPN/100 mL | | 1 | 1730 | 130 | 172 |
| E. Coli (MPN) | MPN/100 mL | | 1 | 4 | <1 | 5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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PROJECT: TE201017 - Fall Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Chlorophyll-a in Water

DATE RECEIVED: 2020-10-29

DATE REPORTED: 2020-11-09

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | Hwy 102-1 | Hwy 102-2 | PML-1 | PML-2 | LSD | LU | KL-5 | KL-1 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | 1618748 | 1618749 | 1618750 | 1618751 | 1618752 | 1618753 | 1618754 | 1618755 |
| Chlorophyll-a | µg/L | | 0.25 | 0.63 | 0.81 | 0.63 | 0.95 | 0.32 | 3.78 | 0.83 | 0.95 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | KL-2 | KL-3 | KL-4 |
| SAMPLE TYPE: | | | | Water | Water | Water |
| DATE SAMPLED: | | | | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | 1618756 | 1618757 | 1618758 |
| Chlorophyll-a | µg/L | | 0.25 | 3.15 | 0.64 | 0.63 |

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

Analysis performed at AGAT Vancouver (unless marked by *)

Certified By: Marta Manka



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CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

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SAMPLING SITE:

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## Low Level Total Phosphorous- 0.002mg/L

DATE RECEIVED: 2020-10-29

DATE REPORTED: 2020-11-09

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | Hwy 102-1 | Hwy 102-2 | PML-1 | PML-2 | LSD | LU | KL-5 | KL-1 |
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | 1618748 | 1618749 | 1618750 | 1618751 | 1618752 | 1618753 | 1618754 | 1618755 |
| Total Phosphorus | mg/L | | 0.002 | 0.007 | 0.013 | 0.020 | 0.004 | 0.010 | 0.016 | 0.004 | 0.029 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | KL-2 | KL-3 | KL-4 |
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | 1618756 | 1618757 | 1618758 |
| Total Phosphorus | mg/L | | 0.002 | 0.016 | 0.023 | 0.003 |

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

1618748-1618758 Total Phosphorous RDL is the calculated MDL.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Marta Manka



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CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2020-10-29

DATE REPORTED: 2020-11-09

| | | SAMPLE DESCRIPTION: | | Hwy 102-1 | Hwy 102-2 | PML-1 | PML-2 | LSD | | LU |
|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | | Water |
| | | DATE SAMPLED: | | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | 1618748 | 1618749 | 1618750 | 1618751 | 1618752 | RDL | 1618753 |
| pH | | | | 6.95 | 6.77 | 6.85 | 6.85 | 6.75 | | 7.19 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 6.2 | 6.7 | 2.3 | 2.4 | 3.9 | 0.5 | 5.2 |
| Chloride | mg/L | | 1 | 72 | 99 | 60 | 61 | 32 | 2 | 147 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | <0.12 | <0.12 | <0.12 | 0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 20 | 16 | 10 | 10 | 5 | 2 | 30 |
| Alkalinity | mg/L | | 5 | 14 | 11 | 5 | 7 | 13 | 5 | 17 |
| True Color | TCU | | 5.00 | 23.9 | 26.3 | 14.1 | 14.6 | 30.1 | 5.00 | 11.2 |
| Turbidity | NTU | | 0.5 | 1.0 | 3.0 | 0.6 | 0.7 | 0.7 | 0.5 | 1.7 |
| Electrical Conductivity | umho/cm | | 1 | 339 | 412 | 243 | 249 | 150 | 1 | 558 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.50 | 0.30 | 0.19 | 0.18 | 0.05 | 0.05 | 1.23 |
| Nitrate as N | mg/L | | 0.05 | 0.50 | 0.30 | 0.19 | 0.18 | 0.05 | 0.05 | 1.23 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 6.2 | 6.3 | 4.3 | 4.2 | 6.9 | 0.5 | 3.9 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 |
| Total Sodium | mg/L | | 0.1 | 41.7 | 57.8 | 36.3 | 39.6 | 21.9 | 0.1 | 86.1 |
| Total Potassium | mg/L | | 0.1 | 2.3 | 2.1 | 1.0 | 1.2 | 1.2 | 0.1 | 2.5 |
| Total Calcium | mg/L | | 0.1 | 17.8 | 19.2 | 7.4 | 8.3 | 6.3 | 0.1 | 16.7 |
| Total Magnesium | mg/L | | 0.1 | 2.4 | 2.8 | 1.1 | 1.3 | 1.5 | 0.1 | 2.3 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 14 | 11 | 5 | 7 | 13 | 5 | 17 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 | <10 | 10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | 5 | <5 |
| Calculated TDS | mg/L | | 1 | 167 | 206 | 120 | 127 | 77 | 1 | 301 |
| Hardness | mg/L | | | 54.3 | 59.5 | 23.0 | 26.1 | 21.9 | | 51.2 |
| Langelier Index (@20C) | NA | | | -2.26 | -2.52 | -3.18 | -2.98 | -2.91 | | -1.99 |
| Langelier Index (@ 4C) | NA | | | -2.58 | -2.84 | -3.50 | -3.30 | -3.23 | | -2.31 |
| Saturation pH (@ 20C) | NA | | | 9.21 | 9.29 | 10.0 | 9.83 | 9.66 | | 9.18 |
| Saturation pH (@ 4C) | NA | | | 9.53 | 9.61 | 10.3 | 10.2 | 9.98 | | 9.50 |
| Anion Sum | me/L | | | 2.76 | 3.37 | 2.01 | 2.08 | 1.27 | | 5.20 |

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ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2020-10-29

DATE REPORTED: 2020-11-09

| SAMPLE DESCRIPTION: | | | | Hwy 102-1 | Hwy 102-2 | PML-1 | PML-2 | LSD | | LU |
|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | | Water |
| DATE SAMPLED: | | | | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | 1618748 | 1618749 | 1618750 | 1618751 | 1618752 | RDL | 1618753 |
| Cation sum | me/L | | | 2.97 | 3.81 | 2.08 | 2.29 | 1.45 | | 4.86 |
| % Difference/ Ion Balance | % | | | 3.7 | 6.2 | 1.5 | 4.7 | 6.6 | | 3.4 |
| Total Copper | ug/L | | 1 | 2 | 2 | <1 | <1 | 1 | 1 | 3 |
| Total Iron | ug/L | | 50 | 196 | 1030 | 108 | 124 | 378 | 50 | 432 |
| Total Manganese | ug/L | | 2 | 8 | 99 | 21 | 32 | 102 | 2 | 63 |
| Total Phosphorous | mg/L | | 0.02 | 0.02 | 0.03 | 0.02 | 0.03 | <0.02 | 0.02 | 0.03 |
| Total Zinc | ug/L | | 5 | <5 | 7 | <5 | <5 | <5 | 5 | 22 |

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SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2020-10-29

DATE REPORTED: 2020-11-09

| | | SAMPLE DESCRIPTION: | | KL-5 | KL-1 | KL-2 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | 1618754 | 1618755 | 1618756 | 1618757 | 1618758 |
| pH | | | | 6.81 | 6.79 | 6.49 | 6.83 | 6.86 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 1.9 | 2.0 | 4.7 | 2.1 | 2.1 |
| Chloride | mg/L | | 1 | 61 | 60 | 15 | 59 | 91 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | <0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 9 | 9 | 5 | 9 | 13 |
| Alkalinity | mg/L | | 5 | 8 | 7 | 7 | 8 | 5 |
| True Color | TCU | | 5.00 | 15.0 | 15.8 | 80.6 | 12.1 | 15.5 |
| Turbidity | NTU | | 0.5 | 0.9 | 0.7 | 2.9 | 0.7 | 1.1 |
| Electrical Conductivity | umho/cm | | 1 | 248 | 239 | 88 | 240 | 240 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.17 | 0.17 | 0.08 | 0.18 | 0.17 |
| Nitrate as N | mg/L | | 0.05 | 0.17 | 0.17 | 0.08 | 0.18 | 0.17 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 4.0 | 12.1 | 4.2 | 4.1 | 2.1 |
| Ortho-Phosphate as P | mg/L | | 0.01 | 0.01 | 0.01 | <0.01 | <0.01 | 0.02 |
| Total Sodium | mg/L | | 0.1 | 38.0 | 40.3 | 7.8 | 39.4 | 39.6 |
| Total Potassium | mg/L | | 0.1 | 1.0 | 0.8 | 0.7 | 1.0 | 1.0 |
| Total Calcium | mg/L | | 0.1 | 7.0 | 6.4 | 3.0 | 7.3 | 7.1 |
| Total Magnesium | mg/L | | 0.1 | 1.1 | 1.0 | 0.8 | 1.2 | 1.2 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 8 | 7 | 7 | 8 | 5 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 123 | 123 | 38 | 123 | 157 |
| Hardness | mg/L | | | 22.0 | 20.1 | 10.8 | 23.2 | 22.7 |
| Langelier Index (@20C) | NA | | | -3.04 | -3.15 | -3.73 | -3.00 | -3.20 |
| Langelier Index (@ 4C) | NA | | | -3.36 | -3.47 | -4.05 | -3.32 | -3.52 |
| Saturation pH (@ 20C) | NA | | | 9.85 | 9.94 | 10.2 | 9.83 | 10.1 |
| Saturation pH (@ 4C) | NA | | | 10.2 | 10.3 | 10.5 | 10.1 | 10.4 |
| Anion Sum | me/L | | | 2.08 | 2.03 | 0.67 | 2.02 | 2.95 |

Certified By: Marta Manka



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PROJECT: TE201017 - Fall Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2020-10-29

DATE REPORTED: 2020-11-09

| | | | | SAMPLE DESCRIPTION: | KL-5 | KL-1 | KL-2 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | | 1618754 | 1618755 | 1618756 | 1618757 | 1618758 |
| Cation sum | me/L | | | | 2.13 | 2.19 | 0.64 | 2.22 | 2.21 |
| % Difference/ Ion Balance | % | | | | 1.2 | 3.7 | 2.6 | 4.5 | 14.3 |
| Total Copper | ug/L | | 1 | | <1 | 1 | 1 | 1 | 1 |
| Total Iron | ug/L | | 50 | | 111 | 88 | 659 | 105 | 102 |
| Total Manganese | ug/L | | 2 | | 25 | 15 | 168 | 19 | 18 |
| Total Phosphorous | mg/L | | 0.02 | | 0.02 | 0.03 | 0.02 | 0.02 | <0.02 |
| Total Zinc | ug/L | | 5 | | <5 | <5 | <5 | <5 | <5 |

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

1618748-1618755 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

1618756 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

When the cation and anion sums are at, or below 1 me/L, the acceptable criteria is less than 0.3me/L

1618757-1618758 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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SAMPLING SITE:

SAMPLED BY:

## TKN, TSS

DATE RECEIVED: 2020-10-29

DATE REPORTED: 2020-11-09

| | | SAMPLE DESCRIPTION: | | Hwy 102-1 | Hwy 102-2 | PML-1 | PML-2 | LSD | LU | KL-5 | KL-1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | 1618748 | 1618749 | 1618750 | 1618751 | 1618752 | 1618753 | 1618754 | 1618755 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | 3.8 | 9.8 | 0.6 | <0.4 | 0.6 | 6.4 | 8.1 | 1.7 |
| Total Suspended Solids | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |

| | | SAMPLE DESCRIPTION: | | KL-2 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2020-10-29 08:40 | 2020-10-29 08:40 | 2020-10-29 08:40 |
| Parameter | Unit | G / S | RDL | 1618756 | 1618757 | 1618758 |
| Total Kjeldahl Nitrogen as N | mg/L | | 0.4 | 0.6 | 0.8 | 0.8 |
| Total Suspended Solids | mg/L | | 5 | 5 | <5 | <5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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# Quality Assurance

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AGAT WORK ORDER: 20X670982
PROJECT: TE201017 - Fall Event
ATTENTION TO: Charlotte Clark
SAMPLING SITE:
SAMPLED BY:

## Water Analysis

RPT Date: Nov 09, 2020

| PARAMETER | Batch | Sample Id | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| pH | 1618772 | | 5.52 | 5.32 | 3.7% | < | 101% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Reactive Silica as SiO2 | 1618798 | | 1.3 | 1.4 | NA | < 0.5 | 94% | 80% | 120% | 94% | 80% | 120% | 100% | 80% | 120% |
| Chloride | 1615296 | 1615296 | 8 | 8 | 1.6% | | 91% | 80% | 120% | NA | 80% | 120% | 90% | 70% | 130% |
| Fluoride | 1616350 | | 0.47 | 0.48 | NA | < 0.12 | 113% | 80% | 120% | NA | 80% | 120% | 91% | 70% | 130% |
| Sulphate | 1616350 | | 13 | 11 | 12.5% | < 2 | 98% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Alkalinity | 1618772 | | <5 | <5 | NA | < 5 | 92% | 80% | 120% | NA | | | NA | | |
| True Color | 1618798 | | <5.00 | <5.00 | NA | < 5 | 97% | 80% | 120% | 99% | 80% | 120% | NA | | |
| Turbidity | 1634630 | | 81.8 | 81.2 | 0.7% | < 0.5 | 101% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 1618772 | | 33 | 32 | 1.9% | < 1 | 103% | 90% | 110% | NA | | | NA | | |
| Nitrate as N | 1616350 | | <0.05 | <0.05 | NA | < 0.05 | 97% | 80% | 120% | NA | 80% | 120% | 95% | 70% | 130% |
| Nitrite as N | 1616350 | | <0.05 | <0.05 | NA | < 0.05 | 81% | 80% | 120% | NA | 80% | 120% | 98% | 70% | 130% |
| Ammonia as N | 1619721 | | 0.03 | 0.04 | NA | < 0.03 | 94% | 80% | 120% | 99% | 80% | 120% | 95% | 70% | 130% |
| Total Organic Carbon | 1619814 | | 5.1 | 5.5 | 6.8% | < 0.5 | 90% | 80% | 120% | NA | 80% | 120% | 88% | 80% | 120% |
| Ortho-Phosphate as P | 1618798 | | 0.02 | 0.01 | NA | < 0.01 | 91% | 80% | 120% | 103% | 80% | 120% | 95% | 80% | 120% |
| Total Sodium | 1621746 | | 20.4 | 20.9 | 2.4% | < 0.1 | 102% | 80% | 120% | 102% | 80% | 120% | NA | 70% | 130% |
| Total Potassium | 1621746 | | 1.9 | 1.9 | 3.7% | < 0.1 | 99% | 80% | 120% | 102% | 80% | 120% | NA | 70% | 130% |
| Total Calcium | 1621746 | | 30.3 | 32.6 | 7.4% | < 0.1 | 99% | 80% | 120% | 100% | 80% | 120% | NA | 70% | 130% |
| Total Magnesium | 1621746 | | 7.9 | 8.3 | 4.9% | < 0.1 | 101% | 80% | 120% | 106% | 80% | 120% | NA | 70% | 130% |
| Bicarb. Alkalinity (as CaCO3) | 1618772 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 1618772 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Hydroxide | 1618772 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Copper | 1621746 | | <1 | <1 | NA | < 1 | 98% | 80% | 120% | 94% | 80% | 120% | 103% | 70% | 130% |
| Total Iron | 1621746 | | 55 | 64 | NA | < 50 | 96% | 80% | 120% | 106% | 80% | 120% | 129% | 70% | 130% |
| Total Manganese | 1621746 | | 4 | 4 | NA | < 2 | 93% | 80% | 120% | 90% | 80% | 120% | 105% | 70% | 130% |
| Total Phosphorous | 1621746 | | 0.03 | 0.02 | NA | < 0.02 | 107% | 80% | 120% | 112% | 80% | 120% | 85% | 70% | 130% |
| Total Zinc | 1621746 | | <5 | <5 | NA | < 5 | 93% | 80% | 120% | 90% | 80% | 120% | 94% | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TKN, TSS | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | 1614678 | | 0.5 | 0.8 | NA | < 0.4 | 105% | 80% | 120% | 107% | 80% | 120% | 110% | 80% | 120% |
| Total Suspended Solids | 1616549 | | <5 | <5 | NA | < 5 | 97% | 80% | 120% | NA | | | 92% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| pH | 1616365 | | 7.28 | 7.26 | 0.3% | < | 101% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Chloride | 1627834 | | <1 | <1 | NA | < 1 | 92% | 80% | 120% | NA | 80% | 120% | 97% | 70% | 130% |
| Fluoride | 1627834 | | <0.12 | <0.12 | NA | < 0.12 | 112% | 80% | 120% | NA | 80% | 120% | 115% | 70% | 130% |
| Sulphate | 1627834 | | <2 | <2 | NA | < 2 | 100% | 80% | 120% | NA | 80% | 120% | 104% | 70% | 130% |
| Alkalinity | 1616365 | | 15 | 14 | NA | < 5 | 92% | 80% | 120% | NA | | | NA | | |



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.

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of
PROJECT: TE201017 - Fall Event
SAMPLING SITE:

AGAT WORK ORDER: 20X670982
ATTENTION TO: Charlotte Clark
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Nov 09, 2020 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Electrical Conductivity | 1616365 | | 100 | 99 | 0.6% | < 1 | 104% | 90% | 110% | NA | | | NA | | |
| Nitrate as N | 1627834 | | <0.05 | <0.05 | NA | < 0.05 | 93% | 80% | 120% | NA | 80% | 120% | 93% | 70% | 130% |
| Nitrite as N | 1627834 | | <0.05 | <0.05 | NA | < 0.05 | 81% | 80% | 120% | NA | 80% | 120% | 91% | 70% | 130% |
| Bicarb. Alkalinity (as CaCO3) | 1616365 | | 15 | 14 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 1616365 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Hydroxide | 1616365 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low Level Total Phosphorous- 0.002mg/L | | | | | | | | | | | | | | | |
| Total Phosphorus | 1647634 | | 0.008 | 0.010 | NA | < 0.002 | 101% | 70% | 130% | 101% | 80% | 120% | 102% | 70% | 130% |

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low Level Total Phosphorous- 0.002mg/L | | | | | | | | | | | | | | | |
| Total Phosphorus | 1618756 | 1618756 | 0.016 | 0.016 | 0% | < 0.002 | 101% | 70% | 130% | 101% | 80% | 120% | 101% | 70% | 130% |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chlorophyll-a in Water | | | | | | | | | | | | | | | |
| Chlorophyll-a | 1639854 | | 840 | 1045 | 20.0% | < 0.25 | 92% | 85% | 115% | | | | | | |

Certified By: Marta Manka



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X670982

PROJECT: TE201017 - Fall Event

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MPN) | MIC-121-7000 | Based on SM 9223B | INCUBATOR |
| E. Coli (MPN) | MIC-121-7000 | Based on SM 9223B | INCUBATOR |



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 20X670982

PROJECT: TE201017 - Fall Event

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Chlorophyll-a | | SM 10200 H | SPECTROPHOTOMETER |
| Total Phosphorus | INOR-93-6022 | modified from SM 4500-P B and SM 4500-P E | SPECTROPHOTOMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Fluoride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| True Color | INOR-121-6008 | SM 2120 B | LACHAT FIA |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Potassium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Hydroxide | INORG-121-6001 | SM 2320 B | PC-TITRATE |
| Calculated TDS | | SM 1030E | CALCULATION |
| Hardness | | SM 2340B | CALCULATION |
| Langelier Index (@20C) | | | CALCULATION |
| Langelier Index (@ 4C) | | | CALCULATION |
| Saturation pH (@ 20C) | | | CALCULATION |
| Saturation pH (@ 4C) | | | CALCULATION |
| Anion Sum | | SM 1030E | CALCULATION |
| Cation sum | | SM 1030E | CALCULATION |
| % Difference/ Ion Balance | | SM 1030E | CALCULATION |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorous | MET-121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Kjeldahl Nitrogen as N | INOR-121-6020 | SM 4500-NORG D | COLORIMETER |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |



Results relate only to the items tested. Results apply to samples as received.

# AGAT Laboratories

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## Chain of Custody Record

**Laboratory Use Only**

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 5.1, 33.6.0
Hold Time: 20x670982
AGAT Job Number: '20 OCT 29 2:50PM
Notes:

**Report Information**

Company: Wood
Contact: Charlotte Clark
Address: 50 Troop Ave, Unit 300, Dartmouth, NS
Phone: 902-468-2848 Fax:
Client Project #: TE201017 - Fall Event
AGAT Quotation: 335022BP
Please Note: If quotation number is not provided client will be billed full price for analysis.

**Report Information** (Please print):

1. Name: Charlotte Clark
   Email: charlotte.clark@woodplc.com
2. Name: Leah Darche
   Email: leah.darche@woodplc.com

**Report Format**

☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

**Turnaround Time Required (TAT)**

Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

**Invoice To** Same Yes ☐ / No ☐

Company: Wood
Contact: Rhonda MacDonald/ Denise Hirtle
Address:
Phone: Fax:
PO/Credit Card#:

**Regulatory Requirements** (Check):

☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

**Drinking Water Sample:** ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

| Sample Identification | Date/Time Sampled | Sample Matrix | # Containers | Comments – Site/Sample Info. Sample Containment | Standard Water Analysis | Low Level Total Phosphorus | TSS | TKN | Total Coliforms, E. Coli (MPN) | Chlorophyll A & Pheophytin |
|---|---|---|---|---|---|---|---|---|---|---|
| HWY102-1 | 29Oct20 8:40 | SW | 7 | | X | X | X | X | X | X |
| HWY102-2 | 29Oct20/9:01 | SW | 7 | | X | X | X | X | X | X |
| PML-1 | 29Oct20/10:02 | SW | 7 | | X | X | X | X | X | X |
| PML-2 | 29Oct20/10:25 | SW | 7 | | X | X | X | X | X | X |
| LSD | " /11:22 | SW | 7 | | X | X | X | X | X | X |
| LU | " /12:22 | SW | 7 | | X | X | X | X | X | X |
| KL-5 | " /12:45 | SW | 7 | | X | X | X | X | X | X |
| KL-1 | " /12:59 | SW | 7 | | X | X | X | X | X | X |
| KL-2 | " /13:22 | SW | 7 | | X | X | X | X | X | X |
| KL-3 | " /13:42 | SW | 7 | | X | X | X | X | X | X |
| KL-4 | " /13:59 | SW | 7 | | X | X | X | X | X | X |
| | | SW | | | | | | | | |

| Samples Relinquished By (Print Name) | Date/Time | Samples Received By (Print Name) | Date/Time |
|---|---|---|---|
| Elizabeth Robinson | 29 Oct 20 | | |
| Samples Relinquished By (Sign) | Date/Time | Samples Received By (Sign) | Date/Time |
| [signature] | 14:49 | [signature] | |

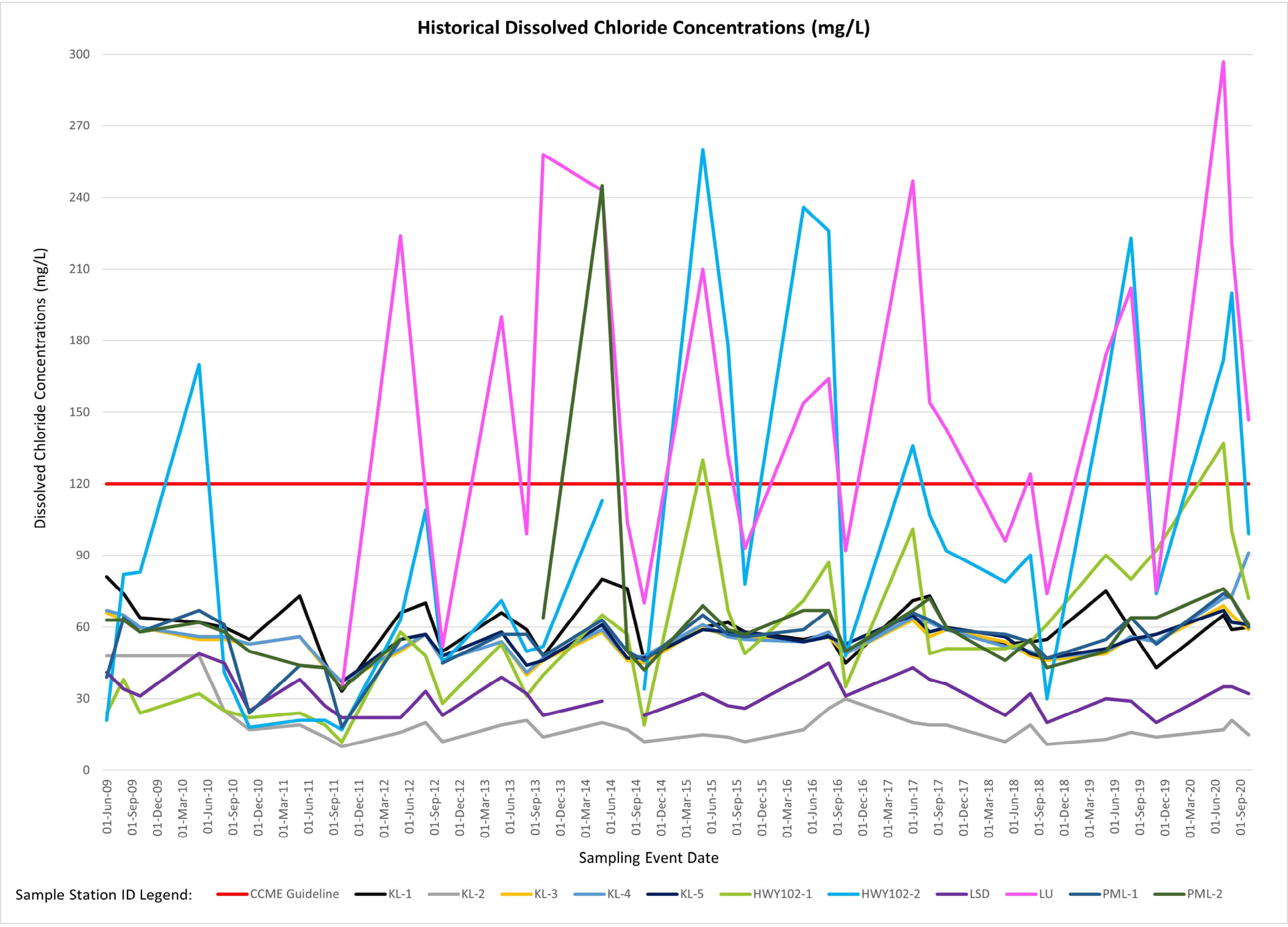
Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

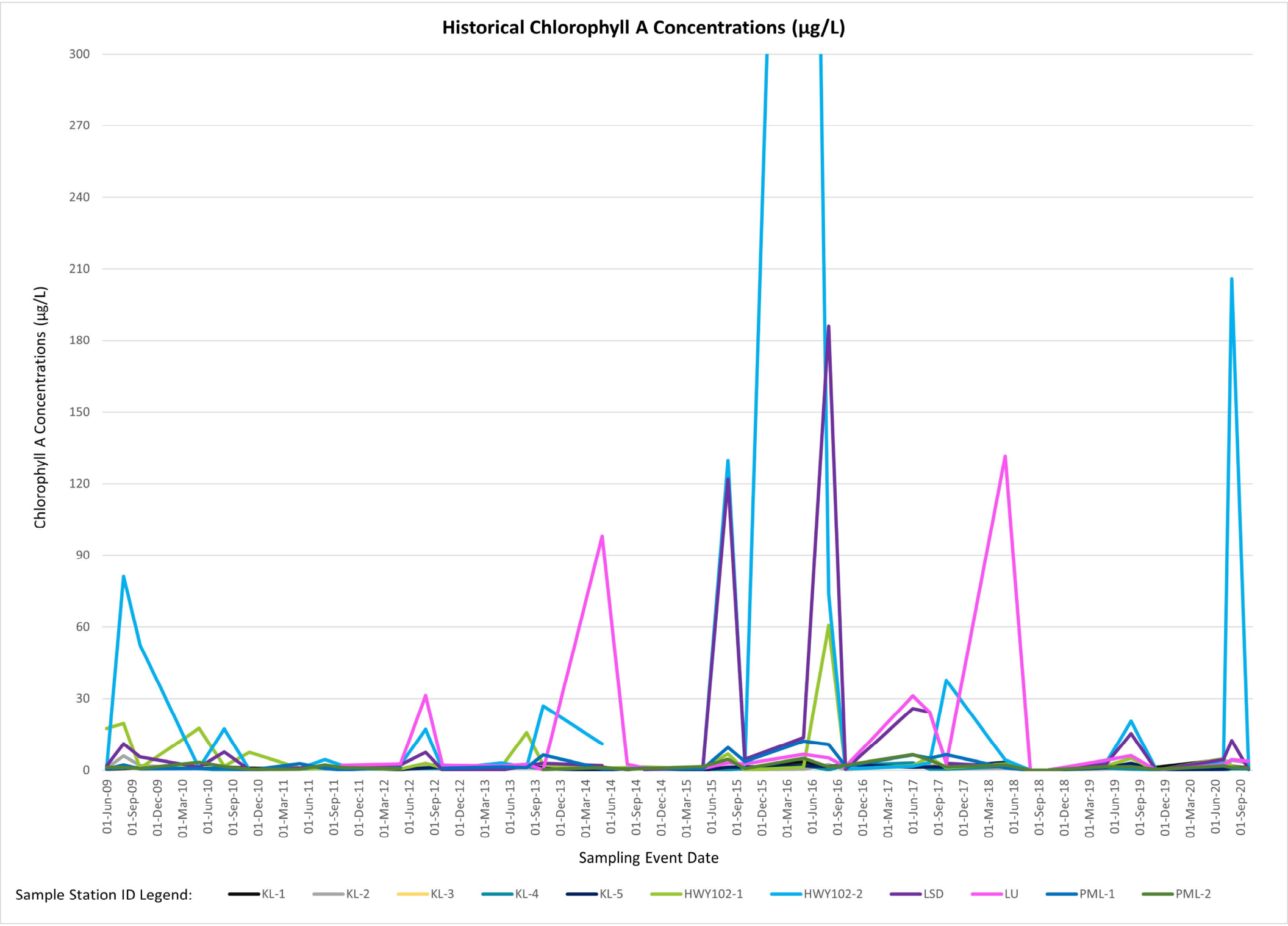
Page 1 of 1
Nº:

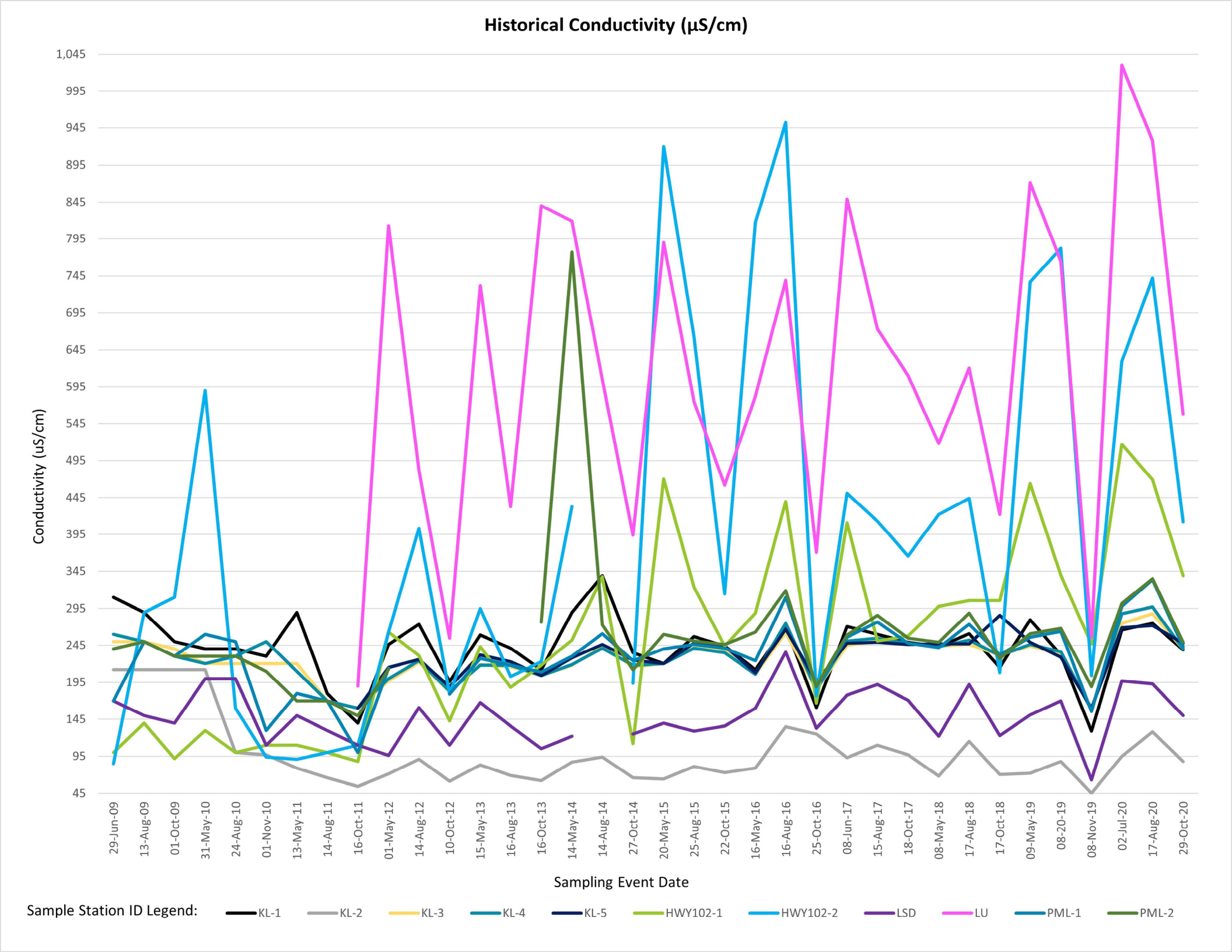
Document ID: DW-113-1002.002
Date revised: May 19, 2019

# Appendix E

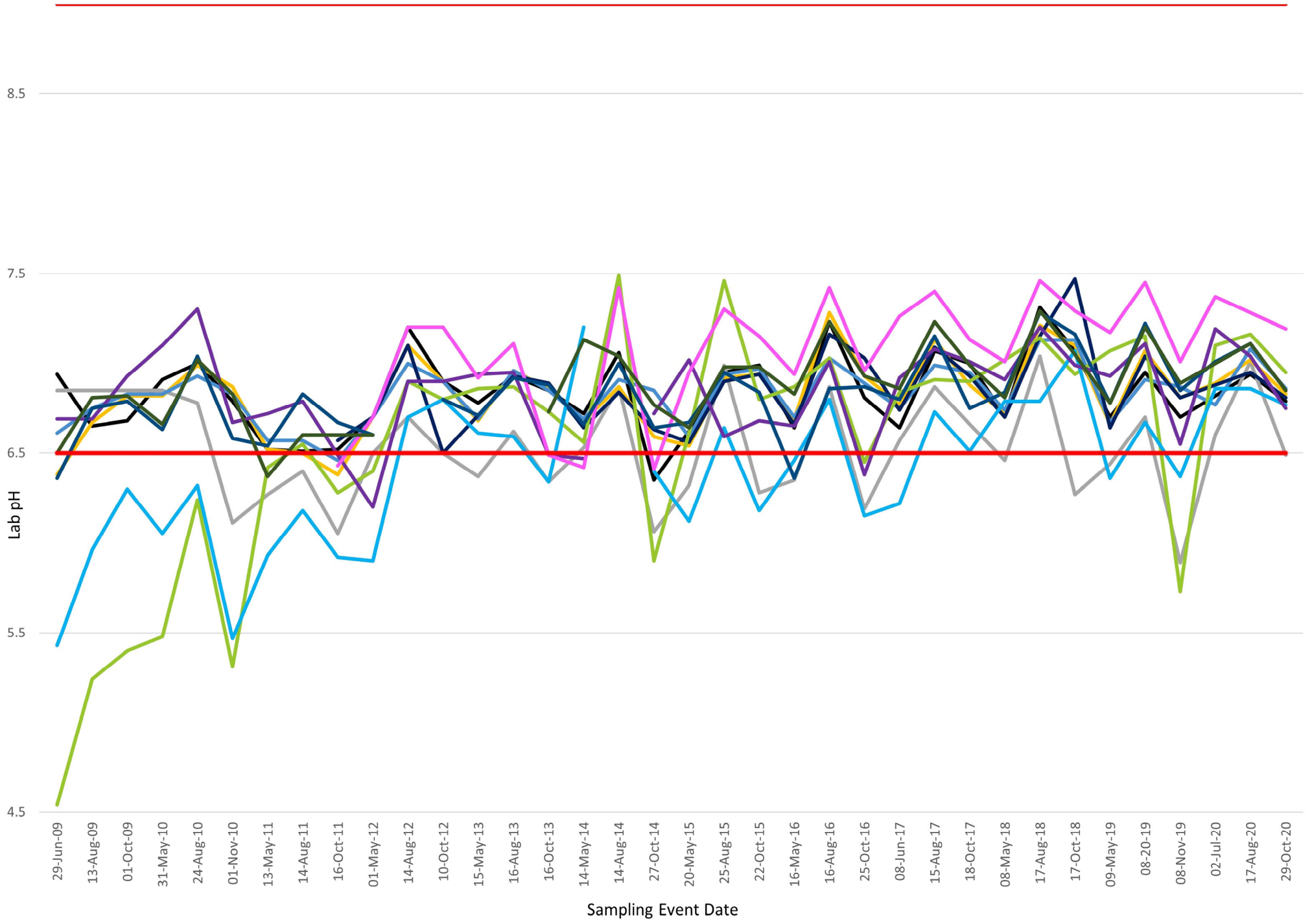
# Graphs


Historical Dissolved Chloride Concentrations (mg/L)
Dissolved Chloride Concentrations (mg/L)
300
270
240
210
180
150
120
90
60
30
0
01-Jun-09
01-Sep-09
01-Dec-09
01-Mar-10
01-Jun-10
01-Sep-10
01-Dec-10
01-Mar-11
01-Jun-11
01-Sep-11
01-Dec-11
01-Mar-12
01-Jun-12
01-Sep-12
01-Dec-12
01-Mar-13
01-Jun-13
01-Sep-13
01-Dec-13
01-Mar-14
01-Jun-14
01-Sep-14
01-Dec-14
01-Mar-15
01-Jun-15
01-Sep-15
01-Dec-15
01-Mar-16
01-Jun-16
01-Sep-16
01-Dec-16
01-Mar-17
01-Jun-17
01-Sep-17
01-Dec-17
01-Mar-18
01-Jun-18
01-Sep-18
01-Dec-18
01-Mar-19
01-Jun-19
01-Sep-19
01-Dec-19
01-Mar-20
01-Jun-20
01-Sep-20
Sampling Event Date
Sample Station ID Legend:
CCME Guideline
KL-1
KL-2
KL-3
KL-4
KL-5
HWY102-1
HWY102-2
LSD
LU
PML-1
PML-2


Historical Chlorophyll A Concentrations (µg/L)
Chlorophyll A Concentrations (µg/L)
300
270
240
210
180
150
120
90
60
30
0
01-Jun-09
01-Sep-09
01-Dec-09
01-Mar-10
01-Jun-10
01-Sep-10
01-Dec-10
01-Mar-11
01-Jun-11
01-Sep-11
01-Dec-11
01-Mar-12
01-Jun-12
01-Sep-12
01-Dec-12
01-Mar-13
01-Jun-13
01-Sep-13
01-Dec-13
01-Mar-14
01-Jun-14
01-Sep-14
01-Dec-14
01-Mar-15
01-Jun-15
01-Sep-15
01-Dec-15
01-Mar-16
01-Jun-16
01-Sep-16
01-Dec-16
01-Mar-17
01-Jun-17
01-Sep-17
01-Dec-17
01-Mar-18
01-Jun-18
01-Sep-18
01-Dec-18
01-Mar-19
01-Jun-19
01-Sep-19
01-Dec-19
01-Mar-20
01-Jun-20
01-Sep-20
Sampling Event Date
Sample Station ID Legend:
KL-1
KL-2
KL-3
KL-4
KL-5
HWY102-1
HWY102-2
LSD
LU
PML-1
PML-2

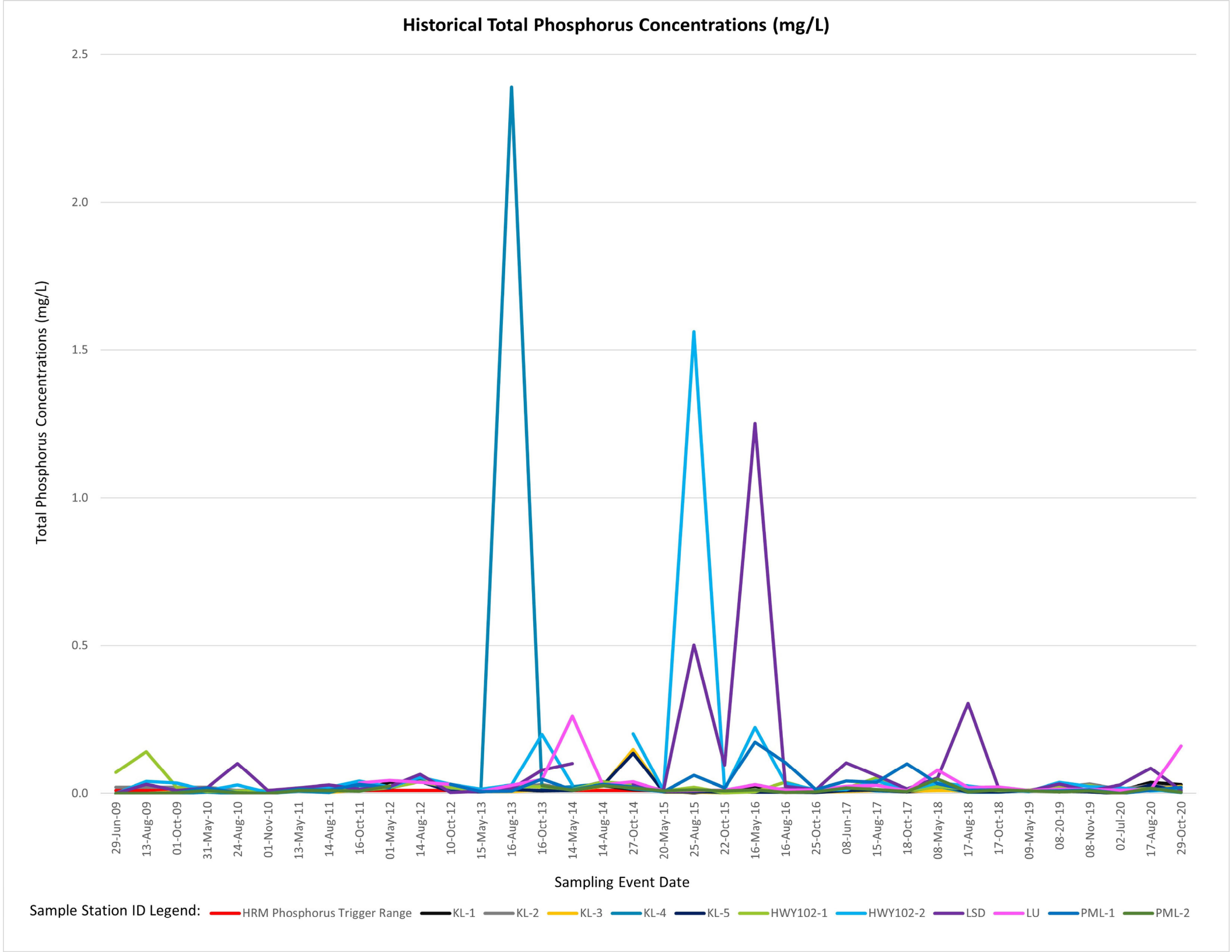

Historical Conductivity (µS/cm)
Conductivity (uS/cm)
1,045
995
945
895
845
795
745
695
645
595
545
495
445
395
345
295
245
195
145
95
45
29-Jun-09
13-Aug-09
01-Oct-09
31-May-10
24-Aug-10
01-Nov-10
13-May-11
14-Aug-11
16-Oct-11
01-May-12
14-Aug-12
10-Oct-12
15-May-13
16-Aug-13
16-Oct-13
14-May-14
14-Aug-14
27-Oct-14
20-May-15
25-Aug-15
22-Oct-15
16-May-16
16-Aug-16
25-Oct-16
08-Jun-17
15-Aug-17
18-Oct-17
08-May-18
17-Aug-18
17-Oct-18
09-May-19
08-20-19
08-Nov-19
02-Jul-20
17-Aug-20
29-Oct-20
Sampling Event Date
Sample Station ID Legend:
KL-1
KL-2
KL-3
KL-4
KL-5
HWY102-1
HWY102-2
LSD
LU
PML-1
PML-2

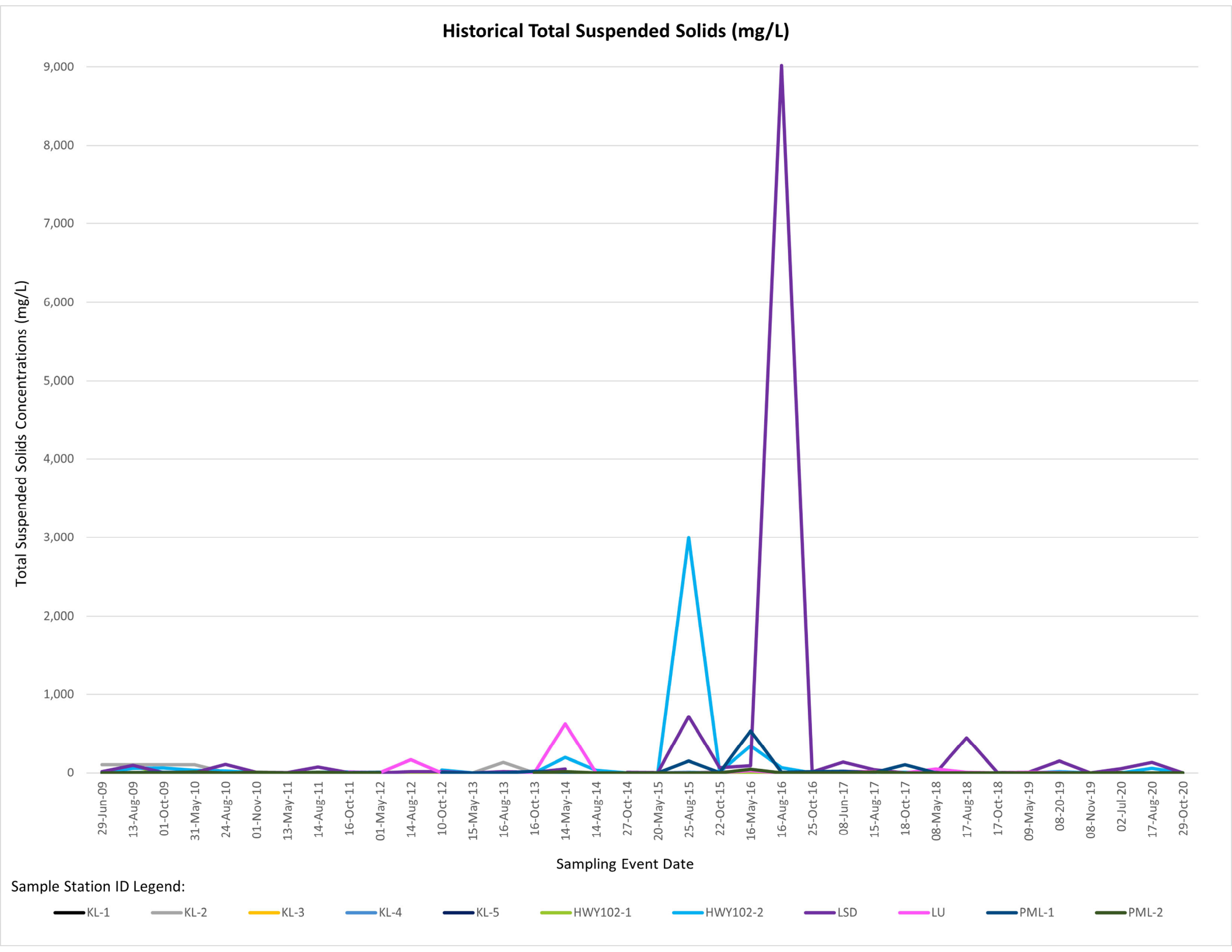
# Historical Laboratory pH Units




Sample Station ID Legend:

KL-1 KL-2 KL-3 KL-4 KL-5 HWY102-1 HWY102-2 LSD LU PML-1 PML-2 CCME Guideline (min) CCME Guideline (max)


Historical Total Phosphorus Concentrations (mg/L)
Total Phosphorus Concentrations (mg/L)
2.5
2.0
1.5
1.0
0.5
0.0
29-Jun-09
13-Aug-09
01-Oct-09
31-May-10
24-Aug-10
01-Nov-10
13-May-11
14-Aug-11
16-Oct-11
01-May-12
14-Aug-12
10-Oct-12
15-May-13
16-Aug-13
16-Oct-13
14-May-14
14-Aug-14
27-Oct-14
20-May-15
25-Aug-15
22-Oct-15
16-May-16
16-Aug-16
25-Oct-16
08-Jun-17
15-Aug-17
18-Oct-17
08-May-18
17-Aug-18
17-Oct-18
09-May-19
08-20-19
08-Nov-19
02-Jul-20
17-Aug-20
29-Oct-20
Sampling Event Date
Sample Station ID Legend:
HRM Phosphorus Trigger Range
KL-1
KL-2
KL-3
KL-4
KL-5
HWY102-1
HWY102-2
LSD
LU
PML-1
PML-2


Historical Total Suspended Solids (mg/L)
Total Suspended Solids Concentrations (mg/L)
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
29-Jun-09
13-Aug-09
01-Oct-09
31-May-10
24-Aug-10
01-Nov-10
13-May-11
14-Aug-11
16-Oct-11
01-May-12
14-Aug-12
10-Oct-12
15-May-13
16-Aug-13
16-Oct-13
14-May-14
14-Aug-14
27-Oct-14
20-May-15
25-Aug-15
22-Oct-15
16-May-16
16-Aug-16
25-Oct-16
08-Jun-17
15-Aug-17
18-Oct-17
08-May-18
17-Aug-18
17-Oct-18
09-May-19
08-20-19
08-Nov-19
02-Jul-20
17-Aug-20
29-Oct-20
Sampling Event Date
Sample Station ID Legend:
KL-1
KL-2
KL-3
KL-4
KL-5
HWY102-1
HWY102-2
LSD
LU
PML-1
PML-2

# Appendix F

# Calibration Logs

# INSTRUMENT CALIBRATION REPORT

**Pine Environmental Services LLC**

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

## Pine Environmental Services, Inc.

**Instrument ID** 27633
**Description** YSI 556
**Calibrated** 6/26/2020 12:05:37PM

**Manufacturer** YSI
**Model Number** 556
**Serial Number/ Lot Number** 15A101424
**Location** Ontario
**Department**

**State Certified**
**Status** Pass
**Temp °C** 22
**Humidity %** 45

### Calibration Specifications

**Group #** 1
**Group Name** pH
**Stated Accy** Plus / Minus
**Range Acc %** 0.0000
**Reading Acc %** 0.0000
**Plus/Minus** 0.20

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 4.00 / 4.00 | PH | 4.00 | PH | 3.96 | 4.00 | 0.00% | Pass |
| 7.00 / 7.00 | PH | 7.00 | PH | 7.07 | 7.00 | 0.00% | Pass |
| 10.00 / 10.00 | PH | 10.00 | PH | 9.92 | 10.00 | 0.00% | Pass |

**Group #** 2
**Group Name** Conductivity
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 1.0000
**Plus/Minus** 0.000

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 1.413 / 1.413 | ms/cm | 1.413 | ms/cm | 1.448 | 1.413 | 0.00% | Pass |

**Group #** 3
**Group Name** ORP
**Stated Accy** Plus / Minus
**Range Acc %** 0.0000
**Reading Acc %** 0.0000
**Plus/Minus** 20.00

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 240.00 / 240.00 | mv | 240.00 | mv | 232.50 | 240.00 | 0.00% | Pass |

**Group #** 4
**Group Name** Dissolved Oxygen Span
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 0.0000
**Plus/Minus** 3.00

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 0.00 / 0.00 | % | 0.00 | % | 0.00 | 0.00 | 0.00% | Pass |
| 100.00 / 100.00 | % | 100.00 | % | 98.60 | 100.00 | 0.00% | Pass |

# INSTRUMENT CALIBRATION REPORT

**Pine Environmental Services LLC**
6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

## Pine Environmental Services, Inc.

**Instrument ID** 27633
**Description** YSI 556
**Calibrated** 6/26/2020 12:05:37PM

**Test Instruments Used During the Calibration** (As Of Cal Entry Date)

| Test Standard ID | Description | Manufacturer | Model Number | Serial Number / Lot Number | Last Cal Date/ Opened Date | Next Cal Date / Expiration Date |
|---|---|---|---|---|---|---|
| ON_CAA_H20 1413 MS/CM 9GK393 | Conductivity Standard 1.413 mS/cm (1413 µS/cm) | AquaPhoenix Scientific | 31986 | 9GK393 | | 11/30/2020 |
| ON_CAA_H20 240 MV 3640 | ORP Standard 240 mV | Hanna | HI 7021 | 3640 | | 11/30/2023 |
| ON_CAA_H20 DO ZERO 2017010359 | ON_CAA_H20 Sodium Sulfite 2017010359 | EMD | 14548 | 2017010359 | | |
| ON_CAA_H20 NIST 23609-204 | ON_CAA_H20 NIST Traceable Thermometer | Pine Environmental Services, Inc. | 23609-204 | 181805368 | | 12/12/2020 |
| ON_CAA_H20 PH10 9GK002 | Buffer Solution, pH 10.00 +/- 0.01 @ 25°C | AquaPhoenix Scientific | 32034 | 9GK002 | | 7/31/2020 |
| ON_CAA_H20 PH4 | ON_CAA_H20 pH7 Lot: 9GK205 | Pine Environmental Services, Inc. | | 9GK205 | | 10/31/2020 |
| ON_CAA_H20 PH7 LOT: 9GB719 | ON_CAA_H20 pH7 Lot: 9GB719 | Pine Environmental Services, Inc. | | 9GB719 | | 10/31/2020 |

**Notes about this calibration**

**Calibration Result** Calibration Successful
**Who Calibrated** Nathan Nguyen

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

**Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment**
**Please call 800-301-9663 for Technical Assistance**

# INSTRUMENT CALIBRATION REPORT

**Pine Environmental Services LLC**
6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

## Pine Environmental Services, Inc.

**Instrument ID** 22392
**Description** YSI 556
**Calibrated** 8/13/2020 11:51:00AM

**Test Instruments Used During the Calibration** (As Of Cal Entry Date)

| Test Standard ID | Description | Manufacturer | Model Number | Serial Number / Lot Number | Last Cal Date / Opened Date | Next Cal Date / Expiration Date |
|---|---|---|---|---|---|---|
| ON_CAA_H20 1413 MS/CM 9GK393 | Conductivity Standard 1.413 mS/cm (1413 µS/cm) | AquaPhoenix Scientific | 31986 | 9GK393 | | 11/30/2020 |
| ON_CAA_H20 240 MV 3640 | ORP Standard 240 mV | Hanna | HI 7021 | 3640 | | 11/30/2023 |
| ON_CAA_H20 DO ZERO 2017010359 | ON_CAA_H20 Sodium Sulfite 2017010359 | EMD | 14548 | 2017010359 | | |
| ON_CAA_H20 NIST 23609-204 | ON_CAA_H20 NIST Traceable Thermometer | Pine Environmental Services, Inc. | 23609-204 | 181805368 | | 12/12/2020 |
| ON_CAA_H20 PH4 | ON_CAA_H20 pH7 Lot: 9GK205 | Pine Environmental Services, Inc. | | 9GK205 | | 10/31/2020 |
| ON_CAA_H20 PH7 LOT: 9GB719 | ON_CAA_H20 pH7 Lot: 9GB719 | Pine Environmental Services, Inc. | | 9GB719 | | 10/31/2020 |

**Notes about this calibration**

**Calibration Result** Calibration Successful
**Who Calibrated** Nathan Nguyen

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

**Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment**
**Please call 800-301-9663 for Technical Assistance**

# INSTRUMENT CALIBRATION REPORT

**Pine Environmental Services LLC**
6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

## Pine Environmental Services, Inc.

**Instrument ID** 22392
**Description** YSI 556
**Calibrated** 8/13/2020 11:51:00AM

**Manufacturer** YSI
**Model Number** 556
**Serial Number/ Lot Number** 13J102398
**Location** Ontario
**Department**

**State Certified**
**Status** Pass
**Temp °C** 25
**Humidity %** 50

### Calibration Specifications

**Group #** 1
**Group Name** PH
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 3.0000
**Plus/Minus** 0.00

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 7.00 / 7.00 | PH | 7.00 | PH | 6.91 | 7.00 | 0.00% | Pass |
| 4.00 / 4.00 | PH | 4.00 | PH | 4.13 | 4.00 | 0.00% | Pass |
| 10.00 / 10.00 | PH | 10.00 | PH | 9.95 | 10.00 | 0.00% | Pass |

**Group #** 2
**Group Name** Conductivity
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 3.0000
**Plus/Minus** 0.000

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 1.413 / 1.413 | ms/cm | 1.413 | ms/cm | 1.365 | 1.413 | 0.00% | Pass |

**Group #** 3
**Group Name** Redox (ORP)
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 3.0000
**Plus/Minus** 0.00

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 240.00 / 240.00 | mv | 240.00 | mv | 235.20 | 240.00 | 0.00% | Pass |

**Group #** 4
**Group Name** Disolved Oxygen Span
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 3.0000
**Plus/Minus** 0.00

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 100.00 / 100.00 | % | 100.00 | % | 107.50 | 100.00 | 0.00% | Pass |

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# Certificate of Calibration

*This certifies that YSI Pro Plus Quatro Sn.* 19J10294 *has been calibrated following the Manufacturer's published specifications and methods.*

| 3-Point pH | Spec. Cond. | ORP | DO |
|---|---|---|---|
| 4.00, 7.00, 10.00 | 1413uS/cm | 240mV | 8.80 @ 22 Deg.C MG/L |
| pH 4.00 lot # 9GH758 Exp.08/2021 | lot # 9GK817 Exp.11/2020 | Lot#3086 exp.06/2023 | |
| pH 7.00 lot # 9GK721 Exp.11/2021 | @ 25deg C | | |
| pH 10.00 lot #9GH1011 | Exp.08/2021 | | |

Aug. 07, 2020

Calibrated

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# 2021 HRM Water Quality Monitoring Program – Bedford West

Final Report
Bedford West Subdivision and Papermill Lake Watershed
Project #TE201017

Prepared for:

**Halifax Regional Municipality**
40 Alderney Drive, Dartmouth, NS, B2Y 2N5

20-Dec-21

# 2021 HRM Water Quality Monitoring Program – Bedford West

## Final Report

## Bedford West Subdivision and Papermill Lake Watershed

**Project #TE201017**

**Prepared for:**
Halifax Regional Municipality
40 Alderney Drive, Dartmouth, NS, B2Y 2N5

**Prepared by:**
Wood Environment & Infrastructure Solutions
50 Troop Avenue, Unit 300
Dartmouth, NS B3B 1Z1
Canada
T: 902-468-2848

**20-Dec-21**

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# Executive summary

Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood) has prepared this report to provide Halifax Regional Municipality (HRM) with water quality data for eleven (11) surface water stations throughout the Bedford West development area. Water quality monitoring in the Bedford West development area has been ongoing since 2009 and in June 2020 Wood was retained by HRM to complete water quality monitoring programs each spring, summer, and fall for three years beginning in July 2020. Sample collection in 2021 was completed during Spring (May), Summer (August), and Fall (October) events. The results of the 2021 surface water monitoring program are detailed herein. The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the development projects within the Papermill and Bedford West Watersheds in order to detect any impacts on and/or changes to water quality.

The 2021 water quality monitoring event included the collection of surface water samples at eleven water quality sampling stations for the analysis of inorganics, calculated parameters, standard metals, microbiological and additional metals. Additionally, field parameters collected at each station included in-situ pH, water temperature, dissolved oxygen, conductivity, Secchi depth, air temperature, cloud cover and wildlife sightings.

### 2021 Bedford West Water Quality Monitoring Program Results

#### *Total Phosphorus*

All eleven (11) monitoring stations reported concentrations that exceeded HRM's Total Phosphorus (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) during at least one monitoring event in 2021. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL-1: Summer 0.017 mg/L, Fall 0.011 mg/L
- KL-2: Spring 0.014 mg/L, Summer 0.025 mg/L, Fall 0.015 mg/L
- KL-3: Summer 0.024 mg/L, Fall 0.014 mg/L
- KL-4: Spring 0.038 mg/L, Summer 0.031 mg/L
- KL-5: Summer 0.019 mg/L
- HWY-102-1: Summer 0.034 mg/L, Fall 0.012 mg/L
- HWY-102-2: Spring 0.018 mg/L, Summer 0.036 mg/L, Fall 0.018 mg/L
- LSD: Spring 0.044 mg/L, Summer 0.043 mg/L, Fall 0.034 mg/L
- LU: Summer 0.018 mg/L, Fall 0.11 mg/L
- PML-1: Spring 0.017 mg/L, and
- PML-2: Summer 0.022 mg/L.

#### *Field Measurements*

- All eleven (11) stations were within the 5.0 – 9.0 pH Health Canada range for Recreational Water Quality during the Spring, Summer and Fall monitoring events. All eleven (11) sampling stations were found outside the CCME-FWAL recommended range of 6.5-9.0 during specific Spring, Summer and Fall events, ranging from 5.35 to 6.41. Seven (7) sampling stations were found outside the NSE EQS recommended range of 6.5-9.0 during the Fall event in 2021.

- In-situ dissolved oxygen was below the CCME FAL acceptable range of >5.5 mg/L at one (1) of the sampling stations: HWY-102-2: Summer 4.27 mg/L.
- There are no applicable CCME, HC or NSE guidelines for recreational water temperature. Water temperature was recorded between 10.5°C during the Fall event (LSD) and 23.1°C during the Spring event (KL-5).
- There are no applicable CCME, HC or NSE guidelines for recreational water conductivity. However, specific water conductivity was recorded between 69.0 µs/cm at KL-2 during the Spring event to 729.0 µs/cm at LU during the Summer event.
- Secchi depths were collected at one (1) monitoring station, KL-2 in the Spring (0.2 m) and Fall (1.65 m) meeting the Health Canada reference value of 1.2 metres in the Fall.

### *General Chemistry and Metals*

- Two (2) sampling stations reported chloride concentrations above the CCME FWAL limit of 120 mg/L: HWY-102-2: Fall 199 mg/L, and LU: Spring 189 mg/L, Summer 132 mg/L, Fall 153 mg/L. These two (2) sampling stations were also found outside the NSE EQS of 120 mg/L during the Fall event.
- One (1) sampling station reported a nitrite concentration above the CCME FWAL limit of 0.06 mg/L: LU: Spring 0.09 mg/L.
- All eleven (11) stations reported laboratory pH values well within Health Canada range of 5.0-9.0 for Recreational Water Quality. Four (4) monitoring stations were found outside the recommended laboratory pH ranges of 6.5 – 9.0 for the CCME FWAL: KL-2: Summer pH 6.42, KL-4: Summer pH 6.49, KL-5: Summer pH 6.47, HWY-102-1: Summer pH 6.40.
- All eleven (11) stations exceeded the NSE EQS aluminum guideline of 5 µg/L and eight (8) of those stations also exceeded the CCME FWAL limit of 100 µg/L: KL-1: Spring 145 µg/L, KL-2: Spring 204 µg/L, KL-3: Spring 116 µg/L, KL-4: Spring 1510 µg/L, KL-5: Spring 126 µg/L, HWY-102-1: Spring 66 µg/L, HWY-102-2: Spring 112 µg/L, LSD: Spring 199 µg/L, LU: Spring 52 µg/L, PML-1: Spring 114 µg/L, and PML-2: Spring 93 µg/L.
- One (1) station exceeded the CCME cadmium guideline of 0.04-0.16 µg/L and the NSE EQS cadmium guidelines of 0.09 µg/L: KL-4: Spring 0.15 µg/L.
- Three (3) stations exceeded the NSE EQS copper guideline of 2 µg/L and the CCME FWAL guideline of 2-2.41 µg/L: KL-4: Spring 4 µg/L, HWY-102-2: Fall 5 µg/L, and LU: Summer 3 µg/L.
- Five (5) stations exceeded the NSE EQS iron guideline and CCME FWAL limit of 300 µg/L: KL-2: Spring 472 µg/L, Summer 503 µg/L, Fall 462 µg/L, KL-4: Spring 2070 µg/L, HWY-102-2: Spring 1600 µg/L, Summer 1080 µg/L, Fall 2400 µg/L, LSD: Spring 1020 µg/L, Summer 356 µg/L, Fall 440 µg/L, and LU: Summer 650 µg/L.
- One (1) station exceeded the NSE EQS of 1 µg/L and CCME FWAL lead guidelines of 1-3.26 µg/L: KL-4: Spring 5.1 µg/L.
- One (1) station exceeded the NSE EQS of 430 µg/L: HWY-102-2: Fall 562 µg/L.
- One (1) station exceeded the NSE EQS nickel guideline of 820 µg/L: PML-1: Spring 60 µg/L.
- Seven (7) station exceeded the NSE EQS of 7 µg/L for zinc and five (5) stations exceeded the and CCME FWAL zinc guideline of 30 µg/L: KL-1: Spring 189 µg/L, KL-3: Spring 40 µg/L, KL-4: Spring 201 µg/L, HWY-102-2: Fall 16 µg/L, LU: Spring 31 µg/L, Fall 13 µg/L, and PML-1: Spring 120 µg/L.

### *Microbiology*

- One station may have exceeded the HC *E. coli* Guidelines of 400 CFU/100 mL (maximum allowable concentration based on collection of a single sample): LSD: Spring >200 CFU/100 mL.
- HC does not have a recreational water quality guideline for Total Coliform. All eleven (11) stations reported Total Coliform concentrations above the laboratory Reportable Detection Limit (RDL) of 1 CFU/100 mL. Reported concentrations ranged from 196 CFU/100mL to >200 CFU/100 mL.

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# 1.0 Introduction

Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood) has prepared this report to provide Halifax Regional Municipality (HRM) with water quality data for eleven (11) surface water stations throughout the Bedford West development area. Water quality monitoring in the Bedford West development area has been ongoing since 2009 and in June 2020 Wood was retained by HRM to complete water quality monitoring programs each spring, summer, and fall for three years beginning in July 2020. Sample collection in 2021 was completed during Spring (May), Summer (August), and Fall (October) events. The results of the 2021 surface water monitoring program are detailed herein. The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the development projects within the Papermill and Bedford West Watersheds in order to detect any impacts on and/or changes to water quality.

## 1.1 Background

HRM has designated the Bedford West area as one of the primary locations for urban growth through 2031. The Bedford West Secondary Planning Strategy (SPS) was approved by Regional Council in 2006 and divides the Bedford West area into 12 sub-areas. The SPS provides direction for land use, environmental protection and other activities, across the area. It also enables development primarily through the development agreement (DA) process. DAs for eight of the 12 Sub-Areas (2, 3+4, 5, 7+8, 9, 10) have been approved by Council; DAs for the remaining areas are anticipated to be negotiated and approved at various points between 2020 and 2030.

Environmental protection policy in the SPS requires water quality testing to determine the impact of development on the Papermill Lake watershed. Each DA approved under the SPS identifies specific requirements for water quality monitoring, including the location of testing sites and required testing parameters. Water quality monitoring in the Bedford West area has been reportedly ongoing since 2009.

The goal of this contract is to fulfill the legislative requirement for water quality monitoring in Bedford West for a period of three years, to determine the potential impact of development activities within the affected watershed, in accordance with the terms of applicable DAs.

Water quality monitoring is required by HRM in spring (May), summer (August), and fall (October) from the 11 locations identified on the Bedford West Sampling Location Map included in Appendix A.

## 1.2 Purpose

The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to ongoing development projects in order to detect any impacts on and/or changes to water quality.

The 2021 sampling stations are summarized in Table 1 and shown in Figure 1.

**Table 1: Bedford West Water Quality Sampling Stations**

| Water Course | Sampling Location Name | Updated Coordinates (UTM NAD 83) | |
|---|---|---|---|
| | | Easting | Northing |
| Kearney Lake | KL-1 | 20T0445718E | 4948496N |
| Kearney Lake | KL-2 | 20T0443942E | 4949803N |
| Kearney Run | KL-3 | 20T0444390E | 4950406N |
| Kearney Run | KL-4 | 20T0444463E | 4950571N |
| Kearney Lake | KL-5 | 20T0445280E | 4949142N |
| Creek Above Highway | HWY-102-1 | 20T0444708E | 4951644N |
| Creek Below Highway | HWY-102-2 | 20T0444829E | 4951778N |
| Lake Shore Drive | LSD | 20T0442583E | 4950431N |
| Larry Uteck Off-Ramp | LU | 20T0442583E | 4949891N |
| Paper Mill Lake | PML-1 | 20T0445129E | 4951154N |
| Paper Mill Lake | PML-2 | 20T0445363E | 4951740N |

# 2.0 Methodology

The 2021 water quality sampling events included measurements of Field Parameters (Group A) and collection of surface water for laboratory analysis of:

- Inorganics (Group B);
- Calculated Parameters (Group C);
- Standard Elements/Metals (Group D); and
- Microbiological Analyses (Group E).

Table 2 below summarizes the water quality parameters measured in the field or analyzed by the laboratory.

**Table 2. Analytical Parameter Groups**

| Field Parameters (A) | Inorganics (B) | Calculated Parameters (C) | Standard Metals (D) | Microbiology (E) |
|---|---|---|---|---|
| • pH<br>• TDS<br>• Dissolved Oxygen<br>• Temperature<br>• Secchi Depth<br>• Conductance<br>• Air Temperature<br>• Cloud Cover<br>• Incidental Wildlife Sightings | • Total Alkalinity (as CaCO3)<br>• Dissolved Chloride<br>• Total Kjeldahl Nitrogen<br>• Nitrate + Nitrite<br>• Nitrate<br>• Nitrite<br>• Nitrogen (as NH4)<br>• Total Organic Carbon<br>• Orthophosphate (P)<br>• pH<br>• Low Total Phosphorus<br>• Reactive Silica<br>• Total Suspended Solids<br>• Dissolved Sulphate<br>• Turbidity<br>• Conductivity | • Anion Sum<br>• Cation Sum<br>• Ion Balance<br>• Bicarbonate Alkalinity (as CaCO3)<br>• Carbonate Alkalinity (as CaCO3)<br>• Hardness<br>• Total Dissolved Solids<br>• Saturation pH (@4°C & 20°C)<br>• Langelier Index (@4°C & 20°C) | • Calcium<br>• Copper<br>• Iron<br>• Magnesium<br>• Manganese<br>• Potassium<br>• Sodium<br>• Zinc | • Chlorophyll-A<br>• *E. coli*<br>• Most Probable Number (MPN) or CFU per 100 mL |

The Spring water quality monitoring event at Bedford West was completed on 27 May 2021, followed by the Summer monitoring event on 9 August 2021, and the Fall event on 22 October 2021.

Field measurements of pH, dissolved oxygen, specific conductance and water temperature were taken at each station using a YSI Professional Plus multi metre probe. Calibration logs for the YSI metre are included in Appendix F. Field measurements and documentation of cloud cover, wildlife sightings, and wind and wave observations were recorded on Standard Project Field Reports, which are included in Appendix B. It should be noted that samples were collected from the shore at eight (8) stations (KL-2, KL-3, KL-4, KL-5, HWY-102-1, HWY-102-2, LSD, and LU); however, a non-motorized boat was used to access three (3) stations KL-1, PML-1, and PML-2.

Surface water sampling followed Wood's Standard Operating Procedures (SOP) for surface water sampling (Appendix G). A new pair of nitrile gloves was used at each sampling location. Water samples and field parameter readings were collected within a depth of ≤ 1.0 m below surface (if possible). Surface water grab samples were collected and placed in clean laboratory-supplied bottles and stored in a chilled container

together with a chain of custody record for transport to the laboratory. Samples were sent to AGAT Laboratories located in Dartmouth, Nova Scotia. AGAT is an accredited laboratory by the Standard Council of Canada (SCC). Canadian Association of Laboratory Accreditation (CALA) and ISO9011:2015.

# 3.0 Applicable Guidelines

For this water quality program, the Federal and Provincial Water Quality Guidelines being used for the assessment of surface water quality results are as follows: the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Aquatic Life – freshwater (FWAL) (Version, 2015), the Health Canada (HC) guidelines for Canadian Recreational Water Quality (2012, Third Edition), and the Table 3 Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) for Contaminated Sites (NSE, 2021) for Surface Water (µg/L) for Fresh Water. These guidelines were to gauge whether a tested parameter was an exceedance. Exceedances may be an indication of water quality impairment or conditions that will eventually lead to impairment. A detailed description of the guidelines is presented below.

### *Canadian Council of Ministers of the Environment (CCME) Guidelines*

The CCME FWAL guidelines were used for parameters such as dissolved oxygen, pH (in-situ and analytical), chloride, nitrate, nitrite, nitrogen, as well as for total metals such as aluminum, arsenic, boron, cadmium, copper, iron, lead, molybdenum, nickel, selenium, silver, thallium, uranium, and zinc.

There is no CCME recommended value for Total Suspended Solids (TSS); however, the following CCME narrative for TSS as high flow was applied "maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L should not increase more than 10% of background levels when background is ≥ 250 mg/L".

According to CCME, 10 µg/L of total phosphorus is the threshold between oligotrophic and mesotrophic classification. In the Canadian framework, a trigger range is a desired concentration range for phosphorus; if the upper limit of the range is exceeded, it indicates potential for environmental quality issues, which may trigger the need for further investigation. HRM defined a Total Phosphorus management threshold value of 10 µg/L or 0.01 mg/L for this monitoring program.

### *Health Canada (HC) Guidelines*

The HC guidelines for Canadian Recreational Quality was used for parameters such as Secchi depth (i.e. visibility at a minimum depth of 1.2 metres), pH guidelines of 5.0-9.0, turbidity (limit of 50 Nephelometric Turbidity Units), and *E. coli* (i.e. maximum allowable concentration of 400 *E. coli*/100 mL when evaluating a single sample rather than geomean). The maximum allowable concentration guideline of 400 *E. coli*/100 mL is also the guideline used by the HRM Beach Monitoring Program to assess compliance.

### *Nova Scotia Environment (NSE) Guidelines*

The NSE Table 3 Tier 1 surface water EQS were used for assessment of total metals such as aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, strontium, thallium, uranium, vanadium, and zinc. It should be noted that NSE recently updated their surface water EQSs for pH, chloride, nitrate as N, nitrite as N, sulphate, antimony, beryllium, boron, cadmium, total chromium, cobalt, manganese, silver, uranium, vanadium, and zinc in September 2021. A summary of the NSE surface water EQS updates is provided in Table 3 below.

**Table 3. September 2021 NSE Environmental Quality Standard Updates for Surface Water**

| Surface Water Parameter | NSE EQS prior to September 2021 | NSE EQS September 2021 | Reference Guideline | Reportable Detection Limit (2021) |
|---|---|---|---|---|
| **pH** | -- | 6.5-9.0 | CCME | -- |
| **Chloride** | -- | 120 | CCME | 1 |
| **True Color** | -- | See Note 1 | CCME | -- |
| **Nitrate as N** | -- | 13 | CCME | 0.05 |
| **Nitrite as N** | -- | 0.06 | CCME | 0.05 |
| **Sulphate** | -- | 128 | BCMOECCS, 2019 – Approved [2] | 2 |
| **Antimony** | 20 | 9 | | 2 |
| **Beryllium** | 5.3 | 0.15 | | 2 [3] |
| **Boron** | 1200 | 1500 | | 5 |
| **Cadmium** | 0.01 | 0.09 | | 0.09 [4] |
| **Total Chromium** | -- | 8.9 | | 1 |
| **Cobalt** | 10 | 1 | | 1 |
| **Manganese** | 820 | 430 | | 2 |
| **Silver** | 0.1 | 0.25 | | 0.1 |
| **Uranium** | 300 | 15 | | 0.1 |
| **Vanadium** | 6 | 120 | | 2 |
| **Zinc** | 30 | 7 | | 5 |

**Notes:**

1 In September 2021 NSE adopted the True colour standard from the 2001 CCME Guidelines, which indicates True Colour: Mean absorbance of filtered samples at 456 nm shall not be significantly higher than seasonally adjusted expected value for system under consideration. Apparent Colour: Mean percent transmission of white light per metre shall not be significantly less than seasonally adjusted value for system under consideration.

2 In September 2021 NSE adopted the Sulphate standard from the 2019 British Columbia and Ontario Ministry of Environment and Climate Change Standards (BCMOECCS, 2019 – Approved).

3 In 2021, the Reportable Detection Limit (RDL) for Beryllium was 2, above the September 2021 NSE EQS of 0.15 for Beryllium.

4 In 2021, the RDL for cadmium was 0.09 which equals the September 2021 NSE EQS for Beryllium.

# 4.0 Field Observations

The 2021 site conditions were recorded for all eleven (11) surface water quality monitoring stations during the Spring, Summer and Fall monitoring events and are included in the field data sheets in Appendix B. Site condition observations include weather, cloud cover, air temperature, wildlife sightings and site accessibility.

# 5.0 Field Measurements

Field parameters such as in situ pH, dissolved oxygen, water temperature, conductivity and Secchi depth (where applicable) were recorded on field data sheets. Field collected data is included in Appendix B.

Field measurements are also tabulated in Appendix C: Table C1 – 2021 Results and Table C2: Historical Results.

### *In-situ pH*

All eleven (11) stations were within the 5.0 – 9.0 pH Health Canada range for Recreational Water Quality during the Spring, Summer and Fall monitoring events. Each of the eleven (11) sampling stations had readings outside of the CCME-FWAL recommended range of 6.5-9.0 during specific events:

- KL-1: Summer pH 5.95
- KL-2: Spring pH 6.07, Summer pH 5.80, Fall pH 6.14
- KL-3: Summer pH 6.34
- KL-4: Summer pH 6.29
- KL-5: Summer pH 6.24
- HWY-102-1: Spring pH 6.38, Summer pH 5.74, Fall pH 6.31
- HWY-102-2: Summer pH 5.99, Fall pH 6.07
- LSD: Fall pH 5.95
- LU: Summer pH 6.03, Fall pH 6.33
- PML-1: Spring pH 6.10, Summer pH 5.35, Fall pH 5.60; and,
- PML-2: Spring pH 6.41, Summer pH 5.53, Fall pH 6.22.

This included seven (7) sampling stations found outside the NSE EQS recommended range of 6.5-9.0 during the Fall event in 2021, as noted above.

### *Dissolved Oxygen*

In-situ dissolved oxygen was below the CCME FWAL acceptable range of >5.5 mg/L at one (1) of the sampling stations during the 2021 Summer event:

- HWY-102-2: Summer 4.27 mg/L

### *Water Temperature*

There are no applicable CCME, HC or NSE guidelines for recreational water temperature. Water temperature was recorded between 10.5°C during the Fall event (LSD) and 23.1°C during the Spring event (KL-5).

### *Conductivity*

There are no applicable CCME, HC or NSE guidelines for recreational water conductivity. Specific water conductivity was recorded between 69.0 µs/cm at KL-2 during the Spring event to 729.0 µs/cm at LU during the Summer event.

### *Secchi Depth*

Secchi depths were collected from shore at one (1) monitoring station, KL-2 Secchi depth readings met the Health Canada reference guidelines of minimum 1.2 metres (m) Recorded values were as follows:

- KL-2: Fall 1.65 m.

# 6.0 Analytical Results

Analytical results of the 2021 spring, summer, and fall monitoring programs and applicable/reference guidelines are tabulated in Table C1 and enclosed in Appendix C. In addition, historical water quality results from 2009 – 2021 for each sample location are summarized in Table C2 and included in Appendix C.

Laboratory certificates of analysis for the 2021 sampling events are located in Appendix D.

## 6.1 Total Phosphorus

All eleven (11) monitoring stations reported concentrations that exceeded HRM's Total Phosphorus (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) during at least one monitoring event in 2021. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL-1: Summer 0.017 mg/L, Fall 0.011 mg/L
- KL-2: Spring 0.014 mg/L, Summer 0.025 mg/L, Fall 0.015 mg/L
- KL-3: Summer 0.024 mg/L, Fall 0.014 mg/L
- KL-4: Spring 0.038 mg/L, Summer 0.031 mg/L
- KL-5: Summer 0.019 mg/L
- HWY-102-1: Summer 0.034 mg/L, Fall 0.012 mg/L
- HWY-102-2: Spring 0.018 mg/L, Summer 0.036 mg/L, Fall 0.018 mg/L
- LSD: Spring 0.044 mg/L, Summer 0.043 mg/L, Fall 0.034 mg/L
- LU: Summer 0.018 mg/L, Fall 0.11 mg/L
- PML-1: Spring 0.017 mg/L, and
- PML-2: Summer 0.022 mg/L.

## 6.2 General Chemistry

Of the tested inorganic parameters (Column B, Table 3) and calculated parameters (Column C, Table 3), only concentrations of chloride, nitrite, and pH values were reported outside or above the applicable guidelines.

### *Chloride*

Two (2) sampling stations reported chloride concentrations above the CCME FWAL limit of 120 mg/L:

- HWY-102-2: Fall 199 mg/L, and
- LU: Spring 189 mg/L, Summer 132 mg/L, Fall 153 mg/L

Two (2) sampling stations were found outside the NSE EQS of 120 mg/L during the Fall event in 2021, as noted above.

### *Nitrite*

One (1) sampling station reported a nitrite concentration above the CCME FWAL limit of 0.06 mg/L:

- LU: Spring 0.09 mg/L

### *Laboratory pH*

All eleven (11) stations reported laboratory pH values well within Health Canada range of 5.0-9.0 for Recreational Water Quality. Four (4) monitoring stations were found outside the recommended pH ranges of 6.5 – 9.0 for the CCME FWAL:

- KL-2: Summer pH 6.42
- KL-4: Summer pH 6.49
- KL-5: Summer pH 6.47
- HWY-102-1: Summer pH 6.40

## 6.3 Metals

The following metals were analyzed during the Spring 2021 monitoring event: aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, tin, titanium, uranium, vanadium, and zinc. The following metals were analyzed during the Summer and Fall 2021 monitoring events: calcium, copper, iron, lead, manganese, magnesium, potassium, sodium, and zinc. During the 2021 monitoring events, exceedances were reported well above the guidelines/reference limits for aluminum, cadmium, copper, iron, nickel, and zinc parameters. Exceedances were reported as follows:

### *Aluminum*

All eleven (11) stations exceeded the NSE EQS aluminum guideline of 5 µg/L and eight (8) of those stations also exceeded the CCME FWAL limit of 100 µg/L.

- KL-1: Spring 145 µg/L (CCME and NSE Exceedance)
- KL-2: Spring 204 µg/L (CCME and NSE Exceedance)
- KL-3: Spring 116 µg/L (CCME and NSE Exceedance)
- KL-4: Spring 1510 µg/L (CCME and NSE Exceedance)
- KL-5: Spring 126 µg/L (CCME and NSE Exceedance)
- HWY-102-1: Spring 66 µg/L (NSE EQS Exceedance)
- HWY-102-2: Spring 112 µg/L (CCME and NSE Exceedance)
- LSD: Spring 199 µg/L (CCME and NSE Exceedance)
- LU: Spring 52 µg/L (NSE EQS Exceedance)
- PML-1: Spring 114 µg/L, and (CCME and NSE Exceedance),
- PML-2: Spring 93 µg/L (NSE EQS Exceedance)

### *Cadmium*

A Cadmium concentration at one station exceeded the CCME guideline of 0.04-0.16 µg/L and the NSE EQS cadmium guideline of 0.09 µg/L:

- KL-4: Spring 0.15 µg/L

### *Copper*

Three (3) stations exceeded the NSE EQS copper guideline of 2 µg/L and the CCME FWAL guideline of 2-2.41 µg/L:

- KL-4: Spring  4 µg/L
- HWY-102-2: Fall 5 µg/L, and
- LU: Summer 3 µg/L

### *Iron*

Five (5) stations exceeded the NSE EQS iron guideline and CCME FWAL limit of 300 µg/L:

- KL-2: Spring 472 µg/L, Summer 503 µg/L, Fall 462 µg/L
- KL-4: Spring 2070 µg/L
- HWY-102-2: Spring 1600 µg/L, Summer 1080 µg/L, Fall 2400 µg/L
- LSD: Spring 1020 µg/L, Summer 356 µg/L, Fall 440 µg/L, and
- LU: Summer 650 µg/L

### *Lead*

One (1) station exceeded the NSE EQS of 1 µg/L and CCME FWAL lead guidelines of 1-3.26 µg/L:

- KL-4: Spring 5.1 µg/L

### *Manganese*

One (1) station exceeded the NSE EQS of 430 µg/L during the 2021 Fall event:

- HWY-102-2: Fall 562 µg/L

### *Nickel*

One (1) station exceeded the NSE EQS nickel guideline of 820 µg/L:

- PML-1: Spring 60 µg/L

### *Zinc*

Seven (7) stations exceeded the NSE EQS of 7 µg/L for zinc and five (5) stations exceeded the CCME FWAL zinc guideline of 30 µg/L:

- KL-1: Spring 189 µg/L (CCME and NSE Exceedance)
- KL-3: Spring 40 µg/L (CCME and NSE Exceedance)
- KL-4: Spring 201 µg/L (CCME and NSE Exceedance)
- Hwy-102-2: Fall 16 µg/L (NSE Exceedance)
- LU: Spring 31 µg/L; Fall 13 µg/L (CCME and NSE Exceedance in Spring; NSE Exceedance in Fall)
- PML-1: Spring 120 µg/L (CCME and NSE Exceedance)

## 6.4 Microbiological

One station exceeded the HC *E. coli* Guidelines of 400 CFU/100 mL (maximum allowable concentration):

- LSD: Spring >200 CFU/100 ml

HC does not have a recreational water quality guideline for Total Coliform. All eleven (11) stations reported Total Coliform concentrations above the laboratory RDL of 1 CFU/100 mL. Reported concentrations ranged from 196 CFU/100mL to >200 CFU/100 mL.

# 7.0 Statistical Presentation

Statistics water quality data from June 2009 to October 2021 of all eleven (11) water quality monitoring stations. Table 4 below for each of the stations provides the seasonal statistics for the following six (6) key water quality parameters selected by HRM:

- Total Phosphorus (mg/L);
- Dissolved Oxygen (mg/L);
- Laboratory measured pH;
- Total Suspended Solids (mg/L);
- Conductivity (µs/cm); and,
- Chlorophyll-A (µg/L).

Where analytical results were found to be less than the laboratory RDL, the statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) as a conservative approach. It should be noted that the number of decimal places presented for each listed parameter is based on the decimal places of the RDL and reported laboratory Certificate of Analysis.

The method of detection for Chlorophyll-A for this report was Spectrophotometer, which was changed from 2018 which used acidification by fluorometric (Holm-Hansen) and non-acidification by fluorometric (Welschmeyer). For the graphical representation of Chlorophyll-A, the results from the Welschmeyer method were graphed until August 2019, afterwards Spectrophotometer results were graphed. Historical samples had been submitted to Dalhousie prior to 2018; however, it was determined that the local laboratory was not an approved vendor for 17025 accreditation, thus following 2018, samples were sent to AGAT Laboratories in Burnaby, British Columbia, for Chlorophyll A analysis by Spectrophotometer.

**Table 4: Statistical Presentation of Key Water Quality Parameters - KL-1**

| KL-1 | RDL (2021) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)**[1] | | | | | | |
| Spring 2021 | 0.006 | <0.006 | 0.003 | 0.037 | 0.010 | 0.010 |
| Summer 2021 | 0.006 | 0.017 | 0.002 | 0.043 | 0.010 | 0.011 |
| Fall 2021 | 0.006 | 0.011 | 0.001 | 0.029 | 0.008 | 0.008 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2021 | 1 | 49 | 49 | 81 | 66 | 65 |
| Summer 2021 | 1 | 48 | 45 | 76 | 59 | 61 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Fall 2021 | 1 | 53 | 33 | 64 | 53 | 51 |
| **Lab pH** | | | | | | |
| Spring 2021 | N/A | 6.69 | 6.52 | 6.94 | 6.70 | 6.72 |
| Summer 2021 | N/A | 6.50 | 6.50 | 7.31 | 6.95 | 6.94 |
| Fall 2021 | N/A | 7.06 | 6.35 | 7.07 | 6.81 | 6.81 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2021 | 5 | <5 | 1 | 38 | 3 | 3 |
| Summer 2021 | 5 | <5 | 1 | 17 | 3 | 3 |
| Fall 2021 | 5 | <5 | 1 | 5 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2021 | 1 | 205 | 205 | 310 | 259 | 254 |
| Summer 2021 | 1 | 217 | 180 | 339 | 260 | 254 |
| Fall 2021 | 1 | 222 | 129 | 250 | 222 | 205 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2021 | 0.25 | 0.95 | 0.95 | 4.42 | 2.69 | 2.05 |
| Summer 2021 | 0.25 | 2.4 | 1.73 | 2.4 | 2.065 | 2.04 |
| Fall 2021 | 0.25 | 1.05 | 0.95 | 1.26 | 1.05 | 1.08 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters - KL-2**

| KL-2 | RDL (2021) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2021 | 0.006 | 0.014 | 0.008 | 0.021 | 0.013 | 0.013 |
| Summer 2021 | 0.006 | 0.025 | 0.008 | 0.059 | 0.020 | 0.020 |
| Fall 2021 | 0.006 | 0.015 | 0.004 | 0.031 | 0.013 | 0.014 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2021 | 1.0 | 13 | 12 | 48 | 17 | 19.2 |
| Summer 2021 | 1.0 | 13 | 13 | 48 | 19 | 20 |
| Fall 2021 | 1.0 | 14 | 10 | 48 | 14 | 16 |
| **Lab pH** | | | | | | |
| Spring 2021 | N/A | 6.69 | 6.27 | 6.85 | 6.50 | 6.52 |
| Summer 2021 | N/A | 6.42 | 6.40 | 7.04 | 6.85 | 6.78 |
| Fall 2021 | N/A | 7.04 | 5.89 | 7.04 | 6.28 | 6.36 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2021 | 5 | <5 | 1 | 103 | 3 | 3 |
| Summer 2021 | 5 | <5 | 1 | 135 | 3 | 5 |
| Fall 2021 | 5 | 6 | 1 | 103 | 3 | 3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2021 | 1 | 79 | 64 | 212 | 79 | 91 |
| Summer 2021 | 1 | 94 | 66 | 212 | 94 | 101 |
| Fall 2021 | 1 | 106 | 45 | 212 | 72 | 82 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2021 | 0.25 | 0.95 | 0.53 | 0.95 | 0.74 | 0.71 |
| Summer 2021 | 0.25 | 0.60 | 0.60 | 4.25 | 2.43 | 1.60 |
| Fall 2021 | 0.25 | 0.79 | 0.13 | 3.15 | 0.79 | 0.68 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for total suspended solids and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters - KL-3**

| KL-3 | RDL (2021) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2021 | 0.006 | <0.006 | 0.003 | 0.019 | 0.008 | 0.008 |
| Summer 2021 | 0.006 | 0.024 | 0.001 | 0.045 | 0.009 | 0.008 |
| Fall 2021 | 0.006 | 0.014 | 0.002 | 0.148 | 0.007 | 0.009 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2021 | 1 | 51 | 49 | 69 | 55 | 57 |
| Summer 2021 | 1 | 49 | 40 | 65 | 56 | 53 |
| Fall 2021 | 1 | 52 | 37 | 60 | 52 | 50 |
| **Lab pH** | | | | | | |
| Spring 2021 | N/A | 6.76 | 6.38 | 6.89 | 6.70 | 6.68 |
| Summer 2021 | N/A | 6.50 | 6.50 | 7.28 | 6.99 | 6.94 |
| Fall 2021 | N/A | 7.10 | 6.38 | 7.10 | 6.87 | 6.84 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2021 | 5 | <5 | 1 | 3 | 3 | 2 |
| Summer 2021 | 5 | <5 | 1 | 3 | 3 | 2 |
| Fall 2021 | 5 | <5 | 1 | 3 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2021 | 1 | 210 | 197 | 275 | 220 | 227 |
| Summer 2021 | 1 | 233 | 170 | 288 | 242 | 235 |
| Fall 2021 | 1 | 227 | 160 | 247 | 220 | 209 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2021 | 0.25 | 1.1 | 0.47 | 1.10 | 0.79 | 0.72 |
| Summer 2021 | 0.25 | 1.60 | 1.41 | 1.60 | 1.51 | 1.50 |
| Fall 2021 | 0.25 | 13.10 | 0.47 | 13.10 | 0.64 | 1.58 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters - KL-4**

| KL-4 | RDL (2021) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2021 | 0.006 | 0.038 | 0.003 | 0.038 | 0.009 | 0.010 |
| Summer 2021 | 0.006 | 0.031 | 0.001 | 2.39 | 0.010 | 0.013 |
| Fall 2021 | 0.006 | 0.008 | 0.001 | 0.026 | 0.006 | 0.005 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2021 | 1.0 | 51 | 50 | 72 | 56 | 57 |
| Summer 2021 | 1.0 | 49 | 41 | 73 | 56 | 54 |
| Fall 2021 | 1.0 | 53 | 37 | 91 | 53 | 53 |
| **Lab pH** | | | | | | |
| Spring 2021 | N/A | 6.64 | 6.57 | 6.83 | 6.69 | 6.69 |
| Summer 2021 | N/A | 6.49 | 6.49 | 7.13 | 6.94 | 6.90 |
| Fall 2021 | N/A | 7.08 | 6.46 | 7.13 | 6.87 | 6.88 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2021 | 5 | 12.00 | 0.50 | 12 | 3 | 2 |
| Summer 2021 | 5 | <5 | 0.50 | 7 | 3 | 2 |
| Fall 2021 | 5 | <5 | 0.50 | 10 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2021 | 1 | 213 | 200 | 288 | 220 | 229 |
| Summer 2021 | 1 | 234 | 170 | 297 | 241 | 238 |
| Fall 2021 | 1 | 228 | 158 | 250 | 228 | 211 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2021 | 0.25 | 8.31 | 0.13 | 8.31 | 4.22 | 1.02 |
| Summer 2021 | 0.25 | 1.80 | 0.60 | 1.80 | 1.20 | 1.04 |
| Fall 2021 | 0.25 | 5.26 | 0.32 | 5.26 | 0.63 | 1.02 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus, total suspended solids, and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters - KL-5**

| KL-5 | RDL (2021) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2021 | 0.006 | 0.007 | 0.003 | 0.031 | 0.009 | 0.008 |
| Summer 2021 | 0.006 | 0.019 | 0.004 | 0.040 | 0.013 | 0.012 |
| Fall 2021 | 0.006 | 0.009 | 0.003 | 0.135 | 0.005 | 0.008 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2021 | 1 | 50 | 50 | 67 | 57 | 57 |
| Summer 2021 | 1 | 51 | 44 | 62 | 56 | 53 |
| Fall 2021 | 1 | 53 | 37 | 61 | 53 | 51 |
| **Lab pH** | | | | | | |
| Spring 2021 | N/A | 6.71 | 6.56 | 6.88 | 6.70 | 6.69 |
| Summer 2021 | N/A | 6.47 | 6.47 | 7.16 | 7.00 | 6.96 |
| Fall 2021 | N/A | 7.07 | 6.50 | 7.47 | 6.89 | 6.87 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2021 | 5 | <5 | 1 | 3 | 3 | 2 |
| Summer 2021 | 5 | <5 | 3 | 3 | 3 | 3 |
| Fall 2021 | 5 | <5 | 1 | 3 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2021 | 1 | 208 | 208 | 269 | 230 | 232 |
| Summer 2021 | 1 | 229 | 223 | 272 | 247 | 243 |
| Fall 2021 | 1 | 226 | 160 | 286 | 225 | 213 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2021 | 0.25 | 0.79 | 0.47 | 0.79 | 0.63 | 0.61 |
| Summer 2021 | 0.25 | 1.90 | 0.95 | 1.90 | 1.43 | 1.34 |
| Fall 2021 | 0.25 | 63.10 | 0.32 | 63.10 | 0.83 | 2.56 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus, total suspended solids, and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – HWY-102-1**

| HWY-102-1 | RDL (2021) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2021 | 0.006 | 0.007 | 0.005 | 0.07 | 0.011 | 0.012 |
| Summer 2021 | 0.006 | 0.034 | 0.007 | 0.14 | 0.023 | 0.026 |
| Fall 2021 | 0.006 | 0.012 | 0.002 | 0.031 | 0.011 | 0.012 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Chloride (mg/L)** | | | | | | |
| Spring 2021 | 1.0 | 98 | 24 | 137 | 65 | 62 |
| Summer 2021 | 1.0 | 57 | 19 | 100 | 54 | 50 |
| Fall 2021 | 1.0 | 82 | 12 | 92 | 40 | 38 |
| **Lab pH** | | | | | | |
| Spring 2021 | N/A | 7.06 | 5 | 7.10 | 6.84 | 6.48 |
| Summer 2021 | N/A | 6.87 | 5 | 7.49 | 6.91 | 6.82 |
| Fall 2021 | N/A | 7.20 | 5 | 7.20 | 6.73 | 6.38 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2021 | 5 | 5 | 1 | 9 | 3 | 3 |
| Summer 2021 | 5 | <5 | 1 | 80 | 6 | 6 |
| Fall 2021 | 5 | <5 | 2 | 3 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2021 | 1 | 424 | 100 | 517 | 289 | 269 |
| Summer 2021 | 1 | 326 | 100 | 469 | 306 | 245 |
| Fall 2021 | 1 | 365 | 88 | 365 | 218 | 185 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2021 | 0.25 | 0.95 | 0.95 | 4.93 | 2.94 | 2.16 |
| Summer 2021 | 0.25 | 1.20 | 1.20 | 1.57 | 1.39 | 1.37 |
| Fall 2021 | 0.25 | 1.05 | 0.13 | 1.05 | 0.63 | 0.44 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – HWY-102-2**

| HWY-102-2 | RDL (2021) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)**[1] | | | | | | |
| Spring 2021 | 0.006 | 0.018 | 0.006 | 0.222 | 0.014 | 0.017 |
| Summer 2021 | 0.006 | 0.036 | 0.008 | 1.56 | 0.035 | 0.040 |
| Fall 2021 | 0.006 | 0.018 | 0.003 | 0.201 | 0.018 | 0.023 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2021 | 1.0 | 103 | 21 | 260 | 113 | 97 |
| Summer 2021 | 1.0 | 94 | 21 | 226 | 101 | 96 |
| Fall 2021 | 1.0 | 199 | 17 | 199 | 52 | 54 |
| **Lab pH** | | | | | | |
| Spring 2021 | N/A | 7.05 | 5.43 | 7.20 | 6.36 | 6.36 |
| Summer 2021 | N/A | 6.40 | 5.96 | 6.86 | 6.66 | 6.55 |
| Fall 2021 | N/A | 6.66 | 5.47 | 7.07 | 6.37 | 6.37 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2021 | 5 | 9 | 1 | 342 | 3 | 6 |
| Summer 2021 | 5 | 14 | 3 | 3000 | 22 | 25 |
| Fall 2021 | 5 | <5 | 3 | 194 | 3 | 7 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2021 | 1 | 436 | 85 | 920 | 436 | 387 |
| Summer 2021 | 1 | 430 | 100 | 952 | 422 | 386 |
| Fall 2021 | 1 | 546 | 94 | 546 | 208 | 229 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2021 | 0.25 | 1.1 | 1.10 | 2.89 | 2.00 | 1.78 |
| Summer 2021 | 0.25 | 0.77 | 0.77 | 206.00 | 103.39 | 12.59 |
| Fall 2021 | 0.25 | 4.99 | 0.32 | 4.99 | 0.81 | 1.09 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus, total suspended solids, and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – LSD**

| LSD | RDL (2021) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)**[1] | | | | | | |
| Spring 2021 | 0.006 | 0.044 | 0.007 | 1.25 | 0.022 | 0.032 |
| Summer 2021 | 0.006 | 0.043 | 0.015 | 0.501 | 0.051 | 0.059 |
| Fall 2021 | 0.006 | 0.034 | 0.003 | 0.095 | 0.014 | 0.017 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2021 | 1.0 | 27 | 20 | 36 | 25 | 26 |
| Summer 2021 | 1.0 | 26 | 26 | 45 | 33 | 33 |
| Fall 2021 | 1.0 | 33 | 20 | 36 | 25 | 26 |
| **Lab pH** | | | | | | |
| Spring 2021 | N/A | 6.88 | 6.20 | 7.19 | 6.91 | 6.81 |
| Summer 2021 | N/A | 6.54 | 6.54 | 7.30 | 6.98 | 6.93 |
| Fall 2021 | N/A | 7.15 | 6.38 | 7.15 | 6.72 | 6.74 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2021 | 5 | 19 | 3 | 138 | 8 | 12 |
| Summer 2021 | 5 | 32 | 16 | 9020 | 104 | 127 |
| Fall 2021 | 5 | <5 | 3 | 69 | 6 | 7 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2021 | 1 | 139 | 96 | 200 | 151 | 150 |
| Summer 2021 | 1 | 146 | 129 | 236 | 166 | 167 |
| Fall 2021 | 1 | 163 | 63 | 171 | 125 | 123 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2021 | 0.25 | 5.06 | 4.42 | 5.06 | 4.74 | 4.73 |
| Summer 2021 | 0.25 | 2.30 | 2.30 | 12.50 | 7.40 | 5.36 |
| Fall 2021 | 0.25 | 0.79 | 0.13 | 0.79 | 0.32 | 0.32 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – LU**

| LU | RDL (2021) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2021 | 0.006 | 0.007 | 0.006 | 0.26 | 0.018 | 0.021 |
| Summer 2021 | 0.006 | 0.018 | 0.009 | 0.036 | 0.019 | 0.018 |
| Fall 2021 | 0.006 | 0.011 | 0.008 | 0.16 | 0.021 | 0.023 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2021 | 1.0 | 189 | 96 | 297 | 200 | 194 |
| Summer 2021 | 1.0 | 132 | 99 | 221 | 132 | 140 |
| Fall 2021 | 1.0 | 153 | 34 | 258 | 92 | 94 |
| **Lab pH** | | | | | | |
| Spring 2021 | N/A | 7.36 | 6.42 | 7.37 | 6.98 | 7.00 |
| Summer 2021 | N/A | 6.75 | 6.75 | 7.46 | 7.35 | 7.28 |
| Fall 2021 | N/A | 7.38 | 6.41 | 7.29 | 7.07 | 6.92 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2021 | 5 | <5 | 1 | 626 | 6 | 9 |
| Summer 2021 | 5 | 8 | 3 | 165 | 4 | 7 |
| Fall 2021 | 5 | <5 | 3 | 13 | 3 | 3 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2021 | 1 | 717 | 518 | 1030 | 802 | 759 |
| Summer 2021 | 1 | 620 | 433 | 928 | 620 | 630 |
| Fall 2021 | 1 | 568 | 190 | 840 | 422 | 412 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2021 | 0.25 | 10.9 | 2.41 | 10.90 | 6.66 | 5.13 |
| Summer 2021 | 0.25 | 3.40 | 3.40 | 4.41 | 3.91 | 3.87 |
| Fall 2021 | 0.25 | 2.37 | 0.13 | 3.78 | 2.37 | 1.04 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for total suspended solids and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – PML-1**

| PML-1 | RDL (2021) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)**[1] | | | | | | |
| Spring 2021 | 0.006 | 0.017 | 0.003 | 0.173 | 0.014 | 0.015 |
| Summer 2021 | 0.006 | 0.01 | 0.00 | 0.10 | 0.011 | 0.014 |
| Fall 2021 | 0.006 | 0.01 | 0.001 | 0.099 | 0.018 | 0.014 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2021 | 1.0 | 55 | 39 | 74 | 57 | 57 |
| Summer 2021 | 1.0 | 50 | 43 | 72 | 59 | 58 |
| Fall 2021 | 1.0 | 55 | 18 | 60 | 50 | 45 |
| **Lab pH** | | | | | | |
| Spring 2021 | N/A | 6.80 | 6.36 | 7.01 | 6.67 | 6.67 |
| Summer 2021 | N/A | 6.50 | 6.50 | 7.28 | 6.98 | 6.96 |
| Fall 2021 | N/A | 7.15 | 6.58 | 7.16 | 6.84 | 6.83 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2021 | 5 | <5 | 1 | 531 | 3 | 5 |
| Summer 2021 | 5 | <5 | 1 | 149 | 3 | 4 |
| Fall 2021 | 5 | <5 | 1 | 104 | 5 | 5 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2021 | 1 | 227 | 170 | 298 | 230 | 230 |
| Summer 2021 | 1 | 238 | 170 | 334 | 256 | 254 |
| Fall 2021 | 1 | 238 | 100 | 248 | 224 | 195 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2021 | 0.25 | 0.47 | 0.47 | 1.89 | 1.18 | 0.94 |
| Summer 2021 | 0.25 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| Fall 2021 | 0.25 | <0.25 | 0.13 | 0.63 | 0.32 | 0.29 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 4 cont.: Statistical Presentation of Key Water Quality Parameters – PML-2**

| PML-2 | RDL (2021) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)**[1] | | | | | | |
| Spring 2021 | 0.006 | 0.006 | 0.003 | 0.047 | 0.010 | 0.010 |
| Summer 2021 | 0.006 | 0.022 | 0.002 | 0.026 | 0.010 | 0.009 |
| Fall 2021 | 0.006 | 0.009 | 0.001 | 0.026 | 0.008 | 0.006 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2021 | 1.0 | 58 | 44 | 245 | 63 | 66 |
| Summer 2021 | 1.0 | 47 | 43 | 72 | 59 | 58 |
| Fall 2021 | 1.0 | 59 | 34 | 64 | 58 | 53 |
| **Lab pH** | | | | | | |
| Spring 2021 | N/A | 6.84 | 6.37 | 7.13 | 6.78 | 6.74 |
| Summer 2021 | N/A | 6.54 | 6.54 | 7.29 | 7.04 | 7.00 |
| Fall 2021 | N/A | 7.17 | 6.60 | 7.17 | 6.87 | 6.88 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2021 | 5 | <5 | 1 | 45 | 3 | 3 |
| Summer 2021 | 5 | <5 | 1 | 14 | 3 | 3 |
| Fall 2021 | 5 | <5 | 1 | 11 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2021 | 1 | 241 | 170 | 777 | 254 | 266 |
| Summer 2021 | 1 | 238 | 170 | 335 | 268 | 261 |
| Fall 2021 | 1 | 252 | 150 | 277 | 229 | 221 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2021 | 0.25 | 2.84 | 1.89 | 2.84 | 2.37 | 2.32 |
| Summer 2021 | 0.25 | 0.64 | 0.64 | 1.10 | 0.87 | 0.84 |
| Fall 2021 | 0.25 | 1.05 | 0.47 | 1.05 | 0.95 | 0.78 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

# 8.0 Graphs

Graphs were completed for all eleven (11) water quality monitoring stations including all historical data collected from June 2009 to October 2021. Appendix E presents seasonal and annual graphs that illustrate concentrations of the following six (6) key water quality parameters previously selected by HRM:

- Total Phosphorus (mg/L)
- Dissolved chloride (mg/L)
- Laboratory pH

- Total Suspended Solids (mg/L)
- Conductivity (µS/cm), and
- Chlorophyll-A (µg/L).

The graphs allow for comparison between water quality sampling stations and identification of concentration increases and associated guideline exceedances. As many parameters show seasonal concentration fluctuations, the water quality data was also graphed showing only the concentrations for a given season. It should be noted that where results were found to be less than the laboratory Reportable Detection Limit (<RDL), results were graphed as half the reportable detection limit (1/2 RDL value) as a conservative approach.

# 9.0 Conclusions

The 2021 water quality monitoring event included the collection of surface water samples at eleven water quality sampling stations for the analysis of inorganics, calculated parameters, standard metals, microbiological and additional metals. Additionally, field parameters collected at each station included in-situ pH, water temperature, dissolved oxygen, conductivity, Secchi depth (one station only), air temperature, cloud cover and wildlife sightings.

### *Total Phosphorus*

All eleven (11) monitoring stations reported concentrations that exceeded HRM's Total Phosphorus (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) during at least one monitoring event in 2021. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL-1: Summer 0.017 mg/L, Fall 0.011 mg/L
- KL-2: Spring 0.014 mg/L, Summer 0.025 mg/L, Fall 0.015 mg/L
- KL-3: Summer 0.024 mg/L, Fall 0.014 mg/L
- KL-4: Spring 0.038 mg/L, Summer 0.031 mg/L
- KL-5: Summer 0.019 mg/L
- HWY-102-1: Summer 0.034 mg/L, Fall 0.012 mg/L
- HWY-102-2: Spring 0.018 mg/L, Summer 0.036 mg/L, Fall 0.018 mg/L
- LSD: Spring 0.044 mg/L, Summer 0.043 mg/L, Fall 0.034 mg/L
- LU: Summer 0.018 mg/L, Fall 0.11 mg/L
- PML-1: Spring 0.017 mg/L, and
- PML-2: Summer 0.022 mg/L.

### *Field Measurements*

- All eleven (11) stations were within the 5.0 – 9.0 pH Health Canada range for Recreational Water Quality during the Spring, Summer and Fall monitoring events. All eleven (11) sampling stations were found outside the CCME-FWAL recommended range of 6.5-9.0 during specific Spring, Summer and Fall events, ranging from 5.35 to 6.41. Seven (7) sampling stations were found outside the NSE EQS recommended range of 6.5-9.0 during the Fall event in 2021.

- In-situ dissolved In-situ dissolved oxygen was below the CCME FWAL acceptable range of >5.5 mg/L at one (1) of the sampling stations: HWY-102-2: Summer 4.27 mg/L.
- There are no applicable CCME, HC or NSE guidelines for recreational water temperature. Water temperature was recorded between 10.5°C during the Fall event (LSD) and 23.1°C during the Spring event (KL-5).
- There are no applicable CCME, HC or NSE guidelines for recreational water conductivity. However, specific water conductivity was recorded between 69.0 µs/cm at KL-2 during the Spring event to 729.0 µs/cm at LU during the Summer event.
- Secchi depths were collected at one (1) monitoring station, KL-2 in the Spring (0.2 m) and Fall (1.65 m) meeting the Health Canada reference value of 1.2 metres in the Fall.

### *General Chemistry and Metals*

- Two (2) sampling stations reported chloride concentrations above the CCME FWAL limit of 120 mg/L: HWY-102-2: Fall 199 mg/L, and LU: Spring 189 mg/L, Summer 132 mg/L, Fall 153 mg/L. These two (2) sampling stations were also found outside the NSE EQS of 120 mg/L during the Fall event.
- One (1) sampling station reported a nitrite concentration above the CCME FWAL limit of 0.06 mg/L: LU: Spring 0.09 mg/L.
- All eleven (11) stations reported laboratory pH values well within Health Canada range of 5.0-9.0 for Recreational Water Quality. Four (4) monitoring stations were found outside the recommended laboratory pH ranges of 6.5 – 9.0 for the CCME FWAL: KL-2: Summer pH 6.42, KL-4: Summer pH 6.49, KL-5: Summer pH 6.47, HWY-102-1: Summer pH 6.40.
- All eleven (11) stations exceeded the NSE EQS aluminum guideline of 5 µg/L and eight (8) of those stations also exceeded the CCME FWAL limit of 100 µg/L: KL-1: Spring 145 µg/L, KL-2: Spring 204 µg/L, KL-3: Spring 116 µg/L, KL-4: Spring 1510 µg/L, KL-5: Spring 126 µg/L, HWY-102-1: Spring 66 µg/L, HWY-102-2: Spring 112 µg/L, LSD: Spring 199 µg/L, LU: Spring 52 µg/L, PML-1: Spring 114 µg/L, and PML-2: Spring 93 µg/L.
- One (1) station exceeded the CCME cadmium guideline of 0.04-0.16 µg/L and the NSE EQS cadmium guidelines of 0.09 µg/L: KL-4: Spring 0.15 µg/L.
- Three (3) stations exceeded the NSE EQS copper guideline of 2 µg/L and the CCME FWAL guideline of 2-2.41 µg/L: KL-4: Spring 4 µg/L, HWY-102-2: Fall 5 µg/L, and LU: Summer 3 µg/L.
- Five (5) stations exceeded the NSE EQS iron guideline and CCME FWAL limit of 300 µg/L: KL-2: Spring 472 µg/L, Summer 503 µg/L, Fall 462 µg/L, KL-4: Spring 2070 µg/L, HWY-102-2: Spring 1600 µg/L, Summer 1080 µg/L, Fall 2400 µg/L, LSD: Spring 1020 µg/L, Summer 356 µg/L, Fall 440 µg/L, and LU: Summer 650 µg/L.
- One (1) station exceeded the NSE EQS of 1 µg/L and CCME FWAL lead guidelines of 1-3.26 µg/L: KL-4: Spring 5.1 µg/L.
- One (1) station exceeded the NSE EQS of 430 µg/L: HWY-102-2: Fall 562 µg/L.
- One (1) station exceeded the NSE EQS nickel guideline of 820 µg/L: PML-1: Spring 60 µg/L.
- Seven (7) station exceeded the NSE EQS of 7 µg/L for zinc and five (5) stations exceeded the and CCME FWAL zinc guideline of 30 µg/L: KL-1: Spring 189 µg/L, KL-3: Spring 40 µg/L, KL-4: Spring 201 µg/L, HWY-102-2: Fall 16 µg/L, LU: Spring 31 µg/L, Fall 13 µg/L, and PML-1: Spring 120 µg/L.

***Microbiology***

- One station exceeded the HC *E. coli* Guidelines of 400 CFU/100 mL (maximum allowable concentration): LSD: Spring >200 CFU/100 mL.
- HC does not have a recreational water quality guideline for Total Coliform. All eleven (11) stations reported Total Coliform concentrations above the laboratory RDL of 1 CFU/100 mL. Reported concentrations ranged from 196 CFU/100mL to >200 CFU/100 mL.

# 10.0 Closure

This report was prepared for the exclusive use of Halifax Regional Municipality and is intended to provide a water quality results for the program. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Wood will be required. With respect to third parties, Wood has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The report is based on data and information collected during the 2021 Bedford West Water Quality Monitoring Program conducted by Wood. It is based solely on the conditions of the Site encountered during field investigations conducted in May, August, and October 2021. Except as otherwise maybe specified, Wood disclaims any obligation to update this report for events taking place, or with respect to information that becomes available to Wood after the time during which Wood conducted the Water Quality Monitoring program.

Wood makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

**Wood Environment & Infrastructure Solutions,**
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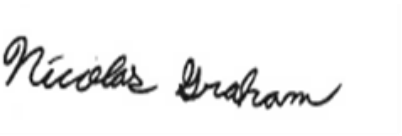

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# 11.0 References

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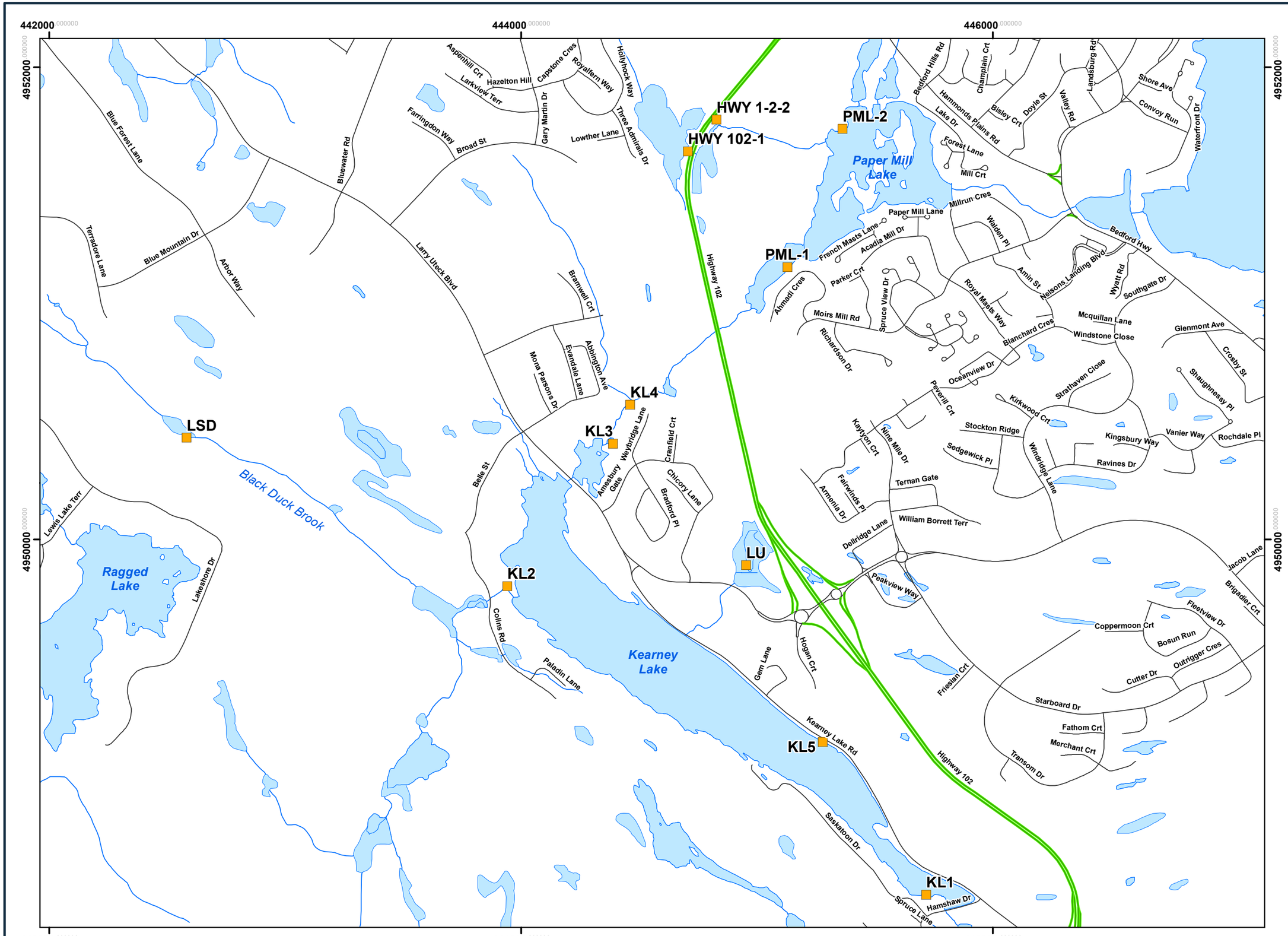
Nova Scotia Environment, September 2021. Environmental Quality Standards for Surface Water (Notification of Contamination Protocol 100, Table 3).

# Appendix A

# Water Quality Sampling Locations




LEGEND:

- Bedford West Water Quality Monitoring Locations
- Highway
- Local Road
- Rivers/Streams
- Lakes/Bedford Basin

CLIENT:

HALIFAX

wood.

TITLE:

**BEDFOR WEST WATER QUALITY MONITORING LOCATIONS**

PROJECT:

**HRM BEDFORD WEST WATER QUALITY MONITORING PROGRAM**

| PROJECT NO: | DATE: |
|---|---|
| TE201017 | MAY 2021 |
| REV NO: | DWN/CHK'D BY: |
| 0 | CM / CC |
| DATUM: | PROJECTION: |
| NAD83 | UTM ZONE 20 N |

FIGURE: **FIGURE 1**

SCALE: 1:15,000

0 125 250 500

Metres

Path: G:\5290 PROJECTS\2020\TE201017_HRM_Bedford_West_Water_Quality_Monitoring\GIS\MXD\TE201017_FIGURE_1_WaterQualityMonitoringLocations.mxd User: candace.macdonald Date: 5/12/2021

# Appendix B

# Field Reports

**HRM Bedford West - Field Report** Event: Spring 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-1 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | same as previous | | |
| Wood Field Personnel: | LD FR | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 16°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | fish, songbirds |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 27 May 21 |
| Time (hh:mm): | 12:15 |
| Sample Depth (m): | 0.2 m |
| pH: | 6.76 |
| Dissolved Oxygen (mg/L): | 17.24 mg/L 172.3 % |
| Secchi Depth (m): | n/a can see bottom |
| Water Temp (degrees C): | 15.61 °C |
| Conductivity (µs/cm): | 176 µs/cm , 0.176 ms/cm |

**Additional Comments/Notes**

no odour, clear

**HRM Bedford West - Field Report** Event: Spring 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-2 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | same as previous | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, Rain |
| Air Temperature: | 16°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | morning doves, songbirds |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 27 May 21 |
| Time (hh:mm): | 11:33 |
| Sample Depth (m): | 0.2 m |
| pH: | 6.71 |
| Dissolved Oxygen (mg/L): | 15.01 mg/L 146 % |
| Secchi Depth (m): | n/a see on bottom |
| Water Temp (degrees C): | 14.12°C |
| Conductivity (µs/cm): | 69 µs/cm 0.071 mS/cm |

279.6 ORP

**Additional Comments/Notes**

**HRM Bedford West - Field Report**

Event: Spring 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-3 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | same as previous | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy |
| Air Temperature: | 17°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | Robins, songbirds |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 27 05 2021 |
| Time (hh:mm): | 13:20 |
| Sample Depth (m): | 0.2m |
| pH: | 6.87 |
| Dissolved Oxygen (mg/L): | 17.84 |
| Secchi Depth (m): | NA - can see @ bottom |
| Water Temp (degrees C): | 16.36 |
| Conductivity (µs/cm): | 0.182 |

**Additional Comments/Notes**

**HRM Bedford West - Field Report**

Event: Spring 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL4 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as prev. | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 17°c |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | Mallard duck family |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 27 May 21 |
| Time (hh:mm): | 12:40 |
| Sample Depth (m): | 0.2m |
| pH: | 6.68 |
| Dissolved Oxygen (mg/L): | 10.37 mg/L |
| Secchi Depth (m): | n/a see bottom |
| Water Temp (degrees C): | 10.09 |
| Conductivity (µs/cm): | 195 ms , 0.205 ms |

**Additional Comments/Notes**

no odour, clear

**HRM Bedford West - Field Report** Event: Spring 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | |
| Watercourse: | | Location: | KL-5 |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as prior | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 16°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | songbirds |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 27 May 21 |
| Time (hh:mm): | 11:52 |
| Sample Depth (m): | 0.2m |
| pH: | 6.74 |
| Dissolved Oxygen (mg/L): | 7.98 mg/L, 101.0 % |
| Secchi Depth (m): | n/a see bottom. |
| Water Temp (degrees C): | 15.99°C |
| Conductivity (µs/cm): | 181 µs/m 0.181 ms/cm 289.6 ORP |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: Spring 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | LSD |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | same as previa | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | overcast rain |
| Air Temperature: | 16°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | — sunbirds |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 27 May 21 |
| Time (hh:mm): | 10:52 |
| Sample Depth (m): | 0.1m |
| pH: | 6.75 |
| Dissolved Oxygen (mg/L): | 12.45 mg/L, 119.3 % |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 13.94°C |
| Conductivity (µs/cm): | 120 µS/cm 0.120 mS/cm |
| | 232.8 ORP |

**Additional Comments/Notes**

no odour, organic sheen, brown particulate

**HRM Bedford West - Field Report** Event: Spring 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | LU | Site ID: | LU |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see previous | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Raining, overcast |
| Air Temperature: | 16°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | fish |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 27may2 |
| Time (hh:mm): | 10:05 |
| Sample Depth (m): | 0.1m |
| pH: | 6.89 |
| Dissolved Oxygen (mg/L): | 18.71 mg/L 190.4 % |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 16.412°C |
| Conductivity (µs/cm): | 618 µs/cm 0.618 ms/cm |

300.1 DBP

**Additional Comments/Notes**

suspended solids, no odor

**HRM Bedford West - Field Report** Event: Spring 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | HWY 102 | Site ID: | HWY102-1 |
| Watercourse: | outflow of PML | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see previous | | |
| Wood Field Personnel: | ER, ED | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, rain |
| Air Temperature: | 15°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | / songbirds |
| Site Accessibility: | / |
| Site Access Detail : | / |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 27 may 21 |
| Time (hh:mm): | 9.42 |
| Sample Depth (m): | 0.1 m |
| pH: | 6.38 |
| Dissolved Oxygen (mg/L): | 11.15 mg/L 110.1 % DO |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 15.08°C |
| Conductivity (µs/cm): | 367 µs/cm, 0.367 ms/cm 262.0 ORP |

**Additional Comments/Notes**

no odour, suspended solids, clear

**HRM Bedford West - Field Report**

Event: Spring 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | Hwy102-2 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see previous | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny, partly ~~cloudy~~ cloudy |
| Air Temperature: | 17°C |
| Cloud Cover: | 7/8 |
| Wildlife Sightings: | — |
| Site Accessibility: | |
| Site Access Detail : | / |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 27 may 21 |
| Time (hh:mm): | 13:38 |
| Sample Depth (m): | 0.2m |
| pH: | 6.52 |
| Dissolved Oxygen (mg/L): | 17.91 mg/L 177.1 % |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 14.92 |
| Conductivity (µs/cm): | 424 µs/cm, 0.427 ms/cm<br>202.5 ORP |

**Additional Comments/Notes**

green algae growth in water
no odor, clear

**HRM Bedford West - Field Report**

Event: Spring 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | PML-1 | Site ID: | |
| Watercourse: | Papermill Lake | Location: | PML |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | same as previous location | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 14°C |
| Cloud Cover: | 10/10 |
| Wildlife Sightings: | ducks |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 27 May 21 |
| Time (hh:mm): | 8:13 |
| Sample Depth (m): | 0.2 m |
| pH: | 6.10 |
| Dissolved Oxygen (mg/L): | 16.27 mg/L 102.9 % |
| Secchi Depth (m): | |
| Water Temp (degrees C): | 15.8°C |
| Conductivity (µs/cm): | 199 , 0.199 ms/cm |

ORP 293.3

**Additional Comments/Notes**

no odour, clear

**HRM Bedford West - Field Report** Event: spring 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | PML-2 | Site ID: | pML-2 |
| Watercourse: | Papermill lake | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | same as before | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 15°C |
| Cloud Cover: | 10/10 |
| Wildlife Sightings: | / ducks |
| Site Accessibility: | / |
| Site Access Detail : | / |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 27 may 21 |
| Time (hh:mm): | 8:25 |
| Sample Depth (m): | 0.2m |
| pH: | 6.41 |
| Dissolved Oxygen (mg/L): | 16.06 mg/L, 165.9% |
| Secchi Depth (m): | N/S |
| Water Temp (degrees C): | 16.99°C |
| Conductivity (µs/cm): | 209 µs/cm, 0.209 ms/cm |

316.30 ORP

**Additional Comments/Notes**

no odour, clear

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-1 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid |
| Air Temperature: | 24°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | ducks, fish |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 9 Aug 21 |
| Time (hh:mm): | 12:12 |
| Sample Depth (m): | 0.20 |
| pH: | 5.95 |
| Dissolved Oxygen (mg/L): | 7.72 mg/L / 89.4% |
| Secchi Depth (m): | n/a too shallow |
| Water Temp (degrees C): | 22.58°C |
| Conductivity (µs/cm): | 0.202 ms/cm (202 µs/cm) |

ORP −48.0

**Additional Comments/Notes**

Clear, colorless, no odor

**HRM Bedford West - Field Report**

Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-2 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | overcast |
| Air Temperature: | 24°C |
| Cloud Cover: | 8/8 cloudy |
| Wildlife Sightings: | red squirrel |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 9 Aug 21 |
| Time (hh:mm): | 11:53 |
| Sample Depth (m): | 0.10 m |
| pH: | 5.80 |
| Dissolved Oxygen (mg/L): | 8.17 mg/L / 86.7 %c |
| Secchi Depth (m): | n/a → too much poison ivy to access |
| Water Temp (degrees C): | 18.47°C |
| Conductivity (µs/cm): | 0.076 ms/cm / 76 µs/cm |

**Additional Comments/Notes**

clear, suspended solids, no odour.

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-3 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid |
| Air Temperature: | 24°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | red squirrel |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 9 Aug 21 |
| Time (hh:mm): | 12:44 |
| Sample Depth (m): | 0.20 m |
| pH: | 6.34 |
| Dissolved Oxygen (mg/L): | 8.36 mg/L / 95.4% |
| Secchi Depth (m): | n/a ~~1.20~~ bottom visible |
| Water Temp (degrees C): | 21.91°C |
| Conductivity (µs/cm): | 0.211 ms/cm (211 µs/cm) |

**Additional Comments/Notes**

Clear, colourless, no odour.

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-4 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid |
| Air Temperature: | 24°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 9 May 21 |
| Time (hh:mm): | 13:02 |
| Sample Depth (m): | 0.20 |
| pH: | 6.29 |
| Dissolved Oxygen (mg/L): | 8.77 mg/L / 99.9 % |
| Secchi Depth (m): | n/a shallow |
| Water Temp (degrees C): | 21.92 °C |
| Conductivity (µs/cm): | 0.212 ms/cm (212 µs/cm) |

-55.5 ORP

**Additional Comments/Notes**

Clear, colourless, no odour.

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-5 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 + DUP1 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid |
| Air Temperature: | 24°C |
| Cloud Cover: | 8/8 fully cloudy |
| Wildlife Sightings: | |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 9 Aug 21 |
| Time (hh:mm): | 12:24 |
| Sample Depth (m): | 0.20 |
| pH: | 6.24 |
| Dissolved Oxygen (mg/L): | 8.66 mg/L / 100.7 % |
| Secchi Depth (m): | n/a bottom visible |
| Water Temp (degrees C): | 23.13 °C |
| Conductivity (µs/cm): | 0.210 ms/cm (210 µs/cm) |

-57.3 ORP

**Additional Comments/Notes**

clear, colorless, no odour.

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | LSD |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | see ipad | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy |
| Air Temperature: | 21°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 9 Aug 21 |
| Time (hh:mm): | 11:07 |
| Sample Depth (m): | 0.10 m |
| pH: | 6.55 |
| Dissolved Oxygen (mg/L): | 6.46 mg/L / 68.1 % |
| Secchi Depth (m): | n/a too shallow |
| Water Temp (degrees C): | 18.57°C |
| Conductivity (µs/cm): | 0.137 ms/cm ( 137 us/cm ) |

-36.0 ORP

**Additional Comments/Notes**

clear, suspended solids, no odour.

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | LO |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | ER LD | | |

**Site Conditions**

| | |
|---|---|
| Weather: | cloudy, humid |
| Air Temperature: | 21°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | ~~n/a~~ odonates (dragonflies) |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 9 May 21 |
| Time (hh:mm): | 10:[illegible] |
| Sample Depth (m): | 0.10 |
| pH: | 6.03 |
| Dissolved Oxygen (mg/L): | 10.02mg/L / 103.9% |
| Secchi Depth (m): | n/a too shallow |
| Water Temp (degrees C): | 18.79°C |
| Conductivity (µs/cm): | 0.507 ms/cm ( 507 µs/cm) |

-32.6 ORP

**Additional Comments/Notes**

Stinky, sulphur odor, colorless, clear some suspended solids

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | HWY102-1 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | See pad | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 20°c |
| Cloud Cover: | 8/8 cloudy |
| Wildlife Sightings: | ducks |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 9 Aug 21 |
| Time (hh:mm): | 9:53 |
| Sample Depth (m): | 0.10m |
| pH: | 5.74 |
| Dissolved Oxygen (mg/L): | 7.16 mg/L / 70.7 % |
| Secchi Depth (m): | n/a too shallow |
| Water Temp (degrees C): | 17.72°C |
| Conductivity (µs/cm): | 0.259 ms/cm (259 µs/cm) |

ORP - 36.6

**Additional Comments/Notes**

clear, colourless, sinks like trash.

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | HWY102-2 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | | | |
| Wood Field Personnel: | LD ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast humid |
| Air Temperature: | 24°c |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | Odonates |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 9 Aug 21 |
| Time (hh:mm): | 13:22 |
| Sample Depth (m): | 0.20 |
| pH: | 5.99 |
| Dissolved Oxygen (mg/L): | 4.27 mg/L / 45.2% |
| Secchi Depth (m): | n/a too shallow |
| Water Temp (degrees C): | 19.53°c |
| Conductivity (µs/cm): | 0.729 mc/cm / 729 µs/cm |
| | -61.7 ORP |

**Additional Comments/Notes**

clear, orange tinge. SS

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | PML-1 |
| Watercourse: | | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | See ipad | | |
| Wood Field Personnel: | L Darche E. Robinson | | |

**Site Conditions**

| | |
|---|---|
| Weather: | 20°C overcast 8/10 |
| Air Temperature: | |
| Cloud Cover: | fully cloudy |
| Wildlife Sightings: | ducks |
| Site Accessibility: | |
| Site Access Detail : | / |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 9 Aug 21 |
| Time (hh:mm): | 8:39 |
| Sample Depth (m): | 20 cm |
| pH: | 5.35 |
| Dissolved Oxygen (mg/L): | 9.16 mg/L 101.7 % |
| Secchi Depth (m): | n/a see bottom. |
| Water Temp (degrees C): | 21.9°C |
| Conductivity (µs/cm): | 219 us/cm (0.219 ms/cm) |

ORP -35.7

**Additional Comments/Notes**

clear, suspended solids, light manganese sheen. Lovely there.
no odour.

**HRM Bedford West - Field Report** Event: Summer

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | PML-2 |
| Watercourse: | Papermill Lake | Location: | |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | See ipad | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast |
| Air Temperature: | 20°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | crows, songbirds, |
| Site Accessibility: | |
| Site Access Detail : | |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 9 Aug. 21 |
| Time (hh:mm): | 8:56 |
| Sample Depth (m): | 20cm |
| pH: | 5.53 |
| Dissolved Oxygen (mg/L): | 9.01 mg/L / 101.6 % |
| Secchi Depth (m): | n/a see bottom |
| Water Temp (degrees C): | 21.85°C |
| Conductivity (µs/cm): | 0.219 ms/cm (219 µs/cm) |

-34.4 ORP

**Additional Comments/Notes**

water - clear, no odour, colourless

**HRM Bedford West - Field Report** Event: FALL (October 2021)

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-1 | Site ID: | KL-1 |
| Watercourse: | Kearney LAKE | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as Previous Events | | |
| Wood Field Personnel: | LO & ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid, windy |
| Air Temperature: | 17°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | mallard ducks |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 22.10.2021 |
| Time (hh:mm): | 11:20 |
| Sample Depth (m): | ~~AA~~ 0.2 |
| pH: | 6.72 |
| Dissolved Oxygen (mg/L): | 11.34 |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 15.17 |
| Conductivity (µs/cm): | 189 |

192.3 mV ORP

**Additional Comments/Notes**

Clear, colorless, no odour.

**HRM Bedford West - Field Report** Event: FALL (October 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-2 | Site ID: | KL-2 |
| Watercourse: | Kearney Lake | Location: | BEDFORD |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same As Previous Events | | |
| Wood Field Personnel: | LD & ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid, windy |
| Air Temperature: | 17°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | Chipmunk |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 22.10.2021 |
| Time (hh:mm): | 11:46 |
| Sample Depth (m): | ~~1.65~~ 0.2 |
| pH: | 6.14 |
| Dissolved Oxygen (mg/L): | 12.07 |
| Secchi Depth (m): | 1.65 |
| Water Temp (degrees C): | 11.66 |
| Conductivity (µs/cm): | 84 |
| | 139.8 mV ORP |

**Additional Comments/Notes**

Clear, colorless, no odour.

**HRM Bedford West - Field Report** Event: FALL (October 2021)

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-3 | Site ID: | KL-3 |
| Watercourse: | Kearney Lake. | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | See previous events | | |
| Wood Field Personnel: | LD + ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, bit humid, windy |
| Air Temperature: | 17°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | NA |
| Site Accessibility: | |
| Site Access Detail : | Same as previous event. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 22.10.2021 |
| Time (hh:mm): | 12:02 |
| Sample Depth (m): | 0.2 |
| pH: | 6.78 |
| Dissolved Oxygen (mg/L): | 15.96 |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 15.04 |
| Conductivity (µs/cm): | 186 |

179.9 mV ORP

**Additional Comments/Notes**

Clear, colorless, no solids, no odour.

9/11

**HRM Bedford West - Field Report** Event: FALL (October 2021)

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-4 | Site ID: | KL-4 |
| Watercourse: | Kearney Lake | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | See previous events | | |
| Wood Field Personnel: | LD & ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid, windy |
| Air Temperature: | 17°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | NA |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 22.10.2021 |
| Time (hh:mm): | 12:16 |
| Sample Depth (m): | 0.2 |
| pH: | 6.79 |
| Dissolved Oxygen (mg/L): | 19.23 |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 15.04 |
| Conductivity (µs/cm): | 188 |

158.1 mV ORP

**Additional Comments/Notes**

Clear, colorless, no odour/solids

**HRM Bedford West - Field Report** Event: FALL (October 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-5 | Site ID: | KL-5 |
| Watercourse: | Kearney Lake | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LB & ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid, windy |
| Air Temperature: | 17°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | Crows |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 22.10.2021 |
| Time (hh:mm): | 11:08 |
| Sample Depth (m): | 0.2 |
| pH: | 6.70 |
| Dissolved Oxygen (mg/L): | 16.90 |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 15.40 |
| Conductivity (µs/cm): | 190 |

188.9 mV ORP

**Additional Comments/Notes**

Clear, colorless, no odour

6/11

**HRM Bedford West - Field Report** Event:

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | HWY102-1 | Site ID: | HWY102-1 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD & ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid |
| Air Temperature: | 17°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | NA |
| Site Accessibility: | |
| Site Access Detail : | Same as prenous events |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 22.10.2021 |
| Time (hh:mm): | 0949 |
| Sample Depth (m): | 0.2 |
| pH: | 6.31 |
| Dissolved Oxygen (mg/L): | 20.74 |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 12.67°C |
| Conductivity (µs/cm): | 316 |
| | 176.8 mV ORP |

**Additional Comments/Notes**

Colorless with suspended solids, pollen, organic sheen.
Sewage / sulphur odour. (standing water)

**HRM Bedford West - Field Report** Event: FALL (October 2021)

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | HWY102-2 | Site ID: | HWY102-2 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | See previous events | | |
| Wood Field Personnel: | LD + ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid, windy |
| Air Temperature: | 17°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | dragonflies |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 22.10.2021 |
| Time (hh:mm): | 12:34 |
| Sample Depth (m): | 0.1 |
| pH: | 6.07 |
| Dissolved Oxygen (mg/L): | 15.05 |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 13.65 |
| Conductivity (µs/cm): | 728 |
| | 63.1 mV ORP |

**Additional Comments/Notes**

Clear, colorless with suspended solids. No odour.

**HRM Bedford West - Field Report** Event: FALL (October 2021)

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | LSD | Site ID: | LSD |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LO + ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid, windy |
| Air Temperature: | 17°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | NA |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 22.10.2021 |
| Time (hh:mm): | 10:38 |
| Sample Depth (m): | 0.1 |
| pH: | 5.95 |
| Dissolved Oxygen (mg/L): | 12.45 |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 10.47 |
| Conductivity (µs/cm): | 129 |

136.2 mV ORP

**Additional Comments/Notes**

Clear, colorless, suspended solids, no odour.

**HRM Bedford West - Field Report** Event: FALL (October 2021)

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | LU | Site ID: | LU |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD & ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid, windy |
| Air Temperature: | 17°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | NA |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 22.10.2021 |
| Time (hh:mm): | 10:08 |
| Sample Depth (m): | 0.2 |
| pH: | 6.33 |
| Dissolved Oxygen (mg/L): | 12.39 |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 14.03 |
| Conductivity (µs/cm): | 503 |

18.1 mV ORP

**Additional Comments/Notes**

Clear, colorless, sulphur odour.

**HRM Bedford West - Field Report**

Event: FALL (OCTOBER 2021)

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | PML-1 | Site ID: | PML-1 |
| Watercourse: | Papermill Lake | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous event | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | OVERCAST, WARM, |
| Air Temperature: | 18°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | CROWS, BLUEJAYS, DUCKS |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 22.11.2021 |
| Time (hh:mm): | 08:44 |
| Sample Depth (m): | 0.2 |
| pH: | 5.6 |
| Dissolved Oxygen (mg/L): | 20.6 |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 13.73 |
| Conductivity (µs/cm): | 266 |

238.5 mV ORP

**Additional Comments/Notes**

Clear, colorless, no odour

**HRM Bedford West - Field Report** Event: Fall (October 2021

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | PML-2 | Site ID: | PML-2 |
| Watercourse: | Papermill Lake | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LO & ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Overcast, humid |
| Air Temperature: | 18°C |
| Cloud Cover: | 8/8 |
| Wildlife Sightings: | ducks, squirrels, songbirds |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 22.10.2021 |
| Time (hh:mm): | 0859 |
| Sample Depth (m): | 0.2 |
| pH: | 6.22 |
| Dissolved Oxygen (mg/L): | 11.88 |
| Secchi Depth (m): | NA |
| Water Temp (degrees C): | 14.11 |
| Conductivity (µs/cm): | 207 |
| | 260.8mV ORP |

**Additional Comments/Notes**

Clear, colorless, no odour

# Appendix C

# Summary Table Reports

**Table C1: Bedford West Water Quality Sampling Program - 2021 Results**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | KL-1 | | | KL-2 | | | KL-3 | | | KL-4 | | | KL-5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Event | | | | | | | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall |
| Sampling Date | | | | | | | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | | | | | | | 12:15 PM | 12:12 PM | 11:20 AM | 11:33 AM | 11:53 AM | 11:46 AM | 1:20 PM | 12:44 PM | 12:02 PM | 12:40 PM | 1:02 PM | 12:16 PM | 11::52 PM | 12:24 PM | 11:08 AM |
| Field Data (in Situ) | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | meters | -- | -- | -- | minimum of 1.2 | -- | NA* | NA* | NA* | 0.2 m | NA* | 1.65 | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | 15.6 | 22.6 | 15.2 | 14.1 | 18.5 | 11.7 | 16.4 | 21.9 | 15.0 | 16.1 | 21.9 | 15.0 | 16.0 | 23.1 | 15.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | > 5.5 | 17.24 | 7.72 | 11.34 | 15.01 | 8.17 | 12.07 | 17.84 | 8.36 | 15.96 | 16.37 | 8.77 | 19.23 | 17.88 | 8.66 | 16.90 |
| pH | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | 6.76 | **5.95** | 6.72 | **6.07** | **5.80** | **6.14** | 6.87 | **6.34** | 6.78 | 6.68 | **6.29** | 6.79 | 6.74 | **6.24** | 6.70 |
| Specific Conductance (µs/cm) | uS/cm | -- | -- | -- | -- | -- | 176.0 | 202.0 | 189.0 | 69.0 | 76.0 | 84.0 | 182.0 | 211.0 | 186.0 | 185.0 | 212.0 | 188.0 | 181.0 | 210.0 | 190.0 |
| Inorganic Parameters | | | | | | | | | | | | | | | | | | | | | |
| Alkalinity | mg/L | 5 | -- | -- | -- | -- | <5 | 9 | 10 | 8 | 8 | 15 | 6 | 8 | 9 | <5 | 8 | 11 | <5 | 8 | 11 |
| Chloride | mg/L | 1 | -- | 120 | -- | 120 | 49 | 48 | 53 | 13 | 13 | 14 | 51 | 49 | 52 | 51 | 49 | 53 | 50 | 51 | 53 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | <0.12 | -- | -- | <0.12 | -- | -- | <0.12 | -- | -- | <0.12 | -- | -- | <0.12 |
| True Color | TCU | 5 | -- | -- | -- | -- | 20.7 | 14.7 | 10.9 | 47.0 | 84.1 | 66.3 | 18.5 | 13.4 | 13.6 | 21.7 | 10.5 | 13.3 | 16.7 | 13.1 | 12.6 |
| Nitrate + Nitrite as N | mg/L | 0.05 | -- | -- | -- | -- | 0.14 | 0.11 | 0.23 | 0.05 | 0.41 | 0.10 | <0.05 | 0.18 | 0.19 | 0.18 | 0.16 | 0.21 | 0.19 | 0.15 | 0.20 |
| Nitrate as N | mg/L | 0.05 | -- | 13 | -- | 13 | 0.14 | 0.11 | 0.23 | 0.05 | 0.41 | 0.10 | <0.05 | 0.18 | 0.19 | 0.18 | 0.16 | 0.21 | 0.19 | 0.15 | 0.20 |
| Nitrite as N | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.44 | <0.03 | <0.03 | 0.67 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | 0.19 | 0.22 | <0.10 | 0.24 | 0.24 | <0.10 | 0.14 | 0.1 | <0.10 | 0.22 | 0.1 | | 0.16 | <0.10 | |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | 5.2 | 3.1 | 5.2 | 8.5 | 9.9 | 3.0 | 5.1 | 2.9 | 7.5 | 6.1 | 3.1 | 3.0 | 5.1 | 2.9 | 2.9 |
| Ortho-Phosphate as P | mg/L | 0.01 | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | 0.88 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | | | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | 6.69 | 6.50 | 7.06 | 6.69 | **6.42** | 7.04 | 6.76 | 6.50 | 7.10 | 6.64 | **6.49** | 7.08 | 6.71 | **6.47** | 7.07 |
| Total Calcium | mg/L | 0.1 | -- | -- | -- | -- | 9.2 | 7.5 | 8.6 | 3.8 | 5.9 | 7.6 | 7.5 | 7.6 | 8.6 | 10.1 | 8.1 | 8.6 | 6.0 | 7.3 | 8.6 |
| Total Magnesium | mg/L | 0.1 | -- | -- | -- | -- | 1.1 | 1.1 | 1.2 | 0.8 | 1.3 | 1.5 | 1.0 | 1.3 | 1.2 | 1.2 | 1.3 | 1.2 | 1.0 | 1.1 | 1.2 |
| Total Phosphorus | mg/L | 0.006 | -- | -- | -- | 0.01 note [6] | <0.006 | **0.017** | **0.011** | **0.014** | **0.025** | **0.015** | <0.006 | **0.024** | **0.014** | **0.038** | **0.031** | 0.008 | 0.007 | **0.019** | 0.009 |
| Total Potassium | mg/L | 0.1 | -- | -- | -- | -- | 0.8 | 1.1 | 1.0 | 0.7 | 1.1 | 1.0 | 0.8 | 1.2 | 1.0 | 1.0 | 1.1 | 1.0 | 0.8 | 1.1 | 1.0 |
| Total Sodium | mg/L | 0.1 | -- | -- | -- | -- | 34.2 | 31.9 | 30.4 | 10.1 | 10.9 | 10.0 | 31.3 | 32.8 | 28.6 | 34.8 | 34.0 | 29.0 | 34.7 | 31.4 | 30.7 |
| Reactive Silica as SiO2 | mg/L | 0.5 | -- | -- | -- | -- | 2.8 | 3.7 | 1.7 | 2.3 | 5.4 | 3.9 | 2.9 | 4.1 | 0.7 | 3.1 | 3.9 | 1.9 | 3.0 | 4.2 | 1.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | <5 | <5 | <5 | <5 | <5 | 6.0 | <5 | <5 | <5 | 12 | <5 | <5 | <5 | <5 | <5 |
| Sulphate | mg/L | 2 | -- | 128 | -- | -- | 8 | 8 | 10 | 4 | 6 | 7 | 8 | 8 | 10 | 8 | 8 | 10 | 8 | 8 | 10 |
| Turbidity | NTU | 0.1 | -- | -- | 50 | -- | 1.0 | 2.1 | 0.9 | 3.0 | 5.6 | 1.3 | 0.7 | 0.8 | 0.7 | 22.6 | 0.6 | 0.7 | 1.3 | 0.6 | <0.5 |
| Conductivity | umho/cm | 1 | -- | -- | -- | -- | 205 | 217 | 222 | 79 | 94 | 106 | 210 | 233 | 227 | 213 | 234 | 228 | 208 | 229 | 226 |
| Calculated Parameters | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | | -- | -- | -- | -- | 1.56 | 1.71 | 1.92 | 0.61 | 0.68 | 0.85 | 1.73 | 1.72 | 1.87 | 1.62 | 1.72 | 1.94 | 1.59 | 1.78 | 1.94 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | <5 | 9 | 10 | 8 | 8 | 15 | 6 | 8 | 9 | <5 | 8 | 11 | <5 | 8 | 11 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | 103 | 104 | 111 | 38 | 46 | 52 | 103 | 106 | 109 | 111 | 107 | 110 | 102 | 105 | 112 |
| Carb. Alkalinity (as CaCO3) | mg/L | 10 | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation sum | me/L | -- | -- | -- | -- | -- | 2.09 | 1.90 | 1.88 | 0.76 | 0.97 | 1.04 | 1.86 | 1.95 | 1.85 | 2.40 | 2.03 | 1.82 | 1.93 | 1.86 | 1.89 |
| Hardness | mg/L | -- | -- | -- | -- | -- | 27.5 | 23.3 | 26.4 | 12.8 | 20.1 | 25.2 | 22.8 | 24.3 | 26.4 | 30.2 | 25.6 | 26.4 | 19.1 | 22.8 | 26.4 |
| % Difference/ Ion Balance (NS) | % | -- | -- | -- | -- | -- | 14.5 | 5.2 | 0.9 | 10.4 | 17.7 | 10.3 | 3.7 | 6.3 | 0.5 | 19.5 | 8.2 | 3.1 | 9.6 | 2.2 | 1.1 |
| Langelier Index (@20C) | NA | -- | -- | -- | -- | -- | -3.24 | -3.26 | -2.60 | -3.37 | -3.46 | -2.46 | -3.18 | -3.31 | -2.60 | -3.25 | -3.29 | -2.54 | -3.40 | -3.35 | -2.55 |
| Langelier Index (@ 4C) | NA | -- | -- | -- | -- | -- | -3.56 | -3.58 | -2.92 | -3.69 | -3.78 | -2.78 | -3.50 | -3.63 | -2.92 | -3.57 | -3.61 | -2.86 | -3.72 | -3.67 | -2.87 |
| Saturation pH (@ 20C) | NA | -- | -- | -- | -- | -- | 9.93 | 9.76 | 9.66 | 10.1 | 9.88 | 9.50 | 9.94 | 9.81 | 9.70 | 9.89 | 9.78 | 9.62 | 10.1 | 9.82 | 9.62 |
| Saturation pH (@ 4C) | NA | -- | -- | -- | -- | -- | 10.2 | 10.1 | 10.0 | 10.4 | 10.2 | 9.8 | 10.3 | 10.1 | 10.0 | 10.2 | 10.1 | 9.9 | 10.4 | 10.1 | 9.9 |
| Metals (ICP-MS) | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum | ug/L | 5 | 5 | 5 | -- | 100 (pH based) | **145** | -- | -- | **204** | -- | -- | **116** | -- | -- | **1510** | -- | -- | **126** | -- | -- |
| Total Antimony | ug/L | 2 | 20 | 9 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic | ug/L | 2 | 5.0 | 5.0 | -- | 5 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium | ug/L | 5 | 1000 | 1000 | -- | -- | 14 | -- | -- | 13 | -- | -- | 16 | -- | -- | 30 | -- | -- | 15 | -- | -- |
| Total Beryllium | ug/L | 2 | 5.3 | 0.15 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron | ug/L | 5 | 1200 | 1500 | -- | 1500 | 16 | -- | -- | 11 | -- | -- | 9 | -- | -- | 18 | -- | -- | 7 | -- | -- |
| Total Cadmium | ug/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | | -- | -- | | -- | -- | | -- | -- | **0.15** | -- | -- | <0.09 | -- | -- |
| Total Chromium | ug/L | 1 | --- | 8.9 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | 2 | -- | -- | <1 | -- | -- |
| Total Cobalt | ug/L | 1 | 10 | 1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | 5 | -- | -- | <1 | -- | -- |
| Total Copper | ug/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | 1 | 2 | <1 | 1 | 2 | <1 | 1 | 1 | <1 | **4** | 1 | <1 | 1 | 2 | <1 |
| Total Iron | ug/L | 50 | 300 | 300 | -- | 300 | 139 | 115 | 53 | **472** | **503** | **462** | 114 | 68 | <50 | **2070** | 69 | 73 | 103 | <50 | <50 |
| Total Lead | ug/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | <0.5 | -- | -- | 0.7 | -- | -- | <0.5 | -- | -- | **5.1** | -- | -- | <0.5 | -- | -- |
| Total Manganese | ug/L | 2 | 820 | 430 | -- | -- | 51 | 33 | 13 | 77 | 36 | 44 | 24 | 16 | 35 | 252 | 19 | 32 | 21 | 8 | 7 |
| Total Molybdenum | ug/L | 2 | 73 | 73 | -- | 73 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel | ug/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | 7 | -- | -- | 3 | -- | -- | <2 | -- | -- | 6 | -- | -- | <2 | -- | -- |
| Total Selenium | ug/L | 1 | 1.0 | 1.0 | -- | 1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver | ug/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium | ug/L | 5 | 21000 | 21000 | -- | -- | 33 | -- | -- | 17 | -- | -- | 31 | -- | -- | 37 | -- | -- | 30 | -- | -- |
| Total Thallium | ug/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | 4 | -- | -- | <2 | -- | -- | 30 | -- | -- | <2 | -- | -- |
| Total Uranium | ug/L | 0.1 | 300 | 15 | -- | 15 | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- | 0.4 | -- | -- | <0.2 | -- | -- |
| Total Vanadium | ug/L | 2 | 6 | 120 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | 5 | -- | -- | <2 | -- | -- |
| Total Zinc | ug/L | 5 | 30 | 7 | -- | 30 | **189** | 6 | <5 | <5 | <5 | <5 | **40** | <5 | <5 | **201** | <5 | <5 | 6 | <5 | <5 |
| Microbiological Parameters | | | | | | | | | | | | | | | | | | | | | |
| Total Coliforms | MPN/100 mL | 1 | -- | | -- | -- | >200 | >200 | >200 | >200 | >200 | >200 | >200 | >200 | >200 | >200 | >200 | >200 | 196 | >200 | >200 |
| E. Coli | MPN/100 mL | 1 | -- | | 400/ 100 mL | -- | 25 | 130 | 43 | 195 | 26 | 12 | 12 | 18 | 29 | 39 | 24 | 44 | <1 | 9 | 1 |
| Chlorophyll A - Spectrophotometer | ug/L | 0.25-0.50 | -- | | -- | -- | 0.95 | 2.4 | 1.05 | 0.95 | 0.6 | 0.79 | 1.1 | 1.6 | 13.1 | 8.31 | 1.8 | 5.26 | 0.79 | 1.9 | 63.1 |

**Notes:**

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

* Secchi depth measurement not possible, disc visible at bottom of the watercourse or the sample location was too shallow for secchi depth use (KL4, KL5, HWY-102 locations, and LSD).

RDL = Reported Detection Limit (represents most recent sampling event)

" -- '' = no guideline available / no parameter tested.

| | |
|---|---|
| **Bold and Black Shaded** | Concentration exceeds CCME FWAL applicable guideline. |
| Underlined and Black Shaded | Concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality (Reference Guidelines) |

**Table C1: Bedford West Water Quality Sampling Program - 2021 Results**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HWY-102-1 | | | HWY-102-2 | | | LSD | | | LU | | | PML-1 | | | PML-2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Event | | | | | | | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall |
| Sampling Date | | | | | | | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | | | | | | | 9:42 AM | 9:53 AM | 9:49 AM | 1:38 PM | 1:22 PM | 12:34 PM | 10:52 PM | 11:07 AM | 10:38 AM | 10:05 AM | 10:18 AM | 10:08 AM | 8:13 AM | 8:39 AM | 8:44 AM | 8:25 AM | 8:56 AM | 8:59 AM |
| Field Data (in Situ) | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | meters | -- | -- | -- | minimum of 1.2 | -- | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | 15.1 | 17.7 | 12.3 | 14.9 | 18.5 | 13.7 | 13.9 | 18.6 | 10.5 | 16.4 | 18.8 | 14.0 | 15.8 | 21.9 | 13.7 | 17.0 | 21.9 | 14.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | > 5.5 | 11.15 | 7.16 | 20.74 | 17.91 | **4.27** | 15.05 | 12.45 | 6.46 | 12.45 | 18.71 | 10.02 | 12.39 | 16.27 | 9.16 | 20.65 | 16.06 | 9.01 | 11.88 |
| pH | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | **6.38** | **5.74** | **6.31** | 6.52 | **5.99** | **6.07** | 6.75 | 6.55 | **5.95** | 6.89 | **6.03** | **6.33** | **6.10** | **5.35** | **5.60** | **6.41** | **5.53** | **6.22** |
| Specific Conductance (µs/cm) | uS/cm | -- | -- | -- | -- | -- | 367.0 | 259.0 | 316.0 | 424.0 | 729.0 | 728.0 | 120.0 | 137.0 | 129.0 | 618.0 | 507.0 | 503.0 | 199.0 | 219.0 | 266.0 | 209.0 | 219.0 | 207.0 |
| Inorganic Parameters | | | | | | | | | | | | | | | | | | | | | | | | |
| Alkalinity | mg/L | 5 | -- | -- | -- | -- | 21 | 23 | 25 | 16 | 11 | 8 | 15 | 13 | 17 | 15 | 17 | 24 | 6 | 9 | 13 | 6 | 10 | 13 |
| Chloride | mg/L | 1 | -- | 120 | -- | 120 | 98 | 57 | 82 | 103 | 94 | **199** | 27 | 26 | 33 | **189** | **132** | **153** | 55 | 50 | 55 | 58 | 47 | 59 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | <0.12 | -- | -- | <0.12 | -- | -- | <0.12 | -- | -- | <0.12 | -- | -- | <0.12 | -- | -- | <0.12 |
| True Color | TCU | 5 | -- | -- | -- | -- | 19.2 | 51.6 | 27.7 | 22.9 | 86.6 | 24.8 | 17.0 | 50.8 | 31.1 | 6.12 | 26.2 | 12.2 | 15.0 | 8.19 | 7.50 | 12.4 | 5.50 | 12.00 |
| Nitrate + Nitrite as N | mg/L | 0.05 | -- | -- | -- | -- | 0.25 | 0.65 | 0.17 | 0.11 | <0.05 | 0.06 | 0.10 | <0.05 | <0.05 | 0.69 | 1.09 | 0.71 | 0.20 | 0.21 | 0.25 | 0.17 | 0.25 | 0.22 |
| Nitrate as N | mg/L | 0.05 | -- | 13 | -- | 13 | 0.25 | 0.65 | 0.17 | 0.11 | <0.05 | 0.06 | 0.10 | <0.05 | <0.05 | 0.60 | 1.09 | 0.71 | 0.20 | 0.21 | 0.25 | 0.17 | 0.25 | 0.22 |
| Nitrite as N | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | **0.09** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | 0.24 | 0.3 | 0.2 | 0.35 | 0.4 | 0.1 | 0.64 | 0.3 | <0.10 | 0.27 | <0.10 | <0.10 | 0.11 | <0.10 | <0.10 | 0.12 | <0.10 | <0.10 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | 6.7 | 5.2 | 3.0 | 9.0 | 10.4 | 4.7 | 7.3 | 6.4 | 3.7 | 5.7 | 3.5 | 4.4 | 4.6 | 2.9 | 14.8 | 4.7 | 3.0 | 2.8 |
| Ortho-Phosphate as P | mg/L | 0.01 | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | | | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | 7.06 | 6.87 | 7.20 | 7.05 | **6.40** | 6.66 | 6.88 | 6.54 | 7.15 | 7.36 | 6.75 | 7.38 | 6.80 | 6.50 | 7.15 | 6.84 | 6.54 | 7.17 |
| Total Calcium | mg/L | 0.1 | -- | -- | -- | -- | 18.0 | 15.9 | 19.6 | 19.3 | 11.9 | 17.1 | 7.5 | 6.3 | 8.4 | 20.2 | 19.8 | 18.0 | 8.9 | 7.8 | 9.9 | 8.5 | 8.2 | 8.8 |
| Total Magnesium | mg/L | 0.1 | -- | -- | -- | -- | 2.7 | 2.2 | 2.6 | 2.8 | 1.8 | 2.1 | 1.6 | 1.4 | 1.7 | 2.7 | 2.8 | 2.4 | 1.2 | 1.3 | 1.3 | 1.2 | 1.3 | 1.3 |
| Total Phosphorus | mg/L | 0.006 | -- | -- | -- | 0.01 note [6] | 0.007 | **0.034** | **0.012** | **0.018** | **0.036** | **0.018** | **0.044** | **0.043** | **0.034** | 0.007 | **0.018** | **0.011** | **0.017** | 0.01 | 0.010 | 0.006 | **0.022** | 0.009 |
| Total Potassium | mg/L | 0.1 | -- | -- | -- | -- | 2.0 | 2.3 | 2.1 | 1.9 | 1.2 | 2.0 | 1.1 | 1.0 | 1.4 | 2.3 | 2.7 | 2.2 | 1.0 | 0.9 | 1.1 | 1.0 | 1.5 | 1.2 |
| Total Sodium | mg/L | 0.1 | -- | -- | -- | -- | 60.4 | 39.6 | 41.1 | 64.7 | 61.9 | 98.1 | 17.9 | 19.9 | 20.2 | 120 | 102 | 81.2 | 35.4 | 32.8 | 31.6 | 38.6 | 34.8 | 34.2 |
| Reactive Silica as SiO2 | mg/L | 0.5 | -- | -- | -- | -- | 2.8 | 7.1 | 3.8 | 3.3 | 6.6 | 4.5 | 3.0 | 4.9 | 3.4 | 4.0 | 6.8 | 3.2 | 2.7 | 4.3 | 2.1 | 2.6 | 4.2 | 1.8 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | 5 | <5 | <5 | 9 | 14 | <5 | 19 | 32 | <5 | <5 | 8 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Sulphate | mg/L | 2 | -- | 128 | -- | -- | 15 | 21 | 17 | 13 | 6 | 8 | 4 | 4 | 4 | 25 | 27 | 29 | 8 | 9 | 11 | 9 | 9 | 11 |
| Turbidity | NTU | 0.1 | -- | -- | 50 | -- | 1.1 | 0.8 | 0.8 | 2.6 | 1.7 | 6.8 | 8.2 | 0.9 | 1.2 | 1.6 | 2.9 | 1.4 | 0.6 | 0.7 | <0.5 | 1.0 | 0.6 | 0.6 |
| Conductivity | umho/cm | 1 | -- | -- | -- | -- | 424 | 326 | 365 | 436 | 430 | 546 | 139 | 146 | 163 | 717 | 620 | 568 | 227 | 238 | 238 | 241 | 238 | 252 |
| Calculated Parameters | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | | -- | -- | -- | -- | 3.51 | 2.55 | 3.18 | 3.50 | 3.00 | 5.94 | 1.15 | 1.08 | 1.35 | 6.20 | 4.70 | 5.45 | 1.85 | 1.79 | 2.06 | 1.96 | 1.73 | 2.17 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | 21 | 23 | 25 | 16 | 11 | 8 | 15 | 13 | 17 | 15 | 17 | 24 | 6 | 9 | 13 | 6 | 10 | 13 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | 210 | 155 | 180 | 217 | 185 | 335 | 70 | 67 | 80 | 372 | 302 | 304 | 114 | 108 | 119 | 121 | 109 | 125 |
| Carb. Alkalinity (as CaCO3) | mg/L | 10 | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation sum | me/L | -- | -- | -- | -- | -- | 3.81 | 2.78 | 3.05 | 4.13 | 3.54 | 5.49 | 1.40 | 1.35 | 1.51 | 6.53 | 5.77 | 4.70 | 2.14 | 1.96 | 2.01 | 2.24 | 2.08 | 2.08 |
| Hardness | mg/L | -- | -- | -- | -- | -- | 56.1 | 48.8 | 59.6 | 59.7 | 37.1 | 51.3 | 25.3 | 21.5 | 28.0 | 61.6 | 61.0 | 54.8 | 27.2 | 24.8 | 30.1 | 26.2 | 25.8 | 27.3 |
| % Difference/ Ion Balance (NS) | % | -- | -- | -- | -- | -- | 4.1 | 4.4 | 2.1 | 8.2 | 8.4 | 4.0 | 9.6 | 11.3 | 5.4 | 2.6 | 10.2 | 7.4 | 7.1 | 4.3 | 1.2 | 6.9 | 9.1 | 2.2 |
| Langelier Index (@20C) | NA | -- | -- | -- | -- | -- | -1.98 | -2.17 | -1.72 | -2.08 | -3.10 | -2.84 | -2.64 | -3.12 | -2.27 | -1.80 | -2.36 | -1.62 | -3.07 | -3.24 | -2.34 | -3.05 | -3.14 | -2.37 |
| Langelier Index (@ 4C) | NA | -- | -- | -- | -- | -- | -2.30 | -2.49 | -2.04 | -2.40 | -3.42 | -3.16 | -2.96 | -3.44 | -2.59 | -2.12 | -2.68 | -1.94 | -3.39 | -3.56 | -2.66 | -3.37 | -3.46 | -2.69 |
| Saturation pH (@ 20C) | NA | -- | -- | -- | -- | -- | 9.04 | 9.04 | 8.92 | 9.13 | 9.50 | 9.50 | 9.52 | 9.66 | 9.42 | 9.16 | 9.11 | 9.00 | 9.87 | 9.74 | 9.49 | 9.89 | 9.68 | 9.54 |
| Saturation pH (@ 4C) | NA | -- | -- | -- | -- | -- | 9.36 | 9.36 | 9.24 | 9.45 | 9.82 | 9.82 | 9.84 | 9.98 | 9.74 | 9.48 | 9.43 | 9.32 | 10.2 | 10.1 | 9.81 | 10.2 | 10.0 | 9.86 |
| Metals (ICP-MS) | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum | ug/L | 5 | 5 | 5 | -- | 100 (pH based) | 66 | -- | -- | **112** | -- | -- | **199** | -- | -- | 52 | -- | -- | **114** | -- | -- | 93 | -- | -- |
| Total Antimony | ug/L | 2 | 20 | 9 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic | ug/L | 2 | 5.0 | 5.0 | -- | 5 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium | ug/L | 5 | 1000 | 1000 | -- | -- | 110 | -- | -- | 174 | -- | -- | 18 | -- | -- | 116 | -- | -- | 22 | -- | -- | 25 | -- | -- |
| Total Beryllium | ug/L | 2 | 5.3 | 0.15 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron | ug/L | 5 | 1200 | 1500 | -- | 1500 | 11 | -- | -- | 10 | -- | -- | 14 | -- | -- | 11 | -- | -- | 14 | -- | -- | 8 | -- | -- |
| Total Cadmium | ug/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | <0.09 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- |
| Total Chromium | ug/L | 1 | --- | 8.9 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt | ug/L | 1 | 10 | 1 | -- | -- | <1 | -- | -- | <1 | -- | -- | 1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Copper | ug/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | 1 | 2 | 1 | 2 | 2 | **5** | 1 | 2 | <1 | 2 | **3** | 2 | 1 | 1 | 2 | 2 | 2 | 2 |
| Total Iron | ug/L | 50 | 300 | 300 | -- | 300 | 193 | 294 | 179 | **1600** | **1,080** | **2,400** | **1020** | **356** | **440** | 289 | **650** | 231 | 169 | 74 | 65 | 142 | 74 | 213 |
| Total Lead | ug/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | <0.5 | -- | -- | 0.6 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese | ug/L | 2 | 820 | 430 | -- | -- | 16 | 34 | 21 | 100 | 328 | 562 | 678 | 74 | 308 | 77 | 103 | 59 | 52 | 25 | 19 | 48 | 20 | 33 |
| Total Molybdenum | ug/L | 2 | 73 | 73 | -- | 73 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel | ug/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | 12 | -- | -- | <2 | -- | -- | <2 | -- | -- | 3 | -- | -- | **60** | -- | -- | <2 | -- | -- |
| Total Selenium | ug/L | 1 | 1.0 | 1.0 | -- | 1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver | ug/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium | ug/L | 5 | 21000 | 21000 | -- | -- | 89 | -- | -- | 97 | -- | -- | 30 | -- | -- | 96 | -- | -- | 37 | -- | -- | 36 | -- | -- |
| Total Thallium | ug/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | 3 | -- | -- | 4 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Uranium | ug/L | 0.1 | 300 | 15 | -- | 15 | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium | ug/L | 2 | 6 | 120 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Zinc | ug/L | 5 | 30 | 7 | -- | 30 | 6 | 8 | <5 | 6 | 6 | **16** | 8 | 8 | <5 | **31** | 26 | **13** | **120** | <5 | <5 | 5 | <5 | 7 |
| Microbiological Parameters | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliforms | MPN/100 mL | 1 | -- | | -- | -- | >200 | >200 | >200 | >200 | >200 | >200 | >200 | >200 | >200 | <1 | >200 | >200 | >200 | >200 | >200 | >200 | >200 | >200 |
| E. Coli | MPN/100 mL | 1 | -- | | 400/ 100 mL | -- | 27 | 34 | 1 | 14 | 31 | <1 | **>200** | 27 | 18 | <1 | 60 | 70 | 2 | 23 | 2 | 2 | 19 | 9 |
| Chlorophyll A - Spectrophotometer | ug/L | 0.25-0.50 | -- | | -- | -- | 0.95 | 1.2 | 1.05 | 1.1 | 0.77 | 4.99 | 5.06 | 2.3 | 0.79 | 10.9 | 3.4 | 2.37 | 0.47 | 1.1 | <0.25 | 2.84 | 0.64 | 1.05 |

**Notes:**

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Su

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L)

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the h

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range bas

* Secchi depth measurement not possible, disc visible at bottom of the watercourse or the sample location was too shallow for secchi depth use (

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / no parameter tested.

| | |
|---|---|
| **Bold and Black Shaded** | Concentration exceeds CCME FWAL applicable guideline. |
| Underlined and Black Shaded | Concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recre |

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site (KL-1) | | | | | | | | KL-1 | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 2013/08/13 | 2009/10/01 | 2010/05/31 | 2010/08/24 | 2010/11/01 | 2011/05/13 | 2011/08/14 | 2011/10/16 | 2012/05/01 | 2012/08/14 | 2012/10/02 | 2013/05/15 | 2013/08/16 | 2013/10/16 | 2014/05/14 | 2014/08/14 | 2014/10/27 | 2015/05/20 | 2015/08/25 | 2015/10/22 | 2016/05/16 | 2016/08/16 | 2016/10/25 | 2017/06/08 | 2017/08/15 | 2017/10/18 |
| Sampling Time | hh:mm | | | | | | | 08:00 | 11:45 | 08:30 | 11:00 | 13:10 | 12:00 | 11:00 | 14:30 | 14:00 | 8:30 | 11:20 | 9:50 | 10:20 | 11:10 | 13:30 | 10:30 | 14:15 | 14:55 | 08:30 | 14:54 | 12:30 | 9:30 | 7:50 | 13:20 | 8:30 | 9:30 AM | 9:35 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 4.1 | 4.2 | 5.0 | N/A | 5.0 | 4.9 | 2.4 | 3.2 | 2.4 | 2.4 | 5.4 | N/A | 2.5 | 2.0 | 2.9 | 2.4 | 2.7 | 2.5 | NCC | N/A | 2.2 | 1.8 | 2.1 | 2.5 | 2.1 | 2.2 | 2.2 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 14.0 | 22.2 | 16.7 | 12.9 | 23.3 | 8.8 | 11.5 | 25.6 | 15.9 | 8.9 | 23.3 | 15.4 | 13.2 | 22.2 | 14.1 | 12.7 | 23.2 | 12.2 | 14.1 | 26.1 | 9.4 | 12.8 | 22.2 | 11.9 | 16.6 | 23.2 | 14.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.77** | 8.20 | 7.00 | 9.13 | 7.86 | **10.48** | **10.69** | 8.22 | 9.22 | 8.98 | 7.93 | 8.72 | **9.76** | 8.57 | 8.30 | **15.29** | 7.22 | 8.12 | **9.55** | 8.13 | 7.38 | **14.02** | **10.33** | **12.06** | 8.27 | 7.91 | 8.22 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.20** | 6.76 | 6.67 | 7.23 | 7.32 | 6.61 | 6.60 | **6.16** | **6.04** | 8.67 | 6.91 | **6.32** | **6.32** | 8.24 | **6.35** | 6.74 | 7.46 | **6.44** | 8.33 | 6.95 | 7.02 | 8.29 | **4.60** | **6.23** | 7.47 | 7.00 | 7.84 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 263.0 | 299.0 | 261.0 | 248.0 | 242.0 | 218.7 | 288.0 | 178.6 | 146.3 | 277.0 | 279.0 | 198.1 | 243.0 | 216.5 | 217.9 | 547.0 | 341.0 | 223.0 | 0.2 | 298.3 | 238.5 | 239.0 | 298.0 | 212.4 | 240.0 | 292.0 | 312.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 6 | 8 | 8 | 7 | 8 | 6 | <5 | 9 | 7 | 24 | 7 | <5 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 81 | 74 | 64 | 62 | 60 | 55 | 73 | 45 | 33 | 66 | 70 | 50 | 66 | 59 | 48 | 80 | 76 | 46 | 60 | 62 | 58 | 55 | 57 | 45 | 71 | 73 | 60 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 18 | 18 | 16 | 26 | 8 | 21 | 28 | 40 | 45 | 50 | 11 | 20 | 11 | 37 | 20 | 13 | 8 | 23 | 37 | 8 | 22 | 31 | 17 | 18 | 15 | 14 | 12 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.18 | 0.09 | 0.12 | 0.21 | 0.16 | 0.23 | 0.20 | 0.11 | 0.13 | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.15 | 0.13 | 0.20 | 0.29 | 0.10 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.18 | -- | -- | 0.21 | 0.16 | -- | 0.20 | -- | -- | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.08 | 0.13 | 0.08 | 0.08 | 0.10 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.07** | <0.05 | **0.12** | **0.21** | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.04 | 0.03 | <0.03 | 0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.010 | <0.03 | <0.03 | 0.05 | 0.09 | <0.03 | <0.03 | <0.03 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | ** | ** | ** | ** | ** | ** | ** | ** | ** | 0.9 | 3.1 | 0.4 | ** | ** | 0.7 | <0.4 | 1.1 | <0.4 | 0.4 | 0.2 | 4.5 | 0.4 | 0.7 | <0.4 | 0.6 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.4 | 2.9 | 4.7 | 3.3 | 3.2 | 3.1 | 3.4 | 5.9 | 5.5 | 5.4 | 2.9 | 5.2 | 4.4 | 4.1 | 4.3 | 4.6 | 2.4 | 4.4 | 3.0 | 5.3 | 5.5 | 4.3 | 3.4 | 7.3 | 4.5 | 4.6 | 4.8 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.94 | 6.65 | 6.68 | 6.91 | 7.00 | 6.79 | 6.52 | 6.51 | 6.52 | 6.70 | 7.20 | 6.90 | 6.78 | 6.93 | 6.85 | 6.72 | 7.06 | **6.35** | 6.62 | 6.95 | 6.99 | 6.64 | 7.23 | 6.81 | 6.64 | 7.07 | 7.00 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 9.2 | 8.5 | 7.2 | 7.7 | 8.7 | 8.3 | 7.7 | 4.8 | 5.3 | 6.8 | 8.4 | 6.3 | 7.5 | 6.6 | 6.5 | 8.1 | 11.0 | 6.0 | 6,400.0 | 7.9 | 6.1 | 6.8 | 8.0 | 6.3 | 8.6 | 7.1 | 8.3 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.5 | 1.4 | 1.2 | 1.4 | 1.4 | 1.3 | 1.3 | 0.9 | 1.1 | 1.1 | 1.5 | 1.5 | 1.1 | 1.2 | 1.2 | 1.6 | 1.6 | 0.9 | 920.0 | 1.3 | 0.9 | 1.1 | 1.1 | 1.2 | 1.3 | 1.2 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | <0.020 | <0.020 | <0.003 | 0.009 | 0.007 | 0.005 | 0.008 | **0.012** | 0.009 | **0.037** | **0.043** | 0.007 | 0.007 | **0.011** | 0.008 | **0.011** | **0.026** | **0.013** | 0.008 | 0.002 | **0.011** | **0.024** | 0.005 | 0.008 | 0.010 | 0.010 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 0.9 | 1.3 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.7 | 1.1 | 0.9 | 1.6 | 0.7 | 680.0 | 0.9 | 0.7 | 0.7 | 0.9 | 0.8 | 1.0 | 0.9 | 1.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 51.0 | 46.0 | 37.0 | 31.8 | 35.2 | 33.8 | 43.7 | 22.8 | 19.8 | 40.1 | 42.0 | 29.8 | 35.8 | 26.2 | 31.6 | 50.2 | 54.2 | 37.6 | 33.0 | 43.3 | 39.8 | 35.5 | 32.2 | 31.0 | 44.9 | 50.3 | 35.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.6 | 2.2 | 2.3 | 2.9 | 2.7 | 2.9 | 2.8 | 1.9 | 2.3 | 2.4 | 1.3 | 2.2 | 2.5 | 1.8 | 2.2 | 2.0 | 1.5 | 1.8 | 2.5 | 1.8 | 2.7 | 2.8 | 2.0 | 1.6 | 2.0 | 1.6 | 1.8 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 1 | 1 | <5 | 4 | 17 | 3 | 2 | 2 | 3 | <5 | <5 | <5 | <5 | <5 | 5 | 4 | <5 | <5 | <10 | <5 | <5 | 38 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 14 | 13 | 12 | 11 | 11 | 11 | 12 | 10 | 8 | 8 | 9 | 9 | 11 | 9 | 9 | 12 | 11 | 7 | 9 | 10 | 8 | 10 | 10 | 10 | 11 | 9 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.7 | 0.8 | 1.0 | 1.3 | 0.6 | 1.0 | 1.0 | 1.0 | 0.9 | 2.4 | 0.8 | 1.3 | 1.6 | 3.3 | 0.5 | 2.9 | 0.7 | 1.9 | 0.8 | 1.9 | 1.1 | 10.6 | 0.9 | 2.6 | 1.4 | 1.1 | 0.8 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 310 | 290 | 250 | 240 | 240 | 230 | 290 | 180 | 140 | 246 | 274 | 196 | 259 | 241 | 212 | 290 | 339 | 235 | 220 | 257 | 244 | 212 | 270 | 161 | 271 | 260 | 249 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.72 | 2.52 | 2.23 | 2.12 | 2.08 | 1.91 | 2.33 | 1.66 | 1.27 | 2.52 | 2.31 | 1.60 | 2.10 | 1.86 | 1.71 | 3.11 | 2.66 | 1.45 | 1.98 | 2.09 | 1.95 | 1.87 | 1.99 | 1.61 | 2.25 | 2.43 | 2.11 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 6 | 8 | 8 | 7 | 8 | 6 | <1 | 9 | 7 | 24 | 7 | <5 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 166 | 151 | 131 | 123 | 125 | 118 | 143 | 92 | 77 | 139 | 137 | 98 | 124 | 104 | 103 | 172 | 165 | 99 | 120 | 130 | 119 | 113 | 115 | 99 | 139 | 148 | 123 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.85 | 2.57 | 2.12 | 1.92 | 2.10 | 2.02 | 2.42 | 1.33 | 1.25 | 2.24 | 2.41 | 1.79 | 2.08 | 1.61 | 1.84 | 2.77 | 3.09 | 2.05 | 1.84 | 2.43 | 2.14 | 2.03 | 1.93 | 1.82 | 2.54 | 2.67 | 2.12 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 29.00 | 27.00 | 23.00 | 25.00 | 27.00 | 26.00 | 24.00 | 16.00 | 18.00 | 21.50 | 27.20 | 21.90 | 23.30 | 21.40 | 21.20 | 26.80 | 34.10 | 18.70 | 20.00 | 25.10 | 18.90 | 21.50 | 24.50 | 20.70 | 26.80 | 22.70 | 26.10 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 2.33 | 0.98 | 2.53 | 4.95 | 0.48 | 2.80 | 1.89 | 11.00 | 0.79 | 5.90 | 2.10 | 5.30 | 0.70 | 7.30 | 3.40 | 5.80 | 7.50 | 17.20 | 3.66 | 7.50 | 4.50 | 4.10 | 1.50 | 6.20 | 6.10 | 4.80 | 0.20 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.68 | -2.87 | -2.94 | -2.72 | -2.51 | -2.87 | NC | -3.18 | -3.21 | -2.69 | -2.63 | -3.19 | -3.24 | -3.14 | -3.02 | -2.51 | -2.36 | -3.76 | -3.21 | -2.97 | -2.97 | -3.42 | -2.56 | -3.20 | -3.33 | -2.78 | -2.68 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -2.93 | -3.12 | -3.19 | -2.97 | -2.76 | -3.12 | NC | -3.43 | -3.46 | -3.01 | -2.95 | -3.51 | -3.56 | -3.46 | -3.34 | -2.83 | -2.68 | -4.08 | -3.46 | -3.29 | -3.29 | -3.74 | -2.88 | -3.52 | -3.65 | -3.10 | -3.00 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.62 | 9.52 | 9.62 | 9.63 | 9.51 | 9.66 | NC | 9.69 | 9.73 | 9.39 | 9.83 | 10.10 | 10.00 | 10.10 | 9.87 | 9.23 | 9.42 | 10.10 | 9.83 | 9.92 | 9.96 | 10.10 | 9.79 | 10.00 | 9.97 | 9.85 | 9.68 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.87 | 9.77 | 9.87 | 9.88 | 9.76 | 9.91 | NC | 9.94 | 9.98 | 9.71 | 10.20 | 10.40 | 10.30 | 10.40 | 10.20 | 9.55 | 9.74 | 10.40 | 10.10 | 10.20 | 10.30 | 10.40 | 10.10 | 10.30 | 10.30 | 10.20 | 10.00 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **230** | -- | -- | **289** | **48** | -- | **338** | -- | -- | **321** | **43** | **168** | **191** | **120** | **56** | **229** | **42** | **155** | **100** | -- | **88** | **206** | -- | -- | **158** | **41** | **46** |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 16 | -- | -- | 19 | 16 | -- | 13 | -- | -- | 12 | 15 | 9 | 12 | 7 | 16 | 14 | 20 | 9 | 16 | -- | 17 | 14 | -- | -- | 16 | -- | 17 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 8 | -- | -- | 11 | 9 | -- | <50 | -- | -- | <5 | 11 | 33 | 6 | 10 | 9 | 7 | 22 | 10 | <50 | -- | <5 | 8 | -- | -- | <5 | -- | 26 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.3 | -- | -- | **0.053** | <0.017 | -- | **0.056** | -- | -- | **0.032** | **0.027** | **0.021** | **0.020** | <0.017 | **0.017** | **0.037** | <0.017 | **0.025** | -- | -- | **0.187** | **0.029** | -- | -- | **0.058** | -- | <0.017 |
| Total Chromium (Cr) | µg/L | 1 | ---- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | **6** | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | **1** | -- | -- | **1** | <0.40 | -- | **1** | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2 | -- | -- | **6** | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | 1 | <1 | 1 | <2.0 | <1 | 2 | <1 | <1 | 1 | <1 | 2 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 130 | -- | -- | **313** | 62 | 125 | 177 | 162 | **384** | 229 | 137 | 195 | 207 | 132 | 92 | 147 | 124 | 168 | 110 | 157 | 81 | 149 | 62 | 269 | 78 | 70 | 116 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **10.3** | <0.50 | -- | <0.50 | -- | -- | <0.5 | <0.5 | **1.9** | <0.5 | <0.5 | <0.5 | **5.1** | <0.5 | <0.5 | <0.50 | -- | <0.5 | <0.5 | -- | -- | **1.3** | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 100 | -- | -- | 79 | 57 | 59 | 78 | 52 | 56 | 48 | 65 | 68 | 73 | 48 | 24 | 48 | 115 | 42 | 39 | 41 | 22 | 47 | 23 | 45 | 46 | 31 | 17 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 5 | -- | -- | 3 | <2.0 | -- | 3 | -- | -- | <2 | <2 | 2 | 2 | <2 | <2 | 3 | <2 | 3 | <2.0 | -- | <2 | 3 | -- | -- | 15 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <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 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 46 | -- | -- | 39 | 38 | -- | 36 | -- | -- | 32 | 41 | 32 | 37 | 33 | 30 | 40 | 45 | 26 | 29 | -- | 19 | 30 | -- | -- | 38 | -- | 40 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 11 | -- | -- | 6 | <2.0 | -- | 5 | -- | -- | 8 | <2 | 3 | 4 | 2 | <2 | 2 | <2 | 5 | 2 | -- | <2 | 2 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | 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 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | 2 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 27 | -- | -- | 14 | 8 | 11 | 12 | 13 | 10 | 5 | <5 | 11 | 11 | 6 | 5 | 14 | <5 | 9 | 13 | 8 | <5 | 11 | <5 | 19 | **58** | <5 | 6 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 200 | 65 | -- | >250 | 63 | >250 | 91 | >250 | -- | 2,420 | >2420 | 1,120 | 1,200 | 866 | 488 | 525 | 1,550 | >2420 | --- | 980 | 122 | 866 | 548 | >2420 | 299 | 488 | 154 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 39 | 24 | -- | 9 | 15 | 37 | 8 | **>250** | <100 | 41 | 11 | 17 | 48 | 2 | 7 | <1 | 15 | 28 | 60 | 24 | 6 | 4 | 33 | 99 | 29 | 18 | 3 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.53 | 0.79 | 1.11 | 1.73 | 1.47 | 0.99 | 0.76 | 1.44 | 1.36 | 0.62 | 2.30 | 1.54 | 1.22 | 1.40 | 1.19 | 0.40 | 0.41 | 0.84 | 0.64 | 1.14 | 1.79 | 2.76 | 0.90 | 2.08 | 1.45 | 1.75 | 1.10 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.48 | 0.69 | 1.17 | 1.61 | 1.42 | 0.81 | 0.69 | 1.15 | 1.14 | 0.63 | 2.30 | 2.16 | 1.40 | 1.40 | 1.19 | 1.32 | 0.36 | 0.80 | 0.62 | 1.11 | 0.95 | 3.48 | 1.15 | 2.19 | 2.55 | 1.87 | 1.18 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site (KL-1) | | | | | | | | KL-1 | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | hh:mm | | | | | | | 9:15 AM | 7:50 AM | 9:00 AM | 8:40 AM | 9:15 AM | 8:45 AM | 3:05 PM | 11:40 AM | 12:59 PM | 12:15 PM | 12:12 PM | 11:20 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | -- | 1.2 | -- | -- | 2.1 | 2.1 | 2.5 | 2.5 | 2.7 | 1.9 | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | -- | 12.2 | 24.2 | 12.8 | 12.2 | 23.6 | 10.4 | 25.4 | 22.6 | 11.6 | 15.6 | 22.6 | 15.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | -- | 5.5 - 9.5 | -- | **11.13** | 6.72 | 8.61 | ** | 7.10 | 8.90 | 6.55 | 8.04 | **9.69** | 17.24 | 7.72 | 11.34 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.85 | 7.51 | 6.84 | **9.70** | 7.41 | 6.77 | **6.43** | 6.67 | 6.54 | 6.76 | **5.95** | 6.72 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 203.1 | 288.2 | 253.7 | 205.0 | 160.0 | 194.0 | 245.0 | 219.0 | 219.6 | 176.0 | 202.0 | 189.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 9 | 7.0 | <5 | 7.0 | <5 | <5 | 8.0 | 7.0 | <5 | 9 | 10 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 53 | 54 | 55 | 75 | 59 | 43 | 65 | 59 | 60 | 49 | 48 | 53 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 42 | 16 | 18 | 41 | 21 | 19 | 22 | 11 | 16 | 20.7 | 14.7 | 10.9 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.26 | 0.16 | 0.2 | 0.2 | 0.1 | 0.3 | 0.10 | 0.06 | 0.17 | 0.14 | 0.11 | 0.23 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.16 | 0.07 | 0.2 | 0.2 | 0.1 | 0.3 | 0.10 | 0.06 | 0.17 | 0.14 | 0.11 | 0.23 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.10** | **0.09** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.08 | 0.1 | <0.03 | 0.1 | 0.1 | <0.03 | 0.08 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | <0.4 | <0.4 | <0.4 | 0.6 | 3.0 | <0.4 | 0.60 | 1.70 | 0.19 | 0.22 | <0.10 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.1 | 3.1 | 4.0 | 4.3 | 4.2 | 4.0 | 3.20 | 3.90 | 12.10 | 5.2 | 3.1 | 5.2 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.71 | 7.31 | 7.07 | 6.70 | 6.95 | 6.70 | 6.82 | 6.94 | 6.79 | 6.69 | 6.50 | 7.06 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 5.8 | 7.2 | 6.9 | 7.0 | 7.8 | 4.2 | 6.8 | 5.4 | 6.4 | 9.2 | 7.5 | 8.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.0 | 1.2 | 1.3 | 1.2 | 1.2 | 0.8 | 1.1 | 20.0 | 1.0 | 1.1 | 1.1 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.012** | 0.007 | 0.008 | **0.011** | 0.005 | 0.008 | 0.008 | **0.036** | **0.029** | <0.006 | **0.017** | **0.011** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.7 | 1.0 | 0.8 | 0.8 | 1.0 | 0.6 | 0.9 | 0.7 | 0.8 | 0.8 | 1.1 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 36.4 | 34.7 | 31.7 | 46.3 | 43.9 | 23.4 | 36.0 | 44.4 | 40.3 | 34.2 | 31.9 | 30.4 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.6 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.7 | 1.3 | 2.0 | 2.8 | 3.7 | 1.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | <5 | <5 | <5 | <5 | <5 | 6.0 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 8 | 7.0 | 9.0 | 10.0 | 9.0 | 9.0 | 9.0 | 8.0 | 9.0 | 8 | 8 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 1.3 | 0.7 | 2.1 | 0.9 | 3.2 | 2.9 | 3.4 | 0.8 | 0.7 | 1.0 | 2.1 | 0.9 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 243 | 261 | 215 | 280 | 232 | 129 | 266 | 275 | 239 | 205 | 217 | 222 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.68 | 1.86 | 1.9 | 2.3 | 2.0 | 1.42 | 2.03 | 2.00 | 2.03 | 1.56 | 1.71 | 1.92 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 9 | 7.0 | <5 | 7.0 | <5 | <5 | 8 | 7 | <5 | 9 | 10 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 106 | 112 | 110.0 | 141.0 | 127.0 | 83.0 | 120 | 124 | 123 | 103 | 104 | 111 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.00 | 2.01 | 1.9 | 2.5 | 2.4 | 1.34 | 2.05 | 2.33 | 2.19 | 2.09 | 1.90 | 1.88 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 18.6 | 22.9 | 22.6 | 22.4 | 24.4 | 13.8 | 21.5 | 18.0 | 20.1 | 27.5 | 23.3 | 26.4 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 8.6 | 3.8 | 0.4 | 3.5 | 9.9 | 3.1 | 0.5 | 7.7 | 3.7 | 14.5 | 5.2 | 0.9 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.42 | -2.47 | -2.8 | -3.4 | -2.9 | -3.6 | -3.24 | -3.02 | -3.15 | -3.24 | -3.26 | -2.60 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.74 | -2.79 | -3.2 | -3.7 | -3.2 | -3.9 | -3.56 | -3.34 | -3.47 | -3.56 | -3.58 | -2.92 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 10.1 | 9.78 | 9.9 | 10.1 | 9.9 | 10.3 | 10.10 | 9.96 | 9.94 | 9.93 | 9.76 | 9.66 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.4 | 10.1 | 10.2 | 10.4 | 10.2 | 10.6 | 10.4 | 10.3 | 10.3 | 10.2 | 10.1 | 10.0 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **169** | **29** | -- | **145** | **49** | **160** | **136** | -- | -- | **145** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 12 | 16 | -- | 14.0 | 15.0 | 8.0 | 18.0 | -- | -- | 14 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 5 | 10 | -- | 5.0 | 11.0 | 5.0 | 9.0 | -- | -- | 16 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | **0.024** | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | ---- | 8.9 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | 2.0 | <1 | 1.0 | 1.0 | 2.0 | <1 | 1.0 | 1 | 2 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 96 | 142 | 142 | 155 | 105 | 145 | 264 | 135 | 88 | 139 | 115 | 53 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | **1.3** | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 28 | 49 | 28.0 | 42.0 | 32.0 | 23.0 | 85 | 20 | 15 | 51 | 33 | 13 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | -- | 2.0 | <2 | 6.0 | <2 | -- | -- | 7 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 26 | 38 | -- | 36.0 | 33.0 | 27.0 | 45.0 | -- | -- | 33 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | ---- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | 3.0 | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | -- | 0.1 | <0.1 | 0.1 | <0.1 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | <2 | -- | 2.0 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 8 | <5 | 19.0 | 8.0 | <5 | 6.0 | 6.0 | <5 | <5 | **189** | 6 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 14 | 611 | 157.0 | 256 | NDOGT | 1198 | >2420 | 345 | 158 | >200 | >200 | >200 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 5 | 11 | 61.0 | <1 | 6 | 26 | 59 | 11 | 1 | 25 | 130 | 43 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | ** | -- | 1.26 | 4.42 | 1.73 | 0.95 | 0.95 | 2.4 | 1.05 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.91 | 1.26 | 1.63 | 1.50 | 2.18 | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 3.09 | -- | * | 1.46 | 1.89 | -- | -- | -- | -- | -- | -- | -- |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
* -- " = no guideline available / Not Tested.
[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.
[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.
[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).
[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).
[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature).
[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.
[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.
[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a res
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Can

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Reg

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - KL-2 | | | | | | | | KL-2 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | | | | | | | 11:00 | 10:30 | 10:45 | 10:15 | 12:25 | 10:50 | 09:30 | 14:00 | 13:15 | 9:50 | 10:30 | 10:20 | 09:10 | 16:10 | 14:30 | 10:45 | 9:20 | 14:04 | 09:15 | 13:29 | 13:05 | 10:30 | 8:30 | 12:50 | 10:47 | 11:15 AM | 10:30 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 1.3 | 2.1 | 1.8 | 1.9 | 2.0 | 1.5 | 1.2 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 16.8 | 18.2 | 15.4 | 13.5 | 20.4 | 8.0 | 9.9 | 19.1 | 14.1 | 7.6 | 21.8 | 12.3 | 10.1 | 22.9 | 9.7 | 11.7 | 21.1 | 10.8 | 13.1 | 24.7 | 8.1 | 10.7 | 20.3 | 10.2 | 15.7 | 21.2 | 10.6 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.16** | 8.50 | 5.70 | 6.28 | **4.66** | **9.58** | **9.66** | 7.06 | 8.43 | 6.47 | 5.82 | 7.63 | 9.37 | 6.38 | 7.40 | **14.90** | 6.95 | 7.70 | 8.41 | 7.28 | 7.14 | 7.88 | **4.21** | **9.65** | **9.72** | 6.61 | 6.23 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.33** | **6.35** | **6.19** | 6.61 | 6.96 | **6.25** | 6.77 | **5.90** | **5.62** | 7.72 | **6.41** | **6.29** | **5.75** | 7.47 | **5.57** | 6.60 | 7.22 | **5.79** | **6.36** | **5.88** | **6.43** | 7.64 | **5.97** | **5.54** | 6.69 | **6.00** | **6.29** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 46.0 | 106.0 | 89.2 | 198.5 | 104.0 | 75.1 | 79.7 | 66.7 | 54.3 | 58.0 | 96.6 | 61.1 | 77.9 | 65.3 | 64.5 | 188.0 | 266.0 | 63.0 | 0.1 | 107.9 | 73.6 | 82.0 | 117.0 | 103.7 | 78.0 | 114.0 | 109.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 8 | 8 | 8 | 8 | 7 | <5 | <5 | 7 | <5 | 20 | <5 | 8 | <5 | <5 | <5 | 29 | 7 | 28 | <5.0 | 7 | <5 | <5 | 10 | 6 | 5 | 12 | 9 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 48 | 48 | 48 | 48 | 25 | 17 | 19 | 14 | 10 | 16 | 20 | 12 | 19 | 21 | 14 | 20 | 17 | 12 | 15 | 14 | 12 | 17 | 26 | 30 | 20 | 19 | 19 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 20 | 20 | 20 | 20 | 63 | 95 | 80 | 110 | 120 | 52 | 60 | 94 | 37 | 90 | 71 | 25 | 44 | 168 | 50 | 63 | 61 | 47 | 48 | 93 | 46 | 46 | 57 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.19 | 0.19 | 0.19 | 0.19 | 0.07 | 0.06 | 0.12 | 0.07 | <0.05 | 0.11 | 0.08 | <0.05 | 0.12 | <0.05 | <0.05 | 0.08 | <0.05 | <0.05 | 0.06 | 0.08 | <0.05 | <0.05 | 0.06 | 0.19 | 0.05 | 0.08 | <0.05 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.19 | 0.19 | 0.19 | 0.19 | 0.07 | -- | 0.12 | -- | -- | 0.11 | 0.08 | <0.05 | 0.12 | <0.05 | <0.05 | 0.08 | <0.05 | <0.05 | 0.06 | 0.08 | <0.05 | <0.05 | <0.05 | 0.19 | <0.05 | 0.08 | <0.05 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | <0.03 | 0.04 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | 0.06 | <0.03 | <0.03 | 0.03 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 2.2 | 0.7 | -- | 1.1 | <0.4 | <0.4 | 0.4 | <0.4 | 0.4 | 0.8 | 0.8 | 0.4 | 0.9 | 0.5 | <0.4 | 0.5 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 4.3 | 4.3 | 4.3 | 4.3 | 6.6 | 9.7 | 6.5 | 10.0 | 12.0 | 8.1 | 7.1 | 10.9 | 7.5 | 11.1 | 10.9 | 6.2 | 6.6 | 12.9 | 4.0 | 13.3 | 14.0 | 6.2 | 7.0 | 13.2 | 8.5 | 8.2 | 8.5 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | 0.09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.85 | 6.85 | 6.85 | 6.85 | 6.78 | **6.11** | **6.27** | **6.40** | **6.05** | 6.50 | 6.70 | 6.50 | **6.37** | 6.62 | **6.34** | 6.53 | 6.87 | **6.06** | **6.32** | 6.99 | **6.28** | **6.35** | 6.87 | **6.19** | 6.57 | 6.87 | 6.66 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.5 | 6.5 | 6.5 | 6.5 | 4.1 | 3.6 | 2.5 | 2.5 | 2.2 | 2.4 | 3.6 | 2.9 | 2.7 | 2.5 | 2.4 | 3.4 | 4.0 | 2.4 | 2,600.0 | 3.4 | 1.1 | 2.9 | 4.5 | 5.6 | 3.6 | 4.3 | 3.9 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.2 | 1.2 | 1.2 | 1.2 | 1.0 | 0.8 | 0.6 | 0.6 | 0.4 | 0.7 | 1.0 | 1.0 | 0.7 | 0.5 | 0.8 | 1.1 | 1.0 | 0.6 | 640.0 | 0.9 | 0.7 | 0.7 | 1.1 | 1.5 | 1.0 | 1.2 | 0.9 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.020** | **0.020** | **0.020** | **0.020** | 0.009 | 0.009 | 0.009 | 0.008 | **0.013** | **0.021** | **0.059** | **0.013** | 0.010 | **0.020** | **0.029** | **0.013** | **0.039** | **0.025** | 0.008 | **0.012** | 0.008 | 0.009 | **0.016** | **0.013** | **0.012** | **0.028** | 0.010 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 1.1 | 1.1 | 1.1 | 0.6 | 0.8 | 0.5 | 0.5 | 0.7 | 0.5 | 0.7 | 0.8 | 0.5 | 0.5 | 0.7 | 0.7 | 0.9 | 0.7 | 540.0 | 0.7 | 0.6 | 0.9 | 0.8 | 1.1 | 0.8 | 0.8 | 0.7 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 31.6 | 31.6 | 31.6 | 31.6 | 14.7 | 10.6 | 11.1 | 7.8 | 6.9 | 9.8 | 14.2 | 9.5 | 8.9 | 7.0 | 7.9 | 17.5 | 14.0 | 7.6 | 8.4 | 11.5 | 6.6 | 11.5 | 16.1 | 17.7 | 13.8 | 15.4 | 13.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.2 | 2.2 | 2.2 | 2.2 | 4.2 | 4.7 | 2.7 | 4.3 | 4.0 | 2.6 | 4.0 | 4.9 | 2.8 | 4.4 | 4.9 | 2.4 | 3.3 | 4.6 | 2.0 | 3.7 | 5.1 | 2.0 | 2.3 | 4.5 | 1.3 | 2.2 | 4.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 103 | 103 | 103 | 103 | 7 | <1 | <1 | <2 | <1 | <5 | <5 | <5 | <5 | 135 | <5 | <5 | <5 | <5 | <1.0 | <5 | 17 | <5 | <5 | <5 | <5 | 12 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 9 | 9 | 9 | 9 | <2 | <2 | <2 | <2 | <2 | 3 | 3 | 2 | 4 | 5 | 4 | 4 | 2 | 3 | 3 | <2 | 3 | 4 | 3 | 7 | 3 | 2 | 3 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.5 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 | 0.4 | 0.7 | 0.6 | 0.5 | 1.1 | 1.0 | 1.9 | 2.2 | 1.0 | 0.9 | 0.8 | 1.2 | <1.0 | 1.6 | 6.2 | 0.7 | 2.0 | 1.9 | 0.8 | 4.4 | 1.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 212 | 212 | 212 | 212 | 100 | 97 | 79 | 66 | 54 | 71 | 91 | 61 | 83 | 69 | 62 | 87 | 94 | 66 | 64 | 81 | 73 | 79 | 135 | 125 | 93 | 110 | 97 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.49 | 0.82 | 0.45 | 0.77 | 0.85 | 0.49 | 0.53 | 0.53 | 0.28 | 0.92 | 0.63 | 0.54 | 0.63 | 0.70 | 0.48 | 1.23 | 0.66 | 0.96 | 0.48 | 0.54 | 0.40 | 0.56 | 1.00 | 1.13 | 0.73 | 0.82 | 0.78 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <1 | 8 | <1 | 5 | 7 | <1 | <1 | 7 | <1 | 20 | <5 | 8 | <5 | <5 | <5 | 29 | 7 | 28 | <1.0 | 7 | <1 | <5 | 10 | 6 | 5 | 12 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 36 | 55 | 35 | 46 | 55 | 38 | 37 | 34 | 25 | 45 | 44 | 34 | 37 | 37 | 31 | 65 | 44 | 44 | 32 | 36 | 25 | 38 | 59 | 68 | 46 | 51 | 47 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.71 | 0.99 | 0.67 | 0.74 | 0.95 | 0.74 | 0.68 | 0.55 | 0.49 | 0.65 | 0.94 | 0.73 | 0.63 | 0.54 | 0.60 | 1.07 | 0.97 | 0.57 | 0.57 | 0.82 | 0.47 | 0.76 | 1.09 | 1.25 | 0.91 | 1.05 | 0.90 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 10.00 | 15.00 | 10.00 | 12.00 | 14.00 | 12.00 | 9.00 | 9.00 | 8.00 | 8.90 | 13.10 | 11.40 | 9.60 | 8.30 | 9.30 | 13.00 | 14.10 | 8.50 | 9.10 | 12.20 | 5.60 | 10.10 | 15.80 | 20.20 | 13.10 | 15.70 | 13.40 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 18.30 | 9.39 | 19.60 | 1.99 | 5.56 | 20.30 | 12.40 | 1.85 | 27.30 | 17.60 | 19.70 | 15.10 | 0.30 | 12.90 | 11.00 | 7.10 | 19.10 | 25.70 | 8.57 | 20.50 | 7.50 | 14.90 | 4.50 | 5.30 | 11.00 | 12.30 | 7.50 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | -3.20 | NC | -3.44 | -3.05 | NC | NC | -3.66 | NC | -3.37 | -3.60 | -3.68 | -4.05 | -3.83 | -4.12 | -3.04 | -3.23 | -3.66 | NC | -3.18 | -4.51 | -4.04 | -3.04 | -3.85 | -3.73 | -2.98 | -3.35 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | -3.45 | NC | -3.70 | -3.30 | NC | NC | -3.91 | NC | -3.69 | -3.92 | -4.00 | -4.37 | -4.15 | -4.44 | -3.36 | -3.55 | -3.98 | NC | -3.50 | -4.83 | -4.36 | -3.36 | -4.17 | -4.05 | -3.30 | -3.67 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | 9.78 | NC | 10.00 | 9.83 | NC | NC | 10.10 | NC | 9.87 | 10.30 | 10.20 | 10.40 | 10.50 | 10.50 | 9.57 | 10.10 | 9.72 | NC | 10.20 | 10.80 | 10.40 | 9.91 | 10.00 | 10.30 | 9.85 | 10.00 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | 10.00 | NC | 10.30 | 10.10 | NC | NC | 10.30 | NC | 10.20 | 10.60 | 10.50 | 10.70 | 10.80 | 10.80 | 9.89 | 10.40 | 10.00 | NC | 10.50 | 11.10 | 10.70 | 10.20 | 10.40 | 10.60 | 10.20 | 10.30 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **290** | -- | -- | **175** | **151** | -- | **271** | -- | -- | **209** | **205** | **338** | **256** | **270** | **259** | **205** | **236** | **340** | **180** | -- | **284** | **187** | -- | -- | **185** | **150** | **240** |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 9 | -- | -- | 12 | 14 | -- | 10 | -- | -- | 9 | 11 | 10 | 8 | <5 | 13 | 13 | 18 | 9 | 9 | -- | 9 | 10 | -- | -- | 10 | -- | 14 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 8 | -- | -- | 15 | 13 | -- | <50 | -- | -- | 6 | 14 | 22 | 6 | 11 | 9 | 11 | 12 | 12 | <50 | -- | <5 | 9 | -- | -- | <5 | -- | 17 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.3 | -- | -- | **0.018** | <0.017 | -- | <0.017 | -- | -- | <0.017 | <0.017 | <0.017 | <0.017 | <0.017 | **0.019** | <0.017 | <0.017 | **0.018** | **0.014** | -- | **0.176** | <0.017 | -- | -- | **0.041** | -- | <0.017 |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <50 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | **9** | <1 | <1 | <1.0 | -- | <1 | 1 | -- | -- | <1 | -- | 1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2 | -- | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <3 | 2 | <1 | <1 | **4** | <2.0 | <3 | <1 | <1 | <1 | 2 | <1 | 1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 250 | -- | -- | 227 | **403** | 238 | 202 | **418** | **358** | 154 | **541** | **813** | 269 | **528** | **523** | 174 | **723** | **305** | 250 | **641** | **478** | 232 | **1,000** | 290 | 168 | **759** | **572** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **1.0** | <0.50 | -- | <0.50 | -- | -- | <0.5 | <0.5 | **1.1** | <0.5 | 0.5 | <0.5 | **5.8** | <0.5 | 0.5 | <0.5 | -- | 0.6 | <0.5 | -- | -- | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 26 | -- | -- | 43 | 83 | 35 | 12 | 68 | 23 | 17 | 90 | 114 | 24 | 67 | 53 | 33 | 146 | 25 | 47 | 120 | 57 | 21 | 109 | 39 | 39 | 96 | 64 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1 | <1 | -- | <1 | -- | -- | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | **0.420** | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 14 | -- | -- | 18 | 20 | -- | 12 | -- | -- | 10 | 18 | 15 | 12 | 9 | 12 | 16 | 17 | 12 | 12 | -- | 8 | 12 | -- | -- | 15 | -- | 20 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 2 | -- | -- | <2 | <2 | -- | 3 | -- | -- | <2 | 2 | 3 | 4 | <2 | 2 | 2 | <2 | 3 | 3 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 8 | -- | -- | 5 | 5 | 7 | <5.0 | <5.0 | <5.0 | <5 | <5 | 7 | <5 | <5 | <5 | <5 | <5 | <5 | <5.0 | <5 | <5 | <5 | <5 | 8 | <5 | 8 | 6 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 1,800 | 170 | -- | >250 | 11 | >250 | 59 | >250 | -- | >2420 | 1,986 | >2420 | >2420 | >2420 | >2420 | 525 | >2420 | >2420 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | 659 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | **1,500** | 100 | -- | **>250** | 6 | 6 | 2 | **>250** | <100 | 3 | 7 | 3 | 12 | 6 | 2 | <1 | 18 | 11 | 30 | 11 | 5 | 4 | 15 | 25 | 31 | 16 | 3 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.82 | 6.05 | 1.97 | 0.73 | 0.55 | 0.22 | 0.44 | 0.89 | 0.97 | 0.53 | 2.20 | 0.07 | 0.62 | 1.00 | 0.73 | 0.13 | 0.83 | 0.41 | 0.34 | 0.96 | 0.46 | 0.30 | 1.86 | 0.32 | 0.99 | 1.47 | 0.31 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.87 | 5.97 | 1.95 | 0.66 | 0.54 | 0.21 | 0.42 | 0.73 | 0.82 | 0.56 | 2.20 | 0.12 | 0.72 | 1.00 | 0.74 | 0.14 | 0.86 | 0.41 | --- | 1.26 | 0.26 | 0.43 | 2.43 | 0.36 | 1.86 | 1.81 | 0.49 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - KL-2 | | | | | | | | KL-2 | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | hh:mm | | | | | | | 11:00 AM | 10:10 AM | 10:00 AM | 10:44 AM | 3:01 PM | 10:45 AM | 1:10 PM | 4:05 PM | 13.22 PM | 11:33 AM | 11:53 AM | 11:46 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 2.1 | 1.4 | 1.4 | 2.2 | 1.80 | 1.20 | 1.35 | 1.60 | NA* | 0.2 m | NA* | 1.65 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 11.7 | 21.6 | 10.3 | 10.3 | 26.4 | 10.1 | 21.5 | 19.3 | 8.4 | 14.1 | 18.5 | 11.7 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 9.41 | **4.17** | 7.54 | ** | **2.58** | 7.90 | **5.10** | **4.96** | **9.84** | 15.01 | 8.17 | 12.07 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.21** | **5.16** | **5.84** | 8.50 | **5.18** | **6.11** | **6.07** | **5.98** | **6.16** | **6.07** | **5.80** | **6.14** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 57.4 | 109.9 | 67.2 | 48.3 | 119.0 | 214.0 | 81.0 | 101.0 | 80.8 | 69.0 | 76.0 | 84.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 11 | <5 | <5 | 9.0 | <5 | 9.0 | 14.0 | 7.0 | 8 | 8 | 15 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 12 | 19 | 11 | 13 | 16 | 14 | 17 | 21 | 15 | 13 | 13 | 14 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 82 | 59 | 123 | 76 | 106 | 77 | 59 | 40 | 81 | 47.0 | 84.1 | 66.3 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.07 | 0.05 | <0.05 | 0.1 | 0.05 | <0.05 | 0.12 | 0.10 | 0.08 | 0.05 | 0.41 | 0.10 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.07 | <0.05 | <0.05 | 0.06 | 0.05 | <0.05 | 0.12 | 0.10 | 0.08 | 0.05 | 0.41 | 0.10 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | 0.04 | 0.06 | 0.05 | <0.03 | 0.12 | 0.07 | 0.07 | 0.09 | <0.03 | <0.03 | <0.03 | 0.44 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | <0.4 | <0.4 | 0.5 | 0.80 | 2.70 | <0.4 | 1.70 | 0.60 | 0.24 | 0.24 | <0.10 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 9.0 | 6.6 | 14.0 | 6.9 | 12.10 | 9.40 | 5.80 | 2.50 | 4.20 | 8.5 | 9.9 | 3.0 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.46** | 7.04 | **6.27** | **6.44** | 6.70 | **5.89** | 6.60 | 7.01 | **6.49** | 6.69 | **6.42** | 7.04 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.3 | 4.2 | 2.9 | 2.3 | 4.3 | 2.0 | 3.8 | 5.7 | 3.0 | 3.8 | 5.9 | 7.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.7 | 1.1 | 0.8 | 0.7 | 1.1 | 0.6 | 1.0 | 1.4 | 0.8 | 0.8 | 1.3 | 1.5 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.014** | **0.015** | 0.004 | 0.009 | **0.019** | **0.031** | **0.014** | **0.027** | **0.016** | **0.014** | **0.025** | **0.015** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.5 | 0.8 | 0.6 | 0.6 | 0.8 | 0.6 | 0.6 | 0.9 | 0.7 | 0.7 | 1.1 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 9.2 | 13.9 | 11.8 | 11.9 | 10.0 | 7.5 | 10.1 | 14.8 | 7.8 | 10.1 | 10.9 | 10.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.3 | 2.8 | 3.6 | 1.7 | 3.7 | 3.5 | 2.6 | 3.4 | 4.7 | 2.3 | 5.4 | 3.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 5.0 | <5 | <5 | 6.0 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 3 | <2 | 3.0 | 3.0 | <2 | 4.0 | 3.0 | 4.0 | 5.0 | 4 | 6 | 7 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.9 | 1.2 | 1.1 | 0.6 | 3.5 | 1.3 | 1.3 | 1.8 | 2.9 | 3.0 | 5.6 | 1.3 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 68 | 115 | 70 | 72 | 88 | 45 | 95 | 128 | 88 | 79 | 94 | 106 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.41 | 0.76 | 0.4 | 0.4 | 0.6 | 0.5 | 0.73 | 0.96 | 0.67 | 0.61 | 0.68 | 0.85 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 11 | <5 | <5 | 9.0 | <5 | 9 | 14 | 7 | 8 | 8 | 15 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 28 | 47 | 31.0 | 32.0 | 40.0 | 29.0 | 42 | 58 | 38 | 38 | 46 | 52 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.62 | 0.97 | 0.8 | 0.7 | 0.9 | 0.5 | 0.78 | 1.13 | 0.64 | 0.76 | 0.97 | 1.04 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 8.6 | 15 | 10.5 | 8.6 | 15.3 | 7.5 | 13.6 | 20.0 | 10.8 | 12.8 | 20.1 | 25.2 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 20.8 | 12.4 | 36.7 | 25.6 | 14.6 | 6.4 | 3.1 | 8.2 | 2.6 | 10.4 | 17.7 | 10.3 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -4.02 | -2.85 | -4.1 | -4.0 | -3.3 | -4.7 | -3.42 | -2.65 | -3.73 | -3.37 | -3.46 | -2.46 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -4.34 | -3.17 | -4.4 | -4.4 | -3.6 | -5.0 | -3.74 | -2.97 | -4.05 | -3.69 | -3.78 | -2.78 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 10.5 | 9.89 | 10.4 | 10.5 | 10.0 | 10.5 | 10.00 | 9.66 | 10.20 | 10.1 | 9.88 | 9.50 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.8 | 10.2 | 10.7 | 10.8 | 10.3 | 10.9 | 10.3 | 10.0 | 10.5 | 10.4 | 10.2 | 9.8 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **228** | **123** | -- | **156** | **257** | **318** | **227** | -- | -- | **204** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 7 | 14 | -- | 10 | 37 | 9 | 15.0 | -- | -- | 13 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 7 | 13 | -- | 7 | 11 | 7 | 14.0 | -- | -- | 11 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | -- | <1 | 1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | 1 | <1 | <1 | 1 | <1 | <1 | 1.0 | 1 | 2 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 148 | **783** | **336** | 227 | **1,210** | 277 | **486** | **1,040** | **659** | **472** | **503** | **462** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | **1.2** | <0.5 | -- | <0.5 | 1.0 | **1.6** | <0.5 | -- | -- | 0.7 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 17 | 78 | 29 | 28 | 295 | 23 | 98 | 260 | 168 | 77 | 36 | 44 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | 3 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 10 | 24 | -- | 13 | 24 | 13 | 17.0 | -- | -- | 17 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | 2 | 2 | 3.0 | -- | -- | 4 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | <5 | <5 | 20 | <5 | 9 | 6 | <5 | <5 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 10 | 2420 | 140.0 | 1960 | 630 | 1240 | >2420 | >2420 | 1730 | >200 | >200 | >200 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 4 | 20 | 50 | <10 | 2 | 12 | 31 | 58 | 4 | 195 | 26 | 12 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.25 | 0.53 | 4.25 | 3.15 | 0.95 | 0.6 | 0.79 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.51 | 1.25 | 0.75 | 0.47 | 1.67 | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.91 | -- | * | 0.49 | 1.50 | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

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Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health C

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-3**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-3 | | | | | | | | KL-3 | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/16/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | | | | | | | 09:00 | 11:00 | 09:30 | 11:30 | 14:12 | 11:40 | 10:30 | 12:20 | 12:00 | 10:26 | 12:20 | 11:20 | 9:50 | 10:00 | 14:00 | 11:00 | 11:50 | 14:25 | 10:35 | 11:45 | 10:40 | 11:00 | 11:30 | 11:00 | 9:36 | 10:15 | 10:15 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 14.0 | 21.6 | 17.3 | 14.7 | 23.1 | 9.9 | 10.3 | 21.1 | 15.5 | 9.0 | 24.5 | 15.6 | 11.7 | 21.5 | 13.6 | 11.0 | 22.7 | 12.8 | 14.7 | 25.0 | 8.4 | 12.1 | 21.7 | 12.5 | 16.1 | 22.5 | 13.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.79** | 8.00 | 8.00 | 9.26 | 7.83 | **10.35** | **11.06** | 8.42 | **9.60** | 8.89 | 8.17 | 7.72 | **10.20** | 9.20 | 8.90 | 5.90 | 7.87 | 8.12 | 8.02 | **9.91** | 8.65 | 9.34 | 7.72 | **11.41** | 9.00 | 7.40 | 8.17 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.27 | 6.74 | 6.97 | 7.27 | 7.33 | 6.76 | 6.83 | 6.96 | **6.30** | 7.68 | 6.85 | 6.51 | **5.86** | 7.25 | **6.49** | 6.55 | 7.37 | 6.67 | 6.84 | 6.87 | 7.17 | 7.40 | 6.82 | **5.58** | 7.02 | 7.04 | 6.97 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 95.0 | 282.0 | 246.0 | 220.0 | 228.0 | 199.4 | 220.0 | 175.0 | 161.3 | 204.0 | 225.0 | 177.2 | 207.3 | 194.4 | 210.6 | 405.0 | 252.0 | 208.0 | 0.2 | 245.1 | 236.6 | 213.0 | 264.0 | 227.8 | 204.0 | 248.0 | 248.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 | 5 | 6 | <5.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 66 | 63 | 60 | 55 | 55 | 53 | 56 | 43 | 37 | 50 | 57 | 46 | 54 | 40 | 46 | 58 | 46 | 45 | 60 | 56 | 56 | 54 | 56 | 49 | 63 | 56 | 59 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 22 | 20 | 20 | 28 | 12 | 20 | 31 | 38 | 40 | 57 | 15 | 31 | 19 | 23 | 20 | 16 | 13 | 20 | 34 | 13 | 14 | 29 | 13 | 21 | 24 | 13 | 15 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.14 | 0.12 | 0.14 | 0.24 | 0.15 | 0.22 | 0.24 | 0.15 | 0.16 | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.13 | 0.10 | 0.24 | 0.30 | 0.24 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.14 | -- | -- | 0.24 | 0.15 | -- | 0.24 | -- | -- | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.06 | 0.10 | 0.13 | 0.17 | 0.24 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.07** | <0.05 | **0.11** | **0.13** | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.04 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 | 0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 2.8 | <0.4 | -- | 1.3 | <0.4 | 0.6 | 0.4 | 0.4 | 0.2 | 1.2 | 0.9 | <0.4 | <0.4 | 0.4 | <0.4 | 0.8 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.6 | 3.9 | 4.3 | 3.6 | 3.1 | 3.3 | 3.8 | 5.1 | 5.0 | 5.9 | 3.4 | 4.9 | 4.3 | 4.4 | 4.6 | 4.6 | 2.8 | 4.5 | 3.4 | 5.7 | 5.8 | 4.3 | 2.7 | 8.0 | 5.3 | 4.9 | 4.1 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.38** | 6.67 | 6.82 | 6.82 | 6.99 | 6.87 | 6.52 | 6.50 | **6.38** | 6.70 | 7.10 | 6.90 | 6.68 | 6.96 | 6.86 | 6.68 | 6.87 | 6.59 | 6.54 | 6.92 | 6.94 | 6.69 | 7.28 | 6.93 | 6.77 | 7.13 | 6.88 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.7 | 7.1 | 6.8 | 6.8 | 8.0 | 8.3 | 7.1 | 4.7 | 5.6 | 5.7 | 6.9 | 6.0 | 7.0 | 5.3 | 6.8 | 6.4 | 7.9 | 6.8 | 6,600.0 | 7.8 | 5.2 | 6.2 | 8.3 | 7.3 | 6.9 | 7.2 | 8.1 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.2 | 1.2 | 1.1 | 1.2 | 1.3 | 1.3 | 1.2 | 0.8 | 1.0 | 1.0 | 1.2 | 1.3 | 1.0 | 0.9 | 1.3 | 1.4 | 1.2 | 1.0 | 940.0 | 1.2 | 0.9 | 1.0 | 1.3 | 1.3 | 1.0 | 1.1 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | <0.02 | <0.02 | 0.005 | 0.005 | <0.002 | 0.003 | 0.008 | 0.003 | **0.012** | **0.019** | **0.045** | 0.007 | 0.006 | 0.006 | **0.012** | 0.009 | **0.023** | **0.148** | 0.004 | 0.004 | 0.002 | 0.008 | 0.005 | 0.004 | 0.006 | 0.009 | 0.007 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.9 | 1.1 | 0.9 | 0.8 | 0.8 | 1.0 | 0.9 | 0.7 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.6 | 1.2 | 0.8 | 1.1 | 0.9 | 770.0 | 0.9 | 0.7 | 0.7 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 38.0 | 38.0 | 35.0 | 28.3 | 33.1 | 33.0 | 33.0 | 20.8 | 21.3 | 31.2 | 34.5 | 26.4 | 35.1 | 20.1 | 32.1 | 36.4 | 39.0 | 35.3 | 34.0 | 40.0 | 27.1 | 32.1 | 37.2 | 32.8 | 44.0 | 41.4 | 35.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.7 | 2.6 | 2.6 | 3.2 | 2.9 | 3.2 | 2.9 | 2.5 | 2.6 | 2.7 | 2.0 | 2.6 | 2.9 | 2.6 | 2.7 | 2.6 | 1.9 | 2.4 | 2.5 | 2.4 | 2.6 | 2.6 | 1.8 | 2.5 | 2.2 | 1.6 | 1.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <1 | 1 | 1 | 2 | <2 | <1 | <1 | <1 | <1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 3 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 11 | 12 | 12 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 8 | 7 | 7 | 7 | 8 | 9 | 7 | 7 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 9 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.7 | 1.4 | 0.6 | 0.3 | 0.5 | 0.6 | 0.6 | 0.6 | 0.4 | 0.8 | 0.7 | 1.0 | 0.7 | 2.4 | 0.4 | 0.4 | 0.3 | 0.9 | 0.7 | 0.5 | 0.7 | 1.1 | 1.1 | 1.0 | 1.0 | 1.3 | 2.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 250 | 250 | 240 | 220 | 220 | 220 | 220 | 170 | 160 | 197 | 222 | 182 | 219 | 216 | 204 | 218 | 243 | 216 | 220 | 242 | 238 | 206 | 262 | 185 | 245 | 251 | 247 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.11 | 2.17 | 2.08 | 1.90 | 1.93 | 1.87 | 1.90 | 1.58 | 1.36 | 2.03 | 1.90 | 1.55 | 1.68 | 1.38 | 1.60 | 2.14 | 1.55 | 1.54 | 1.87 | 1.90 | 1.88 | 1.74 | 1.98 | 1.76 | 2.00 | 1.95 | 2.07 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 | 5 | 6 | <5.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 128 | 130 | 123 | 110 | 117 | 116 | 115 | 88 | 82 | 111 | 113 | 91 | 106 | 78 | 100 | 122 | 106 | 100 | 110 | 119 | 103 | 105 | 120 | 107 | 127 | 122 | 122 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.12 | 2.16 | 1.99 | 1.69 | 1.97 | 1.98 | 1.92 | 1.23 | 1.32 | 1.77 | 1.98 | 1.60 | 2.00 | 1.24 | 1.89 | 2.07 | 2.23 | 2.00 | 1.89 | 2.27 | 1.55 | 1.83 | 2.18 | 1.94 | 2.38 | 2.28 | 2.10 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 22.00 | 23.00 | 22.00 | 22.00 | 25.00 | 26.00 | 23.00 | 15.00 | 18.00 | 18.40 | 22.20 | 20.30 | 21.60 | 16.90 | 22.30 | 21.70 | 24.70 | 21.10 | 20.00 | 24.40 | 16.70 | 19.60 | 26.10 | 23.60 | 21.30 | 22.50 | 25.20 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 0.24 | 0.23 | 2.21 | 5.85 | 1.03 | 2.86 | 0.52 | 12.50 | 1.49 | 6.80 | 2.10 | 1.60 | 8.60 | 5.50 | 8.30 | 1.50 | 17.90 | 12.80 | 0.53 | 9.00 | 9.80 | 2.60 | 4.80 | 4.90 | 8.60 | 7.90 | 0.80 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | -3.00 | -2.89 | -2.92 | -2.60 | -2.73 | -3.23 | -3.33 | -3.35 | -2.77 | -2.88 | -3.21 | -3.37 | -3.19 | -3.05 | -2.93 | -3.12 | -3.39 | NC | -3.00 | -3.15 | -3.41 | -2.44 | -2.89 | -3.29 | -2.71 | -2.85 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | -3.25 | -3.14 | -3.17 | -2.85 | -2.99 | -3.49 | -3.58 | -3.60 | -3.09 | -3.20 | -3.53 | -3.69 | -3.51 | -3.37 | -3.25 | -3.44 | -3.71 | NC | -3.32 | -3.47 | -3.73 | -2.76 | -3.21 | -3.61 | -3.03 | -3.17 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | 9.67 | 9.71 | 9.74 | 9.59 | 9.60 | 9.75 | 9.83 | 9.73 | 9.47 | 9.98 | 10.10 | 10.00 | 10.20 | 9.91 | 9.61 | 9.99 | 9.98 | NC | 9.92 | 10.10 | 10.10 | 9.72 | 9.82 | 10.10 | 9.84 | 9.73 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | 9.92 | 9.96 | 9.99 | 9.84 | 9.86 | 10.00 | 10.10 | 9.98 | 9.79 | 10.30 | 10.40 | 10.40 | 10.50 | 10.20 | 9.93 | 10.30 | 10.30 | NC | 10.20 | 10.40 | 10.40 | 10.00 | 10.10 | 10.40 | 10.20 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **259** | **259** | -- | **124** | **54** | -- | **266** | -- | -- | **199** | **54** | **153** | **140** | **65** | **100** | **260** | **52** | **105** | **180** | -- | **90** | **163** | -- | -- | **128** | **36** | **43** |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 13 | 13 | -- | 16 | 13 | -- | 19 | -- | -- | 18 | 17 | 15 | 19 | 9 | 18 | 17 | 17 | 16 | 19 | -- | 19 | 15 | -- | -- | 17 | -- | 20 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 9 | 9 | -- | 8 | 9 | -- | <50 | -- | -- | 5 | 9 | 17 | 7 | 7 | 10 | 8 | 10 | 12 | <50 | -- | <5 | 8 | -- | -- | 7 | -- | 12 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.019** | **0.019** | -- | **0.030** | <0.017 | -- | **0.046** | -- | -- | **0.019** | **0.021** | **0.027** | **0.028** | <0.017 | <0.017 | **0.038** | <0.017 | **0.017** | **0.033** | -- | <0.017 | **0.021** | -- | -- | **0.020** | -- | <0.017 |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | **7** | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | 2 | 2 | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | 1 | <1 | 2 | <2.0 | 1 | <1 | 2 | <1 | <1 | <1 | <1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **523** | **523** | -- | 73 | 133 | 58 | 136 | 104 | 154 | 137 | 136 | 119 | 131 | 71 | 172 | 137 | 96 | 118 | 120 | 165 | 115 | 112 | 117 | 99 | 125 | 83 | 130 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | <0.5 | -- | 0.6 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.7 | <0.5 | <0.5 | 0.9 | **3.6** | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 53 | 53 | -- | 37 | 67 | 32 | 42 | 33 | 33 | 25 | 47 | 46 | 37 | 20 | 92 | 41 | 45 | 27 | 36 | 48 | 24 | 31 | 41 | 20 | 30 | 35 | 54 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | -- | 2 | <2.0 | -- | 2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | -- | <0.10 | <0.10 | -- | <0.10 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 12 | 12 | -- | 34 | 36 | -- | 33 | -- | -- | 25 | 33 | 29 | 33 | 18 | 32 | 31 | 32 | 29 | 29 | -- | 21 | 28 | -- | -- | 33 | -- | 41 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | -- | <0.1 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 2 | 2 | -- | <2.0 | <2.0 | -- | 5 | -- | -- | <2 | <2 | <2 | <2 | <2 | 2 | 3 | <2 | 2 | 3 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | -- | -- | <0.1 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | <5 | <5 | -- | 10 | 7 | 6 | 9 | 7 | 9 | <5 | <5 | 8 | 10 | 5 | 7 | 10 | <5 | 6 | 9 | 7 | 8 | 8 | <5 | <5 | 6 | 6 | 6 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 120 | 24 | -- | 190 | 16 | 58 | 72 | 110 | -- | 291 | 1,553 | 178 | 345 | 2,420 | 1,300 | 86 | 1,730 | >2420 | --- | 2,420 | 285 | 548 | 1,990 | 2,420 | 687 | 2,420 | 411 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 1 | 17 | -- | 2 | <1 | 8 | 5 | 37 | <100 | 2 | <1 | 3 | 8 | 21 | <1 | <1 | <1 | 13 | <0.10 | 7 | 6 | 2 | 38 | 30 | 7 | 13 | 46 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.04 | 1.11 | 1.18 | 1.30 | 1.14 | 0.51 | 0.78 | 1.26 | 1.24 | 0.52 | 1.30 | 0.81 | 1.44 | 2.00 | 0.65 | 0.76 | 0.59 | 1.23 | 0.72 | 1.27 | 1.34 | 1.63 | 0.81 | 2.29 | 1.96 | 1.24 | 1.34 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.94 | 0.97 | 1.21 | 1.09 | 1.19 | 0.42 | 0.67 | 0.98 | 1.01 | 0.55 | 1.20 | 1.14 | 1.62 | 2.30 | 0.61 | 0.69 | 0.51 | 1.12 | 0.68 | 1.34 | 0.69 | 2.00 | 0.99 | 2.37 | 2.46 | 1.32 | 1.87 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-3**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-3 | | | | | | | | KL-3 | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | hh:mm | | | | | | | 10:30 | 9:10 | 11:30 AM | 10:00 AM | 10:00 AM | 11:45 AM | 3:30 PM | 3:30 PM | 13:42 PM | 1:20 PM | 12:44 PM | 12:02 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 12.1 | 23.8 | 12.4 | 9.6 | 23.3 | 11.3 | 25.2 | 21.8 | 11.5 | 16.4 | 21.9 | 15.0 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 7.33 | 6.90 | 8.64 | ** | 7.28 | 9.30 | **5.09** | 6.94 | 8.84 | 17.84 | 8.36 | 15.96 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.66 | 6.94 | 6.64 | 8.25 | 7.05 | 6.61 | 6.61 | **6.21** | 6.51 | 6.87 | **6.34** | 6.78 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 190.3 | 242.7 | 209.8 | 158.6 | 319.0 | 183.0 | 253.0 | 217.0 | 219.9 | 182.0 | 211.0 | 186.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 8 | 7 | <5 | 8 | 6 | 7.0 | 8.0 | 8.0 | 6 | 8 | 9 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 54 | 48 | 46 | 49 | 56 | 54 | 69 | 65 | 59 | 51 | 49 | 52 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 63 | 26 | 27 | 53 | 13 | 21 | 25 | 12 | 12 | 18.5 | 13.4 | 13.6 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.17 | 0.06 | 0.13 | 0.14 | 0.10 | 0.29 | 0.18 | <0.05 | 0.18 | <0.05 | 0.18 | 0.19 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.17 | 0.06 | 0.13 | 0.14 | 0.10 | 0.29 | 0.18 | <0.05 | 0.18 | <0.05 | 0.18 | 0.19 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.04 | 0.03 | <0.03 | 0.08 | 0.07 | <0.03 | 0.08 | <0.03 | <0.03 | <0.03 | 0.67 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 2.0 | 0.40 | 0.70 | 0.80 | 0.14 | 0.1 | <0.10 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.1 | 3.2 | 4.0 | 4.4 | 4.1 | 4.0 | 3.30 | <0.5 | 4.10 | 5.1 | 2.9 | 7.5 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 1.04 | <0.01 | 0.01 | <0.01 | 0.88 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.72 | 7.21 | 7.10 | 6.66 | 7.07 | 6.81 | 6.89 | 7.02 | 6.83 | 6.76 | 6.50 | 7.10 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.0 | 7.3 | 8.4 | 5.9 | 7.6 | 5.0 | 7.6 | 7.7 | 7.3 | 7.5 | 7.6 | 8.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.0 | 1.2 | 1.4 | 1.0 | 1.2 | 0.9 | 1.2 | 1.1 | 1.0 | 1.3 | 1.3 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | 0.010 | 0.010 | 0.006 | **0.011** | 0.007 | 0.007 | 0.010 | **0.014** | **0.023** | <0.006 | **0.024** | **0.014** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.7 | 1.0 | 1.1 | 0.7 | 1.0 | 0.8 | 0.9 | 0.9 | 1.0 | 0.8 | 1.2 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 35.9 | 36.6 | 39.9 | 44.3 | 38.9 | 30.1 | 36.9 | 42.2 | 39.4 | 31.3 | 32.8 | 28.6 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.6 | 1.7 | 1.9 | 2.1 | 1.4 | 2.2 | 1.6 | 1.3 | 2.1 | 2.9 | 4.1 | 0.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 8 | 7 | 7 | 6 | 9 | 9 | 9.0 | 8.0 | 9.0 | 8 | 8 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 1.0 | 0.5 | 1.2 | 0.9 | 2.0 | 1.1 | 1.0 | 0.8 | 0.7 | 0.7 | 0.8 | 0.7 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 244 | 246 | 232 | 244 | 233 | 160 | 275 | 288 | 240 | 210 | 233 | 227 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.70 | 1.66 | 1.6 | 1.5 | 1.9 | 1.9 | 2.29 | 2.16 | 2.02 | 1.73 | 1.72 | 1.87 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 8 | <5 | <5 | 8.0 | 6.0 | 7 | 8 | 8 | 6 | 8 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 107 | 106 | 109.0 | 108.0 | 119.0 | 105.0 | 130 | 130 | 123 | 103 | 106 | 109 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.98 | 2.09 | 2.3 | 2.3 | 2.2 | 1.7 | 2.14 | 2.35 | 2.22 | 1.86 | 1.95 | 1.85 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 19.1 | 23.2 | 26.7 | 18.9 | 23.9 | 16.2 | 24.7 | 23.8 | 23.2 | 22.8 | 24.3 | 26.4 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 7.6 | 11.4 | 18.4 | 21.4 | 6.7 | 5.2 | 3.3 | 4.2 | 4.5 | 3.7 | 6.3 | 0.5 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.39 | -2.61 | -2.7 | -3.5 | -2.7 | -3.3 | -2.97 | -2.79 | -3.00 | -3.18 | -3.31 | -2.60 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.71 | -2.93 | -3.0 | -3.8 | -3.1 | -3.6 | -3.29 | -3.11 | -3.32 | -3.50 | -3.63 | -2.92 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 10.1 | 9.82 | 9.8 | 10.1 | 9.8 | 10.1 | 9.86 | 9.81 | 9.83 | 9.94 | 9.81 | 9.70 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.4 | 10.1 | 10.1 | 10.4 | 10.1 | 10.4 | 10.2 | 10.1 | 10.1 | 10.3 | 10.1 | 10.0 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **164** | **26** | -- | **139** | **39** | **80** | **60** | -- | -- | **116** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 14 | 15 | -- | 17 | 16 | 15 | 21.0 | -- | -- | 16 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 5 | 10 | -- | 6 | 9 | 6 | 8.0 | -- | -- | 9 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | 2.0 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | 1 | <1 | 1 | <1 | 1.0 | <1 | 1.0 | 1 | 1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 81 | 148 | <50 | 123 | 93 | <50 | 274 | 180 | 105 | 114 | 68 | <50 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | 0.7 | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 21 | 50 | 22 | 26 | 44 | 18 | 137 | 80 | 19 | 24 | 16 | 35 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | -- | 3 | <2 | 2 | 2.0 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 27 | 38 | -- | 30 | 34 | 31 | 49.0 | -- | -- | 31 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 6 | <5 | <5 | 16 | <5 | <5 | <5 | <5 | <5 | **40** | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | <1 | NDOGT | 5,020.0 | 103.0 | NDOGT | 628.0 | >2420 | 1990 | 130 | >200 | >200 | >200 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | <1 | 51 | 20 | 1 | 15 | 6 | 44 | 61 | <1 | 12 | 18 | 29 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.47 | 0.47 | 1.41 | 0.64 | 1.1 | 1.6 | 13.1 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.16 | 1.14 | 1.28 | 0.74 | 1.94 | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.80 | -- | * | 0.74 | 1.73 | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Wat

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

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[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperatur

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a r

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health C

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-4**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-4 | | | | | | | | KL-4 | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/16/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 |
| Sampling Time | hh:mm | | | | | | | 10:00 | 11:30 | 10:00 | 11:20 | 13:50 | 11:15 | 10:10 | 11:40 | 11:40 | 10:16 | 12:00 | 11:40 | 9:41 | 10:30 | 14:20 | 11:15 | 11:35 | 14:35 | 10:25 | 11:02 | 11:15 | 11:30 | 12:00 | 11:11 | 9:25 | 10:45 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 13.4 | 21.9 | 17.3 | 14.5 | 21.9 | 9.8 | 10.1 | 21.2 | 15.3 | 9.0 | 24.4 | 15.7 | 11.7 | 20.4 | 13.5 | 11.0 | 21.8 | 12.5 | 14.8 | 24.7 | 9.5 | 12.2 | 20.6 | 12.3 | 16.5 | 22.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.87** | 8.10 | 8.30 | 9.01 | 6.27 | **10.89** | **10.99** | 8.55 | **9.65** | 8.70 | 7.32 | 8.87 | **10.09** | 8.89 | **9.60** | **14.50** | 5.92 | 7.52 | **9.81** | 9.09 | 8.80 | 8.27 | 5.50 | **10.11** | 8.33 | 6.41 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 8.00 | 6.71 | 6.94 | 7.19 | 6.98 | **6.07** | **6.49** | **6.43** | **6.02** | 9.00 | 6.71 | 6.77 | **5.72** | 7.08 | **6.41** | **6.30** | 7.25 | 6.55 | 6.64 | 6.81 | 7.09 | 7.32 | 6.72 | **6.14** | 6.90 | 6.88 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 771.0 | 262.0 | 247.0 | 224.0 | 226.0 | 214.8 | 218.0 | 171.9 | 126.2 | 206.0 | 225.0 | 185.9 | 207.1 | 196.2 | 209.0 | 273.0 | 251.0 | 208.0 | 0.2 | 243.5 | 232.4 | 215.0 | 260.0 | 228.0 | 213.0 | 262.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <5.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 67 | 65 | 60 | 56 | 56 | 53 | 56 | 44 | 37 | 51 | 57 | 46 | 54 | 41 | 47 | 59 | 47 | 48 | 61 | 56 | 55 | 54 | 58 | 49 | 64 | 62 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 22 | 18 | 20 | 27 | 11 | 20 | 32 | 38 | 43 | 48 | 11 | 20 | 17 | 21 | 20 | 13 | 11 | 28 | 33 | 10 | 12 | 25 | 12 | 22 | 19 | 11 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.15 | 0.12 | 0.14 | 0.23 | 0.19 | 0.21 | 0.23 | 0.15 | 0.17 | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.21 | 0.10 | 0.27 | 0.12 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.15 | -- | -- | 0.23 | 0.19 | -- | 0.23 | -- | -- | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.14 | 0.10 | 0.15 | 0.12 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.07** | <0.05 | **0.12** | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.10 | <0.03 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | <0.4 | 0.7 | -- | 1.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.2 | 0.4 | 1.0 | <0.4 | <0.4 | 0.4 | <0.4 | 0.5 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.5 | 2.6 | 4.0 | 3.3 | 2.6 | 3.1 | 3.7 | 6.0 | 5.4 | 7.5 | 3.2 | 4.8 | 4.2 | 4.5 | 4.3 | 4.4 | 2.1 | 4.4 | 2.8 | 5.2 | 5.7 | 4.3 | 3.3 | 8.1 | 5.1 | 4.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.61 | 6.75 | 6.83 | 6.83 | 6.93 | 6.83 | 6.57 | 6.57 | **6.46** | 6.70 | 7.00 | 6.90 | 6.69 | 6.96 | 6.85 | 6.69 | 6.91 | 6.85 | 6.59 | 6.94 | 6.97 | 6.70 | 7.03 | 6.89 | 6.75 | 6.99 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.8 | 7.7 | 7.0 | 6.8 | 8.0 | 8.5 | 6.8 | 4.9 | 5.2 | 5.7 | 6.8 | 5.8 | 6.8 | 5.1 | 6.8 | 6.4 | 7.9 | 6.8 | 6,500.0 | 7.9 | 3.7 | 6.5 | 7.1 | 7.3 | 7.7 | 7.5 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.2 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.2 | 0.9 | 1.0 | 1.0 | 1.2 | 1.2 | 1.0 | 0.8 | 1.2 | 1.3 | 1.2 | 1.0 | 920.0 | 1.3 | 1.0 | 1.0 | 1.1 | 1.3 | 1.2 | 1.1 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | <0.02 | <0.02 | <0.002 | 0.004 | <0.002 | <0.002 | 0.007 | 0.003 | **0.026** | **0.022** | **0.043** | 0.007 | 0.006 | **2.390** | **0.016** | **0.022** | **0.031** | **0.015** | 0.006 | 0.007 | 0.003 | 0.007 | 0.004 | 0.007 | **0.020** | 0.008 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.9 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 | 0.8 | 0.7 | 1.1 | 0.7 | 1.0 | 0.9 | 0.8 | 0.6 | 1.2 | 0.8 | 1.1 | 0.9 | 760.0 | 0.9 | 0.7 | 0.7 | 0.9 | 1.0 | 0.8 | 0.9 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 39.0 | 41.0 | 37.0 | 28.5 | 34.3 | 33.9 | 32.1 | 21.5 | 21.1 | 31.5 | 34.5 | 25.2 | 31.6 | 20.1 | 30.7 | 35.9 | 38.6 | 34.1 | 34.0 | 40.0 | 28.2 | 32.4 | 41.4 | 31.1 | 37.6 | 41.4 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.7 | 2.6 | 2.6 | 3.1 | 2.9 | 3.1 | 2.9 | 2.5 | 2.7 | 2.7 | 2.2 | 2.6 | 3.0 | 2.6 | 2.5 | 2.6 | 2.1 | 2.5 | 2.5 | 2.6 | 3.0 | 2.6 | 2.0 | 2.4 | 2.3 | 1.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <1 | 1 | <1 | <2 | <2 | <1 | 2 | <1 | <2 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <1.0 | 7 | <5 | 7 | <5 | 10 | 6 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 11 | 12 | 11 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 8 | 7 | 7 | 7 | 9 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 9 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.5 | 1.0 | 0.3 | 0.3 | 0.2 | 0.8 | 0.7 | 0.7 | 0.4 | 0.7 | 0.4 | 0.8 | 0.7 | 2.6 | 2.1 | 1.1 | 0.6 | 0.8 | 0.6 | 0.7 | 1.2 | 1.2 | 1.5 | 1.6 | 1.3 | 0.9 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 260 | 250 | 230 | 220 | 230 | 250 | 210 | 170 | 160 | 200 | 224 | 183 | 218 | 218 | 204 | 219 | 241 | 218 | 220 | 241 | 235 | 206 | 275 | 185 | 251 | 255 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.23 | 2.22 | 2.09 | 1.91 | 1.94 | 1.85 | 1.88 | 1.62 | 1.36 | 2.04 | 1.94 | 1.45 | 1.68 | 1.31 | 1.53 | 2.47 | 1.60 | 2.11 | 1.88 | 1.90 | 1.87 | 1.74 | 2.04 | 1.76 | 2.03 | 2.12 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <1.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 132 | 135 | 125 | 111 | 118 | 116 | 113 | 90 | 81 | 111 | 114 | 87 | 103 | 75 | 97 | 132 | 108 | 117 | 110 | 121 | 102 | 106 | 125 | 105 | 123 | 128 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.16 | 2.32 | 2.07 | 1.70 | 2.02 | 2.03 | 1.86 | 1.28 | 1.30 | 1.78 | 1.97 | 1.53 | 1.84 | 1.23 | 1.84 | 2.04 | 2.21 | 1.94 | 1.91 | 2.35 | 1.53 | 1.86 | 2.28 | 1.87 | 2.17 | 2.31 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 22.00 | 25.00 | 22.00 | 22.00 | 25.00 | 27.00 | 22.00 | 16.00 | 17.00 | 18.40 | 21.90 | 19.40 | 21.10 | 16.00 | 21.90 | 21.30 | 24.70 | 21.10 | 20.00 | 25.10 | 13.40 | 20.30 | 22.30 | 23.60 | 24.20 | 23.30 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 1.59 | 2.20 | 0.48 | 5.82 | 2.02 | 4.64 | 0.53 | 11.70 | 2.26 | 6.60 | 0.80 | 2.80 | 4.50 | 3.20 | 9.20 | 9.50 | 15.80 | 4.20 | 0.79 | 10.70 | 10.10 | 3.40 | 5.50 | 3.00 | 3.20 | 4.10 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.21 | -2.89 | -2.84 | -2.92 | -2.64 | -2.75 | -3.22 | -3.18 | -3.31 | -2.79 | -2.86 | -3.22 | -3.37 | -3.21 | -3.21 | -2.63 | -3.08 | -2.45 | NC | -2.98 | -3.20 | -3.38 | -2.76 | -2.93 | -3.26 | -2.78 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.46 | -3.14 | -3.09 | -3.17 | -2.89 | -3.00 | -3.47 | -3.43 | -3.56 | -3.11 | -3.18 | -3.54 | -3.69 | -3.53 | -3.53 | -2.95 | -3.40 | -2.77 | NC | -3.30 | -3.52 | -3.70 | -3.08 | -3.25 | -3.58 | -3.10 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.82 | 9.64 | 9.67 | 9.75 | 9.57 | 9.58 | 9.79 | 9.75 | 9.77 | 9.49 | 9.86 | 10.10 | 10.10 | 10.20 | 10.10 | 9.32 | 9.99 | 9.30 | NC | 9.92 | 10.20 | 10.10 | 9.79 | 9.82 | 10.00 | 9.77 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.10 | 9.89 | 9.92 | 10.00 | 9.82 | 9.83 | 10.00 | 10.00 | 10.00 | 9.81 | 10.20 | 10.40 | 10.40 | 10.50 | 10.40 | 9.64 | 10.30 | 9.62 | NC | 10.20 | 10.50 | 10.40 | 10.10 | 10.10 | 10.30 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **150** | -- | -- | **125** | **29** | -- | **231** | -- | -- | **188** | **48** | **149** | **141** | **106** | **159** | **236** | **46** | **93** | **160** | -- | **84** | **172** | -- | -- | **180** | **89** |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 16 | -- | -- | 17 | 18 | -- | 18 | -- | -- | 18 | 17 | 16 | 18 | 10 | 19 | 17 | 19 | 16 | 20 | -- | 17 | 16 | -- | -- | 20 | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 6 | -- | -- | 9 | 9 | -- | <50 | -- | -- | 6 | 9 | 16 | 7 | 6 | 9 | 8 | 11 | 11 | <50 | -- | <5 | 7 | -- | -- | <5 | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.3 | -- | -- | **0.031** | <0.017 | -- | **0.035** | -- | -- | **0.021** | <0.017 | **0.027** | **0.027** | <0.017 | **0.050** | **0.027** | <0.017 | <0.017 | **0.033** | -- | <0.017 | **0.024** | -- | -- | **0.021** | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | **6** | <1 | <1 | <1 | **6** | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.4 | -- | <1 | <1 | -- | -- | <1 | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2 | -- | -- | <2.0 | **2** | <2.0 | **2** | <2.0 | <2.0 | <2 | <2 | **4** | **9** | <1 | 1 | <1 | <1 | 2 | **7** | 1 | 1 | 1 | <1 | <1 | <1 | -- |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 86 | -- | -- | 82 | 51 | 55 | 119 | 109 | 138 | 129 | 118 | 133 | 213 | 144 | 248 | 129 | 55 | 104 | 100 | 217 | 83 | 122 | 61 | 114 | 136 | 131 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **3.2** | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.8 | 0.9 | <0.5 | <0.5 | **2.6** | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 51 | -- | -- | 35 | 64 | 29 | 39 | 27 | 30 | 23 | 34 | 38 | 34 | 77 | 130 | 34 | 29 | 24 | 25 | 78 | 34 | 34 | 58 | 29 | 74 | 76 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 3 | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | 5 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | 7 | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | **3** | <1 | -- | -- | <1 | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <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 | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 34 | -- | -- | 33 | 37 | -- | 33 | -- | -- | 25 | 32 | 28 | 32 | 17 | 31 | 31 | 31 | 29 | 30 | -- | 20 | 28 | -- | -- | 33 | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | 5 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | <2 | <2 | <2 | <2 | 3 | 2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 14 | -- | -- | 10 | 7 | 7 | 11 | 7 | 7 | <5 | <5 | **68** | 21 | <5 | 9 | 9 | <5 | <5 | 10 | 8 | 12 | 7 | <5 | <5 | 13 | 7 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 28 | 58 | -- | 100 | 16 | 75 | 83 | 95 | -- | 345 | >2420 | 921 | 548 | >2420 | 770 | 308 | 1,550 | >2420 | --- | >2420 | 281 | 488 | 1,730 | >2420 | 792 | >2420 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 4 | 33 | -- | 1 | <1 | 2 | 5 | 39 | <100 | 4 | <1 | 4 | 6 | 38 | <1 | <1 | 1 | 8 | <10 | 5 | 1 | 2 | 35 | 29 | 15 | 1 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.78 | 1.11 | 1.06 | 0.92 | 0.07 | 0.50 | 0.60 | 1.04 | 1.31 | 0.52 | 0.70 | 0.55 | 1.34 | 1.50 | 0.40 | 0.44 | 0.50 | 1.03 | 0.55 | 0.26 | 1.09 | 1.62 | 0.16 | 2.18 | 2.40 | 0.33 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.69 | 0.96 | 1.11 | 0.77 | 0.07 | 0.41 | 0.55 | 0.82 | 1.07 | 0.55 | 0.70 | 0.74 | 1.48 | 1.70 | 0.39 | 0.40 | 0.57 | 0.95 | 0.51 | 0.31 | 0.55 | 2.09 | 0.21 | 2.15 | 3.04 | 0.39 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-4**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-4 | | | | | | | | KL-4 | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 10/18/2017 | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | hh:mm | | | | | | | 10:05 AM | 10:45 AM | 9:00 AM | 11:45 AM | 9:43 AM | 9:43 AM | 12:15 PM | 4:06 PM | 3:09 PM | 13:59 PM | 12:40 PM | 1:02 PM | 12:16 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA** | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 13.8 | 12.7 | 23.1 | 12.7 | 9.9 | 23.4 | 10.9 | 23.6 | 20.7 | 11.4 | 16.1 | 21.9 | 15.0 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 7.32 | **11.01** | **4.70** | 8.46 | ** | **2.98** | **10.80** | **3.49** | **4.73** | 9.22 | 16.37 | 8.77 | 19.23 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.84 | 7.01 | 6.67 | 6.91 | 8.68 | 6.97 | 6.81 | **6.30** | **5.78** | 6.68 | 6.68 | **6.29** | 6.79 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 252.0 | 202.9 | 251.0 | 210.6 | 161.1 | 540.0 | 188.0 | 259.0 | 221.0 | 220.6 | 185.0 | 212.0 | 188.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 10 | <5 | 9 | 8 | <5 | 9 | 6 | 7.0 | 12.0 | 5.0 | <5 | 8 | 11 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 59 | 52 | 50 | 47 | 50 | 56 | 54 | 72 | 73 | 91 | 51 | 49 | 53 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 16 | 35 | 10 | 16 | 42 | <5 | 17 | 22 | <5 | 16 | 21.7 | 10.5 | 13.3 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.15 | 0.27 | 0.25 | 0.13 | 0.15 | 0.18 | 0.29 | 0.24 | 0.19 | 0.17 | 0.18 | 0.16 | 0.21 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.15 | 0.17 | 0.13 | 0.13 | 0.15 | 0.18 | 0.29 | 0.24 | 0.19 | 0.17 | 0.18 | 0.16 | 0.21 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.05 | **0.10** | **0.12** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | 0.04 | <0.03 | 0.04 | 0.03 | <0.03 | 0.06 | 0.07 | <0.03 | 0.10 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 0.6 | 0.6 | <0.4 | 0.40 | 0.80 | 0.22 | 0.1 | |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 4.0 | 5.1 | 2.7 | 4.0 | 4.5 | 3.3 | 4.3 | 2.60 | 2.90 | 2.10 | 6.1 | 3.1 | 3.0 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | 0.02 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.95 | 6.74 | 7.13 | 7.13 | 6.67 | 6.91 | 6.87 | 6.77 | 7.08 | 6.86 | 6.64 | **6.49** | 7.08 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 8.6 | 5.9 | 7.9 | 7.7 | 6.2 | 8.0 | 5.1 | 8.1 | 8.6 | 7.1 | 10.1 | 8.1 | 8.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.3 | 1.0 | 1.2 | 1.3 | 1.0 | 1.2 | 0.9 | 1.3 | 1.3 | 1.2 | 1.2 | 1.3 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | 0.006 | **0.024** | 0.004 | 0.004 | 0.009 | **0.011** | 0.005 | <0.006 | **0.014** | 0.003 | **0.038** | **0.031** | 0.008 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 0.7 | 1.0 | 1.0 | 0.8 | 1.1 | 0.8 | 1.0 | 1.1 | 1.0 | 1.0 | 1.1 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 38.9 | 35.6 | 39.2 | 40.6 | 37.0 | 36.7 | 23.4 | 37.4 | 39.4 | 39.6 | 34.8 | 34.0 | 29.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.1 | 2.6 | 1.8 | 2.0 | 2.1 | 1.4 | 2.2 | 1.8 | 1.7 | 2.1 | 3.1 | 3.9 | 1.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | <5 | <5 | <5 | <5 | 6 | <5 | <5 | <5 | <5 | 12 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 10 | 8 | 7 | 8 | 6 | 9 | 9 | 9.0 | 9.0 | 13.0 | 8 | 8 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 1.6 | 1.2 | 0.5 | 1.7 | 0.8 | 1.5 | 1.1 | 1.0 | 0.8 | 1.1 | 22.6 | 0.6 | 0.7 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 248 | 243 | 252 | 231 | 246 | 236 | 158 | 288 | 297 | 240 | 213 | 234 | 228 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.08 | 1.65 | 1.75 | 1.7 | 1.6 | 2.0 | 1.9 | 2.38 | 2.50 | 2.95 | 1.62 | 1.72 | 1.94 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 10 | <5 | 9 | 8.0 | <5 | 9.0 | 6.0 | 7 | 12 | 5 | <5 | 8 | 11 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 126 | 105 | 113 | 111.0 | 102.0 | 119.0 | 98.0 | 135 | 141 | 157 | 111 | 107 | 110 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.27 | 1.96 | 2.24 | 2.3 | 2.0 | 2.1 | 1.4 | 2.18 | 2.31 | 2.21 | 2.40 | 2.03 | 1.82 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 26.80 | 18.9 | 24.7 | 24.6 | 19.6 | 24.9 | 16.4 | 25.6 | 26.8 | 22.7 | 30.2 | 25.6 | 26.4 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 4.30 | 8.6 | 12.1 | 16.2 | 13.8 | 4.4 | 14.5 | 4.2 | 4.1 | 14.3 | 19.5 | 8.2 | 3.1 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.71 | -3.38 | -2.61 | -2.7 | -3.4 | -2.8 | -3.2 | -3.08 | -2.51 | -3.20 | -3.25 | -3.29 | -2.54 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.03 | -3.70 | -2.93 | -3.0 | -3.8 | -3.2 | -3.6 | -3.40 | -2.83 | -3.52 | -3.57 | -3.61 | -2.86 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.66 | 10.1 | 9.74 | 9.8 | 10.1 | 9.7 | 10.1 | 9.85 | 9.59 | 10.10 | 9.89 | 9.78 | 9.62 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.98 | 10.4 | 10.1 | 10.1 | 10.4 | 10.1 | 10.4 | 10.2 | 9.9 | 10.4 | 10.2 | 10.1 | 9.9 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **55** | **157** | **32** | -- | **132** | **70** | **92** | **52** | -- | -- | **1510** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 20 | 15 | 19 | -- | 18 | 20 | 17 | 21.0 | -- | -- | 30 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 11 | 6 | 10 | -- | 6 | 9 | 6 | 7.0 | -- | -- | 18 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | **0.020** | -- | -- | **0.15** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | 2 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | 5 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | <1 | 1 | <1 | 1 | 1 | 2.0 | <1 | 1.0 | **4** | 1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 141 | 83 | 119 | 78 | 120 | 100 | <50 | 177 | 139 | 102 | **2070** | 69 | 73 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | **1.4** | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | **5.1** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 48 | 19 | 84 | 43 | 24 | 85 | 19 | 209 | 357 | 18 | 252 | 19 | 32 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | 6 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 40 | 27 | 39 | -- | 33 | 35 | 31 | 45.0 | -- | -- | 37 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | 30 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | 0.4 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- | 5 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | <5 | 7 | <5 | 7 | 7 | 6 | 6 | <5 | <5 | <5 | **201** | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | >2420 | 4 | NDOGT | 8,000.0 | 198.0 | 560.0 | 604.0 | 2,420 | >2420 | 172 | >200 | >200 | >200 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 3 | 2 | 19 | 12 | <1 | 1 | <1 | 48 | 133 | 5 | 39 | 24 | 44 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.32 | <0.25 | 0.60 | 0.63 | 8.31 | 1.8 | 5.26 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.35 | 1.06 | 0.24 | 1.12 | 0.78 | 0.47 | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.43 | 1.71 | -- | * | 0.82 | 0.42 | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Wat

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperatur

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a r

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health C

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-5**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | | KL-5 | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2011/10/17 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/16/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 |
| Sampling Time | hh:mm | | | | | | | 9:40 | 10:52 | 13:10 | 12:10 | 10:03 | 10:50 | 13:45 | 11:30 | 13:55 | 10:45 | 09:00 | 12:04 | 12:00 | 10:00 | 8:00 | 13:05 | 9:00 | 9:45 | 9:50 | 9:30 | 8:20 | 9:30 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.7 | 2.1 | 5.3 | 4.2 | 2.1 | 4.6 | 2.7 | 3.1 | 3.01 | 3.8 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 14.7 | 10.5 | 26.1 | 16.6 | 13.3 | 22.7 | 14.7 | 13.7 | 22.9 | 12.8 | 14.1 | 25.4 | 9.4 | 12.2 | 22.2 | 12.7 | 16.8 | 21.0 | 14.6 | 12.7 | 24.5 | 13.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 9.38 | 7.88 | 7.90 | 8.16 | **9.67** | 8.89 | 8.60 | **15.83** | 7.64 | 7.91 | 8.32 | 8.75 | 7.63 | **10.47** | 8.39 | **9.92** | 8.70 | 7.07 | 7.17 | **10.42** | 6.42 | 7.58 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.52 | 7.76 | 6.69 | 6.72 | **6.20** | 8.57 | 6.51 | 6.79 | 7.86 | 6.60 | 7.82 | 6.77 | 7.05 | **5.75** | **5.11** | **5.72** | 7.00 | 6.83 | 7.05 | 6.74 | 7.14 | 6.67 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 111.9 | 230.0 | 229.0 | 189.0 | 219.5 | 202.1 | 212.9 | 472.0 | 251.0 | 211.0 | 0.2 | 249.8 | 240.8 | 209.0 | 267.0 | 243.2 | 219.0 | 246.0 | 257.0 | 196.4 | 244.9 | 236.4 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 9 | 21 | 8 | <5 | <5 | 6 | 5 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 37 | 55 | 57 | 48 | 58 | 44 | 46 | 61 | 47 | 47 | 59 | 58 | 58 | 54 | 56 | 53 | 65 | 58 | 60 | 56 | 49 | 47 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 35 | 43 | 10 | 27 | 10 | 22 | 18 | 14 | 11 | 22 | 35 | 8 | 19 | 27 | 13 | 17 | 18 | 14 | 14 | 34 | 14 | 12 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.17 | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.25 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.19 | 0.15 | 0.25 | 0.21 | 0.09 | 0.17 | 0.20 | 0.42 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | -- | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.20 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.09 | 0.15 | 0.13 | 0.07 | 0.09 | 0.17 | 0.09 | 0.42 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.03 | <0.05 | <0.05 | **0.10** | <0.05 | **0.12** | **0.14** | <0.05 | <0.05 | **0.11** | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | <0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.06 | <0.050 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | 0.05 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | <0.4 | 2.3 | 1.0 | -- | 0.6 | 1.1 | <0.4 | 0.5 | 1.1 | 0.3 | <0.4 | 1.8 | 0.5 | <0.4 | 0.7 | 0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 4.8 | 5.8 | 3.4 | 4.7 | 4.0 | 4.6 | 7.0 | 4.3 | 2.7 | 4.5 | 3.1 | 5.3 | 5.7 | 4.4 | 3.3 | 7.0 | 4.7 | 4.8 | 3.9 | 4.9 | 2.9 | 3.0 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.03 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.57 | 6.70 | 7.10 | 6.50 | 6.71 | 6.93 | 6.89 | 6.64 | 6.84 | 6.63 | 6.56 | 6.90 | 6.94 | 6.66 | 7.16 | 7.03 | 6.74 | 7.09 | 6.93 | 6.70 | 7.15 | 7.47 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 5.8 | 6.1 | 6.6 | 5.9 | 7.1 | 5.7 | 6.4 | 6.5 | 7.6 | 7.0 | 6,500.0 | 8.0 | 4.7 | 6.3 | 7.3 | 8.2 | 7.4 | 7.0 | 7.5 | 5.9 | 6.7 | 7.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 1.0 | 1.1 | 1.2 | 1.0 | 1.0 | 1.1 | 1.4 | 1.2 | 1.0 | 930.0 | 1.3 | 0.9 | 1.0 | 1.1 | 1.3 | 1.2 | 1.0 | 1.1 | 1.0 | 1.1 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | 0.009 | 0.018 | 0.040 | 0.006 | 0.005 | 0.013 | 0.010 | 0.010 | 0.026 | 0.135 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 | 0.003 | 0.010 | 0.012 | 0.005 | 0.031 | 0.005 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.9 | 0.7 | 0.9 | 0.8 | 0.8 | 0.7 | 1.1 | 0.8 | 1.1 | 0.9 | 720.0 | 0.1 | 0.7 | 0.7 | 0.9 | 1.0 | 0.9 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 22.0 | 34.6 | 32.0 | 27.7 | 33.6 | 19.2 | 31.3 | 37.5 | 40.3 | 38.3 | 33.0 | 42.6 | 28.3 | 32.5 | 33.1 | 33.5 | 38.9 | 42.4 | 37.2 | 37.2 | 38.5 | 41.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.5 | 2.7 | 2.0 | 2.4 | 2.7 | 2.5 | 2.5 | 2.7 | 2.1 | 2.5 | 3.3 | 1.9 | 2.2 | 2.7 | 2.0 | 2.3 | 2.1 | 1.6 | 1.7 | 2.4 | 1.7 | 3.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 9 | 7 | 8 | 8 | 8 | 7 | 8 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 8 | 10 | 8 | 7 | 11 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.9 | 1.1 | 0.7 | 0.9 | 0.7 | 0.8 | 0.4 | 1.1 | 0.4 | 0.8 | 0.7 | 1.0 | 1.0 | 0.7 | 1.3 | 1.2 | 0.9 | 0.9 | 0.9 | 1.4 | 0.4 | 0.7 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 160 | 215 | 226 | 189 | 232 | 223 | 204 | 228 | 246 | 225 | 220 | 248 | 244 | 208 | 267 | 196 | 248 | 249 | 246 | 247 | 247 | 286 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.42 | 2.13 | 1.95 | 1.58 | 1.82 | 1.52 | 1.58 | 2.56 | 1.50 | 1.50 | 1.94 | 1.95 | 1.96 | 1.74 | 1.94 | 1.89 | 2.06 | 1.96 | 2.09 | 1.76 | 1.68 | 2.1 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 9 | 21 | 8 | <5 | <5 | 6 | 5 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 84 | 118 | 111 | 96 | 110 | 82 | 98 | 136 | 106 | 103 | 120 | 124 | 106 | 105 | 114 | 113 | 125 | 122 | 123 | 110 | 108 | 127.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.36 | 1.94 | 1.85 | 1.64 | 1.94 | 1.23 | 1.81 | 2.12 | 2.27 | 2.14 | 1.87 | 2.40 | 1.58 | 1.86 | 1.93 | 2.01 | 2.20 | 2.30 | 2.12 | 2.04 | 2.13 | 2.3 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 19.00 | 19.30 | 21.00 | 19.70 | 21.80 | 18.40 | 20.50 | 22.00 | 23.90 | 21.60 | 20.00 | 25.30 | 15.40 | 19.80 | 22.80 | 25.80 | 23.40 | 21.60 | 23.30 | 18.9 | 21.3 | 23.9 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 2.16 | 4.70 | 2.60 | 2.00 | 3.20 | 10.60 | 6.70 | 9.40 | 20.30 | 17.50 | 1.84 | 10.20 | 10.80 | 3.20 | 0.40 | 3.00 | 3.40 | 8.10 | 0.70 | 7.3 | 11.8 | 5.0 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.06 | -2.79 | -2.77 | -3.62 | -3.33 | -3.11 | -3.19 | -2.64 | -3.17 | -3.42 | -3.24 | -3.20 | -3.13 | -3.43 | -2.72 | -2.69 | -3.29 | -2.82 | -2.84 | -3.42 | -2.77 | -1.8 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.31 | -3.11 | -3.09 | -3.94 | -3.65 | -3.43 | -3.51 | -2.96 | -3.49 | -3.74 | -3.50 | -3.34 | -3.45 | -3.75 | -3.04 | -3.01 | -3.61 | -3.14 | -3.16 | -3.74 | -3.09 | -2.2 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.63 | 9.49 | 9.87 | 10.10 | 10.00 | 10.00 | 10.10 | 9.28 | 10.00 | 10.00 | 9.81 | 9.92 | 10.10 | 10.10 | 9.88 | 9.72 | 10.00 | 9.91 | 9.77 | 10.1 | 9.92 | 9.3 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.88 | 9.81 | 10.20 | 10.40 | 10.40 | 10.40 | 10.40 | 9.60 | 10.30 | 10.40 | 10.10 | 10.20 | 10.40 | 10.40 | 10.20 | 10.00 | 10.30 | 10.20 | 10.10 | 10.4 | 10.2 | 9.6 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | -- | **222** | **52** | **154** | **136** | **58** | **61** | **224** | **53** | **108** | **180** | --- | **79** | **163** | -- | -- | **156** | **45** | **44** | **172** | **30** | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | -- | 18 | 16 | 15 | 19 | 9 | 16 | 16 | 17 | 17 | 17 | --- | 19 | 14 | -- | -- | 17 | -- | 17 | 13 | 13 | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | -- | 6 | 9 | 15 | 7 | 7 | 9 | 7 | 6 | 10 | <50 | --- | <5 | 7 | -- | -- | <5 | -- | 10 | 5 | 9 | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | -- | **0.022** | **0.027** | **0.029** | **0.024** | <0.017 | **0.034** | **0.036** | <0.017 | **0.024** | **0.035** | --- | **0.332** | **0.024** | -- | -- | **0.025** | -- | <0.017 | <0.09 | <0.09 | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | -- | <1 | <1 | **5** | <1 | <1 | <1 | **6** | <1 | <1 | <1.0 | --- | **7** | <1 | -- | -- | **2** | -- | <1 | <1 | <1 | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | <1 | <1 | **5** | <2.0 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | <1 | <1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 175 | 160 | 78 | 120 | 111 | 70 | 79 | 111 | <50 | 119 | 100 | 123 | 158 | 96 | 55 | 88 | 59 | <50 | 106 | 80 | 81 | <50 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | -- | <0.5 | <0.5 | 0.6 | <0.5 | <0.5 | <0.5 | **1.9** | <0.5 | 0.5 | <0.5 | --- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 0.9 | <0.5 | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 36 | 30 | 14 | 37 | 35 | 13 | 12 | 40 | 18 | 25 | 34 | 24 | 35 | 23 | 15 | 17 | 24 | 11 | 13 | 24 | 15 | 14 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | -- | <2 | <2 | 5 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | --- | 3 | 3 | -- | -- | 14 | -- | <2 | <2 | <2 | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | --- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | -- | 27 | 31 | 29 | 31 | 18 | 31 | 31 | 30 | 30 | 29 | --- | 23 | 28 | -- | -- | 32 | -- | 38 | 28 | 35 | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | -- | <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 | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | -- | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | 2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | -- | 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 | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 9 | 5 | <5 | **64** | 11 | 7 | 5 | 10 | <5 | 10 | 14 | 6 | 12 | 10 | <5 | <5 | 11 | 8 | <5 | 8 | <5 | 7 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | -- | 461 | 613 | 93 | 461 | 308 | 461 | 42 | 629 | >2470 | --- | 356 | 163 | 179 | 517 | 2,420 | 260 | 577 | >2420 | 58 | 601 | 6,000.0 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 100 | 14 | 2 | 6 | 6 | 6 | 4 | <1 | 1 | 17 | <10 | 1 | 2 | <1 | 23 | 44 | <1 | 5 | **517** | 8 | 1 | 11 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.91 | 0.30 | 1.20 | 1.09 | 1.44 | 2.20 | 0.64 | 0.20 | 0.61 | 0.90 | 0.48 | 1.22 | 2.71 | 1.52 | 1.20 | 2.32 | 1.09 | 1.43 | 1.22 | 6.25 | 1.28 | 1.68 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.85 | 0.33 | 1.00 | 1.41 | 1.59 | 2.40 | 0.62 | 0.20 | 0.54 | 0.84 | --- | 1.26 | 1.44 | 1.86 | 1.57 | 2.34 | 1.28 | 1.40 | 1.33 | 3.35 | -- | * |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-5**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | | KL-5 | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | hh:mm | | | | | | | 9:10 AM | 9:27 AM | 10:00 AM | 2:40 PM | 11:27 AM | 12:45 PM | 11..52 PM | 12:24 PM | 11:08 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 3.1 | 3.70 | 2.20 | NA** | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 11.2 | 23.8 | 12.8 | 25.6 | 22.9 | 12.2 | 16.0 | 23.1 | 15.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | ** | **5.46** | 8.10 | 6.85 | 7.43 | 8.02 | 17.88 | 8.66 | 16.90 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **9.20** | 7.45 | 6.62 | **6.49** | 6.73 | 6.73 | 6.74 | **6.24** | 6.70 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 171.6 | 220.0 | 216.0 | 245.0 | 221.0 | 224.0 | 181.0 | 210.0 | 190.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 7 | 6 | 6.0 | 7.0 | 8.0 | <5 | 8 | 11 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 51 | 55 | 57 | 67 | 62 | 61 | 50 | 51 | 53 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 38 | 16 | 19 | 28 | 17 | 15 | 16.7 | 13.1 | 12.6 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.14 | 0.16 | 0.35 | 0.38 | 0.08 | 0.17 | 0.19 | 0.15 | 0.20 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.14 | 0.16 | 0.35 | 0.38 | 0.08 | 0.17 | 0.19 | 0.15 | 0.20 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.06 | 0.06 | <0.03 | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | <0.4 | 0.6 | 1.50 | 0.80 | 8.10 | 0.16 | <0.10 | |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 4.5 | 4.5 | 4.2 | 3.20 | 3.80 | 4.00 | 5.1 | 2.9 | 2.9 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.64 | 7.04 | 6.81 | 6.88 | 6.95 | 6.81 | 6.71 | **6.47** | 7.07 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.4 | 7.7 | 5.4 | 6.8 | 5.5 | 7.0 | 6.0 | 7.3 | 8.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 1.2 | 0.9 | 1.1 | 4.0 | 1.1 | 1.0 | 1.1 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | 0.011 | 0.007 | 0.005 | <0.006 | **0.028** | 0.004 | 0.007 | **0.019** | 0.009 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.8 | 1.0 | 0.8 | 0.8 | 0.8 | 1.0 | 0.8 | 1.1 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 43.8 | 37.7 | 30.6 | 35.4 | 39.7 | 38.0 | 34.7 | 31.4 | 30.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.1 | 1.4 | 2.0 | 1.8 | 1.5 | 1.9 | 3.0 | 4.2 | 1.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 6 | 8 | 9 | 9.0 | 8.0 | 9.0 | 8 | 8 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.9 | 2.0 | 0.8 | 0.9 | 1.2 | 0.9 | 1.3 | 0.6 | <0.5 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 249 | 229 | 160 | 269 | 272 | 248 | 208 | 229 | 226 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.6 | 1.9 | 1.9 | 2.22 | 2.06 | 2.08 | 1.59 | 1.78 | 1.94 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 7.0 | 6.0 | 6 | 7 | 8 | <5 | 8 | 11 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 110.0 | 116.0 | 109.0 | 125 | 122 | 123 | 102 | 105 | 112 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.4 | 2.2 | 1.7 | 2.00 | 2.12 | 2.13 | 1.93 | 1.86 | 1.89 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 20.5 | 24.2 | 17.2 | 21.5 | 17.9 | 22.0 | 19.1 | 22.8 | 26.4 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 19.9 | 7.3 | 6.3 | 5.3 | 1.3 | 1.2 | 9.6 | 2.2 | 1.1 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.5 | -2.8 | -3.3 | -3.11 | -3.06 | -3.04 | -3.40 | -3.35 | -2.55 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.8 | -3.1 | -3.6 | -3.43 | -3.38 | -3.36 | -3.72 | -3.67 | -2.87 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 10.1 | 9.9 | 10.1 | 9.99 | 10.00 | 9.85 | 10.1 | 9.82 | 9.62 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.4 | 10.2 | 10.4 | 10.3 | 10.3 | 10.2 | 10.4 | 10.1 | 9.9 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **142** | **57** | **97** | **75** | -- | -- | **<u>126</u>** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 17 | 16 | 15 | 15.0 | -- | -- | 15 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 6 | 9 | 7 | 8.0 | -- | -- | 7 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.09 | <0.09 | <0.09 | **0.026** | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | 1 | 1 | 1.0 | <1 | <1 | 1 | 2 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 121 | 63 | <50 | <50 | 72 | 111 | 103 | <50 | <50 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 25 | 18 | 17 | 28 | 4 | 25 | 21 | 8 | 7 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | **0.300** | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 31 | 33 | 33 | 28.0 | -- | -- | 30 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | 2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 7 | <5 | 5 | 5.0 | <5 | <5 | 6 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 55.0 | 770.0 | 560.0 | >2420 | 291 | 159 | 196 | >200 | >200 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 1 | <1 | 8 | 6 | 122 | <1 | <1 | 9 | 1 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | 0.32 | 0.47 | 0.95 | 0.83 | 0.79 | 1.9 | 63.1 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.24 | 3.70 | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.19 | 3.00 | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). T

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a resul

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

<u>Underlined (black shaded)</u> = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Can

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Reg

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Highway 102-1 | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | | HWY102-1 | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/29/2009 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 2013/08/15 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | | 07:00 | 12:45 | 08:00 | 13:00 | 10:20 | 09:00 | 13:40 | 11:00 | 11:00 | 14:50 | 11:00 | 9:50 | 14:15 | 12:22 | 12:30 | 12:00 | 10:10 | 9:30 | 13:15 | 09:20 | 9:40 | 14:30 | 11:00 | 10:20 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 11.8 | 18.8 | 15.7 | 14.9 | 19.6 | 7.4 | 11.4 | 17.8 | 14.6 | 10.7 | 21.8 | 13.6 | 11.7 | 19.5 | 8.9 | 12.1 | 19.6 | 10.2 | 14.3 | 20.7 | 5.4 | 13.4 | 19.3 | 9.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **11.44** | 5.80 | **4.34** | 8.18 | **4.25** | 6.05 | 8.15 | **3.88** | **5.34** | 5.65 | **1.03** | **3.83** | 7.55 | **3.32** | **3.10** | **12.03** | **2.09** | **4.54** | **4.27** | **3.82** | **5.03** | 8.18 | **10.14** | 7.35 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.98 | **5.35** | **5.25** | **6.31** | **5.26** | **5.62** | **5.75** | **5.77** | **5.99** | 8.76 | **5.73** | **6.38** | **6.19** | 7.10 | 6.79 | **6.02** | 6.63 | **5.12** | **6.35** | **6.24** | 6.92 | 7.34 | **6.14** | **5.69** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 194.0 | 153.0 | 103.8 | 135.0 | 106.0 | 108.6 | 114.1 | 107.6 | 88.6 | 288.0 | 225.0 | 155.5 | 226.0 | 173.2 | 234.0 | 880.0 | 337.0 | 109.0 | 0.4 | 335.8 | 251.2 | 289.0 | 353.0 | 208.9 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | <5 | <5 | <5 | <5 | <5 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 24 | 38 | 24 | 32 | 25 | 22 | 24 | 19 | 12 | 58 | 48 | 28 | 53 | 31 | 40 | 65 | 57 | 19 | **130** | 67 | 49 | 71 | 87 | 35 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 67 | 68 | 57 | 37 | 89 | 53 | 39 | 65 | 79 | 24 | 65 | 40 | 9 | 65 | 25 | 11 | 31 | 93 | 22 | 27 | 29 | 23 | 37 | 64 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | <0.05 | <0.05 | <0.05 | 0.69 | <0.05 | 1.20 | 0.69 | 0.25 | 1.20 | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | 0.13 | 0.53 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | <0.05 | -- | -- | 0.69 | <0.05 | -- | 0.69 | -- | -- | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | <0.05 | 0.53 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.13** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | 0.29 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.10 | 0.07 | 0.31 | 0.19 | 0.04 | <0.03 | 0.05 | 0.06 | <0.03 | 0.04 | 0.03 | <0.050 | <0.03 | 0.04 | 0.06 | 0.06 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.1 | 1.3 | 0.6 | -- | 0.6 | 0.6 | 0.7 | 0.6 | <0.4 | 0.3 | 0.5 | 0.6 | 0.7 | 1.2 | 0.7 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 6.5 | 10.0 | 7.7 | 4.7 | 11.0 | 6.3 | 4.5 | 7.2 | 7.4 | 5.5 | 10.0 | 7.0 | 5.1 | 10.1 | 17.7 | 4.1 | 7.7 | 9.0 | 2.7 | 14.6 | 8.4 | 4.5 | 8.0 | 11.5 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **4.54** | **5.24** | **5.40** | **5.48** | **6.24** | **5.31** | **6.42** | 6.55 | **6.28** | **6.40** | 6.90 | 6.80 | 6.86 | 6.87 | 6.73 | 6.56 | 7.49 | **5.90** | 6.61 | 7.46 | 6.80 | 6.87 | 7.03 | **6.45** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.7 | 1.8 | 1.6 | 4.9 | 3.3 | 5.1 | 4.9 | 5.2 | 5.6 | 12.5 | 11.7 | 7.5 | 11.1 | 10.5 | 13.9 | 7.2 | 23.3 | 2.2 | 18,000.0 | 18.0 | 12.4 | 12.9 | 25.8 | 9.9 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.3 | 0.5 | 0.5 | 1.1 | 0.8 | 1.1 | 0.9 | 0.9 | 1.2 | 1.7 | 2.0 | 1.4 | 1.4 | 1.5 | 2.3 | 1.6 | 3.2 | 0.6 | 2,400.0 | 2.7 | 2.3 | 1.7 | 2.7 | 1.7 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.070** | **0.140** | **0.020** | 0.006 | 0.007 | **0.011** | 0.009 | **0.012** | 0.010 | **0.019** | **0.039** | **0.020** | 0.006 | **0.021** | **0.022** | **0.013** | **0.038** | **0.031** | 0.007 | **0.020** | 0.002 | 0.005 | **0.038** | 0.009 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.5 | 1.2 | 0.7 | 1.1 | 1.6 | 1.3 | 1.1 | 1.5 | 1.9 | 1.6 | 2.5 | 1.5 | 1.3 | 1.7 | 2.4 | 1.2 | 2.5 | 0.7 | 2,000.0 | 2.1 | 1.5 | 1.4 | 1.9 | 1.7 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 15.0 | 25.0 | 13.0 | 15.9 | 14.5 | 14.6 | 14.8 | 10.2 | 8.3 | 36.3 | 27.7 | 14.6 | 30.8 | 15.0 | 20.5 | 39.1 | 38.7 | 18.6 | 64.0 | 37.7 | 28.8 | 45.4 | 43.8 | 24.8 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.5 | 2.2 | 2.0 | 1.1 | 3.8 | 5.1 | 2.8 | 5.2 | 4.6 | 4.1 | 6.1 | 5.1 | 3.1 | 5.1 | 5.8 | 1.7 | 7.1 | 4.7 | 2.1 | 4.9 | 4.8 | 1.4 | 6.3 | 4.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 7 | 80 | 2 | <2 | 11 | <2 | <1 | 1 | <1 | 9 | 6 | <5 | <5 | <5 | <5 | 6 | <5 | <5 | <1.0 | <5 | <5 | <5 | 10 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 5 | 3 | 3 | 8 | <2 | 8 | 10 | 8 | 10 | 14 | 8 | 9 | 12 | 8 | 12 | 10 | 7 | 6 | 13 | 9 | 14 | 14 | 14 | 18 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 14.0 | 35.0 | 0.9 | 1.4 | 1.2 | 0.6 | 0.4 | 0.6 | 1.1 | 0.9 | 1.9 | 0.9 | 0.5 | 1.6 | 0.5 | 0.7 | 1.6 | 0.9 | 0.6 | 0.9 | 0.8 | 1.0 | 4.1 | 1.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 100 | 140 | 92 | 130 | 100 | 110 | 110 | 100 | 88 | 263 | 231 | 143 | 243 | 188 | 218 | 252 | 338 | 112 | 470 | 324 | 244 | 289 | 440 | 167 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.77 | 1.12 | 0.73 | 1.11 | 0.71 | 0.88 | 1.03 | 0.95 | 0.80 | 2.55 | 2.02 | 1.31 | 1.96 | 1.50 | 1.78 | 2.66 | 2.31 | 1.30 | 4.20 | 2.50 | 1.93 | 2.58 | 3.29 | 1.60 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | <5 | <5 | <5 | <5 | <5 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 50 | 73 | 45 | 67 | 50 | 63 | 65 | 58 | 54 | 150 | 117 | 73 | 117 | 83 | 104 | 143 | 150 | 68 | 240 | 151 | 116 | 155 | 193 | 100 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.84 | 1.32 | 0.74 | 1.06 | 0.93 | 1.02 | 1.00 | 0.83 | 0.80 | 2.43 | 6.04 | 1.19 | 2.06 | 1.40 | 1.87 | 2.25 | 3.22 | 1.04 | 3.94 | 2.88 | 2.11 | 2.81 | 3.51 | 1.79 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 6.00 | 6.00 | 6.00 | 17.00 | 12.00 | 17.00 | 16.00 | 17.00 | 19.00 | 38.20 | 37.50 | 24.50 | 33.50 | 32.40 | 44.20 | 24.60 | 71.40 | 8.00 | 55.00 | 56.10 | 40.40 | 39.20 | 75.50 | 31.70 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 4.35 | 8.20 | 0.68 | 2.30 | 13.40 | 7.37 | 1.48 | 6.74 | 0.00 | 2.60 | 1.90 | 4.60 | 2.40 | 3.50 | 2.60 | 8.40 | 16.40 | 11.20 | 3.19 | 7.10 | 4.70 | 4.40 | 3.10 | 5.70 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | NC | NC | NC | NC | -3.50 | -2.99 | -3.36 | -2.77 | -2.23 | -2.72 | -2.73 | -2.33 | -2.41 | -2.69 | -1.30 | -3.85 | -2.32 | -1.57 | -2.62 | -2.48 | -1.74 | -3.14 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | NC | NC | NC | NC | -3.75 | -3.25 | -3.61 | -3.09 | -2.55 | -3.04 | -3.05 | -2.65 | -2.73 | -3.01 | -1.62 | -4.17 | -2.57 | -1.89 | -2.94 | -2.80 | -2.06 | -3.46 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | NC | NC | NC | NC | 9.92 | 9.54 | 9.64 | 9.17 | 9.13 | 9.52 | 9.59 | 9.20 | 9.14 | 9.25 | 8.79 | 9.75 | 8.93 | 9.03 | 9.42 | 9.35 | 8.77 | 9.59 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | NC | NC | NC | NC | 10.20 | 9.80 | 9.89 | 9.49 | 9.45 | 9.84 | 9.91 | 9.52 | 9.46 | 9.57 | 9.11 | 10.10 | 9.18 | 9.35 | 9.74 | 9.67 | 9.09 | 9.91 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **510** | -- | -- | **169** | **192** | -- | **205** | -- | -- | **134** | **183** | **146** | **86** | **145** | **150** | **187** | **83** | **310** | **51** | -- | **52** | **81** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 22 | -- | -- | 53 | 37 | -- | 37 | -- | -- | 58 | 284 | 42 | 57 | 57 | 80 | 46 | 142 | 17 | 130 | -- | 86 | 79 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | -- | 11 | 11 | -- | <50 | -- | -- | 12 | 18 | 13 | 10 | 10 | 11 | 9 | 14 | 11 | <50 | -- | <5 | 10 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.300 | -- | -- | **0.043** | <0.017 | -- | **0.023** | -- | -- | **0.034** | **0.021** | <0.017 | <0.017 | <0.017 | **0.040** | **0.022** | <0.017 | **0.022** | **0.024** | -- | <0.017 | <0.017 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | **8** | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | 1 | 0 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | 2 | -- | -- | **3** | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | **3** | <2 | <1 | 2 | <1 | <1 | 2 | <2.0 | <1 | 1 | <1 | <1 | 2 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **720** | -- | -- | 146 | **637** | 150 | 107 | 209 | 219 | 102 | **1,380** | 255 | 111 | **938** | **446** | 147 | **820** | 290 | 140 | **1,280** | 138 | 144 | **766** | 228 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | **1.6** | -- | -- | **2.4** | 0.6 | -- | <0.5 | -- | -- | <0.5 | 0.7 | <0.5 | <0.5 | <0.5 | 0.6 | **2.6** | <0.5 | 0.6 | <0.5 | -- | <0.5 | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 40 | -- | -- | 55 | 39 | 67 | 28 | 21 | 31 | 34 | 79 | 28 | 23 | 45 | 31 | 56 | 122 | 61 | 28 | 95 | 22 | 19 | 78 | 38 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <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 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 11 | -- | -- | 29 | 20 | -- | 24 | -- | -- | 48 | 58 | 36 | 52 | 47 | 62 | 38 | 103 | 13 | 85 | -- | 39 | 58 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | <0.10 | -- | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 6 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | 3 | <2 | <2 | <2 | 4 | 2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 21 | -- | -- | 16 | 7 | 7 | <5.0 | <5.0 | 7 | <5 | 6 | <5 | <5 | <5 | 10 | 10 | <5 | 7 | 11 | <5 | <5 | <5 | <5 | 6 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 84 | >250 | -- | >250 | >250 | 180 | 120 | 180 | -- | 687 | >2420 | >2420 | 1,550 | >2420 | 1,553 | 120 | >2420 | >2420 | --- | >2420 | 659 | >2420 | >2420 | -- |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 54 | **>250** | -- | 12 | 17 | 5 | 1 | 78 | <100 | 3 | 68 | 145 | 4 | 9 | 5 | 3 | 179 | 3 | 20 | 25 | 2 | <1 | 86 | -- |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 15.40 | 19.29 | 0.70 | 18.12 | 1.61 | 8.45 | 0.93 | 0.58 | 0.69 | 0.53 | 2.59 | 0.81 | 1.27 | 14.70 | 1.99 | 0.25 | 1.10 | 1.22 | 0.50 | 7.27 | 0.36 | 0.94 | 51.51 | 0.33 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 17.50 | 19.60 | 0.84 | 17.62 | 1.68 | 7.52 | 0.84 | 0.56 | 0.65 | 0.59 | 2.89 | 1.05 | 1.45 | 15.80 | 2.20 | 0.82 | 1.11 | 1.38 | 0.55 | 6.79 | 0.23 | 1.30 | 60.68 | 0.43 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Highway 102-1 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | | HWY102-1 | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | hh:mm | | | | | | | 12:00 | 15:00 | 11:40 | 12:40 | 11:00 | 15:40:00 PM | 2:45 PM | 12:40 PM | 4:15 PM | 10:22 AM | 10:34 AM | 8:40 AM | 9:42 AM | 9:53 AM | 9:49 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA** | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 16.4 | 22.1 | 10.1 | 14.4 | 21.4 | 10.6 | 14.0 | 27.4 | 9.7 | 21.2 | 19.7 | 6.2 | 15.1 | 17.7 | 12.3 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 5.77 | 5.77 | 5.56 | 7.09 | **2.78** | 6.06 | ** | 6.27 | 7.80 | **3.27** | **2.61** | 6.05 | 11.15 | 7.16 | 20.74 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.40** | 7.76 | **6.32** | **6.13** | **6.13** | 6.70 | 7.20 | **6.09** | **6.37** | **6.20** | **6.22** | **6.49** | **6.38** | **5.74** | **6.31** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 354.0 | 257.0 | 266.0 | 232.2 | 280.5 | 189.4 | 330.0 | 383.0 | 210.0 | 446.0 | 345.0 | 318.2 | 367.0 | 259.0 | 316.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 17 | 21 | 16 | 13 | 26 | 12 | 12 | 23 | <5 | 23.0 | 27.0 | 14.0 | 21 | 23 | 25 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 101 | 49 | 51 | 51 | 54 | 61 | 90 | 80 | 92 | **137** | 100 | 72 | 98 | 57 | 82 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 24 | 31 | 29 | 27 | 56 | 68 | 35 | 37 | 28 | 30 | 32 | 24 | 19.2 | 51.6 | 27.7 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.35 | 0.71 | 0.58 | 0.37 | 0.11 | 0.19 | 0.57 | <0.05 | 0.12 | 0.05 | <0.05 | 0.50 | 0.25 | 0.65 | 0.17 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.18 | 0.50 | 0.58 | 0.37 | <0.05 | 0.19 | 0.32 | <0.05 | 0.12 | 0.05 | <0.05 | 0.50 | 0.25 | 0.65 | 0.17 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.17** | **0.21** | <0.05 | <0.05 | **0.11** | <0.05 | **0.25** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.10 | 0.07 | <0.03 | 0.07 | <0.03 | <0.03 | 0.06 | 0.06 | 0.24 | 0.17 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | 0.5 | 1.3 | 3.8 | 1.1 | 0.7 | <0.4 | <0.4 | 0.6 | 0.9 | <0.4 | 0.90 | 3.80 | 0.24 | 0.3 | 0.2 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 7.4 | 8.6 | 6.9 | 5.0 | 7.7 | 7.0 | 4.4 | 9.5 | 4.1 | 6.00 | 9.00 | 6.20 | 6.7 | 5.2 | 3.0 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.84 | 6.91 | 6.90 | 7.02 | 7.14 | 6.94 | 7.07 | 7.15 | **5.73** | 7.10 | 7.16 | 6.95 | 7.06 | 6.87 | 7.20 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 20.9 | 10.3 | 14.6 | 12.5 | 15.6 | 9.9 | 16.5 | 17.9 | 12.2 | 22.5 | 23.7 | 17.8 | 18.0 | 15.9 | 19.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 3.0 | 1.7 | 2.2 | 1.8 | 2.2 | 1.8 | 2.5 | 2.6 | 1.8 | 3.0 | 41.0 | 2.4 | 2.7 | 2.2 | 2.6 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.017** | **0.052** | 0.008 | **0.022** | **0.014** | 0.010 | **0.011** | **0.023** | **0.026** | **0.012** | **0.016** | 0.007 | 0.007 | **0.034** | **0.012** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.0 | 2.1 | 2.0 | 1.6 | 2.0 | 1.4 | 2.3 | 2.3 | 0.9 | 2.4 | 2.9 | 2.3 | 2.0 | 2.3 | 2.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 64.1 | 29.7 | 29.6 | 41.2 | 35.5 | 47.9 | 69.1 | 54.3 | 38.3 | 68.7 | 60.3 | 41.7 | 60.4 | 39.6 | 41.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 1.8 | 3.8 | 5.6 | 2.5 | 5.3 | 4.6 | 2.2 | 4.7 | 4.8 | 4.3 | 5.9 | 6.2 | 2.8 | 7.1 | 3.8 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | 11 | <5 | <5 | <5 | <5 | <5 | 8 | <5 | <5 | <5 | <5 | 5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 15 | 13 | 19 | 12 | 7 | 11 | 14 | 10 | 8 | 13.0 | 8.0 | 20.0 | 15 | 21 | 17 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 1.3 | 7.7 | 1.1 | 1.7 | 1.1 | 3.2 | 0.8 | 2.6 | 1.5 | 1.2 | 1.5 | 1.0 | 1.1 | 0.8 | 0.8 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 411 | 251 | 258 | 298 | 306 | 306 | 464 | 340 | 247 | 517 | 469 | 339 | 424 | 326 | 365 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 3.53 | 2.12 | 2.20 | 1.97 | 2.2 | 2.2 | 3.1 | 2.9 | 2.8 | 4.60 | 3.53 | 2.76 | 3.51 | 2.55 | 3.18 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 17 | 21 | 16 | 13 | 26 | 12.0 | 12.0 | 23.0 | <5 | 23 | 27 | 14 | 21 | 23 | 25 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 218 | 127 | 131 | 130 | 133 | 142.0 | 204.0 | 182.0 | 154.0 | 262 | 215 | 167 | 210 | 155 | 180 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 4.14 | 2.22 | 2.28 | 2.62 | 2.6 | 2.8 | 4.1 | 3.6 | 2.5 | 4.46 | 4.15 | 2.97 | 3.81 | 2.78 | 3.05 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 64.50 | 32.70 | 45.50 | 38.6 | 48 | 32.1 | 51.5 | 55.4 | 37.9 | 68.5 | 70.3 | 54.3 | 56.1 | 48.8 | 59.6 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 8.00 | 2.20 | 1.80 | 14.0 | 8.3 | 12.1 | 13.8 | 10.0 | 5.3 | 1.5 | 8.1 | 3.7 | 4.1 | 4.4 | 2.1 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.23 | -2.35 | -2.33 | -2.37 | -1.85 | -2.6 | -2.3 | -1.9 | -4.1 | -1.82 | -1.65 | -2.26 | -1.98 | -2.17 | -1.72 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -2.55 | -2.67 | -2.65 | -2.69 | -2.17 | -2.9 | -2.6 | -2.2 | -4.4 | -2.14 | -1.97 | -2.58 | -2.30 | -2.49 | -2.04 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.07 | 9.26 | 9.23 | 9.39 | 8.99 | 9.5 | 9.3 | 9.0 | 9.8 | 8.92 | 8.81 | 9.21 | 9.04 | 9.04 | 8.92 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.39 | 9.58 | 9.55 | 9.71 | 9.31 | 9.9 | 9.6 | 9.3 | 10.1 | 9.2 | 9.1 | 9.5 | 9.36 | 9.36 | 9.24 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **69** | **450** | **100** | **72** | **80** | -- | **45** | **93** | **215** | **107** | -- | -- | **66** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 130 | -- | 77 | 68 | 100 | -- | 108 | 104 | 197 | 141.0 | -- | -- | 110 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | 24 | 11 | 14 | -- | 10 | 16 | 6 | 11.0 | -- | -- | 11 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.032** | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | 1 | -- | 1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | 2 | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | **4** | 1 | 1 | <1 | **3** | 1 | 2 | 2 | <1 | <1 | 2.0 | 1 | 2 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 151 | **3,960** | 281 | 85 | **634** | **403** | 122 | **896** | 256 | **429** | **528** | 196 | 193 | 294 | 179 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | <0.5 | 0.8 | <0.5 | -- | <0.5 | 0.7 | 0.9 | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 22 | 511 | 28 | 9 | 99 | 71 | 14 | 62 | 125 | 33 | 41 | 8 | 16 | 34 | 21 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 12 | -- | <2 | 6 | <2 | -- | <2 | <2 | 5 | <2 | -- | -- | 12 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 92 | -- | 76 | 54 | 88 | -- | 93 | 88 | 67 | 102.0 | -- | -- | 89 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2 | 2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 9 | **37** | 8 | 6 | <5 | 12 | 5 | 8 | 12 | <5 | <5 | <5 | 6 | 8 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 914 | >2420 | >2420 | 105 | 9010 | 370.0 | 1,520.0 | 450.0 | 1,128.0 | >2420 | >2420 | 1,200 | >200 | >200 | >200 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 12 | 14 | 3 | <1 | 10 | 2 | 1 | 3 | 2 | 70 | 33 | 3 | 27 | 34 | 1 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.25 | 4.93 | 1.57 | 0.63 | 0.95 | 1.2 | 1.05 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.56 | 5.32 | 0.62 | 1.57 | 0.86 | 1.11 | 1.88 | 5.55 | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 2.04 | 5.48 | 0.99 | 2.62 | -- | * | 1.90 | 5.09 | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperat

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health C

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Highway 102-2 | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site HWY102-2 | | | | | | | | HWY102-2 | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | | 12:30 | 12:15 | 12:30 | 12:40 | 09:30 | 12:30 | 11:20 | 15:00 | 15:30 | 11:20 | 12:20 | 10:35 | 10:40 | 10:00 | 10:22 | 12:15 | 10:07 | 11:00 | 12:58 | 14:30 | 12:50 | 12:45 | 10:40 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 16.7 | 19.2 | 16.4 | 17.2 | 17.0 | 8.7 | 10.8 | 24.2 | 15.1 | 7.8 | 23.7 | 14.3 | 11.5 | 22.0 | 10.7 | 11.4 | 10.4 | 12.7 | 23.7 | 9.3 | 13.4 | 20.4 | 10.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.01** | 5.90 | **4.80** | **4.91** | **2.45** | **2.99** | 6.92 | 7.03 | **5.09** | **3.73** | **13.10** | **3.28** | 6.30 | **1.57** | **4.20** | **10.50** | 9.25 | **4.24** | 6.11 | **5.28** | 6.77 | 7.06 | 6.80 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.57 | **5.71** | **5.40** | **6.33** | **5.86** | **5.64** | **6.22** | **5.89** | **5.29** | 7.30 | **6.37** | 6.72 | **6.01** | 6.92 | **5.40** | **5.40** | **5.85** | **6.45** | **6.04** | **5.96** | **5.86** | **6.19** | **5.36** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 37.0 | 457.0 | 162.1 | 415.0 | 167.0 | 101.2 | 92.2 | 123.1 | 96.0 | 225.0 | 226.0 | 159.1 | 288.0 | 188.5 | 204.4 | 204.4 | 174.0 | 0.4 | 699.0 | 197.6 | 968.0 | 838.0 | 219.2 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | <5 | 7 | 6 | 5 | <5 | <5 | 5 | <5 | 17 | 7 | <5 | 6 | 14 | 7 | 30 | 8 | 8 | 5 | <5 | 13 | 21 | 6 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 21 | 82 | 83 | **170** | 41 | 18 | 21 | 21 | 17 | 63 | 109 | 45 | 71 | 50 | 52 | 113 | 34 | **260** | **178** | 78 | **236** | **226** | 48 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 120 | 190 | 91 | 96 | 160 | 68 | 65 | 98 | 77 | 32 | 100 | 70 | 11 | 61 | 36 | 13 | 85 | 17 | 9 | 8 | 14 | 39 | 86 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | <0.05 | <0.05 | <0.05 | 0.10 | <0.05 | 0.62 | 0.26 | 1.80 | 3.20 | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 | 0.12 | <0.050 | <0.05 | 0.15 | 0.21 | 0.23 | 0.11 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | <0.05 | -- | -- | 0.10 | <0.05 | -- | 0.26 | -- | -- | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 | 0.12 | <0.050 | <0.05 | 0.15 | <0.05 | <0.05 | 0.11 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | **0.21** | **0.23** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | 0.06 | <0.05 | <0.05 | 0.20 | <0.05 | <0.05 | 0.30 | 0.08 | 0.09 | <0.03 | <0.03 | <0.03 | 0.17 | 0.09 | <0.03 | <0.03 | 0.06 | 0.19 | 0.05 | 0.14 | 0.37 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.6 | 1.1 | 0.5 | -- | 0.7 | 2.0 | 15.3 | <0.4 | 0.3 | 62.6 | 2.0 | 24.3 | 2.1 | 0.6 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 8.5 | 13.0 | 13.0 | 7.2 | 14.0 | 7.4 | 5.7 | 9.2 | 8.4 | 7.0 | 15.8 | 11.2 | 6.1 | 10.6 | 5.1 | 17.4 | 8.0 | 3.0 | 29.0 | 9.9 | 79.3 | 11.1 | 13.4 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.05 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.05 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **5.43** | **5.96** | **6.30** | **6.05** | **6.32** | **5.47** | **5.93** | **6.18** | **5.92** | **5.90** | 6.70 | 6.80 | 6.61 | 6.59 | **6.34** | 7.20 | **6.40** | **6.12** | 6.64 | **6.18** | **6.46** | 6.80 | **6.15** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.6 | 4.0 | 4.8 | 7.4 | 3.8 | 4.0 | 3.1 | 2.2 | 3.8 | 7.0 | 8.4 | 5.6 | 7.6 | 8.5 | 8.2 | 14.1 | 9.5 | 20,000.0 | 33.3 | 9.8 | 23.9 | 23.8 | 8.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.4 | 0.7 | 0.9 | 1.0 | 0.6 | 1.0 | 0.7 | 0.7 | 1.4 | 1.2 | 1.4 | 1.2 | 1.2 | 1.3 | 2.2 | 3.1 | 1.8 | 2,500.0 | 32.7 | 2.2 | 3.2 | 2.5 | 1.7 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [5] | 0.010 | <0.02 | **0.040** | **0.034** | 0.010 | **0.028** | 0.003 | 0.009 | **0.019** | **0.041** | **0.021** | **0.054** | **0.030** | **0.014** | **0.028** | **0.199** | **0.028** | **0.201** | 0.010 | **1.560** | **0.012** | **0.222** | **0.034** | **0.012** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.5 | 0.8 | 1.1 | 1.0 | 1.0 | 1.4 | 0.8 | 1.3 | 1.9 | 1.2 | 1.7 | 1.6 | 1.3 | 1.5 | 2.5 | 2.9 | 1.7 | 1,900.0 | 12.5 | 1.1 | 4.0 | 2.1 | 1.4 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 15.0 | 51.0 | 55.0 | 83.7 | 32.0 | 12.1 | 13.3 | 13.1 | 13.3 | 41.5 | 63.6 | 20.4 | 39.0 | 19.1 | 34.5 | 69.6 | 24.0 | 150.0 | 124.0 | 36.8 | 149.0 | 124.0 | 26.4 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.2 | 4.4 | 4.0 | 3.0 | 6.4 | 5.4 | 2.5 | 6.5 | 6.7 | 4.1 | 6.9 | 5.8 | 1.6 | 6.2 | 6.6 | 1.6 | 5.9 | 2.3 | 7.2 | 5.6 | 2.8 | 9.0 | 4.5 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <2 | 58 | 62 | 34 | 27 | 3 | <1 | 10 | 14 | <5 | 39 | <5 | <5 | <5 | 194 | 34 | <5 | 2 | **3,000** | 15 | **342** | 69 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | <2 | 3 | 8 | 11 | <2 | 7 | 5 | 5 | 8 | 12 | 6 | 10 | 10 | 9 | 10 | 12 | 8 | 15 | 7 | 8 | 22 | 21 | 8 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.7 | 3.8 | 4.2 | 2.6 | 3.1 | 0.5 | 0.4 | **1.2 ( 1 )** | 3.9 | 0.6 | 10.8 | 2.0 | 1.5 | 3.3 | **144.0** | 1.1 | 1.1 | 1.2 | **1,490.0** | 9.9 | **131.0** | **54.2** | 1.1 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 85 | 290 | 310 | 590 | 160 | 94 | 91 | 100 | 110 | 263 | 403 | 179 | 295 | 203 | 223 | 433 | 194 | 920 | 662 | 315 | 817 | 952 | 177 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.60 | 2.37 | 2.62 | 5.13 | 1.27 | 0.70 | 0.73 | 0.91 | 0.86 | 2.48 | 3.34 | 1.49 | 2.34 | 1.88 | 1.81 | 4.04 | 1.29 | 7.88 | 5.27 | 2.38 | 7.39 | 7.25 | 1.65 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | <5 | 7 | 6 | 5 | <5 | <5 | 5 | <5 | 17 | 7 | <5 | 6 | 14 | 7 | 30 | 8 | 8 | 5 | <5 | 13 | 21 | 6 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 42 | 150 | 165 | 282 | 93 | 52 | 48 | 62 | 67 | 143 | 200 | 86 | 135 | 100 | 145 | 235 | 85 | 460 | 712 | 138 | 473 | 422 | 99 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.81 | 2.65 | 2.89 | 4.17 | 1.81 | 0.86 | 0.82 | 0.83 | 0.97 | 2.32 | 2.10 | 1.40 | 2.24 | 1.50 | 3.50 | 4.17 | 1.76 | 7.87 | 29.10 | 2.35 | 9.27 | 7.23 | 1.80 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 6.00 | 13.00 | 16.00 | 23.00 | 12.00 | 14.00 | 11.00 | 8.00 | 15.00 | 22.40 | 26.70 | 18.90 | 23.90 | 26.60 | 29.50 | 48.00 | 31.10 | 59.00 | 218.00 | 33.50 | 72.90 | 69.70 | 28.50 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 14.90 | 5.58 | 4.90 | 10.30 | 17.50 | 10.30 | 5.81 | 4.60 | 6.01 | 3.30 | 3.60 | 3.10 | 2.30 | 11.30 | 31.70 | 1.60 | 15.10 | 0.06 | 69.40 | 0.50 | 11.30 | 0.10 | 4.30 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | -3.57 | -3.72 | -3.70 | NC | NC | -4.07 | NC | -3.63 | -3.15 | -3.34 | -3.33 | -2.92 | -3.50 | -1.80 | -3.30 | -3.18 | -2.81 | -3.73 | -2.70 | -2.15 | -3.72 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | -3.82 | -3.97 | -3.95 | NC | NC | -4.32 | NC | -3.95 | -3.47 | -3.66 | -3.65 | -3.24 | -3.82 | -2.12 | -3.62 | -3.42 | -3.13 | -4.05 | -3.02 | -2.47 | -4.04 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | 9.87 | 9.77 | 10.00 | NC | NC | 10.30 | NC | 9.53 | 9.85 | 10.10 | 9.94 | 9.51 | 9.84 | 9.00 | 9.70 | 9.29 | 9.45 | 9.91 | 9.16 | 8.95 | 9.87 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | 10.10 | 10.00 | 10.30 | NC | NC | 10.50 | NC | 9.85 | 10.20 | 10.50 | 10.30 | 9.83 | 10.20 | 9.32 | 10.00 | 9.54 | 9.77 | 10.20 | 9.48 | 9.27 | 10.20 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **270** | -- | -- | **189** | **368** | -- | **260** | -- | -- | **145** | **466** | **259** | **130** | **138** | **2,760** | **400** | **216** | **100** | -- | **129** | **3,880** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | 2 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | **6** | <2 | <2 | <1.0 | -- | <2 | 3 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 20 | -- | -- | 53 | 28 | -- | 27 | -- | -- | 49 | 74 | 33 | 44 | 43 | 213 | 381 | 63 | 140 | -- | 147 | 762 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | -- | 8 | 8 | -- | <50 | -- | -- | 10 | 17 | 15 | 9 | 10 | 13 | 11 | 12 | <50 | -- | <5 | 9 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.300 | -- | -- | **0.051** | <0.017 | -- | <0.017 | -- | -- | **0.037** | **0.031** | **0.032** | **0.019** | <0.017 | **0.096** | **0.051** | **0.019** | **0.100** | -- | <0.017 | **0.778** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | 1 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | 1 | **9** | **2** | <1 | <1.0 | -- | <1 | **8** | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | 1 | 1 | -- | <0.40 | -- | -- | <1 | 1 | 1 | <1 | 1 | 3 | 1 | <1 | 2 | -- | 3 | 4 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | 2 | -- | -- | 2 | <2.0 | <2.0 | <2.0 | **3** | **3** | <2 | **3** | **3** | <2 | 1 | **12** | **4** | 2 | <2.0 | **404** | 2 | **13** | <1 | 2 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **880** | -- | -- | **1,380** | **3,850** | **303** | 229 | **897** | **1,110** | 214 | **5,210** | **1,550** | **383** | **1,720** | **28,400** | **1,660** | **485** | **960** | **217,000** | **714** | **21,300** | **7,380** | **375** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | **1.9** | -- | -- | **1.6** | **2.7** | -- | 0.6 | -- | -- | <0.5 | **5.2** | **2.1** | 0.6 | 0.7 | **19.4** | **3.5** | 1.0 | <0.50 | -- | 0.6 | **39.7** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 110 | -- | -- | 387 | 135 | 53 | 41 | 106 | 176 | 78 | 219 | 207 | 83 | 173 | 327 | 212 | 93 | 470 | **2,800** | 303 | 586 | 359 | 71 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | 4 | 2 | <2 | <2.0 | -- | <2 | 8 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <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 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 11 | -- | -- | 37 | 21 | -- | 17 | -- | -- | 33 | 45 | 31 | 39 | 40 | 45 | 75 | 43 | 96 | -- | 38 | 96 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 4 | -- | -- | <2 | 6 | -- | 5 | -- | -- | <2 | 10 | 4 | 4 | <2 | 60 | 9 | 6 | <2 | -- | <2 | 41 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | 0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | 2 | <2 | <2 | <2 | **11** | <2 | <2 | <2.0 | -- | <2 | **18** | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 12 | -- | -- | 14 | 12 | 9 | 6 | 9 | 13 | <5 | 7 | 12 | 12 | <5 | **46** | **36** | 17 | 27 | **1,210** | 10 | **170** | 22 | 11 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 28 | >250 | -- | >250 | 75 | 41 | 110 | >250 | -- | 1,553 | >2420 | >2420 | 2,420 | 1,990 | >2420 | 687 | >2420 | --- | >2420 | 328 | >2420 | >2420 | >2420 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 4 | 230 | -- | 9 | 5 | <1 | 7 | **>250** | <100 | <1 | 16 | 50 | 111 | 9 | 4 | <1 | <1 | <10 | 201 | 2 | 1 | 20 | 11 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.90 | 82.63 | 48.17 | 0.85 | 16.36 | 0.25 | 0.97 | 4.91 | 1.90 | 2.07 | 21.03 | 0.33 | 2.41 | 1.10 | 21.62 | 10.34 | 0.46 | 0.53 | 119.14 | 6.24 | 539.78 | 54.98 | 0.43 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.91 | 81.20 | 52.50 | 0.85 | 17.35 | 0.23 | 0.87 | 4.49 | 2.15 | 2.27 | 17.26 | 0.50 | 3.02 | 1.30 | 27.02 | 11.09 | 0.55 | 0.58 | 129.77 | 2.23 | 793.90 | 73.67 | 0.56 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Highway 102 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site HWY102-2 | | | | | | | | HWY102-2 | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/8/2107 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | hh:mm | | | | | | | 11:45 | 15:25 | 12:25 | 12:30 | 11:30 | 14:15 PM | 3:55PM | 12:20PM | 16:30 | 10:00 AM | 1:54 PM | 9:01 AM | 1:38 PM | 1:22 PM | 12:34 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA** | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 13.0 | 22.4 | 15.2 | 14.9 | 18.3 | 10.6 | 11.4 | 23.1 | 9.7 | 18.8 | 17.7 | 7.5 | 14.9 | 18.5 | 13.7 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 5.68 | **1.81** | **11.32** | 8.75 | **2.29** | 5.62 | ** | **3.81** | **12.70** | **4.92** | 7.96 | **5.45** | 17.91 | **4.27** | 15.05 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.04** | 7.56 | 8.32 | **6.13** | **5.88** | 7.24 | 6.83 | **6.19** | 6.98 | **5.99** | **5.56** | **6.18** | 6.52 | **5.99** | **6.07** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 400.0 | 414.0 | 338.0 | 355.6 | 394.7 | 246.4 | 501.0 | 720.0 | 202.0 | 461.0 | 472.0 | 399.0 | 424.0 | 729.0 | 728.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 22 | 11 | 9 | 21 | 13 | <5 | 17 | <5 | 18.0 | 11.0 | 11.0 | 16 | 11 | 8 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | **136** | 107 | 92 | 79 | 90 | 30 | **161** | **223** | 74 | **172** | **200** | 99 | 103 | 94 | **199** |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 20 | 41 | 22 | 25 | 85 | 85 | 22 | 42 | 45 | 27 | 56 | 26 | 22.9 | 86.6 | 24.8 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.20 | 0.09 | 0.07 | 0.33 | 0.21 | 0.76 | 0.60 | 0.14 | 0.58 | 0.08 | <0.05 | 0.30 | 0.11 | <0.05 | 0.06 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | <0.05 | 0.09 | 0.07 | 0.16 | <0.05 | 0.76 | 0.17 | 0.07 | 0.58 | 0.08 | <0.05 | 0.30 | 0.11 | <0.05 | 0.06 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.20** | <0.05 | <0.05 | **0.17** | **0.21** | <0.05 | **0.43** | **0.07** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.09 | 0.14 | <0.03 | 0.24 | 0.06 | 0.04 | 0.29 | 0.05 | 0.25 | 0.31 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | 0.7 | 0.6 | 1.4 | 0.9 | <0.4 | <0.4 | 0.7 | 1.2 | <0.4 | 4.10 | 9.80 | 0.35 | 0.4 | 0.1 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.4 | 9.2 | 5.9 | 5.6 | 7.5 | 8.0 | 3.2 | 8.2 | 6.8 | 4.90 | 21.20 | 6.30 | 9.0 | 10.4 | 4.7 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.22** | 6.73 | 6.51 | 6.79 | 6.79 | 7.07 | **6.36** | 6.67 | **6.37** | 6.86 | 6.86 | 6.77 | 7.05 | **6.40** | 6.66 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 13.3 | 14.7 | 14.7 | 11.5 | 12.5 | 16.5 | 22.8 | 17.2 | 7.9 | 23.2 | 9.8 | 19.2 | 19.3 | 11.9 | 17.1 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.5 | 1.9 | 2.1 | 1.4 | 1.7 | 1.9 | 3.6 | 2.2 | 1.4 | 3.1 | 340.0 | 2.8 | 2.8 | 1.8 | 2.1 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.013** | **0.042** | **0.011** | **0.034** | **0.025** | **0.014** | 0.006 | **0.037** | **0.022** | **0.018** | 0.008 | **0.013** | **0.018** | **0.036** | **0.018** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 1.6 | 1.6 | 1.3 | 1.6 | 1.7 | 2.2 | 2.1 | 1.1 | 2.1 | 3.7 | 2.1 | 1.9 | 1.2 | 2.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 68.8 | 66.0 | 55.2 | 59.4 | 81.6 | 29.4 | 148.0 | 139.0 | 31.7 | 96.7 | 118.0 | 57.8 | 64.7 | 61.9 | 98.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 3.1 | 5.7 | 6.4 | 1.6 | 8.8 | 4.6 | 3.1 | 7.2 | 4.4 | 5.7 | 7.6 | 6.7 | 3.3 | 6.6 | 4.5 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 6 | 7 | 8 | 12 | <5 | <5 | <5 | 16 | <5 | <5 | 57.0 | <5 | 9 | 14 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 10 | 7 | 9 | 9 | 4 | 16 | 13 | 11 | 9 | 12.0 | 10.0 | 16.0 | 13 | 6 | 8 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 2.4 | 9.9 | 12.5 | 7.0 | 13.8 | 1.1 | 1.2 | 26.8 | 4.4 | 9.7 | 32.9 | 3.0 | 2.6 | 1.7 | 6.8 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 451 | 413 | 366 | 422 | 444 | 208 | 737 | 782 | 204 | 629 | 742 | 412 | 436 | 430 | 546 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 4.06 | 3.61 | 3.01 | 2.62 | 3.06 | 1.5 | 4.9 | 6.9 | 2.3 | 5.47 | 6.07 | 3.37 | 3.50 | 3.00 | 5.94 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 22 | 11 | 9 | 21 | 13.0 | <5 | 17.0 | <5 | 18 | 11 | 11 | 16 | 11 | 8 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 233 | 215 | 187 | 170 | 209 | 107.0 | 354.0 | 415.0 | 129.0 | 324 | 359 | 206 | 217 | 185 | 335 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 3.92 | 3.93 | 3.60 | 3.36 | 4.53 | 2.3 | 8.0 | 7.5 | 2.0 | 5.83 | 6.25 | 3.81 | 4.13 | 3.54 | 5.49 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 43.50 | 44.50 | 45.40 | 34.5 | 38.2 | 49.0 | 71.8 | 52.0 | 25.5 | 70.7 | 33.1 | 59.5 | 59.7 | 37.1 | 51.3 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 1.80 | 4.20 | 8.90 | 12.4 | 19.4 | 21.8 | 24.3 | 4.4 | 8.0 | 3.2 | 1.5 | 6.2 | 8.2 | 8.4 | 4.0 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.58 | -2.38 | -2.90 | -2.81 | -2.41 | -2.2 | -3.2 | -2.5 | -3.6 | -2.16 | -2.75 | -2.52 | -2.08 | -3.10 | -2.84 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.90 | -2.70 | -3.22 | -3.13 | -2.73 | -2.5 | -3.6 | -2.8 | -4.0 | -2.48 | -3.07 | -2.84 | -2.40 | -3.42 | -3.16 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.80 | 9.11 | 9.41 | 9.60 | 9.2 | 9.3 | 9.6 | 9.2 | 10.0 | 9.02 | 9.61 | 9.29 | 9.13 | 9.50 | 9.50 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.10 | 9.43 | 9.73 | 9.92 | 9.52 | 9.6 | 9.9 | 9.5 | 10.3 | 9.3 | 9.9 | 9.6 | 9.45 | 9.82 | 9.82 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **99** | **149** | **542** | **167** | **152** | -- | **126** | **194** | **306** | **99** | -- | -- | **112** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <3 | -- | <3 | <2 | <2 | -- | <2 | 4 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 151 | -- | 122 | 96 | 146 | -- | 272 | 138 | 100 | 266.0 | -- | -- | 174 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | 12 | 7 | 11 | -- | 7 | 9 | 6 | 11.0 | -- | -- | 10 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.019** | -- | **0.048** | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | -- | **2** | <1 | **2** | -- | <1 | 1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | 2 | <1 | 2 | -- | <1 | 3 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | 1 | **3** | 2 | 1 | 2 | 2 | 1 | **3** | **3** | **4** | 2.0 | 2 | 2 | **5** |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **369** | **2,650** | **4,760** | **870** | **3,600** | 93 | **728** | **8,440** | **506** | **3,260** | **7,640** | **1,030** | **1600** | **1,080** | **2,400** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | **3.3** | **2.3** | 1.0 | -- | **1.4** | **1.4** | **1.9** | 0.7 | -- | -- | 0.6 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 125 | 160 | 215 | 55 | 262 | 10 | 137 | 625 | 50 | 341 | 340 | 99 | 100 | 328 | 562 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 6 | -- | 3 | <2 | <2 | -- | 3 | <2 | 2 | <2 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 72 | -- | 80 | 53 | 81 | -- | 129 | 95 | 49 | 112.0 | -- | -- | 97 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | 15 | 4 | 3 | -- | <2 | 3 | 7 | 2.0 | -- | -- | 3 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | 2 | -- | 3 | <2 | 2 | -- | 4 | 5 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 14 | 9 | 19 | 12 | 6 | **69** | 16 | 15 | 13 | <5 | 24.0 | 7.0 | 6 | 6 | 16 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | >2420 | >2420 | >2420 | 6 | 410 | 81.0 | 930.0 | NDOGT | 1,152.0 | >2420 | >2420 | 816 | >200 | >200 | >200 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | <1 | 8 | 41 | 1 | 26 | 3 | <10 | 30 | 18 | 365 | 172 | <1 | 14 | 31 | <1 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.32 | 2.89 | 206 | 0.81 | 1.1 | 0.77 | 4.99 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.40 | 2.11 | 28.94 | 2.56 | 2.58 | 0.53 | 3.06 | 23.70 | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.74 | 3.20 | 37.67 | 4.28 | -- | * | 3.04 | 20.50 | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperati

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health C

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - LSD**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Lake Shore Drive | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LSD | | | | | | | | LSD | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/17/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/15/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | | 12:00 | 09:30 | 11:45 | 09:00 | 11:28 | 10:00 | 08:45 | 13:20 | 9:00 | 9:15 | 13:00 | 9:10 | 08:40 | 15:30 | 11:55 | 9:30 | 13:30 | 09:50 | 16:02 | 13:40 | 15:00 | 12:10 | 12:25 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 13.1 | 16.7 | 15.3 | 13.4 | 21.3 | 7.3 | 10.2 | 21.0 | 12.0 | 5.7 | 25.7 | 13.4 | 7.7 | 20.2 | 8.8 | 8.9 | 10.5 | 12.5 | 24.3 | 5.8 | 13.2 | 24.0 | 9.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.84** | 5.70 | 5.50 | 8.60 | **5.41** | 8.47 | 9.44 | 7.87 | 8.16 | **4.06** | **2.69** | 7.58 | 8.77 | 7.26 | 7.60 | **14.78** | 7.22 | 6.26 | 7.25 | 7.21 | 8.22 | **1.86** | 8.67 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.88 | 6.74 | **6.34** | **6.42** | 6.64 | **6.17** | 7.09 | 6.88 | 6.63 | 8.22 | 7.16 | 6.92 | **5.19** | 7.28 | **6.23** | 7.02 | **6.31** | 6.88 | **6.34** | **6.48** | 6.63 | **6.16** | **6.25** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 723.0 | 210.0 | 167.7 | 217.8 | 203.2 | 110.3 | 145.9 | 126.4 | 111.9 | 62.0 | 177.5 | 116.7 | 123.6 | 132.5 | 147.8 | 180.0 | 111.0 | 0.1 | 155.3 | 132.3 | 162.0 | 254.0 | 162.2 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 13 | 16 | 12 | 13 | 21 | 9 | 9 | 15 | 12 | 21 | 14 | 11 | 8 | 20 | 11 | 35 | 10 | 11 | 7 | 9 | 11 | 22 | 8 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 41 | 34 | 31 | 49 | 45 | 25 | 38 | 27 | 22 | 22 | 33 | 23 | 39 | 32 | 23 | 29 | 23 | 32 | 27 | 26 | 39 | 45 | 31 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 32 | 27 | 37 | 20 | 26 | 33 | 32 | 41 | 49 | 13 | 20 | 40 | 10 | 21 | 25 | 9 | 31 | 20 | 11 | 26 | 25 | 26 | 24 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.14 | 0.14 | 0.06 | 0.23 | 0.10 | 0.12 | 0.25 | 0.17 | 0.09 | 0.13 | 0.80 | <0.05 | 0.18 | 0.20 | <0.05 | 0.09 | 0.11 | 0.15 | 0.25 | 0.30 | 0.08 | 0.08 | <0.05 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.14 | -- | -- | 0.23 | 0.10 | -- | 0.25 | -- | -- | 0.13 | 0.80 | <0.05 | 0.18 | 0.20 | <0.05 | 0.09 | 0.11 | 0.15 | 0.16 | 0.30 | 0.08 | 0.08 | <0.05 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | **0.09** | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.06 | 0.03 | <0.03 | <0.03 | <0.03 | 0.03 | 0.03 | 0.04 | <0.03 | <0.050 | 0.11 | <0.03 | 0.06 | 0.10 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | 3.5 | 0.5 | -- | 0.7 | 3.0 | 1.0 | <0.4 | 0.3 | 77.4 | 2.8 | 2.2 | 11.8 | 0.5 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.0 | 3.8 | 6.8 | 3.7 | 6.0 | 5.3 | 4.7 | 7.1 | 7.5 | 3.1 | 8.0 | 7.7 | 4.7 | 6.3 | 6.9 | 5.2 | 8.1 | 3.2 | 14.1 | 9.9 | 5.5 | 14.0 | 8.9 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.69 | 6.69 | 6.93 | 7.10 | 7.30 | 6.67 | 6.72 | 6.79 | **6.49** | **6.20** | 6.90 | 6.90 | 6.94 | 6.95 | **6.49** | **6.47** | 6.72 | 7.02 | 6.59 | 6.68 | 6.65 | 7.01 | **6.38** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.5 | 6.9 | 5.4 | 8.0 | 10.5 | 5.3 | 5.9 | 5.1 | 5.0 | 2.6 | 18.1 | 5.1 | 6.4 | 6.0 | 5.6 | 5.4 | 5.1 | 6,100.0 | 52.2 | 5.4 | 6.6 | 9.9 | 4.8 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.4 | 1.6 | 1.3 | 2.0 | 2.1 | 1.2 | 1.3 | 1.2 | 1.2 | 0.7 | 3.3 | 1.4 | 1.2 | 1.4 | 1.6 | 1.5 | 1.1 | 1,300.0 | 23.0 | 1.5 | 1.4 | 1.8 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [5] | 0.010 | <0.02 | **0.030** | 0.009 | **0.018** | **0.100** | 0.009 | **0.018** | **0.028** | **0.014** | **0.022** | **0.063** | 0.003 | 0.007 | **0.015** | **0.078** | **0.100** | **0.031** | **0.011** | **0.501** | **0.095** | **1.250** | **0.023** | **0.012** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.2 | 1.1 | 1.3 | 1.2 | 1.2 | 1.0 | 1.1 | 1.0 | 1.2 | 0.6 | 1.9 | 1.3 | 1.2 | 1.1 | 1.4 | 1.1 | 1.1 | 1,100.0 | 9.7 | 1.0 | 1.2 | 1.3 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 24.0 | 21.0 | 18.0 | 24.8 | 26.9 | 15.2 | 23.2 | 14.3 | 13.8 | 11.3 | 18.6 | 15.2 | 21.9 | 26.6 | 14.6 | 23.4 | 18.1 | 19.0 | 24.4 | 13.4 | 25.1 | 23.4 | 19.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 3.1 | 4.2 | 4.0 | 3.2 | 3.4 | 4.3 | 2.6 | 3.9 | 3.8 | 3.1 | 2.9 | 4.9 | 2.6 | 3.9 | 5.0 | 2.9 | 4.2 | 2.4 | 4.2 | 4.4 | 1.6 | 3.3 | 3.5 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 16 | 98 | 5 | 6 | 110 | 7 | 4 | 77 | 5 | <5 | 16 | 19 | <5 | 17 | 9 | 51 | 8 | 5 | **719** | 69 | 93 | **9,020** | 15 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 6 | 4 | 5 | 7 | 3 | 4 | 6 | 4 | 4 | 5 | 5 | 5 | 6 | 7 | 5 | 5 | 4 | 5 | <2 | 3 | 5 | 6 | 7 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.6 | 12.0 | 2.5 | 12.0 | 6.2 | 1.0 | 0.6 | 2.5 | 1.7 | 6.7 | **283.0** | 2.1 | 1.1 | 31.6 | **82.6** | 6.6 | 1.4 | 1.2 | **4,430.0** | 5.4 | **65.3** | **206.0** | 7.9 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 170 | 150 | 140 | 200 | 200 | 110 | 150 | 130 | 110 | 96 | 161 | 110 | 168 | 136 | 105 | 122 | 125 | 140 | 129 | 136 | 160 | 236 | 133 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.56 | 0.82 | 1.22 | 1.80 | 1.77 | 0.97 | 1.39 | 1.14 | 0.96 | 1.15 | 1.37 | 0.97 | 1.40 | 1.46 | 0.97 | 1.63 | 0.94 | 1.22 | 0.92 | 1.00 | 1.43 | 1.84 | 1.18 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 13 | 8 | 12 | 13 | 21 | 9 | 9 | 15 | 12 | 21 | 14 | 11 | 8 | 20 | 11 | 35 | 10 | 11 | 7 | 9 | 11 | 22 | 8 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 92 | 55 | 74 | 104 | 107 | 62 | 84 | 66 | 60 | 56 | 163 | 58 | 82 | 87 | 66 | 88 | 59 | 74 | 498 | 65 | 91 | 107 | 70 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | <1 | -- | <1 | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.53 | 0.99 | 1.20 | 1.69 | 1.94 | 1.05 | 1.44 | 1.02 | 1.00 | 0.76 | 3.59 | 1.10 | 1.43 | 1.62 | 1.62 | 1.52 | 1.19 | 1.28 | 31.00 | 1.42 | 1.94 | 2.04 | 1.27 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 22.00 | 15.00 | 19.00 | 28.00 | 35.00 | 18.00 | 20.00 | 18.00 | 18.00 | 9.40 | 58.80 | 18.50 | 20.90 | 20.70 | 20.60 | 19.70 | 17.30 | 21.00 | 225.00 | 19.70 | 22.20 | 32.10 | 17.30 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 0.97 | 9.39 | 0.83 | 3.15 | 4.58 | 3.96 | 1.77 | 5.56 | 2.04 | 20.70 | 63.00 | 6.10 | 1.00 | 5.20 | 25.00 | 3.40 | 11.80 | 2.40 | 94.20 | 17.50 | 15.20 | 5.30 | 3.80 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.74 | -3.20 | -2.60 | -2.22 | -1.71 | -2.99 | -2.88 | -2.64 | -3.05 | -3.62 | -2.30 | -2.91 | -2.93 | -2.55 | -3.29 | -2.84 | -3.14 | -2.50 | -2.50 | -3.20 | -2.97 | -2.24 | -3.61 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -2.99 | -3.45 | -2.85 | -2.47 | -1.96 | -3.24 | -3.13 | -2.89 | -3.31 | -3.94 | -2.62 | -3.23 | -3.25 | -2.87 | -3.61 | -3.16 | -3.46 | -2.75 | -2.82 | -3.52 | -3.29 | -2.56 | -3.93 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.43 | 9.78 | 9.53 | 9.32 | 9.01 | 9.66 | 9.60 | 9.43 | 9.54 | 9.82 | 9.20 | 9.81 | 9.87 | 9.50 | 9.78 | 9.31 | 9.86 | 9.51 | 9.09 | 9.88 | 9.72 | 9.25 | 9.99 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.68 | 10.00 | 9.78 | 9.57 | 9.26 | 9.91 | 9.85 | 9.68 | 9.80 | 10.10 | 9.52 | 10.10 | 10.20 | 9.82 | 10.10 | 9.63 | 10.20 | 9.77 | 9.41 | 10.20 | 10.00 | 9.57 | 10.30 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **259** | -- | -- | **349** | **189** | -- | **217** | -- | -- | **490** | **19,200** | **186** | **131** | **93** | **3,420** | **487** | **141** | **120** | -- | **1,960** | **2,150** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | **8** | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 13 | -- | -- | 15 | 19 | -- | 14 | -- | -- | 11 | 86 | 12 | 12 | 7 | 24 | 15 | 11 | 12 | -- | 27 | 34 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | 2 | <2 | <2 | <3 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 9 | -- | -- | 41 | 22 | -- | <50 | -- | -- | 6 | 24 | 16 | 10 | 15 | 15 | 14 | 16 | <50 | -- | <5 | 12 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.019** | -- | -- | **0.018** | <0.017 | -- | <0.017 | -- | -- | **0.029** | **1.050** | **0.023** | <0.017 | <0.017 | **0.073** | **0.032** | <0.017 | **0.011** | -- | <0.017 | **0.120** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | **11** | <1 | <1 | <1 | **2** | <1 | <1 | <1.0 | -- | **3** | **2** | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | <0.40 | 1 | -- | <0.40 | -- | -- | <1 | 34 | <1 | <1 | <1 | 1 | <1 | <1 | <0.40 | -- | 4 | 4 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | 2 | -- | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | **22** | 2 | <2 | 1 | **12** | 2 | **3** | <2.0 | **183** | **6** | **3** | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **523** | -- | -- | **554** | **965** | 120 | 211 | **388** | **384** | 161 | **38,900** | **312** | 236 | 254 | **4,200** | **593** | **363** | 230 | **176,000** | **4,570** | **2,790** | **2,190** | **303** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **3.0** | 0.5 | -- | <0.5 | -- | -- | 0.6 | **82.4** | <0.5 | <0.5 | <0.5 | **5.2** | 0.5 | <0.5 | <0.5 | -- | **5.9** | **4.3** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 53 | -- | -- | 113 | 632 | 23 | 30 | 53 | 39 | 26 | **13,200** | 67 | 71 | 81 | 124 | 140 | 60 | 130 | **13,800** | **985** | **921** | **2,420** | 75 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | 13 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | -- | 5 | 2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | **2** | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 0.100 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 12 | -- | -- | 36 | 42 | -- | 24 | -- | -- | 12 | 82 | 22 | 24 | 24 | 25 | 26 | 19 | 25 | -- | 16 | 29 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 2 | -- | -- | 7 | 4 | -- | 5 | -- | -- | 3 | 405 | 4 | <2 | 2 | 36 | 6 | 3 | 3 | -- | 41 | 30 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 1.6 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | -- | 0.2 | 0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | **30** | <2 | <2 | <2 | 2 | <2 | <2 | <2 | -- | 6 | 4 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | <5 | -- | -- | 7 | 7 | <5.0 | <5.0 | <5.0 | 5 | <5 | **110** | 7 | 6 | <5 | 15 | <5 | <5 | <5.0 | **799** | 11 | 17 | 14 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 53 | >250 | -- | >250 | >250 | 280 | 85 | >250 | -- | 1,414 | >2420 | >2420 | 1,990 | >2420 | >2420 | 1,203 | 8 | --- | >2420 | >2420 | >2420 | >2420 | >2420 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 22 | 24 | -- | 4 | 45 | 6 | 10 | **>250** | <100 | 2 | 26 | 10 | 10 | 20 | 2 | <1 | **>2420** | <10 | 16 | 17 | 9 | 30 | 16 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.46 | 10.70 | 4.68 | 1.21 | 6.64 | 0.21 | 1.19 | 1.93 | 1.41 | 1.88 | 6.62 | 0.13 | <0.50 | 1.60 | 2.02 | 1.91 | 0.32 | 1.02 | 90.33 | 5.12 | 8.22 | 127.14 | 0.38 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.85 | 11.10 | 5.62 | 1.32 | 7.71 | 0.19 | 1.07 | 1.73 | 1.18 | 2.28 | 7.58 | 0.22 | <0.50 | 2.00 | 2.98 | 1.91 | 0.33 | 1.07 | 121.83 | 4.62 | 13.77 | 185.98 | 0.48 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - LSD**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Lake Shore Drive | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LSD | | | | | | | | LSD | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | hh:mm | | | | | | | 10:20 | 11:55 | 11:05 | 11:30 | 10:30 | 10:50 AM | 11:26 AM | 10:44 AM | 1:45 PM | 12:15 PM | 1:08 PM | 11:22 AM | 10:52 PM | 11:07 AM | 10:38 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA | NA** | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 15.6 | 23.0 | 9.7 | 14.4 | 22.4 | 9.3 | 10.2 | 25.0 | 8.3 | 26.5 | 18.3 | 6.8 | 13.9 | 18.6 | 10.5 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **11.35** | 6.95 | **5.34** | 9.08 | 6.85 | 7.24 | ** | **4.93** | 7.90 | **2.66** | **3.24** | **11.40** | 12.45 | 6.46 | 12.45 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.78 | 6.57 | **5.91** | **5.82** | **6.41** | **5.90** | 7.01 | 6.51 | **6.40** | **6.31** | **6.05** | **6.41** | 6.75 | 6.55 | **5.95** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 150.0 | 188.0 | 92.0 | 75.0 | 182.9 | 108.1 | 99.7 | 368.0 | 171.0 | 195.0 | 158.0 | 145.8 | 120.0 | 137.0 | 129.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 12 | 26 | 20 | 9 | 27 | 9 | 12 | 33 | <5 | 30.0 | 21.0 | 13.0 | 15 | 13 | 17 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 43 | 38 | 36 | 23 | 32 | 20 | 30 | 29 | 20 | 35 | 35 | 32 | 27 | 26 | 33 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 25 | 31 | 21 | 36 | 40 | 65 | 39 | 86 | 38 | 56 | 60 | 30 | 17.0 | 50.8 | 31.1 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.19 | 0.48 | 0.22 | 0.32 | <0.05 | 0.10 | 0.08 | 0.07 | 0.07 | <0.05 | <0.05 | 0.05 | 0.10 | <0.05 | <0.05 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.10 | 0.39 | 0.22 | 0.32 | <0.05 | 0.10 | 0.08 | 0.07 | 0.07 | <0.05 | <0.05 | 0.05 | 0.10 | <0.05 | <0.05 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.09** | **0.09** | <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 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.08 | 0.04 | <0.03 | 0.06 | <0.03 | <0.03 | 0.53 | 0.06 | 0.60 | 0.68 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | 1.0 | 34.5 | 10.0 | <0.4 | 1.7 | <0.4 | <0.4 | 1.6 | 1.6 | 0.70 | 4.10 | 0.60 | 0.64 | 0.3 | <0.10 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 7.7 | 8.1 | 6.9 | 5.8 | 5.8 | 8.0 | 5.9 | 12.1 | 6.2 | 7.50 | 8.70 | 6.90 | 7.3 | 6.4 | 3.7 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.92 | 7.08 | 7.01 | 6.91 | 7.20 | 6.99 | 6.93 | 7.11 | 6.55 | 7.19 | 7.04 | 6.75 | 6.88 | 6.54 | 7.15 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 7.1 | 8.0 | 6.7 | 4.4 | 10.2 | 3.5 | 6.0 | 9.6 | 2.7 | 8.4 | 4.5 | 6.3 | 7.5 | 6.3 | 8.4 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.6 | 1.7 | 1.6 | 1.1 | 2.3 | 0.9 | 1.5 | 2.6 | 0.7 | 1.8 | 1,190.0 | 1.6 | 1.4 | 1.4 | 1.7 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [5] | 0.010 | **0.102** | **0.059** | **0.015** | **0.052** | **0.305** | **0.018** | 0.008 | **0.031** | 0.008 | **0.028** | **0.084** | 0.010 | **0.044** | **0.043** | **0.034** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.3 | 1.4 | 1.2 | 0.9 | 1.6 | 0.8 | 1.3 | 1.7 | 0.6 | 1.2 | 0.9 | 1.2 | 1.1 | 1.0 | 1.4 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 25.2 | 26.0 | 23.0 | 16.5 | 21.7 | 15.4 | 24.4 | 20.7 | 9.8 | 21.4 | 25.1 | 21.9 | 17.9 | 19.9 | 20.2 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 1.1 | 2.7 | 4.0 | 2.4 | 2.4 | 3.3 | 1.7 | 4.2 | 3.5 | 3.9 | 2.0 | 3.9 | 3.0 | 4.9 | 3.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 138 | 41 | <5 | <5 | **444** | 6 | 8 | 150 | <5 | 56.0 | 132.0 | <5 | 19 | 32 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 4 | 3 | 4 | 5 | <2 | 5 | 4 | <2 | 5 | 3.0 | 3.0 | 5.0 | 4 | 4 | 4 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | **53.8** | 21.3 | 15.1 | 2.0 | **72.2** | 2.5 | 5.0 | 44.4 | 1.2 | 6.4 | 18.2 | 0.7 | 8.2 | 0.9 | 1.2 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 178 | 192 | 171 | 122 | 192 | 123 | 151 | 170 | 63 | 197 | 193 | 150 | 139 | 146 | 163 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.55 | 1.69 | 1.51 | 0.96 | 1.44 | 0.9 | 1.2 | 1.5 | 0.7 | 1.65 | 1.47 | 1.27 | 1.15 | 1.08 | 1.35 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 12 | 26 | 20 | 9 | 27 | 9.0 | 12.0 | 33.0 | <5 | 30 | 21 | 13 | 15 | 13 | 17 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 92 | 97 | 87 | 58 | 95 | 52.0 | 76.0 | 96.0 | 39.0 | 96 | 90 | 77 | 70 | 67 | 80 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | <10 | <10 | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.75 | 1.74 | 1.59 | 1.08 | 2.27 | 1.0 | 1.6 | 2.1 | 0.7 | 1.83 | 1.76 | 1.45 | 1.40 | 1.35 | 1.51 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 24.30 | 27.00 | 23.30 | 15.5 | 34.9 | 12.4 | 21.2 | 34.7 | 9.6 | 28.4 | 17.0 | 21.9 | 25.3 | 21.5 | 28.0 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 6.10 | 1.40 | 2.30 | 6.0 | 22.2 | 6.6 | 14.2 | 17.9 | 1.0 | 5.1 | 9.0 | 6.6 | 9.6 | 11.3 | 5.4 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.73 | -2.19 | -2.44 | -3.06 | -1.94 | -3.1 | -2.8 | -2.0 | -3.9 | -1.99 | -2.57 | -2.91 | -2.64 | -3.12 | -2.27 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.05 | -2.51 | -2.76 | -3.38 | -2.26 | -3.4 | -3.1 | -2.3 | -4.2 | -2.31 | -2.89 | -3.23 | -2.96 | -3.44 | -2.59 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.65 | 9.27 | 9.45 | 9.97 | 9.14 | 10.1 | 9.7 | 9.1 | 10.4 | 9.18 | 9.61 | 9.66 | 9.52 | 9.66 | 9.42 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.97 | 9.59 | 9.77 | 10.3 | 9.46 | 10.4 | 10.0 | 9.4 | 10.7 | 9.5 | 9.9 | 10.0 | 9.84 | 9.98 | 9.74 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **731** | **48** | **401** | **142** | **2,590** | -- | **124** | **665** | **154** | **248** | -- | -- | **199** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | 3 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 32 | -- | 11 | 8 | 53 | -- | 13 | 53 | 7 | 42.0 | -- | -- | 18 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | 20 | 10 | 20 | -- | 9 | 21 | 9 | 18.0 | -- | -- | 14 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.031** | -- | <0.017 | <0.09 | **0.130** | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | -- | 1 | <1 | **2** | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | 1 | -- | <1 | <1 | 6 | -- | <1 | 6 | <1 | 2.0 | -- | -- | 1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | 1 | <1 | **4** | 1 | <1 | 2 | 1 | <1 | 1.0 | 1.0 | 1 | 2 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **1,080** | **375** | **874** | 239 | **5,460** | 164 | **560** | **5,530** | 118 | **3,510** | **4,550** | **378** | **1020** | **356** | **440** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | 0.6 | -- | 0.7 | 0.7 | **4.3** | -- | <0.5 | **3.2** | <0.5 | 0.8 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 436 | 212 | 250 | 55 | **2,630** | 58 | 368 | **5,050** | 8 | **2,840** | **1,190** | 102 | 678 | 74 | 308 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | <2 | <2 | 4 | -- | <2 | <2 | 9 | <2 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | **0.200** | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 28 | -- | 31 | 17 | 54 | -- | 27 | 56 | 15 | 32.0 | -- | -- | 30 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 14 | -- | 7 | 3 | 36 | -- | <2 | 6 | <2 | 5.0 | -- | -- | 4 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | <0.1 | <0.1 | 0.2 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | <2 | <2 | 4 | -- | <2 | 2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 8 | <5 | 7 | <5 | 23 | <5 | <5 | 10 | <5 | <5 | <5 | <5 | 8 | 8 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 534 | >2420 | 641 | 46 | 3020 | 2,380.0 | 1120 | NDOGT | 932 | >2420 | >2420 | 1,200 | >200 | >200 | >200 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 1 | **479** | 1 | 23 | 20 | 20 | 7 | 50 | 12 | 12 | 172 | 2 | **>200** | 27 | 18 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.25 | 4.42 | 12.5 | 0.32 | 5.06 | 2.3 | 0.79 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 18.67 | 20.15 | 1.85 | 0.93 | 141.49 | 0.60 | 2.47 | 14.60 | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 25.84 | 24.37 | 2.89 | 1.60 | -- | * | 2.51 | 15.40 | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

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[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperati

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health C

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - LU**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Larry Uteck Blvd | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LU | | | | | | | | LU | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 10/17/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/15/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | | | | | | | 10:30 | 15:20 | 11:30 | 10:10 | 14:30 | 14:30 | 13:00 | 11:45 | 10:45 | 9:54 | 13:45 | 10:23 | 10:05 | 12:20 | 11:20 | 11:45 | 11:25 | 10:15 AM | 12:00 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 11.3 | 12.8 | 27.3 | 14.6 | 13.9 | 18.3 | 10.9 | 15.0 | 22.8 | 10.2 | 16.1 | 23.4 | 8.2 | 13.3 | 21.9 | 11.6 | 18.2 | 22.4 | 13.3 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **4.24** | 6.17 | 8.20 | 9.04 | **10.15** | 8.29 | **4.50** | **11.96** | 8.08 | 7.55 | 7.28 | 9.49 | 8.50 | 8.75 | **16.62** | **9.68** | **9.56** | 8.34 | 7.43 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.07** | 7.82 | 6.65 | 6.78 | **6.39** | 7.49 | **5.45** | 6.50 | 7.23 | **6.17** | 6.57 | 6.80 | 6.99 | 7.17 | **6.24** | **6.23** | 6.80 | 7.11 | 6.90 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 203.0 | 955.0 | 480.0 | 262.0 | 670.0 | 320.0 | 845.0 | 999.0 | 611.0 | 371.0 | 0.6 | 569.0 | 436.2 | 588.0 | 574.0 | 483.4 | 755.0 | 660.0 | 590.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 34 | **224** | 116 | 52 | **190** | 99 | **258** | **243** | 104 | 70 | **210** | **132** | 93 | **154** | **164** | 92 | **247** | **154** | **143** |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 94 | 18 | 14 | 18 | 7 | 7 | 19 | 6 | 8 | 18 | 8 | 8 | 6 | 17 | 13 | 26 | 12 | 12 | 8 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.61 | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.47 | 2.61 | 1.35 | 0.87 | 1.72 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | -- | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.41 | 2.61 | 1.01 | 0.51 | 1.72 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | **0.34** | **0.36** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | 0.06 | 0.04 | 0.16 | <0.03 | <0.03 | 0.04 | 0.04 | 0.05 | <0.03 | <0.03 | <0.050 | 0.05 | <0.03 | 0.05 | 0.05 | <0.03 | <0.03 | 0.09 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | 0.4 | 4.2 | 0.7 | -- | 0.5 | <0.4 | 1.2 | 1.7 | <0.4 | 0.3 | 8.0 | 0.7 | 1.2 | 1.1 | 0.6 | 0.7 | 3.8 | 0.6 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 11.0 | 3.7 | 22.8 | 4.8 | 3.1 | 4.5 | 2.9 | 6.9 | 4.7 | 4.7 | 2.2 | 7.6 | 6.5 | 3.9 | 5.3 | 7.6 | 6.1 | 6.8 | 5.4 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.43** | 6.70 | 7.20 | 7.20 | 6.92 | 7.11 | **6.49** | **6.42** | 7.42 | **6.41** | 6.95 | 7.30 | 7.15 | 6.94 | 7.42 | 6.96 | 7.26 | 7.40 | 7.13 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 7.6 | 30.7 | 22.1 | 14.5 | 22.0 | 17.6 | 21.8 | 23.9 | 27.6 | 12.6 | 27,000.0 | 20.3 | 15.9 | 20.6 | 17.2 | 17.9 | 25.7 | 23.8 | 22.8 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.3 | 4.2 | 3.6 | 2.2 | 2.8 | 2.7 | 4.0 | 4.2 | 3.8 | 2.2 | 3,800.0 | 3.4 | 1.9 | 2.9 | 3.4 | 2.6 | 3.8 | 3.0 | 2.5 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [5] | 0.010 | **0.034** | **0.043** | **0.036** | **0.030** | 0.006 | **0.027** | **0.046** | **0.260** | **0.028** | **0.039** | 0.007 | 0.009 | **0.011** | **0.029** | **0.011** | **0.012** | **0.024** | **0.027** | 0.008 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.1 | 3.2 | 3.6 | 2.5 | 2.6 | 2.8 | 2.9 | 3.1 | 3.7 | 3.0 | 3,300.0 | 2.8 | 1.6 | 2.8 | 2.6 | 2.7 | 3.2 | 3.0 | 2.6 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 22.7 | 124.0 | 62.2 | 32.3 | 95.1 | 51.7 | 170.0 | 147.0 | 88.1 | 62.7 | 110.0 | 102.0 | 57.8 | 96.4 | 81.1 | 65.6 | 137.0 | 113.0 | 86.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 6.9 | 4.9 | 0.7 | 6.3 | 5.1 | 8.6 | 7.0 | 2.1 | 2.5 | 6.9 | 3.6 | 4.9 | 6.9 | 4.2 | 1.3 | 6.7 | 4.6 | 3.6 | 5.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 13 | 5 | 165 | <5 | <5 | <5 | <5 | **626** | <5 | <5 | <1.0 | <5 | 6 | 29 | <5 | <5 | 22 | 16 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 21 | 26 | 25 | 23 | 26 | 29 | 33 | 29 | 20 | 27 | 27 | 31 | 30 | 28 | 23 | 41 | 32 | 18 | 33 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 3.3 | 4.1 | 23.0 | 2.3 | 1.8 | 1.6 | 0.7 | 42.7 | 10.1 | 1.6 | 0.3 | 2.8 | 2.4 | 15.8 | 3.0 | 3.3 | 7.3 | 6.6 | 3.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 190 | 813 | 482 | 255 | 732 | 433 | 840 | 819 | 605 | 394 | 790 | 575 | 462 | 582 | 739 | 371 | 849 | 673 | 610 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.69 | 7.21 | 4.12 | 2.36 | 6.10 | 4.02 | 8.13 | 8.15 | 3.80 | 2.68 | 6.77 | 4.73 | 3.62 | 5.26 | 5.68 | 3.91 | 7.99 | 5.32 | 5.24 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 109 | 426 | 246 | 144 | 347 | 229 | 496 | 477 | 262 | 187 | 400 | 305 | 216 | 321 | 310 | 242 | 463 | 341 | 311 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.70 | 7.40 | 4.30 | 2.43 | 5.55 | 3.51 | 8.90 | 8.24 | 5.64 | 3.64 | 6.69 | 5.86 | 3.52 | 5.78 | 4.76 | 4.06 | 7.65 | 6.74 | 5.21 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 29.00 | 94.00 | 70.00 | 45.30 | 66.50 | 55.10 | 70.90 | 77.00 | 84.60 | 40.50 | 84.00 | 64.70 | 47.50 | 63.40 | 56.90 | 55.40 | 79.80 | 71.80 | 67.20 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 0.29 | 1.30 | 2.20 | 1.40 | 4.70 | 6.80 | 4.50 | 0.60 | 19.40 | 15.20 | 0.59 | 10.60 | 1.40 | 4.70 | 8.80 | 1.80 | 2.20 | 11.80 | 0.30 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.95 | -2.32 | -1.94 | -2.10 | -2.60 | -1.93 | -2.98 | -2.38 | -1.45 | -3.41 | -1.95 | -1.82 | -2.16 | -2.27 | -1.55 | -2.27 | -1.87 | -1.43 | -1.85 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.20 | -2.64 | -2.26 | -2.42 | -2.92 | -2.25 | -3.30 | -2.70 | -1.77 | -3.73 | -2.20 | -2.14 | -2.48 | -2.59 | -1.87 | -2.59 | -2.19 | -1.75 | -2.17 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.38 | 9.02 | 9.14 | 9.30 | 9.52 | 9.04 | 9.47 | 8.80 | 8.87 | 9.82 | 8.90 | 9.12 | 9.31 | 9.21 | 8.97 | 9.23 | 9.13 | 8.83 | 8.98 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.63 | 9.34 | 9.46 | 9.62 | 9.84 | 9.36 | 9.79 | 9.12 | 9.19 | 10.10 | 9.15 | 9.44 | 9.63 | 9.53 | 9.29 | 9.55 | 9.45 | 9.15 | 9.30 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | -- | **218** | **227** | **252** | **107** | **447** | **31** | **1,400** | **46** | **109** | **59** | -- | **66** | **1,420** | -- | -- | **61** | **978** | **29** |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | -- | 225 | 201 | 116 | 133 | 134 | 119 | 185 | 157 | 80 | 150 | -- | 111 | 127 | -- | -- | 132 | -- | 111 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | -- | 11 | 17 | 22 | 10 | 22 | 18 | 22 | 20 | 21 | <50 | -- | 9 | 14 | -- | -- | <5 | -- | 19 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | -- | **0.538** | **0.171** | **0.168** | **0.300** | **0.236** | **0.148** | **0.171** | **0.031** | **0.079** | **0.150** | -- | **0.176** | **0.426** | -- | -- | **0.069** | -- | **0.052** |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | -- | <1 | <1 | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | 3 | -- | -- | <1 | -- | 1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | -- | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | 2 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | **3** | <2 | **3** | **16** | 2 | **6** | 2 | 2 | <1 | **4** | **2** | **3** | **3** | **10** | <1 | **3** | <1 | **14** | **3** |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **2,150** | **347** | **1,320** | **500** | 194 | **890** | 157 | **2,000** | 207 | 229 | 170 | **671** | 171 | **1,940** | **374** | 223 | <50 | **3,540** | 289 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | -- | 0.8 | 0.7 | 1.0 | <0.5 | **1.4** | <0.5 | **1.8** | <0.5 | <0.5 | <0.5 | -- | <0.5 | **3.4** | -- | -- | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 129 | 182 | 485 | 120 | 87 | 89 | 26 | 71 | 182 | 36 | 110 | 371 | 61 | 444 | 148 | 35 | 77 | **1,870** | 91 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | 3 | <2 | <2 | <2.0 | -- | <2 | 3 | -- | -- | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | -- | <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 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | -- | 112 | 94 | 60 | 93 | 90 | 96 | 116 | 111 | 54 | 120 | -- | 43 | 89 | -- | -- | 104 | -- | 111 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | -- | <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 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | -- | 4 | 3 | 7 | 3 | 11 | 2 | 22 | <2 | 3 | <2 | -- | <2 | 31 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | 0.2 | -- | -- | <0.1 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | 4 | -- | -- | 3 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 9 | **79** | **92** | **39** | **57** | **49** | 26 | 17 | 8 | 23 | 27 | 17 | 16 | **64** | 7 | **52** | 21 | **120** | 22 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | -- | >2420 | >2420 | 2,420 | 866 | >2420 | 866 | >2420 | 961 | >2420 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | 488 | >2420 | 1,990 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | <100 | <1 | 2 | 19 | 3 | 86 | <1 | <1 | 7 | **1,730** | <10 | 19 | 6 | <1 | 40 | 50 | 6 | 51 | 4 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.99 | 2.44 | 32.52 | 1.80 | 1.54 | 2.30 | 0.12 | 99.13 | 2.54 | 0.96 | 0.69 | 3.14 | 4.94 | 5.43 | 4.57 | 1.55 | 25.83 | 21.03 | 2.47 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 2.08 | 2.71 | 31.31 | 2.15 | 1.77 | 2.50 | 0.11 | 98.00 | 2.51 | 0.96 | 0.68 | 3.10 | 2.71 | 6.73 | 5.23 | 1.61 | 31.14 | 24.37 | 2.85 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

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[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - LU**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Larry Uteck Blvd | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LU | | | | | | | | LU | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | hh:mm | | | | | | | 10:00 | 8:40 | 12:25 PM | 3:20PM | 11:45 AM | 12:15 PM | 11:00 AM | 11:00 AM | 12:22 PM | 10:05 AM | 10:18 AM | 10:08 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 14.3 | 23.1 | 12.4 | 13.8 | 25.8 | 10.8 | 24.5 | 21.6 | 10.2 | 16.4 | 18.8 | 14.0 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **11.34** | 6.76 | **9.79** | ** | 5.54 | **10.30** | **3.53** | 6.44 | 8.12 | 18.71 | 10.02 | 12.39 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.73 | 6.85 | 7.09 | 7.22 | 6.92 | 6.62 | **6.36** | **6.24** | **6.27** | 6.89 | **6.03** | **6.33** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 434.6 | 588.0 | 384.4 | 621.0 | 710.0 | 196.0 | 945.0 | 710.0 | 511.8 | 618.0 | 507.0 | 503.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 11 | 23 | 13 | 10 | 23 | 10 | 26.0 | 21.0 | 17.0 | 15 | 17 | 24 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 96 | **124** | 74 | **174** | **202** | 75 | **297** | **221** | **147** | **189** | **132** | **153** |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 28 | 21 | 24 | 18 | 14 | 16 | 17 | 16 | 11 | 6.12 | 26.2 | 12.2 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 1.01 | 0.41 | 1.26 | 1.27 | 0.37 | 1.77 | 0.20 | 0.24 | 1.23 | 0.69 | 1.09 | 0.71 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.87 | 0.16 | 1.26 | 0.80 | 0.30 | 1.24 | 0.20 | 0.24 | 1.23 | 0.60 | 1.09 | 0.71 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.14** | **0.25** | <0.05 | **0.47** | **0.07** | **0.53** | <0.05 | <0.05 | <0.05 | **0.09** | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.17 | <0.03 | <0.03 | 0.09 | 0.15 | 0.24 | 0.11 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | 1.1 | 0.6 | <0.4 | 0.6 | <0.4 | 0.7 | <0.4 | 1.60 | 6.40 | 0.27 | <0.10 | <0.10 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 9.3 | 5.5 | 5.0 | 4.3 | 5.7 | 3.9 | 4.80 | 6.60 | 3.90 | 5.7 | 3.5 | 4.4 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.01 | 7.46 | 7.29 | 7.17 | 7.45 | 7.01 | 7.37 | 7.28 | 7.19 | 7.36 | 6.75 | 7.38 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 12.7 | 20.8 | 14.9 | 25.2 | 30.2 | 9.6 | 33.4 | 33.7 | 16.7 | 20.2 | 19.8 | 18.0 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.6 | 2.7 | 2.1 | 3.5 | 4.2 | 1.5 | 4.6 | 18.0 | 2.3 | 2.7 | 2.8 | 2.4 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.078** | **0.019** | **0.021** | 0.010 | **0.014** | **0.013** | **0.011** | **0.013** | **0.160** | 0.007 | **0.018** | **0.011** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.2 | 2.9 | 2.3 | 3.2 | 3.4 | 1.7 | 3.4 | 3.2 | 2.5 | 2.3 | 2.7 | 2.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 73.0 | 94.7 | 69.9 | 159.0 | 129.0 | 44.0 | 183.0 | 150.0 | 86.1 | 120 | 102 | 81.2 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 3.5 | 5.4 | 4.7 | 3.7 | 3.0 | 4.4 | 3.8 | 1.8 | 5.2 | 4.0 | 6.8 | 3.2 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 52 | 11 | <5 | 7 | 6 | <5 | <5 | <5 | <5 | <5 | 8 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 19 | 15 | 24 | 22 | 23 | 23 | 21.0 | 23.0 | 30.0 | 25 | 27 | 29 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 21.4 | 2.4 | 4.5 | 3.6 | 3.7 | 3.8 | 3.6 | 2.4 | 1.7 | 1.6 | 2.9 | 1.4 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 518 | 620 | 422 | 871 | 765 | 256 | 1,030 | 928 | 558 | 717 | 620 | 568 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 3.40 | 4.3 | 2.9 | 5.7 | 6.7 | 2.9 | 9.35 | 7.15 | 5.20 | 6.20 | 4.70 | 5.45 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 11 | 23 | 13.0 | 10.0 | 23.0 | 10.0 | 26 | 21 | 17 | 15 | 17 | 24 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 216 | 277 | 201.0 | 399.0 | 408.0 | 169.0 | 561 | 449 | 301 | 372 | 302 | 304 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 4.04 | 5.52 | 4.1 | 8.6 | 7.6 | 2.6 | 10.20 | 8.61 | 4.86 | 6.53 | 5.77 | 4.70 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 38.3 | 63.1 | 45.9 | 77.3 | 92.7 | 30.1 | 102.0 | 99.0 | 51.2 | 61.6 | 61.0 | 54.8 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 8.7 | 12.5 | 15.9 | 20.4 | 6.5 | 5.8 | 4.2 | 9.3 | 3.4 | 2.6 | 10.2 | 7.4 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.47 | -1.49 | -2.0 | -2.1 | -1.4 | -2.6 | -1.35 | -1.52 | -1.99 | -1.80 | -2.36 | -1.62 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -2.79 | -1.81 | -2.4 | -2.4 | -1.7 | -2.9 | -1.67 | -1.84 | -2.31 | -2.12 | -2.68 | -1.94 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.48 | 8.95 | 9.3 | 9.3 | 8.8 | 9.6 | 8.72 | 8.80 | 9.18 | 9.16 | 9.11 | 9.00 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.80 | 9.27 | 9.7 | 9.6 | 9.1 | 10.0 | 9.0 | 9.1 | 9.5 | 9.48 | 9.43 | 9.32 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **231** | **94** | -- | **84** | **31** | **169** | **32** | -- | -- | **52** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 110 | 143 | -- | 135 | 184 | 63 | 350.0 | -- | -- | 116 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 9 | 16 | -- | 11 | 16 | 10 | 13.0 | -- | -- | 11 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.140** | <0.09 | -- | **0.120** | <0.09 | <0.09 | **0.025** | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | **4** | 2 | **5** | **3** | 2 | **4** | <1 | 1 | **3** | 2 | **3** | 2 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **494** | **1,090** | 206 | 290 | **556** | **313** | **1,210** | **429** | **432** | 289 | **650** | 231 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | **1.3** | <0.5 | -- | <0.5 | <0.5 | 0.8 | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 91 | 240 | 40 | 51 | 66 | 33 | 291 | 18 | 63 | 77 | 103 | 59 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | 2 | -- | 10 | <2 | 3 | 3.0 | -- | -- | 3 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 56 | 115 | -- | 107 | 134 | 58 | 146.0 | -- | -- | 96 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 6 | 2 | -- | <2 | <2 | 4 | 2.0 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | 2 | <2 | -- | 5 | <2 | 2 | 2.0 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | **41** | 13 | **38** | 27 | 8 | 23 | 6.0 | 5 | 22.0 | **31** | 26 | 13 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 210 | 5020 | 330.0 | 540.0 | NDOGT | 984.0 | >2420 | >2420 | 921 | <1 | >200 | >200 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | <1 | 20 | 30 | <10 | 26 | 8 | 11 | 2 | <1 | <1 | 60 | 70 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.25 | 2.41 | 4.41 | 3.78 | 10.9 | 3.4 | 2.37 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 78.76 | 5.50 | 2.39 | 4.19 | 6.38 | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 131.56 | -- | * | 4.24 | 6.19 | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperatı

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health C

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Paper Mill Lake | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - PML-1 | | | | | | | | PML-1 | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/15/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | | 13:45 | 13:00 | 13:00 | 13:35 | 15:15 | 13:00 | 13:00 | 16:50 | 17:00 | 12:50 | 10:55 | 10:51 | 11:35 | 10:45 | 10:30 | 14:45 | 12:35 | 12:45 | 08:45 | 8:20 | 13:15 | 9:30 | 9:15 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 3.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.9 | 2.7 | 4.2 | 3.8 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 15.7 | 17.1 | 16.2 | 13.2 | 22.7 | 9.1 | 10.3 | 22.1 | 13.6 | 8.3 | 14.9 | 11.6 | 22.5 | 12.3 | 12.1 | 23.6 | 12.4 | 15.1 | 24.0 | 9.3 | 12.8 | 21.6 | 12.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.56** | 8.10 | 6.90 | 8.76 | 7.83 | **10.43** | **10.39** | 8.17 | **9.54** | 8.41 | 8.60 | **9.98** | 7.65 | **9.90** | **12.08** | 7.49 | 8.06 | 7.16 | 8.04 | 8.63 | 8.84 | 6.53 | **12.96** |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.39 | 6.57 | 6.64 | 7.06 | 7.35 | **5.89** | **6.28** | **6.20** | **6.11** | 7.58 | 6.63 | **6.39** | 7.20 | **6.32** | 6.60 | 7.42 | 6.60 | 6.90 | **6.34** | 7.98 | 7.57 | **5.94** | **4.63** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 561.0 | 279.0 | 223.0 | 265.0 | 234.0 | 124.5 | 176.6 | 173.6 | 105.5 | 366.0 | 186.4 | 215.1 | 199.0 | 250.5 | 431.0 | 263.0 | 210.0 | 0.2 | 432.1 | 289.1 | 231.0 | 289.0 | 234.3 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 | <5 | 8 | 7 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 39 | 64 | 58 | 67 | 61 | 24 | 44 | 43 | 18 | 55 | 45 | 57 | 57 | 48 | 63 | 50 | 46 | 65 | 57 | 56 | 59 | 67 | 50 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 54 | 15 | 21 | 19 | 12 | 57 | 32 | 38 | 65 | 38 | 29 | 8 | 15 | 11 | 17 | 10 | 30 | 31 | 7 | 15 | 18 | 16 | 20 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.49 | 0.10 | 0.17 | 0.42 | 0.27 | 0.66 | 0.55 | 0.15 | 0.62 | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 | 0.19 | 0.09 | 0.16 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.49 | -- | -- | 0.42 | 0.27 | -- | 0.55 | -- | -- | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 | 0.19 | <0.05 | 0.16 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.09** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.06 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | <0.03 | <0.03 | <0.050 | <0.03 | 0.03 | 0.06 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 0.4 | -- | 0.4 | 0.8 | 0.4 | 0.4 | <5 | 0.5 | 1.2 | 6.0 | 2.6 | 3.4 | 0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 6.5 | 3.6 | 4.7 | 0.7 | 3.3 | 6.7 | 4.6 | 5.0 | 8.3 | 5.7 | 5.3 | 4.2 | 4.1 | 5.1 | 4.0 | 2.0 | 4.4 | 2.7 | 5.4 | 5.8 | 7.1 | 6.1 | 8.7 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.36** | 6.75 | 6.79 | 6.63 | 7.04 | 6.58 | 6.54 | 6.83 | 6.67 | 6.60 | 6.80 | 6.71 | 6.92 | 6.88 | 6.66 | 7.00 | 6.64 | 6.67 | 6.95 | 6.84 | **6.36** | 6.86 | 6.87 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 4.5 | 6.9 | 6.4 | 8.4 | 9.0 | 5.9 | 6.0 | 5.0 | 4.6 | 6.0 | 6.0 | 6.8 | 6.6 | 6.9 | 6.9 | 9.1 | 7.0 | 6,900.0 | 7.8 | 4.8 | 7.9 | 10.5 | 7.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.6 | 1.1 | 1.0 | 1.3 | 1.2 | 0.8 | 1.0 | 0.9 | 0.8 | 1.0 | 1.1 | 1.0 | 0.9 | 1.5 | 1.3 | 1.4 | 1.0 | 970.0 | 1.4 | 0.9 | 1.5 | 1.8 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | <0.02 | <0.02 | 0.002 | **0.018** | 0.002 | <0.002 | **0.014** | **0.011** | **0.030** | **0.019** | **0.030** | 0.006 | 0.007 | **0.047** | **0.012** | **0.030** | **0.021** | 0.005 | **0.060** | **0.018** | **0.173** | **0.104** | **0.013** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.9 | 0.9 | 0.9 | 1.2 | 1.1 | 1.3 | 1.2 | 0.8 | 1.4 | 0.8 | 1.0 | 0.8 | 1.0 | 1.5 | 0.9 | 1.3 | 0.9 | 800.0 | 1.0 | 0.6 | 1.0 | 1.3 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 25.0 | 38.0 | 34.0 | 35.2 | 40.2 | 18.4 | 26.8 | 22.8 | 13.7 | 33.6 | 29.8 | 35.3 | 28.5 | 32.2 | 38.1 | 41.6 | 33.7 | 35.0 | 38.6 | 25.6 | 37.6 | 35.1 | 32.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 4.5 | 2.6 | 2.8 | 3.8 | 3.4 | 5.9 | 3.7 | 2.6 | 5.4 | 2.9 | 3.2 | 2.8 | 2.6 | 2.6 | 2.5 | 2.3 | 2.7 | 2.4 | 2.4 | 2.5 | 2.5 | 0.8 | 2.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <2 | 3 | 9 | 7 | <2 | <1 | 1 | <2 | 5 | 9 | 6 | <5 | <5 | 23 | 6 | <5 | <5 | 1 | 149 | 6 | **531** | 10 | 18 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 13 | 11 | 11 | 13 | 12 | 12 | 12 | 10 | 12 | 7 | 10 | 8 | 10 | 10 | 10 | 8 | 8 | 8 | 9 | 8 | 11 | 11 | 11 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.4 | 0.5 | 0.6 | 8.2 | 0.9 | 0.5 | 0.6 | 1.0 | 1.2 | 0.7 | 1.0 | 0.7 | 1.1 | 19.2 | 1.4 | 0.9 | 1.5 | 0.5 | 3.8 | 24.2 | **199.0** | **112.0** | 2.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 170 | 250 | 230 | 260 | 250 | 130 | 180 | 170 | 100 | 214 | 179 | 227 | 218 | 209 | 230 | 261 | 224 | 240 | 246 | 241 | 224 | 310 | 189 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.51 | 2.18 | 1.99 | 2.34 | 2.15 | 1.09 | 1.62 | 1.56 | 0.92 | 2.11 | 1.49 | 1.79 | 1.95 | 1.71 | 2.62 | 1.73 | 1.62 | 2.11 | 1.93 | 1.88 | 1.91 | 2.29 | 1.79 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 | <5 | 8 | 7 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 93 | 129 | 118 | 137 | 134 | 75 | 100 | 90 | 63 | 117 | 95 | 110 | 109 | 115 | 140 | 117 | 102 | 120 | 126 | 109 | 141 | 148 | 108 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.40 | 2.11 | 1.89 | 2.11 | 2.33 | 1.20 | 1.58 | 1.35 | 0.95 | 1.89 | 1.78 | 2.00 | 1.69 | 2.56 | 2.18 | 2.45 | 1.94 | 1.98 | 2.61 | 1.93 | 3.54 | 3.33 | 1.93 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 14.00 | 22.00 | 20.00 | 26.00 | 28.00 | 18.00 | 19.00 | 16.00 | 15.00 | 19.10 | 19.50 | 21.10 | 20.20 | 23.40 | 22.60 | 28.50 | 21.60 | 21.00 | 25.20 | 15.70 | 25.90 | 33.60 | 24.30 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 3.78 | 1.63 | 2.58 | 5.17 | 4.02 | 4.80 | 1.25 | 7.22 | 1.60 | 5.50 | 9.00 | 5.50 | 7.00 | 19.80 | 9.20 | 17.00 | 9.20 | 3.18 | 15.20 | 1.20 | 30.00 | 18.60 | 3.80 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.57 | -2.90 | -2.94 | -2.96 | -2.43 | -3.25 | -3.27 | -2.94 | -3.13 | -2.91 | -3.31 | -3.35 | -3.07 | -3.03 | -2.61 | -2.79 | -3.26 | -3.13 | -2.98 | -3.29 | -3.65 | -2.82 | -2.99 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.82 | -3.15 | -3.19 | -3.21 | -2.68 | -3.50 | -3.53 | -3.19 | -3.38 | -3.23 | -3.63 | -3.67 | -3.39 | -3.35 | -2.93 | -3.11 | -3.58 | -3.38 | -3.30 | -3.61 | -3.97 | -3.14 | -3.31 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.93 | 9.65 | 9.73 | 9.59 | 9.47 | 9.83 | 9.81 | 9.77 | 9.80 | 9.51 | 10.10 | 10.10 | 9.99 | 9.91 | 9.27 | 9.79 | 9.90 | 9.80 | 9.93 | 10.10 | 10.00 | 9.68 | 9.86 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.20 | 9.90 | 9.98 | 9.84 | 9.72 | 10.10 | 10.10 | 10.00 | 10.10 | 9.83 | 10.40 | 10.40 | 10.30 | 10.20 | 9.59 | 10.10 | 10.20 | 10.10 | 10.20 | 10.50 | 10.30 | 10.00 | 10.20 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **260** | -- | -- | **665** | **46** | -- | **233** | -- | -- | **177** | **306** | **141** | **103** | **3,920** | **305** | **129** | **142** | **140** | -- | **2,320** | **7,690** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | 2 | <2 | <2 | <2 | <1.0 | -- | <2 | 4 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 23 | -- | -- | 35 | 24 | -- | 27 | -- | -- | 22 | 19 | 20 | 12 | 40 | 23 | 23 | 18 | 21 | -- | 34 | 60 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 8 | -- | -- | 11 | 9 | -- | <50 | -- | -- | 6 | 9 | 6 | 8 | 9 | 8 | 13 | 11 | <50 | -- | <5 | 10 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.300 | -- | -- | **0.032** | <0.017 | -- | <0.017 | -- | -- | <0.017 | **0.066** | **0.021** | **0.018** | **0.430** | <0.017 | **0.020** | <0.017 | **0.025** | -- | **0.146** | **0.227** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | **3** | <1 | <1 | <1 | <1.0 | -- | **2** | **6** | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- | <1 | 2 | <1 | <1 | 9 | <1 | <1 | <1 | <0.40 | -- | 3 | 6 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2 | -- | -- | 2 | <2.0 | <2.0 | **4** | <2.0 | **2** | <2 | <2 | <2 | 1 | **6** | 1 | <1 | 2 | <2.0 | **3** | **4** | **10** | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 140 | -- | -- | **837** | 89 | 161 | 141 | **315** | **528** | 137 | **742** | 130 | 205 | **5,300** | 239 | 296 | 182 | 93 | **4,460** | **6,020** | **13,600** | **8,250** | 171 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **1.7** | <0.5 | -- | <0.5 | -- | -- | <0.5 | 0.9 | <0.5 | <0.5 | **13.5** | 0.9 | <0.5 | <0.5 | <0.5 | -- | **6.3** | **13.9** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 17 | -- | -- | 142 | 69 | 41 | 14 | 128 | 62 | 48 | 214 | 33 | 58 | 693 | 54 | 260 | 49 | 34 | 296 | 278 | 424 | 281 | 53 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | 2 | <2 | <2 | 9 | <2 | <2 | <2 | <2.0 | -- | 5 | 7 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | 1 | 1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <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 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 18 | -- | -- | 36 | 37 | -- | 25 | -- | -- | 26 | 30 | 31 | 25 | 34 | 35 | 37 | 30 | 32 | -- | 22 | 40 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | 8 | <2.0 | -- | 4 | -- | -- | <2 | 4 | <2 | <2 | 65 | 4 | <2 | 3 | <2 | -- | 25 | 106 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | 0.1 | <0.1 | <0.1 | <0.1 | 0.6 | <0.1 | <0.1 | <0.1 | <0.1 | -- | 0.6 | 0.9 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | **10** | <2 | <2 | <2 | <2 | -- | **7** | **16** | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 8 | -- | -- | 10 | 5 | 6 | 6 | 6 | 5 | <5 | 13 | 8 | <5 | **62** | <5 | <5 | 6 | 11 | 13 | 12 | **34** | 20 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 200 | 73 | -- | >250 | >250 | >250 | 85 | >250 | -- | 411 | 2,420 | 866 | 1,730 | 1,011 | 613 | 2,420 | >2420 | --- | **>2420** | >2420 | >2420 | 1,410 | >2420 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 33 | 45 | -- | 19 | **>250** | 2 | 2 | 34 | <100 | 2 | 20 | 12 | 4 | 6 | 6 | 10 | 10 | <10 | 3 | 6 | **>2420** | 34 | 10 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.62 | 2.31 | 0.57 | 0.82 | 1.12 | 0.07 | 2.85 | 0.86 | 0.15 | 1.03 | 0.69 | 1.17 | 1.10 | 5.07 | 0.67 | 0.64 | 0.91 | 0.57 | 8.84 | 4.67 | 8.00 | 4.71 | 1.70 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.64 | 2.21 | 0.64 | 0.74 | 1.04 | 0.06 | 2.75 | 0.76 | 0.15 | 1.10 | 0.91 | 1.37 | 1.10 | 6.39 | 0.65 | 0.65 | 0.87 | 0.54 | 9.54 | 3.69 | 12.31 | 10.82 | 1.76 |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.
[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.
[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).
[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).
[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.
[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.
[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.
[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Paper Mill Lake | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - PML-1 | | | | | | | | PML-1 | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | hh:mm | | | | | | | 13:40 | 13:45 | 13:25 | 13:00 | 11:40 | 14:45 PM | 1:10PM | 4:20 PM | 2:45 PM | 8:20 AM | 9:07 AM | 10:02 AM | 8:13 AM | 8:39 AM | 8:44 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 4.1 | 4.7 | 3.9 | 4.1 | 2.4 | 2.9 | 1.9 | 4.30 | N/A | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 17.2 | 23.0 | 14.4 | 14.4 | 24.7 | 12.3 | 12.0 | 28.1 | 11.1 | 23.1 | 23.5 | 10.5 | 15.8 | 21.9 | 13.7 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 6.97 | 7.76 | 8.19 | 9.44 | 5.57 | 8.36 | ** | 6.07 | 9.20 | 8.35 | 6.72 | **10.80** | 16.27 | 9.16 | 20.65 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.91 | 6.74 | 7.31 | **6.29** | 6.75 | 7.19 | 7.38 | 6.53 | 7.05 | **5.77** | **5.62** | 6.56 | **6.10** | **5.35** | **5.60** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 234.0 | 273.0 | 255.0 | 203.7 | 203.8 | 208.1 | 177.9 | 257.0 | 201.0 | 267.0 | 271.0 | 224.5 | 199.0 | 219.0 | 266.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 13 | 9 | <5 | 10 | 8 | <5 | 11 | 6 | 8.0 | 9.0 | 5.0 | 6 | 9 | 13 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 66 | 63 | 59 | 57 | 54 | 47 | 55 | 64 | 53 | 74 | 72 | 60 | 55 | 50 | 55 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 20 | 18 | 24 | 28 | 7 | 31 | 46 | 16 | 21 | 14 | 15 | 14 | 15.0 | 8.19 | 7.50 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.28 | 0.28 | 0.20 | 0.51 | 0.15 | 0.24 | 0.18 | 0.05 | 0.49 | 0.13 | <0.05 | 0.19 | 0.20 | 0.21 | 0.25 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.17 | 0.13 | 0.20 | 0.40 | 0.05 | 0.24 | 0.18 | 0.05 | 0.49 | 0.13 | <0.05 | 0.19 | 0.20 | 0.21 | 0.25 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.11** | **0.15** | <0.05 | **0.11** | **0.10** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | <0.03 | 0.05 | <0.03 | 0.04 | <0.03 | <0.03 | 0.10 | 0.08 | 0.07 | 0.10 | <0.03 | 0.04 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | 0.5 | 0.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.6 | <0.4 | 0.7 | <0.4 | 1.00 | 0.60 | 0.11 | <0.10 | <0.10 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.7 | 4.7 | 6.3 | 4.9 | 3.2 | 4.0 | 4.2 | 4.2 | 4.4 | 3.10 | 4.10 | 4.30 | 4.6 | 2.9 | 14.8 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.80 | 7.15 | 6.75 | 6.84 | 7.28 | 7.16 | 6.78 | 7.22 | 6.85 | 7.01 | 7.11 | 6.85 | 6.80 | 6.50 | 7.15 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 8.0 | 8.2 | 9.5 | 6.3 | 8.7 | 8.4 | 7.0 | 8.3 | 5.3 | 8.8 | 8.2 | 7.4 | 8.9 | 7.8 | 9.9 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.3 | 1.2 | 1.5 | 1.1 | 1.4 | 1.4 | 1.2 | 1.3 | 0.9 | 1.3 | 61.0 | 1.1 | 1.2 | 1.3 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.041** | **0.036** | **0.099** | **0.032** | **0.011** | **0.012** | 0.007 | 0.008 | **0.012** | <0.006 | **0.011** | **0.020** | **0.017** | 0.01 | 0.010 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.0 | 1.1 | 1.3 | 0.9 | 1.2 | 1.1 | 0.9 | 1.2 | 0.8 | 0.9 | 1.1 | 1.0 | 1.0 | 0.9 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 40.9 | 45.3 | 36.0 | 35.5 | 37.5 | 39.2 | 42.6 | 45.4 | 27.8 | 41.6 | 8.2 | 36.3 | 35.4 | 32.8 | 31.6 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 1.9 | 1.3 | 1.8 | 2.7 | 1.2 | 2.3 | 2.3 | 0.9 | 2.5 | 0.9 | 0.7 | 2.3 | 2.7 | 4.3 | 2.1 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 20 | 5 | 104 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 10 | 9 | 11 | 9 | 7 | 9 | 7 | 9 | 10 | 9.0 | 19.0 | 10.0 | 8 | 9 | 11 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 3.3 | 3.2 | 31.3 | 0.7 | 0.5 | 2.1 | 1.2 | 1.2 | 1.7 | 1.1 | 1.0 | 0.6 | 0.6 | 0.7 | <0.5 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 256 | 277 | 248 | 242 | 274 | 232 | 256 | 264 | 156 | 298 | 334 | 243 | 227 | 238 | 238 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.09 | 2.24 | 2.09 | 1.83 | 1.88 | 1.7 | 1.7 | 2.2 | 1.9 | 2.44 | 2.61 | 2.01 | 1.85 | 1.79 | 2.06 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 13 | 9 | <5 | 10 | 8.0 | <5 | 11.0 | 6.0 | 8 | 9 | 5 | 6 | 9 | 13 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 129 | 137 | 142 | 112 | 117 | 112.0 | 115.0 | 136.0 | 104.0 | 141 | 156 | 120 | 114 | 108 | 119 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.35 | 2.53 | 3.15 | 1.99 | 2.23 | 2.3 | 2.4 | 2.6 | 1.6 | 2.40 | 2.68 | 2.08 | 2.14 | 1.96 | 2.01 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 25.30 | 25.40 | 29.90 | 20.3 | 27.5 | 26.7 | 22.4 | 26.1 | 16.9 | 27.3 | 26.7 | 23.0 | 27.2 | 24.8 | 30.1 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 5.80 | 6.10 | 20.30 | 4.2 | 8.4 | 14.9 | 15.7 | 6.9 | 7.7 | 0.9 | 1.4 | 1.5 | 7.1 | 4.3 | 1.2 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.20 | -2.42 | -2.92 | -3.26 | -2.37 | -2.6 | -3.3 | -2.4 | -3.2 | -2.74 | -2.63 | -3.18 | -3.07 | -3.24 | -2.34 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.52 | -2.74 | -3.24 | -3.58 | -2.69 | -2.9 | -3.6 | -2.7 | -3.6 | -3.06 | -2.95 | -3.50 | -3.39 | -3.56 | -2.66 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 10.00 | 9.57 | 9.67 | 10.1 | 9.65 | 9.8 | 10.1 | 9.6 | 10.1 | 9.75 | 9.74 | 10.00 | 9.87 | 9.74 | 9.49 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.30 | 9.89 | 9.99 | 10.4 | 9.97 | 10.1 | 10.4 | 10.0 | 10.4 | 10.1 | 10.1 | 10.3 | 10.2 | 10.1 | 9.81 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **250** | **94** | **4,190** | **151** | **26** | -- | **139** | **25** | **133** | **35** | -- | -- | **114** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | 3 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 22 | -- | 58 | 19 | 12 | -- | 21 | 16 | 17 | 25.0 | -- | -- | 22 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | 12 | 6 | 11 | -- | 7 | 10 | 7 | 8.0 | -- | -- | 14 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.041** | -- | **0.179** | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | -- | **5** | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | 6 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | **8** | <1 | <1 | 1 | 1 | <1 | 1 | <1 | <1 | <1 | 1 | 1 | 2 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 206 | **359** | **12,600** | 93 | 184 | 82 | 136 | 187 | 108 | 164 | 224 | 108 | 169 | 74 | 65 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | **9.1** | **1.2** | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 64 | 125 | **894** | 21 | 64 | 22 | 26 | 115 | 28 | 220 | 61 | 21 | 52 | 25 | 19 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 22 | -- | 6 | 2 | <2 | -- | 5 | 2 | <2 | <2 | -- | -- | **60** | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 34 | -- | 47 | 27 | 42 | -- | 35 | 37 | 30 | 38.0 | -- | -- | 37 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 2 | -- | 75 | <2 | <2 | -- | <2 | <2 | 2 | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | 0.6 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | **12** | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 11 | <5 | 29 | 6 | 6 | <5 | 7 | <5 | <5 | <5 | <5 | <5 | **120** | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 665 | >2420 | 166 | 9 | 400 | 4,000.0 | 128 | 500 | 864 | 166 | 548 | 250 | >200 | >200 | >200 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 6 | 2 | <1 | 1 | 10 | 13 | <1 | 4 | 14 | 3 | 10 | 2 | 2 | 23 | 2 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.32 | 1.89 | 1.1 | 0.63 | 0.47 | 1.1 | <0.25 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 4.97 | 4.40 | 4.86 | 1.93 | 1.14 | 1.12 | 1.53 | 1.84 | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 6.45 | 4.96 | 6.58 | 0.98 | -- | * | 1.44 | 1.56 | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperat

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health C

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Paper Mill Lake | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site PML-2 | | | | | | | | PML-2 | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 5/15/2013 | 10/16/2013 | 5/15/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | | 13:15 | 13:40 | 13:45 | 14:30 | 16:20 | 13:00 | 12:40 | 16:20 | 16:15 | 13:16 | 13:40 | 11:20 | 11:00 | 9:20 | 8:30 | 11:30 | 13:45 | 9:08 | 13:45 | 10:00 | 9:50 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | -- | 1.2 | -- | -- | 2.8 | 2.2 | 2.3 | N/A | 3.0 | 2.0 | 2.2 | 2.3 | 2.2 | 2.4 | 3.2 | N/A | N/A | N/A | 3.1 | NCC | N/A | 2.4 | 2.7 | 2.3 | 2.6 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | -- | 14.8 | 24.2 | 19.7 | 17.8 | 25.3 | 10.1 | 10.9 | 23.1 | 15.2 | 11.6 | 14.8 | 12.6 | 14.4 | 21.1 | 12.1 | 15.1 | 27.0 | 9.0 | 13.8 | 22.1 | 11.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | -- | **10.20** | 8.30 | 8.40 | 8.78 | 8.09 | **10.58** | **9.88** | 8.70 | 8.94 | 7.75 | 9.26 | 8.90 | **12.44** | 6.95 | 7.92 | 8.06 | **9.76** | 8.28 | 8.55 | 7.69 | **10.31** |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | -- | **6.36** | 6.82 | 6.84 | 7.09 | 7.39 | 6.53 | **6.31** | 6.67 | **6.13** | 8.61 | **6.49** | **6.13** | 6.50 | 7.22 | **5.92** | 6.56 | 6.76 | 7.25 | 7.57 | **5.93** | **5.37** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | -- | 267.0 | 264.0 | 241.0 | 237.0 | 234.0 | 200.5 | 158.7 | 173.2 | 155.9 | 231.0 | 234.0 | 250.5 | 966.0 | 266.0 | 215.0 | 0.2 | 255.6 | 454.9 | 264.0 | 298.0 | 230.3 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | -- | 5 | 7 | 7 | 6 | 8 | 7 | <5 | 8 | 7 | 21 | <5 | 8 | 32 | 10 | 26 | <5.0 | 5 | 7 | 7 | 10 | 8 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | -- | 63 | 63 | 58 | 62 | 58 | 50 | 44 | 43 | 34 | 55 | 63 | 64 | **245** | 50 | 42 | 69 | 59 | 57 | 67 | 67 | 50 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | -- | 22 | 17 | 19 | 20 | 13 | 23 | 35 | 38 | 48 | 39 | 18 | 8 | 6 | 7 | 31 | 26 | 10 | 9 | 22 | 13 | 22 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | -- | 0.14 | 0.07 | 0.09 | 0.19 | 0.11 | 0.23 | 0.33 | 0.14 | 0.22 | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.32 | 0.23 | 0.10 | 0.11 | 0.18 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | -- | 0.14 | -- | -- | 0.19 | 0.11 | -- | 0.33 | -- | -- | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.17 | 0.23 | 0.10 | <0.05 | 0.18 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | **0.15** | <0.05 | <0.05 | **0.11** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.03 | 0.23 | 0.05 | 0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | -- | 1.7 | <0.4 | 0.4 | <5 | 0.2 | 1.2 | 3.0 | 0.6 | <0.4 | 0.5 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | -- | 3.6 | 2.6 | 4.5 | 3.2 | 3.4 | 3.6 | 4.0 | 6.0 | 5.6 | 5.9 | 4.4 | 4.0 | 2.7 | 2.4 | 5.8 | 2.8 | 6.0 | 6.1 | 4.0 | 3.6 | 8.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | -- | 6.50 | 6.81 | 6.82 | 6.66 | 7.02 | 6.83 | **6.37** | 6.60 | 6.60 | 6.60 | 6.68 | 6.73 | 7.13 | 7.04 | 6.77 | 6.64 | 6.98 | 6.98 | 6.83 | 7.23 | 6.93 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | -- | 6.1 | 7.1 | 6.1 | 7.2 | 7.7 | 8.0 | 5.3 | 4.8 | 5.0 | 6.1 | 6.7 | 7.7 | 19.2 | 8.8 | 6.9 | 7,300.0 | 8.2 | 6.2 | 8.9 | 8.1 | 7.4 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | -- | 1.1 | 1.1 | 1.1 | 1.3 | 1.2 | 1.2 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 1.4 | 1.7 | 1.4 | 1.0 | 1,000.0 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | -- | <0.002 | <0.002 | 0.002 | 0.010 | 0.002 | <0.002 | 0.009 | 0.009 | 0.007 | **0.025** | 0.006 | **0.026** | **0.011** | **0.026** | **0.018** | 0.008 | **0.012** | 0.008 | **0.012** | 0.003 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | -- | 0.9 | 1.0 | 0.9 | 1.0 | 0.9 | 1.0 | 0.9 | 0.8 | 1.0 | 0.8 | 0.8 | 1.3 | 1.4 | 1.2 | 1.1 | 830.0 | 1.0 | 0.9 | 1.0 | 1.0 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | -- | 35.0 | 40.0 | 34.0 | 31.1 | 35.1 | 30.8 | 25.7 | 21.3 | 20.9 | 34.6 | 37.5 | 42.0 | 133.0 | 42.6 | 33.9 | 38.0 | 43.3 | 31.3 | 42.9 | 37.5 | 32.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | -- | 2.6 | 2.5 | 2.3 | 2.6 | 2.3 | 3.3 | 2.9 | 2.5 | 3.0 | 2.8 | 2.7 | 4.2 | 2.4 | 2.3 | 2.9 | 1.9 | 1.8 | 2.8 | 2.3 | 0.6 | 2.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | -- | 2 | 3 | <1 | 15 | <2 | 11 | <1 | 8 | <1 | <5 | <5 | <5 | 16 | <5 | <5 | 1 | <5 | <5 | 45 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | -- | 11 | 11 | 11 | 10 | 10 | 10 | 9 | 10 | 9 | 7 | 9 | 11 | 27 | 7 | 7 | 8 | 9 | 9 | 12 | 7 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | -- | 0.8 | 0.7 | 0.6 | 1.0 | 0.8 | 0.4 | 0.4 | 3.4 | 0.5 | 0.7 | 1.0 | 3.3 | 2.6 | 0.7 | 1.0 | 0.9 | 1.9 | 1.3 | 9.4 | 1.1 | 1.4 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | -- | 240 | 250 | 230 | 230 | 230 | 210 | 170 | 170 | 150 | 213 | 254 | 277 | 777 | 273 | 212 | 260 | 251 | 246 | 263 | 319 | 190 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | -- | 2.11 | 2.17 | 1.99 | 2.07 | 2.01 | 1.77 | 1.46 | 1.58 | 1.30 | 2.13 | 1.98 | 2.19 | 8.12 | 1.77 | 1.86 | 2.13 | 1.97 | 1.95 | 2.29 | 2.24 | 1.79 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | -- | 5 | 7 | 7 | 6 | 8 | 7 | <1 | 8 | 7 | 21 | -- | 8 | 32 | 10 | 26 | <1.0 | 5 | 7 | 7 | 10 | 8 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | -- | 123 | 131 | 117 | 120 | 120 | 110 | 91 | 89 | 79 | 119 | 119 | 137 | 448 | 118 | 109 | 130 | 127 | 112 | 139 | 129 | 108 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | -- | 1.94 | 2.23 | 1.88 | 1.88 | 2.03 | 1.86 | 1.48 | 1.28 | 1.27 | 1.94 | 2.09 | 2.55 | 6.96 | 2.47 | 1.95 | 2.14 | 2.44 | 1.84 | 2.53 | 2.17 | 1.92 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | -- | 20.00 | 22.00 | 20.00 | 23.00 | 24.00 | 25.00 | 17.00 | 15.00 | 16.00 | 19.30 | 20.80 | 25.00 | 54.90 | 27.70 | 21.30 | 23.00 | 25.80 | 20.40 | 27.20 | 25.20 | 23.80 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | -- | 4.20 | 1.36 | 2.84 | 4.81 | 0.50 | 2.48 | 0.68 | 10.50 | 1.17 | 4.80 | 2.80 | 7.50 | 7.70 | 16.50 | 2.20 | 0.23 | 10.60 | 3.00 | 5.10 | 1.70 | 3.40 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -- | -3.33 | -2.83 | -2.93 | -3.06 | -2.55 | -2.80 | NC | -3.18 | -3.17 | -2.89 | -3.39 | -3.08 | -1.73 | -2.61 | -2.57 | NC | -3.00 | -2.97 | -2.98 | -2.46 | -2.89 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -- | -3.59 | -3.08 | -3.18 | -3.31 | -2.80 | -3.05 | NC | -3.43 | -3.42 | -3.21 | -3.71 | -3.40 | -2.05 | -2.93 | -2.89 | NC | -3.32 | -3.29 | -3.30 | -2.78 | -3.21 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -- | 9.83 | 9.64 | 9.75 | 9.72 | 9.57 | 9.63 | NC | 9.78 | 9.77 | 9.49 | 10.10 | 9.81 | 8.86 | 9.65 | 9.34 | NC | 9.98 | 9.95 | 9.81 | 9.69 | 9.82 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -- | 10.10 | 9.89 | 10.00 | 9.97 | 9.82 | 9.88 | NC | 10.00 | 10.00 | 9.81 | 10.40 | 10.10 | 9.18 | 9.97 | 9.66 | NC | 10.30 | 10.30 | 10.10 | 10.00 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **130** | -- | -- | **1,030** | **56** | -- | **202** | -- | -- | **189** | **131** | **107** | **181** | **52** | **122** | **130** | -- | **278** | **610** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 16 | -- | -- | 23 | 12 | -- | 23 | -- | -- | 22 | 22 | 37 | 50 | 27 | 19 | 25 | -- | 24 | 35 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 5 | -- | -- | 8 | 9 | -- | <50 | -- | -- | 6 | 6 | 9 | 7 | 13 | 11 | <50 | -- | <5 | 8 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.300 | -- | -- | **0.037** | <0.017 | -- | **0.028** | -- | -- | **0.023** | **0.039** | **0.060** | **0.062** | **0.019** | **0.018** | **0.023** | -- | **0.145** | **0.042** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- | <1 | <1 | 2 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2 | -- | -- | **3** | <2 | <2 | <2 | <2 | <2 | <2 | <2 | **1,380** | 1 | <1 | 2 | <2.0 | 2 | 2 | <1 | <1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 100 | -- | -- | **1,090** | 151 | 76 | 143 | **699** | 181 | 178 | 181 | **1,760** | 264 | **316** | 134 | 170 | **334** | **368** | **647** | 174 | 123 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **2.4** | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | **49.7** | 0.7 | <0.5 | <0.5 | <0.5 | -- | 0.5 | **1.1** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 58 | -- | -- | 159 | 81 | 28 | 34 | 89 | 31 | 22 | 87 | **866** | 206 | 278 | 24 | 43 | 67 | 61 | 109 | 36 | 23 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 2 | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2.0 | -- | 2 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | 0.100 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 30 | -- | -- | 35 | 33 | -- | 26 | -- | -- | 27 | 31 | 35 | 68 | 37 | 29 | 34 | -- | 21 | 38 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | 21 | <2 | -- | 4 | -- | -- | <2 | <2 | 2 | 3 | <2 | <2 | 2 | -- | 4 | 7 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 12 | -- | -- | 18 | <5.0 | 6 | 7 | 8 | 10 | 8 | 11 | **762** | <5 | <5 | 5 | 14 | <5 | 8 | 7 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 49 | 40 | -- | >250 | 46 | 97 | 64 | >250 | -- | 261 | 1,410 | 411 | 291 | 517 | >2420 | --- | >2420 | 1,120 | 687 | >2420 | >2420 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 10 | 31 | -- | 69 | <1 | 6 | 17 | **>250** | <100 | 1 | 12 | 2 | <1 | 3 | 16 | <0.10 | 5 | 2 | 4 | 47 | 30 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.15 | 1.36 | 0.59 | 3.50 | 1.54 | 0.53 | 0.55 | 2.48 | 1.33 | 0.76 | 1.18 | 0.25 | 0.99 | 0.48 | 0.72 | 1.67 | 4.79 | 1.50 | 3.82 | 1.09 | 2.02 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.22 | 1.33 | 0.66 | 3.39 | 1.51 | 0.42 | 0.51 | 2.26 | 1.13 | 0.76 | 1.34 | 0.27 | 1.13 | 0.44 | 0.70 | 1.56 | 4.59 | 0.74 | 5.04 | 1.42 | 2.12 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Paper Mill Lake | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site PML-2 | | | | | | | | PML-2 | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 |
| Sampling Time | hh:mm | | | | | | | 14:30 | 14:30 | 14:00 | 13:30 | 12:10 | 14:15 PM | 12:50PM | 3:40 PM | 3:15 PM | 8:50 AM | 9:27 AM | 10:25 AM | 8:25 AM | 8:56 AM | 8:59 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 2.5 | 2.5 | 2.9 | 2.9 | 3.0 | 2.2 | 2.4 | 2.20 | N/A | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 17.1 | 24.0 | 14.0 | 15.3 | 5.4 | 12.2 | 12.7 | 27.4 | 11.3 | 23.9 | 23.7 | 10.4 | 17.0 | 21.9 | 14.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.44** | 8.89 | 6.56 | **9.91** | 6.97 | 8.70 | ** | 6.06 | **9.80** | 7.79 | 7.58 | **10.16** | 16.06 | 9.01 | 11.88 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.73 | 7.01 | 6.87 | **6.33** | **24.70** | 7.00 | 6.76 | **6.39** | 7.40 | **6.07** | **6.08** | 6.64 | **6.41** | **5.53** | **6.22** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 242.0 | 285.0 | 252.0 | 214.4 | 293.8 | 297.3 | 6.1 | 239.0 | 193.0 | 275.0 | 270.0 | 228.7 | 209.0 | 219.0 | 207.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 5 | 12 | 11 | 5 | 11 | 8 | <5 | 11 | 8 | 9.0 | 10.0 | 7.0 | 6 | 10 | 13 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 67 | 72 | 60 | 46 | 55 | 43 | 50 | 64 | 64 | 76 | 72 | 61 | 58 | 47 | 59 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 18 | 7 | 19 | 31 | 21 | 21 | 43 | 14 | 19 | <5 | 12 | 15 | 12.4 | 5.50 | 12.00 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.27 | 0.07 | 0.16 | 0.17 | 0.13 | 0.20 | 0.14 | 0.07 | 0.38 | <0.05 | <0.05 | 0.18 | 0.17 | 0.25 | 0.22 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.16 | 0.07 | 0.16 | 0.17 | <0.05 | 0.20 | 0.14 | 0.07 | 0.38 | <0.05 | <0.05 | 0.18 | 0.17 | 0.25 | 0.22 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.11** | <0.05 | <0.05 | <0.05 | **0.13** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | 0.05 | 0.06 | 0.08 | 0.06 | 0.06 | 0.08 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | 0.6 | 0.6 | <0.4 | <0.4 | <0.4 | <0.4 | 1.3 | <0.4 | 1.9 | <0.4 | 1.40 | <0.4 | 0.12 | <0.10 | <0.10 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.5 | 5.4 | 4.1 | 4.9 | 3.5 | 4.0 | 4.3 | 4.4 | 4.5 | 3.00 | 4.10 | 4.20 | 4.7 | 3.0 | 2.8 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.86 | 7.23 | 6.99 | 6.81 | 7.29 | 7.05 | 6.78 | 7.20 | 6.89 | 7.00 | 7.11 | 6.85 | 6.84 | 6.54 | 7.17 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 8.1 | 8.5 | 8.1 | 6.7 | 8.1 | 7.7 | 7.1 | 9.1 | 5.6 | 8.6 | 7.2 | 8.3 | 8.5 | 8.2 | 8.8 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.3 | 1.1 | 1.2 | 1.1 | 1.2 | 1.3 | 1.2 | 1.4 | 0.9 | 1.3 | 40.0 | 1.3 | 1.2 | 1.3 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.018** | **0.013** | 0.006 | **0.047** | 0.005 | **0.012** | 0.008 | 0.005 | 0.008 | <0.0006 | **0.02** | 0.004 | 0.006 | **0.022** | 0.009 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.9 | 1.4 | 1.1 | 0.9 | 1.1 | 1.1 | 0.9 | 1.2 | 0.8 | 0.9 | 1.1 | 1.2 | 1.0 | 1.5 | 1.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 41.5 | 47.2 | 35.5 | 37.5 | 37.7 | 39.6 | 42.9 | 46.7 | 29.9 | 40.7 | 50.2 | 39.6 | 38.6 | 34.8 | 34.2 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 1.7 | 0.8 | 2.0 | 2.5 | 1.0 | 2.3 | 2.0 | 0.9 | 2.4 | 0.9 | 0.6 | 2.4 | 2.6 | 4.2 | 1.8 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | 14 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 10 | 8 | 11 | 7 | 7 | 8 | 7 | 9 | 11 | 9.0 | 8.0 | 10.0 | 9 | 9 | 11 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 1.9 | 1.9 | 1.8 | 1.4 | 0.7 | 1.2 | 1.0 | 1.2 | 2.2 | 1.1 | 0.8 | 0.7 | 1.0 | 0.6 | 0.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 259 | 286 | 255 | 249 | 289 | 227 | 261 | 268 | 189 | 302 | 335 | 249 | 241 | 238 | 252 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.22 | 2.44 | 2.15 | 1.56 | 1.93 | 1.6 | 1.57 | 2.2 | 2.2 | 2.51 | 2.40 | 2.08 | 1.96 | 1.73 | 2.17 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 5 | 12 | 11 | 5 | 11 | 8.0 | <5 | 11.0 | 8.0 | 9 | 10 | 7 | 6 | 10 | 13 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 133 | 146 | 124 | 103 | 118 | 107.0 | 110 | 139.0 | 119.0 | 142 | 146 | 127 | 121 | 109 | 125 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.37 | 2.62 | 2.09 | 2.10 | 2.19 | 2.3 | 2.37 | 2.7 | 1.7 | 2.35 | 2.69 | 2.29 | 2.24 | 2.08 | 2.08 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 25.60 | 25.80 | 25.20 | 21.3 | 25.2 | 24.6 | 22.70 | 28.5 | 17.7 | 26.8 | 22.9 | 26.1 | 26.2 | 25.8 | 27.3 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 3.20 | 3.50 | 1.60 | 14.9 | 6.4 | 18.7 | 20.40 | 9.0 | 13.6 | 3.3 | 5.7 | 4.7 | 6.9 | 9.1 | 2.2 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.13 | -2.37 | -2.66 | -3.25 | -2.35 | -2.8 | -3.26 | -2.4 | -3.1 | -2.71 | -2.64 | -2.98 | -3.05 | -3.14 | -2.37 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.45 | -2.69 | -2.98 | -3.57 | -2.67 | -3.1 | -3.58 | -2.7 | -3.4 | -3.03 | -2.96 | -3.30 | -3.37 | -3.46 | -2.69 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.99 | 9.60 | 9.65 | 10.1 | 9.64 | 9.8 | 10.00 | 9.6 | 9.9 | 9.71 | 9.75 | 9.83 | 9.89 | 9.68 | 9.54 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.30 | 9.92 | 9.97 | 10.4 | 9.96 | 10.1 | 10.40 | 9.9 | 10.3 | 10.0 | 10.1 | 10.2 | 10.2 | 10.0 | 9.86 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **215** | **40** | **34** | **141** | **75** | -- | **134** | **27** | **79** | **36.00** | -- | -- | 93 | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 27 | -- | 23 | 21 | 8 | -- | 25 | 19 | 17 | 28.0 | -- | -- | 25 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | 11 | 6 | 10 | -- | 6 | 11 | 6 | 8.0 | -- | -- | 8 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.017 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | 1 | <1 | <1 | 2 | <1 | 1 | 1 | <1 | <1 | <1 | 2 | 2 | 2 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | <50 | 203 | 145 | 104 | 163 | 165 | 128 | 258 | <50 | 172 | 224 | 124 | 142 | 74 | 213 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 85 | 68 | 26 | 20 | 42 | 74 | 28 | 139 | 30 | 192 | 40 | 32 | 48 | 20 | 33 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 4 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 35 | -- | 39 | 29 | 38 | -- | 35 | 42 | 27 | 40.0 | -- | -- | 36 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 8 | 9 | 5 | 5 | <5 | 6 | 7 | <5 | <5 | <5 | <5 | <5 | 5 | <5 | 7 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 1,990 | >2420 | 1,730 | 1 | 4000 | 3,030.0 | 106.0 | NDOGT | 1134 | 249 | 192 | 285 | >200 | >200 | >200 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 1 | 11 | 5 | <1 | 1 | 30 | <1 | 3 | 20 | 2 | 7 | 2 | 2 | 19 | 9 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.47 | 1.89 | 1.1 | 0.95 | 2.84 | 0.64 | 1.05 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 5.31 | 4.30 | 1.27 | 1.37 | 1.28 | 1.78 | 1.58 | 1.62 | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 6.60 | 4.23 | 1.47 | 2.22 | -- | * | 1.50 | 1.44 | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperat

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations and/or Health C

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

# Appendix D

# Laboratory Certificates of Analysis

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848

ATTENTION TO: Charlotte Clark

PROJECT: TE201017

AGAT WORK ORDER: 21X752309

MICROBIOLOGY ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

WATER ANALYSIS REVIEWED BY: Marta Manka, Data Reporter

DATE REPORTED: Jun 10, 2021

PAGES (INCLUDING COVER): 17

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

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



Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

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# Certificate of Analysis

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2021-05-27

DATE REPORTED: 2021-06-10

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | HWY102-1 | LU | LSD | KL-2 | KL-5 | KL-1 |
| | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | DATE SAMPLED: | 2021-05-27 08:13 | 2021-05-27 08:25 | 2021-05-27 09:42 | 2021-05-27 10:05 | 2021-05-27 10:52 | 2021-05-27 11:33 | 2021-05-27 11:52 | 2021-05-27 12:15 |
| Parameter | Unit | G / S | RDL | 2517481 | 2517518 | 2517519 | 2517520 | 2517521 | 2517522 | 2517523 | 2517524 |
| Total Coliforms (MF) | CFU/100 mL | | 1 | >200 | >200 | >200 | <1 | >200 | >200 | 196 | >200 |
| E. Coli (MF) | CFU/100 mL | | 1 | 2 | 2 | 27 | <1 | >200 | 195 | <1 | 25 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | KL-4 | KL-3 | HWY102-2 |
| | | SAMPLE TYPE: | Water | Water | Water |
| | | DATE SAMPLED: | 2021-05-27 12:40 | 2021-05-27 13:20 | 2021-05-27 13:38 |
| Parameter | Unit | G / S RDL | 2517525 | 2517526 | 2517527 |
| Total Coliforms (MF) | CFU/100 mL | 1 | >200 | >200 | >200 |
| E. Coli (MF) | CFU/100 mL | 1 | 39 | 12 | 14 |

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

Analysis perfomed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories
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# Certificate of Analysis

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Chlorophyll-a

DATE RECEIVED: 2021-05-27

DATE REPORTED: 2021-06-10

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | LU | LSD | KL-2 | KL-5 | KL-1 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-05-27 08:13 | 2021-05-27 08:25 | 2021-05-27 09:42 | 2021-05-27 10:05 | 2021-05-27 10:52 | 2021-05-27 11:33 | 2021-05-27 11:52 | 2021-05-27 12:15 |
| Parameter | Unit | G / S | RDL | 2517481 | 2517518 | 2517519 | 2517520 | 2517521 | 2517522 | 2517523 | 2517524 |
| Chlorophyll-a | µg/L | | 0.25 | 0.47 | 2.84 | 0.95 | 10.9 | 5.06 | 0.95 | 0.79 | 0.95 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | KL-4 | KL-3 | HWY102-2 |
| SAMPLE TYPE: | | | | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-05-27 12:40 | 2021-05-27 13:20 | 2021-05-27 13:38 |
| Parameter | Unit | G / S | RDL | 2517525 | 2517526 | 2517527 |
| Chlorophyll-a | µg/L | | 0.25 | 8.31 | 1.10 | 1.10 |

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

Analysis perfomed at AGAT Vancouver (unless marked by *)

Certified By: Marta Manka



Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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# Certificate of Analysis

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-05-27

DATE REPORTED: 2021-06-10

| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | | LU | | LSD | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | Water | | Water | | Water | Water |
| DATE SAMPLED: | | | | 2021-05-27 08:13 | 2021-05-27 08:25 | 2021-05-27 09:42 | | 2021-05-27 10:05 | | 2021-05-27 10:52 | 2021-05-27 11:33 |
| Parameter | Unit | G / S | RDL | 2517481 | 2517518 | 2517519 | RDL | 2517520 | RDL | 2517521 | 2517522 |
| pH | | | | 6.80 | 6.84 | 7.06 | | 7.36 | | 6.88 | 6.69 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 2.7 | 2.6 | 2.8 | 0.5 | 4.0 | 0.5 | 3.0 | 2.3 |
| Chloride | mg/L | | 1 | 55 | 58 | 98 | 2 | 189 | 1 | 27 | 13 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | <0.12 | 0.12 | <0.12 | 0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 8 | 9 | 15 | 2 | 25 | 2 | 4 | 4 |
| Alkalinity | mg/L | | 5 | 6 | 6 | 21 | 5 | 15 | 5 | 15 | 8 |
| True Color | TCU | | 5.00 | 15.0 | 12.4 | 19.2 | 5.00 | 6.12 | 5.00 | 17.0 | 47.0 |
| Turbidity | NTU | | 0.5 | 0.6 | 1.0 | 1.1 | 0.5 | 1.6 | 0.5 | 8.2 | 3.0 |
| Electrical Conductivity | umho/cm | | 1 | 227 | 241 | 424 | 1 | 717 | 1 | 139 | 79 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.20 | 0.17 | 0.25 | 0.05 | 0.69 | 0.05 | 0.10 | 0.05 |
| Nitrate as N | mg/L | | 0.05 | 0.20 | 0.17 | 0.25 | 0.05 | 0.60 | 0.05 | 0.10 | 0.05 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.09 | 0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | 0.04 | <0.03 | <0.03 | 0.03 | <0.03 | 0.03 | <0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 4.6 | 4.7 | 6.7 | 0.5 | 5.7 | 0.5 | 7.3 | 8.5 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 | 0.01 | 0.01 | <0.01 |
| Total Sodium | mg/L | | 0.1 | 35.4 | 38.6 | 60.4 | 0.1 | 120 | 0.1 | 17.9 | 10.1 |
| Total Potassium | mg/L | | 0.1 | 1.0 | 1.0 | 2.0 | 0.1 | 2.3 | 0.1 | 1.1 | 0.7 |
| Total Calcium | mg/L | | 0.1 | 8.9 | 8.5 | 18.0 | 0.1 | 20.2 | 0.1 | 7.5 | 3.8 |
| Total Magnesium | mg/L | | 0.1 | 1.2 | 1.2 | 2.7 | 0.1 | 2.7 | 0.1 | 1.6 | 0.8 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 6 | 6 | 21 | 5 | 15 | 5 | 15 | 8 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | 10 | <10 | 10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 | 5 | <5 | 5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 114 | 121 | 210 | 1 | 372 | 1 | 70 | 38 |
| Hardness | mg/L | | | 27.2 | 26.2 | 56.1 | | 61.6 | | 25.3 | 12.8 |
| Langelier Index (@20C) | NA | | | -3.07 | -3.05 | -1.98 | | -1.80 | | -2.64 | -3.37 |
| Langelier Index (@ 4C) | NA | | | -3.39 | -3.37 | -2.30 | | -2.12 | | -2.96 | -3.69 |
| Saturation pH (@ 20C) | NA | | | 9.87 | 9.89 | 9.04 | | 9.16 | | 9.52 | 10.1 |
| Saturation pH (@ 4C) | NA | | | 10.2 | 10.2 | 9.36 | | 9.48 | | 9.84 | 10.4 |
| Anion Sum | me/L | | | 1.85 | 1.96 | 3.51 | | 6.20 | | 1.15 | 0.61 |

Certified By: Marta Manka



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-05-27

DATE REPORTED: 2021-06-10

| | | SAMPLE DESCRIPTION: | | PML-1 | PML-2 | HWY102-1 | | LU | | LSD | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | | Water | | Water | Water |
| | | DATE SAMPLED: | | 2021-05-27 08:13 | 2021-05-27 08:25 | 2021-05-27 09:42 | | 2021-05-27 10:05 | | 2021-05-27 10:52 | 2021-05-27 11:33 |
| Parameter | Unit | G / S | RDL | 2517481 | 2517518 | 2517519 | RDL | 2517520 | RDL | 2517521 | 2517522 |
| Cation sum | me/L | | | 2.14 | 2.24 | 3.81 | | 6.53 | | 1.40 | 0.76 |
| % Difference/ Ion Balance | % | | | 7.1 | 6.9 | 4.1 | | 2.6 | | 9.6 | 10.4 |
| Total Aluminum | ug/L | | 5 | 114 | 93 | 66 | 5 | 52 | 5 | 199 | 204 |
| Total Antimony | ug/L | | 2 | <2 | <2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Arsenic | ug/L | | 2 | <2 | <2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Barium | ug/L | | 5 | 22 | 25 | 110 | 5 | 116 | 5 | 18 | 13 |
| Total Beryllium | ug/L | | 2 | <2 | <2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Bismuth | ug/L | | 2 | <2 | <2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Boron | ug/L | | 5 | 14 | 8 | 11 | 5 | 11 | 5 | 14 | 11 |
| Total Cadmium | ug/L | | 0.09 | <0.09 | <0.09 | <0.09 | 0.09 | <0.09 | 0.09 | <0.09 | <0.09 |
| Total Chromium | ug/L | | 1 | <1 | <1 | <1 | 1 | <1 | 1 | <1 | <1 |
| Total Cobalt | ug/L | | 1 | <1 | <1 | <1 | 1 | <1 | 1 | 1 | <1 |
| Total Copper | ug/L | | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 |
| Total Iron | ug/L | | 50 | 169 | 142 | 193 | 50 | 289 | 50 | 1020 | 472 |
| Total Lead | ug/L | | 0.5 | <0.5 | <0.5 | <0.5 | 0.5 | <0.5 | 0.5 | <0.5 | 0.7 |
| Total Manganese | ug/L | | 2 | 52 | 48 | 16 | 2 | 77 | 2 | 678 | 77 |
| Total Molybdenum | ug/L | | 2 | <2 | <2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Nickel | ug/L | | 2 | 60 | <2 | 12 | 2 | 3 | 2 | <2 | 3 |
| Total Phosphorous | mg/L | | 0.02 | 0.04 | 0.04 | 0.04 | 0.02 | 0.03 | 0.02 | 0.08 | 0.05 |
| Total Selenium | ug/L | | 1 | <1 | <1 | <1 | 1 | <1 | 1 | <1 | <1 |
| Total Silver | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | 0.1 | <0.1 | <0.1 |
| Total Strontium | ug/L | | 5 | 37 | 36 | 89 | 5 | 96 | 5 | 30 | 17 |
| Total Thallium | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | 0.1 | <0.1 | <0.1 |
| Total Tin | ug/L | | 2 | <2 | <2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Titanium | ug/L | | 2 | <2 | <2 | <2 | 2 | <2 | 2 | 4 | 4 |
| Total Uranium | ug/L | | 0.2 | <0.2 | <0.2 | <0.2 | 0.2 | <0.2 | 0.2 | <0.2 | <0.2 |
| Total Vanadium | ug/L | | 2 | <2 | <2 | <2 | 2 | <2 | 2 | <2 | <2 |
| Total Zinc | ug/L | | 5 | 120 | 5 | 6 | 5 | 31 | 5 | 8 | <5 |

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-05-27

DATE REPORTED: 2021-06-10

| | | SAMPLE DESCRIPTION: | | KL-5 | KL-1 | KL-4 | KL-3 | HWY102-2 |
|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2021-05-27 11:52 | 2021-05-27 12:15 | 2021-05-27 12:40 | 2021-05-27 13:20 | 2021-05-27 13:38 |
| Parameter | Unit | G / S | RDL | 2517523 | 2517524 | 2517525 | 2517526 | 2517527 |
| pH | | | | 6.71 | 6.69 | 6.64 | 6.76 | 7.05 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 3.0 | 2.8 | 3.1 | 2.9 | 3.3 |
| Chloride | mg/L | | 1 | 50 | 49 | 51 | 51 | 103 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | <0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 8 | 8 | 8 | 8 | 13 |
| Alkalinity | mg/L | | 5 | <5 | <5 | <5 | 6 | 16 |
| True Color | TCU | | 5.00 | 16.7 | 20.7 | 21.7 | 18.5 | 22.9 |
| Turbidity | NTU | | 0.5 | 1.3 | 1.0 | 22.6 | 0.7 | 2.6 |
| Electrical Conductivity | umho/cm | | 1 | 208 | 205 | 213 | 210 | 436 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.19 | 0.14 | 0.18 | <0.05 | 0.11 |
| Nitrate as N | mg/L | | 0.05 | 0.19 | 0.14 | 0.18 | <0.05 | 0.11 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 5.1 | 5.2 | 6.1 | 5.1 | 9.0 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 |
| Total Sodium | mg/L | | 0.1 | 34.7 | 34.2 | 34.8 | 31.3 | 64.7 |
| Total Potassium | mg/L | | 0.1 | 0.8 | 0.8 | 1.0 | 0.8 | 1.9 |
| Total Calcium | mg/L | | 0.1 | 6.0 | 9.2 | 10.1 | 7.5 | 19.3 |
| Total Magnesium | mg/L | | 0.1 | 1.0 | 1.1 | 1.2 | 1.0 | 2.8 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | <5 | <5 | <5 | 6 | 16 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 102 | 103 | 111 | 103 | 217 |
| Hardness | mg/L | | | 19.1 | 27.5 | 30.2 | 22.8 | 59.7 |
| Langelier Index (@20C) | NA | | | -3.40 | -3.24 | -3.25 | -3.18 | -2.08 |
| Langelier Index (@ 4C) | NA | | | -3.72 | -3.56 | -3.57 | -3.50 | -2.40 |
| Saturation pH (@ 20C) | NA | | | 10.1 | 9.93 | 9.89 | 9.94 | 9.13 |
| Saturation pH (@ 4C) | NA | | | 10.4 | 10.2 | 10.2 | 10.3 | 9.45 |
| Anion Sum | me/L | | | 1.59 | 1.56 | 1.62 | 1.73 | 3.50 |

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-05-27

DATE REPORTED: 2021-06-10

| SAMPLE DESCRIPTION: | | | | KL-5 | KL-1 | KL-4 | KL-3 | HWY102-2 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-05-27 11:52 | 2021-05-27 12:15 | 2021-05-27 12:40 | 2021-05-27 13:20 | 2021-05-27 13:38 |
| Parameter | Unit | G / S | RDL | 2517523 | 2517524 | 2517525 | 2517526 | 2517527 |
| Cation sum | me/L | | | 1.93 | 2.09 | 2.40 | 1.86 | 4.13 |
| % Difference/ Ion Balance | % | | | 9.6 | 14.5 | 19.5 | 3.7 | 8.2 |
| Total Aluminum | ug/L | | 5 | 126 | 145 | 1510 | 116 | 112 |
| Total Antimony | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 |
| Total Arsenic | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 |
| Total Barium | ug/L | | 5 | 15 | 14 | 30 | 16 | 174 |
| Total Beryllium | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 |
| Total Bismuth | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 |
| Total Boron | ug/L | | 5 | 7 | 16 | 18 | 9 | 10 |
| Total Cadmium | ug/L | | 0.09 | <0.09 | <0.09 | 0.15 | <0.09 | <0.09 |
| Total Chromium | ug/L | | 1 | <1 | <1 | 2 | <1 | <1 |
| Total Cobalt | ug/L | | 1 | <1 | <1 | 5 | <1 | <1 |
| Total Copper | ug/L | | 1 | 1 | 1 | 4 | 1 | 2 |
| Total Iron | ug/L | | 50 | 103 | 139 | 2070 | 114 | 1600 |
| Total Lead | ug/L | | 0.5 | <0.5 | <0.5 | 5.1 | <0.5 | 0.6 |
| Total Manganese | ug/L | | 2 | 21 | 51 | 252 | 24 | 100 |
| Total Molybdenum | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 |
| Total Nickel | ug/L | | 2 | <2 | 7 | 6 | <2 | <2 |
| Total Phosphorous | mg/L | | 0.02 | 0.04 | 0.03 | 0.11 | 0.03 | 0.05 |
| Total Selenium | ug/L | | 1 | <1 | <1 | <1 | <1 | <1 |
| Total Silver | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Strontium | ug/L | | 5 | 30 | 33 | 37 | 31 | 97 |
| Total Thallium | ug/L | | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Tin | ug/L | | 2 | <2 | <2 | <2 | <2 | <2 |
| Total Titanium | ug/L | | 2 | <2 | <2 | 30 | <2 | 3 |
| Total Uranium | ug/L | | 0.2 | <0.2 | <0.2 | 0.4 | <0.2 | <0.2 |
| Total Vanadium | ug/L | | 2 | <2 | <2 | 5 | <2 | <2 |
| Total Zinc | ug/L | | 5 | 6 | 189 | 201 | 40 | 6 |

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-05-27

DATE REPORTED: 2021-06-10

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

2517481-2517521 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

2517522 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Ion Balance is biased high, contributing parameters have been confirmed.

2517523 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

2517524-2517525 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Ion Balance is biased high, contributing parameters have been confirmed.

2517526-2517527 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis perfomed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TKN (Water)

DATE RECEIVED: 2021-05-27

DATE REPORTED: 2021-06-10

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | LU | LSD | KL-2 | KL-5 | KL-1 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-05-27 08:13 | 2021-05-27 08:25 | 2021-05-27 09:42 | 2021-05-27 10:05 | 2021-05-27 10:52 | 2021-05-27 11:33 | 2021-05-27 11:52 | 2021-05-27 12:15 |
| Parameter | Unit | G / S | RDL | 2517481 | 2517518 | 2517519 | 2517520 | 2517521 | 2517522 | 2517523 | 2517524 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | 0.11 | 0.12 | 0.24 | 0.27 | 0.64 | 0.24 | 0.16 | 0.19 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | KL-4 | KL-3 | HWY102-2 |
| SAMPLE TYPE: | | | | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-05-27 12:40 | 2021-05-27 13:20 | 2021-05-27 13:38 |
| Parameter | Unit | G / S | RDL | 2517525 | 2517526 | 2517527 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | 0.22 | 0.14 | 0.35 |

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

Analysis perfomed at AGAT Toronto (unless marked by *)

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TSS

DATE RECEIVED: 2021-05-27

DATE REPORTED: 2021-06-10

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | LU | LSD | KL-2 | KL-5 | KL-1 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-05-27 08:13 | 2021-05-27 08:25 | 2021-05-27 09:42 | 2021-05-27 10:05 | 2021-05-27 10:52 | 2021-05-27 11:33 | 2021-05-27 11:52 | 2021-05-27 12:15 |
| Parameter | Unit | G / S | RDL | 2517481 | 2517518 | 2517519 | 2517520 | 2517521 | 2517522 | 2517523 | 2517524 |
| Total Suspended Solids | mg/L | | 5 | <5 | <5 | 5 | <5 | 19 | <5 | <5 | <5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | KL-4 | KL-3 | HWY102-2 |
| SAMPLE TYPE: | | | | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-05-27 12:40 | 2021-05-27 13:20 | 2021-05-27 13:38 |
| Parameter | Unit | G / S | RDL | 2517525 | 2517526 | 2517527 |
| Total Suspended Solids | mg/L | | 5 | 12 | <5 | 9 |

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

Analysis perfomed at AGAT Halifax (unless marked by *)

Certified By: Marta Manka



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# Certificate of Analysis

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Phosphorus in Water (Low Level)

DATE RECEIVED: 2021-05-27

DATE REPORTED: 2021-06-10

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | LU | LSD | KL-2 | KL-5 | KL-1 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-05-27 08:13 | 2021-05-27 08:25 | 2021-05-27 09:42 | 2021-05-27 10:05 | 2021-05-27 10:52 | 2021-05-27 11:33 | 2021-05-27 11:52 | 2021-05-27 12:15 |
| Parameter | Unit | G / S | RDL | 2517481 | 2517518 | 2517519 | 2517520 | 2517521 | 2517522 | 2517523 | 2517524 |
| Total Phosphorus | mg/L | | 0.006 | 0.017 | 0.006 | 0.007 | 0.007 | 0.044 | 0.014 | 0.007 | <0.006 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | KL-4 | KL-3 | HWY102-2 |
| SAMPLE TYPE: | | | | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-05-27 12:40 | 2021-05-27 13:20 | 2021-05-27 13:38 |
| Parameter | Unit | G / S | RDL | 2517525 | 2517526 | 2517527 |
| Total Phosphorus | mg/L | | 0.006 | 0.038 | <0.006 | 0.018 |

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

Analysis perfomed at AGAT Toronto (unless marked by *)

Certified By: Marta Manka



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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of
AGAT WORK ORDER: 21X752309

PROJECT: TE201017
ATTENTION TO: Charlotte Clark

SAMPLING SITE:
SAMPLED BY:

## Water Analysis

| RPT Date: Jun 10, 2021 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Standard Water Analysis + Total Metals | | | | | | | | | | | | | | | |
| pH | 2518023 | | 6.96 | 6.99 | 0.4% | < | 102% | 80% | 120% | NA | | | NA | | |
| Reactive Silica as SiO2 | 2517572 | | 2.3 | 2.3 | NA | < 0.5 | 102% | 80% | 120% | 85% | 80% | 120% | 82% | 80% | 120% |
| Chloride | 2517102 | | 166 | 168 | 1.2% | < 1 | 85% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Fluoride | 2517102 | | 0.21 | 0.21 | NA | < 0.12 | 101% | 80% | 120% | NA | 80% | 120% | 92% | 70% | 130% |
| Sulphate | 2517102 | | 104 | 106 | 1.9% | < 2 | 105% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Alkalinity | 2518023 | | 37 | 37 | 0.9% | < 5 | 92% | 80% | 120% | NA | | | NA | | |
| True Color | 2517572 | | <5.00 | <5.00 | NA | < 5 | 90% | 80% | 120% | 99% | 80% | 120% | NA | | |
| Turbidity | 2517481 | 2517481 | 0.6 | 0.6 | NA | < 0.5 | 96% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 2518023 | | 116 | 115 | 0.6% | < 1 | 105% | 90% | 110% | NA | | | NA | | |
| Nitrate as N | 2517102 | | 1.33 | 1.35 | 1.8% | < 0.05 | 91% | 80% | 120% | NA | 80% | 120% | 75% | 70% | 130% |
| Nitrite as N | 2517102 | | <0.05 | <0.05 | NA | < 0.05 | 96% | 80% | 120% | NA | 80% | 120% | 114% | 70% | 130% |
| Ammonia as N | 2517525 | 2517525 | <0.03 | <0.03 | NA | < 0.03 | 98% | 80% | 120% | 101% | 80% | 120% | 116% | 70% | 130% |
| Total Organic Carbon | 2520475 | | 2.0 | 2.2 | NA | < 0.5 | 102% | 80% | 120% | NA | 80% | 120% | 103% | 80% | 120% |
| Ortho-Phosphate as P | 2517572 | | <0.01 | <0.01 | NA | < 0.01 | 99% | 80% | 120% | 101% | 80% | 120% | 107% | 80% | 120% |
| Total Sodium | 2521634 | | 82.9 | 81.2 | 2.1% | < 0.1 | 118% | 80% | 120% | 119% | 80% | 120% | NA | 70% | 130% |
| Total Potassium | 2521634 | | <0.1 | <0.1 | NA | < 0.1 | 106% | 80% | 120% | 107% | 80% | 120% | 94% | 70% | 130% |
| Total Calcium | 2521634 | | 1.3 | 1.2 | 8.0% | < 0.1 | 104% | 80% | 120% | 106% | 80% | 120% | NA | 70% | 130% |
| Total Magnesium | 2521634 | | <0.1 | <0.1 | NA | < 0.1 | 104% | 80% | 120% | 107% | 80% | 120% | 110% | 70% | 130% |
| Bicarb. Alkalinity (as CaCO3) | 2518023 | | 37 | 37 | 0.9% | < 5 | NA | 80% | 120% | NA | | | NA | | |
| Carb. Alkalinity (as CaCO3) | 2518023 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | | | NA | | |
| Hydroxide | 2518023 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | | | NA | | |
| Total Aluminum | 2521634 | | 18 | 18 | NA | < 5 | 94% | 80% | 120% | 102% | 80% | 120% | 106% | 70% | 130% |
| Total Antimony | 2521634 | | <2 | <2 | NA | < 2 | 97% | 80% | 120% | 101% | 80% | 120% | 107% | 70% | 130% |
| Total Arsenic | 2521634 | | 3 | 3 | NA | < 2 | 99% | 80% | 120% | 96% | 80% | 120% | 98% | 70% | 130% |
| Total Barium | 2521634 | | <5 | <5 | NA | < 5 | 104% | 80% | 120% | 104% | 80% | 120% | 103% | 70% | 130% |
| Total Beryllium | 2521634 | | <2 | <2 | NA | < 2 | 107% | 80% | 120% | 108% | 80% | 120% | 102% | 70% | 130% |
| Total Bismuth | 2521634 | | <2 | <2 | NA | < 2 | 109% | 80% | 120% | 107% | 80% | 120% | 96% | 70% | 130% |
| Total Boron | 2521634 | | 13 | 22 | NA | < 5 | 105% | 80% | 120% | 107% | 80% | 120% | 116% | 70% | 130% |
| Total Cadmium | 2521634 | | <0.09 | <0.09 | NA | < 0.09 | 102% | 80% | 120% | 102% | 80% | 120% | 100% | 70% | 130% |
| Total Chromium | 2521634 | | <1 | <1 | NA | < 1 | 97% | 80% | 120% | 98% | 80% | 120% | 112% | 70% | 130% |
| Total Cobalt | 2521634 | | <1 | <1 | NA | < 1 | 100% | 80% | 120% | 98% | 80% | 120% | 108% | 70% | 130% |
| Total Copper | 2521634 | | 24 | 25 | 2.6% | < 1 | 102% | 80% | 120% | 100% | 80% | 120% | NA | 70% | 130% |
| Total Iron | 2521634 | | 89 | 70 | NA | < 50 | 97% | 80% | 120% | 100% | 80% | 120% | 100% | 70% | 130% |
| Total Lead | 2521634 | | 1.6 | 1.1 | NA | < 0.5 | 108% | 80% | 120% | 107% | 80% | 120% | 95% | 70% | 130% |
| Total Manganese | 2521634 | | 28 | 28 | 0.0% | < 2 | 100% | 80% | 120% | 100% | 80% | 120% | NA | 70% | 130% |
| Total Molybdenum | 2521634 | | <2 | <2 | NA | < 2 | 97% | 80% | 120% | 93% | 80% | 120% | 109% | 70% | 130% |
| Total Nickel | 2521634 | | 11 | 4 | NA | < 2 | 100% | 80% | 120% | 100% | 80% | 120% | NA | 70% | 130% |
| Total Phosphorous | 2521634 | | 0.03 | 0.04 | NA | < 0.02 | 116% | 80% | 120% | NA | 80% | 120% | 129% | 70% | 130% |
| Total Selenium | 2521634 | | <1 | <1 | NA | < 1 | 102% | 80% | 120% | 90% | 80% | 120% | 83% | 70% | 130% |



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Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories
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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of
PROJECT: TE201017
SAMPLING SITE:

AGAT WORK ORDER: 21X752309
ATTENTION TO: Charlotte Clark
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Jun 10, 2021 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Total Silver | 2521634 | | <0.1 | <0.1 | NA | < 0.1 | 104% | 80% | 120% | 96% | 80% | 120% | 100% | 70% | 130% |
| Total Strontium | 2521634 | | <5 | <5 | NA | < 5 | 99% | 80% | 120% | 97% | 80% | 120% | 114% | 70% | 130% |
| Total Thallium | 2521634 | | <0.1 | <0.1 | NA | < 0.1 | 105% | 80% | 120% | 104% | 80% | 120% | 98% | 70% | 130% |
| Total Tin | 2521634 | | <2 | <2 | NA | < 2 | 100% | 80% | 120% | 99% | 80% | 120% | 108% | 70% | 130% |
| Total Titanium | 2521634 | | <2 | <2 | NA | < 2 | 104% | 80% | 120% | 108% | 80% | 120% | 119% | 70% | 130% |
| Total Uranium | 2521634 | | <0.2 | <0.2 | NA | < 0.2 | 98% | 80% | 120% | 102% | 80% | 120% | 102% | 70% | 130% |
| Total Vanadium | 2521634 | | <2 | <2 | NA | < 2 | 96% | 80% | 120% | 97% | 80% | 120% | 111% | 70% | 130% |
| Total Zinc | 2521634 | | 74 | 88 | 17.3% | < 5 | 100% | 80% | 120% | 98% | 80% | 120% | NA | 70% | 130% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| TSS | | | | | | | | | | | | | | | |
| Total Suspended Solids | 2515227 | | <5 | <5 | NA | < 5 | 102% | 80% | 120% | NA | | | 98% | 80% | 120% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| Total Phosphorus in Water (Low Level) | | | | | | | | | | | | | | | |
| Total Phosphorus | 2549481 | | 0.490 | 0.513 | 4.6% | < 0.006 | 96% | 70% | 130% | 100% | 80% | 120% | NA | 70% | 130% |
| Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated. | | | | | | | | | | | | | | | |
| TKN (Water) | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen | 2512188 | | 16.1 | 18.2 | 12.2% | < 0.10 | 101% | 70% | 130% | 98% | 80% | 120% | 106% | 70% | 130% |
| Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated. | | | | | | | | | | | | | | | |
| Total Phosphorus in Water (Low Level) | | | | | | | | | | | | | | | |
| Total Phosphorus | 2517522 | 2517522 | 0.014 | 0.016 | NA | < 0.006 | 99% | 70% | 130% | 98% | 80% | 120% | 93% | 70% | 130% |
| Chlorophyll-a | | | | | | | | | | | | | | | |
| Chlorophyll-a | 2517481 | | 951 | 929 | 2.3% | < 0.25 | 99% | 85% | 115% | | | | | | |

Certified By: Marta Manka



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MF) | MIC-121-7002 | Sm 9222 H | MF/INCUBATOR |
| E. Coli (MF) | MIC-121-7002 | SM 9222 H | MF/INCUBATOR |



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AGAT WORK ORDER: 21X752309

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SAMPLING SITE:

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| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Chlorophyll-a | | SM 10200 H | SPECTROPHOTOMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Fluoride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| True Color | INOR-121-6008 | SM 2120 B | LACHAT FIA |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Potassium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Hydroxide | INORG-121-6001 | SM 2320 B | PC-TITRATE |
| Calculated TDS | CALCULATION | SM 1030E | CALCULATION |
| Hardness | CALCULATION | SM 2340B | CALCULATION |
| Langelier Index (@20C) | CALCULATION | CALCULATION | CALCULATION |
| Langelier Index (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 20C) | CALCULATION | CALCULATION | CALCULATION |
| Saturation pH (@ 4C) | CALCULATION | CALCULATION | CALCULATION |
| Anion Sum | CALCULATION | SM 1030E | CALCULATION |
| Cation sum | CALCULATION | SM 1030E | CALCULATION |
| % Difference/ Ion Balance | CALCULATION | SM 1030E | CALCULATION |
| Total Aluminum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Antimony | MET121-6104 & MET-121-6105 | SM 3125 | ICP-MS |
| Total Arsenic | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Barium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Beryllium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Bismuth | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Boron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cadmium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 21X752309

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Total Chromium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cobalt | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Lead | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Molybdenum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Nickel | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorous | MET-121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Selenium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Silver | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Strontium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Thallium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Tin | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Titanium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Uranium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Vanadium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Kjeldahl Nitrogen | INOR-93-6048 | modified from EPA 351.2 and SM 4500-NORG D | LACHAT FIA |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |
| Total Phosphorus | INOR-93-6022 | modified from SM 4500-P B and SM 4500-P E | SPECTROPHOTOMETER |



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# AGAT Laboratories

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## Chain of Custody Record

**Laboratory Use Only**

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 9.8, 9.8, 8.2
Hold Time:
AGAT Job Number: 21x752309
Notes: Cooler, Ice

**Report Information**

Company: Wood
Contact: CHARLOTTE CLARK
Address:
Phone: Fax:
Client Project #: TE201017
AGAT Quotation: 335022Bp
Please Note: If quotation number is not provided client will be billed full price for analysis.

**Report Information** (Please print):

1. Name: CHARLOTTE CLARK
   Email:
2. Name:
   Email:

**Report Format**

☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

**Turnaround Time Required (TAT)**

Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

**Invoice To** Same Yes ☐ / No ☐

Company: 4
Contact: DENISE HIRTLE
Address:
Phone: Fax:
PO/Credit Card#:

**Regulatory Requirements** (Check):

☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No Salt Water Sample ☐ Yes ☐ No
Reg. No.:

| Sample Identification | Date/Time Sampled | Sample Matrix | # Containers | Comments – Site/Sample Info. Sample Containment | Field Filtered/Preserved | Standard Water Analysis | Metals: ☐ Total ☐ Diss ☐ Available | ~~Mercury~~ SWA + Tot. Metals | ☐ BOD ☐ CBOD | ~~NH3 LL Total Phos~~ | ☑ TSS ~~☐ TBS ☐ VSS~~ | TKN, Nitrogen: | Total Phosphorus (low level) | ~~Phenols~~ Total Coliforms (MPN) | Tier 1: TPH/BTEX (PIRI) ☐ low level | Tier 2: TPH/BTEX Fractionation | CCME-CWS TPH/BTEX | ~~VOC~~ Chlorophyll A + Pheophytin | ~~THM~~ | HAA | PAH | PCB | TC + EC ☐ P/A ☐ MPN ☐ MF | ☐ HPC ☐ Pseudomonas | Fecal Coliform ☐ MPN ☐ MF | Other: | Other: | Hazardous (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PML-1 | 27 May 2021 8:13 | SW | 7 | | | | | ✓ | | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | | | | |
| PML-2 | 8:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HWY102-1 | 9:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LU | 10:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LSD | 10:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| KL-2 | 11:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| KL-5 | 11:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| KL-1 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| KL-4 | 12:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| KL-3 | 13:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HWY102-2 | 13:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Samples Relinquished By (Print Name): | Date/Time | Samples Received By (Print Name): | Date/Time |
|---|---|---|---|
| [signature] | 2:20 | | |
| Samples Relinquished By (Sign): | Date/Time | Samples Received By (Sign): | Date/Time |
| | 27 May 2021 | [signature] | |

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1

Nº: 69453

Document ID: DIV-133-1502.002

Date revised: May 19, 2016

AGAT Laboratories

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CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848

ATTENTION TO: Charlotte Clark

PROJECT: TE201017

AGAT WORK ORDER: 21X785297

MICROBIOLOGY ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

WATER ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

DATE REPORTED: Aug 19, 2021

PAGES (INCLUDING COVER): 16

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

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



Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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# Certificate of Analysis

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2021-08-09

DATE REPORTED: 2021-08-19

| | | | | SAMPLE DESCRIPTION: | HW102-1 | HW102-2 | KL-4 | KL-3 | KL-5 | DUP1 | KL-1 | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2021-08-09 09:53 | 2021-08-09 13:22 | 2021-08-09 13:02 | 2021-08-09 12:44 | 2021-08-09 12:24 | 2021-08-09 12:24 | 2021-08-09 12:12 | 2021-08-09 11:53 |
| Parameter | Unit | G / S | RDL | | 2830084 | 2830085 | 2830086 | 2830087 | 2830088 | 2830089 | 2830090 | 2830091 |
| Total Coliforms (MF) | CFU/100 mL | 1 | 1 | | >200 | >200 | >200 | >200 | >200 | >200 | >200 | >200 |
| E. Coli (MF) | CFU/100 mL | 1 | 1 | | 34 | 31 | 24 | 18 | 9 | 6 | 130 | 26 |

| | | | | SAMPLE DESCRIPTION: | LSD | LU | PML-2 | PML-1 |
|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2021-08-09 11:07 | 2021-08-09 10:18 | 2021-08-09 08:56 | 2021-08-09 08:39 |
| Parameter | Unit | G / S | RDL | | 2830092 | 2830093 | 2830094 | 2830095 |
| Total Coliforms (MF) | CFU/100 mL | 1 | 1 | | >200 | >200 | >200 | >200 |
| E. Coli (MF) | CFU/100 mL | 1 | 1 | | 27 | 60 | 19 | 23 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2021-03
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.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashley Dussault



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Chlorophyll-a and Phaeophytin in Water (µg/L)

DATE RECEIVED: 2021-08-09

DATE REPORTED: 2021-08-19

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | HW102-1 | HW102-2 | KL-4 | KL-3 | KL-5 | DUP1 | KL-1 | KL-2 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-08-09 09:53 | 2021-08-09 13:22 | 2021-08-09 13:02 | 2021-08-09 12:44 | 2021-08-09 12:24 | 2021-08-09 12:24 | 2021-08-09 12:12 | 2021-08-09 11:53 |
| Parameter | Unit | G / S | RDL | 2830084 | 2830085 | 2830086 | 2830087 | 2830088 | 2830089 | 2830090 | 2830091 |
| Chlorophyll-a | µg/L | | 0.25 | 1.2 | 0.77 | 1.8 | 1.6 | 1.9 | 1.7 | 2.4 | 0.60 |
| Phaeophytin | µg/L | | 0.5 | 0.6 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | LSD | LU | PML-2 | PML-1 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-08-09 11:07 | 2021-08-09 10:18 | 2021-08-09 08:56 | 2021-08-09 08:39 |
| Parameter | Unit | G / S | RDL | 2830092 | 2830093 | 2830094 | 2830095 |
| Chlorophyll-a | µg/L | | 0.25 | 2.3 | 3.4 | 0.64 | 1.1 |
| Phaeophytin | µg/L | | 0.5 | <0.5 | 2.5 | <0.5 | <0.5 |

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

Analysis performed at AGAT Vancouver (unless marked by *)

Certified By: Ashley Dussault



Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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# Certificate of Analysis

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2021-08-09

DATE REPORTED: 2021-08-19

| | | SAMPLE DESCRIPTION: | | HW102-1 | HW102-2 | KL-4 | KL-3 | KL-5 | DUP1 | KL-1 | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2021-08-09 09:53 | 2021-08-09 13:22 | 2021-08-09 13:02 | 2021-08-09 12:44 | 2021-08-09 12:24 | 2021-08-09 12:24 | 2021-08-09 12:12 | 2021-08-09 11:53 |
| Parameter | Unit | G / S | RDL | 2830084 | 2830085 | 2830086 | 2830087 | 2830088 | 2830089 | 2830090 | 2830091 |
| pH | | | | 6.87 | 6.40 | 6.49 | 6.50 | 6.47 | 6.49 | 6.50 | 6.42 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 7.1 | 6.6 | 3.9 | 4.1 | 4.2 | 3.7 | 3.7 | 5.4 |
| Chloride | mg/L | | 1 | 57 | 94 | 49 | 49 | 51 | 48 | 48 | 13 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | 0.17 | 0.17 | 0.19 | 0.16 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 21 | 6 | 8 | 8 | 8 | 8 | 8 | 6 |
| Alkalinity | mg/L | | 5 | 23 | 11 | 8 | 8 | 8 | 8 | 9 | 8 |
| True Color | TCU | | 5.00 | 51.6 | 86.6 | 10.5 | 13.4 | 13.1 | 13.2 | 14.7 | 84.1 |
| Turbidity | NTU | | 0.5 | 0.8 | 1.7 | 0.6 | 0.8 | 0.6 | 0.6 | 2.1 | 5.6 |
| Electrical Conductivity | umho/cm | | 1 | 326 | 430 | 234 | 233 | 229 | 228 | 217 | 94 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.65 | <0.05 | 0.16 | 0.18 | 0.15 | 0.16 | 0.11 | 0.41 |
| Nitrate as N | mg/L | | 0.05 | 0.65 | <0.05 | 0.16 | 0.18 | 0.15 | 0.16 | 0.11 | 0.41 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 5.2 | 10.4 | 3.1 | 2.9 | 2.9 | 3.0 | 3.1 | 9.9 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Total Sodium | mg/L | | 0.1 | 39.6 | 61.9 | 34.0 | 32.8 | 31.4 | 31.6 | 31.9 | 10.9 |
| Total Potassium | mg/L | | 0.1 | 2.3 | 1.2 | 1.1 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 |
| Total Calcium | mg/L | | 0.1 | 15.9 | 11.9 | 8.1 | 7.6 | 7.3 | 7.4 | 7.5 | 5.9 |
| Total Magnesium | mg/L | | 0.1 | 2.2 | 1.8 | 1.3 | 1.3 | 1.1 | 1.2 | 1.1 | 1.3 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 23 | 11 | 8 | 8 | 8 | 8 | 9 | 8 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 155 | 185 | 107 | 106 | 105 | 103 | 104 | 46 |
| Hardness | mg/L | | | 48.8 | 37.1 | 25.6 | 24.3 | 22.8 | 23.4 | 23.3 | 20.1 |
| Langelier Index (@20C) | NA | | | -2.17 | -3.10 | -3.29 | -3.31 | -3.35 | -3.33 | -3.26 | -3.46 |
| Langelier Index (@ 4C) | NA | | | -2.49 | -3.42 | -3.61 | -3.63 | -3.67 | -3.65 | -3.58 | -3.78 |
| Saturation pH (@ 20C) | NA | | | 9.04 | 9.50 | 9.78 | 9.81 | 9.82 | 9.82 | 9.76 | 9.88 |
| Saturation pH (@ 4C) | NA | | | 9.36 | 9.82 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.2 |
| Anion Sum | me/L | | | 2.55 | 3.00 | 1.72 | 1.72 | 1.78 | 1.69 | 1.71 | 0.68 |

Certified By:





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# Certificate of Analysis

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2021-08-09

DATE REPORTED: 2021-08-19

| | | SAMPLE DESCRIPTION: | | HW102-1 | HW102-2 | KL-4 | KL-3 | KL-5 | DUP1 | KL-1 | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2021-08-09 09:53 | 2021-08-09 13:22 | 2021-08-09 13:02 | 2021-08-09 12:44 | 2021-08-09 12:24 | 2021-08-09 12:24 | 2021-08-09 12:12 | 2021-08-09 11:53 |
| Parameter | Unit | G / S | RDL | 2830084 | 2830085 | 2830086 | 2830087 | 2830088 | 2830089 | 2830090 | 2830091 |
| Cation sum | me/L | | | 2.78 | 3.54 | 2.03 | 1.95 | 1.86 | 1.88 | 1.90 | 0.97 |
| % Difference/ Ion Balance | % | | | 4.4 | 8.4 | 8.2 | 6.3 | 2.2 | 5.3 | 5.2 | 17.7 |
| Total Copper | ug/L | | 1 | 2 | 2 | 1 | 1 | 2 | 12 | 2 | 2 |
| Total Iron | ug/L | | 50 | 294 | 1080 | 69 | 68 | <50 | 61 | 115 | 503 |
| Total Manganese | ug/L | | 2 | 34 | 328 | 19 | 16 | 8 | 10 | 33 | 36 |
| Total Phosphorous | mg/L | | 0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Total Zinc | ug/L | | 5 | 8 | 6 | <5 | <5 | <5 | <5 | 6 | <5 |

Certified By: Ashley Dussault



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# Certificate of Analysis

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2021-08-09

DATE REPORTED: 2021-08-19

| | | SAMPLE DESCRIPTION: | | LSD | | LU | | PML-2 | PML-1 |
|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | | Water | Water |
| | | DATE SAMPLED: | | 2021-08-09 11:07 | | 2021-08-09 10:18 | | 2021-08-09 08:56 | 2021-08-09 08:39 |
| Parameter | Unit | G / S | RDL | 2830092 | RDL | 2830093 | RDL | 2830094 | 2830095 |
| pH | | | | 6.54 | | 6.75 | | 6.54 | 6.50 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 4.9 | 0.5 | 6.8 | 0.5 | 4.2 | 4.3 |
| Chloride | mg/L | | 1 | 26 | 2 | 132 | 1 | 47 | 50 |
| Fluoride | mg/L | | 0.12 | <0.12 | 0.12 | <0.12 | 0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 4 | 2 | 27 | 2 | 9 | 9 |
| Alkalinity | mg/L | | 5 | 13 | 5 | 17 | 5 | 10 | 9 |
| True Color | TCU | | 5.00 | 50.8 | 5.00 | 26.2 | 5.00 | 5.50 | 8.19 |
| Turbidity | NTU | | 0.5 | 0.9 | 0.5 | 2.9 | 0.5 | 0.6 | 0.7 |
| Electrical Conductivity | umho/cm | | 1 | 146 | 1 | 620 | 1 | 238 | 238 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | <0.05 | 0.05 | 1.09 | 0.05 | 0.25 | 0.21 |
| Nitrate as N | mg/L | | 0.05 | <0.05 | 0.05 | 1.09 | 0.05 | 0.25 | 0.21 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | 0.03 | <0.03 | 0.03 | <0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 6.4 | 0.5 | 3.5 | 0.5 | 3.0 | 2.9 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | 0.01 | <0.01 | 0.01 | <0.01 | <0.01 |
| Total Sodium | mg/L | | 0.1 | 19.9 | 0.1 | 102 | 0.1 | 34.8 | 32.8 |
| Total Potassium | mg/L | | 0.1 | 1.0 | 0.1 | 2.7 | 0.1 | 1.5 | 0.9 |
| Total Calcium | mg/L | | 0.1 | 6.3 | 0.1 | 19.8 | 0.1 | 8.2 | 7.8 |
| Total Magnesium | mg/L | | 0.1 | 1.4 | 0.1 | 2.8 | 0.1 | 1.3 | 1.3 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 13 | 5 | 17 | 5 | 10 | 9 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | 10 | <10 | 10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | 5 | <5 | 5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 67 | 1 | 302 | 1 | 109 | 108 |
| Hardness | mg/L | | | 21.5 | | 61.0 | | 25.8 | 24.8 |
| Langelier Index (@20C) | NA | | | -3.12 | | -2.36 | | -3.14 | -3.24 |
| Langelier Index (@ 4C) | NA | | | -3.44 | | -2.68 | | -3.46 | -3.56 |
| Saturation pH (@ 20C) | NA | | | 9.66 | | 9.11 | | 9.68 | 9.74 |
| Saturation pH (@ 4C) | NA | | | 9.98 | | 9.43 | | 10.0 | 10.1 |
| Anion Sum | me/L | | | 1.08 | | 4.70 | | 1.73 | 1.79 |

Certified By: Ashley Dussault



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# Certificate of Analysis

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2021-08-09

DATE REPORTED: 2021-08-19

| | | SAMPLE DESCRIPTION: | | LSD | | LU | | PML-2 | PML-1 |
|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | | Water | Water |
| | | DATE SAMPLED: | | 2021-08-09 11:07 | | 2021-08-09 10:18 | | 2021-08-09 08:56 | 2021-08-09 08:39 |
| Parameter | Unit | G / S | RDL | 2830092 | RDL | 2830093 | RDL | 2830094 | 2830095 |
| Cation sum | me/L | | | 1.35 | | 5.77 | | 2.08 | 1.96 |
| % Difference/ Ion Balance | % | | | 11.3 | | 10.2 | | 9.1 | 4.3 |
| Total Copper | ug/L | | 1 | 2 | 1 | 3 | 1 | 2 | 1 |
| Total Iron | ug/L | | 50 | 356 | 50 | 650 | 50 | 74 | 74 |
| Total Manganese | ug/L | | 2 | 74 | 2 | 103 | 2 | 20 | 25 |
| Total Phosphorous | mg/L | | 0.02 | <0.02 | 0.02 | <0.02 | 0.02 | <0.02 | 0.13 |
| Total Zinc | ug/L | | 5 | 8 | 5 | 26 | 5 | <5 | <5 |

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

2830084-2830090 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Samples were digested with HNO3 prior to analysis for metals by ICP-MS & ICP/OES.
Metals analysis was performed at AGAT Mississauga.

2830091 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
When the cation and anion sums are at, or below 1 me/L, the acceptable criteria is less than 0.3me/L

Samples were digested with HNO3 prior to analysis for metals by ICP-MS & ICP/OES.
Metals analysis was performed at AGAT Mississauga.

2830092-2830093 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
Ion Balance is biased high, contributing parameters have been confirmed.
Samples were digested with HNO3 prior to analysis for metals by ICP-MS & ICP/OES.
Metals analysis was performed at AGAT Mississauga.

2830094-2830095 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Samples were digested with HNO3 prior to analysis for metals by ICP-MS & ICP/OES.
Metals analysis was performed at AGAT Mississauga.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashley Dussault



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# Certificate of Analysis

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TKN

DATE RECEIVED: 2021-08-09

DATE REPORTED: 2021-08-19

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | HW102-1 | HW102-2 | KL-4 | KL-3 | KL-5 | DUP1 | KL-1 | KL-2 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-08-09 09:53 | 2021-08-09 13:22 | 2021-08-09 13:02 | 2021-08-09 12:44 | 2021-08-09 12:24 | 2021-08-09 12:24 | 2021-08-09 12:12 | 2021-08-09 11:53 |
| Parameter | Unit | G / S | RDL | 2830084 | 2830085 | 2830086 | 2830087 | 2830088 | 2830089 | 2830090 | 2830091 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | 0.30 | 0.40 | 0.12 | 0.12 | <0.10 | <0.10 | 0.22 | 0.24 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | LSD | LU | PML-2 | PML-1 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-08-09 11:07 | 2021-08-09 10:18 | 2021-08-09 08:56 | 2021-08-09 08:39 |
| Parameter | Unit | G / S | RDL | 2830092 | 2830093 | 2830094 | 2830095 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | 0.26 | <0.10 | <0.10 | <0.10 |

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Ashley Dussault



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# Certificate of Analysis

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TSS

DATE RECEIVED: 2021-08-09

DATE REPORTED: 2021-08-19

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | HW102-1 | HW102-2 | KL-4 | KL-3 | KL-5 | DUP1 | KL-1 | KL-2 |
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2021-08-09 09:53 | 2021-08-09 13:22 | 2021-08-09 13:02 | 2021-08-09 12:44 | 2021-08-09 12:24 | 2021-08-09 12:24 | 2021-08-09 12:12 | 2021-08-09 11:53 |
| Parameter | Unit | G / S | RDL | 2830084 | 2830085 | 2830086 | 2830087 | 2830088 | 2830089 | 2830090 | 2830091 |
| Total Suspended Solids | mg/L | | 5 | <5 | 14 | <5 | <5 | <5 | <5 | <5 | <5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | LSD | LU | PML-2 | PML-1 |
| | | SAMPLE TYPE: | | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2021-08-09 11:07 | 2021-08-09 10:18 | 2021-08-09 08:56 | 2021-08-09 08:39 |
| Parameter | Unit | G / S | RDL | 2830092 | 2830093 | 2830094 | 2830095 |
| Total Suspended Solids | mg/L | | 5 | 32 | 8 | <5 | <5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashley Dussault



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# Certificate of Analysis

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Phosphorus in Water (Low Level)

DATE RECEIVED: 2021-08-09

DATE REPORTED: 2021-08-19

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | HW102-1 | HW102-2 | KL-4 | KL-3 | KL-5 | DUP1 | KL-1 | KL-2 |
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2021-08-09 09:53 | 2021-08-09 13:22 | 2021-08-09 13:02 | 2021-08-09 12:44 | 2021-08-09 12:24 | 2021-08-09 12:24 | 2021-08-09 12:12 | 2021-08-09 11:53 |
| Parameter | Unit | G / S | RDL | 2830084 | 2830085 | 2830086 | 2830087 | 2830088 | 2830089 | 2830090 | 2830091 |
| Total Phosphorus | mg/L | | 0.006 | 0.034 | 0.036 | 0.031 | 0.024 | 0.019 | 0.028 | 0.017 | 0.025 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | LSD | LU | PML-2 | PML-1 |
| | | SAMPLE TYPE: | | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2021-08-09 11:07 | 2021-08-09 10:18 | 2021-08-09 08:56 | 2021-08-09 08:39 |
| Parameter | Unit | G / S | RDL | 2830092 | 2830093 | 2830094 | 2830095 |
| Total Phosphorus | mg/L | | 0.006 | 0.043 | 0.018 | 0.022 | 0.007 |

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Ashley Dussault



Results relate only to the items tested. Results apply to samples as received.

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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of
PROJECT: TE201017
SAMPLING SITE:

AGAT WORK ORDER: 21X785297
ATTENTION TO: Charlotte Clark
SAMPLED BY:

## Water Analysis

RPT Date: Aug 19, 2021

| PARAMETER | Batch | Sample Id | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| pH | 2833543 | | 5.49 | 4.96 | 10.1% | < | 101% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Reactive Silica as SiO2 | 2818631 | | 15.1 | 15.6 | 3.6% | < 0.5 | 104% | 80% | 120% | 89% | 80% | 120% | 86% | 80% | 120% |
| Chloride | 2823135 | | <1 | <1 | NA | < 1 | 97% | 80% | 120% | NA | 80% | 120% | 95% | 70% | 130% |
| Fluoride | 2823135 | | <0.12 | <0.12 | NA | < 0.12 | 98% | 80% | 120% | NA | 80% | 120% | 94% | 70% | 130% |
| Sulphate | 2823135 | | <2 | <2 | NA | < 2 | 105% | 80% | 120% | NA | 80% | 120% | 101% | 70% | 130% |
| Alkalinity | 2833543 | | <5 | <5 | NA | < 5 | 87% | 80% | 120% | NA | | | NA | | |
| True Color | 2818631 | | <5.00 | <5.00 | NA | < 5 | 101% | 80% | 120% | 89% | 80% | 120% | NA | | |
| Turbidity | 2830084 | 2830084 | 0.8 | 0.8 | NA | < 0.5 | 93% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 2833543 | | 88 | 88 | 0.2% | < 1 | 105% | 90% | 110% | NA | | | NA | | |
| Nitrate as N | 2823135 | | <0.05 | <0.05 | NA | < 0.05 | 88% | 80% | 120% | NA | 80% | 120% | 85% | 70% | 130% |
| Nitrite as N | 2823135 | | <0.05 | <0.05 | NA | < 0.05 | 96% | 80% | 120% | NA | 80% | 120% | 93% | 70% | 130% |
| Ammonia as N | 2833430 | | <0.03 | <0.03 | NA | < 0.03 | 98% | 80% | 120% | 91% | 80% | 120% | 106% | 70% | 130% |
| Total Organic Carbon | 2837500 | | 3.8 | 3.9 | 1.5% | < 0.5 | 103% | 80% | 120% | NA | 80% | 120% | 86% | 80% | 120% |
| Ortho-Phosphate as P | 2818631 | | 0.05 | 0.05 | NA | < 0.01 | 104% | 80% | 120% | 98% | 80% | 120% | 105% | 80% | 120% |
| Bicarb. Alkalinity (as CaCO3) | 2833543 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 2833543 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Hydroxide | 2833543 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| TSS | | | | | | | | | | | | | | | |
| Total Suspended Solids | 2826847 | | 9 | 9 | NA | < 5 | 106% | 80% | 120% | NA | | | 104% | 80% | 120% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| Chloride | 2830090 | 2830090 | 48 | 48 | 0.2% | < 1 | 97% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Fluoride | 2830090 | 2830090 | <0.12 | <0.12 | NA | < 0.12 | 103% | 80% | 120% | NA | 80% | 120% | 105% | 70% | 130% |
| Sulphate | 2830090 | 2830090 | 8 | 8 | NA | < 2 | 107% | 80% | 120% | NA | 80% | 120% | 87% | 70% | 130% |
| Nitrate as N | 2830090 | 2830090 | 0.11 | 0.10 | NA | < 0.05 | 89% | 80% | 120% | NA | 80% | 120% | 83% | 70% | 130% |
| Nitrite as N | 2830090 | 2830090 | <0.05 | <0.05 | NA | < 0.05 | 97% | 80% | 120% | NA | 80% | 120% | 105% | 70% | 130% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| Total Phosphorus in Water (Low Level) | | | | | | | | | | | | | | | |
| Total Phosphorus | 2830084 | 2830084 | 0.034 | 0.032 | 6.1% | < 0.006 | 97% | 70% | 130% | 105% | 80% | 120% | 99% | 70% | 130% |
| TKN | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen | 2829529 | | 31.8 | 35.2 | 10.4% | < 0.10 | 98% | 70% | 130% | 98% | 80% | 120% | 101% | 70% | 130% |
| Chlorophyll-a and Phaeophytin in Water (µg/L) | | | | | | | | | | | | | | | |
| Chlorophyll-a | 2812489 | BS | 682 | 676 | 0.9% | < 0.25 | NA | 85% | 115% | | | | | | |
| Phaeophytin | 2812489 | BS | 65 | 68 | 4.5% | < 0.5 | | | | | | | | | |



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AGAT Laboratories

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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Aug 19, 2021 | | | 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:



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MF) | MIC-121-7002 | Sm 9222 H | MF/INCUBATOR |
| E. Coli (MF) | MIC-121-7002 | SM 9222 H | MF/INCUBATOR |



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Chlorophyll-a | | SM 10200 H | SPECTROPHOTOMETER |
| Phaeophytin | | SM 10200 H | SPECTROPHOTOMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Fluoride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| True Color | INOR-121-6008 | SM 2120 B | LACHAT FIA |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Potassium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Hydroxide | INORG-121-6001 | SM 2320 B | PC-TITRATE |
| Calculated TDS | | SM 1030E | CALCULATION |
| Hardness | | SM 2340B | CALCULATION |
| Langelier Index (@20C) | | | CALCULATION |
| Langelier Index (@ 4C) | | | CALCULATION |
| Saturation pH (@ 20C) | | | CALCULATION |
| Saturation pH (@ 4C) | | | CALCULATION |
| Anion Sum | | SM 1030E | CALCULATION |
| Cation sum | | SM 1030E | CALCULATION |
| % Difference/ Ion Balance | | SM 1030E | CALCULATION |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorous | MET-121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Kjeldahl Nitrogen | INOR-93-6048 | modified from EPA 351.2 and SM 4500-NORG D | LACHAT FIA |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 21X785297

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Total Phosphorus | INOR-93-6022 | modified from SM 4500-P B and SM 4500-P E | SPECTROPHOTOMETER |



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# AGAT Laboratories

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## Chain of Custody Record

**Laboratory Use Only**
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 11.1, 18.1, 17.0
Hold Time:
AGAT Job Number: 21x785297
Notes: Cool, ice

**Report Information**
Company: Wood
Contact: CHARLOTTE CLARK
Address:
Phone: Fax:
Client Project #: TE201017
AGAT Quotation: 3350228P
Please Note: If quotation number is not provided client will be billed full price for analysis.

**Report Information** (Please print):
1. Name: CHARLOTTE CLARK
Email:
2. Name:
Email:

**Report Format**
☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

**Turnaround Time Required (TAT)**
**Regular TAT** ☑ 5 to 7 working days
**Rush TAT** ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

**Regulatory Requirements** (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No Salt Water Sample ☐ Yes ☐ No
Reg. No.:

**Invoice To** Same Yes ☐ / No ☐
Company: APinvoice.Canada@woodplc.com
Contact:
Address: ATT Charlotte Clark
Phone: Fax:
PO/Credit Card#: TE201017.####.####.573000

| Sample Identification | Date/Time Sampled | Sample Matrix | # Containers | Comments – Site/Sample Info. Sample Containment |
|---|---|---|---|---|
| HW102-1 | 9 Aug 21 / 9:53 | SW | 7 | |
| HW102-2 | 13:22 | | | |
| KL-4 | 13:02 | | | |
| KL-3 | 12:44 | | | |
| KL-5 | 12:24 | | | |
| DUP1 | 12:24 | | | |
| KL-1 | 12:12 | | | |
| KL-2 | 11:53 | | | |
| LSD | 11:07 | | | |
| LU | 10:18 | | | |
| PML-2 | 8:56 | | | |
| PML-1 | 8:39 | | | |

| Field Filtered/Preserved | Standard Water Analysis | Metals: ☐ Total ☐ Diss ☐ Available | ~~Mercury~~ LL Total PHOS | ☐ BOD ☐ CBOD | pH Total Coliform/E.Coli (MPN) | ☐ TSS ☐ TDS ☐ VSS | TKN | Total Phosphorus | ~~Phenols~~ Chlorophyll A + phosphine | Tier 1: TPH/BTEX (PIRI) ☐ low level | Tier 2: TPH/BTEX Fractionation | CCME-CWS TPH/BTEX | VOC | THM | HAA | PAH | PCB | TC + EC ☐ P/A ☐ MPN ☐ MF | ☐ HPC ☐ Pseudomonas | Fecal Coliform ☐ MPN ☐ MF | Other: | Other: | Hazardous (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X | | X | X | X | | X | | X | | | | | | | | | | | | | |

TSS

| Samples Relinquished By (Print Name): | Date/Time | Samples Received By (Print Name): | Date/Time |
|---|---|---|---|
| LEAH J. DARCHE | 9 Aug 2021 | | |
| Samples Relinquished By (Sign): | Date/Time | Samples Received By (Sign): | Date/Time |
| | 2:21 | | |

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page ____ of ____
N°: 56955

AGAT Laboratories

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CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848

ATTENTION TO: Charlotte Clark

PROJECT: TE201017

AGAT WORK ORDER: 21X819711

MICROBIOLOGY ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

WATER ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

DATE REPORTED: Nov 08, 2021

PAGES (INCLUDING COVER): 16

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

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



Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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# Certificate of Analysis

AGAT WORK ORDER: 21X819711

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2021-10-22

DATE REPORTED: 2021-11-08

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2021-10-22 08:44 | 2021-10-22 08:59 | 2021-10-22 09:49 | 2021-10-22 12:34 | 2021-10-22 10:08 | 2021-10-22 10:38 | 2021-10-22 11:20 | 2021-10-22 11:46 |
| Parameter | Unit | G / S | RDL | | 3118415 | 3118419 | 3118420 | 3118421 | 3118422 | 3118423 | 3118424 | 3118425 |
| Total Coliforms (MF) | CFU/100 mL | 1 | 1 | | >200 | >200 | >200 | >200 | >200 | >200 | >200 | >200 |
| E. Coli (MF) | CFU/100 mL | 1 | 1 | | 2 | 9 | 1 | <1 | 70 | 18 | 43 | 12 |

| | | | | SAMPLE DESCRIPTION: | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water |
| | | | | DATE SAMPLED: | 2021-10-22 12:02 | 2021-10-22 12:16 | 2021-10-22 11:08 |
| Parameter | Unit | G / S | RDL | | 3118426 | 3118427 | 3118428 |
| Total Coliforms (MF) | CFU/100 mL | 1 | 1 | | >200 | >200 | >200 |
| E. Coli (MF) | CFU/100 mL | 1 | 1 | | 29 | 44 | 1 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2021-03
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.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashley Dussault



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 21X819711

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Chlorophyll-a and Phaeophytin in Water (µg/L)

DATE RECEIVED: 2021-10-22

DATE REPORTED: 2021-11-08

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2021-10-22 08:44 | 2021-10-22 08:59 | 2021-10-22 09:49 | 2021-10-22 12:34 | 2021-10-22 10:08 | 2021-10-22 10:38 | 2021-10-22 11:20 | 2021-10-22 11:46 |
| Parameter | Unit | G / S | RDL | 3118415 | 3118419 | 3118420 | 3118421 | 3118422 | 3118423 | 3118424 | 3118425 |
| Chlorophyll-a | µg/L | | 0.25 | <0.25 | 1.05 | 1.05 | 4.99 | 2.37 | 0.79 | 1.05 | 0.79 |
| Phaeophytin | µg/L | | 0.5 | <0.5 | <0.5 | 0.6 | 0.9 | <0.5 | 0.5 | <0.5 | 0.7 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | KL-3 | KL-4 | KL-5 |
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2021-10-22 12:02 | 2021-10-22 12:16 | 2021-10-22 11:08 |
| Parameter | Unit | G / S | RDL | 3118426 | 3118427 | 3118428 |
| Chlorophyll-a | µg/L | | 0.25 | 13.1 | 5.26 | 63.1 |
| Phaeophytin | µg/L | | 0.5 | 1.6 | <0.5 | <0.5 |

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

Analysis performed at AGAT Vancouver (unless marked by *)

Certified By: Ashley Dussault



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 21X819711

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2021-10-22

DATE REPORTED: 2021-11-08

| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | | HWY102-2 | LU | | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | Water | | Water | Water | | Water |
| DATE SAMPLED: | | | | 2021-10-22 08:44 | 2021-10-22 08:59 | 2021-10-22 09:49 | | 2021-10-22 12:34 | 2021-10-22 10:08 | | 2021-10-22 10:38 |
| Parameter | Unit | G / S | RDL | 3118415 | 3118419 | 3118420 | RDL | 3118421 | 3118422 | RDL | 3118423 |
| pH | | | | 7.15 | 7.17 | 7.20 | | 6.66 | 7.38 | | 7.15 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 2.1 | 1.8 | 3.8 | 0.5 | 4.5 | 3.2 | 0.5 | 3.4 |
| Chloride | mg/L | | 1 | 55 | 59 | 82 | 2 | 199 | 153 | 1 | 33 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | <0.12 | 0.12 | <0.12 | <0.12 | 0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 11 | 11 | 17 | 2 | 8 | 29 | 2 | 4 |
| Alkalinity | mg/L | | 5 | 13 | 13 | 25 | 5 | 8 | 24 | 5 | 17 |
| True Color | TCU | | 5.00 | 7.50 | 12.0 | 27.7 | 5.00 | 24.8 | 12.2 | 5.00 | 31.1 |
| Turbidity | NTU | | 0.5 | <0.5 | 0.6 | 0.8 | 0.5 | 6.8 | 1.4 | 0.5 | 1.2 |
| Electrical Conductivity | umho/cm | | 1 | 238 | 252 | 365 | 1 | 546 | 568 | 1 | 163 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.25 | 0.22 | 0.17 | 0.05 | 0.06 | 0.71 | 0.05 | <0.05 |
| Nitrate as N | mg/L | | 0.05 | 0.25 | 0.22 | 0.17 | 0.05 | 0.06 | 0.71 | 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 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | <0.03 | <0.03 | 0.03 | <0.03 | <0.03 | 0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 14.8 | 2.8 | 3.0 | 0.5 | 4.7 | 4.4 | 0.5 | 3.7 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | 0.01 | <0.01 |
| Total Sodium | mg/L | | 0.1 | 31.6 | 34.2 | 41.1 | 0.1 | 98.1 | 81.2 | 0.1 | 20.2 |
| Total Potassium | mg/L | | 0.1 | 1.1 | 1.2 | 2.1 | 0.1 | 2.0 | 2.2 | 0.1 | 1.4 |
| Total Calcium | mg/L | | 0.1 | 9.9 | 8.8 | 19.6 | 0.1 | 17.1 | 18.0 | 0.1 | 8.4 |
| Total Magnesium | mg/L | | 0.1 | 1.3 | 1.3 | 2.6 | 0.1 | 2.1 | 2.4 | 0.1 | 1.7 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 13 | 13 | 25 | 5 | 8 | 24 | 5 | 17 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | 10 | <10 | <10 | 10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 | 5 | <5 | <5 | 5 | <5 |
| Calculated TDS | mg/L | | 1 | 119 | 125 | 180 | 1 | 335 | 304 | 1 | 80 |
| Hardness | mg/L | | | 30.1 | 27.3 | 59.6 | | 51.3 | 54.8 | | 28.0 |
| Langelier Index (@20C) | NA | | | -2.34 | -2.37 | -1.72 | | -2.84 | -1.62 | | -2.27 |
| Langelier Index (@ 4C) | NA | | | -2.66 | -2.69 | -2.04 | | -3.16 | -1.94 | | -2.59 |
| Saturation pH (@ 20C) | NA | | | 9.49 | 9.54 | 8.92 | | 9.50 | 9.00 | | 9.42 |
| Saturation pH (@ 4C) | NA | | | 9.81 | 9.86 | 9.24 | | 9.82 | 9.32 | | 9.74 |
| Anion Sum | me/L | | | 2.06 | 2.17 | 3.18 | | 5.94 | 5.45 | | 1.35 |

Certified By: Ashley Dussault



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# Certificate of Analysis

AGAT WORK ORDER: 21X819711

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2021-10-22

DATE REPORTED: 2021-11-08

| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | | HWY102-2 | LU | | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | Water | | Water | Water | | Water |
| DATE SAMPLED: | | | | 2021-10-22 08:44 | 2021-10-22 08:59 | 2021-10-22 09:49 | | 2021-10-22 12:34 | 2021-10-22 10:08 | | 2021-10-22 10:38 |
| Parameter | Unit | G / S | RDL | 3118415 | 3118419 | 3118420 | RDL | 3118421 | 3118422 | RDL | 3118423 |
| Cation sum | me/L | | | 2.01 | 2.08 | 3.05 | | 5.49 | 4.70 | | 1.51 |
| % Difference/ Ion Balance | % | | | 1.2 | 2.2 | 2.1 | | 4.0 | 7.4 | | 5.4 |
| Total Copper | ug/L | | 1 | 2 | 2 | 1 | 1 | 5 | 2 | 1 | <1 |
| Total Iron | ug/L | | 50 | 65 | 213 | 179 | 50 | 2400 | 231 | 50 | 440 |
| Total Manganese | ug/L | | 2 | 19 | 33 | 21 | 2 | 562 | 59 | 2 | 308 |
| Total Phosphorous | mg/L | | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 | 0.02 | 0.02 | 0.04 |
| Total Zinc | ug/L | | 5 | <5 | 7 | <5 | 5 | 16 | 13 | 5 | <5 |

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ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2021-10-22

DATE REPORTED: 2021-11-08

| | | SAMPLE DESCRIPTION: | | KL-1 | KL-2 | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2021-10-22 11:20 | 2021-10-22 11:46 | 2021-10-22 12:02 | 2021-10-22 12:16 | 2021-10-22 11:08 |
| Parameter | Unit | G / S | RDL | 3118424 | 3118425 | 3118426 | 3118427 | 3118428 |
| pH | | | | 7.06 | 7.04 | 7.10 | 7.08 | 7.07 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 1.7 | 3.9 | 0.7 | 1.9 | 1.6 |
| Chloride | mg/L | | 1 | 53 | 14 | 52 | 53 | 53 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | <0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 10 | 7 | 10 | 10 | 10 |
| Alkalinity | mg/L | | 5 | 10 | 15 | 9 | 11 | 11 |
| True Color | TCU | | 5.00 | 10.9 | 66.3 | 13.6 | 13.3 | 12.6 |
| Turbidity | NTU | | 0.5 | 0.9 | 1.3 | 0.7 | 0.7 | <0.5 |
| Electrical Conductivity | umho/cm | | 1 | 222 | 106 | 227 | 228 | 226 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.23 | 0.10 | 0.19 | 0.21 | 0.20 |
| Nitrate as N | mg/L | | 0.05 | 0.23 | 0.10 | 0.19 | 0.21 | 0.20 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | 0.44 | 0.67 | <0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 5.2 | 3.0 | 7.5 | 3.0 | 2.9 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | <0.01 | 0.88 | <0.01 | <0.01 |
| Total Sodium | mg/L | | 0.1 | 30.4 | 10.0 | 28.6 | 29.0 | 30.7 |
| Total Potassium | mg/L | | 0.1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total Calcium | mg/L | | 0.1 | 8.6 | 7.6 | 8.6 | 8.6 | 8.6 |
| Total Magnesium | mg/L | | 0.1 | 1.2 | 1.5 | 1.2 | 1.2 | 1.2 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 10 | 15 | 9 | 11 | 11 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 111 | 52 | 109 | 110 | 112 |
| Hardness | mg/L | | | 26.4 | 25.2 | 26.4 | 26.4 | 26.4 |
| Langelier Index (@20C) | NA | | | -2.60 | -2.46 | -2.60 | -2.54 | -2.55 |
| Langelier Index (@ 4C) | NA | | | -2.92 | -2.78 | -2.92 | -2.86 | -2.87 |
| Saturation pH (@ 20C) | NA | | | 9.66 | 9.50 | 9.70 | 9.62 | 9.62 |
| Saturation pH (@ 4C) | NA | | | 9.98 | 9.82 | 10.0 | 9.94 | 9.94 |
| Anion Sum | me/L | | | 1.92 | 0.85 | 1.87 | 1.94 | 1.94 |

Certified By: Ashley Dussault



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# Certificate of Analysis

AGAT WORK ORDER: 21X819711

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2021-10-22

DATE REPORTED: 2021-11-08

| | | | | SAMPLE DESCRIPTION: | KL-1 | KL-2 | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2021-10-22 11:20 | 2021-10-22 11:46 | 2021-10-22 12:02 | 2021-10-22 12:16 | 2021-10-22 11:08 |
| Parameter | Unit | G / S | RDL | | 3118424 | 3118425 | 3118426 | 3118427 | 3118428 |
| Cation sum | me/L | | | | 1.88 | 1.04 | 1.85 | 1.82 | 1.89 |
| % Difference/ Ion Balance | % | | | | 0.9 | 10.3 | 0.5 | 3.1 | 1.1 |
| Total Copper | ug/L | | 1 | | <1 | <1 | <1 | <1 | <1 |
| Total Iron | ug/L | | 50 | | 53 | 462 | <50 | 73 | <50 |
| Total Manganese | ug/L | | 2 | | 13 | 44 | 35 | 32 | 7 |
| Total Phosphorous | mg/L | | 0.02 | | 0.02 | 0.03 | 0.02 | 0.02 | 0.02 |
| Total Zinc | ug/L | | 5 | | <5 | <5 | <5 | <5 | <5 |

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

3118415-3118428 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashley Dussault



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ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TKN

DATE RECEIVED: 2021-10-22

DATE REPORTED: 2021-11-08

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2021-10-22 08:44 | 2021-10-22 08:59 | 2021-10-22 09:49 | 2021-10-22 12:34 | 2021-10-22 10:08 | 2021-10-22 10:38 | 2021-10-22 11:20 | 2021-10-22 11:46 |
| Parameter | Unit | G / S | RDL | | 3118415 | 3118419 | 3118420 | 3118421 | 3118422 | 3118423 | 3118424 | 3118425 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | | <0.10 | <0.10 | 0.15 | <0.10 | 0.13 | <0.10 | <0.10 | <0.10 |

| | | | | SAMPLE DESCRIPTION: | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water |
| | | | | DATE SAMPLED: | 2021-10-22 12:02 | 2021-10-22 12:16 | 2021-10-22 11:08 |
| Parameter | Unit | G / S | RDL | | 3118426 | 3118427 | 3118428 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | | <0.10 | <0.10 | <0.10 |

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Ashley Dussault



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# Certificate of Analysis

AGAT WORK ORDER: 21X819711

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TSS

DATE RECEIVED: 2021-10-22

DATE REPORTED: 2021-11-08

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2021-10-22 08:44 | 2021-10-22 08:59 | 2021-10-22 09:49 | 2021-10-22 12:34 | 2021-10-22 10:08 | 2021-10-22 10:38 | 2021-10-22 11:20 | 2021-10-22 11:46 |
| Parameter | Unit | G / S | RDL | | 3118415 | 3118419 | 3118420 | 3118421 | 3118422 | 3118423 | 3118424 | 3118425 |
| Total Suspended Solids | mg/L | | 5 | | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 6 |

| | | | | SAMPLE DESCRIPTION: | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water |
| | | | | DATE SAMPLED: | 2021-10-22 12:02 | 2021-10-22 12:16 | 2021-10-22 11:08 |
| Parameter | Unit | G / S | RDL | | 3118426 | 3118427 | 3118428 |
| Total Suspended Solids | mg/L | | 5 | | <5 | <5 | <5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Ashley Dussault



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# Certificate of Analysis

AGAT WORK ORDER: 21X819711

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Phosphorus in Water (Low Level)

DATE RECEIVED: 2021-10-22

DATE REPORTED: 2021-11-08

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-10-22 08:44 | 2021-10-22 08:59 | 2021-10-22 09:49 | 2021-10-22 12:34 | 2021-10-22 10:08 | 2021-10-22 10:38 | 2021-10-22 11:20 | 2021-10-22 11:46 |
| Parameter | Unit | G / S | RDL | 3118415 | 3118419 | 3118420 | 3118421 | 3118422 | 3118423 | 3118424 | 3118425 |
| Total Phosphorus | mg/L | | 0.006 | 0.010 | 0.009 | 0.012 | 0.018 | 0.011 | 0.034 | 0.011 | 0.015 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | KL-3 | KL-4 | KL-5 |
| SAMPLE TYPE: | | | | Water | Water | Water |
| DATE SAMPLED: | | | | 2021-10-22 12:02 | 2021-10-22 12:16 | 2021-10-22 11:08 |
| Parameter | Unit | G / S | RDL | 3118426 | 3118427 | 3118428 |
| Total Phosphorus | mg/L | | 0.006 | 0.014 | 0.008 | 0.009 |

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Ashley Dussault



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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 21X819711

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Water Analysis

RPT Date: Nov 08, 2021

| PARAMETER | Batch | Sample Id | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| TSS | | | | | | | | | | | | | | | |
| Total Suspended Solids | 3118415 | 3118415 | <5 | <5 | NA | < 5 | 105% | 80% | 120% | NA | | | 105% | 80% | 120% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| pH | 3118434 | | 6.64 | 6.60 | 0.6% | < | 101% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Reactive Silica as SiO2 | 3125786 | | 5.9 | 7.2 | 18.9% | < 0.5 | 96% | 80% | 120% | 98% | 80% | 120% | 94% | 80% | 120% |
| Chloride | 3141102 | | 11 | 11 | 0.5% | < 1 | 93% | 80% | 120% | NA | 80% | 120% | 99% | 70% | 130% |
| Fluoride | 3141102 | | <0.12 | <0.12 | NA | < 0.12 | 108% | 80% | 120% | NA | 80% | 120% | 105% | 70% | 130% |
| Sulphate | 3141102 | | 11 | 11 | 0.2% | < 2 | 112% | 80% | 120% | NA | 80% | 120% | 100% | 70% | 130% |
| Alkalinity | 3118434 | | 36 | 35 | 3.4% | < 5 | 88% | 80% | 120% | NA | | | NA | | |
| True Color | 3173422 | | 51.5 | 51.5 | 0% | <5 | 87% | 80% | 120% | 90% | 80% | 120% | NA | | |
| Turbidity | 3133627 | | 37.2 | 43.3 | 15.2% | < 0.5 | 94% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 3118434 | | 1250 | 1240 | 0.7% | < 1 | 106% | 90% | 110% | NA | | | NA | | |
| Nitrate as N | 3141102 | | 2.92 | 2.93 | 0.5% | < 0.05 | 98% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Nitrite as N | 3141102 | | <0.05 | <0.05 | NA | < 0.05 | 102% | 80% | 120% | NA | 80% | 120% | 106% | 70% | 130% |
| Ammonia as N | 3118601 | | <0.03 | <0.03 | NA | <0.03 | 100% | 80% | 120% | 101% | 80% | 120% | 103% | 70% | 130% |
| Total Organic Carbon | 3092948 | | 3.6 | 3.7 | 1.4% | < 0.5 | 86% | 80% | 120% | NA | 80% | 120% | 100% | 80% | 120% |
| Ortho-Phosphate as P | 3125786 | | <0.01 | 0.04 | NA | < 0.01 | 102% | 80% | 120% | 102% | 80% | 120% | 106% | 80% | 120% |
| Total Sodium | 3117717 | | 13.3 | 13.1 | 1.0% | < 0.1 | 100% | 80% | 120% | 107% | 80% | 120% | NA | 70% | 130% |
| Total Potassium | 3117717 | | 0.3 | 0.3 | NA | < 0.1 | 100% | 80% | 120% | 104% | 80% | 120% | 103% | 70% | 130% |
| Total Calcium | 3117717 | | 18.0 | 18.5 | 3.0% | < 0.1 | 95% | 80% | 120% | 99% | 80% | 120% | NA | 70% | 130% |
| Total Magnesium | 3117717 | | 0.4 | 0.4 | NA | < 0.1 | 96% | 80% | 120% | 101% | 80% | 120% | 103% | 70% | 130% |
| Bicarb. Alkalinity (as CaCO3) | 3118434 | | 36 | 35 | 3.4% | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 3118434 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Hydroxide | 3118434 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Copper | 3117717 | | 29 | 28 | 5.0% | < 1 | 100% | 80% | 120% | 103% | 80% | 120% | NA | 70% | 130% |
| Total Iron | 3117717 | | 118 | 113 | NA | < 50 | 98% | 80% | 120% | 101% | 80% | 120% | 112% | 70% | 130% |
| Total Manganese | 3117717 | | 2 | 2 | NA | < 2 | 96% | 80% | 120% | 101% | 80% | 120% | 106% | 70% | 130% |
| Total Phosphorous | 3117717 | | 0.77 | 0.80 | 4.1% | < 0.02 | 95% | 80% | 120% | 106% | 80% | 120% | NA | 70% | 130% |
| Total Zinc | 3117717 | | 82 | 80 | 2.4% | < 5 | 99% | 80% | 120% | 103% | 80% | 120% | NA | 70% | 130% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| Total Phosphorus in Water (Low Level) | | | | | | | | | | | | | | | |
| Total Phosphorus | 3118415 | 3118415 | 0.010 | 0.011 | NA | < 0.006 | 95% | 70% | 130% | 101% | 80% | 120% | 89% | 70% | 130% |
| Comments: If the RPD value is NA, the results of the duplicates are less than 5X the RDL and will not be calculated. | | | | | | | | | | | | | | | |
| TKN | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen | 3118508 | | <0.10 | <0.10 | NA | < 0.10 | 100% | 70% | 130% | 103% | 80% | 120% | 93% | 70% | 130% |



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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of
AGAT WORK ORDER: 21X819711
PROJECT: TE201017
ATTENTION TO: Charlotte Clark
SAMPLING SITE:
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Nov 08, 2021 | | | 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 |
| Chlorophyll-a and Phaeophytin in Water (µg/L) | | | | | | | | | | | | | | | |
| Chlorophyll-a | 3118415 | BlkSpk | 847 | 841 | 0.7% | < 0.25 | 105% | 85% | 115% | | | | | | |
| Phaeophytin | 3118415 | BlkSpk | 91.7 | 78.8 | 15.1% | < 0.5 | | | | | | | | | |

Comments: If the RPD value is NA, the results of the duplicates are less than 5X the RDL and will not be calculated.

Certified By:



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.

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 21X819711

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MF) | MIC-121-7002 | Sm 9222 H | MF/INCUBATOR |
| E. Coli (MF) | MIC-121-7002 | SM 9222 H | MF/INCUBATOR |



Results relate only to the items tested. Results apply to samples as received.

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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 21X819711

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ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Chlorophyll-a | | SM 10200 H | SPECTROPHOTOMETER |
| Phaeophytin | | SM 10200 H | SPECTROPHOTOMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Fluoride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| True Color | INOR-121-6008 | SM 2120 B | LACHAT FIA |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Potassium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Hydroxide | INORG-121-6001 | SM 2320 B | PC-TITRATE |
| Calculated TDS | | SM 1030E | CALCULATION |
| Hardness | | SM 2340B | CALCULATION |
| Langelier Index (@20C) | | | CALCULATION |
| Langelier Index (@ 4C) | | | CALCULATION |
| Saturation pH (@ 20C) | | | CALCULATION |
| Saturation pH (@ 4C) | | | CALCULATION |
| Anion Sum | | SM 1030E | CALCULATION |
| Cation sum | | SM 1030E | CALCULATION |
| % Difference/ Ion Balance | | SM 1030E | CALCULATION |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorous | MET-121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Kjeldahl Nitrogen | INOR-93-6048 | modified from EPA 351.2 and SM 4500-NORG D | LACHAT FIA |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |



Results relate only to the items tested. Results apply to samples as received.

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http://www.agatlabs.com

# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 21X819711

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Total Phosphorus | INOR-93-6022 | modified from SM 4500-P B and SM 4500-P E | SPECTROPHOTOMETER |



Results relate only to the items tested. Results apply to samples as received.

# AGAT Laboratories

Unit 122 • 11 Morris Drive
Dartmouth, NS
B3B 1M2
webearth.agatlabs.com • www.agatlabs.com
P: 902.468.8718 • F: 902.468.8924

## Chain of Custody Record

**Laboratory Use Only**
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 14.5, 10.0, 11.7
Hold Time:
AGAT Job Number: 21X819711
Notes:
'21 OCT 22 1:22PM

**Report Information**
Company: WOOD
Contact: Charlotte Clark
Address: 50Troop Dr
Dartmouth,NS
Phone: 902-468-2848 Fax:
Client Project #: TE201017
AGAT Quotation: 335022B
Please Note: If quotation number is not provided client will be billed full price for analysis.

**Report Information** (Please print):
1. Name: Charlotte Clark
Email: charlotte.clark@woodplc.com
2. Name: Leah Darche
Email: leah.darche@woodplc.com

**Report Format**
☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

**Turnaround Time Required (TAT)**
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

**Invoice To** Same Yes ☐ / No ☐
Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#: TE201017.0000.0000.5290.573000

**Regulatory Requirements** (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial
☐ Res/Park ☐ HRM 101
☐ Agricultural ☐ Storm Water
☐ FWAL ☐ Waste Water
☐ Sediment ☐ Other

**Drinking Water Sample:** ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

| Sample Identification | Date/Time Sampled | Sample Matrix | # Containers | Comments – Site/Sample Info. Sample Containment | standard water analysis | LL total phosphorous | TSS | TKN | TC/EC(MPN) | Chlorpphyll A & Pheophytin |
|---|---|---|---|---|---|---|---|---|---|---|
| PML-1 (22OCT2021) | 8:44 | SW | 7 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PML-2 | 8:59 | | | | | | | | | |
| HWY102-1 | 9:49 | | | | | | | | | |
| HWY102-2 | 12:34 | | | | | | | | | |
| LU | 10:08 | | | | | | | | | |
| LSD | 10:38 | | | | | | | | | |
| KL-1 | 11:20 | | | | | | | | | |
| KL-2 | 11:46 | | | | | | | | | |
| KL-3 | 12:02 | | | | | | | | | |
| KL-4 | 12:16 | | | | | | | | | |
| KL-5 | 11:08 | | | | | | | | | |

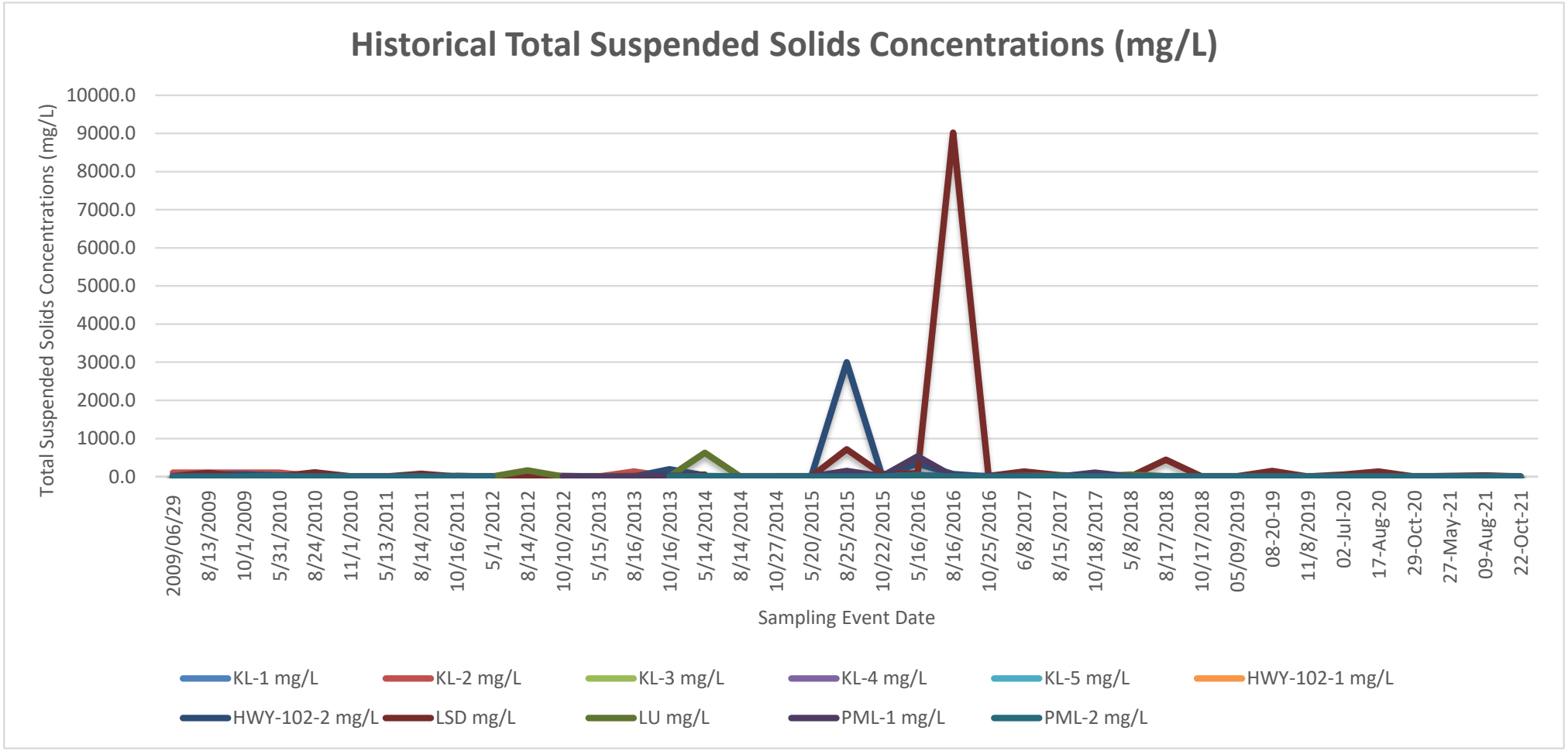
| Samples Relinquished By (Print Name): | Date/Time | Samples Received By (Print Name): | Date/Time |
|---|---|---|---|
| LEAH DARCHE | 22OCT2021 | | |
| Samples Relinquished By (Sign): | Date/Time | Samples Received By (Sign): | Date/Time |
| | 1:16 | | |

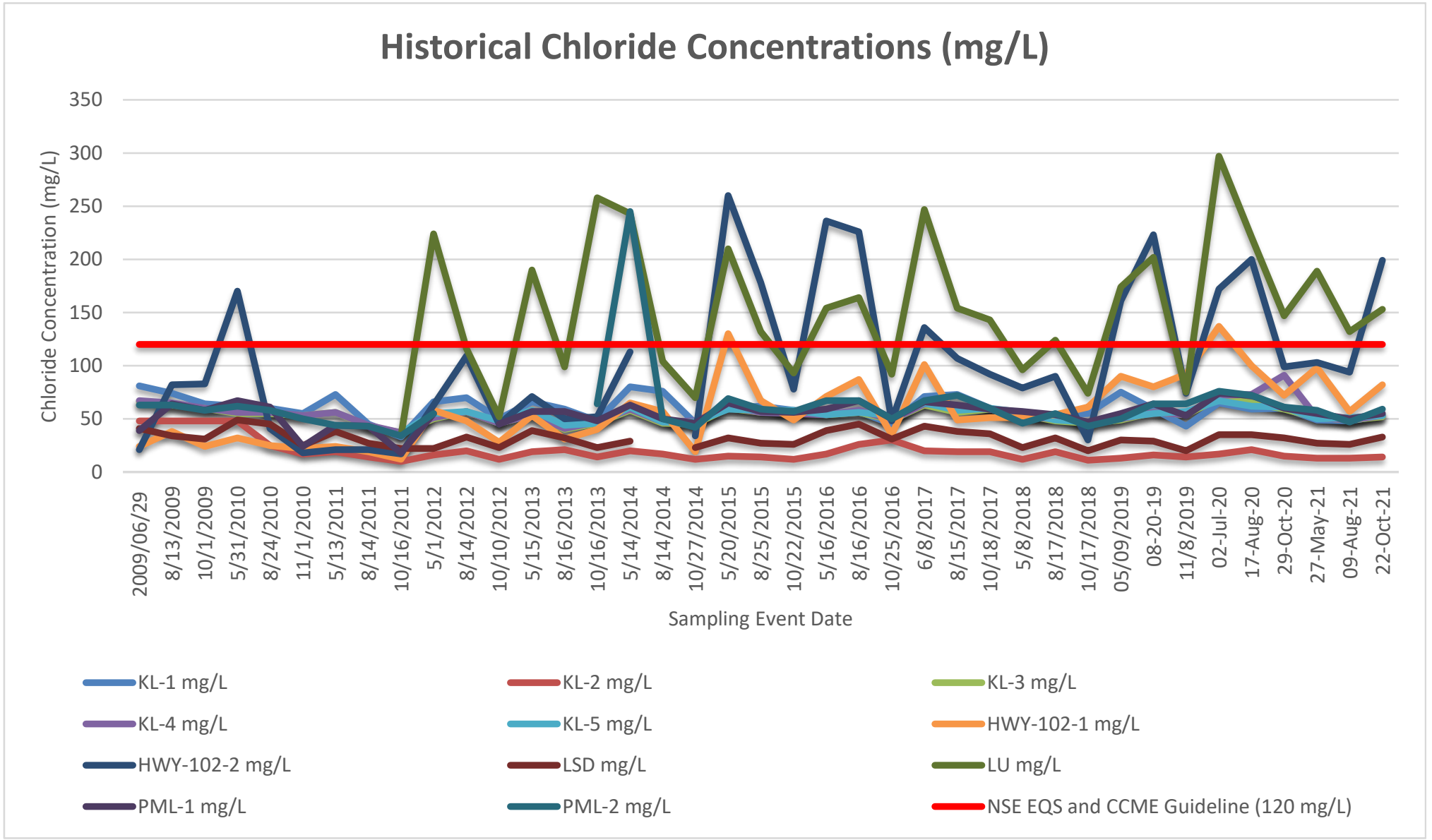
Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

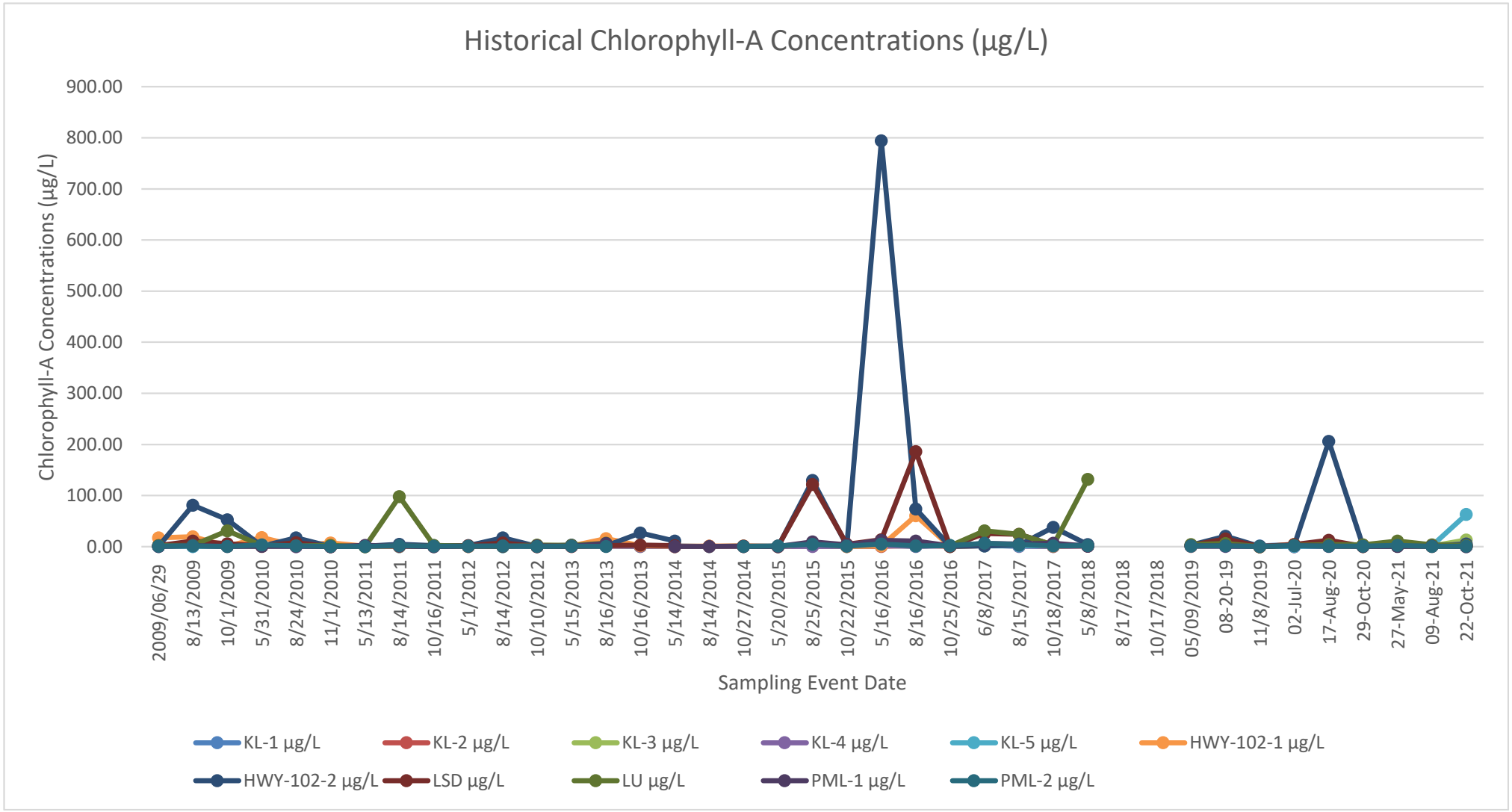
Page 1 of 1
N°:

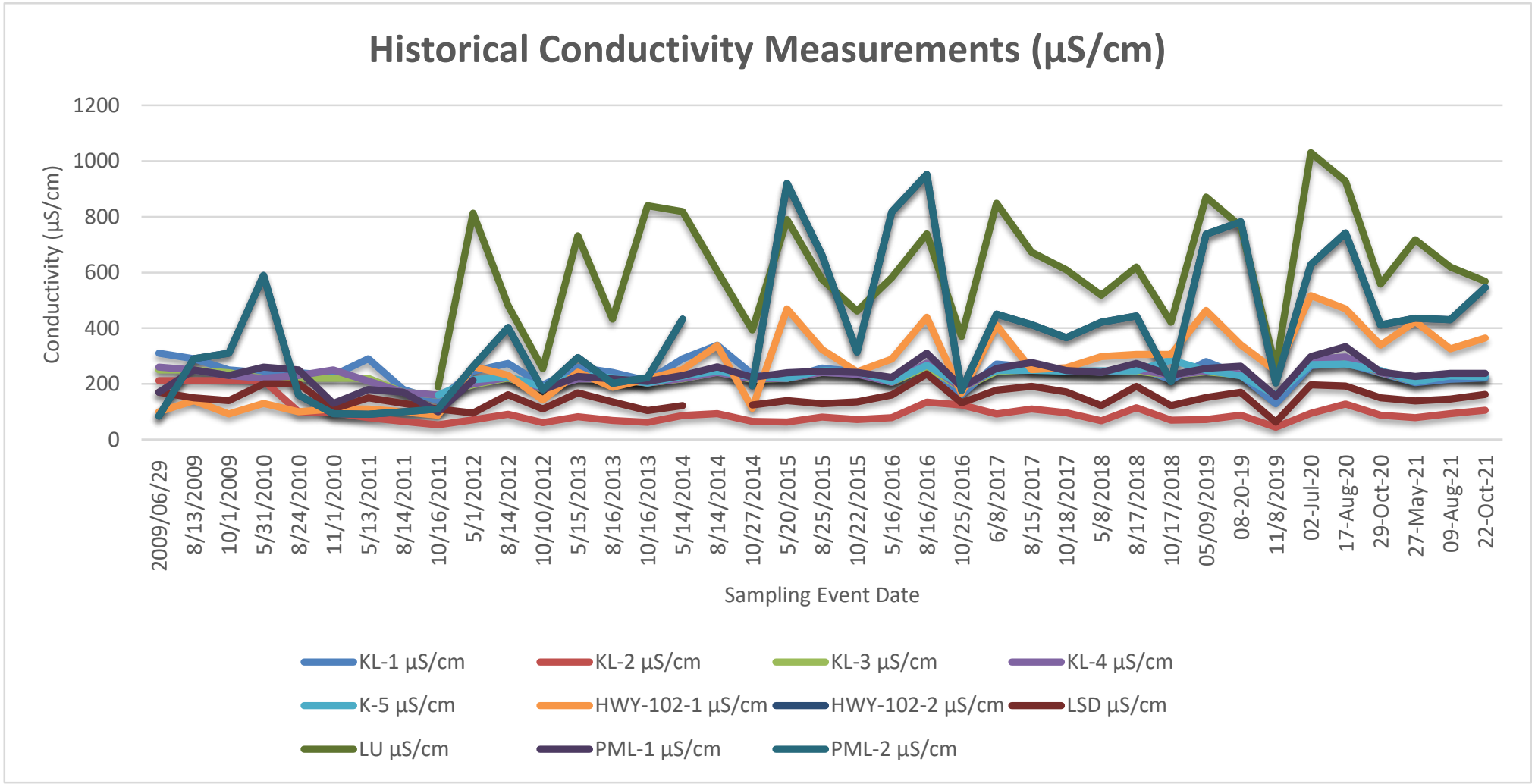
# Appendix E

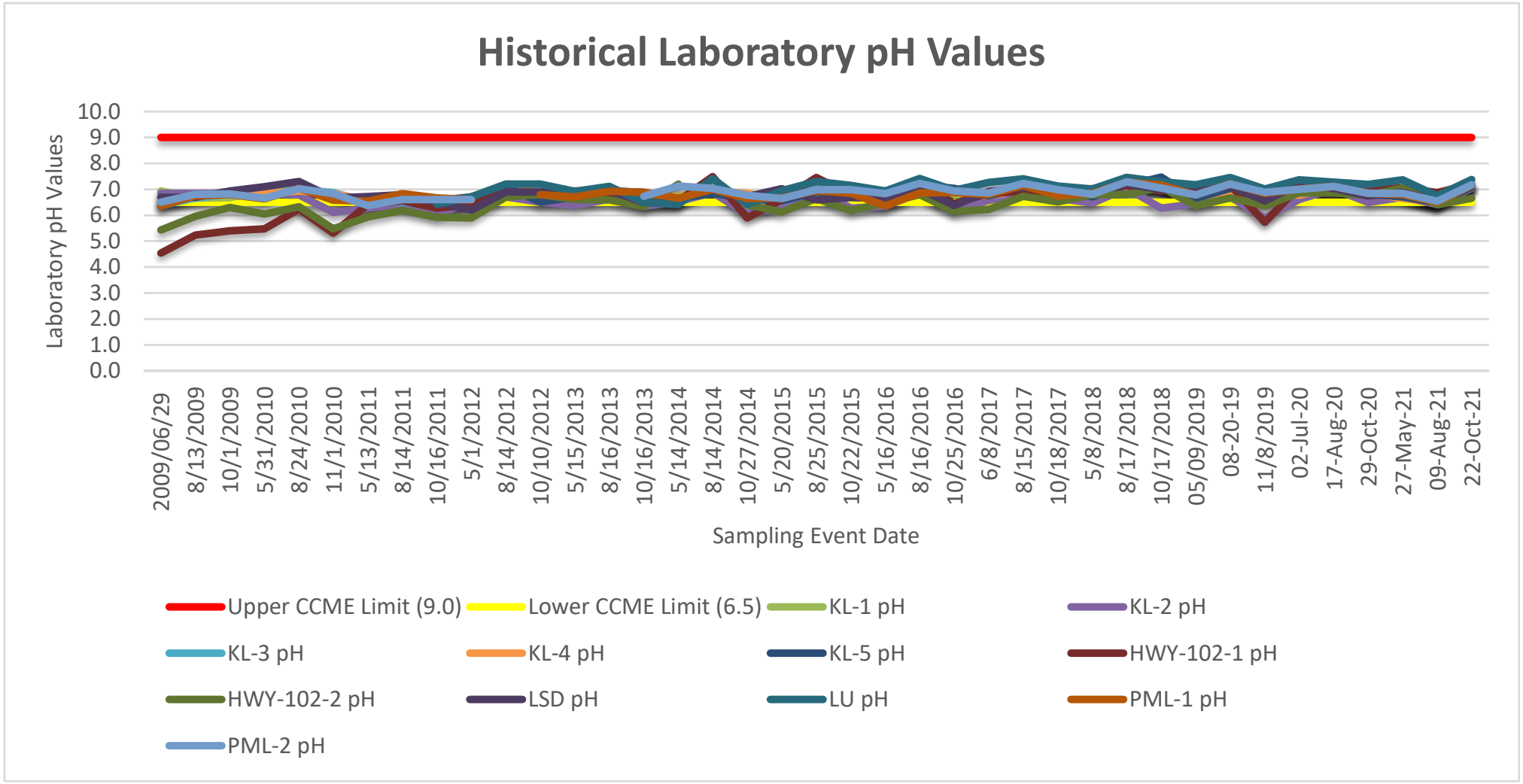
# Graphs

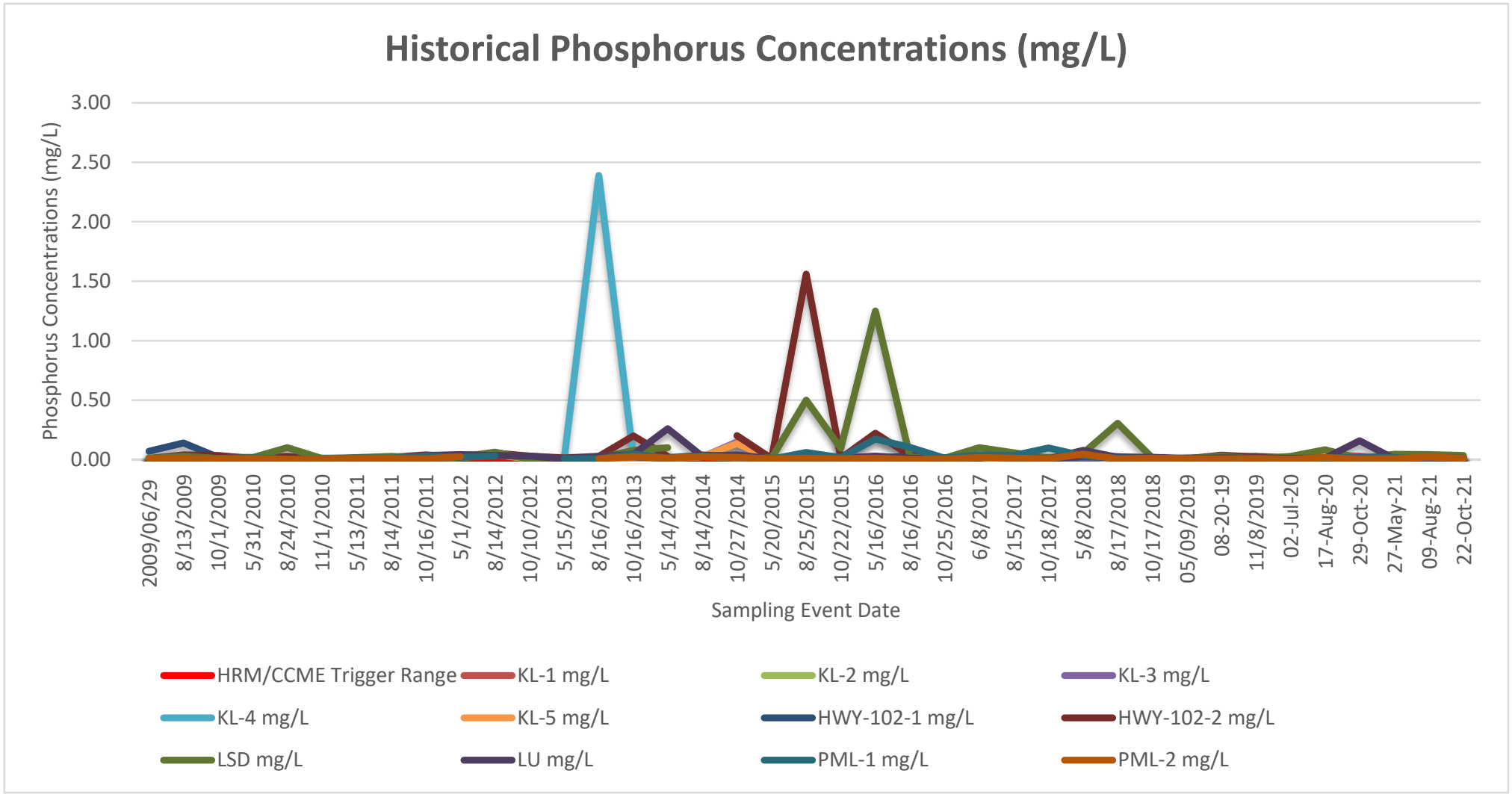

Historical Total Suspended Solids Concentrations (mg/L)
Total Suspended Solids Concentrations (mg/L)
10000.0
9000.0
8000.0
7000.0
6000.0
5000.0
4000.0
3000.0
2000.0
1000.0
0.0
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
Sampling Event Date
KL-1 mg/L
KL-2 mg/L
KL-3 mg/L
KL-4 mg/L
KL-5 mg/L
HWY-102-1 mg/L
HWY-102-2 mg/L
LSD mg/L
LU mg/L
PML-1 mg/L
PML-2 mg/L


Historical Chloride Concentrations (mg/L)
Chloride Concentration (mg/L)
350
300
250
200
150
100
50
0
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
Sampling Event Date
KL-1 mg/L
KL-2 mg/L
KL-3 mg/L
KL-4 mg/L
KL-5 mg/L
HWY-102-1 mg/L
HWY-102-2 mg/L
LSD mg/L
LU mg/L
PML-1 mg/L
PML-2 mg/L
NSE EQS and CCME Guideline (120 mg/L)


Historical Chlorophyll-A Concentrations (µg/L)
Chlorophyll-A Concentrations (µg/L)
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
Sampling Event Date
KL-1 µg/L
KL-2 µg/L
KL-3 µg/L
KL-4 µg/L
KL-5 µg/L
HWY-102-1 µg/L
HWY-102-2 µg/L
LSD µg/L
LU µg/L
PML-1 µg/L
PML-2 µg/L


Historical Conductivity Measurements (µS/cm)
Conductivity (µS/cm)
1200
1000
800
600
400
200
0
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
Sampling Event Date
KL-1 µS/cm
KL-2 µS/cm
KL-3 µS/cm
KL-4 µS/cm
K-5 µS/cm
HWY-102-1 µS/cm
HWY-102-2 µS/cm
LSD µS/cm
LU µS/cm
PML-1 µS/cm
PML-2 µS/cm


Historical Laboratory pH Values
Laboratory pH Values
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
Sampling Event Date
Upper CCME Limit (9.0)
Lower CCME Limit (6.5)
KL-1 pH
KL-2 pH
KL-3 pH
KL-4 pH
KL-5 pH
HWY-102-1 pH
HWY-102-2 pH
LSD pH
LU pH
PML-1 pH
PML-2 pH


Historical Phosphorus Concentrations (mg/L)
Phosphorus Concentrations (mg/L)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
Sampling Event Date
HRM/CCME Trigger Range
KL-1 mg/L
KL-2 mg/L
KL-3 mg/L
KL-4 mg/L
KL-5 mg/L
HWY-102-1 mg/L
HWY-102-2 mg/L
LSD mg/L
LU mg/L
PML-1 mg/L
PML-2 mg/L

# Appendix F

# Calibration Logs

# INSTRUMENT CALIBRATION REPORT

**Pine Environmental Services LLC**
159 Colonnade Road
Unit 3
Ottawa, Ontario K2E 7L9

## Pine Environmental Services, Inc.

**Instrument ID** 4628
**Description** YSI 650 Display
**Calibrated** 5/25/2021 2:52:49PM

**Manufacturer** YSI
**Model Number** 650 Display
**Serial Number/ Lot Number** 02K0599AC
**Location** Ottawa
**Department**

**State Certified**
**Status** Pass
**Temp °C** 20
**Humidity %** 30

### Calibration Specifications

**Group #** 1
**Group Name** INSTRUMENT TEST
**Test Performed: Yes** **As Found Result: Pass** **As Left Result: Pass**

**Test Instruments Used During the Calibration** (As Of Cal Entry Date)

| Test Standard ID | Description | Manufacturer | Model Number | Serial Number / Lot Number | Next Cal Date / Last Cal Date/ Expiration Date Opened Date |
|---|---|---|---|---|---|

**Notes about this calibration**

**Calibration Result** Calibration Successful
**Who Calibrated** Nathan Nguyen

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

**Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment**
**Please call 800-301-9663 for Technical Assistance**

# INSTRUMENT CALIBRATION REPORT

**Pine Environmental Services LLC**

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

## Pine Environmental Services, Inc.

**Instrument ID** 8978
**Description** YSI 600 XLM
**Calibrated** 5/25/2021 2:54:28PM

**Manufacturer** YSI
**Model Number** 600 XLM
**Serial Number/ Lot Number** 08G101420
**Location** Ontario
**Department**

**State Certified**
**Status** Pass
**Temp °C** 20
**Humidity %** 30

### Calibration Specifications

**Group #** 1
**Group Name** PH
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 3.0000
**Plus/Minus** 0.00

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 7.00 / 7.00 | PH | 7.00 | PH | 6.88 | 7.00 | 0.00% | Pass |
| 4.00 / 4.00 | PH | 4.00 | PH | 4.14 | 4.00 | 0.00% | Pass |
| 10.00 / 10.00 | PH | 10.00 | PH | 10.05 | 10.00 | 0.00% | Pass |

**Group #** 2
**Group Name** Conductivity
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 3.0000
**Plus/Minus** 0.000

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 1.413 / 1.413 | ms/cm | 1.413 | ms/cm | 1.395 | 1.413 | 0.00% | Pass |

**Group #** 3
**Group Name** Redox (ORP)
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 3.0000
**Plus/Minus** 0.00

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 240.00 / 240.00 | mv | 240.00 | mv | 252.00 | 240.00 | 0.00% | Pass |

**Group #** 4
**Group Name** Disolved Oxygen Span
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 3.0000
**Plus/Minus** 0.00

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 20.30 / 20.30 | degrees C | 8.79 | mg/L | 8.66 | 8.79 | 0.00% | Pass |

**Group #** 5
**Group Name** Disolved Oxygen Zero
**Test Performed: Yes** **As Found Result: Pass** **As Left Result: Pass**

# INSTRUMENT CALIBRATION REPORT

**Pine Environmental Services LLC**

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

## Pine Environmental Services, Inc.

**Instrument ID** 8978
**Description** YSI 600 XLM
**Calibrated** 5/25/2021 2:54:28PM

**Test Instruments Used During the Calibration** **(As Of Cal Entry Date)**

| Test Standard ID | Description | Manufacturer | Model Number | Serial Number / Lot Number | Next Cal Date / Last Cal Date/ Expiration Date Opened Date |
|---|---|---|---|---|---|

**Notes about this calibration**

**Calibration Result** Calibration Successful
**Who Calibrated** Nathan Nguyen

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

**Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment**
**Please call 800-301-9663 for Technical Assistance**

# INSTRUMENT CALIBRATION REPORT

**Pine Environmental Services LLC**

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

## Pine Environmental Services, Inc.

**Instrument ID** 29223
**Description** YSI 556
**Calibrated** 10/19/2021 2:42:23PM

**Manufacturer** YSI
**Model Number** 556
**Serial Number/ Lot Number** 14H100445
**Location** Ontario
**Department**

**State Certified**
**Status** Pass
**Temp °C** 22
**Humidity %** 55

### Calibration Specifications

**Group #** 1
**Group Name** pH
**Stated Accy** Plus / Minus
**Range Acc %** 0.0000
**Reading Acc %** 0.0000
**Plus/Minus** 0.20

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 7.00 / 7.00 | PH | 7.00 | PH | 7.06 | 7.00 | 0.00% | Pass |
| 4.00 / 4.00 | PH | 4.00 | PH | 3.94 | 4.00 | 0.00% | Pass |
| 10.00 / 10.00 | PH | 10.00 | PH | 10.16 | 10.00 | 0.00% | Pass |

**Group #** 2
**Group Name** Conductivity
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 1.0000
**Plus/Minus** 0.000

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 1.413 / 1.413 | ms/cm | 1.413 | ms/cm | 1.385 | 1.413 | 0.00% | Pass |

**Group #** 3
**Group Name** ORP
**Stated Accy** Plus / Minus
**Range Acc %** 0.0000
**Reading Acc %** 0.0000
**Plus/Minus** 20.0

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 240.0 / 240.0 | mv | 240.0 | mv | 253.0 | 240.0 | 0.00% | Pass |

**Group #** 4
**Group Name** Dissolved Oxygen Saturation %
**Stated Accy** Pct of Reading
**Range Acc %** 0.0000
**Reading Acc %** 3.0000
**Plus/Minus** 0.00

| Nom In Val / In Val | In Type | Out Val | Out Type | Fnd As | Lft As | Dev% | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 100.00 / 100.00 | % | 100.00 | % | 103.60 | 100.00 | 0.00% | Pass |

# INSTRUMENT CALIBRATION REPORT

**Pine Environmental Services LLC**

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

## Pine Environmental Services, Inc.

**Instrument ID** 29223
**Description** YSI 556
**Calibrated** 10/19/2021 2:42:23PM

**Test Instruments Used During the Calibration** (As Of Cal Entry Date)

| Test Standard ID | Description | Manufacturer | Model Number | Serial Number / Lot Number | Next Cal Date / Last Cal Date/ Expiration Date Opened Date |
|---|---|---|---|---|---|
| ON_CAA_H20 240 MV 3640 | ORP Standard 240 mV | Hanna | HI 7021 | 3640 | 11/30/2023 |
| ON_CAA_H20 COND 1.413MS/CM 0GJ10 | Conductivity Standard 1.413 mS/cm (1413 µS/cm) | AquaPhoenix Scientific | | 0GJ1078 | 11/30/2021 |
| ON_CAA_H20 DO ZERO 2017010359 | ON_CAA_H20 Sodium Sulfite 2017010359 | EMD | 14548 | 2017010359 | |
| ON_CAA_H20 NIST 23609-204 | ON_CAA_H20 NIST Traceable Thermometer | Pine Environmental Services, Inc. | 23609-204 | 181805368 | 11/16/2022 |
| ON_CAA_H20 PH10 9GK002 | Buffer Solution, pH 10.00 +/- 0.01 @ 25°C | AquaPhoenix Scientific | 32034 | 9GK002 | 11/30/2021 |
| ON_CAA_H20 PH4 | ON_CAA_H20 pH7 Lot: 9GK205 | Pine Environmental Services, Inc. | | 9GK205 | 10/31/2022 |
| ON_CAA_H20 PH7 LOT: 9GB719 | ON_CAA_H20 pH7 Lot: 9GB719 | Pine Environmental Services, Inc. | | 9GB719 | 10/31/2022 |

**Notes about this calibration**

**Calibration Result** Calibration Successful
**Who Calibrated** Nathan Nguyen

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# Appendix G

# Standard Operating Procedures

# Standard Operation Procedure No.1

# Surface Water Sampling

| Owner: Halifax Regional Municipality | Issue No.: 1 | Creation Date: May 2021 |
|---|---|---|
| | | Revision Date: |

## 1.0 Objective

This document describes the required procedures for collecting surface water samples from a water body during environmental monitoring.

## 2.0 Scope

This procedure applies to all Wood personnel who conduct environmental monitoring for the Halifax Regional Municipality as part of the Bedford West Surface Water Monitoring Program.

## 3.0 Introduction

To ensure complete and accurate data, surface water samples must be properly collected, handled and stored prior to analysis. Records of the sampling must also be kept for reporting and auditing purposes.

## 4.0 Preparation

| | |
|---|---|
| **Hazards** | Water hazard, falling into stream, pond or lake.<br>Slips, trips, and falls.<br>Splashes from contaminated water. |
| **Tools** | Water meter (for field-measured parameters), secchi disk, camera, sample bottles, cooler/ice packs, field data sheets.<br>For water depth measurements: measuring stick or tape.<br>For boat accessed sample locations: canoe, paddles, life jackets, boat safety kit including bailer bucket, rope with floatation devises, whistle, and flashlight. |
| **Requirements** | Review required field QA/QC procedures for any sampling to be completed at this property **(See: T-1 QA-QC Table.)**<br>Experience completing environmental monitoring including using various types of environmental monitoring equipment. |

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Registered in Canada No. 1115271-8; GST: 899879050 RT0008; DUNS: 25-362-6642

## 5.0 Tasks

| | |
|---|---|
| **1. Preparation for Sampling** | • Conduct site inspection and monitoring prior to sampling.<br>• On arriving at the location, perform an inspection noting any conditions that may have changed since the last visit. Look for indications of new or continuing impacts such as seeps, stressed vegetation, staining or new contaminant sources such as debris or discarded materials. Inspect shoreline, water level and water surface. Note any sheen / colour / odour / snow cover/ changes / damage on the Field Report.<br>• Take photographs to document conditions and/or changes at the site.<br>• Record time of sampling and weather conditions. Provide comments regarding weather or other events/conditions that may affect sample results. Record observations and results on the field report including air temperature and cloud cover. Record any wildlife sightings.<br>• Wear fresh disposable latex or other suitable gloves and safety glasses when collecting and preserving samples for each location.<br>• Measure pH, dissolved oxygen (mg/L), water temperature (°) and electrical conductivity using calibrated meters. Observe meter readings until field parameters become steady. Take secchi depth using secchi disk on metered line. Record final readings on Field Report.<br>• Record field observations (color, odour [include type of odour], turbidity, sheen [include type of sheen], surface water depth), on the Field Report. |
| **2. Sample Labelling** | • Label each sample container prior to filling.<br>See: **T-2 Sample Labelling Table.** |
| **3. Collecting a Sample** | • Collect the surface water sample in mid-stream (if steam-like condition) or collect grab sample at least 1m from shore line.<br>• Avoid stirring up sediments or debris during sampling. Avoid collecting any floating debris and do not sample immediately downstream of a bridge, etc.<br>• Remain downstream of the sampling location in order to prevent contamination of sample and point the mouth of the bottle upstream.<br>• Unless the preservative is supplied in the container, rinse the bottle and cap in the water by inserting the bottle with closed cap into the water. Immerse the bottle orientated vertically to 50 to 100 mm below the water surface. Remove the cap, collect some water and recap the bottle before removing from the water. Shake, rinse and empty. Repeat the rinsing process twice more before collecting the sample for analysis. Add preservative if required.<br>• If the preservative is supplied in the bottle, do not pre-rinse the bottle. Rinse a laboratory-supplied disposable syringe three |

| | |
|---|---|
| | times by submerging the tip to between 50 mm and 100 mm below surface and drawing in water by pulling up on the plunger. Remove the sample bottle cap and use the rinsed syringe to collect the sample for analysis. |
| **5. QA/QC Requirements** | • Complete required field QA/QC procedures for any sampling at this sample location. **See: T-2 QA-QC Table.**<br>• Duplicate samples should be collected as sequential samples; the first bottle from each set should be filled sequentially followed by the second bottle from each set, etc. |
| **6. Sample Storage and Delivery** | • Immediately following collection, all samples are to be placed in a chilled cooler with ice.<br>• Samples should be delivered under chain of custody documentation to the analytical laboratory as soon as possible (i.e. bacteria samples must be submitted to laboratory before 3 p.m. and other samples preferably the same day). |

## Table T-1: QA/QC Table

| QA/QC Protocol | Purpose | Procedures |
|---|---|---|
| **Quality Assurance (QA) Protocol** | To ensure accuracy and precision of samples collected. | • Use of Standard Operating Procedures (SOP).<br>• Use of Laboratory supplied sterile collection containers and Laboratory preservatives.<br>• Decontamination of all sampling equipment between wells and other sample locations.<br>• Dedicated sterile gloves for each well worn during sample collection.<br>• Dedicated inline disposable filters for each sample that requires filtering.<br>• Control of external contaminate sources when sampling such as; running motors, location of sampling equipment, wind direction, container handling. |
| **Quality Control (QC) Protocol** | To evaluate the reproducibility, accuracy and level of contamination introduced by field procedures. | • Laboratory receiving samples will follow their own internal QA / QC program. A copy of the results to be included with results for samples submitted. |

## Table T-1: Sample Labelling

| Label Requirement | Comments |
|---|---|
| | |
| A specific identification code used for each site | Specific HRM nomenclature for each site. |
| Site or Property ID | Identify to which of multiple sites or properties the sample belongs. |
| Sample Location or Monitoring Well ID | Identify which of multiple sampling locations within a site or property the sample represents. |
| Date Collected | Include date in a standard format to eliminate confusion (e.g. DD/MMM/YYYY or 02MAR2009). |
| Time Collected | Important for parameters with a very short holding time. |
| Filtering | Identify whether sample was field-filtered, needs lab filtering or does not require any filtering. |
| Preservatives Added | Identify any preservatives added. |
| Sampler Initials | Identify sampler. |
| | |
| This information is to be included on sample bottles or the chain of custody as appropriate. | |

HALIFAX REGIONAL MUNICIPALITY

# 2022 HRM WATER QUALITY MONITORING PROGRAM – BEDFORD WEST

## BEDFORD WEST SUBDIVISION AND PAPERMILL LAKE WATERSHED

FEBRUARY 09, 2023

CONFIDENTIAL



wsp

# 2022 HRM WATER QUALITY MONITORING PROGRAM – BEDFORD WEST

## BEDFORD WEST SUBDIVISION AND PAPERMILL LAKE WATERSHED

HALIFAX REGIONAL MUNICIPALITY

FINAL REPORT
CONFIDENTIAL

PROJECT NO.: TE201017
DATE: FEBRUARY 09, 2023

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**"Effective September 21, 2022, Wood Environment & Infrastructure Solutions Canada Limited is now operating as WSP E&I Canada Limited. No other aspects of our legal entity, contractual terms or capabilities have changed in relation to this report submission."**

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# EXECUTIVE SUMMARY

WSP E&I Canada Limited has prepared this report to provide Halifax Regional Municipality (HRM) with water quality data for eleven (11) surface water stations throughout the Bedford West development area. Water quality monitoring in the Bedford West development area has been ongoing since 2009 and in June 2020 Wood (now WSP E&I) was retained by HRM to complete water quality monitoring programs each spring, summer, and fall for three years beginning in July 2020. Sample collection in 2022 was completed during Spring (May), Summer (August), and Fall (October) events. The results of the 2022 surface water monitoring program are detailed herein. The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the development projects within the Papermill and Bedford West Watersheds in order to detect any impacts on and/or changes to water quality.

The 2022 water quality monitoring event included the collection of surface water samples at eleven water quality sampling stations for the analysis of inorganics, calculated parameters, standard metals, microbiological and additional metals. Additionally, field parameters collected at each station included in-situ pH, water temperature, dissolved oxygen, conductivity, Secchi depth (one station only), air temperature, cloud cover and wildlife sightings.

## 2022 Bedford West Water Quality Monitoring Program Results

### Field Measurements

- All eleven (11) stations were within the 5.0 – 9.0 pH Health Canada (HC) range for Recreational Water Quality, the 6.5 – 9.0 pH Canadian Council of Ministers of the Environment (CCME) range for Freshwater Aquatic Life (FWAL), and the 6.5 - 9.0 pH Nova Scotia Environment and Climate Change (NSECC) Environmental Quality Standards (EQS) recommended range during the 2022 Spring, Summer and Fall monitoring events, with the exception of the following during the Fall event: KL-1: Fall pH 9.47; PML-1: Fall pH 9.61; and PML-2: Fall pH 10.44. When compared to historic data, pH values were found to be elevated at all 11 surface water locations during the Fall 2022 event, ranging between 7.86 and 10.44. Based on the laboratory measured pH values for the same surface water samples, pH values ranged between 6.15 and 7.18. Although the multi meter was supplier calibrated prior to pick up, it is suspected that the pH meter was not functioning properly in the field as surface water tends to be slightly acidic in the area. Laboratory pH values should be used for any future calculations for the Fall 2022 event.
- In-situ dissolved oxygen was below the CCME FWAL acceptable range of >5.5 mg/L at two (2) of the sampling stations during the Spring, Summer, and Fall events (HWY-101-1 and HWY-101-2). In-situ dissolved oxygen was also found to be below the CCME FWAL acceptable range of >5.5 mg/L at the following stations during the Summer event: KL-2 (2.00 mg/L), LSD (4.09 mg/L), and LU (3.55 mg/L).
- There are no applicable CCME, HC or NSECC guidelines for recreational water temperature. Water temperature was recorded between 10.6°C during the Fall event (HWY-102-1) and 22.9°C during the Summer event (KL-5).
- There are no applicable CCME, HC or NSECC guidelines for recreational water conductivity. However, specific water conductivity was recorded between 70.0 µs/cm at KL-1 during the Summer event to 770.0 µs/cm at LU during the Spring event.
- A Secchi depth was collected at one (1) monitoring station, KL-1 in the Fall (1.00 m), not meeting the Health Canada reference value of 1.2 metres.

### Total Phosphorus

All eleven (11) monitoring stations reported concentrations that exceeded HRM's Total Phosphorus (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) during all three monitoring events in 2022. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL-1: Spring 0.015 mg/L, Summer 0.298 mg/L, Fall 0.030 mg/L
- KL-2: Spring 0.018 mg/L, Summer 0.063 mg/L, Fall 0.030 mg/L
- KL-3: Spring 0.016 mg/L, Summer 0.021 mg/L, Fall 0.030 mg/L
- KL-4: Spring 0.016 mg/L, Summer 0.013 mg/L, Fall 0.030 mg/L
- KL-5: Spring 0.015 mg/L, Summer 0.023 mg/L, Fall 0.020 mg/L
- HWY-102-1: Spring 0.059 mg/L, Summer 0.284 mg/L, Fall 0.030 mg/L
- HWY-102-2: Spring 0.020 mg/L, Summer 0.033 mg/L, Fall 0.030 mg/L
- LSD: Spring 0.020 mg/L, Summer 0.064 mg/L, Fall 0.030 mg/L
- LU: Spring 0.019 mg/L, Summer 0.062 mg/L, Fall 0.030 mg/L
- PML-1: Spring 0.015 mg/L, Summer 0.070 mg/L, 0.030 Fall mg/L, and
- PML-2: Spring 0.027 mg/L, Summer 0.010 mg/L, 0.030 Fall mg/L.

### General Chemistry and Metals

- Three (3) sampling stations reported chloride concentrations above the CCME FWAL limit of 120 mg/L: HWY-102-1: Spring 171 mg/L, HWY-101-2: Spring 251 mg/L and Summer 186 mg/L, and LU: Spring 243 mg/L and Summer 167 mg/L. These three (3) sampling stations were also found outside the NSECC EQS of 120 mg/L during the 2022 Spring event and two (2) sampling stations were found to exceed the NSECC EQS of 120 mg/L during the 2022 Summer event.
- All eleven (11) stations reported laboratory pH values well within HC range of 5.0-9.0 for Recreational Water Quality. Ten (10) monitoring stations were found outside the recommended laboratory pH ranges of 6.5 – 9.0 for the CCME FWAL and NSECC EQS: KL-1: Fall pH 6.23, KL-2: Fall pH 6.29, KL-3: Fall pH 6.30, KL-4: Fall pH 6.30, KL-5: Fall pH 6.30, HWY-102-1: Fall pH 6.38, HWY-102-2: Fall pH 6.15, LSD: Fall pH 6.34, LU: Fall pH 6.42, and PML-2: Fall pH 6.29.
- All eleven (11) stations exceeded the NSECC EQS aluminum guideline of 5 µg/L and five (5) of those stations also exceeded the CCME FWAL limit of 100 µg/L: KL-1: Spring 123 µg/L, KL-2: Spring 231 µg/L, KL-3: Spring 137 µg/L, KL-4: Spring 116 µg/L, and KL-5: Spring 115 µg/L.
- Four (4) stations exceeded the NSECC EQS iron guideline and CCME FWAL limit of 300 µg/L: KL-2: Spring 338 µg/L, Summer 631 µg/L, Fall 339 µg/L, HWY-102-2: Spring 367 µg/L, Summer 1250 µg/L, Fall 309 µg/L, LSD: Summer 761 µg/L, and LU: Summer 633 µg/L, Fall 360 µg/L.
- Two (2) stations exceeded the NSECC EQS of 7 µg/L for zinc; however, no stations exceeded the CCME FWAL zinc guideline of 30 µg/L: HWY-102-2: Spring 11 µg/L, LU: Spring 13 µg/L, Summer 10 µg/L, Fall 18 µg/L.

### Microbiology

- Three stations exceeded the HC E. coli Guidelines of 400 CFU/100 mL (maximum allowable concentration): KL-1: Summer 1500 CFU/100 mL, LSD: Summer >200 CFU/100 mL, and LU: Summer 500 CFU/100 mL, Fall 500 CFU/100 mL.
- HC does not have a recreational water quality guideline for Total Coliform. All eleven (11) stations reported Total Coliform concentrations above the laboratory Reportable Detection Limit (RDL) of 1 CFU/100 mL. Reported concentrations ranged from 300 CFU/100mL to 23,000 (or >200) CFU/100 mL.

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APPENDIX F STANDARD OPERATING PROCEDURES

# 1 INTRODUCTION

WSP E&I Canada Limited (WSP E&I, previously Wood) has prepared this report to provide Halifax Regional Municipality (HRM) with water quality data for eleven (11) surface water stations throughout the Bedford West development area. Water quality monitoring in the Bedford West development area has been ongoing since 2009 and in June 2020 Wood (now WSP E&I) was retained by HRM to complete water quality monitoring programs each spring, summer, and fall for three years beginning in July 2020. Sample collection in 2022 was completed during Spring (May), Summer (August), and Fall (October) events. The results of the 2022 surface water monitoring program are detailed herein. The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to the development projects within the Papermill and Bedford West Watersheds in order to detect any impacts on and/or changes to water quality.

## 1.1 BACKGROUND

HRM has designated the Bedford West area as one of the primary locations for urban growth through 2031. The Bedford West Secondary Planning Strategy (SPS) was approved by Regional Council in 2006 and divides the Bedford West area into 12 sub-areas. The SPS provides direction for land use, environmental protection and other activities, across the area. It also enables development primarily through the development agreement (DA) process. DAs for eight of the 12 Sub-Areas (2, 3+4, 5, 7+8, 9, 10) have been approved by Council; DAs for the remaining areas are anticipated to be negotiated and approved at various points between 2020 and 2030.

Environmental protection policy in the SPS requires water quality testing to determine the impact of development on the Papermill Lake watershed. Each DA approved under the SPS identifies specific requirements for water quality monitoring, including the location of testing sites and required testing parameters. Water quality monitoring in the Bedford West area has been ongoing since 2009.

The goal of this contract is to fulfill the legislative requirement for water quality monitoring in Bedford West for a period of three years, to determine the potential impact of development activities within the affected watershed, in accordance with the terms of applicable DAs.

Water quality monitoring is required by HRM in spring (May), summer (August), and fall (October) from the 11 locations identified on the Bedford West Sampling Location Map included in Appendix A.

## 1.2 PURPOSE

The overall purpose of the program is to conduct water quality sampling and testing prior to and during construction activities related to ongoing development projects in order to detect any impacts on and/or changes to water quality.

The 2022 sampling stations are summarized in Table 1 and shown in Figure 1 below.

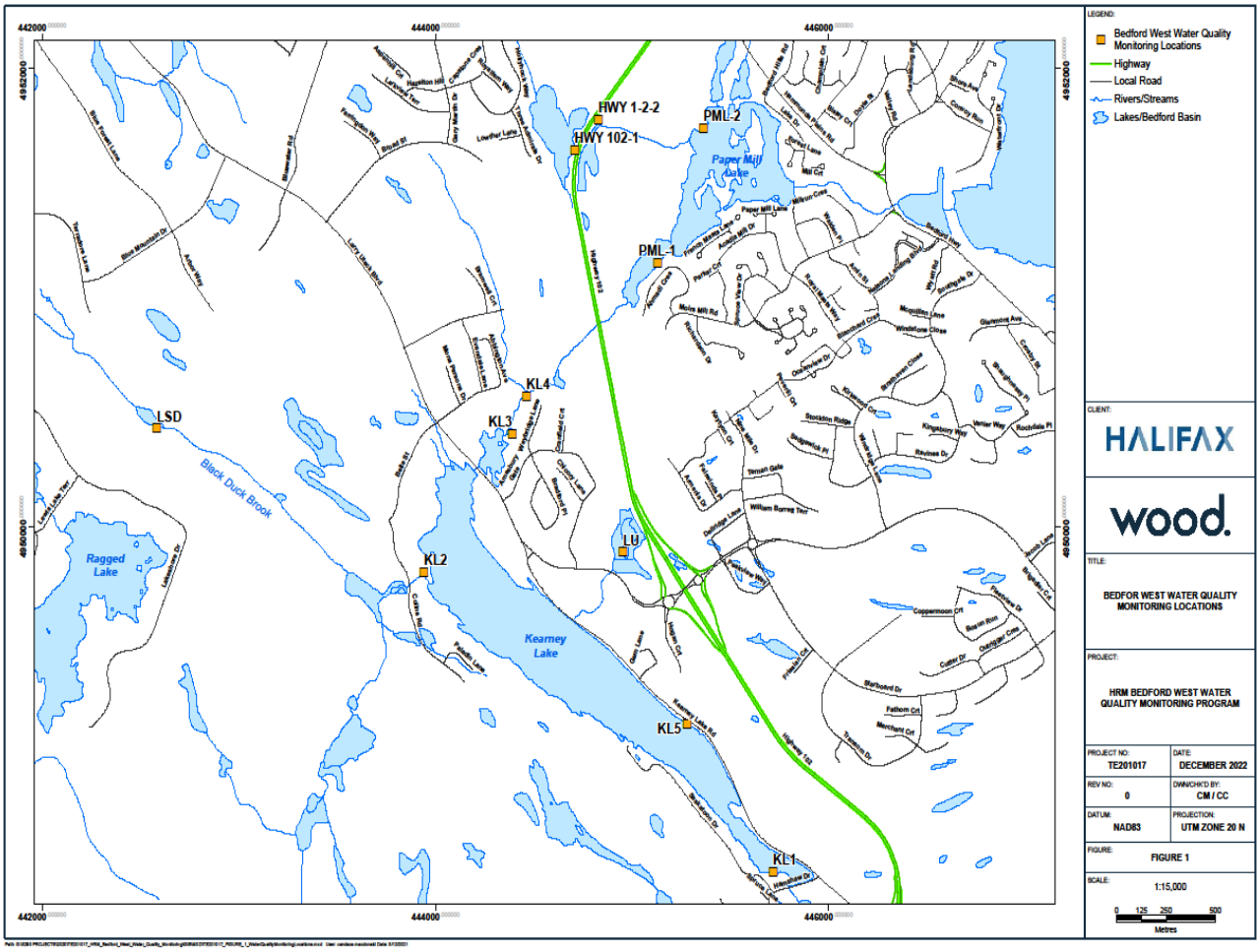
442000
444000
446000
4952000
4950000
HWY 1-2-2
HWY 102-1
PML-2
PML-1
Paper Mill Lake
KL4
KL3
KL2
KL5
KL1
LU
LSD
Black Duck Brook
Ragged Lake
Kearney Lake
LEGEND:
Bedford West Water Quality Monitoring Locations
Highway
Local Road
Rivers/Streams
Lakes/Bedford Basin
CLIENT:
HALIFAX
wood.
TITLE:
BEDFOR WEST WATER QUALITY MONITORING LOCATIONS
PROJECT:
HRM BEDFORD WEST WATER QUALITY MONITORING PROGRAM
PROJECT NO: TE201017
DATE: DECEMBER 2022
REV NO: 0
DWN/CHK'D BY: CM / CC
DATUM: NAD83
PROJECTION: UTM ZONE 20 N
FIGURE: FIGURE 1
SCALE: 1:15,000
0 125 250 500
Metres

**Table 1 Bedford West Water Quality Sampling Stations**

| Water Course | Sampling Location Name | Updated Coordinates (UTM NAD 83) | |
|---|---|---|---|
| | | Easting | Northing |
| Kearney Lake | KL-1 | 20T0445718E | 4948496N |
| Kearney Lake | KL-2 | 20T0443942E | 4949803N |
| Kearney Run | KL-3 | 20T0444390E | 4950406N |
| Kearney Run | KL-4 | 20T0444463E | 4950571N |
| Kearney Lake | KL-5 | 20T0445280E | 4949142N |
| Creek Above Highway | HWY-102-1 | 20T0444708E | 4951644N |
| Creek Below Highway | HWY-102-2 | 20T0444829E | 4951778N |
| Lake Shore Drive | LSD | 20T0442583E | 4950431N |
| Larry Uteck Off-Ramp | LU | 20T0442583E | 4949891N |
| Paper Mill Lake | PML-1 | 20T0445129E | 4951154N |
| Paper Mill Lake | PML-2 | 20T0445363E | 4951740N |

# 2 METHODOLOGY

The 2022 water quality sampling events included measurements of Field Parameters (Group A) and collection of surface water for laboratory analysis of:

- Inorganics (Group B);
- Calculated Parameters (Group C);
- Standard Elements/Metals (Group D); and
- Microbiological Analyses (Group E).

Table 2 below summarizes the water quality parameters measured in the field or analyzed by the laboratory.

**Table 2 Analytical Parameter Groups**

| Field Parameters (A) | Inorganics (B) | Calculated Parameters (C) | Standard Metals (D) | Microbiology (E) |
|---|---|---|---|---|
| • pH<br>• TDS<br>• Dissolved Oxygen<br>• Temperature<br>• Secchi Depth<br>• Conductance<br>• Air Temperature<br>• Cloud Cover<br>• Incidental Wildlife Sightings | • Total Alkalinity (as CaCO3)<br>• Dissolved Chloride<br>• Total Kjeldahl Nitrogen<br>• Nitrate + Nitrite<br>• Nitrate<br>• Nitrite<br>• Nitrogen (as NH4)<br>• Total Organic Carbon<br>• Orthophosphate (P)<br>• pH<br>• Low Total Phosphorus<br>• Reactive Silica<br>• Total Suspended Solids<br>• Dissolved Sulphate<br>• Turbidity<br>• Conductivity | • Anion Sum<br>• Cation Sum<br>• Ion Balance<br>• Bicarbonate Alkalinity (as CaCO3)<br>• Carbonate Alkalinity (as CaCO3)<br>• Hardness<br>• Total Dissolved Solids<br>• Saturation pH (@4°C & 20°C)<br>• Langelier Index (@4°C & 20°C) | • Calcium<br>• Copper<br>• Iron<br>• Magnesium<br>• Manganese<br>• Potassium<br>• Sodium<br>• Zinc | • Chlorophyll-A<br>• E. coli<br>• Most Probable Number (MPN) or CFU per 100 mL |

The Spring water quality monitoring event at Bedford West was completed on 31 May 2022, followed by the Summer monitoring event on 18 August 2022, and the Fall event on 21 October 2022.

Field measurements of pH, dissolved oxygen, specific conductance and water temperature were taken at each station using a YSI Professional Plus multi metre probe. Although supplier calibration was confirmed prior to delivery to WSP, the calibration logs for the YSI metre were not available for inclusion in this report. Field measurements and documentation of cloud cover, wildlife sightings, and wind and wave observations were recorded on Standard Project Field Reports, which are included in Appendix B. It should be noted that samples were collected from the shore at eight (8) stations (KL-2, KL-3, KL-4, KL-5, HWY-102-1, HWY-102-2, LSD, and LU); however, a non-motorized boat was used to access three (3) stations KL-1, PML-1, and PML-2.

Surface water sampling followed WSP E&I's Standard Operating Procedures (SOP) for surface water sampling (Appendix G). A new pair of nitrile gloves was used at each sampling location. Water samples and field parameter readings were collected within a depth of ≤1.0 m below surface (if possible). Surface water grab samples were collected and placed in clean laboratory-supplied bottles and stored in a chilled container together with a chain of custody record for transport to the laboratory. Samples were sent to AGAT Laboratories located in Dartmouth, Nova Scotia. AGAT is an accredited laboratory by the Standard Council of Canada (SCC). Canadian Association of Laboratory Accreditation (CALA) and ISO9011:2015. AGAT utilized an accredited sub-contracted laboratory, InnoTech Alberta, to analyze Chlorophyll A samples by phytoplankton method.

# 3 APPLICABLE GUIDELINES

For this water quality program, the Federal and Provincial Water Quality Guidelines being used for the assessment of surface water quality results are as follows: the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Aquatic Life – freshwater (FWAL) (Version, 2019), the Health Canada (HC) guidelines for Canadian Recreational Water Quality (2012, Third Edition), and the Table 3 Nova Scotia Environment and Climate Change (NSECC) Environmental Quality Standards (EQS) for Contaminated Sites (NSECC, 2021) for Surface Water (µg/L) for Fresh Water. These guidelines were to gauge whether a tested parameter was an exceedance. Exceedances may be an indication of water quality impairment or conditions that will eventually lead to impairment. A detailed description of the guidelines is presented below.

### Canadian Council of Ministers of the Environment (CCME) Guidelines

The CCME FWAL guidelines were used for parameters such as dissolved oxygen, pH (in-situ and analytical), chloride, nitrate, nitrite, nitrogen, as well as for total metals such as aluminum, arsenic, boron, cadmium, copper, iron, lead, molybdenum, nickel, selenium, silver, thallium, uranium, and zinc.

There is no CCME recommended value for Total Suspended Solids (TSS); however, the following CCME narrative for TSS as high flow was applied “maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L should not increase more than 10% of background levels when background is ≥ 250 mg/L”.

According to CCME, 10 µg/L of total phosphorus is the threshold between oligotrophic and mesotrophic classification. In the Canadian framework, a trigger range is a desired concentration range for phosphorus; if the upper limit of the range is exceeded, it indicates potential for environmental quality issues, which may trigger the need for further investigation. HRM defined a Total Phosphorus management threshold value of 10 µg/L or 0.01 mg/L for this monitoring program.

### Health Canada (HC) Guidelines

The HC guidelines for Canadian Recreational Quality was used for parameters such as Secchi depth (i.e. visibility at a minimum depth of 1.2 metres), pH guidelines of 5.0-9.0, turbidity (limit of 50 Nephelometric Turbidity Units), and E. coli (i.e. maximum allowable concentration of 400 E. coli/100 mL when evaluating a single sample rather than geomean). The maximum allowable concentration guideline of 400 E. coli/100 mL as well as a geomean, average of five samples not exceeding 200CFU/100ml with no single sample exceeding 400CFU/100ml, is also the guideline used by the HRM Beach Monitoring Program to assess compliance.

### Nova Scotia Environment and Climate Change (NSECC) Guidelines

The NSECC Table 3 Tier 1 surface water EQS were used for assessment of total metals such as aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, strontium, thallium, uranium, vanadium, and zinc. It should be noted that NSECC updated their surface water EQSs for pH, chloride, nitrate as N, nitrite as N, sulphate, antimony, beryllium, boron, cadmium, total chromium, cobalt, manganese, silver, uranium, vanadium, and zinc in September 2021.

# 4 FIELD OBSERVATIONS

The 2022 site conditions were recorded for all eleven (11) surface water quality monitoring stations during the Spring, Summer and Fall monitoring events and are included in the field data sheets in Appendix B. Site condition observations include weather, cloud cover, air temperature, wildlife sightings and site accessibility.

# 5 FIELD MEASUREMENTS

Field parameters such as in situ pH, dissolved oxygen, water temperature, conductivity and Secchi depth (where applicable) were recorded on field data sheets. Field collected data is included in Appendix B.

Field measurements are also tabulated in Appendix C: Table C1 – 2022 Results and Table C2: Historical Results.

### In-situ pH

All eleven (11) stations were within the 5.0 – 9.0 pH HC range for Recreational Water Quality, the 6.5 – 9.0 pH CCME range for FWAL, and the 6.5 - 9.0 pH NSECC EQS recommended range during the 2022 Spring, Summer and Fall monitoring events, with the exception of the following during the Fall event:

- KL-1: Fall pH 9.47
- PML-1: Fall pH 9.61; and,
- PML-2: Fall pH 10.44.

When compared to historic data, pH values were found to be elevated at all 11 surface water locations during the Fall 2022 event, ranging between 7.86 and 10.44. Based on the laboratory measured pH values for the same surface water samples, pH values ranged between 6.15 and 7.18. It is highly suspected that the pH meter was not functioning properly in the field as surface water tends to be slightly acidic in the area. Laboratory pH values should be used for any future calculations for the Fall 2022 event.

### Dissolved Oxygen

In-situ dissolved oxygen was below the CCME FWAL acceptable range of >5.5 mg/L consistently at two (2) of the sampling stations during the 2022 Spring, Summer and Fall events:

- HWY-102-1: Spring 5.45 mg/L, Summer 2.80 mg/L, Fall 4.79 mg/L
- HWY-102-2: Spring 3.92 mg/L, Summer 2.27 mg/L, Fall 5.05 mg/L

During the 2022 Summer event, in-situ dissolved oxygen was also found to be below the CCME FWAL acceptable range of >5.5 mg/L at the following sampling stations:

- KL-2: Summer 2.00 mg/L
- LSD: Summer 4.09 mg/L
- LU: Summer 3.55 mg/L

### Water Temperature

There are no applicable CCME, HC or NSECC guidelines for recreational water temperature. Water temperature was recorded between 10.6°C during the Fall event (HWY-102-1) and 22.9°C during the Summer event (KL-5).

### Conductivity

There are no applicable CCME, HC or NSECC guidelines for recreational water conductivity. Specific water conductivity was recorded between 70.0 µs/cm at KL-1 during the Summer event to 770.0 µs/cm at LU during the Spring event.

### Secchi Depth

A Secchi depth was collected from shore at one (1) monitoring station, KL-1, during the Fall event. Secchi depth readings did not meet the Health Canada reference guidelines of minimum 1.2 metres (m) at all locations during the 2022 Spring, Summer and Fall events. Recorded values were as follows:

- KL-1: Fall 1.00 m.

# 6 ANALYTICAL RESULTS

Analytical results for the 2022 spring, summer, and fall monitoring programs and applicable reference guidelines are tabulated in Table C1 included in Appendix C. In addition, historical water quality results from 2009 – 2021 for each sample location are summarized in Table C2 included in Appendix C.

Laboratory certificates of analysis for the 2022 sampling events are located in Appendix D.

## 6.1 TOTAL PHOSPHORUS

All eleven (11) monitoring stations reported concentrations that exceeded HRM's Total Phosphorus (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) during all three monitoring events in 2022. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL-1: Spring 0.015 mg/L, Summer 0.298 mg/L, Fall 0.030 mg/L
- KL-2: Spring 0.018 mg/L, Summer 0.063 mg/L, Fall 0.030 mg/L
- KL-3: Spring 0.016 mg/L, Summer 0.021 mg/L, Fall 0.030 mg/L
- KL-4: Spring 0.016 mg/L, Summer 0.013 mg/L, Fall 0.030 mg/L
- KL-5: Spring 0.015 mg/L, Summer 0.023 mg/L, Fall 0.020 mg/L
- HWY-102-1: Spring 0.059 mg/L, Summer 0.284 mg/L, Fall 0.030 mg/L
- HWY-102-2: Spring 0.020 mg/L, Summer 0.033 mg/L, Fall 0.030 mg/L
- LSD: Spring 0.020 mg/L, Summer 0.064 mg/L, Fall 0.030 mg/L
- LU: Spring 0.019 mg/L, Summer 0.062 mg/L, Fall 0.030 mg/L
- PML-1: Spring 0.015 mg/L, Summer 0.070 mg/L, 0.030 Fall mg/L, and
- PML-2: Spring 0.027 mg/L, Summer 0.010 mg/L, 0.030 Fall mg/L.

## 6.2 GENERAL CHEMISTRY

Of the tested inorganic parameters (Column B, Table 2) and calculated parameters (Column C, Table 2), only concentrations of chloride and pH values were reported outside or above the applicable guidelines.

### Chloride

Three (3) sampling stations reported chloride concentrations above the CCME FWAL limit of 120 mg/L:

- HWY-102-1: Spring 171 mg/L
- HWY-102-2: Spring 251 mg/L, Summer 186 mg/L, and
- LU: Spring 243 mg/L, Summer 167 mg/L.

Three (3) sampling stations were found outside the NSECC EQS of 120 mg/L during the Spring event in 2022 and two (2) sampling stations were found outside the NSECC EQS of 120 mg/L during the 2022 Summer event, as noted above.

### Laboratory pH

All eleven (11) stations reported laboratory pH values well within Health Canada range of 5.0-9.0 for Recreational Water Quality. Ten (10) monitoring stations were found outside the recommended pH ranges of 6.5 – 9.0 for the CCME FWAL and NSECC EQS:

- KL-1: Fall pH 6.23
- KL-2: Fall pH 6.29

- KL-3: Fall pH 6.30
- KL-4: Fall pH 6.30
- KL-5: Fall pH 6.30
- HWY-102-1: Fall pH 6.38
- HWY-102-2: Fall pH 6.15
- LSD: Fall pH 6.34
- LU: Fall pH 6.42, and
- PML-2: Fall pH 6.29.

## 6.3 METALS

The following metals were analyzed during the Spring 2022 monitoring event: aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, tin, titanium, uranium, vanadium, and zinc. The following metals were analyzed during the Summer and Fall 2022 monitoring events: calcium, copper, iron, lead, manganese, magnesium, potassium, sodium, and zinc. During the 2022 monitoring events, exceedances were reported well above the guidelines/reference limits for aluminum, and zinc parameters. Exceedances were reported as follows:

### Aluminum

All eleven (11) stations exceeded the NSECC EQS aluminum guideline of 5 µg/L and five (5) of those stations also exceeded the CCME FWAL limit of 100 µg/L.

- KL-1: Spring 123 µg/L (CCME and NSECC Exceedance)
- KL-2: Spring 231 µg/L (CCME and NSECC Exceedance)
- KL-3: Spring 137 µg/L (CCME and NSECC Exceedance)
- KL-4: Spring 116 µg/L (CCME and NSECC Exceedance)
- KL-5: Spring 115 µg/L (CCME and NSECC Exceedance)

### Iron

Four (4) stations exceeded the NSECC EQS iron guideline and CCME FWAL limit of 300 µg/L:

- KL-2: Spring 338 µg/L, Summer 631 µg/L, Fall 339 µg/L
- HWY-102-2: Spring 367 µg/L, Summer 1250 µg/L, Fall 309 µg/L
- LSD: Summer 761 µg/L, and
- LU: Summer 633 µg/L, Fall 360 µg/L.

### Zinc

Two (2) stations exceeded the NSECC EQS of 7 µg/L for zinc; however, no stations exceeded the CCME FWAL zinc guideline of 30 µg/L:

- Hwy-102-2: Spring 11 µg/L (NSECC Exceedance)
- LU: Spring 13 µg/L, Summer 10 µg/L, Fall 18 µg/L (NSECC Exceedance)

## 6.4 MICROBIOLOGICAL

Three (3) stations exceeded the HC E. coli Guidelines of 400 CFU/100 mL (maximum allowable concentration):

- KL-1: Summer 1500 CFU/100 mL
- LSD: Summer >200 CFU/100 mL, and
- LU: Summer 500 CFU/100 mL, Fall 500 CFU/100 mL.

HC does not have a recreational water quality guideline for Total Coliform. All eleven (11) stations reported Total Coliform concentrations above the laboratory RDL of 1 CFU/100 mL. Reported concentrations ranged from 300 CFU/100mL to 23000 (or >200 CFU/100 mL during the 2022 Spring event).

# 7 STATISTICAL PRESENTATION

A summary of the water quality data from June 2009 through October 2022 for all eleven (11) water quality monitoring stations is included as Table C-2, Appendix C. Presented in Table 3 below are the seasonal statistics for each monitoring location, for the following six (6) key water quality parameters selected by HRM:

- Total Phosphorus (mg/L);
- Dissolved Oxygen (mg/L);
- Laboratory measured pH;
- Total Suspended Solids (mg/L);
- Conductivity (µs/cm); and,
- Chlorophyll-A (µg/L).

Where analytical results were found to be less than the laboratory RDL, the statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) as a conservative approach. It should be noted that the number of decimal places presented for each listed parameter is based on the decimal places of the RDL and reported laboratory Certificate of Analysis.

The method of detection for Chlorophyll-A for this report was Spectrophotometer, which was changed from 2018 which used acidification by fluorometric (Holm-Hansen) and non-acidification by fluorometric (Welschmeyer). For the graphical representation of Chlorophyll-A, the results from the Welschmeyer method were graphed until August 2019, afterwards Spectrophotometer results were graphed. Historical samples had been submitted to Dalhousie prior to 2018; however, it was determined that the local laboratory was not an approved vendor for 17025 accreditation, thus following 2018, samples were sent to AGAT Laboratories in Burnaby, British Columbia, for Chlorophyll A analysis by Spectrophotometer.

**Table 3 Statistical Presentation of Key Water Quality Parameters**

| KL-1 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2022 | 0.002 | 0.015 | 0.003 | 0.037 | 0.010 | 0.010 |
| Summer 2022 | 0.002 | 0.298 | 0.002 | 0.298 | 0.011 | 0.013 |
| Fall 2022 | 0.002 | 0.030 | 0.001 | 0.030 | 0.008 | 0.008 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2022 | 1 | 84 | 49 | 84 | 66 | 66 |
| Summer 2022 | 1 | 73 | 45 | 76 | 60 | 61 |
| Fall 2022 | 1 | 67 | 33 | 67 | 54 | 52 |
| **Lab pH** | | | | | | |
| Spring 2022 | N/A | 6.94 | 6.52 | 6.94 | 6.71 | 6.74 |
| Summer 2022 | N/A | 6.55 | 6.50 | 7.31 | 6.95 | 6.91 |
| Fall 2022 | N/A | 6.23 | 6.23 | 7.07 | 6.80 | 6.76 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2022 | 5 | <5 | <1 | 38 | 3 | 3 |
| Summer 2022 | 5 | <5 | 1 | 17 | 3 | 3 |
| Fall 2022 | 5 | <5 | <1 | 5 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2022 | 1 | 313 | 205 | 313 | 263 | 258 |

| KL-1 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Summer 2022 | 1 | 286 | 180 | 339 | 261 | 256 |
| Fall 2022 | 1 | 257 | 129 | 257 | 226 | 208 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2022 | 0.3 | 1.4 | 1.0 | 4.4 | 1.4 | 1.8 |
| Summer 2022 | 0.3 | 2.3 | 1.7 | 2.4 | 2.3 | 2.1 |
| Fall 2022 | 0.3 | 1.5 | 1.0 | 1.5 | 1.2 | 1.2 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 3 cont. Statistical Presentation of Key Water Quality Parameters – KL2**

| KL-2 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2022 | 0.002 | 0.018 | 0.008 | 0.021 | 0.014 | 0.013 |
| Summer 2022 | 0.002 | 0.063 | 0.008 | 0.063 | 0.020 | 0.021 |
| Fall 2022 | 0.002 | 0.030 | 0.004 | 0.031 | 0.014 | 0.015 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2022 | 1 | 24 | 12 | 48 | 18 | 19 |
| Summer 2022 | 1 | 19 | 13 | 48 | 19 | 20 |
| Fall 2022 | 1 | 19 | 10 | 48 | 14 | 16 |
| **Lab pH** | | | | | | |
| Spring 2022 | N/A | 7.70 | 6.27 | 7.70 | 6.52 | 6.60 |
| Summer 2022 | N/A | 6.75 | 6.40 | 7.04 | 6.82 | 6.77 |
| Fall 2022 | N/A | 6.29 | 5.89 | 7.04 | 6.29 | 6.35 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2022 | 5 | <5 | <1 | 103 | 3 | 3 |
| Summer 2022 | 5 | <5 | <2 | 135 | 3 | 5 |
| Fall 2022 | 5 | <5 | <1 | 103 | 3 | 3 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2022 | 1 | 350 | 64 | 350 | 81 | 101 |
| Summer 2022 | 1 | 135 | 66 | 212 | 97 | 104 |
| Fall 2022 | 1 | 105 | 45 | 212 | 81 | 83 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2022 | 0.3 | 0.6 | 0.5 | 1.0 | 0.6 | 0.7 |
| Summer 2022 | 0.3 | 2.0 | 0.6 | 4.3 | 2.0 | 1.7 |
| Fall 2022 | 0.3 | 0.5 | 0.5 | 3.2 | 0.8 | 1.1 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for total suspended solids and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 3 cont. Statistical Presentation of Key Water Quality Parameters – KL3**

| KL-3 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2022 | 0.002 | 0.016 | 0.003 | 0.019 | 0.009 | 0.008 |
| Summer 2022 | 0.002 | 0.021 | 0.001 | 0.045 | 0.010 | 0.009 |
| Fall 2022 | 0.002 | 0.030 | 0.002 | 0.148 | 0.007 | 0.010 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2022 | 1 | 79 | 49 | 79 | 56 | 58 |
| Summer 2022 | 1 | 73 | 40 | 73 | 56 | 54 |
| Fall 2022 | 1 | 65 | 37 | 65 | 53 | 51 |
| **Lab pH** | | | | | | |
| Spring 2022 | N/A | 6.97 | 6.38 | 6.97 | 6.70 | 6.70 |
| Summer 2022 | N/A | 6.61 | 6.50 | 7.28 | 6.98 | 6.91 |
| Fall 2022 | N/A | 6.30 | 6.30 | 7.10 | 6.87 | 6.80 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2022 | 5 | <5 | <1 | 3 | 3 | 2 |
| Summer 2022 | 5 | <5 | <1 | 3 | 3 | 2 |
| Fall 2022 | 5 | <5 | <1 | 3 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2022 | 1 | 115 | 115 | 275 | 220 | 217 |
| Summer 2022 | 1 | 291 | 170 | 291 | 243 | 239 |
| Fall 2022 | 1 | 252 | 160 | 252 | 224 | 212 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2022 | 0.3 | 1.1 | 0.5 | 1.1 | 1.1 | 0.8 |
| Summer 2022 | 0.3 | 1.6 | 1.4 | 1.6 | 1.6 | 1.5 |
| Fall 2022 | 0.3 | 13.1 | 0.5 | 13.1 | 6.9 | 2.7 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 3 cont. Statistical Presentation of Key Water Quality Parameters – KL4**

| KL-4 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |

| KL-4 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Spring 2022 | 0.002 | 0.016 | 0.003 | 0.038 | 0.010 | 0.011 |
| Summer 2022 | 0.002 | 0.013 | 0.001 | 2.390 | 0.011 | 0.013 |
| Fall 2022 | 0.002 | 0.030 | 0.001 | 0.030 | 0.007 | 0.006 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2022 | 1 | 80 | 50 | 80 | 56 | 58 |
| Summer 2022 | 1 | 75 | 41 | 75 | 56 | 56 |
| Fall 2022 | 1 | 65 | 37 | 91 | 53 | 53 |
| **Lab pH** | | | | | | |
| Spring 2022 | N/A | 6.82 | 6.57 | 6.83 | 6.70 | 6.70 |
| Summer 2022 | N/A | 6.57 | 6.49 | 7.13 | 6.94 | 6.87 |
| Fall 2022 | N/A | 6.30 | 6.30 | 7.13 | 6.87 | 6.84 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2022 | 5 | 12 | <1 | 12 | 3 | 3 |
| Summer 2022 | 5 | <5 | 1 | 7 | 3 | 2 |
| Fall 2022 | 5 | <5 | <1 | 10 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2022 | 1 | 289 | 200 | 289 | 220 | 233 |
| Summer 2022 | 1 | 300 | 170 | 300 | 241 | 242 |
| Fall 2022 | 1 | 254 | 158 | 254 | 229 | 214 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2022 | 0.3 | 2.0 | 2.0 | 8.3 | 5.2 | 4.1 |
| Summer 2022 | 0.3 | 0.6 | 0.6 | 1.8 | 0.6 | 0.9 |
| Fall 2022 | 0.3 | 0.4 | 0.3 | 5.3 | 0.5 | 0.8 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus, total suspended solids, and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 3 cont. Statistical Presentation of Key Water Quality Parameters – KL5**

| KL-5 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2022 | 0.002 | 0.015 | 0.003 | 0.031 | 0.010 | 0.009 |
| Summer 2022 | 0.002 | 0.023 | 0.004 | 0.040 | 0.013 | 0.013 |
| Fall 2022 | 0.002 | 0.020 | 0.003 | 0.135 | 0.006 | 0.008 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2022 | 1 | 80 | 50 | 80 | 58 | 59 |

| KL-5 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Summer 2022 | 1 | 72 | 44 | 72 | 56 | 55 |
| Fall 2022 | 1 | 65 | 37 | 65 | 53 | 52 |
| **Lab pH** | | | | | | |
| Spring 2022 | N/A | 6.82 | 6.56 | 6.88 | 6.70 | 6.70 |
| Summer 2022 | N/A | 6.59 | 6.47 | 7.16 | 6.95 | 6.93 |
| Fall 2022 | N/A | 6.30 | 6.30 | 7.47 | 6.85 | 6.82 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2022 | 5 | <5 | 1 | 3 | 3 | 2 |
| Summer 2022 | 5 | <5 | 3 | 3 | 3 | 3 |
| Fall 2022 | 5 | <5 | 1 | 3 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2022 | 1 | 290 | 208 | 290 | 232 | 236 |
| Summer 2022 | 1 | 284 | 223 | 284 | 247 | 247 |
| Fall 2022 | 1 | 257 | 160 | 286 | 226 | 217 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2022 | 0.3 | 1.1 | 0.5 | 1.1 | 0.8 | 0.7 |
| Summer 2022 | 0.3 | 2.3 | 1.0 | 2.3 | 1.9 | 1.6 |
| Fall 2022 | 0.3 | 0.7 | 0.3 | 63.1 | 0.8 | 1.9 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus, total suspended solids, and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 3 cont. Statistical Presentation of Key Water Quality Parameters – HWY-102-1**

| HWY-102-1 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2022 | 0.002 | 0.059 | 0.005 | 0.070 | 0.012 | 0.013 |
| Summer 2022 | 0.002 | 0.284 | 0.007 | 0.284 | 0.029 | 0.031 |
| Fall 2022 | 0.002 | 0.030 | 0.002 | 0.031 | 0.012 | 0.013 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2022 | 2 | 171 | 24 | 171 | 68 | 67 |
| Summer 2022 | 1 | 101 | 19 | 101 | 56 | 52 |
| Fall 2022 | 1 | 71 | 12 | 92 | 45 | 40 |
| **Lab pH** | | | | | | |
| Spring 2022 | N/A | 7.34 | 4.54 | 7.34 | 6.85 | 6.54 |
| Summer 2022 | N/A | 6.70 | 5.24 | 7.49 | 6.91 | 6.81 |

| HWY-102-1 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Fall 2022 | N/A | 6.38 | 5.31 | 7.20 | 6.59 | 6.38 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2022 | 5 | <5 | 1 | 9 | 3 | 2 |
| Summer 2022 | 5 | <5 | 1 | 80 | 3 | 5 |
| Fall 2022 | 5 | <5 | 1 | 3 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2022 | 1 | 573 | 100 | 573 | 294 | 284 |
| Summer 2022 | 1 | 418 | 100 | 469 | 315 | 255 |
| Fall 2022 | 1 | 303 | 88 | 365 | 231 | 192 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2022 | 0.3 | 0.7 | 0.7 | 4.9 | 1.0 | 1.5 |
| Summer 2022 | 0.3 | 13.4 | 1.2 | 13.4 | 1.6 | 2.9 |
| Fall 2022 | 0.3 | 0.4 | 0.4 | 1.1 | 0.6 | 0.6 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 3 cont. Statistical Presentation of Key Water Quality Parameters – HWY-102-2**

| HWY-102-2 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2022 | 0.002 | 0.020 | 0.006 | 0.222 | 0.018 | 0.018 |
| Summer 2022 | 0.002 | 0.033 | 0.008 | 1.560 | 0.034 | 0.040 |
| Fall 2022 | 0.002 | 0.030 | 0.003 | 0.201 | 0.020 | 0.024 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2022 | 5 | 251 | 21 | 260 | 125 | 104 |
| Summer 2022 | 2 | 186 | 21 | 226 | 107 | 101 |
| Fall 2022 | 1 | 108 | 17 | 199 | 63 | 56 |
| **Lab pH** | | | | | | |
| Spring 2022 | N/A | 6.99 | 5.43 | 7.20 | 6.41 | 6.41 |
| Summer 2022 | N/A | 6.44 | 5.96 | 6.86 | 6.64 | 6.54 |
| Fall 2022 | N/A | 6.15 | 5.47 | 7.07 | 6.36 | 6.35 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2022 | 5 | 13 | 1 | 342 | 4 | 6 |
| Summer 2022 | 5 | <5 | 3 | 3000 | 16 | 21 |
| Fall 2022 | 5 | <5 | 3 | 194 | 3 | 6 |

| HWY-102-2 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2022 | 1 | 746 | 85 | 920 | 444 | 406 |
| Summer 2022 | 1 | 647 | 100 | 952 | 430 | 402 |
| Fall 2022 | 1 | 413 | 94 | 546 | 216 | 239 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2022 | 0.3 | 8.2 | 1.1 | 8.2 | 2.9 | 3.0 |
| Summer 2022 | 0.3 | 1.2 | 0.8 | 206.0 | 1.2 | 5.8 |
| Fall 2022 | 0.3 | <0.3 | 0.3 | 5.0 | 0.8 | 1.1 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus, total suspended solids, and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 3 cont. Statistical Presentation of Key Water Quality Parameters – LSD**

| LSD | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2022 | 0.002 | 0.020 | 0.007 | 1.250 | 0.021 | 0.031 |
| Summer 2022 | 0.002 | 0.064 | 0.015 | 0.501 | 0.059 | 0.060 |
| Fall 2022 | 0.002 | 0.030 | 0.003 | 0.095 | 0.015 | 0.017 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2022 | 1 | 60 | 22 | 60 | 37 | 35 |
| Summer 2022 | 1 | 42 | 26 | 45 | 33 | 34 |
| Fall 2022 | 1 | 37 | 20 | 37 | 26 | 27 |
| **Lab pH** | | | | | | |
| Spring 2022 | N/A | 7.35 | 6.20 | 7.35 | 6.92 | 6.85 |
| Summer 2022 | N/A | 6.70 | 6.54 | 7.30 | 6.95 | 6.91 |
| Fall 2022 | N/A | 6.34 | 6.34 | 7.15 | 6.70 | 6.71 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2022 | 5 | <5 | 3 | 138 | 7 | 11 |
| Summer 2022 | 5 | 6 | 6 | 9020 | 98 | 100 |
| Fall 2022 | 5 | <5 | 3 | 69 | 6 | 6 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2022 | 1 | 243 | 96 | 243 | 156 | 156 |
| Summer 2022 | 1 | 197 | 129 | 236 | 170 | 169 |
| Fall 2022 | 1 | 170 | 63 | 171 | 129 | 126 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |

| LSD | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| Spring 2022 | 0.3 | 4.2 | 4.2 | 5.1 | 4.4 | 4.5 |
| Summer 2022 | 0.3 | 3.0 | 2.3 | 12.5 | 3.0 | 4.4 |
| Fall 2022 | 0.3 | 0.5 | 0.3 | 0.8 | 0.5 | 0.5 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 3 cont. Statistical Presentation of Key Water Quality Parameters – LU**

| LU | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2022 | 0.002 | 0.019 | 0.006 | 0.260 | 0.019 | 0.021 |
| Summer 2022 | 0.002 | 0.062 | 0.009 | 0.062 | 0.019 | 0.021 |
| Fall 2022 | 0.002 | 0.030 | 0.008 | 0.160 | 0.026 | 0.023 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2022 | 5 | 243 | 96 | 297 | 210 | 198 |
| Summer 2022 | 2 | 167 | 99 | 221 | 132 | 142 |
| Fall 2022 | 1 | 97 | 34 | 258 | 93 | 94 |
| **Lab pH** | | | | | | |
| Spring 2022 | N/A | 7.13 | 6.42 | 7.37 | 7.01 | 7.02 |
| Summer 2022 | N/A | 6.73 | 6.73 | 7.46 | 7.30 | 7.22 |
| Fall 2022 | N/A | 6.42 | 6.41 | 7.38 | 7.07 | 6.91 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2022 | 5 | <5 | <1 | 626 | 5 | 8 |
| Summer 2022 | 5 | 6 | <5 | 165 | 6 | 6 |
| Fall 2022 | 5 | 7 | <5 | 13 | 3 | 3 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2022 | 1 | 758 | 518 | 1030 | 790 | 759 |
| Summer 2022 | 1 | 605 | 433 | 928 | 620 | 628 |
| Fall 2022 | 1 | 420 | 190 | 840 | 421 | 412 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2022 | 0.3 | 7.5 | 2.4 | 10.9 | 7.5 | 5.8 |
| Summer 2022 | 0.3 | 5.3 | 3.4 | 5.3 | 4.4 | 4.3 |
| Fall 2022 | 0.3 | 6.1 | 0.1 | 6.1 | 3.1 | 1.6 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for total suspended solids and Chlorophyll-A.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 3 cont. Statistical Presentation of Key Water Quality Parameters – PML-1**

| PML-1 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2022 | 0.002 | 0.015 | 0.003 | 0.173 | 0.015 | 0.015 |
| Summer 2022 | 0.002 | 0.070 | 0.002 | 0.104 | 0.011 | 0.016 |
| Fall 2022 | 0.002 | 0.030 | 0.001 | 0.099 | 0.019 | 0.015 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2022 | 1 | 86 | 39 | 86 | 58 | 59 |
| Summer 2022 | 1 | 78 | 43 | 78 | 61 | 59 |
| Fall 2022 | 1 | 62 | 18 | 62 | 52 | 46 |
| **Lab pH** | | | | | | |
| Spring 2022 | N/A | 6.98 | 6.36 | 7.01 | 6.69 | 6.69 |
| Summer 2022 | N/A | 7.12 | 6.50 | 7.28 | 7.00 | 6.98 |
| Fall 2022 | N/A | 7.18 | 6.58 | 7.18 | 6.85 | 6.86 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2022 | 5 | <5 | 1 | 531 | 3 | 4 |
| Summer 2022 | 5 | <5 | <2 | 149 | 3 | 4 |
| Fall 2022 | 5 | <5 | <1 | 104 | 4 | 5 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2022 | 1 | 320 | 170 | 320 | 235 | 236 |
| Summer 2022 | 1 | 323 | 170 | 334 | 261 | 259 |
| Fall 2022 | 1 | 256 | 100 | 256 | 227 | 199 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2022 | 0.3 | 0.9 | 0.5 | 1.9 | 0.9 | 0.9 |
| Summer 2022 | 0.3 | 2.9 | 1.1 | 2.9 | 1.1 | 1.5 |
| Fall 2022 | 0.3 | <0.3 | 0.3 | 0.6 | 0.5 | 0.4 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

**Table 3 cont. Statistical Presentation of Key Water Quality Parameters – PML-2**

| PML-2 | RDL (2022) | Seasonal Result | Historical Seasonal Minimum | Historical Seasonal Maximum | Historical Seasonal Median | Historical Seasonal Mean |
|---|---|---|---|---|---|---|
| **Total Phosphorus (mg/L)** | | | | | | |
| Spring 2022 | 0.002 | 0.027 | 0.003 | 0.047 | 0.010 | 0.011 |
| Summer 2022 | 0.002 | 0.010 | 0.002 | 0.026 | 0.010 | 0.009 |
| Fall 2022 | 0.002 | 0.030 | 0.001 | 0.030 | 0.008 | 0.007 |
| **Chloride (mg/L)** | | | | | | |
| Spring 2022 | 1 | 94 | 44 | 245 | 63 | 68 |
| Summer 2022 | 1 | 82 | 43 | 82 | 61 | 60 |
| Fall 2022 | 1 | 69 | 34 | 69 | 58 | 54 |
| **Lab pH** | | | | | | |
| Spring 2022 | N/A | 6.98 | 6.37 | 7.13 | 6.80 | 6.76 |
| Summer 2022 | N/A | 6.64 | 6.54 | 7.29 | 7.03 | 6.97 |
| Fall 2022 | N/A | 6.29 | 6.29 | 7.17 | 6.85 | 6.84 |
| **Total Suspended Solids (mg/L)** | | | | | | |
| Spring 2022 | 5 | <5 | 1 | 45 | 3 | 3 |
| Summer 2022 | 5 | <5 | 1 | 14 | 3 | 3 |
| Fall 2022 | 5 | <5 | 1 | 11 | 3 | 2 |
| **Conductivity (µS/cm)** | | | | | | |
| Spring 2022 | 1 | 349 | 170 | 777 | 257 | 271 |
| Summer 2022 | 1 | 328 | 170 | 335 | 271 | 266 |
| Fall 2022 | 1 | 271 | 150 | 277 | 230 | 225 |
| **Chlorophyll-A Spectrophotometer (µg/L)*** | | | | | | |
| Spring 2022 | 0.3 | 1.3 | 1.3 | 2.8 | 1.9 | 1.9 |
| Summer 2022 | 0.3 | 1.3 | 0.6 | 1.3 | 1.1 | 1.0 |
| Fall 2022 | 0.3 | 0.6 | 0.5 | 1.1 | 0.8 | 0.7 |

**Notes:**

1 The statistics (i.e. minimum, maximum, media and average) were calculated as half the laboratory RDL limit (1/2 RDL value) where analytical results were found to be less than the laboratory Reportable Detection Limit (RDL) for phosphorus and total suspended solids.

2 The statistics for Chlorophyll-A (i.e. minimum, maximum, media and average) were calculated from analytical data from November 2019 to October 2021, since the method of detection was changed to Spectrophotometer.

# 8 GRAPHS

Graphs were completed for all eleven (11) water quality monitoring stations including all historical data collected from June 2009 to October 2022. Appendix E presents seasonal and annual graphs that illustrate concentrations of the following six (6) key water quality parameters previously selected by HRM:

- Total Phosphorus (mg/L)
- Dissolved chloride (mg/L)
- Laboratory pH
- Total Suspended Solids (mg/L)
- Conductivity (µS/cm), and
- Chlorophyll-A (µg/L).

The graphs allow for comparison between water quality sampling stations and identification of concentration increases and associated guideline exceedances. As many parameters show seasonal concentration fluctuations, the water quality data was also graphed showing only the concentrations for a given season. It should be noted that where results were found to be less than the laboratory Reportable Detection Limit (<RDL), results were graphed as half the reportable detection limit (1/2 RDL value) as a conservative approach.

# 9 CONCLUSIONS

The 2022 water quality monitoring event included the collection of surface water samples at eleven water quality sampling stations for the analysis of inorganics, calculated parameters, standard metals, microbiological and additional metals. Additionally, field parameters collected at each station included in-situ pH, water temperature, dissolved oxygen, conductivity, Secchi depth (one station only), air temperature, cloud cover and wildlife sightings.

### Field Measurements

- All eleven (11) stations were within the 5.0 – 9.0 pH Health Canada range for Recreational Water Quality, the 6.5 – 9.0 pH CCME range for FWAL, and the 6.5 - 9.0 pH NSECC EQS recommended range during the 2022 Spring, Summer and Fall monitoring events, with the exception of the following during the Fall event: KL-1: Fall pH 9.47; PML-1: Fall pH 9.61; and PML-2: Fall pH 10.44. When compared to historic data, pH values were found to be elevated at all 11 surface water locations during the Fall 2022 event, ranging between 7.86 and 10.44. Based on the laboratory measured pH values for the same surface water samples, pH values ranged between 6.15 and 7.18. It is highly suspected that the pH meter was not functioning properly in the field as surface water tends to be slightly acidic in the area. Laboratory pH values should be used for any future calculations for the Fall 2022 event.
- In-situ dissolved In-situ dissolved oxygen was below the CCME FWAL acceptable range of >5.5 mg/L at two (2) of the sampling stations during the Spring, Summer, and Fall events (HWY-101-1 and HWY-101-2). In-situ dissolved oxygen was also found to be below the CCME FWAL acceptable range of >5.5 mg/L at the following stations during the Summer event: KL-2 (2.00 mg/L), LSD (4.09 mg/L), and LU (3.55 mg/L).
- There are no applicable CCME, HC or NSECC guidelines for recreational water temperature. Water temperature was recorded between 10.6°C during the Fall event (HWY-102-1) and 22.9°C during the Summer event (KL-5).
- There are no applicable CCME, HC or NSECC guidelines for recreational water conductivity. However, specific water conductivity was recorded between 70.0 µs/cm at KL-1 during the Summer event to 770.0 µs/cm at LU during the Spring event.
- A Secchi depths was collected at one (1) monitoring station, KL-1 in the Fall (1.00 m), not meeting the Health Canada reference value of 1.2 metres.

### Total Phosphorus

All eleven (11) monitoring stations reported concentrations that exceeded HRM's Total Phosphorus (TP) management threshold criteria of 10 µg/L (equivalent to 0.01 mg/L) during all three monitoring events in 2022. Based on the laboratory results reported in milligrams per litre (mg/L), the TP exceedances were as follows:

- KL-1: Spring 0.015 mg/L, Summer 0.298 mg/L, Fall 0.030 mg/L
- KL-2: Spring 0.018 mg/L, Summer 0.063 mg/L, Fall 0.030 mg/L
- KL-3: Spring 0.016 mg/L, Summer 0.021 mg/L, Fall 0.030 mg/L
- KL-4: Spring 0.016 mg/L, Summer 0.013 mg/L, Fall 0.030 mg/L
- KL-5: Spring 0.015 mg/L, Summer 0.023 mg/L, Fall 0.020 mg/L
- HWY-102-1: Spring 0.059 mg/L, Summer 0.284 mg/L, Fall 0.030 mg/L
- HWY-102-2: Spring 0.020 mg/L, Summer 0.033 mg/L, Fall 0.030 mg/L
- LSD: Spring 0.020 mg/L, Summer 0.064 mg/L, Fall 0.030 mg/L
- LU: Spring 0.019 mg/L, Summer 0.062 mg/L, Fall 0.030 mg/L
- PML-1: Spring 0.015 mg/L, Summer 0.070 mg/L, 0.030 Fall mg/L, and

- PML-2: Spring 0.027 mg/L, Summer 0.010 mg/L, 0.030 Fall mg/L.

### General Chemistry and Metals

- Three (3) sampling stations reported chloride concentrations above the CCME FWAL limit of 120 mg/L: HWY-102-1: Spring 171 mg/L, HWY-101-2: Spring 251 mg/L and Summer 186 mg/L, and LU: Spring 243 mg/L and Summer 167 mg/L. These three (3) sampling stations were also found outside the NSECC EQS of 120 mg/L during the 2022 Spring event and two (2) sampling stations were found to exceed the NSECC EQS of 120 mg/L during the 2022 Summer event.
- All eleven (11) stations reported laboratory pH values well within Health Canada range of 5.0-9.0 for Recreational Water Quality. Ten (10) monitoring stations were found outside the recommended laboratory pH ranges of 6.5 – 9.0 for the CCME FWAL and NSECC EQS: KL-1: Fall pH 6.23, KL-2: Fall pH 6.29, KL-3: Fall pH 6.30, KL-4: Fall pH 6.30, KL-5: Fall pH 6.30, HWY-102-1: Fall pH 6.38, HWY-102-2: Fall pH 6.15, LSD: Fall pH 6.34, LU: Fall pH 6.42, and PML-2: Fall pH 6.29.
- All eleven (11) stations exceeded the NSECC EQS aluminum guideline of 5 µg/L and five (5) of those stations also exceeded the CCME FWAL limit of 100 µg/L: KL-1: Spring 123 µg/L, KL-2: Spring 231 µg/L, KL-3: Spring 137 µg/L, KL-4: Spring 116 µg/L, and KL-5: Spring 115 µg/L.
- Four (4) stations exceeded the NSECC EQS iron guideline and CCME FWAL limit of 300 µg/L: KL-2: Spring 338 µg/L, Summer 631 µg/L, Fall 339 µg/L, HWY-102-2: Spring 367 µg/L, Summer 1250 µg/L, Fall 309 µg/L, LSD: Summer 761 µg/L, and LU: Summer 633 µg/L, Fall 360 µg/L.
- Two (2) stations exceeded the NSECC EQS of 7 µg/L for zinc; however, no stations exceeded the CCME FWAL zinc guideline of 30 µg/L: HWY-102-2: Spring 11 µg/L, LU: Spring 13 µg/L, Summer 10 µg/L, Fall 18 µg/L.

### Microbiology

- Three stations exceeded the HC E. coli Guidelines of 400 CFU/100 mL (maximum allowable concentration): KL-1: Summer 1500 CFU/100 mL, LSD: Summer >200 CFU/100 mL, and LU: Summer 500 CFU/100 mL, Fall 500 CFU/100 mL.
- HC does not have a recreational water quality guideline for Total Coliform. All eleven (11) stations reported Total Coliform concentrations above the laboratory RDL of 1 CFU/100 mL. Reported concentrations ranged from 300 CFU/100mL to 23,000 (or >200) CFU/100 mL.

# 10 CLOSURE

This report was prepared for the exclusive use of Halifax Regional Municipality and is intended to provide a water quality results for the program. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from WSP E&I Canada Limited will be required. With respect to third parties, WSP E&I Canada Limited has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The report is based on data and information collected during the 2022 Bedford West Water Quality Monitoring Program conducted by WSP E&I Canada Limited. It is based solely on the conditions of the Site encountered during field investigations conducted in May, August, and October 2022. Except as otherwise maybe specified, WSP E&I Canada Limited disclaims any obligation to update this report for events taking place, or with respect to information that becomes available to WSP E&I Canada Limited after the time during which WSP E&I Canada Limited conducted the Water Quality Monitoring program.

WSP E&I Canada Limited makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

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Canadian Council of Ministers of the Environment, 2015. Guidelines for the Protection of Aquatic Life – Freshwater.

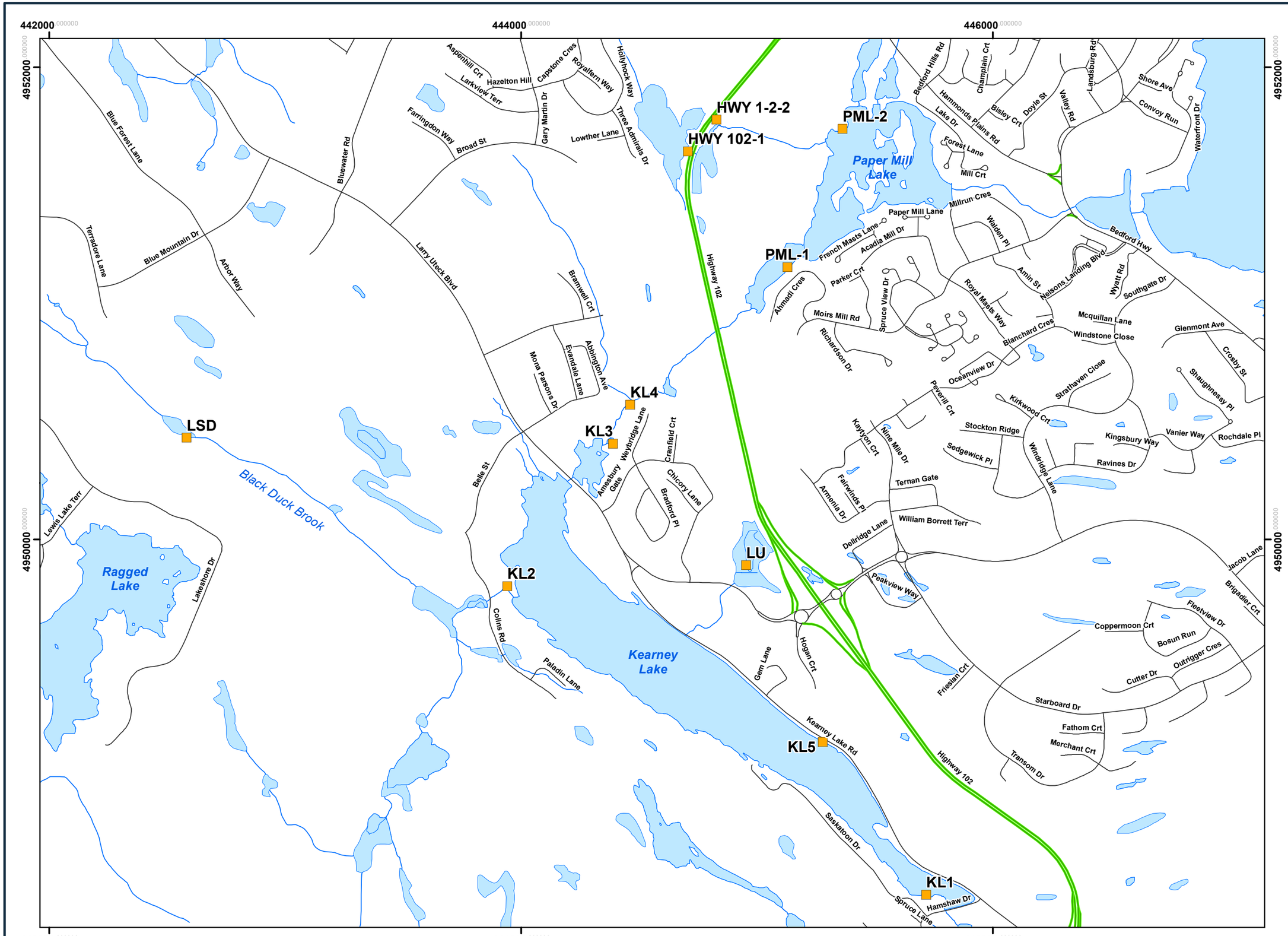
Health Canada, 2012. Canadian Guidelines for Recreation Water Quality, Third Edition.

Nova Scotia Environment, 2020. Environmental Quality Standards for Surface Water (Notification of Contamination Protocol 100, Table 3).

Nova Scotia Environment, September 2021. Environmental Quality Standards for Surface Water (Notification of Contamination Protocol 100, Table 3).

# APPENDIX

# A WATER QUALITY SAMPLING LOCATIONS




LEGEND:

- Bedford West Water Quality Monitoring Locations
- Highway
- Local Road
- Rivers/Streams
- Lakes/Bedford Basin

CLIENT:

HALIFAX

wood.

TITLE:

**BEDFOR WEST WATER QUALITY MONITORING LOCATIONS**

PROJECT:

**HRM BEDFORD WEST WATER QUALITY MONITORING PROGRAM**

| PROJECT NO: | DATE: |
|---|---|
| TE201017 | DECEMBER 2022 |
| REV NO: | DWN/CHK'D BY: |
| 0 | CM / CC |
| DATUM: | PROJECTION: |
| NAD83 | UTM ZONE 20 N |

FIGURE: **FIGURE 1**

SCALE: 1:15,000

0 125 250 500

Metres

Path: G:\5290 PROJECTS\2020\TE201017_HRM_Bedford_West_Water_Quality_Monitoring\GIS\MXD\TE201017_FIGURE_1_WaterQualityMonitoringLocations.mxd User: candace.macdonald Date: 5/12/2021

# APPENDIX

# B FIELD REPORTS

**HRM Bedford West - Field Report** Event: 2022 Spring Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-1 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | sunny, partly cloudy, windy |
| Air Temperature: | 16°C |
| Cloud Cover: | 5/8 |
| Wildlife Sightings: | songbirds |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 31.05.2022 |
| Time (hh:mm): | 13:00 |
| Sample Depth (m): | 0.2 |
| pH: | 7.14 |
| Dissolved Oxygen (mg/L): | 7.675 mg/L / 82.8% |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 18.9°C |
| Conductivity (µs/cm): | 299.4 SPC µs/cm<br>0.9 mV ORP |

**Additional Comments/Notes**

clear, colourless, no odour

**HRM Bedford West - Field Report** Event: 2022 Spring Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-2 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | sunny, windy, partly cloudy |
| Air Temperature: | 14°C |
| Cloud Cover: | 2/10 |
| Wildlife Sightings: | Songbirds |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. poison ivy around site, mowed to stay out |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 31.05.2022 |
| Time (hh:mm): | 12:00 |
| Sample Depth (m): | 0.2 |
| pH: | ~~7.00~~ 6.56 |
| Dissolved Oxygen (mg/L): | 8.11 mg/L / 81.5% |
| Secchi Depth (m): | n/a clear |
| Water Temp (degrees C): | 15.5°C |
| Conductivity (µs/cm): | 111.5 SPC |

**Additional Comments/Notes** 129 mV ORP

clear, colourless, no odour

**HRM Bedford West - Field Report** Event: 2022 Spring Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-3 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny, Partly cloudy, windy |
| Air Temperature: | 15°C |
| Cloud Cover: | 4/9 |
| Wildlife Sightings: | songbirds |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 31.05.2022 |
| Time (hh:mm): | 12:15 |
| Sample Depth (m): | 0.2 |
| pH: | 7.17 |
| Dissolved Oxygen (mg/L): | 7.34 mg/L / 75.3 % |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 10.4°C |
| Conductivity (µs/cm): | 279.9 SPC |
| | -16.8 mV ORP |

**Additional Comments/Notes**

Clear, colourless, no odour

**HRM Bedford West - Field Report** Event: 2022 Spring Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-4 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny, windy, partly cloudy |
| Air Temperature: | 15°C |
| Cloud Cover: | 4/8 |
| Wildlife Sightings: | Grackles, ducks |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 31.05.2022 |
| Time (hh:mm): | 12:30 |
| Sample Depth (m): | 0.2 |
| pH: | 7.13 |
| Dissolved Oxygen (mg/L): | 7.98 mg/L / 83.0% |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 16.9°C |
| Conductivity (µs/cm): | 282.6 SPC µs/cm |

41.9 mV ORP

**Additional Comments/Notes**

Clear, colourless, no odour.

**HRM Bedford West - Field Report** Event: 2022 Spring Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | ICL-5 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Windy, sunny |
| Air Temperature: | 15°C |
| Cloud Cover: | 5/8 |
| Wildlife Sightings: | n/a |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 31.05.2022 |
| Time (hh:mm): | 12:50 |
| Sample Depth (m): | 0.2 |
| pH: | 7.45 |
| Dissolved Oxygen (mg/L): | 9.70 mg/L / 94.3% |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 18.7°C |
| Conductivity (µs/cm): | 278.2 SPC<br>-17.2 mV ORP |

**Additional Comments/Notes**

Clear, colourless, no odour

**HRM Bedford West - Field Report** Event: 2022 Spring Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | LU |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny, windy |
| Air Temperature: | 7°C |
| Cloud Cover: | 3/8 |
| Wildlife Sightings: | songbirds |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 31.05.2022 |
| Time (hh:mm): | 10:45 |
| Sample Depth (m): | 0.2 |
| pH: | 7.51 |
| Dissolved Oxygen (mg/L): | 7.40 mg/L, 80.6%. |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 18.3°C |
| Conductivity (µs/cm): | 7700 SPC µS/cm<br>-4.2 ORP mV |

**Additional Comments/Notes**

suspended particulate, no odour, clear

**HRM Bedford West - Field Report** Event: 2022 Spring Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | LSD |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | ~14°C Sunny partly cloudy, windy |
| Air Temperature: | |
| Cloud Cover: | 3/8 |
| Wildlife Sightings: | songbirds |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 31.05.2022 |
| Time (hh:mm): | 11:20 |
| Sample Depth (m): | 0.2 |
| pH: | 7.58 |
| Dissolved Oxygen (mg/L): | 8.69 mg/L / 87.6 % |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 15.7 °C |
| Conductivity (µs/cm): | 246.9 SPC |

-14.2 mV ORP

**Additional Comments/Notes**

clear, colourless, no odour
suspended particulate

**HRM Bedford West - Field Report** Event: 2022 Spring Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | HWY102- 1 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Sunny, partly cloudy, windy |
| Air Temperature: | 17°C |
| Cloud Cover: | 2/8 |
| Wildlife Sightings: | songbirds |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 31.05.2022 |
| Time (hh:mm): | 10:20 |
| Sample Depth (m): | 0.2m |
| pH: | 7.48 |
| Dissolved Oxygen (mg/L): | 5.45mg/L / 54.5% |
| Secchi Depth (m): | n/a shallow |
| Water Temp (degrees C): | 15.7°C |
| Conductivity (µs/cm): | 544 SPC mS/cm |

**Additional Comments/Notes** -23.2 ORP mV

no odour, clear, colourless

**HRM Bedford West - Field Report** Event: 2022 Spring Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | upw102a |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | sunny, windy |
| Air Temperature: | 16°C |
| Cloud Cover: | 4/8 |
| Wildlife Sightings: | duck, gulls |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 31.05.2022 |
| Time (hh:mm): | 13:15 |
| Sample Depth (m): | 0.2 |
| pH: | 6.71 |
| Dissolved Oxygen (mg/L): | 3.92mg/L / 37.9 % |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 14.9°C |
| Conductivity (µs/cm): | 693 SPC µs/cm |

**Additional Comments/Notes** -50.4mV ORP

clear, colourless, no odour.

**HRM Bedford West - Field Report** Event: 2022 Spring Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | PML-1 |
| Watercourse: | Lake | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | sunny, partly cloudy |
| Air Temperature: | 9°C |
| Cloud Cover: | 4/8 |
| Wildlife Sightings: | Ducks |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 31.05.2022 |
| Time (hh:mm): | 09:04 |
| Sample Depth (m): | 0,2 |
| pH: | 7,101 |
| Dissolved Oxygen (mg/L): | 88.1%, 8.67 mg/L |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 17.0 |
| Conductivity (µs/cm): | SPC 309 µS/cm<br>18.1 ORP mV |

**Additional Comments/Notes**

clear, no odour, colourless

**HRM Bedford West - Field Report** Event: 2022 Spring Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | PML-2 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | LD, ER | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Partly cloudy, windy |
| Air Temperature: | 10°C |
| Cloud Cover: | 2/8 |
| Wildlife Sightings: | ducks, red squirrel, robin |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 31.05.2022 |
| Time (hh:mm): | 09:25 |
| Sample Depth (m): | 0.2 |
| pH: | 6.95 |
| Dissolved Oxygen (mg/L): | 8.36 mg/L / 88.8 % |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 18.5 |
| Conductivity (µs/cm): | 333.4 SPC µS/cm |
| | 32.8 ORP mV |

**Additional Comments/Notes**

clear, colourless, no odour

**HRM Bedford West - Field Report** Event: 2022 Fall Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | Kearney lake | Site ID: | KL-1 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | SH, JM | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Clear |
| Air Temperature: | 10°. |
| Cloud Cover: | Partly. |
| Wildlife Sightings: | None |
| Site Accessibility: | Easy. |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | ~~[illegible]~~ 21/10/22 |
| Time (hh:mm): | 11:55 |
| Sample Depth (m): | surface. |
| pH: | 9.44. |
| Dissolved Oxygen (mg/L): | 9.12. |
| Secchi Depth (m): | bottom. (1m). |
| Water Temp (degrees C): | 14.6 |
| Conductivity (µs/cm): | 270.6 SPC 102.5 ORP. |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: 2022 Fall Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-2 |
| Watercourse: | Kearney Lake | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | SH, JM | | |

**Site Conditions**

| | |
|---|---|
| Weather: | clear |
| Air Temperature: | 10°C |
| Cloud Cover: | clear (few clouds) |
| Wildlife Sightings: | none |
| Site Accessibility: | easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 21/10/22 |
| Time (hh:mm): | 12:10 |
| Sample Depth (m): | surface |
| pH: | 8.52 |
| Dissolved Oxygen (mg/L): | 9.04 |
| Secchi Depth (m): | bottom |
| Water Temp (degrees C): | 11.7 |
| Conductivity (µs/cm): | 114.7 SpC 88.3 ORP |

**Additional Comments/Notes**

water is very high

**HRM Bedford West - Field Report**

Event: 2022 Fall Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KL-3 |
| Watercourse: | Kearney lake | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | SH, JM | | |

**Site Conditions**

| | |
|---|---|
| Weather: | clear |
| Air Temperature: | 10°C. |
| Cloud Cover: | light cloudy. |
| Wildlife Sightings: | (none) |
| Site Accessibility: | easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 21/10/22 |
| Time (hh:mm): | 12:28 |
| Sample Depth (m): | surface. |
| pH: | 8.46. |
| Dissolved Oxygen (mg/L): | 10.35. |
| Secchi Depth (m): | / |
| Water Temp (degrees C): | 14.6. |
| Conductivity (µs/cm): | 270.9 SPC 106.0 ORP. |

**Additional Comments/Notes**

water is high / a lot of flow over dam.

**HRM Bedford West - Field Report**

Event: 2022 Fall Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-4 | Site ID: | KL-4 |
| Watercourse: | Kearney Lake | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | SH, JM | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Clear |
| Air Temperature: | 10°C |
| Cloud Cover: | Light clouds |
| Wildlife Sightings: | none |
| Site Accessibility: | easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 21/10/22 |
| Time (hh:mm): | 12:45 |
| Sample Depth (m): | surface |
| pH: | 8.12 |
| Dissolved Oxygen (mg/L): | 8.09 |
| Secchi Depth (m): | ✓ |
| Water Temp (degrees C): | 14.5 |
| Conductivity (µs/cm): | 271.0 SPC 57.5 ORP. |

**Additional Comments/Notes**

**HRM Bedford West - Field Report**

Event: 2022 Fall Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | KLS |
| Watercourse: | Kearney lake | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | SH, JM | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Clear |
| Air Temperature: | 10°C |
| Cloud Cover: | Partly Normal |
| Wildlife Sightings: | Fish |
| Site Accessibility: | Easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | ~~[illegible]~~ 21/10/22 |
| Time (hh:mm): | 11:43 |
| Sample Depth (m): | surface |
| pH: | 8.94 |
| Dissolved Oxygen (mg/L): | 9.44 |
| Secchi Depth (m): | ✓ |
| Water Temp (degrees C): | 15.1°C |
| Conductivity (µs/cm): | 270 SPC 15.6 ORP |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: 2022 Fall Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | LW | Site ID: | LW |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | SH, JM | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Clear |
| Air Temperature: | ~10°C |
| Cloud Cover: | cloudy |
| Wildlife Sightings: | none (deer droppings) |
| Site Accessibility: | easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 21/10/22 |
| Time (hh:mm): | 10:25 am |
| Sample Depth (m): | surface |
| pH: | 8.80 |
| Dissolved Oxygen (mg/L): | 7.47 |
| Secchi Depth (m): | X |
| Water Temp (degrees C): | 13.8 |
| Conductivity (µs/cm): | 419.6 SPC 43.0 ORP |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: 2022 Fall Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | LSD | Site ID: | LSD |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | SH, JM | | |

**Site Conditions**

| | |
|---|---|
| Weather: | clear |
| Air Temperature: | 10°C |
| Cloud Cover: | Cloudy |
| Wildlife Sightings: | none |
| Site Accessibility: | easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | ~~[illegible]~~ 21/10/22 |
| Time (hh:mm): | 11:07 |
| Sample Depth (m): | surface |
| pH: | 8.94 |
| Dissolved Oxygen (mg/L): | 9.27 |
| Secchi Depth (m): | ✓ |
| Water Temp (degrees C): | 11.7 |
| Conductivity (µs/cm): | 171.4 SPC -43.3 ORP |

**Additional Comments/Notes**

YSI doesn't do conductivity

development happening adjacent to this location (across stream)

☆ no photo taken (forgot)

**HRM Bedford West - Field Report** Event: 2022 Fall Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | HWY-102-1 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | SH, JM | | |

**Site Conditions**

| | |
|---|---|
| Weather: | clear. |
| Air Temperature: | ~10°C |
| Cloud Cover: | cloudy. |
| Wildlife Sightings: | none |
| Site Accessibility: | easy. |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | ~~21/10/22~~ 21/10/22 |
| Time (hh:mm): | 9:55 |
| Sample Depth (m): | surface. |
| pH: | 7.83 |
| Dissolved Oxygen (mg/L): | 11.79 |
| Secchi Depth (m): | |
| Water Temp (degrees C): | 10.6 |
| Conductivity (µs/cm): | 306 SPC -26.5 ORP |

**Additional Comments/Notes**

Sulphury smell. brownish colour.

**HRM Bedford West - Field Report** Event: 2022 Fall Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | HWY-102-2 | Site ID: | HWY-102-2 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | SH, JM | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Clear |
| Air Temperature: | 10°C |
| Cloud Cover: | few clouds |
| Wildlife Sightings: | none |
| Site Accessibility: | easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 21/10/22 |
| Time (hh:mm): | 11:15 |
| Sample Depth (m): | surface |
| pH: | 7.86 |
| Dissolved Oxygen (mg/L): | 5.05 |
| Secchi Depth (m): | ~ |
| Water Temp (degrees C): | 12.8°C |
| Conductivity (µs/cm): | 450.2 SC 84.1 ORP |

**Additional Comments/Notes**

Quickly stagnant

**HRM Bedford West - Field Report** Event: 2022 Fall Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | | Site ID: | HML-1 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | SH, JM | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Clear |
| Air Temperature: | ~10°C |
| Cloud Cover: | Sunny. |
| Wildlife Sightings: | none |
| Site Accessibility: | easy - Canoe. |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | ~~[illegible]~~ 21/10/22 |
| Time (hh:mm): | 9:15 |
| Sample Depth (m): | surface. |
| pH: | 9.61 |
| Dissolved Oxygen (mg/L): | 9.57. |
| Secchi Depth (m): | bottom (2m) |
| Water Temp (degrees C): | 14.8 |
| Conductivity (µs/cm): | 275.3 SPC<br>247.9 ORP. |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: 2022 Fall Event

| | | | |
|---|---|---|---|
| Project: TE201017 | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | PML | Site ID: | PML-2 |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | SH, JM | | |

**Site Conditions**

| | |
|---|---|
| Weather: | clear |
| Air Temperature: | 10 °C |
| Cloud Cover: | cloudy. |
| Wildlife Sightings: | Mallard. |
| Site Accessibility: | easy - cart. |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data** 21/10/22

| | |
|---|---|
| Date (d.m.y): | ~~21.10.2022~~ |
| Time (hh:mm): | 9:00 am. |
| Sample Depth (m): | surface (0.5m). |
| pH: | 10.44 |
| Dissolved Oxygen (mg/L): | 9.04 mg/l |
| Secchi Depth (m): | bottom |
| Water Temp (degrees C): | 15.2°C |
| Conductivity (µs/cm): | 287.7 SPC<br>27.4 ORP. |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: 2022 Summer Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-1 | Site ID: | |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | JM, SH | | |

**Site Conditions**

| | |
|---|---|
| Weather: | clear / partly sunny |
| Air Temperature: | 18°C. |
| Cloud Cover: | 85% clouds - semi glimmer of blue |
| Wildlife Sightings: | none |
| Site Accessibility: | easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | Aug 19/22. |
| Time (hh:mm): | 11:22. |
| Sample Depth (m): | surface. |
| pH: | 7.27 |
| Dissolved Oxygen (mg/L): | 5.77 / 65.4 %/m |
| Secchi Depth (m): | |
| Water Temp (degrees C): | 22.64. |
| Conductivity (µs/cm): | 70 |

**Additional Comments/Notes**

water clear.

**HRM Bedford West - Field Report**

Event: 2022 Summer Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-2 | Site ID: | |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | JM, SH | | |

**Site Conditions**

| | |
|---|---|
| Weather: | [illegible] |
| Air Temperature: | 16°C |
| Cloud Cover: | [illegible] Cloudy 90% |
| Wildlife Sightings: | none |
| Site Accessibility: | easy. |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | Aug 18/2022 |
| Time (hh:mm): | 11:40 |
| Sample Depth (m): | surface. |
| pH: | 7.45 |
| Dissolved Oxygen (mg/L): | 2.00 / 21.5% |
| Secchi Depth (m): | |
| Water Temp (degrees C): | 19.58 |
| Conductivity (µs/cm): | 162 |

**Additional Comments/Notes**

**HRM Bedford West - Field Report**

Event: 2022 Summer Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-3. | Site ID: | |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | JM, SH | | |

**Site Conditions**

| | |
|---|---|
| Weather: | clear |
| Air Temperature: | 18°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | ducks |
| Site Accessibility: | easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | Aug 18/2022 |
| Time (hh:mm): | 11:58 |
| Sample Depth (m): | surface |
| pH: | 7.42 |
| Dissolved Oxygen (mg/L): | 5.97 |
| Secchi Depth (m): | |
| Water Temp (degrees C): | 22.9 |
| Conductivity (µs/cm): | 72 |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: 2022 Summer Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | KL-4 | Site ID: | |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | JM, SH | | |

**Site Conditions**

| | |
|---|---|
| Weather: | clear |
| Air Temperature: | 15°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | none |
| Site Accessibility: | easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | Aug 19 / 2022 |
| Time (hh:mm): | 12:46 |
| Sample Depth (m): | surface |
| pH: | 7.39 |
| Dissolved Oxygen (mg/L): | 5.17 / 66.4 |
| Secchi Depth (m): | |
| Water Temp (degrees C): | 22.4 |
| Conductivity (µs/cm): | 73 |

**Additional Comments/Notes**

water is clear

**HRM Bedford West - Field Report** Event: 2022 Summer Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | RL-5 | Site ID: | |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | JM, SH | | |

**Site Conditions**

| | |
|---|---|
| Weather: | clear |
| Air Temperature: | 15°C |
| Cloud Cover: | Partly cloudy |
| Wildlife Sightings: | None |
| Site Accessibility: | easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | Aug 18/2022 |
| Time (hh:mm): | 11:05 |
| Sample Depth (m): | surface (0.25m) |
| pH: | 7.44 |
| Dissolved Oxygen (mg/L): | 5.83 / 68.5% |
| Secchi Depth (m): | |
| Water Temp (degrees C): | 22.90 |
| Conductivity (µs/cm): | 99 |

**Additional Comments/Notes**

Clear water, no smell.
Some foam on shore

**HRM Bedford West - Field Report** Event: 2022 Summer Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: LU | | Site ID: | |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | JM, SH | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy |
| Air Temperature: | |
| Cloud Cover: | 100% |
| Wildlife Sightings: | Birds |
| Site Accessibility: | Fair |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 08-18-22 |
| Time (hh:mm): | 9:35 |
| Sample Depth (m): | Surface |
| pH: | 7.100 |
| Dissolved Oxygen (mg/L): | 3.55 |
| Secchi Depth (m): | n/a |
| Water Temp (degrees C): | 20.95 |
| Conductivity (µs/cm): | 190 |

**Additional Comments/Notes**

**HRM Bedford West - Field Report**

Event: 2022 Summer Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | LSD | Site ID: | |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | JM, SH | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Partly Cloudy (Light) |
| Air Temperature: | 18°C |
| Cloud Cover: | 100% |
| Wildlife Sightings: | None - Prints of Raccoon, Skunk |
| Site Accessibility: | |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | Aug 18/22 |
| Time (hh:mm): | 10:00 |
| Sample Depth (m): | surface |
| pH: | 7.52 |
| Dissolved Oxygen (mg/L): | 4.09 / 43.8% |
| Secchi Depth (m): | |
| Water Temp (degrees C): | 19.21 |
| Conductivity (µS/cm): | 141 |

**Additional Comments/Notes**

Murky smell to water

**HRM Bedford West - Field Report**

Event: 2022 Summer Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | FML - 1 | Site ID: | |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | JM, SH | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy, Drizzle |
| Air Temperature: | 18.0° |
| Cloud Cover: | 95% |
| Wildlife Sightings: | Black Ducks, Birds |
| Site Accessibility: | Canoe |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 08-18-22 |
| Time (hh:mm): | 8:35 AM |
| Sample Depth (m): | Surface |
| pH: | 7.53 |
| Dissolved Oxygen (mg/L): | 6.70 |
| Secchi Depth (m): | N/A |
| Water Temp (degrees C): | 22.52 |
| Conductivity (µs/cm): | 75 |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: 2022 Summer Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: PML -2 | | Site ID: | |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | JM, SH | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy, Drissle |
| Air Temperature: | |
| Cloud Cover: | 95% |
| Wildlife Sightings: | Offspray, Blue jay |
| Site Accessibility: | Canoe |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 08-18-22 |
| Time (hh:mm): | 8:10 |
| Sample Depth (m): | Surface |
| pH: | 7.54 |
| Dissolved Oxygen (mg/L): | 7.53 |
| Secchi Depth (m): | N/A |
| Water Temp (degrees C): | 22.63 °C |
| Conductivity (µs/cm): | 76 |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: 2022 Summer Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: Hwy 102 - 1 | | Site ID: | |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | JM, SH | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Cloudy, Drizzle |
| Air Temperature: | |
| Cloud Cover: | 100 % |
| Wildlife Sightings: | |
| Site Accessibility: | Foot |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | 08-18-22 |
| Time (hh:mm): | 9:15 AM |
| Sample Depth (m): | Surface |
| pH: | 7.45 |
| Dissolved Oxygen (mg/L): | 2.20 |
| Secchi Depth (m): | N/A |
| Water Temp (degrees C): | 18.85 |
| Conductivity (µs/cm): | 99 |

**Additional Comments/Notes**

**HRM Bedford West - Field Report** Event: 2022 Summer Event

| | | | |
|---|---|---|---|
| Project: | Water Quality Monitoring - Bedford West | Sub-Area(s): | |
| Client: | Halifax Regional Munipality | | |
| Site: | HW4 102-2 | Site ID: | |
| Watercourse: | | Location: | Bedford |
| Sample Type: | Surface Water | No. of bottles: | 7 |
| GPS Coordinates: | Same as previous events | | |
| Wood Field Personnel: | JM, SH | | |

**Site Conditions**

| | |
|---|---|
| Weather: | Clear |
| Air Temperature: | 18°C |
| Cloud Cover: | 40% |
| Wildlife Sightings: | none |
| Site Accessibility: | easy |
| Site Access Detail : | Same as previous events. |

**Field Parameter Data**

| | |
|---|---|
| Date (d.m.y): | Aug 18/2022 |
| Time (hh:mm): | 12:40 |
| Sample Depth (m): | surface |
| pH: | 7.29 |
| Dissolved Oxygen (mg/L): | 2.68 / 28.2 % |
| Secchi Depth (m): | |
| Water Temp (degrees C): | 18.39 |
| Conductivity (µs/cm): | 689 |

**Additional Comments/Notes**

smells bad
alot of algae + floating gunk in water

# APPENDIX

# C SUMMARY TABLE REPORTS

**Table C1: Bedford West Water Quality Sampling Program - 2022 Results**

| Tested Parameters | Units | RDL (2022) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | KL-1 | | | KL-2 | | | KL-3 | | | KL-4 | | | KL-5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Event | | | | | | | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall |
| Sampling Date | | | | | | | 31-May-22 | 18-Aug-22 | 21-Oct-22 | 31-May-22 | 18-Aug-22 | 21-Oct-22 | 31-May-22 | 18-Aug-22 | 21-Oct-22 | 31-May-22 | 18-Aug-22 | 21-Oct-22 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | | | | | | | 1:00 PM | 11:22 AM | 11:55 AM | 12:00 PM | 11:40 AM | 12:10 PM | 12:15 PM | 11:58 AM | 11:58 AM | 12:30 PM | 12:46 PM | 12:45 PM | 12:50 PM | 11:05 AM | 11:43 AM |
| Field Data (in Situ) | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | meters | -- | -- | -- | minimum of 1.2 | -- | NA* | NA* | 1.00 | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | 18.9 | 22.6 | 14.6 | 15.5 | 19.6 | 11.7 | 16.4 | 22.9 | 14.6 | 16.9 | 22.4 | 14.5 | 18.7 | 22.9 | 15.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | > 5.5 | 7.75 | 5.77 | 9.12 | 8.11 | **2.00** | 9.04 | 7.34 | 5.97 | 10.35 | 7.98 | 5.77 | 8.09 | 8.70 | 5.83 | 9.44 |
| pH | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | 7.14 | 7.27 | ***9.47*** | 6.56 | 7.45 | 8.62 | 7.17 | 7.42 | 8.16 | 7.13 | 7.39 | 8.12 | 7.45 | 7.44 | 8.94 |
| Specific Conductance (µs/cm) | uS/cm | -- | -- | -- | -- | -- | 299.4 | 70.0 | 270.6 | 111.5 | 102.0 | 114.7 | 278.9 | 72.0 | 270.9 | 282.6 | 73.0 | 271.0 | 278.2 | 99.0 | 270.0 |
| Inorganic Parameters | | | | | | | | | | | | | | | | | | | | | |
| Alkalinity | mg/L | 5 | -- | -- | -- | -- | 6 | 9 | 7 | 95 | 24 | 10 | 9 | 10 | 8 | 6 | 10 | 9 | 6 | 9 | 8 |
| Chloride | mg/L | 1 | -- | 120 | -- | 120 | 84 | 73 | 67 | 24 | 19 | 19 | 79 | 73 | 65 | 80 | 75 | 65 | 80 | 72 | 65 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | <0.12 | <0.12 | -- | <0.12 | <0.12 | -- | <0.12 | <0.12 | -- | <0.12 | <0.12 | -- | <0.12 | <0.12 |
| True Color | TCU | 5 | -- | -- | -- | -- | 16.1 | 9.5 | 11.0 | 58.7 | 64.6 | 79.8 | 27.8 | 11.5 | 20.8 | 23.6 | 11.4 | 16.4 | 23.2 | 11.0 | 14.4 |
| Nitrate + Nitrite as N | mg/L | 0.05 | -- | -- | -- | -- | 0.16 | 0.17 | 0.10 | 0.29 | 0.12 | 0.10 | 0.2 | 0.09 | 0.19 | 0.18 | 0.13 | 0.19 | 0.17 | 0.11 | 0.18 |
| Nitrate as N | mg/L | 0.05 | -- | 13 | -- | 13 | 0.16 | 0.17 | 0.10 | 0.29 | 0.12 | 0.10 | 0.2 | 0.09 | 0.19 | 0.18 | 0.13 | 0.19 | 0.17 | 0.11 | 0.18 |
| Nitrite as N | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | <0.03 | 0.04 | 0.09 | <0.03 | <0.03 | 0.19 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.3 | -- | -- | -- | -- | 0.18 | 0.22 | 0.14 | 0.23 | 0.43 | 0.27 | 0.18 | 0.32 | 0.14 | 0.16 | 0.27 | 0.13 | 0.12 | 0.27 | 0.17 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | 3.8 | 4.2 | 3.8 | 6.7 | 8.5 | 10.2 | 4.1 | 4.0 | 4.3 | 4.0 | 3.7 | 4.3 | 3.9 | 3.9 | 4.1 |
| Ortho-Phosphate as P | mg/L | 0.01 | -- | -- | -- | -- | 0.13 | <0.01 | 0.02 | 0.13 | <0.01 | 0.01 | 0.13 | 0.01 | 0.01 | 0.13 | <0.01 | <0.01 | 0.13 | 0.01 | 0.01 |
| pH | | | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | 6.94 | 6.55 | ***6.23*** | 7.7 | 6.75 | ***6.29*** | 6.97 | 6.61 | ***6.30*** | 6.82 | 6.57 | ***6.30*** | 6.82 | 6.59 | ***6.30*** |
| Total Calcium | mg/L | 0.1 | -- | -- | -- | -- | 8.3 | 8.3 | 7.3 | 6.4 | 9.3 | 5.6 | 8.3 | 9.4 | 8.3 | 8.1 | 9.1 | 8.2 | 8.3 | 8.4 | 7.9 |
| Total Magnesium | mg/L | 0.1 | -- | -- | -- | -- | 1.3 | 1.3 | 1.2 | 1.4 | 2 | 1.4 | 1.3 | 1.5 | 1.3 | 1.3 | 1.4 | 1.3 | 1.2 | 1.3 | 1.3 |
| Total Phosphorus | mg/L | 0.006 | -- | -- | -- | 0.01 note [6] | **0.015** | **0.298** | **0.030** | **0.018** | **0.063** | **0.030** | **0.016** | **0.021** | **0.030** | **0.016** | **0.013** | **0.030** | **0.015** | **0.023** | **0.020** |
| Total Potassium | mg/L | 0.1 | -- | -- | -- | -- | 1.1 | 1.2 | 1.0 | 1 | 1.5 | 1.2 | 1.1 | 1.3 | 1.3 | 1.1 | 1.3 | 1.2 | 1.1 | 1.2 | 1.1 |
| Total Sodium | mg/L | 0.1 | -- | -- | -- | -- | 48.0 | 44.0 | 38.0 | 17 | 13 | 13 | 44 | 45 | 39 | 42 | 44 | 38 | 47.0 | 43.0 | 39.0 |
| Reactive Silica as SiO2 | mg/L | 0.5 | -- | -- | -- | -- | 2.6 | 2.0 | 1.7 | 4.2 | 6 | 5.3 | 3.1 | 2.1 | 2.3 | 3.2 | 2.1 | 2.4 | 3.0 | 2.1 | 2.2 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 12 | <5 | <5 | <5 | <5 | <5 |
| Sulphate | mg/L | 2 | -- | 128 | -- | -- | 9 | 9 | 9 | 6 | 7 | 8 | 9 | 9 | 9 | 9 | 9 | 10 | 9 | 9 | 9 |
| Turbidity | NTU | 0.1 | -- | -- | 50 | -- | 1.0 | 1.4 | 0.6 | 1.2 | 1.4 | 2.0 | 1.4 | 0.5 | <0.5 | 0.6 | <0.5 | <0.5 | 0.7 | <0.5 | 1.0 |
| Conductivity | umho/cm | 1 | -- | -- | -- | -- | 313 | 286 | 257 | 350 | 135 | 105 | 115 | 291 | 252 | 289 | 300 | 254 | 290 | 284 | 257 |
| Calculated Parameters | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | | -- | -- | -- | -- | 2.69 | 2.44 | 2.22 | 2.72 | 1.17 | 0.91 | 2.61 | 2.45 | 2.19 | 2.58 | 2.51 | 2.24 | 2.58 | 2.41 | 2.19 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | 6 | 9 | 7 | 95 | 24 | 10 | 9 | 10 | 8 | 6 | 10 | 9 | 6 | 9 | 8 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | 156 | 143 | 128 | 115 | 68 | 55 | 149 | 146 | 130 | 146 | 147 | 130 | 151 | 141 | 129 |
| Carb. Alkalinity (as CaCO3) | mg/L | 10 | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation sum | me/L | -- | -- | -- | -- | -- | 2.66 | 2.47 | 2.15 | 1.24 | 1.28 | 1.03 | 2.49 | 2.60 | 2.27 | 2.38 | 2.52 | 2.22 | 2.60 | 2.43 | 2.24 |
| Hardness | mg/L | -- | -- | -- | -- | -- | 26.1 | 26.1 | 23.2 | 21.7 | 31.5 | 19.7 | 26.1 | 29.6 | 26.1 | 25.6 | 28.5 | 25.8 | 25.7 | 26.3 | 25.1 |
| % Difference/ Ion Balance (NS) | % | -- | -- | -- | -- | -- | 0.6 | 0.7 | 1.7 | 37.5 | 4.4 | 6.4 | 2.5 | 2.9 | 1.6 | 3.9 | 0.2 | 0.3 | 0.5 | 0.6 | 1.0 |
| Langelier Index (@20C) | NA | -- | -- | -- | -- | -- | -2.97 | -3.18 | -3.66 | -1.11 | -2.47 | -3.52 | -2.76 | -3.02 | -3.48 | -3.10 | -3.07 | -3.43 | -3.09 | -3.13 | -3.50 |
| Langelier Index (@ 4C) | NA | -- | -- | -- | -- | -- | -3.29 | -3.50 | -3.98 | -1.43 | -2.79 | -3.84 | -3.08 | -3.34 | -3.80 | -3.42 | -3.39 | -3.75 | -3.41 | -3.45 | -3.82 |
| Saturation pH (@ 20C) | NA | -- | -- | -- | -- | -- | 9.91 | 9.73 | 9.89 | 8.8 | 9.2 | 9.8 | 9.73 | 9.63 | 9.78 | 9.92 | 9.64 | 9.73 | 9.9 | 9.7 | 9.8 |
| Saturation pH (@ 4C) | NA | -- | -- | -- | -- | -- | 10.2 | 10.0 | 10.2 | 9.1 | 9.5 | 10.1 | 10.1 | 10.0 | 10.1 | 10.2 | 10.0 | 10.1 | 10.2 | 10.0 | 10.1 |
| Metals (ICP-MS) | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum | ug/L | 5 | 5 | 5 | -- | 100 (pH based) | ***123*** | -- | -- | ***231*** | -- | -- | ***137*** | -- | -- | ***116*** | -- | -- | ***115*** | -- | -- |
| Total Antimony | ug/L | 2 | 20 | 9 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic | ug/L | 2 | 5.0 | 5.0 | -- | 5 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium | ug/L | 5 | 1000 | 1000 | -- | -- | 22 | -- | -- | 23 | -- | -- | 29 | -- | -- | 30 | -- | -- | 26 | -- | -- |
| Total Beryllium | ug/L | 2 | 5.3 | 0.15 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron | ug/L | 5 | 1200 | 1500 | -- | 1500 | 7 | -- | -- | 16 | -- | -- | 7 | -- | -- | 7 | -- | -- | 7 | -- | -- |
| Total Cadmium | ug/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | <0.09 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- |
| Total Chromium | ug/L | 1 | --- | 8.9 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt | ug/L | 1 | 10 | 1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Copper | ug/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | <1 | <1 | <1 | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | <1 |
| Total Iron | ug/L | 50 | 300 | 300 | -- | 300 | 138 | 82 | 99 | ***338*** | ***631*** | ***339*** | 143 | 178 | 73 | 124 | 96 | 75 | 96 | 56 | 62 |
| Total Lead | ug/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese | ug/L | 2 | 820 | 430 | -- | -- | 53 | 37 | 26 | 46 | 92 | 50 | 54 | 97 | 28 | 41 | 42 | 24 | 21 | 16 | 19 |
| Total Molybdenum | ug/L | 2 | 73 | 73 | -- | 73 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel | ug/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Selenium | ug/L | 1 | 1.0 | 1.0 | -- | 1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver | ug/L | 2 | 0.1 | 0.25 | -- | 0.25 | <0.1 | -- | -- | <0.1 | -- | -- | <2 | -- | -- | <0.1 | -- | -- | <2 | -- | -- |
| Total Strontium | ug/L | 5 | 21000 | 21000 | -- | -- | 39 | -- | -- | 22 | -- | -- | 36 | -- | -- | 37 | -- | -- | 36 | -- | -- |
| Total Thallium | ug/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | 3 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Uranium | ug/L | 0.2 | 300 | 15 | -- | 15 | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium | ug/L | 2 | 6 | 120 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Zinc | ug/L | 5 | 30 | 7 | -- | 30 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Microbiological Parameters | | | | | | | | | | | | | | | | | | | | | |
| Total Coliforms | MPN/100 mL | 100 | -- | | -- | -- | >200 | 8,600 | 4,800 | >200 | 21,600 | 8,600 | >200 | 2,700 | 3,900 | >200 | 4,600 | 3,000 | >200 | 300 | 400 |
| E. Coli | MPN/100 mL | 1 | -- | | 400/ 100 mL | -- | 18 | 1500 | 86 | 36 | 13 | 28 | 41 | 173 | 62 | 37 | 100 | 50 | 4 | 13 | 12 |
| Chlorophyll A - Spectrophotometer | ug/L | 0.30 | -- | | -- | -- | 1.4 | 2.3 | 1.5 | 0.6 | 2.0 | 0.5 | 1.6 | 1.4 | 0.7 | 2.0 | 0.6 | 0.4 | 1.1 | 2.3 | 0.7 |

**Notes:**

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L

[7] CCME FAL TSS reference values between 25-250 mg/L and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

* Secchi depth measurement not possible, disc visible at bottom of the watercourse or the sample location was too shallow for secchi depth use (KL4, KL5, HWY-102 locations, and LSD).

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / no parameter tested.

| | |
|---|---|
| **Bold and Black Shaded** | Concentration exceeds CCME FWAL applicable guideline. |
| Underlined and Black Shaded | Concentration exceeds Health Canada Guideline for Recreational Water Quality (Reference Guidelines) |
| Italics and Black Shaded | Concentration exceeds NSECC EQS Contaminated Sites Regulations |

**Table C1: Bedford West Water Quality Sampling Program - 2022 Results**

| Tested Parameters | Units | RDL (2022) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HWY-102-1 | | | HWY-102-2 | | | LSD | | | LU | | | PML-1 | | | PML-2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Event | | | | | | | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall | Spring | Summer | Fall |
| Sampling Date | | | | | | | 31-May-22 | 18-Aug-22 | 21-Oct-22 | 31-May-22 | 18-Aug-22 | 21-Oct-22 | 31-May-22 | 18-Aug-22 | 21-Oct-22 | 31-May-22 | 18-Aug-22 | 21-Oct-22 | 31-May-22 | 18-Aug-22 | 21-Oct-22 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | | | | | | | 10:20 AM | 9:15 AM | 9:55 AM | 1:15 PM | 12:10 PM | 1:15 PM | 11:20 AM | 10:00 AM | 11:07 AM | 10:45 AM | 9:35 AM | 10:25 AM | 9:04 AM | 8:35 AM | 9:15 AM | 9:25 AM | 8:10 AM | 9:00 AM |
| Field Data (in Situ) | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | meters | -- | -- | -- | minimum of 1.2 | -- | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | 15.7 | 18.9 | 10.6 | 14.9 | 18.4 | 12.8 | 15.7 | 19.2 | 11.7 | 18.3 | 21.0 | 13.8 | 17.0 | 22.5 | 14.3 | 18.5 | 22.6 | 15.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | > 5.5 | **5.45** | **2.80** | **4.79** | **3.92** | **2.27** | **5.05** | 8.69 | **4.09** | 9.27 | 7.40 | **3.55** | 7.47 | 8.67 | 6.70 | 9.57 | 8.36 | 7.53 | 9.04 |
| pH | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | 7.48 | 7.45 | 8.88 | 6.71 | 7.29 | 7.86 | 7.58 | 7.52 | 8.94 | 7.51 | 7.60 | 8.80 | 7.61 | 7.53 | ***9.61*** | 6.95 | 7.54 | ***10.44*** |
| Specific Conductance (µs/cm) | uS/cm | -- | -- | -- | -- | -- | 544.0 | 99.0 | 306.0 | 693.0 | 689.0 | 450.2 | 246.9 | 141.0 | 171.4 | 770.0 | 190.0 | 419.6 | 308.0 | 75.0 | 275.3 | 333.4 | 76.0 | 287.7 |
| Inorganic Parameters | | | | | | | | | | | | | | | | | | | | | | | | |
| Alkalinity | mg/L | 5 | -- | -- | -- | -- | 20 | 25 | 18 | 8 | 13 | 9 | 16 | 14 | 10 | 12 | 24 | 16 | 7 | 14 | 11 | 8 | 11 | 10 |
| Chloride | mg/L | 1 | -- | 120 | -- | 120 | **171** | 101 | 71 | **251** | **186** | 108 | 60 | 42 | 37 | **243** | **167** | 97 | 86 | 78 | 62 | 94 | 82 | 69 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | <0.12 | <0.12 | -- | <0.12 | <0.12 | -- | <0.12 | <0.12 | -- | <0.12 | <0.12 | -- | <0.12 | <0.12 | -- | <0.12 | <0.12 |
| True Color | TCU | 5 | -- | -- | -- | -- | 34.4 | 23.9 | 46.0 | 33 | 45.8 | 42.6 | 25.1 | 16.7 | 31.5 | 14.7 | 24.6 | 26.4 | 19 | 7.76 | 13.5 | 15.5 | 6.1 | 15.9 |
| Nitrate + Nitrite as N | mg/L | 0.05 | -- | -- | -- | -- | 0.16 | 0.06 | 0.30 | 0.06 | 0.09 | 0.08 | 0.08 | 0.31 | <0.05 | 0.41 | 0.24 | 0.75 | 0.23 | 0.11 | 0.21 | 0.20 | 0.07 | 0.18 |
| Nitrate as N | mg/L | 0.05 | -- | 13 | -- | 13 | 0.16 | 0.06 | 0.30 | 0.06 | 0.09 | 0.08 | 0.08 | 0.31 | <0.05 | 0.41 | 0.24 | 0.75 | 0.23 | 0.11 | 0.21 | 0.20 | 0.07 | 0.18 |
| Nitrite as N | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | <0.03 | 0.05 | <0.03 | <0.03 | 0.09 | 0.22 | <0.03 | 0.13 | 0.14 | <0.03 | 0.14 | 0.06 | <0.03 | 0.2 | 0.04 | 0.07 | 0.05 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.3 | -- | -- | -- | -- | 0.29 | 0.44 | 0.29 | 0.23 | 0.64 | 0.25 | 0.23 | 0.61 | 0.3 | 0.34 | 0.77 | 0.33 | 0.18 | 0.29 | 0.16 | 0.16 | 0.33 | 0.18 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | 6.0 | 6.9 | 7.9 | 5.7 | 9.4 | 7.8 | 5.4 | 6.1 | 7.3 | 4.8 | 6.3 | 5.9 | 3.8 | 3.5 | 4.1 | 3.6 | 3.7 | 4.2 |
| Ortho-Phosphate as P | mg/L | 0.01 | -- | -- | -- | -- | 0.13 | <0.01 | 0.01 | 0.13 | 0.01 | 0.01 | 0.13 | <0.01 | 0.01 | 0.13 | <0.01 | <0.01 | 0.13 | <0.01 | <0.01 | 0.13 | <0.01 | 0.01 |
| pH | | | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | 7.34 | 6.70 | ***6.38*** | 6.99 | 6.44 | ***6.15*** | 7.35 | 6.7 | ***6.34*** | 7.13 | 6.73 | ***6.42*** | 6.98 | 7.12 | 7.18 | 6.98 | 6.64 | ***6.29*** |
| Total Calcium | mg/L | 0.1 | -- | -- | -- | -- | 21.5 | 18.4 | 13.7 | 16.6 | 16 | 11.1 | 8.9 | 8.1 | 6.4 | 20.1 | 18.7 | 11.8 | 9.2 | 9.8 | 8.5 | 9.0 | 10.2 | 9.4 |
| Total Magnesium | mg/L | 0.1 | -- | -- | -- | -- | 3.1 | 2.6 | 2.2 | 2.4 | 2.4 | 2.1 | 2 | 1.9 | 1.6 | 2.9 | 2.8 | 1.9 | 1.4 | 1.6 | 1.4 | 1.4 | 1.6 | 1.4 |
| Total Phosphorus | mg/L | 0.006 | -- | -- | -- | 0.01 note [6] | **0.059** | **0.284** | **0.030** | **0.020** | **0.033** | **0.030** | **0.020** | **0.064** | **0.030** | **0.019** | **0.062** | **0.030** | **0.015** | **0.070** | **0.030** | **0.027** | **0.010** | **0.030** |
| Total Potassium | mg/L | 0.1 | -- | -- | -- | -- | 2.6 | 2.4 | 2.4 | 2 | 2.1 | 1.9 | 1.6 | 1.4 | 1.5 | 2.8 | 2.7 | 2.2 | 1.3 | 1.4 | 1.3 | 1.4 | 1.5 | 1.4 |
| Total Sodium | mg/L | 0.1 | -- | -- | -- | -- | 80.0 | 55.0 | 36.0 | 123 | 107 | 63 | 34 | 24 | 22 | 119 | 91 | 60 | 49 | 49 | 38 | 52.0 | 49.0 | 41.0 |
| Reactive Silica as SiO2 | mg/L | 0.5 | -- | -- | -- | -- | 3.8 | 4.6 | 3.2 | 4.8 | 9.4 | 5.3 | 3.9 | 4.3 | 3.9 | 3.5 | 3.4 | 2.8 | 3.2 | 2.2 | 1.8 | 2.1 | 1.6 | 2.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | <5 | <5 | <5 | 13 | <5 | <5 | <5 | 6 | <5 | <5 | 6 | 7 | <5 | <5 | <5 | <5 | <5 | <5 |
| Sulphate | mg/L | 2 | -- | 128 | -- | -- | 14 | 10 | 12 | 13 | 16 | 10 | 7 | 5 | 7 | 22 | 17 | 21 | 10 | 9 | 10 | 10 | 9 | 10 |
| Turbidity | NTU | 0.1 | -- | -- | 50 | -- | 1.1 | 1.9 | 1.0 | 1.1 | 5.4 | 2.0 | 1.4 | 4.6 | 2.9 | 2.2 | 2.8 | 3.8 | 0.7 | 0.5 | 0.7 | 0.7 | 0.8 | 0.6 |
| Conductivity | umho/cm | 1 | -- | -- | -- | -- | 573 | 418 | 303 | 746 | 647 | 413 | 243 | 197 | 170 | 758 | 605 | 420 | 320 | 323 | 256 | 349 | 328 | 271 |
| Calculated Parameters | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | | -- | -- | -- | -- | 5.53 | 3.56 | 2.63 | 7.52 | 5.85 | 3.44 | 2.16 | 1.59 | 1.39 | 7.58 | 5.56 | 3.55 | 2.79 | 2.68 | 2.19 | 3.03 | 2.73 | 2.37 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | 20 | 25 | 18 | 8 | 13 | 9 | 16 | 14 | 10 | 12 | 24 | 16 | 7 | 14 | 11 | 8 | 11 | 10 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | 305 | 205 | 150 | 414 | 339 | 203 | 124 | 94 | 82 | 419 | 316 | 207 | 162 | 158 | 129 | 174 | 160 | 139 |
| Carb. Alkalinity (as CaCO3) | mg/L | 10 | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation sum | me/L | -- | -- | -- | -- | -- | 4.89 | 3.61 | 2.51 | 6.46 | 5.78 | 3.56 | 2.15 | 1.71 | 1.49 | 6.51 | 5.23 | 3.45 | 2.76 | 2.81 | 2.24 | 2.88 | 2.82 | 2.41 |
| Hardness | mg/L | -- | -- | -- | -- | -- | 66.5 | 56.7 | 43.3 | 51.3 | 49.8 | 36.4 | 30.5 | 28.0 | 22.6 | 62.1 | 58.2 | 37.3 | 28.7 | 31.1 | 27.0 | 28.2 | 32.1 | 29.2 |
| % Difference/ Ion Balance (NS) | % | -- | -- | -- | -- | -- | 6.1 | 0.6 | 2.5 | 7.6 | 0.6 | 1.7 | 0.3 | 3.6 | 3.5 | 7.6 | 3.0 | 1.5 | 0.6 | 2.5 | 1.0 | 2.6 | 1.7 | 0.9 |
| Langelier Index (@20C) | NA | -- | -- | -- | -- | -- | -1.66 | -2.26 | -2.83 | -2.54 | -2.88 | -3.47 | -2.09 | -2.83 | -3.43 | -2.14 | -2.26 | -2.92 | -2.82 | -2.35 | -2.45 | -2.77 | -2.92 | -3.34 |
| Langelier Index (@ 4C) | NA | -- | -- | -- | -- | -- | -1.98 | -2.58 | -3.15 | -2.86 | -3.20 | -3.79 | -2.41 | -3.15 | -3.75 | -2.46 | -2.58 | -3.24 | -3.14 | -2.67 | -2.77 | -3.09 | -3.24 | -3.66 |
| Saturation pH (@ 20C) | NA | -- | -- | -- | -- | -- | 9.00 | 8.96 | 9.21 | 9.53 | 9.32 | 9.62 | 9.44 | 9.53 | 9.77 | 9.27 | 8.99 | 9.34 | 9.80 | 9.47 | 9.63 | 9.75 | 9.56 | 9.63 |
| Saturation pH (@ 4C) | NA | -- | -- | -- | -- | -- | 9.32 | 9.28 | 9.53 | 9.85 | 9.64 | 9.94 | 9.76 | 9.85 | 10.10 | 9.59 | 9.31 | 9.66 | 10.1 | 9.8 | 10.0 | 10.1 | 9.9 | 10.0 |
| Metals (ICP-MS) | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum | ug/L | 5 | 5 | 5 | -- | 100 (pH based) | ***54*** | -- | -- | ***98*** | -- | -- | ***92*** | -- | -- | ***56*** | -- | -- | ***91*** | -- | -- | ***63*** | -- | -- |
| Total Antimony | ug/L | 2 | 20 | 9 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic | ug/L | 2 | 5.0 | 5.0 | -- | 5 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium | ug/L | 5 | 1000 | 1000 | -- | -- | 155 | -- | -- | 180 | -- | -- | 17 | -- | -- | 118 | -- | -- | 34 | -- | -- | 42 | -- | -- |
| Total Beryllium | ug/L | 2 | 5.3 | 0.15 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron | ug/L | 5 | 1200 | 1500 | -- | 1500 | 14 | -- | -- | 9 | -- | -- | 20 | -- | -- | 9 | -- | -- | 8 | -- | -- | 8 | -- | -- |
| Total Cadmium | ug/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | <0.09 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- |
| Total Chromium | ug/L | 1 | --- | 8.9 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt | ug/L | 1 | 10 | 1 | -- | -- | <1 | -- | -- | 1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Copper | ug/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | 1 | 1 | 1 | 2 | 2 | 2 | 1 | <1 | 1 | 2 | 2 | 3 | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Iron | ug/L | 50 | 300 | 300 | -- | 300 | 289 | 276 | 151 | ***367*** | ***1250*** | ***309*** | 239 | ***761*** | 245 | 235 | ***633*** | ***360*** | 121 | 139 | 86 | 134 | 93 | 76 |
| Total Lead | ug/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese | ug/L | 2 | 820 | 430 | -- | -- | 25 | 44 | 11 | 134 | 148 | 40 | 112 | 529 | 27 | 58 | 147 | 56 | 64 | 126 | 21 | 78 | 58 | 28 |
| Total Molybdenum | ug/L | 2 | 73 | 73 | -- | 73 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel | ug/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Selenium | ug/L | 1 | 1.0 | 1.0 | -- | 1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver | ug/L | 2 | 0.1 | 0.25 | -- | 0.25 | <2 | -- | -- | <0.1 | -- | -- | <2 | -- | -- | <0.1 | -- | -- | <2 | -- | -- | <0.1 | -- | -- |
| Total Strontium | ug/L | 5 | 21000 | 21000 | -- | -- | 109 | -- | -- | 82 | -- | -- | 36 | -- | -- | 95 | -- | -- | 41 | -- | -- | 45 | -- | -- |
| Total Thallium | ug/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium | ug/L | 2 | -- | -- | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Uranium | ug/L | 0.2 | 300 | 15 | -- | 15 | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium | ug/L | 2 | 6 | 120 | -- | -- | <2 | -- | -- | 2 | -- | -- | <2 | -- | -- | 2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Zinc | ug/L | 5 | 30 | 7 | -- | 30 | 6 | <5 | <5 | ***11*** | 7 | 7 | <5 | <5 | <5 | ***13*** | ***10*** | ***18*** | <5 | <5 | <5 | <5 | 6 | <5 |
| Microbiological Parameters | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliforms | MPN/100 mL | 100 | -- | | -- | -- | >200 | 20,400 | 8,900 | >200 | 10,500 | 4,700 | >200 | 23,000 | 7,900 | >200 | 18,700 | 12,300 | >200 | 2,500 | 5,500 | >200 | 2,600 | 1,700 |
| E. Coli | MPN/100 mL | 1 | -- | | 400/ 100 mL | -- | 46 | 400 | 68 | 33 | 49 | 22 | 109 | >200 | 53 | 32 | 500 | 500 | 29 | 48 | 44 | 6 | 10 | 50 |
| Chlorophyll A - Spectrophotometer | ug/L | 0.30 | -- | | -- | -- | 0.7 | 13.4 | 0.4 | 8.2 | 1.2 | <0.3 | 4.2 | 3 | 0.5 | 7.5 | 5.3 | 6.1 | 0.9 | 2.9 | <0.3 | 1.3 | 1.3 | 0.6 |

**Notes:**

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surfa

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highe

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L

[7] CCME FAL TSS reference values between 25-250 mg/L and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based o

* Secchi depth measurement not possible, disc visible at bottom of the watercourse or the sample location was too shallow for secchi depth use (KL4

RDL = Reported Detection Limit (represents most recent sampling event)

" -- '' = no guideline available / no parameter tested.

| | |
|---|---|
| **Bold and Black Shaded** | Concentration exceeds CCME FWAL applicable guideline. |
| Underlined and Black Shaded | Concentration exceeds Health Canada Guideline for Recreational Water Quality (Reference Guidelines) |
| Italics and Black Shaded | Concentration exceeds NSECC EQS Contaminated Sites Regulations |

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site (KL-1) | | | | | | | | KL-1 | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/16/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | | | | | | | 08:00 | 11:45 | 08:30 | 11:00 | 13:10 | 12:00 | 11:00 | 14:30 | 14:00 | 8:30 | 11:20 | 9:50 | 10:20 | 11:10 | 13:30 | 10:30 | 14:15 | 14:55 | 08:30 | 14:54 | 12:30 | 9:30 | 7:50 | 13:20 | 8:30 | 9:30 AM | 9:35 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 4.1 | 4.2 | 5.0 | N/A | 5.0 | 4.9 | 2.4 | 3.2 | 2.4 | 2.4 | 5.4 | N/A | 2.5 | 2.0 | 2.9 | 2.4 | 2.7 | 2.5 | NCC | N/A | 2.2 | 1.8 | 2.1 | 2.5 | 2.1 | 2.2 | 2.2 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 14.0 | 22.2 | 16.7 | 12.9 | 23.3 | 8.8 | 11.5 | 25.6 | 15.9 | 8.9 | 23.3 | 15.4 | 13.2 | 22.2 | 14.1 | 12.7 | 23.2 | 12.2 | 14.1 | 26.1 | 9.4 | 12.8 | 22.2 | 11.9 | 16.6 | 23.2 | 14.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.77** | 8.20 | 7.00 | 9.13 | 7.86 | **10.48** | **10.69** | 8.22 | 9.22 | 8.98 | 7.93 | 8.72 | **9.76** | 8.57 | 8.30 | **15.29** | 7.22 | 8.12 | **9.55** | 8.13 | 7.38 | **14.02** | **10.33** | **12.06** | 8.27 | 7.91 | 8.22 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.20** | 6.76 | 6.67 | 7.23 | 7.32 | 6.61 | 6.60 | **6.16** | **6.04** | 8.67 | 6.91 | **6.32** | **6.32** | 8.24 | **6.35** | 6.74 | 7.46 | **6.44** | 8.33 | 6.95 | 7.02 | 8.29 | **4.60** | **6.23** | 7.47 | 7.00 | 7.84 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 263.0 | 299.0 | 261.0 | 248.0 | 242.0 | 218.7 | 288.0 | 178.6 | 146.3 | 277.0 | 279.0 | 198.1 | 243.0 | 216.5 | 217.9 | 547.0 | 341.0 | 223.0 | 0.2 | 298.3 | 238.5 | 239.0 | 298.0 | 212.4 | 240.0 | 292.0 | 312.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 6 | 8 | 8 | 7 | 8 | 6 | <5 | 9 | 7 | 24 | 7 | <5 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 81 | 74 | 64 | 62 | 60 | 55 | 73 | 45 | 33 | 66 | 70 | 50 | 66 | 59 | 48 | 80 | 76 | 46 | 60 | 62 | 58 | 55 | 57 | 45 | 71 | 73 | 60 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 18 | 18 | 16 | 26 | 8 | 21 | 28 | 40 | 45 | 50 | 11 | 20 | 11 | 37 | 20 | 13 | 8 | 23 | 37 | 8 | 22 | 31 | 17 | 18 | 15 | 14 | 12 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.18 | 0.09 | 0.12 | 0.21 | 0.16 | 0.23 | 0.20 | 0.11 | 0.13 | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.15 | 0.13 | 0.20 | 0.29 | 0.10 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.18 | -- | -- | 0.21 | 0.16 | -- | 0.20 | -- | -- | 0.20 | 0.09 | 0.10 | 0.18 | 0.14 | 0.19 | 0.11 | 0.11 | 0.08 | 0.15 | 0.15 | 0.17 | 0.10 | 0.08 | 0.13 | 0.08 | 0.08 | 0.10 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.07** | <0.05 | **0.12** | **0.21** | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.04 | 0.03 | <0.03 | 0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.010 | <0.03 | <0.03 | 0.05 | 0.09 | <0.03 | <0.03 | <0.03 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.9 | 3.1 | 0.4 | -- | 0.7 | <0.4 | 1.1 | <0.4 | 0.4 | 0.2 | 4.5 | 0.4 | 0.7 | <0.4 | 0.6 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.4 | 2.9 | 4.7 | 3.3 | 3.2 | 3.1 | 3.4 | 5.9 | 5.5 | 5.4 | 2.9 | 5.2 | 4.4 | 4.1 | 4.3 | 4.6 | 2.4 | 4.4 | 3.0 | 5.3 | 5.5 | 4.3 | 3.4 | 7.3 | 4.5 | 4.6 | 4.8 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.94 | 6.65 | 6.68 | 6.91 | 7.00 | 6.79 | 6.52 | 6.51 | 6.52 | 6.70 | 7.20 | 6.90 | 6.78 | 6.93 | 6.85 | 6.72 | 7.06 | **6.35** | 6.62 | 6.95 | 6.99 | 6.64 | 7.23 | 6.81 | 6.64 | 7.07 | 7.00 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 9.2 | 8.5 | 7.2 | 7.7 | 8.7 | 8.3 | 7.7 | 4.8 | 5.3 | 6.8 | 8.4 | 6.3 | 7.5 | 6.6 | 6.5 | 8.1 | 11.0 | 6.0 | 6,400.0 | 7.9 | 6.1 | 6.8 | 8.0 | 6.3 | 8.6 | 7.1 | 8.3 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.5 | 1.4 | 1.2 | 1.4 | 1.4 | 1.3 | 1.3 | 0.9 | 1.1 | 1.1 | 1.5 | 1.5 | 1.1 | 1.2 | 1.2 | 1.6 | 1.6 | 0.9 | 920.0 | 1.3 | 0.9 | 1.1 | 1.1 | 1.2 | 1.3 | 1.2 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | <0.020 | <0.020 | <0.002 | 0.009 | 0.007 | 0.005 | 0.008 | **0.012** | 0.009 | **0.037** | **0.043** | 0.007 | 0.007 | **0.011** | 0.008 | **0.011** | **0.026** | **0.013** | 0.008 | 0.002 | **0.011** | **0.024** | 0.005 | 0.008 | 0.010 | 0.010 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 0.9 | 1.3 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.7 | 1.1 | 0.9 | 1.6 | 0.7 | 680.0 | 0.9 | 0.7 | 0.7 | 0.9 | 0.8 | 1.0 | 0.9 | 1.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 51.0 | 46.0 | 37.0 | 31.8 | 35.2 | 33.8 | 43.7 | 22.8 | 19.8 | 40.1 | 42.0 | 29.8 | 35.8 | 26.2 | 31.6 | 50.2 | 54.2 | 37.6 | 33.0 | 43.3 | 39.8 | 35.5 | 32.2 | 31.0 | 44.9 | 50.3 | 35.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.6 | 2.2 | 2.3 | 2.9 | 2.7 | 2.9 | 2.8 | 1.9 | 2.3 | 2.4 | 1.3 | 2.2 | 2.5 | 1.8 | 2.2 | 2.0 | 1.5 | 1.8 | 2.5 | 1.8 | 2.7 | 2.8 | 2.0 | 1.6 | 2.0 | 1.6 | 1.8 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 1 | 1 | 3 | 4 | 17 | 3 | 2 | 2 | 3 | <5 | <5 | <5 | 5 | <5 | 5 | <5 | <5 | <5 | <5 | <5 | 38 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 14 | 13 | 12 | 11 | 11 | 11 | 12 | 10 | 8 | 8 | 9 | 9 | 11 | 9 | 9 | 12 | 11 | 7 | 9 | 10 | 8 | 10 | 10 | 10 | 11 | 9 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.7 | 0.8 | 1.0 | 1.3 | 0.6 | 1.0 | 1.0 | 1.0 | 0.9 | 2.4 | 0.8 | 1.3 | 1.6 | 3.3 | 0.5 | 2.9 | 0.7 | 1.9 | 0.8 | 1.9 | 1.1 | 10.6 | 0.9 | 2.6 | 1.4 | 1.1 | 0.8 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 310 | 290 | 250 | 240 | 240 | 230 | 290 | 180 | 140 | 246 | 274 | 196 | 259 | 241 | 212 | 290 | 339 | 235 | 220 | 257 | 244 | 212 | 270 | 161 | 271 | 260 | 249 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.72 | 2.52 | 2.23 | 2.12 | 2.08 | 1.91 | 2.33 | 1.66 | 1.27 | 2.52 | 2.31 | 1.60 | 2.10 | 1.86 | 1.71 | 3.11 | 2.66 | 1.45 | 1.98 | 2.09 | 1.95 | 1.87 | 1.99 | 1.61 | 2.25 | 2.43 | 2.11 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 6 | 8 | 8 | 7 | 8 | 6 | <1 | 9 | 7 | 24 | 7 | <5 | <5 | <5 | 8 | 30 | 14 | <5 | 5 | 6 | 7 | 5 | 8 | 6 | <5 | 8 | 10 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 166 | 151 | 131 | 123 | 125 | 118 | 143 | 92 | 77 | 139 | 137 | 98 | 124 | 104 | 103 | 172 | 165 | 99 | 120 | 130 | 119 | 113 | 115 | 99 | 139 | 148 | 123 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.85 | 2.57 | 2.12 | 1.92 | 2.10 | 2.02 | 2.42 | 1.33 | 1.25 | 2.24 | 2.41 | 1.79 | 2.08 | 1.61 | 1.84 | 2.77 | 3.09 | 2.05 | 1.84 | 2.43 | 2.14 | 2.03 | 1.93 | 1.82 | 2.54 | 2.67 | 2.12 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 29.00 | 27.00 | 23.00 | 25.00 | 27.00 | 26.00 | 24.00 | 16.00 | 18.00 | 21.50 | 27.20 | 21.90 | 23.30 | 21.40 | 21.20 | 26.80 | 34.10 | 18.70 | 20.00 | 25.10 | 18.90 | 21.50 | 24.50 | 20.70 | 26.80 | 22.70 | 26.10 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 2.33 | 0.98 | 2.53 | 4.95 | 0.48 | 2.80 | 1.89 | 11.00 | 0.79 | 5.90 | 2.10 | 5.30 | 0.70 | 7.30 | 3.40 | 5.80 | 7.50 | 17.20 | 3.66 | 7.50 | 4.50 | 4.10 | 1.50 | 6.20 | 6.10 | 4.80 | 0.20 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.68 | -2.87 | -2.94 | -2.72 | -2.51 | -2.87 | NC | -3.18 | -3.21 | -2.69 | -2.63 | -3.19 | -3.24 | -3.14 | -3.02 | -2.51 | -2.36 | -3.76 | -3.21 | -2.97 | -2.97 | -3.42 | -2.56 | -3.20 | -3.33 | -2.78 | -2.68 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -2.93 | -3.12 | -3.19 | -2.97 | -2.76 | -3.12 | NC | -3.43 | -3.46 | -3.01 | -2.95 | -3.51 | -3.56 | -3.46 | -3.34 | -2.83 | -2.68 | -4.08 | -3.46 | -3.29 | -3.29 | -3.74 | -2.88 | -3.52 | -3.65 | -3.10 | -3.00 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.62 | 9.52 | 9.62 | 9.63 | 9.51 | 9.66 | NC | 9.69 | 9.73 | 9.39 | 9.83 | 10.10 | 10.00 | 10.10 | 9.87 | 9.23 | 9.42 | 10.10 | 9.83 | 9.92 | 9.96 | 10.10 | 9.79 | 10.00 | 9.97 | 9.85 | 9.68 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.87 | 9.77 | 9.87 | 9.88 | 9.76 | 9.91 | NC | 9.94 | 9.98 | 9.71 | 10.20 | 10.40 | 10.30 | 10.40 | 10.20 | 9.55 | 9.74 | 10.40 | 10.10 | 10.30 | 10.40 | 10.10 | 10.30 | 10.30 | 10.20 | 10.00 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **230** | -- | -- | **289** | **48** | -- | **338** | -- | -- | **321** | **43** | **168** | **191** | **120** | **56** | **229** | **42** | **155** | **100** | -- | **88** | **206** | -- | -- | -- | **158** | **41** | **46** |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 16 | -- | -- | 19 | 16 | -- | 13 | -- | -- | 12 | 15 | 9 | 12 | 7 | 16 | 14 | 20 | 9 | 16 | -- | 17 | 14 | -- | -- | 16 | -- | 17 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 8 | -- | -- | 11 | 9 | -- | <50 | -- | -- | <5 | 11 | 33 | 6 | 10 | 9 | 7 | 22 | 10 | <50 | -- | <5 | 8 | -- | -- | <5 | -- | 26 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.3 | -- | -- | **0.053** | <0.017 | -- | **0.056** | -- | -- | **0.032** | **0.027** | **0.021** | **0.020** | <0.017 | **0.017** | **0.037** | <0.017 | **0.025** | -- | -- | **0.187** | **0.029** | -- | -- | **0.058** | -- | <0.017 |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | **6** | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | **1** | -- | -- | **1** | <0.40 | -- | **1** | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | -- | <1 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2 | -- | -- | **6** | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | **1** | **1** | <1 | **1** | <2.0 | <1 | **2** | <1 | <1 | <1 | **1** | <1 | **1** |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 130 | -- | -- | **313** | 62 | 125 | 177 | 162 | **384** | 229 | 137 | 195 | 207 | 132 | 92 | 147 | 124 | 168 | 110 | 157 | 81 | 149 | 62 | 269 | 78 | 70 | 116 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **10.3** | <0.50 | -- | <0.50 | -- | -- | <0.5 | <0.5 | **1.9** | <0.5 | <0.5 | <0.5 | **5.1** | <0.5 | <0.5 | <0.50 | -- | <0.5 | <0.5 | -- | -- | **1.3** | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 100 | -- | -- | 79 | 57 | 59 | 78 | 52 | 56 | 48 | 65 | 68 | 73 | 48 | 24 | 48 | 115 | 42 | 39 | 41 | 22 | 47 | 23 | 45 | 46 | 31 | 17 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | **5** | -- | -- | 3 | <2.0 | -- | **3** | -- | -- | <2 | <2 | **2** | **2** | <2 | <2 | 3 | <2 | **3** | <2.0 | -- | <2 | 3 | -- | -- | 15 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <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 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 46 | -- | -- | 39 | 38 | -- | 36 | -- | -- | 32 | 41 | 32 | 37 | 33 | 30 | 40 | 45 | 26 | 29 | -- | 19 | 30 | -- | -- | 38 | -- | 40 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 11 | -- | -- | 6 | <2.0 | -- | 5 | -- | -- | 8 | <2 | 3 | 4 | 2 | <2 | 2 | <2 | 5 | 2 | -- | <2 | 2 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | 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 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | 2 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 27 | -- | -- | 14 | 8 | 11 | 12 | 13 | 10 | 5 | <5 | 11 | 11 | 6 | 5 | 14 | <5 | 9 | 13 | 8 | <5 | 11 | <5 | 19 | **58** | <5 | 6 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 200 | 65 | -- | >250 | 63 | >250 | 91 | >250 | -- | 2,420 | >2420 | 1,120 | 1,200 | 866 | 488 | 525 | 1,550 | >2420 | --- | 980 | 122 | 866 | 548 | >2420 | 299 | 488 | 154 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 39 | 24 | -- | 9 | 15 | 37 | 8 | **>250** | <100 | 41 | 11 | 17 | 48 | 2 | 7 | <1 | 15 | 28 | 60 | 24 | 6 | 4 | 33 | 99 | 29 | 18 | 3 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.53 | 0.79 | 1.11 | 1.73 | 1.47 | 0.99 | 0.76 | 1.44 | 1.36 | 0.62 | 2.30 | 1.54 | 1.22 | 1.40 | 1.19 | 0.40 | 0.41 | 0.84 | 0.64 | 1.14 | 1.79 | 2.76 | 0.90 | 2.08 | 1.45 | 1.75 | 1.10 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.48 | 0.69 | 1.17 | 1.61 | 1.42 | 0.81 | 0.69 | 1.15 | 1.14 | 0.63 | 2.30 | 2.16 | 1.40 | 1.40 | 1.19 | 1.32 | 0.36 | 0.80 | 0.62 | 1.11 | 0.95 | 3.48 | 1.15 | 2.19 | 2.55 | 1.87 | 1.18 |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
* '--' = no guideline available / Not Tested.
[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.
[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.
[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).
[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).
[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.
[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.
[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.
[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site (KL-1) | | | | | | | | KL-1 | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | hh:mm | | | | | | | 9:15 AM | 7:50 AM | 9:00 AM | 8:40 AM | 9:15 AM | 8:45 AM | 3:05 PM | 11:40 AM | 12:59 PM | 12:15 PM | 12:12 PM | 11:20 AM | 1:00 PM | 11:22 AM | 11:55 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 2.1 | 2.1 | 2.5 | 2.5 | 2.7 | 1.9 | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | 1.00 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 12.2 | 24.2 | 12.8 | 12.2 | 23.6 | 10.4 | 25.4 | 22.6 | 11.6 | 15.6 | 22.6 | 15.2 | 18.9 | 22.64 | 14.6 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **11.13** | 6.72 | 8.61 | ** | 7.10 | 8.90 | 6.55 | 8.04 | **9.69** | 17.24 | 7.72 | 11.34 | 7.75 | 5.77 | 9.12 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.85 | 7.51 | 6.84 | **9.70** | 7.41 | 6.77 | **6.43** | 6.67 | 6.54 | 6.76 | **5.95** | 6.72 | 7.14 | 7.27 | ***9.47*** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 203.1 | 288.2 | 253.7 | 205.0 | 160.0 | 194.0 | 245.0 | 219.0 | 219.6 | 176.0 | 202.0 | 189.0 | 299.4 | 70 | 270.6 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 9 | 7.0 | <5 | 7.0 | <5 | <5 | 8.0 | 7.0 | <5 | 9 | 10 | 6 | 9 | 7 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 53 | 54 | 55 | 75 | 59 | 43 | 65 | 59 | 60 | 49 | 48 | 53 | 84 | 73 | 67 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 | -- | <0.12 | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 42 | 16 | 18 | 41 | 21 | 19 | 22 | 11 | 16 | 20.7 | 14.7 | 10.9 | 16.1 | 9.5 | 11.0 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.26 | 0.16 | 0.2 | 0.2 | 0.1 | 0.3 | 0.10 | 0.06 | 0.17 | 0.14 | 0.11 | 0.23 | 0.16 | 0.17 | 0.10 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.16 | 0.07 | 0.2 | 0.2 | 0.1 | 0.3 | 0.10 | 0.06 | 0.17 | 0.14 | 0.11 | 0.23 | 0.16 | 0.17 | 0.10 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.10** | **0.09** | <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 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [3] | -- | <0.03 | 0.08 | 0.1 | <0.03 | 0.1 | 0.1 | <0.03 | 0.08 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | <0.4 | <0.4 | <0.4 | 0.6 | 3.0 | <0.4 | 0.60 | 1.70 | 0.19 | 0.22 | <0.10 | 0.18 | 0.22 | 0.14 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.1 | 3.1 | 4.0 | 4.3 | 4.2 | 4.0 | 3.20 | 3.90 | 12.10 | 5.2 | 3.1 | 5.2 | 3.8 | 4.2 | 3.8 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 | <0.01 | <0.01 | <0.01 | 0.13 | <0.01 | 0.02 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.71 | 7.31 | 7.07 | 6.70 | 6.95 | 6.70 | 6.82 | 6.94 | 6.79 | 6.69 | 6.50 | 7.06 | 6.94 | 6.55 | ***6.23*** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 5.8 | 7.2 | 6.9 | 7.0 | 7.8 | 4.2 | 6.8 | 5.4 | 6.4 | 9.2 | 7.5 | 8.6 | 8.3 | 8.3 | 7.3 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.0 | 1.2 | 1.3 | 1.2 | 1.2 | 0.8 | 1.1 | 20.0 | 1.0 | 1.1 | 1.1 | 1.2 | 1.3 | 1.3 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.012** | 0.007 | 0.008 | **0.011** | 0.005 | 0.008 | 0.008 | **0.036** | **0.029** | <0.006 | **0.017** | **0.011** | **0.015** | **0.298** | **0.030** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.7 | 1.0 | 0.8 | 0.8 | 1.0 | 0.6 | 0.9 | 0.7 | 0.8 | 0.8 | 1.1 | 1.0 | 1.1 | 1.2 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 36.4 | 34.7 | 31.7 | 46.3 | 43.9 | 23.4 | 36.0 | 44.4 | 40.3 | 34.2 | 31.9 | 30.4 | 48.0 | 44.0 | 38.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.6 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.7 | 1.3 | 2.0 | 2.8 | 3.7 | 1.7 | 2.6 | 2.0 | 1.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | <5 | <5 | <5 | <5 | <5 | 6.0 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 8 | 7.0 | 9.0 | 10.0 | 9.0 | 9.0 | 9.0 | 8.0 | 9.0 | 8 | 8 | 10 | 9 | 9 | 9 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 1.3 | 0.7 | 2.1 | 0.9 | 3.2 | 2.9 | 3.4 | 0.8 | 0.7 | 1.0 | 2.1 | 0.9 | 1.0 | 1.4 | 0.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 243 | 261 | 215 | 280 | 232 | 129 | 266 | 275 | 239 | 205 | 217 | 222 | 313 | 286 | 257 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.68 | 1.86 | 1.9 | 2.3 | 2.0 | 1.42 | 2.03 | 2.00 | 2.03 | 1.56 | 1.71 | 1.92 | 2.69 | 2.44 | 2.22 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 9 | 7.0 | <5 | 7.0 | <5 | <5 | 8 | 7 | <5 | 9 | 10 | 6 | 9 | 7 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 106 | 112 | 110.0 | 141.0 | 127.0 | 83.0 | 120 | 124 | 123 | 103 | 104 | 111 | 156 | 143 | 128 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.00 | 2.01 | 1.9 | 2.5 | 2.4 | 1.34 | 2.05 | 2.33 | 2.19 | 2.09 | 1.90 | 1.88 | 2.66 | 2.47 | 2.15 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 18.6 | 22.9 | 22.6 | 22.4 | 24.4 | 13.8 | 21.5 | 18.0 | 20.1 | 27.5 | 23.3 | 26.4 | 26.1 | 26.1 | 23.2 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 8.6 | 3.8 | 0.4 | 3.5 | 9.9 | 3.1 | 0.5 | 7.7 | 3.7 | 14.5 | 5.2 | 0.9 | 0.6 | 0.7 | 1.7 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.42 | -2.47 | -2.8 | -3.4 | -2.9 | -3.6 | -3.24 | -3.02 | -3.15 | -3.24 | -3.26 | -2.60 | -2.97 | -3.18 | -3.66 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.74 | -2.79 | -3.2 | -3.7 | -3.2 | -3.9 | -3.56 | -3.34 | -3.47 | -3.56 | -3.58 | -2.92 | -3.29 | -3.50 | -3.98 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 10.1 | 9.78 | 9.9 | 10.1 | 9.9 | 10.3 | 10.10 | 9.96 | 9.94 | 9.93 | 9.76 | 9.66 | 9.91 | 9.73 | 9.89 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.4 | 10.1 | 10.2 | 10.4 | 10.2 | 10.6 | 10.4 | 10.3 | 10.3 | 10.2 | 10.1 | 10.0 | 10.2 | 10.0 | 10.2 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **169** | **29** | -- | **145** | **49** | **160** | **136** | -- | -- | **145** | -- | -- | ***123*** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 12 | 16 | -- | 14.0 | 15.0 | 8.0 | 18.0 | -- | -- | 14 | -- | -- | 22 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 5 | 10 | -- | 5.0 | 11.0 | 5.0 | 9.0 | -- | -- | 16 | -- | -- | 7 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | **0.024** | -- | -- | <0.09 | -- | -- | -- | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | 2.0 | <1 | 1.0 | 1.0 | 2.0 | <1 | 1.0 | 1 | 2 | <1 | <1 | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 96 | 142 | 142 | 155 | 105 | 145 | 264 | 135 | 88 | 139 | 115 | 53 | 138 | 82 | 99 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | **1.3** | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 28 | 49 | 28.0 | 42.0 | 32.0 | 23.0 | 85 | 20 | 15 | 51 | 33 | 13 | 53 | 37 | 26 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | -- | 2.0 | <2 | 6.0 | <2 | -- | -- | 7 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 26 | 38 | -- | 36.0 | 33.0 | 27.0 | 45.0 | -- | -- | 33 | -- | -- | 39 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | 3.0 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | -- | 0.1 | <0.1 | 0.1 | <0.1 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | <2 | -- | 2.0 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 8 | <5 | 19.0 | 8.0 | <5 | 6.0 | 6.0 | <5 | <5 | **189** | 6 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 14 | 611 | 157.0 | 256 | NDOGT | 1198 | >2420 | 345 | 158 | >200 | >200 | >200 | >200 | 8,600 | 4,800 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 5 | 11 | 61.0 | <1 | 6 | 26 | 59 | 11 | 1 | 25 | 130 | 43 | 18 | 1500 | 86 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.26 | 4.42 | 1.73 | 0.95 | 0.95 | 2.4 | 1.05 | 1.4 | 2.3 | 1.5 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.91 | 1.26 | 1.63 | 1.50 | 2.18 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 3.09 | -- | * | 1.46 | 1.89 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

* "-- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a ran

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

| | |
|---|---|
| **Bold (black shaded)** | = Present Result - Parameter concentration exceeds CCME FWAL Guideline. |
| Underlined (black shaded) | = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality |
| *Italics* (black shaded) | = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations |
| **Blue shaded** | = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Re |

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - KL-2 | | | | | | | | KL-2 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | | | | | | | 11:00 | 10:30 | 10:45 | 10:15 | 12:25 | 10:50 | 09:30 | 14:00 | 13:15 | 9:50 | 10:30 | 10:20 | 09:10 | 16:10 | 14:30 | 10:45 | 9:20 | 14:04 | 09:15 | 13:29 | 13:05 | 10:30 | 8:30 | 12:50 | 10:47 | 11:15 AM | 10:30 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 1.3 | 2.1 | 1.8 | 1.9 | 2.0 | 1.5 | 1.2 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 16.8 | 18.2 | 15.4 | 13.5 | 20.4 | 8.0 | 9.9 | 19.1 | 14.1 | 7.6 | 21.8 | 12.3 | 10.1 | 22.9 | 9.7 | 11.7 | 21.1 | 10.8 | 13.1 | 24.7 | 8.1 | 10.7 | 20.3 | 10.2 | 15.7 | 21.2 | 10.6 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.16** | 8.50 | 5.70 | 6.28 | **4.66** | **9.58** | **9.66** | 7.06 | 8.43 | 6.47 | 5.82 | 7.63 | 9.37 | 6.38 | 7.40 | **14.90** | 6.95 | 7.70 | 8.41 | 7.28 | 7.14 | 7.88 | **4.21** | **9.65** | **9.72** | 6.61 | 6.23 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.33** | **6.35** | **6.19** | 6.61 | 6.96 | **6.25** | 6.77 | **5.90** | **5.62** | 7.72 | **6.41** | **6.29** | **5.75** | 7.47 | **5.57** | 6.60 | 7.22 | **5.79** | **6.36** | **5.88** | **6.43** | 7.64 | **5.97** | **5.54** | 6.69 | **6.00** | **6.29** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 46.0 | 106.0 | 89.2 | 198.5 | 104.0 | 75.1 | 79.7 | 66.7 | 54.3 | 58.0 | 96.6 | 61.1 | 77.9 | 65.3 | 64.5 | 188.0 | 266.0 | 63.0 | 0.1 | 107.9 | 73.6 | 82.0 | 117.0 | 103.7 | 78.0 | 114.0 | 109.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 8 | 8 | 8 | 8 | 7 | <5 | <5 | 7 | <5 | 20 | <5 | 8 | <5 | <5 | <5 | 29 | 7 | 28 | <5.0 | 7 | <5 | <5 | 10 | 6 | 5 | 12 | 9 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 48 | 48 | 48 | 48 | 25 | 17 | 19 | 14 | 10 | 16 | 20 | 12 | 19 | 21 | 14 | 20 | 17 | 12 | 15 | 14 | 12 | 17 | 26 | 30 | 20 | 19 | 19 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 20 | 20 | 20 | 20 | 63 | 95 | 80 | 110 | 120 | 52 | 60 | 94 | 37 | 90 | 71 | 25 | 44 | 168 | 50 | 63 | 61 | 47 | 48 | 93 | 46 | 46 | 57 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.19 | 0.19 | 0.19 | 0.19 | 0.07 | 0.06 | 0.12 | 0.07 | <0.05 | 0.11 | 0.08 | <0.05 | 0.12 | <0.05 | <0.05 | 0.08 | <0.05 | <0.05 | 0.06 | 0.08 | <0.05 | <0.05 | 0.06 | 0.19 | 0.05 | 0.08 | <0.05 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.19 | 0.19 | 0.19 | 0.19 | 0.07 | -- | 0.12 | -- | -- | 0.11 | 0.08 | <0.05 | 0.12 | <0.05 | <0.05 | 0.08 | <0.05 | <0.05 | 0.06 | 0.08 | <0.05 | <0.05 | <0.05 | 0.19 | <0.05 | 0.08 | <0.05 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | <0.03 | 0.04 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | 0.06 | <0.03 | <0.03 | 0.03 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 2.2 | 0.7 | -- | 1.1 | <0.4 | <0.4 | 0.4 | <0.4 | 0.4 | 0.8 | 0.8 | 0.4 | 0.9 | 0.5 | <0.4 | 0.5 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 4.3 | 4.3 | 4.3 | 4.3 | 6.6 | 9.7 | 6.5 | 10.0 | 12.0 | 8.1 | 7.1 | 10.9 | 7.5 | 11.1 | 10.9 | 6.2 | 6.6 | 12.9 | 4.0 | 13.3 | 14.0 | 6.2 | 7.0 | 13.2 | 8.5 | 8.2 | 8.5 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | 0.09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.85 | 6.85 | 6.85 | 6.85 | 6.78 | **6.11** | **6.27** | **6.40** | **6.05** | 6.50 | 6.70 | 6.50 | **6.37** | 6.62 | **6.34** | 6.53 | 6.87 | **6.06** | **6.32** | 6.99 | **6.28** | **6.35** | 6.87 | **6.19** | 6.57 | 6.87 | 6.66 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.5 | 6.5 | 6.5 | 6.5 | 4.1 | 3.6 | 2.5 | 2.5 | 2.2 | 2.4 | 3.6 | 2.9 | 2.7 | 2.5 | 2.4 | 3.4 | 4.0 | 2.4 | 2,600.0 | 3.4 | 1.1 | 2.9 | 4.5 | 5.6 | 3.6 | 4.3 | 3.9 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.2 | 1.2 | 1.2 | 1.2 | 1.0 | 0.8 | 0.6 | 0.6 | 0.4 | 0.7 | 1.0 | 1.0 | 0.7 | 0.5 | 0.8 | 1.1 | 1.0 | 0.6 | 640.0 | 0.9 | 0.7 | 0.7 | 1.1 | 1.5 | 1.0 | 1.2 | 0.9 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.020** | **0.020** | **0.020** | **0.020** | 0.009 | 0.009 | 0.009 | 0.008 | **0.013** | **0.021** | **0.059** | **0.013** | 0.010 | **0.020** | **0.029** | **0.013** | **0.039** | **0.025** | 0.008 | **0.012** | 0.008 | 0.009 | **0.016** | **0.013** | **0.012** | **0.028** | 0.010 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 1.1 | 1.1 | 1.1 | 0.6 | 0.8 | 0.5 | 0.5 | 0.7 | 0.5 | 0.7 | 0.8 | 0.5 | 0.5 | 0.7 | 0.7 | 0.9 | 0.7 | 540.0 | 0.7 | 0.6 | 0.9 | 0.8 | 1.1 | 0.8 | 0.8 | 0.7 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 31.6 | 31.6 | 31.6 | 31.6 | 14.7 | 10.6 | 11.1 | 7.8 | 6.9 | 9.8 | 14.2 | 9.5 | 8.9 | 7.0 | 7.9 | 17.5 | 14.0 | 7.6 | 8.4 | 11.5 | 6.6 | 11.5 | 16.1 | 17.7 | 13.8 | 15.4 | 13.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.2 | 2.2 | 2.2 | 2.2 | 4.2 | 4.7 | 2.7 | 4.3 | 4.0 | 2.6 | 4.0 | 4.9 | 2.8 | 4.4 | 4.9 | 2.4 | 3.3 | 4.6 | 2.0 | 3.7 | 5.1 | 2.0 | 2.3 | 4.5 | 1.3 | 2.2 | 4.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 103 | 103 | 103 | 103 | 7 | <1 | <1 | <2 | <1 | <5 | <5 | <5 | <5 | 135 | <5 | <5 | <5 | <5 | <1.0 | <5 | 17 | <5 | <5 | <5 | <5 | 12 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 9 | 9 | 9 | 9 | <2 | <2 | <2 | <2 | <2 | 3 | 3 | 2 | 4 | 5 | 4 | 4 | 2 | 3 | 3 | <2 | 3 | 4 | 3 | 7 | 3 | 2 | 3 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.5 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 | 0.4 | 0.7 | 0.6 | 0.5 | 1.1 | 1.0 | 1.9 | 2.2 | 1.0 | 0.9 | 0.8 | 1.2 | <1.0 | 1.6 | 6.2 | 0.7 | 2.0 | 1.9 | 0.8 | 4.4 | 1.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 212 | 212 | 212 | 212 | 100 | 97 | 79 | 66 | 54 | 71 | 91 | 61 | 83 | 69 | 62 | 87 | 94 | 66 | 64 | 81 | 73 | 79 | 135 | 125 | 93 | 110 | 97 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.49 | 0.82 | 0.45 | 0.77 | 0.85 | 0.49 | 0.53 | 0.53 | 0.28 | 0.92 | 0.63 | 0.54 | 0.63 | 0.70 | 0.48 | 1.23 | 0.66 | 0.96 | 0.48 | 0.54 | 0.40 | 0.56 | 1.00 | 1.13 | 0.73 | 0.82 | 0.78 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <1 | 8 | <5 | 5 | 7 | <5 | <5 | 7 | <5 | 20 | <5 | 8 | <5 | <5 | <5 | 29 | 7 | 28 | <1.0 | 7 | <5 | <5 | 10 | 6 | 5 | 12 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 36 | 55 | 35 | 46 | 55 | 38 | 37 | 34 | 25 | 45 | 44 | 34 | 37 | 37 | 31 | 65 | 44 | 44 | 32 | 36 | 25 | 38 | 59 | 68 | 46 | 51 | 47 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.71 | 0.99 | 0.67 | 0.74 | 0.95 | 0.74 | 0.68 | 0.55 | 0.49 | 0.65 | 0.94 | 0.73 | 0.63 | 0.54 | 0.60 | 1.07 | 0.97 | 0.57 | 0.57 | 0.82 | 0.47 | 0.76 | 1.09 | 1.25 | 0.91 | 1.05 | 0.90 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 10.00 | 15.00 | 10.00 | 12.00 | 14.00 | 12.00 | 9.00 | 9.00 | 8.00 | 8.90 | 13.10 | 11.40 | 9.60 | 8.30 | 9.30 | 13.00 | 14.10 | 8.50 | 9.10 | 12.20 | 5.60 | 10.10 | 15.80 | 20.20 | 13.10 | 15.70 | 13.40 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 18.30 | 9.39 | 19.60 | 1.99 | 5.56 | 20.30 | 12.40 | 1.85 | 27.30 | 17.60 | 19.70 | 15.10 | 0.30 | 12.90 | 11.00 | 7.10 | 19.10 | 25.70 | 8.57 | 20.50 | 7.50 | 14.90 | 4.50 | 5.30 | 11.00 | 12.30 | 7.50 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | -3.20 | NC | -3.44 | -3.05 | NC | NC | -3.66 | NC | -3.37 | -3.60 | -3.68 | -4.05 | -3.83 | -4.12 | -3.04 | -3.23 | -3.66 | NC | -3.18 | -4.51 | -4.04 | -3.04 | -3.85 | -3.73 | -2.98 | -3.35 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | -3.45 | NC | -3.70 | -3.30 | NC | NC | -3.91 | NC | -3.69 | -3.92 | -4.00 | -4.37 | -4.15 | -4.44 | -3.36 | -3.55 | -3.98 | NC | -3.50 | -4.83 | -4.36 | -3.36 | -4.17 | -4.05 | -3.30 | -3.67 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | 9.78 | NC | 10.00 | 9.83 | NC | NC | 10.10 | NC | 9.87 | 10.30 | 10.20 | 10.40 | 10.50 | 10.50 | 9.57 | 10.10 | 9.72 | NC | 10.20 | 10.80 | 10.40 | 9.91 | 10.00 | 10.30 | 9.85 | 10.00 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | 10.00 | NC | 10.30 | 10.10 | NC | NC | 10.30 | NC | 10.20 | 10.60 | 10.50 | 10.70 | 10.80 | 10.80 | 9.89 | 10.40 | 10.00 | NC | 10.50 | 11.10 | 10.70 | 10.20 | 10.40 | 10.60 | 10.20 | 10.30 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **290** | -- | -- | **175** | **151** | -- | **271** | -- | -- | **209** | **205** | **338** | **256** | **270** | **259** | **205** | **236** | **340** | **180** | -- | **284** | **187** | -- | -- | **185** | **150** | **240** |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 9 | -- | -- | 12 | 14 | -- | 10 | -- | -- | 9 | 11 | 10 | 8 | <5 | 13 | 13 | 18 | 9 | 9 | -- | 9 | 10 | -- | -- | 10 | -- | 14 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 8 | -- | -- | 15 | 13 | -- | <50 | -- | -- | 6 | 14 | 22 | 6 | 11 | 9 | 11 | 12 | 12 | <50 | -- | <5 | 9 | -- | -- | <5 | -- | 17 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.3 | -- | -- | **0.018** | <0.017 | -- | <0.017 | -- | -- | <0.017 | <0.017 | <0.017 | <0.017 | <0.017 | **0.019** | <0.017 | <0.017 | **0.018** | **0.014** | -- | **0.176** | <0.017 | -- | -- | **0.041** | -- | <0.017 |
| Total Chromium (Cr) | µg/L | 1 | -- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | **9** | <1 | <1 | <1.0 | -- | <1 | 1 | -- | -- | <1 | -- | 1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2 | -- | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | 2 | <1 | <1 | **4** | <2.0 | <1 | <1 | <1 | <1 | 2 | <1 | 1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 250 | -- | -- | 227 | **403** | 238 | 202 | **418** | **358** | 154 | **541** | **813** | 269 | **528** | **523** | 174 | **723** | **305** | 250 | **641** | **478** | 232 | **1,000** | 290 | 168 | **759** | **572** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **1.0** | <0.50 | -- | <0.50 | -- | -- | <0.5 | <0.5 | **1.1** | <0.5 | 0.5 | <0.5 | **5.8** | <0.5 | 0.5 | <0.5 | -- | 0.6 | <0.5 | -- | -- | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 26 | -- | -- | 43 | 83 | 35 | 12 | 68 | 23 | 17 | 90 | 114 | 24 | 67 | 53 | 33 | 146 | 25 | 47 | 120 | 57 | 21 | 109 | 39 | 39 | 96 | 64 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1 | <1 | -- | <1 | -- | -- | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | **0.420** | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 14 | -- | -- | 18 | 20 | -- | 12 | -- | -- | 10 | 18 | 15 | 12 | 9 | 12 | 16 | 17 | 12 | 12 | -- | 8 | 12 | -- | -- | 15 | -- | 20 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 2 | -- | -- | <2 | <2 | -- | 3 | -- | -- | <2 | 2 | 3 | 4 | <2 | 2 | 2 | <2 | 3 | 3 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 8 | -- | -- | 5 | 5 | 7 | <5.0 | <5.0 | <5.0 | <5 | <5 | 7 | <5 | <5 | <5 | <5 | <5 | <5 | <5.0 | <5 | <5 | <5 | <5 | 8 | <5 | 8 | 6 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 1,800 | 170 | -- | >250 | 11 | >250 | 59 | >250 | -- | >2420 | 1,986 | >2420 | >2420 | >2420 | >2420 | 525 | >2420 | >2420 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | >2420 | 659 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | **1,500** | 100 | -- | **>250** | 6 | 6 | 2 | **>250** | <100 | 3 | 7 | 3 | 12 | 6 | 2 | <1 | 18 | 11 | 30 | 11 | 5 | 4 | 15 | 25 | 31 | 16 | 3 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.82 | 6.05 | 1.97 | 0.73 | 0.55 | 0.22 | 0.44 | 0.89 | 0.97 | 0.53 | 2.20 | 0.07 | 0.62 | 1.00 | 0.73 | 0.13 | 0.83 | 0.41 | 0.34 | 0.96 | 0.46 | 0.30 | 1.86 | 0.32 | 0.99 | 1.47 | 0.31 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.87 | 5.97 | 1.95 | 0.66 | 0.54 | 0.21 | 0.42 | 0.73 | 0.82 | 0.56 | 2.20 | 0.12 | 0.72 | 1.00 | 0.74 | 0.14 | 0.86 | 0.41 | --- | 1.26 | 0.26 | 0.43 | 2.43 | 0.36 | 1.86 | 1.81 | 0.49 |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.
[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.
[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).
[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).
[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.
[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.
[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.
[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.
Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality
*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - KL-2 | | | | | | | | KL-2 | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | hh:mm | | | | | | | 11:00 AM | 10:10 AM | 10:00 AM | 10:44 AM | 3:01 PM | 10:45 AM | 1:10 PM | 4:05 PM | 13.22 PM | 11:33 AM | 11:53 AM | 11:46 AM | 12:00 PM | 11:40 AM | 12:10 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 2.1 | 1.4 | 1.4 | 2.2 | 1.80 | 1.20 | 1.35 | 1.60 | NA* | 0.2 m | NA* | 1.65 | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 11.7 | 21.6 | 10.3 | 10.3 | 26.4 | 10.1 | 21.5 | 19.3 | 8.4 | 14.1 | 18.5 | 11.7 | 15.5 | 19.58 | 11.7 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 9.41 | **4.17** | 7.54 | ** | **2.58** | 7.90 | **5.10** | **4.96** | **9.84** | 15.01 | 8.17 | 12.07 | 8.11 | **2.00** | 9.04 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.21** | **5.16** | **5.84** | 8.50 | **5.18** | **6.11** | **6.07** | **5.98** | **6.16** | **6.07** | **5.80** | **6.14** | 6.56 | 7.45 | 8.62 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 57.4 | 109.9 | 67.2 | 48.3 | 119.0 | 214.0 | 81.0 | 101.0 | 80.8 | 69.0 | 76.0 | 84.0 | 111.5 | 102 | 114.7 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 11 | <5 | <5 | 9.0 | <5 | 9.0 | 14.0 | 7.0 | 8 | 8 | 15 | 95.0 | 24.0 | 10.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 12 | 19 | 11 | 13 | 16 | 14 | 17 | 21 | 15 | 13 | 13 | 14 | 24 | 19 | 19 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 | | | |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 82 | 59 | 123 | 76 | 106 | 77 | 59 | 40 | 81 | 47.0 | 84.1 | 66.3 | 59 | 65 | 80 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.07 | 0.05 | <0.05 | 0.1 | 0.05 | <0.05 | 0.12 | 0.10 | 0.08 | 0.05 | 0.41 | 0.10 | 0.29 | 0.12 | 0.10 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.07 | <0.05 | <0.05 | 0.06 | 0.05 | <0.05 | 0.12 | 0.10 | 0.08 | 0.05 | 0.41 | 0.10 | 0.29 | 0.12 | 0.10 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | 0.04 | 0.06 | 0.05 | <0.03 | 0.12 | 0.07 | 0.07 | 0.09 | <0.03 | <0.03 | <0.03 | 0.44 | <0.03 | 0.04 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | <0.4 | <0.4 | 0.5 | 0.80 | 2.70 | <0.4 | 1.70 | 0.60 | 0.24 | 0.24 | <0.10 | 0.23 | 0.43 | 0.27 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 9.0 | 6.6 | 14.0 | 6.9 | 12.10 | 9.40 | 5.80 | 2.50 | 4.20 | 8.5 | 9.9 | 3.0 | 6.70 | 8.50 | 10.20 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.13 | <0.01 | 0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.46** | 7.04 | **6.27** | **6.44** | 6.70 | **5.89** | 6.60 | 7.01 | **6.49** | 6.69 | **6.42** | 7.04 | 7.70 | 6.75 | ***6.29*** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.3 | 4.2 | 2.9 | 2.3 | 4.3 | 2.0 | 3.8 | 5.7 | 3.0 | 3.8 | 5.9 | 7.6 | 6.4 | 9.3 | 5.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.7 | 1.1 | 0.8 | 0.7 | 1.1 | 0.6 | 1.0 | 1.4 | 0.8 | 0.8 | 1.3 | 1.5 | 1.4 | 2.0 | 1.4 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.014** | **0.015** | 0.004 | 0.009 | **0.019** | **0.031** | **0.014** | **0.027** | **0.016** | **0.01** | **0.03** | **0.02** | **0.018** | **0.063** | **0.030** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.5 | 0.8 | 0.6 | 0.6 | 0.8 | 0.6 | 0.6 | 0.9 | 0.7 | 0.7 | 1.1 | 1.0 | 1.0 | 1.5 | 1.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 9.2 | 13.9 | 11.8 | 11.9 | 10.0 | 7.5 | 10.1 | 14.8 | 7.8 | 10.1 | 10.9 | 10.0 | 17.0 | 13.0 | 13.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.3 | 2.8 | 3.6 | 1.7 | 3.7 | 3.5 | 2.6 | 3.4 | 4.7 | 2.3 | 5.4 | 3.9 | 4.2 | 6.0 | 5.3 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 5.0 | <5 | <5 | 6.0 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 3 | <2 | 3.0 | 3.0 | <2 | 4.0 | 3.0 | 4.0 | 5.0 | 4 | 6 | 7 | 6.0 | 7.0 | 8.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.9 | 1.2 | 1.1 | 0.6 | 3.5 | 1.3 | 1.3 | 1.8 | 2.9 | 3.0 | 5.6 | 1.3 | 1.2 | 1.4 | 2.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 68 | 115 | 70 | 72 | 88 | 45 | 95 | 128 | 88 | 79 | 94 | 106 | 350 | 135 | 105 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.41 | 0.76 | 0.4 | 0.4 | 0.6 | 0.5 | 0.73 | 0.96 | 0.67 | 0.61 | 0.68 | 0.85 | 2.72 | 1.17 | 0.91 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 11 | <5 | <5 | 9.0 | <5 | 9 | 14 | 7 | 8 | 8 | 15 | 95 | 24 | 10 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 28 | 47 | 31.0 | 32.0 | 40.0 | 29.0 | 42 | 58 | 38 | 38 | 46 | 52 | 115 | 68 | 55 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.62 | 0.97 | 0.8 | 0.7 | 0.9 | 0.5 | 0.78 | 1.13 | 0.64 | 0.76 | 0.97 | 1.04 | 1.24 | 1.28 | 1.03 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 8.6 | 15 | 10.5 | 8.6 | 15.3 | 7.5 | 13.6 | 20.0 | 10.8 | 12.8 | 20.1 | 25.2 | 21.7 | 31.5 | 19.7 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 20.8 | 12.4 | 36.7 | 25.6 | 14.6 | 6.4 | 3.1 | 8.2 | 2.6 | 10.4 | 17.7 | 10.3 | 37.5 | 4.4 | 6.4 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -4.02 | -2.85 | -4.1 | -4.0 | -3.3 | -4.7 | -3.42 | -2.65 | -3.73 | -3.37 | -3.46 | -2.46 | -1.11 | -2.47 | -3.52 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -4.34 | -3.17 | -4.4 | -4.4 | -3.6 | -5.0 | -3.74 | -2.97 | -4.05 | -3.69 | -3.78 | -2.78 | -1.43 | -2.79 | -3.84 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 10.5 | 9.89 | 10.4 | 10.5 | 10.0 | 10.5 | 10.00 | 9.66 | 10.20 | 10.1 | 9.88 | 9.50 | 8.81 | 9.22 | 9.81 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.8 | 10.2 | 10.7 | 10.8 | 10.3 | 10.9 | 10.3 | 10.0 | 10.5 | 10.4 | 10.2 | 9.8 | 9.1 | 9.5 | 10.1 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **228** | **123** | -- | **156** | **257** | **318** | **227** | -- | -- | **204** | **--** | **--** | ***231*** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | **--** | **--** | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | **--** | **--** | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 7 | 14 | -- | 10 | 37 | 9 | 15.0 | -- | -- | 13 | **--** | **--** | 23.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | **--** | **--** | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | **--** | **--** | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 7 | 13 | -- | 7 | 11 | 7 | 14.0 | -- | -- | 11 | **--** | **--** | 16.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | **--** | **--** | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | -- | 8.9 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | **--** | **--** | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | -- | <1 | 1 | <1 | <1 | -- | -- | <1 | **--** | **--** | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | 1 | <1 | <1 | 1 | <1 | <1 | 1.0 | 1 | 2 | <1 | <1 | <1 | 1.0 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 148 | **783** | **336** | 227 | **1,210** | 277 | **486** | **1,040** | **659** | **472** | **503** | **462** | ***338*** | ***631*** | ***339*** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | **1.2** | <0.5 | -- | <0.5 | 1.0 | **1.6** | <0.5 | -- | -- | 0.7 | **--** | **--** | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 17 | 78 | 29 | 28 | 295 | 23 | 98 | 260 | 168 | 77 | 36 | 44 | 46 | 92 | 50 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | **--** | **--** | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | 3 | **--** | **--** | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | **--** | **--** | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | **--** | **--** | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 10 | 24 | -- | 13 | 24 | 13 | 17.0 | -- | -- | 17 | **--** | **--** | 22.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | **--** | **--** | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | **--** | **--** | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | 2 | 2 | 3.0 | -- | -- | 4 | **--** | **--** | 3.0 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | **--** | **--** | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | **--** | **--** | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | <5 | <5 | 20 | <5 | 9 | 6 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 10 | 2420 | 140.0 | 1960 | 630 | 1240 | >2420 | >2420 | 1730 | >200 | >200 | >200 | >200 | 21,600 | 8,600 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 4 | 20 | 50 | <10 | 2 | 12 | 31 | 58 | 4 | 195 | 26 | 12 | 36 | 13 | 28 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.25 | 0.53 | 4.25 | 3.15 | 0.95 | 0.6 | 0.79 | 0.6 | 2.0 | 0.5 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.51 | 1.25 | 0.75 | 0.47 | 1.67 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.91 | -- | * | 0.49 | 1.50 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
" -- " = no guideline available / Not Tested.
[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Wat
[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.
[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).
[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).
[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperatur
[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.
[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.
[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a s
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

| | |
|---|---|
| **Bold (black shaded)** | = Present Result - Parameter concentration exceeds CCME FWAL Guideline. |
| Underlined (black shaded) | = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality |
| *Italics* (black shaded) | = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations |
| **Blue shaded** | = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R |

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-3**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-3 | | | | | | | | KL-3 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/16/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | | | | | | | 09:00 | 11:00 | 09:30 | 11:30 | 14:12 | 11:40 | 10:30 | 12:20 | 12:00 | 10:26 | 12:20 | 11:20 | 9:50 | 10:00 | 14:00 | 11:00 | 11:50 | 14:25 | 10:35 | 11:45 | 10:40 | 11:00 | 11:30 | 11:00 | 9:36 | 10:15 | 10:15 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 14.0 | 21.6 | 17.3 | 14.7 | 23.1 | 9.9 | 10.3 | 21.1 | 15.5 | 9.0 | 24.5 | 15.6 | 11.7 | 21.5 | 13.6 | 11.0 | 22.7 | 12.8 | 14.7 | 25.0 | 8.4 | 12.1 | 21.7 | 12.5 | 16.1 | 22.5 | 13.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.79** | 8.00 | 8.00 | 9.26 | 7.83 | **10.35** | **11.06** | 8.42 | **9.60** | 8.89 | 8.17 | 7.72 | **10.20** | 9.20 | 8.90 | 5.90 | 7.87 | 8.12 | 8.02 | **9.91** | 8.65 | 9.34 | 7.72 | **11.41** | 9.00 | 7.40 | 8.17 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.27 | 6.74 | 6.97 | 7.27 | 7.33 | 6.76 | 6.83 | 6.96 | **6.30** | 7.68 | 6.85 | 6.51 | **5.86** | 7.25 | **6.49** | 6.55 | 7.37 | 6.67 | 6.84 | 6.87 | 7.17 | 7.40 | 6.82 | **5.58** | 7.02 | 7.04 | 6.97 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 95.0 | 282.0 | 246.0 | 220.0 | 228.0 | 199.4 | 220.0 | 175.0 | 161.3 | 204.0 | 225.0 | 177.2 | 207.3 | 194.4 | 210.6 | 405.0 | 252.0 | 208.0 | 0.2 | 245.1 | 236.6 | 213.0 | 264.0 | 227.8 | 204.0 | 248.0 | 248.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 | 5 | 6 | <5.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 66 | 63 | 60 | 55 | 55 | 53 | 56 | 43 | 37 | 50 | 57 | 46 | 54 | 40 | 46 | 58 | 46 | 45 | 60 | 56 | 56 | 54 | 56 | 49 | 63 | 56 | 59 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 22 | 20 | 20 | 28 | 12 | 20 | 31 | 38 | 40 | 57 | 15 | 31 | 19 | 23 | 20 | 16 | 13 | 20 | 34 | 13 | 14 | 29 | 13 | 21 | 24 | 13 | 15 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.14 | 0.12 | 0.14 | 0.24 | 0.15 | 0.22 | 0.24 | 0.15 | 0.16 | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.13 | 0.10 | 0.24 | 0.30 | 0.24 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.14 | -- | -- | 0.24 | 0.15 | -- | 0.24 | -- | -- | 0.19 | 0.09 | 0.09 | 0.21 | 0.11 | <0.05 | 0.17 | 0.13 | 0.13 | 0.16 | 0.12 | 0.21 | 0.14 | 0.06 | 0.10 | 0.13 | 0.17 | 0.24 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.07** | <0.05 | **0.11** | **0.13** | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.04 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 | 0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 2.8 | <0.4 | -- | 1.3 | <0.4 | 0.6 | 0.4 | 0.4 | 0.2 | 1.2 | 0.9 | <0.4 | <0.4 | 0.4 | <0.4 | 0.8 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.6 | 3.9 | 4.3 | 3.6 | 3.1 | 3.3 | 3.8 | 5.1 | 5.0 | 5.9 | 3.4 | 4.9 | 4.3 | 4.4 | 4.6 | 4.6 | 2.8 | 4.5 | 3.4 | 5.7 | 5.8 | 4.3 | 2.7 | 8.0 | 5.3 | 4.9 | 4.1 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.38** | 6.67 | 6.82 | 6.82 | 6.99 | 6.87 | 6.52 | 6.50 | **6.38** | 6.70 | 7.10 | 6.90 | 6.68 | 6.96 | 6.86 | 6.68 | 6.87 | 6.59 | 6.54 | 6.92 | 6.94 | 6.69 | 7.28 | 6.93 | 6.77 | 7.13 | 6.88 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.7 | 7.1 | 6.8 | 6.8 | 8.0 | 8.3 | 7.1 | 4.7 | 5.6 | 5.7 | 6.9 | 6.0 | 7.0 | 5.3 | 6.8 | 6.4 | 7.9 | 6.8 | 6,600.0 | 7.8 | 5.2 | 6.2 | 8.3 | 7.3 | 6.9 | 7.2 | 8.1 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.2 | 1.2 | 1.1 | 1.2 | 1.3 | 1.3 | 1.2 | 0.8 | 1.0 | 1.0 | 1.2 | 1.3 | 1.0 | 0.9 | 1.3 | 1.4 | 1.2 | 1.0 | 940.0 | 1.2 | 0.9 | 1.0 | 1.3 | 1.3 | 1.0 | 1.1 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | <0.02 | <0.02 | 0.005 | 0.005 | <0.002 | 0.003 | 0.008 | 0.003 | **0.012** | **0.019** | **0.045** | 0.007 | 0.006 | 0.006 | **0.012** | 0.009 | **0.023** | **0.148** | 0.004 | 0.004 | 0.002 | 0.008 | 0.005 | 0.004 | 0.006 | 0.009 | 0.007 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.9 | 1.1 | 0.9 | 0.8 | 0.8 | 1.0 | 0.9 | 0.7 | 0.9 | 0.7 | 0.9 | 0.9 | 0.8 | 0.6 | 1.2 | 0.8 | 1.1 | 0.9 | 770.0 | 0.9 | 0.7 | 0.7 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 38.0 | 38.0 | 35.0 | 28.3 | 33.1 | 33.0 | 33.0 | 20.8 | 21.3 | 31.2 | 34.5 | 26.4 | 35.1 | 20.1 | 32.1 | 36.4 | 39.0 | 35.3 | 34.0 | 40.0 | 27.1 | 32.1 | 37.2 | 32.8 | 44.0 | 41.4 | 35.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.7 | 2.6 | 2.6 | 3.2 | 2.9 | 3.2 | 2.9 | 2.5 | 2.6 | 2.7 | 2.0 | 2.6 | 2.9 | 2.6 | 2.7 | 2.6 | 1.9 | 2.4 | 2.5 | 2.4 | 2.6 | 2.6 | 1.8 | 2.5 | 2.2 | 1.6 | 1.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <1 | 1 | 1 | 2 | <2 | <1 | <1 | <1 | <1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 3 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 11 | 12 | 12 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 8 | 7 | 7 | 7 | 8 | 9 | 7 | 7 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 9 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.7 | 1.4 | 0.6 | 0.3 | 0.5 | 0.6 | 0.6 | 0.6 | 0.4 | 0.8 | 0.7 | 1.0 | 0.7 | 2.4 | 0.4 | 0.4 | 0.3 | 0.9 | 0.7 | 0.5 | 0.7 | 1.1 | 1.1 | 1.0 | 1.0 | 1.3 | 2.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 250 | 250 | 240 | 220 | 220 | 220 | 220 | 170 | 160 | 197 | 222 | 182 | 219 | 216 | 204 | 218 | 243 | 216 | 220 | 242 | 238 | 206 | 262 | 185 | 245 | 251 | 247 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.11 | 2.17 | 2.08 | 1.90 | 1.93 | 1.87 | 1.90 | 1.58 | 1.36 | 2.03 | 1.90 | 1.55 | 1.68 | 1.38 | 1.60 | 2.14 | 1.55 | 1.54 | 1.87 | 1.90 | 1.88 | 1.74 | 1.98 | 1.76 | 2.00 | 1.95 | 2.07 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 23 | 6 | 5 | <5 | 5 | 7 | 15 | 5 | 6 | <5.0 | 6 | 6 | <5 | 9 | 8 | <5 | 8 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 128 | 130 | 123 | 110 | 117 | 116 | 115 | 88 | 82 | 111 | 113 | 91 | 106 | 78 | 100 | 122 | 106 | 100 | 110 | 119 | 103 | 105 | 120 | 107 | 127 | 122 | 122 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.12 | 2.16 | 1.99 | 1.69 | 1.97 | 1.98 | 1.92 | 1.23 | 1.32 | 1.77 | 1.98 | 1.60 | 2.00 | 1.24 | 1.89 | 2.07 | 2.23 | 2.00 | 1.89 | 2.27 | 1.55 | 1.83 | 2.18 | 1.94 | 2.38 | 2.28 | 2.10 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 22.00 | 23.00 | 22.00 | 22.00 | 25.00 | 26.00 | 23.00 | 15.00 | 18.00 | 18.40 | 22.20 | 20.30 | 21.60 | 16.90 | 22.30 | 21.70 | 24.70 | 21.10 | 20.00 | 24.40 | 16.70 | 19.60 | 26.10 | 23.60 | 21.30 | 22.50 | 25.20 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 0.24 | 0.23 | 2.21 | 5.85 | 1.03 | 2.86 | 0.52 | 12.50 | 1.49 | 6.80 | 2.10 | 1.60 | 8.60 | 5.50 | 8.30 | 1.50 | 17.90 | 12.80 | 0.53 | 9.00 | 9.80 | 2.60 | 4.80 | 4.90 | 8.60 | 7.90 | 0.80 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | -3.00 | -2.89 | -2.92 | -2.60 | -2.73 | -3.23 | -3.33 | -3.35 | -2.77 | -2.88 | -3.21 | -3.37 | -3.19 | -3.05 | -2.93 | -3.12 | -3.39 | NC | -3.00 | -3.15 | -3.41 | -2.44 | -2.89 | -3.29 | -2.71 | -2.85 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | -3.25 | -3.14 | -3.17 | -2.85 | -2.99 | -3.49 | -3.58 | -3.60 | -3.09 | -3.20 | -3.53 | -3.69 | -3.51 | -3.37 | -3.25 | -3.44 | -3.71 | NC | -3.32 | -3.47 | -3.73 | -2.76 | -3.21 | -3.61 | -3.03 | -3.17 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | 9.67 | 9.71 | 9.74 | 9.59 | 9.60 | 9.75 | 9.83 | 9.73 | 9.47 | 9.98 | 10.10 | 10.00 | 10.20 | 9.91 | 9.61 | 9.99 | 9.98 | NC | 9.92 | 10.10 | 10.10 | 9.72 | 9.82 | 10.10 | 9.84 | 9.73 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | 9.92 | 9.96 | 9.99 | 9.84 | 9.86 | 10.00 | 10.10 | 9.98 | 9.79 | 10.30 | 10.40 | 10.40 | 10.50 | 10.20 | 9.93 | 10.30 | 10.30 | NC | 10.20 | 10.40 | 10.40 | 10.00 | 10.10 | 10.40 | 10.20 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **259** | **259** | -- | **124** | **54** | -- | **266** | -- | -- | **199** | **54** | **153** | **140** | **65** | **100** | **260** | **52** | **105** | **180** | -- | **90** | **163** | -- | -- | **128** | **36** | **43** |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 13 | 13 | -- | 16 | 13 | -- | 19 | -- | -- | 18 | 17 | 15 | 19 | 9 | 18 | 17 | 17 | 16 | 19 | -- | 19 | 15 | -- | -- | 17 | -- | 20 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 9 | 9 | -- | 8 | 9 | -- | <50 | -- | -- | 5 | 9 | 17 | 7 | 7 | 10 | 8 | 10 | 12 | <50 | -- | <5 | 8 | -- | -- | 7 | -- | 12 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.019** | **0.019** | -- | **0.030** | <0.017 | -- | **0.046** | -- | -- | **0.019** | **0.021** | **0.027** | **0.028** | <0.017 | <0.017 | **0.038** | <0.017 | **0.017** | **0.033** | -- | <0.017 | **0.021** | -- | -- | **0.020** | -- | <0.017 |
| Total Chromium (Cr) | µg/L | 1 | -- | 8.9 | -- | -- | -- | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | 7 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | 2 | 2 | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | <2 | <2 | <1 | 1 | 1 | <1 | 2 | <2.0 | 1 | <1 | 2 | <1 | <1 | <1 | -- | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **523** | **523** | -- | 73 | 133 | 58 | 136 | 104 | 154 | 137 | 136 | 119 | 131 | 71 | 172 | 137 | 96 | 118 | 120 | 165 | 115 | 112 | 117 | 99 | 125 | 83 | 130 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | <0.5 | -- | 0.6 | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.7 | <0.5 | <0.5 | 0.9 | **3.6** | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 53 | 53 | -- | 37 | 67 | 32 | 42 | 33 | 33 | 25 | 47 | 46 | 37 | 20 | 92 | 41 | 45 | 27 | 36 | 48 | 24 | 31 | 41 | 20 | 30 | 35 | 54 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | -- | 2 | <2.0 | -- | 2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | -- | <0.10 | <0.10 | -- | <0.10 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | -- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 12 | 12 | -- | 34 | 36 | -- | 33 | -- | -- | 25 | 33 | 29 | 33 | 18 | 32 | 31 | 32 | 29 | 29 | -- | 21 | 28 | -- | -- | 33 | -- | 41 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | -- | <0.1 | -- | <0.1 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 2 | 2 | -- | <2.0 | <2.0 | -- | 5 | -- | -- | <2 | <2 | <2 | <2 | <2 | 2 | 3 | <2 | 2 | 3 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | -- | -- | <0.1 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | <5 | <5 | -- | 10 | 7 | 6 | 9 | 7 | 9 | <5 | <5 | 8 | 10 | 5 | 7 | 10 | <5 | 6 | 9 | 7 | 8 | 8 | <5 | <5 | 6 | 6 | 6 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 120 | 24 | -- | 190 | 16 | 58 | 72 | 110 | -- | 291 | 1,553 | 178 | 345 | 2,420 | 1,300 | 86 | 1,730 | >2420 | --- | 2,420 | 285 | 548 | 1,990 | 2,420 | 687 | 2,420 | 411 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 1 | 17 | -- | 2 | <1 | 8 | 5 | 37 | <100 | 2 | <1 | 3 | 8 | 21 | <1 | <1 | <1 | 13 | <0.10 | 7 | 6 | 2 | 38 | 30 | 7 | 13 | 46 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.04 | 1.11 | 1.18 | 1.30 | 1.14 | 0.51 | 0.78 | 1.26 | 1.24 | 0.52 | 1.30 | 0.81 | 1.44 | 2.00 | 0.65 | 0.76 | 0.59 | 1.23 | 0.72 | 1.27 | 1.34 | 1.63 | 0.81 | 2.29 | 1.96 | 1.24 | 1.34 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.94 | 0.97 | 1.21 | 1.09 | 1.19 | 0.42 | 0.67 | 0.98 | 1.01 | 0.55 | 1.20 | 1.14 | 1.62 | 2.30 | 0.61 | 0.69 | 0.51 | 1.12 | 0.68 | 1.34 | 0.69 | 2.00 | 0.99 | 2.37 | 2.46 | 1.32 | 1.87 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-3**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-3 | | | | | | | | KL-3 | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | hh:mm | | | | | | | 10:30 | 9:10 | 11:30 AM | 10:00 AM | 10:00 AM | 11:45 AM | 3:30 PM | 3:30 PM | 13:42 PM | 1:20 PM | 12:44 PM | 12:02 PM | 12:15 PM | 11:58 AM | 11:58 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 12.1 | 23.8 | 12.4 | 9.6 | 23.3 | 11.3 | 25.2 | 21.8 | 11.5 | 16.4 | 21.9 | 15.0 | 16.36 | 22.9 | 14.6 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 7.33 | 6.90 | 8.64 | ** | 7.28 | 9.30 | 5.09 | 6.94 | 8.84 | 17.84 | 8.36 | 15.96 | 7.34 | 5.97 | 10.35 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.66 | 6.94 | 6.64 | 8.25 | 7.05 | 6.61 | 6.61 | 6.21 | 6.51 | 6.87 | 6.34 | 6.78 | 7.17 | 7.42 | 8.16 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 190.3 | 242.7 | 209.8 | 158.6 | 319.0 | 183.0 | 253.0 | 217.0 | 219.9 | 182.0 | 211.0 | 186.0 | 278.9 | 72 | 270.9 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 8 | 7 | <5 | 8 | 6 | 7.0 | 8.0 | 8.0 | 6 | 8 | 9 | 9 | 10 | 8 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 54 | 48 | 46 | 49 | 56 | 54 | 69 | 65 | 59 | 51 | 49 | 52 | 79 | 73 | 65 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 | -- | <0.12 | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 63 | 26 | 27 | 53 | 13 | 21 | 25 | 12 | 12 | 18.5 | 13.4 | 13.6 | 27.8 | 11.5 | 20.8 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.17 | 0.06 | 0.13 | 0.14 | 0.10 | 0.29 | 0.18 | <0.05 | 0.18 | <0.05 | 0.18 | 0.19 | 0.20 | 0.09 | 0.19 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.17 | 0.06 | 0.13 | 0.14 | 0.10 | 0.29 | 0.18 | <0.05 | 0.18 | <0.05 | 0.18 | 0.19 | 0.20 | 0.09 | 0.19 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.04 | 0.03 | <0.03 | 0.08 | 0.07 | <0.03 | 0.08 | <0.03 | <0.03 | <0.03 | 0.67 | <0.03 | 0.04 | 0.09 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 2.0 | 0.40 | 0.70 | 0.80 | 0.14 | 0.1 | <0.10 | 0.18 | 0.32 | 0.14 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.1 | 3.2 | 4.0 | 4.4 | 4.1 | 4.0 | 3.30 | <0.5 | 4.10 | 5.1 | 2.9 | 7.5 | 4.1 | 4.0 | 4.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 1.04 | <0.01 | 0.01 | <0.01 | 0.88 | 0.1 | 0.0 | 0.0 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.72 | 7.21 | 7.10 | 6.66 | 7.07 | 6.81 | 6.89 | 7.02 | 6.83 | 6.76 | 6.50 | 7.10 | 6.97 | 6.61 | ***6.30*** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.0 | 7.3 | 8.4 | 5.9 | 7.6 | 5.0 | 7.6 | 7.7 | 7.3 | 7.5 | 7.6 | 8.6 | 8.30 | 9.40 | 8.30 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.0 | 1.2 | 1.4 | 1.0 | 1.2 | 0.9 | 1.2 | 1.1 | 1.2 | 1.0 | 1.3 | 1.2 | 1.3 | 1.5 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | 0.010 | 0.010 | 0.006 | **0.011** | 0.007 | 0.007 | 0.010 | **0.014** | **0.023** | <0.006 | **0.024** | **0.014** | **0.016** | **0.021** | **0.030** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.7 | 1.0 | 1.1 | 0.7 | 1.0 | 0.8 | 0.9 | 0.9 | 1.0 | 0.8 | 1.2 | 1.0 | 1.1 | 1.3 | 1.3 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 35.9 | 36.6 | 39.9 | 44.3 | 38.9 | 30.1 | 36.9 | 42.2 | 39.4 | 31.3 | 32.8 | 28.6 | 44.0 | 45.0 | 39.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.6 | 1.7 | 1.9 | 2.1 | 1.4 | 2.2 | 1.6 | 1.3 | 2.1 | 2.9 | 4.1 | 0.7 | 3.1 | 2.1 | 2.3 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 8 | 7 | 7 | 6 | 9 | 9 | 9.0 | 8.0 | 9.0 | 8 | 8 | 10 | 9 | 9 | 9 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 1.0 | 0.5 | 1.2 | 0.9 | 2.0 | 1.1 | 1.0 | 0.8 | 0.7 | 0.7 | 0.8 | 0.7 | 1.4 | 0.5 | <0.5 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 244 | 246 | 232 | 244 | 233 | 160 | 275 | 288 | 240 | 210 | 233 | 227 | 115 | 291 | 252 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.70 | 1.66 | 1.6 | 1.5 | 1.9 | 1.9 | 2.29 | 2.16 | 2.02 | 1.73 | 1.72 | 1.87 | 1.73 | 1.72 | 1.87 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 8 | <5 | <5 | 8.0 | 6.0 | 7 | 8 | 8 | 6 | 8 | 9 | 6 | 8 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 107 | 106 | 109.0 | 108.0 | 119.0 | 105.0 | 130 | 130 | 123 | 103 | 106 | 109 | 103 | 106 | 109 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.98 | 2.09 | 2.3 | 2.3 | 2.2 | 1.7 | 2.14 | 2.35 | 2.22 | 1.86 | 1.95 | 1.85 | 1.86 | 1.95 | 1.85 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 19.1 | 23.2 | 26.7 | 18.9 | 23.9 | 16.2 | 24.7 | 23.8 | 23.2 | 22.8 | 24.3 | 26.4 | 22.80 | 24.30 | 26.40 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 7.6 | 11.4 | 18.4 | 21.4 | 6.7 | 5.2 | 3.3 | 4.2 | 4.5 | 3.7 | 6.3 | 0.5 | 3.70 | 6.30 | 0.50 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.39 | -2.61 | -2.7 | -3.5 | -2.7 | -3.3 | -2.97 | -2.79 | -3.00 | -3.18 | -3.31 | -2.60 | -3.18 | -3.31 | -2.60 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.71 | -2.93 | -3.0 | -3.8 | -3.1 | -3.6 | -3.29 | -3.11 | -3.32 | -3.50 | -3.63 | -2.92 | -3.50 | -3.63 | -2.92 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 10.1 | 9.82 | 9.8 | 10.1 | 9.8 | 10.1 | 9.86 | 9.81 | 9.83 | 9.94 | 9.81 | 9.70 | 9.94 | 9.81 | 9.70 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.4 | 10.1 | 10.1 | 10.4 | 10.1 | 10.4 | 10.2 | 10.1 | 10.1 | 10.3 | 10.1 | 10.0 | 10.30 | 10.10 | 10.00 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **164** | **26** | -- | **139** | **39** | **80** | **60** | -- | -- | **116** | -- | -- | ***137*** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 14 | 15 | -- | 17 | 16 | 15 | 21.0 | -- | -- | 16 | -- | -- | 29 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 5 | 10 | -- | 6 | 9 | 6 | 8.0 | -- | -- | 9 | -- | -- | 7 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | -- | 8.9 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | 2.0 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | 1 | <1 | 1 | <1 | 1.0 | <1 | 1.0 | 1 | 1 | <1 | <1 | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 81 | 148 | <50 | 123 | 93 | <50 | 274 | 180 | 105 | 114 | 68 | <50 | 143 | 178 | 73 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | 0.7 | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 21 | 50 | 22 | 26 | 44 | 18 | 137 | 80 | 19 | 24 | 16 | 35 | 54 | 97 | 28 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | -- | 3 | <2 | 2 | 2.0 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <2 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 27 | 38 | -- | 30 | 34 | 31 | 49.0 | -- | -- | 31 | -- | -- | 36 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 6 | <5 | <5 | 16 | <5 | <5 | <5 | <5 | <5 | **40** | <5 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | <1 | NDOGT | 5,020.0 | 103.0 | NDOGT | 628.0 | >2420 | 1990 | 130 | >200 | >200 | >200 | >200 | 2,700 | 3,900 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | <1 | 51 | 20 | 1 | 15 | 6 | 44 | 61 | <1 | 12 | 18 | 29 | 41 | 173 | 62 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.47 | 0.47 | 1.41 | 0.64 | 1.1 | 1.6 | 13.1 | 1.6 | 1.4 | 0.7 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.16 | 1.14 | 1.28 | 0.74 | 1.94 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.80 | -- | * | 0.74 | 1.73 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Wat

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperatur

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a s

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

| | |
|---|---|
| **Bold (black shaded)** | = Present Result - Parameter concentration exceeds CCME FWAL Guideline. |
| Underlined (black shaded) | = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality |
| *Italics* (black shaded) | = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations |
| **Blue shaded** | = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R |

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-4**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-4 | | | | | | | | KL-4 | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/16/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 |
| Sampling Time | hh:mm | | | | | | | 10:00 | 11:30 | 10:00 | 11:20 | 13:50 | 11:15 | 10:10 | 11:40 | 11:40 | 10:16 | 12:00 | 11:40 | 9:41 | 10:30 | 14:20 | 11:15 | 11:35 | 14:35 | 10:25 | 11:02 | 11:15 | 11:30 | 12:00 | 11:11 | 9:25 | 10:45 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 13.4 | 21.9 | 17.3 | 14.5 | 21.9 | 9.8 | 10.1 | 21.2 | 15.3 | 9.0 | 24.4 | 15.7 | 11.7 | 20.4 | 13.5 | 11.0 | 21.8 | 12.5 | 14.8 | 24.7 | 9.5 | 12.2 | 20.6 | 12.3 | 16.5 | 22.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.87** | 8.10 | 8.30 | 9.01 | 6.27 | **10.89** | **10.99** | 8.55 | **9.65** | 8.70 | 7.32 | 8.87 | **10.09** | 8.89 | **9.60** | **14.50** | 5.92 | 7.52 | **9.81** | 9.09 | 8.80 | 8.27 | 5.50 | **10.11** | 8.33 | 6.41 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 8.00 | 6.71 | 6.94 | 7.19 | 6.98 | **6.07** | **6.49** | **6.43** | **6.02** | 9.00 | 6.71 | 6.77 | **5.72** | 7.08 | **6.41** | **6.30** | 7.25 | 6.55 | 6.64 | 6.81 | 7.09 | 7.32 | 6.72 | **6.14** | 6.90 | 6.88 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 771.0 | 262.0 | 247.0 | 224.0 | 226.0 | 214.8 | 218.0 | 171.9 | 126.2 | 206.0 | 225.0 | 185.9 | 207.1 | 196.2 | 209.0 | 273.0 | 251.0 | 208.0 | 0.2 | 243.5 | 232.4 | 215.0 | 260.0 | 228.0 | 213.0 | 262.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <5.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 67 | 65 | 60 | 56 | 56 | 53 | 56 | 44 | 37 | 51 | 57 | 46 | 54 | 41 | 47 | 59 | 47 | 48 | 61 | 56 | 55 | 54 | 58 | 49 | 64 | 62 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 22 | 18 | 20 | 27 | 11 | 20 | 32 | 38 | 43 | 48 | 11 | 20 | 17 | 21 | 20 | 13 | 11 | 28 | 33 | 10 | 12 | 25 | 12 | 22 | 19 | 11 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.15 | 0.12 | 0.14 | 0.23 | 0.19 | 0.21 | 0.23 | 0.15 | 0.17 | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.21 | 0.10 | 0.27 | 0.12 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.15 | -- | -- | 0.23 | 0.19 | -- | 0.23 | -- | -- | 0.19 | 0.11 | 0.09 | 0.20 | 0.11 | 0.17 | 0.25 | 0.17 | 0.16 | 0.16 | 0.14 | 0.21 | 0.15 | 0.14 | 0.10 | 0.15 | 0.12 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.07** | <0.05 | **0.12** | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.10 | <0.03 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | 0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | <0.4 | 0.7 | -- | 1.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.2 | 0.4 | 1.0 | <0.4 | <0.4 | 0.4 | <0.4 | 0.5 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.5 | 2.6 | 4.0 | 3.3 | 2.6 | 3.1 | 3.7 | 6.0 | 5.4 | 7.5 | 3.2 | 4.8 | 4.2 | 4.5 | 4.3 | 4.4 | 2.1 | 4.4 | 2.8 | 5.2 | 5.7 | 4.3 | 3.3 | 8.1 | 5.1 | 4.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.61 | 6.75 | 6.83 | 6.83 | 6.93 | 6.83 | 6.57 | 6.57 | **6.46** | 6.70 | 7.00 | 6.90 | 6.69 | 6.96 | 6.85 | 6.69 | 6.91 | 6.85 | 6.59 | 6.94 | 6.97 | 6.70 | 7.03 | 6.89 | 6.75 | 6.99 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.8 | 7.7 | 7.0 | 6.8 | 8.0 | 8.5 | 6.8 | 4.9 | 5.2 | 5.7 | 6.8 | 5.8 | 6.8 | 5.1 | 6.8 | 6.4 | 7.9 | 6.8 | 6,500.0 | 7.9 | 3.7 | 6.5 | 7.1 | 7.3 | 7.7 | 7.5 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.2 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.2 | 0.9 | 1.0 | 1.0 | 1.2 | 1.2 | 1.0 | 0.8 | 1.2 | 1.3 | 1.2 | 1.0 | 920.0 | 1.3 | 1.0 | 1.0 | 1.1 | 1.3 | 1.2 | 1.1 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | <0.02 | <0.02 | <0.002 | 0.004 | <0.002 | <0.002 | 0.007 | 0.003 | **0.026** | **0.022** | **0.043** | 0.007 | 0.006 | **2.390** | **0.016** | **0.022** | **0.031** | **0.015** | 0.006 | 0.007 | 0.003 | 0.007 | 0.004 | 0.007 | **0.020** | 0.008 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.9 | 1.0 | 1.0 | 0.8 | 0.9 | 1.0 | 0.8 | 0.7 | 1.1 | 0.7 | 1.0 | 0.9 | 0.8 | 0.6 | 1.2 | 0.8 | 1.1 | 0.9 | 760.0 | 0.9 | 0.7 | 0.7 | 0.9 | 1.0 | 0.8 | 0.9 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 39.0 | 41.0 | 37.0 | 28.5 | 34.3 | 33.9 | 32.1 | 21.5 | 21.1 | 31.5 | 34.5 | 25.2 | 31.6 | 20.1 | 30.7 | 35.9 | 38.6 | 34.1 | 34.0 | 40.0 | 28.2 | 32.4 | 41.4 | 31.1 | 37.6 | 41.4 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.7 | 2.6 | 2.6 | 3.1 | 2.9 | 3.1 | 2.9 | 2.5 | 2.7 | 2.7 | 2.2 | 2.6 | 3.0 | 2.6 | 2.5 | 2.6 | 2.1 | 2.5 | 2.5 | 2.6 | 3.0 | 2.6 | 2.0 | 2.4 | 2.3 | 1.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <1 | 1 | <1 | <2 | <2 | <1 | 2 | <1 | <2 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <1.0 | 7 | <5 | 7 | <5 | 10 | 6 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 11 | 12 | 11 | 10 | 10 | 10 | 9 | 10 | 8 | 7 | 8 | 7 | 7 | 7 | 9 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 9 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.5 | 1.0 | 0.3 | 0.3 | 0.2 | 0.8 | 0.7 | 0.7 | 0.4 | 0.7 | 0.4 | 0.8 | 0.7 | 2.6 | 2.1 | 1.1 | 0.6 | 0.8 | 0.6 | 0.7 | 1.2 | 1.2 | 1.5 | 1.6 | 1.3 | 0.9 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 260 | 250 | 230 | 220 | 230 | 250 | 210 | 170 | 160 | 200 | 224 | 183 | 218 | 218 | 204 | 219 | 241 | 218 | 220 | 241 | 235 | 206 | 275 | 185 | 251 | 255 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.23 | 2.22 | 2.09 | 1.91 | 1.94 | 1.85 | 1.88 | 1.62 | 1.36 | 2.04 | 1.94 | 1.45 | 1.68 | 1.31 | 1.53 | 2.47 | 1.60 | 2.11 | 1.88 | 1.90 | 1.87 | 1.74 | 2.04 | 1.76 | 2.03 | 2.12 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 5 | 7 | 7 | 6 | 8 | 7 | 5 | 8 | 7 | 22 | 8 | <5 | <5 | <5 | <5 | 30 | 5 | 29 | <1.0 | 6 | 7 | <5 | 9 | 8 | <5 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 132 | 135 | 125 | 111 | 118 | 116 | 113 | 90 | 81 | 111 | 114 | 87 | 103 | 75 | 97 | 132 | 108 | 117 | 110 | 121 | 102 | 106 | 125 | 105 | 123 | 128 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.16 | 2.32 | 2.07 | 1.70 | 2.02 | 2.03 | 1.86 | 1.28 | 1.30 | 1.78 | 1.97 | 1.53 | 1.84 | 1.23 | 1.84 | 2.04 | 2.21 | 1.94 | 1.91 | 2.35 | 1.53 | 1.86 | 2.28 | 1.87 | 2.17 | 2.31 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 22.00 | 25.00 | 22.00 | 22.00 | 25.00 | 27.00 | 22.00 | 16.00 | 17.00 | 18.40 | 21.90 | 19.40 | 21.10 | 16.00 | 21.90 | 21.30 | 24.70 | 21.10 | 20.00 | 25.10 | 13.40 | 20.30 | 22.30 | 23.60 | 24.20 | 23.30 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 1.59 | 2.20 | 0.48 | 5.82 | 2.02 | 4.64 | 0.53 | 11.70 | 2.26 | 6.60 | 0.80 | 2.80 | 4.50 | 3.20 | 9.20 | 9.50 | 15.80 | 4.20 | 0.79 | 10.70 | 10.10 | 3.40 | 5.50 | 3.00 | 3.20 | 4.10 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.21 | -2.89 | -2.84 | -2.92 | -2.64 | -2.75 | -3.22 | -3.18 | -3.31 | -2.79 | -2.86 | -3.22 | -3.37 | -3.21 | -3.21 | -2.63 | -3.08 | -2.45 | NC | -2.98 | -3.20 | -3.38 | -2.76 | -2.93 | -3.26 | -2.78 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.46 | -3.14 | -3.09 | -3.17 | -2.89 | -3.00 | -3.47 | -3.43 | -3.56 | -3.11 | -3.18 | -3.54 | -3.69 | -3.53 | -3.53 | -2.95 | -3.40 | -2.77 | NC | -3.30 | -3.52 | -3.70 | -3.08 | -3.25 | -3.58 | -3.10 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.82 | 9.64 | 9.67 | 9.75 | 9.57 | 9.58 | 9.79 | 9.75 | 9.77 | 9.49 | 9.86 | 10.10 | 10.10 | 10.20 | 10.10 | 9.32 | 9.99 | 9.30 | NC | 9.92 | 10.20 | 10.10 | 9.79 | 9.82 | 10.00 | 9.77 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.10 | 9.89 | 9.92 | 10.00 | 9.82 | 9.83 | 10.00 | 10.00 | 10.00 | 9.81 | 10.20 | 10.40 | 10.40 | 10.50 | 10.40 | 9.64 | 10.30 | 9.62 | NC | 10.20 | 10.50 | 10.40 | 10.10 | 10.10 | 10.30 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **150** | -- | -- | **125** | **29** | -- | **231** | -- | -- | **188** | **48** | **149** | **141** | **106** | **159** | **236** | **46** | **93** | **160** | -- | **84** | **172** | -- | -- | **180** | **89** |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 16 | -- | -- | 17 | 18 | -- | 18 | -- | -- | 18 | 17 | 16 | 18 | 10 | 19 | 17 | 19 | 16 | 20 | -- | 17 | 16 | -- | -- | 20 | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 6 | -- | -- | 9 | 9 | -- | 9 | -- | -- | 6 | 9 | 16 | 7 | 6 | 9 | 8 | 11 | 11 | <50 | -- | <5 | 7 | -- | -- | <5 | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.3 | -- | -- | **0.031** | <0.017 | -- | **0.035** | -- | -- | **0.021** | <0.017 | **0.027** | **0.027** | <0.017 | **0.050** | **0.027** | <0.017 | <0.017 | **0.033** | -- | <0.017 | **0.024** | -- | -- | **0.021** | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | **6** | <1 | <1 | <1 | **6** | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | <0.40 | <0.40 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.4 | -- | <1 | <1 | -- | -- | <1 | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2 | -- | -- | <2.0 | **2** | <2.0 | **2** | <2.0 | <2.0 | <2 | <2 | **4** | **9** | <1 | 1 | <1 | <1 | 2 | **7** | 1 | 1 | 1 | <1 | <1 | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 86 | -- | -- | 82 | 51 | 55 | 119 | 109 | 138 | 129 | 118 | 133 | 213 | 144 | 248 | 129 | 55 | 104 | 100 | 217 | 83 | 122 | 61 | 114 | 136 | 131 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **3.2** | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | 0.8 | 0.9 | <0.5 | <0.5 | **2.6** | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | -- | -- | <0.5 | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 51 | -- | -- | 35 | 64 | 29 | 39 | 27 | 30 | 23 | 34 | 38 | 34 | 77 | 130 | 34 | 29 | 24 | 25 | 78 | 34 | 34 | 58 | 29 | 74 | 76 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 3 | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | 5 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | 2 | -- | -- | 7 | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | **3** | <1 | -- | -- | <1 | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <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 | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 34 | -- | -- | 33 | 37 | -- | 33 | -- | -- | 25 | 32 | 28 | 32 | 17 | 31 | 31 | 31 | 29 | 30 | -- | 20 | 28 | -- | -- | 33 | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | 5 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | <2 | <2 | <2 | <2 | 3 | 2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 14 | -- | -- | 10 | 7 | 7 | 11 | 7 | 7 | <5 | <5 | **68** | 21 | <5 | 9 | 9 | <5 | <5 | 10 | 8 | 12 | 7 | <5 | <5 | 13 | 7 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 28 | 58 | -- | 100 | 16 | 75 | 83 | 95 | -- | 345 | >2420 | 921 | 548 | >2420 | 770 | 308 | 1,550 | >2420 | --- | >2420 | 281 | 488 | 1,730 | >2420 | 792 | >2420 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 4 | 33 | -- | 1 | <1 | 2 | 5 | 39 | <100 | 4 | <1 | 4 | 6 | 38 | <1 | <1 | 1 | 8 | <10 | 5 | 1 | 2 | 35 | 29 | 15 | 1 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.78 | 1.11 | 1.06 | 0.92 | 0.07 | 0.50 | 0.60 | 1.04 | 1.31 | 0.52 | 0.70 | 0.55 | 1.34 | 1.50 | 0.40 | 0.44 | 0.50 | 1.03 | 0.55 | 0.26 | 1.09 | 1.62 | 0.16 | 2.18 | 2.40 | 0.33 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.69 | 0.96 | 1.11 | 0.77 | 0.07 | 0.41 | 0.55 | 0.82 | 1.07 | 0.55 | 0.70 | 0.74 | 1.48 | 1.70 | 0.39 | 0.40 | 0.57 | 0.95 | 0.51 | 0.31 | 0.55 | 2.09 | 0.21 | 2.15 | 3.04 | 0.39 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-4**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site KL-4 | | | | | | | | KL-4 | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 10/18/2017 | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | hh:mm | | | | | | | 10:05 AM | 10:45 AM | 9:00 AM | 11:45 AM | 9:43 AM | 9:43 AM | 12:15 PM | 4:06 PM | 3:09 PM | 13:59 PM | 12:40 PM | 1:02 PM | 12:16 PM | 12:30 PM | 12:46 PM | 12:45PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA** | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 13.8 | 12.7 | 23.1 | 12.7 | 9.9 | 23.4 | 10.9 | 23.6 | 20.7 | 11.4 | 16.1 | 21.9 | 15.0 | 16.9 | 22.4 | 14.5 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 7.32 | **11.01** | **4.70** | 8.46 | ** | **2.98** | **10.80** | **3.49** | **4.73** | 9.22 | 16.37 | 8.77 | 19.23 | 7.98 | 5.77 | 8.09 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.84 | 7.01 | 6.67 | 6.91 | 8.68 | 6.97 | 6.81 | **6.30** | **5.78** | 6.68 | 6.68 | **6.29** | 6.79 | 7.13 | 7.39 | 8.12 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 252.0 | 202.9 | 251.0 | 210.6 | 161.1 | 540.0 | 188.0 | 259.0 | 221.0 | 220.6 | 185.0 | 212.0 | 188.0 | 282.6 | 73.0 | 271.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 10 | <5 | 9 | 8 | <5 | 9 | 6 | 7.0 | 12.0 | 5.0 | <5 | 8 | 11 | 6 | 10 | 9 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 59 | 52 | 50 | 47 | 50 | 56 | 54 | 72 | 73 | 91 | 51 | 49 | 53 | 80 | 75 | 65 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 | -- | <0.12 | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 16 | 35 | 10 | 16 | 42 | <5 | 17 | 22 | <5 | 16 | 21.7 | 10.5 | 13.3 | 23.6 | 11.4 | 16.4 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.15 | 0.27 | 0.25 | 0.13 | 0.15 | 0.18 | 0.29 | 0.24 | 0.19 | 0.17 | 0.18 | 0.16 | 0.21 | 0.18 | 0.13 | 0.19 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.15 | 0.17 | 0.13 | 0.13 | 0.15 | 0.18 | 0.29 | 0.24 | 0.19 | 0.17 | 0.18 | 0.16 | 0.21 | 0.18 | 0.13 | 0.19 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.05 | **0.10** | **0.12** | <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 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | 0.04 | <0.03 | 0.04 | 0.03 | <0.03 | 0.06 | 0.07 | <0.03 | 0.10 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.19 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 0.6 | 0.6 | <0.4 | 0.40 | 0.80 | 0.22 | 0.1 | | 0.16 | 0.27 | 0.13 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 4.0 | 5.1 | 2.7 | 4.0 | 4.5 | 3.3 | 4.3 | 2.60 | 2.90 | 2.10 | 6.1 | 3.1 | 3.0 | 4.0 | 3.7 | 4.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | 0.02 | <0.01 | <0.01 | <0.01 | 0.13 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.95 | 6.74 | 7.13 | 7.13 | 6.67 | 6.91 | 6.87 | 6.77 | 7.08 | 6.86 | 6.64 | **6.49** | 7.08 | 6.82 | 6.57 | ***6.30*** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 8.6 | 5.9 | 7.9 | 7.7 | 6.2 | 8.0 | 5.1 | 8.1 | 8.6 | 7.1 | 10.1 | 8.1 | 8.6 | 8.1 | 9.1 | 8.2 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.3 | 1.0 | 1.2 | 1.3 | 1.0 | 1.2 | 0.9 | 1.3 | 1.3 | 1.2 | 1.2 | 1.3 | 1.2 | 1.3 | 1.4 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | 0.006 | **0.024** | 0.004 | 0.004 | 0.009 | **0.011** | 0.005 | <0.006 | **0.014** | 0.003 | **0.038** | **0.031** | 0.008 | **0.016** | **0.013** | **0.030** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 0.7 | 1.0 | 1.0 | 0.8 | 1.1 | 0.8 | 1.0 | 1.1 | 1.0 | 1.0 | 1.1 | 1.0 | 1.1 | 1.3 | 1.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 38.9 | 35.6 | 39.2 | 40.6 | 37.0 | 36.7 | 23.4 | 37.4 | 39.4 | 39.6 | 34.8 | 34.0 | 29.0 | 42.0 | 44.0 | 38.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.1 | 2.6 | 1.8 | 2.0 | 2.1 | 1.4 | 2.2 | 1.8 | 1.7 | 2.1 | 3.1 | 3.9 | 1.9 | 3.2 | 2.1 | 2.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | <5 | <5 | <5 | <5 | 6 | <5 | <5 | <5 | <5 | 12 | <5 | <5 | 12 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 10 | 8 | 7 | 8 | 6 | 9 | 9 | 9.0 | 9.0 | 13.0 | 8 | 8 | 10 | 9 | 9 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 1.6 | 1.2 | 0.5 | 1.7 | 0.8 | 1.5 | 1.1 | 1.0 | 0.8 | 1.1 | 22.6 | 0.6 | 0.7 | 0.6 | <0.5 | <0.5 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 248 | 243 | 252 | 231 | 246 | 236 | 158 | 288 | 297 | 240 | 213 | 234 | 228 | 289 | 300 | 254 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.08 | 1.65 | 1.75 | 1.7 | 1.6 | 2.0 | 1.9 | 2.38 | 2.50 | 2.95 | 1.62 | 1.72 | 1.94 | 2.58 | 2.51 | 2.24 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 10 | <5 | 9 | 8.0 | <5 | 9.0 | 6.0 | 7 | 12 | 5 | <5 | 8 | 11 | 6 | 10 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 126 | 105 | 113 | 111.0 | 102.0 | 119.0 | 98.0 | 135 | 141 | 157 | 111 | 107 | 110 | 146 | 147 | 130 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.27 | 1.96 | 2.24 | 2.3 | 2.0 | 2.1 | 1.4 | 2.18 | 2.31 | 2.21 | 2.40 | 2.03 | 1.82 | 2.380 | 2.520 | 2.220 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 26.80 | 18.9 | 24.7 | 24.6 | 19.6 | 24.9 | 16.4 | 25.6 | 26.8 | 22.7 | 30.2 | 25.6 | 26.4 | 25.6 | 28.5 | 25.8 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 4.30 | 8.6 | 12.1 | 16.2 | 13.8 | 4.4 | 14.5 | 4.2 | 4.1 | 14.3 | 19.5 | 8.2 | 3.1 | 3.9 | 0.2 | 0.3 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.71 | -3.38 | -2.61 | -2.7 | -3.4 | -2.8 | -3.2 | -3.08 | -2.51 | -3.20 | -3.25 | -3.29 | -2.54 | -3.1 | -3.1 | -3.4 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.03 | -3.70 | -2.93 | -3.0 | -3.8 | -3.2 | -3.6 | -3.40 | -2.83 | -3.52 | -3.57 | -3.61 | -2.86 | -3 | -3 | -4 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.66 | 10.1 | 9.74 | 9.8 | 10.1 | 9.7 | 10.1 | 9.85 | 9.59 | 10.10 | 9.89 | 9.78 | 9.62 | 9.92 | 9.64 | 9.73 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.98 | 10.4 | 10.1 | 10.1 | 10.4 | 10.1 | 10.4 | 10.2 | 9.9 | 10.4 | 10.2 | 10.1 | 9.9 | 10.2 | 10.0 | 10.1 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **55** | **157** | **32** | -- | **132** | **70** | **92** | **52** | -- | -- | **1,510** | -- | -- | ***116*** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 20 | 15 | 19 | -- | 18 | 20 | 17 | 21.0 | -- | -- | 30 | -- | -- | 30 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 11 | 6 | 10 | -- | 6 | 9 | 6 | 7.0 | -- | -- | 18 | -- | -- | 7 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | **0.020** | -- | -- | **0.150** | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | -- | 8.9 | -- | -- | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | 2 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | 5 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | <1 | 1 | <1 | 1 | 1 | 2.0 | <1 | 1.0 | **4** | 1 | <1 | <1 | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 141 | 83 | 119 | 78 | 120 | 100 | <50 | 177 | 139 | 102 | **2,070** | 69 | 73 | 124 | 96 | 75 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | **1.4** | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | **5.1** | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 48 | 19 | 84 | 43 | 24 | 85 | 19 | 209 | 357 | 18 | 252 | 19 | 32 | 41 | 42 | 24 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | 6 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 40 | 27 | 39 | -- | 33 | 35 | 31 | 45.0 | -- | -- | 37 | -- | -- | 37 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | 30 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | 0.4 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- | 5 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | <5 | 7 | <5 | 7 | 7 | 6 | 6 | <5 | <5 | <5 | **201** | <5 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | >2420 | 4 | NDOGT | 8,000.0 | 198.0 | 560.0 | 604.0 | 2,420 | >2420 | 172 | >200 | >200 | >200 | >200 | 4,600 | 3,000 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 3 | 2 | 19 | 12 | <1 | 1 | <1 | 48 | 133 | 5 | 39 | 24 | 44 | 37 | 100 | 50 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.32 | <0.25 | 0.60 | 0.63 | 8.31 | 1.8 | 5.26 | 2.0 | 0.6 | 0.4 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.35 | 1.06 | 0.24 | 1.12 | 0.78 | 0.47 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.43 | 1.71 | -- | * | 0.82 | 0.42 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Wat

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperatur

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a r

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-5**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | | KL-5 | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2011/10/17 | 5/1/2012 | 8/14/2012 | 10/10/2012 | 5/15/2013 | 8/16/2013 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 |
| Sampling Time | hh:mm | | | | | | | 9:40 | 10:52 | 13:10 | 12:10 | 10:03 | 10:50 | 13:45 | 11:30 | 13:55 | 10:45 | 09:00 | 12:04 | 12:00 | 10:00 | 8:00 | 13:05 | 9:00 | 9:45 | 9:50 | 9:30 | 8:20 | 9:30 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.7 | 2.1 | 5.3 | 4.2 | 2.1 | 4.6 | 2.7 | 3.1 | 3.01 | 3.8 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 14.7 | 10.5 | 26.1 | 16.6 | 13.3 | 22.7 | 14.7 | 13.7 | 22.9 | 12.8 | 14.1 | 25.4 | 9.4 | 12.2 | 22.2 | 12.7 | 16.8 | 21.0 | 14.6 | 12.7 | 24.5 | 13.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 9.38 | 7.88 | 7.90 | 8.16 | **9.67** | 8.89 | 8.60 | **15.83** | 7.64 | 7.91 | 8.32 | 8.75 | 7.63 | **10.47** | 8.39 | **9.92** | 8.70 | 7.07 | 7.17 | **10.42** | 6.42 | 7.58 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.52 | 7.76 | 6.69 | 6.72 | **6.20** | 8.57 | 6.51 | 6.79 | 7.86 | 6.60 | 7.82 | 6.77 | 7.05 | **5.75** | **5.11** | **5.72** | 7.00 | 6.83 | 7.05 | 6.74 | 7.14 | 6.67 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 111.9 | 230.0 | 229.0 | 189.0 | 219.5 | 202.1 | 212.9 | 472.0 | 251.0 | 211.0 | 0.2 | 249.8 | 240.8 | 209.0 | 267.0 | 243.2 | 219.0 | 246.0 | 257.0 | 196.4 | 244.9 | 236.4 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 9 | 21 | 8 | <5 | <5 | 6 | 5 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 37 | 55 | 57 | 48 | 58 | 44 | 46 | 61 | 47 | 47 | 59 | 58 | 58 | 54 | 56 | 53 | 65 | 58 | 60 | 56 | 49 | 47 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 35 | 43 | 10 | 27 | 10 | 22 | 18 | 14 | 11 | 22 | 35 | 8 | 19 | 27 | 13 | 17 | 18 | 14 | 14 | 34 | 14 | 12 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.17 | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.25 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.19 | 0.15 | 0.25 | 0.21 | 0.09 | 0.17 | 0.20 | 0.42 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | -- | 0.19 | 0.15 | 0.83 | 0.21 | 0.21 | 0.20 | 0.16 | 0.10 | 0.16 | 0.16 | 0.12 | 0.19 | 0.14 | 0.09 | 0.15 | 0.13 | 0.07 | 0.09 | 0.17 | 0.09 | 0.42 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | -- | <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 | **0.10** | <0.05 | **0.12** | **0.14** | <0.05 | <0.05 | **0.11** | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | <0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.050 | <0.03 | 0.04 | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | 0.05 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | <0.4 | 2.3 | 1.0 | -- | 0.6 | 1.1 | <0.4 | 0.5 | 1.1 | 0.3 | <0.4 | 1.8 | 0.5 | <0.4 | 0.7 | 0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 4.8 | 5.8 | 3.4 | 4.7 | 4.0 | 4.6 | 7.0 | 4.3 | 2.7 | 4.5 | 3.1 | 5.3 | 5.7 | 4.4 | 3.3 | 7.0 | 4.7 | 4.8 | 3.9 | 4.9 | 2.9 | 3.0 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.57 | 6.70 | 7.10 | 6.50 | 6.71 | 6.93 | 6.89 | 6.64 | 6.84 | 6.63 | 6.56 | 6.90 | 6.94 | 6.66 | 7.16 | 7.03 | 6.74 | 7.09 | 6.93 | 6.70 | 7.15 | 7.47 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 5.8 | 6.1 | 6.6 | 5.9 | 7.1 | 5.7 | 6.4 | 6.5 | 7.6 | 7.0 | 6,500.0 | 8.0 | 4.7 | 6.3 | 7.3 | 8.2 | 7.4 | 7.0 | 7.5 | 5.9 | 6.7 | 7.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 1.0 | 1.1 | 1.2 | 1.0 | 1.0 | 1.1 | 1.4 | 1.2 | 1.0 | 930.0 | 1.3 | 0.9 | 1.0 | 1.1 | 1.3 | 1.2 | 1.0 | 1.1 | 1.0 | 1.1 | 1.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | 0.009 | 0.018 | 0.040 | 0.006 | 0.005 | 0.013 | 0.010 | 0.010 | 0.026 | 0.135 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 | 0.003 | 0.010 | 0.012 | 0.005 | 0.031 | 0.005 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.9 | 0.7 | 0.9 | 0.8 | 0.8 | 0.7 | 1.1 | 0.8 | 1.1 | 0.9 | 720.0 | 0.1 | 0.7 | 0.7 | 0.9 | 1.0 | 0.9 | 0.8 | 0.9 | 0.7 | 0.9 | 0.9 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 22.0 | 34.6 | 32.0 | 27.7 | 33.6 | 19.2 | 31.3 | 37.5 | 40.3 | 38.3 | 33.0 | 42.6 | 28.3 | 32.5 | 33.1 | 33.5 | 38.9 | 42.4 | 37.2 | 37.2 | 38.5 | 41.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.5 | 2.7 | 2.0 | 2.4 | 2.7 | 2.5 | 2.5 | 2.7 | 2.1 | 2.5 | 3.3 | 1.9 | 2.2 | 2.7 | 2.0 | 2.3 | 2.1 | 1.6 | 1.7 | 2.4 | 1.7 | 3.4 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <1.0 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 9 | 7 | 8 | 8 | 8 | 7 | 8 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 10 | 10 | 10 | 8 | 10 | 8 | 7 | 11 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.9 | 1.1 | 0.7 | 0.9 | 0.7 | 0.8 | 0.4 | 1.1 | 0.4 | 0.8 | 0.7 | 1.0 | 1.0 | 0.7 | 1.3 | 1.2 | 0.9 | 0.9 | 0.9 | 1.4 | 0.4 | 0.7 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 160 | 215 | 226 | 189 | 232 | 223 | 204 | 228 | 246 | 225 | 220 | 248 | 244 | 208 | 267 | 196 | 248 | 249 | 246 | 247 | 247 | 286 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.42 | 2.13 | 1.95 | 1.58 | 1.82 | 1.52 | 1.58 | 2.56 | 1.50 | 1.50 | 1.94 | 1.95 | 1.96 | 1.74 | 1.94 | 1.89 | 2.06 | 1.96 | 2.09 | 1.76 | 1.68 | 2.1 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 9 | 21 | 8 | <5 | <5 | 6 | 5 | 32 | <5 | <5 | 5 | 6 | 7 | <5 | 7 | 9 | <5 | 7 | 9 | <5 | 7 | 26.0 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 84 | 118 | 111 | 96 | 110 | 82 | 98 | 136 | 106 | 103 | 120 | 124 | 106 | 105 | 114 | 113 | 125 | 122 | 123 | 110 | 108 | 127.0 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.36 | 1.94 | 1.85 | 1.64 | 1.94 | 1.23 | 1.81 | 2.12 | 2.27 | 2.14 | 1.87 | 2.40 | 1.58 | 1.86 | 1.93 | 2.01 | 2.20 | 2.30 | 2.12 | 2.04 | 2.13 | 2.3 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 19.00 | 19.30 | 21.00 | 19.70 | 21.80 | 18.40 | 20.50 | 22.00 | 23.90 | 21.60 | 20.00 | 25.30 | 15.40 | 19.80 | 22.80 | 25.80 | 23.40 | 21.60 | 23.30 | 18.9 | 21.3 | 23.9 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 2.16 | 4.70 | 2.60 | 2.00 | 3.20 | 10.60 | 6.70 | 9.40 | 20.30 | 17.50 | 1.84 | 10.20 | 10.80 | 3.20 | 0.40 | 3.00 | 3.40 | 8.10 | 0.70 | 7.3 | 11.8 | 5.0 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.06 | -2.79 | -2.77 | -3.62 | -3.33 | -3.11 | -3.19 | -2.64 | -3.17 | -3.42 | -3.24 | -3.20 | -3.13 | -3.43 | -2.72 | -2.69 | -3.29 | -2.82 | -2.84 | -3.42 | -2.77 | -1.8 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.31 | -3.11 | -3.09 | -3.94 | -3.65 | -3.43 | -3.51 | -2.96 | -3.49 | -3.74 | -3.50 | -3.34 | -3.45 | -3.75 | -3.04 | -3.01 | -3.61 | -3.14 | -3.16 | -3.74 | -3.09 | -2.2 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.63 | 9.49 | 9.87 | 10.10 | 10.00 | 10.00 | 10.10 | 9.28 | 10.00 | 10.00 | 9.81 | 9.92 | 10.10 | 10.10 | 9.88 | 9.72 | 10.00 | 9.91 | 9.77 | 10.1 | 9.92 | 9.3 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.88 | 9.81 | 10.20 | 10.40 | 10.40 | 10.40 | 10.40 | 9.60 | 10.30 | 10.40 | 10.10 | 10.20 | 10.40 | 10.40 | 10.20 | 10.00 | 10.30 | 10.20 | 10.10 | 10.4 | 10.2 | 9.6 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | -- | **222** | **52** | **154** | **136** | **58** | **61** | **224** | **53** | **108** | **180** | --- | **79** | **163** | -- | -- | **156** | **45** | **44** | **172** | **30** | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | -- | 18 | 16 | 15 | 19 | 9 | 16 | 16 | 17 | 17 | 17 | --- | 19 | 14 | -- | -- | 17 | -- | 17 | 13 | 13 | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | --- | <2 | <2 | -- | <2 | <2 | -- | <2 | <2 | <2 | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | -- | 6 | 9 | 15 | 7 | 7 | 9 | 7 | 6 | 10 | <50 | --- | <5 | 7 | -- | -- | <5 | -- | 10 | 5 | 9 | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | -- | **0.022** | **0.027** | **0.029** | **0.024** | <0.017 | **0.034** | **0.036** | <0.017 | **0.024** | **0.035** | --- | **0.332** | **0.024** | -- | -- | **0.025** | -- | <0.017 | <0.09 | <0.09 | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | -- | <1 | <1 | **5** | <1 | <1 | <1 | **6** | <1 | <1 | <1.0 | --- | **7** | <1 | -- | -- | **2** | -- | <1 | <1 | <1 | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2.0 | <2 | <2 | <2 | <2 | <2 | 1 | <2 | <1 | **5** | <2.0 | 1 | <2 | <2 | <2 | <2 | <2 | <1 | 1 | <1 | <1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 175 | 160 | 78 | 120 | 111 | 70 | 79 | 111 | <50 | 119 | 100 | 123 | 158 | 96 | 55 | 88 | 59 | <50 | 106 | 80 | 81 | <50 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | -- | <0.5 | <0.5 | 0.6 | <0.5 | <0.5 | <0.5 | **1.9** | <0.5 | 0.5 | <0.5 | --- | <0.5 | <0.5 | -- | -- | <0.5 | -- | <0.5 | 0.9 | <0.5 | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 36 | 30 | 14 | 37 | 35 | 13 | 12 | 40 | 18 | 25 | 34 | 24 | 35 | 23 | 15 | 17 | 24 | 11 | 13 | 24 | 15 | 14 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | -- | <2 | <2 | 5 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | --- | 3 | 3 | -- | -- | 14 | -- | <2 | <2 | <2 | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | --- | <1 | <1 | -- | -- | <1 | -- | <1 | <1 | <1 | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | --- | <0.1 | <0.1 | -- | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | -- | 27 | 31 | 29 | 31 | 18 | 31 | 31 | 30 | 30 | 29 | --- | 23 | 28 | -- | -- | 32 | -- | 38 | 28 | 35 | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | -- | <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 | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | -- | 3 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 2 | 2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | -- | 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 | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | --- | <2 | <2 | -- | -- | <2 | -- | <2 | <2 | <2 | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 9 | 5 | <5 | **64** | 11 | 7 | 5 | 10 | <5 | 10 | 14 | 6 | 12 | 10 | <5 | <5 | 11 | 8 | <5 | 8 | <5 | 7 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | -- | 461 | 613 | 93 | 461 | 308 | 461 | 42 | 629 | >2470 | --- | 356 | 163 | 179 | 517 | 2,420 | 260 | 577 | >2420 | 58 | 601 | 6,000.0 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 100 | 14 | 2 | 6 | 6 | 6 | 4 | <1 | 1 | 17 | <10 | 1 | 2 | <1 | 23 | 44 | <1 | 5 | **517** | 8 | 1 | 11 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.91 | 0.30 | 1.20 | 1.09 | 1.44 | 2.20 | 0.64 | 0.20 | 0.61 | 0.90 | 0.48 | 1.22 | 2.71 | 1.52 | 1.20 | 2.32 | 1.09 | 1.43 | 1.22 | 6.25 | 1.28 | 1.68 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.85 | 0.33 | 1.00 | 1.41 | 1.59 | 2.40 | 0.62 | 0.20 | 0.54 | 0.84 | --- | 1.26 | 1.44 | 1.86 | 1.57 | 2.34 | 1.28 | 1.40 | 1.33 | 3.35 | -- | * |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

* -- '' = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - KL-5**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Kearney Lake | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | | KL-5 | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | hh:mm | | | | | | | 9:10 AM | 9:27 AM | 10:00 AM | 2:40 PM | 11:27 AM | 12:45 PM | 11:.52 PM | 12:24 PM | 11:08 AM | 12:50 PM | 11:05 AM | 11:43 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 3.1 | 3.70 | 2.20 | NA** | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 11.2 | 23.8 | 12.8 | 25.6 | 22.9 | 12.2 | 16.0 | 23.1 | 15.4 | 18.7 | 22.9 | 15.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | ** | **5.46** | 8.10 | 6.85 | 7.43 | 8.02 | 17.88 | 8.66 | 16.90 | 8.70 | 5.83 | 9.44 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **9.20** | 7.45 | 6.62 | **6.49** | 6.73 | 6.73 | 6.74 | ***6.24*** | 6.70 | 7.45 | 7.44 | 8.94 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 171.6 | 220.0 | 216.0 | 245.0 | 221.0 | 224.0 | 181.0 | 210.0 | 190.0 | 278.2 | 99.0 | 270.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 7 | 6 | 6.0 | 7.0 | 8.0 | <5 | 8.0 | 11.0 | 6.0 | 9.0 | 8.0 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 51 | 55 | 57 | 67 | 62 | 61 | 50 | 51 | 53 | 80 | 72 | 65 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 | -- | <0.12 | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 38 | 16 | 19 | 28 | 17 | 15 | 17 | 13 | 13 | 23 | 11 | 14 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.14 | 0.16 | 0.35 | 0.38 | 0.08 | 0.17 | 0.19 | 0.15 | 0.20 | 0.17 | 0.11 | 0.18 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.14 | 0.16 | 0.35 | 0.38 | 0.08 | 0.17 | 0.19 | 0.15 | 0.20 | 0.17 | 0.11 | 0.18 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) * | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.06 | 0.06 | <0.03 | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | <0.4 | 0.6 | 1.50 | 0.80 | 8.10 | 0.16 | <0.10 | | 0.12 | 0.27 | 0.17 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 4.5 | 4.5 | 4.2 | 3.20 | 3.80 | 4.00 | 5.10 | 2.90 | 2.90 | 3.90 | 3.90 | 4.10 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 | <0.01 | <0.01 | <0.01 | 0.13 | 0.01 | 0.01 |
| pH (Lab) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.64 | 7.04 | 6.81 | 6.88 | 6.95 | 6.81 | 6.71 | **6.47** | 7.07 | 6.82 | 6.59 | ***6.30*** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.4 | 7.7 | 5.4 | 6.8 | 5.5 | 7.0 | 6.0 | 7.3 | 8.6 | 8.3 | 8.4 | 7.9 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 1.2 | 0.9 | 1.1 | 4.0 | 1.1 | 1.0 | 1.1 | 1.2 | 1.2 | 1.3 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | 0.011 | 0.007 | 0.005 | <0.006 | **0.028** | 0.004 | 0.007 | **0.019** | 0.009 | **0.015** | **0.023** | **0.020** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.8 | 1.0 | 0.8 | 0.8 | 0.8 | 1.0 | 0.8 | 1.1 | 1.0 | 1.1 | 1.2 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 43.8 | 37.7 | 30.6 | 35.4 | 39.7 | 38.0 | 34.7 | 31.4 | 30.7 | 47.0 | 43.0 | 39.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.1 | 1.4 | 2.0 | 1.8 | 1.5 | 1.9 | 3.0 | 4.2 | 1.6 | 3.0 | 2.1 | 2.2 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 6 | 8 | 9 | 9.0 | 8.0 | 9.0 | 8.0 | 8.0 | 10.0 | 9.0 | 9.0 | 9.0 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.9 | 2.0 | 0.8 | 0.9 | 1.2 | 0.9 | 1.3 | 0.6 | <0.5 | 0.7 | <0.5 | 1.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 249 | 229 | 160 | 269 | 272 | 248 | 208 | 229 | 226 | 290 | 284 | 257 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.6 | 1.9 | 1.9 | 2.22 | 2.06 | 2.08 | 1.59 | 1.78 | 1.94 | 2.58 | 2.41 | 2.19 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 7.0 | 6.0 | 6 | 7 | 8 | <5 | 8 | 11 | 6 | 9 | 8 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 110.0 | 116.0 | 109.0 | 125 | 122 | 123 | 102 | 105 | 112 | 151 | 141 | 129 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.4 | 2.2 | 1.7 | 2.00 | 2.12 | 2.13 | 1.93 | 1.86 | 1.89 | 2.60 | 2.43 | 2.24 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 20.5 | 24.2 | 17.2 | 21.5 | 17.9 | 22.0 | 19.1 | 22.8 | 26.4 | 25.7 | 26.3 | 25.1 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 19.9 | 7.3 | 6.3 | 5.3 | 1.3 | 1.2 | 9.6 | 2.2 | 1.1 | 0.5 | 0.6 | 1.0 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.5 | -2.8 | -3.3 | -3.11 | -3.06 | -3.04 | -3.40 | -3.35 | -2.55 | -3.09 | -3.13 | -3.50 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.8 | -3.1 | -3.6 | -3.43 | -3.38 | -3.36 | -3.72 | -3.67 | -2.87 | -3.41 | -3.45 | -3.82 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 10.1 | 9.9 | 10.1 | 9.99 | 10.00 | 9.85 | 10.10 | 9.82 | 9.62 | 9.91 | 9.72 | 9.80 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.4 | 10.2 | 10.4 | 10.3 | 10.3 | 10.2 | 10.4 | 10.1 | 9.9 | 10.2 | 10.0 | 10.1 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **142** | **57** | **97** | **75** | -- | -- | **126** | -- | -- | ***115*** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 17 | 16 | 15 | 15.0 | -- | -- | 15.0 | -- | -- | 26.0 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 6 | 9 | 7 | 8.0 | -- | -- | 7.0 | -- | -- | 7.0 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.09 | <0.09 | <0.09 | **0.026** | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | 1 | 1 | 1.0 | <1 | <1 | 1.0 | 2.0 | <1 | <1 | 1.0 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 121 | 63 | <50 | <50 | 72 | 111 | 103 | <50 | <50 | 96 | 56 | 62 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 25 | 18 | 17 | 28 | 4 | 25 | 21 | 8 | 7 | 21 | 16 | 19 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | **0.300** | <0.1 | -- | -- | <0.1 | -- | -- | <2 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 31 | 33 | 33 | 28.0 | -- | -- | 30.0 | -- | -- | 36.0 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | 2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 7 | <5 | 5 | 5.0 | <5 | <5 | 6.0 | <5 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 55.0 | 770.0 | 560.0 | >2420 | 291 | 159 | 196 | >200 | >200 | >200 | 300 | 400 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 1 | <1 | 8 | 6 | 122 | <1 | <1 | 9 | 1 | 4 | 13 | 12 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | 0.32 | 0.47 | 0.95 | 0.83 | 0.79 | 1.9 | 63.1 | 1.1 | 2.3 | 0.7 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.24 | 3.70 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.19 | 3.00 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**
N/A - Not Applicable; NC - Not Calculable; NCC Not Collected
RDL = Reported Detection Limit (represents most recent sampling event)
* -- ** = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.
[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.
[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).
[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).
[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). T
[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.
[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.
[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a resul
(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

| | |
|---|---|
| **Bold (black shaded)** | = Present Result - Parameter concentration exceeds CCME FWAL Guideline. |
| Underlined (black shaded) | = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality |
| *Italics* (black shaded) | = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations |
| **Blue shaded** | = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Reg |

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Highway 102-1 | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | | HWY102-1 | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/29/2009 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 2013/08/15 | 10/16/2013 | 5/14/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | | 07:00 | 12:45 | 08:00 | 13:00 | 10:20 | 09:00 | 13:40 | 11:00 | 11:00 | 14:50 | 11:00 | 9:50 | 14:15 | 12:22 | 12:30 | 12:00 | 10:10 | 9:30 | 13:15 | 09:20 | 9:40 | 14:30 | 11:00 | 10:20 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 11.8 | 18.8 | 15.7 | 14.9 | 19.6 | 7.4 | 11.4 | 17.8 | 14.6 | 10.7 | 21.8 | 13.6 | 11.7 | 19.5 | 8.9 | 12.1 | 19.6 | 10.2 | 14.3 | 20.7 | 5.4 | 13.4 | 19.3 | 9.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **11.44** | 5.80 | **4.34** | 8.18 | **4.25** | 6.05 | 8.15 | **3.88** | **5.34** | 5.65 | **1.03** | **3.83** | 7.55 | **3.32** | **3.10** | **12.03** | **2.09** | **4.54** | **4.27** | **3.82** | **5.03** | 8.18 | **10.14** | 7.35 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.98 | **5.35** | **5.25** | **6.31** | **5.26** | **5.62** | **5.75** | **5.77** | **5.99** | 8.76 | **5.73** | **6.38** | **6.19** | 7.10 | 6.79 | **6.02** | 6.63 | **5.12** | **6.35** | **6.24** | 6.92 | 7.34 | **6.14** | **5.69** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 194.0 | 153.0 | 103.8 | 135.0 | 106.0 | 108.6 | 114.1 | 107.6 | 88.6 | 288.0 | 225.0 | 155.5 | 226.0 | 173.2 | 234.0 | 880.0 | 337.0 | 109.0 | 0.4 | 335.8 | 251.2 | 289.0 | 353.0 | 208.9 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | <5 | <5 | <5 | <5 | <5 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 24 | 38 | 24 | 32 | 25 | 22 | 24 | 19 | 12 | 58 | 48 | 28 | 53 | 31 | 40 | 65 | 57 | 19 | **130** | 67 | 49 | 71 | 87 | 35 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 67 | 68 | 57 | 37 | 89 | 53 | 39 | 65 | 79 | 24 | 65 | 40 | 9 | 65 | 25 | 11 | 31 | 93 | 22 | 27 | 29 | 23 | 37 | 64 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | <0.05 | <0.05 | <0.05 | 0.69 | <0.05 | 1.20 | 0.69 | 0.25 | 1.20 | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | 0.13 | 0.53 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | <0.05 | -- | -- | 0.69 | <0.05 | -- | 0.69 | -- | -- | 2.61 | 0.06 | 0.43 | 0.51 | <0.05 | <0.05 | <0.05 | <0.05 | 0.53 | <0.050 | <0.05 | 0.17 | 0.05 | <0.05 | 0.53 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.13** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | 0.29 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.10 | 0.07 | 0.31 | 0.19 | 0.04 | <0.03 | 0.05 | 0.06 | <0.03 | 0.04 | 0.03 | <0.050 | <0.03 | 0.04 | 0.06 | 0.06 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.1 | 1.3 | 0.6 | -- | 0.6 | 0.6 | 0.7 | 0.6 | <0.4 | 0.3 | 0.5 | 0.6 | 0.7 | 1.2 | 0.7 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 6.5 | 10.0 | 7.7 | 4.7 | 11.0 | 6.3 | 4.5 | 7.2 | 7.4 | 5.5 | 10.0 | 7.0 | 5.1 | 10.1 | 17.7 | 4.1 | 7.7 | 9.0 | 2.7 | 14.6 | 8.4 | 4.5 | 8.0 | 11.5 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.04 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.05 | <0.010 | <0.05 | <0.01 | <0.01 | <0.01 | <0.05 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **4.54** | **5.24** | **5.40** | **5.48** | **6.24** | **5.31** | **6.42** | 6.55 | **6.28** | **6.40** | 6.90 | 6.80 | 6.86 | 6.87 | 6.73 | 6.56 | 7.49 | **5.90** | 6.61 | 7.46 | 6.80 | 6.87 | 7.03 | **6.45** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.7 | 1.8 | 1.6 | 4.9 | 3.3 | 5.1 | 4.9 | 5.2 | 5.6 | 12.5 | 11.7 | 7.5 | 11.1 | 10.5 | 13.9 | 7.2 | 23.3 | 2.2 | 18,000.0 | 18.0 | 12.4 | 12.9 | 25.8 | 9.9 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.3 | 0.5 | 0.5 | 1.1 | 0.8 | 1.1 | 0.9 | 0.9 | 1.2 | 1.7 | 2.0 | 1.4 | 1.4 | 1.5 | 2.3 | 1.6 | 3.2 | 0.6 | 2,400.0 | 2.7 | 2.3 | 1.7 | 2.7 | 1.7 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.070** | **0.140** | **0.020** | 0.006 | 0.007 | **0.011** | 0.009 | **0.012** | 0.010 | **0.019** | **0.039** | **0.020** | 0.006 | **0.021** | **0.022** | **0.013** | **0.038** | **0.031** | 0.007 | **0.020** | 0.002 | 0.005 | **0.038** | 0.009 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.5 | 1.2 | 0.7 | 1.1 | 1.6 | 1.3 | 1.1 | 1.5 | 1.9 | 1.6 | 2.5 | 1.5 | 1.3 | 1.7 | 2.4 | 1.2 | 2.5 | 0.7 | 2,000.0 | 2.1 | 1.5 | 1.4 | 1.9 | 1.7 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 15.0 | 25.0 | 13.0 | 15.9 | 14.5 | 14.6 | 14.8 | 10.2 | 8.3 | 36.3 | 27.7 | 14.6 | 30.8 | 15.0 | 20.5 | 39.1 | 38.7 | 18.6 | 64.0 | 37.7 | 28.8 | 45.4 | 43.8 | 24.8 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.5 | 2.2 | 2.0 | 1.1 | 3.8 | 5.1 | 2.8 | 5.2 | 4.6 | 4.1 | 6.1 | 5.1 | 3.1 | 5.1 | 5.8 | 1.7 | 7.1 | 4.7 | 2.1 | 4.9 | 4.8 | 1.4 | 6.3 | 4.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 7 | 80 | 2 | <2 | 11 | <2 | <1 | 1 | <1 | 9 | 6 | <5 | <5 | <5 | <5 | 6 | <5 | <5 | <1.0 | <5 | <5 | <5 | 10 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 5 | 3 | 3 | 8 | <2 | 8 | 10 | 8 | 10 | 14 | 8 | 9 | 12 | 8 | 12 | 10 | 7 | 6 | 13 | 9 | 14 | 14 | 14 | 18 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 14.0 | 35.0 | 0.9 | 1.4 | 1.2 | 0.6 | 0.4 | 0.6 | 1.1 | 0.9 | 1.9 | 0.9 | 0.5 | 1.6 | 0.5 | 0.7 | 1.6 | 0.9 | 0.6 | 0.9 | 0.8 | 1.0 | 4.1 | 1.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 100 | 140 | 92 | 130 | 100 | 110 | 110 | 100 | 88 | 263 | 231 | 143 | 243 | 188 | 218 | 252 | 338 | 112 | 470 | 324 | 244 | 289 | 440 | 167 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.77 | 1.12 | 0.73 | 1.11 | 0.71 | 0.88 | 1.03 | 0.95 | 0.80 | 2.55 | 2.02 | 1.31 | 1.96 | 1.50 | 1.78 | 2.66 | 2.31 | 1.30 | 4.20 | 2.50 | 1.93 | 2.58 | 3.29 | 1.60 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | 5 | 11 | 8 | 22 | 25 | 15 | 9 | 23 | 20 | 31 | 28 | 30 | 16 | 21 | 12 | 14 | 27 | 10 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 50 | 73 | 45 | 67 | 50 | 63 | 65 | 58 | 54 | 150 | 117 | 73 | 117 | 83 | 104 | 143 | 150 | 68 | 240 | 151 | 116 | 155 | 193 | 100 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.84 | 1.32 | 0.74 | 1.06 | 0.93 | 1.02 | 1.00 | 0.83 | 0.80 | 2.43 | 6.04 | 1.19 | 2.06 | 1.40 | 1.87 | 2.25 | 3.22 | 1.04 | 3.94 | 2.88 | 2.11 | 2.81 | 3.51 | 1.79 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 6.00 | 6.00 | 6.00 | 17.00 | 12.00 | 17.00 | 16.00 | 17.00 | 19.00 | 38.20 | 37.50 | 24.50 | 33.50 | 32.40 | 44.20 | 24.60 | 71.40 | 8.00 | 55.00 | 56.10 | 40.40 | 39.20 | 75.50 | 31.70 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 4.35 | 8.20 | 0.68 | 2.30 | 13.40 | 7.37 | 1.48 | 6.74 | 0.00 | 2.60 | 1.90 | 4.60 | 2.40 | 3.50 | 2.60 | 8.40 | 16.40 | 11.20 | 3.19 | 7.10 | 4.70 | 4.40 | 3.10 | 5.70 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | NC | NC | NC | NC | -3.50 | -2.99 | -3.36 | -2.77 | -2.23 | -2.72 | -2.73 | -2.33 | -2.41 | -2.69 | -1.30 | -3.85 | -2.32 | -1.57 | -2.62 | -2.48 | -1.74 | -3.14 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | NC | NC | NC | NC | -3.75 | -3.25 | -3.61 | -3.09 | -2.55 | -3.04 | -3.05 | -2.65 | -2.73 | -3.01 | -1.62 | -4.17 | -2.57 | -1.89 | -2.94 | -2.80 | -2.06 | -3.46 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | NC | NC | NC | NC | 9.92 | 9.54 | 9.64 | 9.17 | 9.13 | 9.52 | 9.59 | 9.20 | 9.14 | 9.25 | 8.79 | 9.75 | 8.93 | 9.03 | 9.42 | 9.35 | 8.77 | 9.59 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | NC | NC | NC | NC | 10.20 | 9.80 | 9.89 | 9.49 | 9.45 | 9.84 | 9.91 | 9.52 | 9.46 | 9.57 | 9.11 | 10.10 | 9.18 | 9.35 | 9.74 | 9.67 | 9.09 | 9.91 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **510** | -- | -- | **169** | **192** | -- | **205** | -- | -- | **134** | **183** | **146** | **86** | **145** | **150** | **187** | **83** | **310** | **51** | -- | **52** | **81** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 22 | -- | -- | 53 | 37 | -- | 37 | -- | -- | 58 | 284 | 42 | 57 | 57 | 80 | 46 | 142 | 17 | 130 | -- | 86 | 79 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | -- | 11 | 11 | -- | <50 | -- | -- | 12 | 18 | 13 | 10 | 10 | 11 | 9 | 14 | 11 | <50 | -- | <5 | 10 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.300 | -- | -- | **0.043** | <0.017 | -- | **0.023** | -- | -- | **0.034** | **0.021** | <0.017 | <0.017 | <0.017 | **0.040** | **0.022** | <0.017 | **0.022** | **0.024** | -- | <0.017 | <0.017 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | **8** | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | 1 | 0 | -- | <0.40 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | 2 | -- | -- | **3** | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | <2 | **3** | <2 | <1 | 2 | <1 | <1 | 2 | <2.0 | <1 | 1 | <1 | <1 | 2 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **720** | -- | -- | 146 | **637** | 150 | 107 | 209 | 219 | 102 | **1,380** | 255 | 111 | **938** | **446** | 147 | **820** | 290 | 140 | **1,280** | 138 | 144 | **766** | 228 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | **1.6** | -- | -- | **2.4** | 0.6 | -- | <0.5 | -- | -- | <0.5 | 0.7 | <0.5 | <0.5 | <0.5 | 0.6 | **2.6** | <0.5 | 0.6 | <0.5 | -- | <0.5 | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 40 | -- | -- | 55 | 39 | 67 | 28 | 21 | 31 | 34 | 79 | 28 | 23 | 45 | 31 | 56 | 122 | 61 | 28 | 95 | 22 | 19 | 78 | 38 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <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 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 11 | -- | -- | 29 | 20 | -- | 24 | -- | -- | 48 | 58 | 36 | 52 | 47 | 62 | 38 | 103 | 13 | 85 | -- | 39 | 58 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | <0.10 | -- | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 6 | -- | -- | <2 | <2 | -- | 4 | -- | -- | <2 | 3 | <2 | <2 | <2 | 4 | 2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 21 | -- | -- | 16 | 7 | 7 | <5.0 | <5.0 | 7 | <5 | 6 | <5 | <5 | <5 | 10 | 10 | <5 | 7 | 11 | <5 | <5 | <5 | <5 | 6 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 84 | >250 | -- | >250 | >250 | 180 | 120 | 180 | -- | 687 | >2420 | >2420 | 1,550 | >2420 | 1,553 | 120 | >2420 | >2420 | --- | >2420 | 659 | >2420 | >2420 | -- |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 54 | **>250** | -- | 12 | 17 | 5 | 1 | 78 | <100 | 3 | 68 | 145 | 4 | 9 | 5 | 3 | 179 | 3 | 20 | 25 | 2 | <1 | 86 | -- |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 15.40 | 19.29 | 0.70 | 18.12 | 1.61 | 8.45 | 0.93 | 0.58 | 0.69 | 0.53 | 2.59 | 0.81 | 1.27 | 14.70 | 1.99 | 0.25 | 1.10 | 1.22 | 0.50 | 7.27 | 0.36 | 0.94 | 51.51 | 0.33 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 17.50 | 19.60 | 0.84 | 17.62 | 1.68 | 7.52 | 0.84 | 0.56 | 0.65 | 0.59 | 2.89 | 1.05 | 1.45 | 15.80 | 2.20 | 0.82 | 1.11 | 1.38 | 0.55 | 6.79 | 0.23 | 1.30 | 60.68 | 0.43 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Highway 102-1 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Sites | | | | | | | | HWY102-1 | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | hh:mm | | | | | | | 12:00 | 15:00 | 11:40 | 12:40 | 11:00 | 15:40:00 PM | 2:45 PM | 12:40 PM | 4:15 PM | 10:22 AM | 10:34 AM | 8:40 AM | 9:42 AM | 9:53 AM | 9:49 AM | 10:20 AM | 9:15 AM | 9:55 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA** | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 16.4 | 22.1 | 10.1 | 14.4 | 21.4 | 10.6 | 14.0 | 27.4 | 9.7 | 21.2 | 19.7 | 6.2 | 15.1 | 17.7 | 12.3 | 15,7 | 18.9 | 10.6 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 5.77 | 5.77 | 5.56 | 7.09 | **2.78** | 6.06 | ** | 6.27 | 7.80 | **3.27** | **2.61** | 6.05 | 11.15 | 7.16 | 20.74 | ***5.45*** | ***2.80*** | ***4.79*** |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.40** | 7.76 | **6.32** | **6.13** | **6.13** | 6.70 | 7.20 | **6.09** | **6.37** | **6.20** | **6.22** | **6.49** | **6.38** | **5.74** | **6.31** | 7.48 | 7.45 | 8.88 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 354.0 | 257.0 | 266.0 | 232.2 | 280.5 | 189.4 | 330.0 | 383.0 | 210.0 | 446.0 | 345.0 | 318.2 | 367.0 | 259.0 | 316.0 | 544.0 | 99.0 | 306.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 17 | 21 | 16 | 13 | 26 | 12 | 12 | 23 | <5 | 23.0 | 27.0 | 14.0 | 21.0 | 23.0 | 25.0 | 20 | 25 | 18 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 101 | 49 | 51 | 51 | 54 | 61 | 90 | 80 | 92 | **137** | 100 | 72 | 98 | 57 | 82 | ***171*** | 101 | 71 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 | -- | <0.12 | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 24 | 31 | 29 | 27 | 56 | 68 | 35 | 37 | 28 | 30 | 32 | 24 | 19 | 52 | 28 | 34.4 | 23.9 | 46.0 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.35 | 0.71 | 0.58 | 0.37 | 0.11 | 0.19 | 0.57 | <0.05 | 0.12 | 0.05 | <0.05 | 0.50 | 0.25 | 0.65 | 0.17 | 0.16 | 0.06 | 0.30 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.18 | 0.50 | 0.58 | 0.37 | <0.05 | 0.19 | 0.32 | <0.05 | 0.12 | 0.05 | <0.05 | 0.50 | 0.25 | 0.65 | 0.17 | 0.16 | 0.06 | 0.30 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.17** | **0.21** | <0.05 | <0.05 | **0.11** | <0.05 | **0.25** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.10 | 0.07 | <0.03 | 0.07 | <0.03 | <0.03 | 0.06 | 0.06 | 0.24 | 0.17 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.05 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | 0.5 | 1.3 | 3.8 | 1.1 | 0.7 | <0.4 | <0.4 | 0.6 | 0.9 | <0.4 | 0.90 | 3.80 | 0.24 | 0.30 | 0.15 | 0.29 | 0.44 | 0.29 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 7.4 | 8.6 | 6.9 | 5.0 | 7.7 | 7.0 | 4.4 | 9.5 | 4.1 | 6.00 | 9.00 | 6.20 | 6.70 | 5.20 | 3.00 | 6.0 | 6.9 | 7.9 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.13 | <0.01 | 0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.84 | 6.91 | 6.90 | 7.02 | 7.14 | 6.94 | 7.07 | 7.15 | **5.73** | 7.10 | 7.16 | 6.95 | 7.06 | 6.87 | 7.20 | 7.34 | 6.70 | ***6.38*** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 20.9 | 10.3 | 14.6 | 12.5 | 15.6 | 9.9 | 16.5 | 17.9 | 12.2 | 22.5 | 23.7 | 17.8 | 18.0 | 15.9 | 19.6 | 21.5 | 18.4 | 13.7 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 3.0 | 1.7 | 2.2 | 1.8 | 2.2 | 1.8 | 2.5 | 2.6 | 1.8 | 3.0 | 41.0 | 2.4 | 2.7 | 2.2 | 2.6 | 3.1 | 2.6 | 2.2 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.017** | **0.052** | 0.008 | **0.022** | **0.014** | 0.010 | **0.011** | **0.023** | **0.026** | **0.012** | **0.016** | 0.007 | 0.007 | **0.034** | **0.012** | ***0.059*** | ***0.284*** | ***0.030*** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.0 | 2.1 | 2.0 | 1.6 | 2.0 | 1.4 | 2.3 | 2.3 | 0.9 | 2.4 | 2.9 | 2.3 | 2.0 | 2.3 | 2.1 | 2.6 | 2.4 | 2.4 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 64.1 | 29.7 | 29.6 | 41.2 | 35.5 | 47.9 | 69.1 | 54.3 | 38.3 | 68.7 | 60.3 | 41.7 | 60.4 | 39.6 | 41.1 | 80.0 | 55.0 | 36.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 1.8 | 3.8 | 5.6 | 2.5 | 5.3 | 4.6 | 2.2 | 4.7 | 4.8 | 4.3 | 5.9 | 6.2 | 2.8 | 7.1 | 3.8 | 3.8 | 4.6 | 3.2 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | 11 | <5 | <5 | <5 | <5 | <5 | 8 | <5 | <5 | <5 | <5 | 5.0 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 15 | 13 | 19 | 12 | 7 | 11 | 14 | 10 | 8 | 13.0 | 8.0 | 20.0 | 15.0 | 21.0 | 17.0 | 14 | 10 | 12 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 1.3 | 7.7 | 1.1 | 1.7 | 1.1 | 3.2 | 0.8 | 2.6 | 1.5 | 1.2 | 1.5 | 1.0 | 1.1 | 0.8 | 0.8 | 1.1 | 1.9 | 1.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 411 | 251 | 258 | 298 | 306 | 306 | 464 | 340 | 247 | 517 | 469 | 339 | 424 | 326 | 365 | 573 | 418 | 303 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 3.53 | 2.12 | 2.20 | 1.97 | 2.2 | 2.2 | 3.1 | 2.9 | 2.8 | 4.60 | 3.53 | 2.76 | 3.51 | 2.55 | 3.18 | 5.53 | 3.56 | 2.63 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 17 | 21 | 16 | 13 | 26 | 12.0 | 12.0 | 23.0 | < | 23 | 27 | 14 | 21 | 23 | 25 | 20 | 25 | 18 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 218 | 127 | 131 | 130 | 133 | 142.0 | 204.0 | 182.0 | 154.0 | 262 | 215 | 167 | 210 | 155 | 180 | 305 | 205 | 150 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 4.14 | 2.22 | 2.28 | 2.62 | 2.6 | 2.8 | 4.1 | 3.6 | 2.5 | 4.46 | 4.15 | 2.97 | 3.81 | 2.78 | 3.05 | 4.89 | 3.61 | 2.51 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 64.50 | 32.70 | 45.50 | 38.6 | 48 | 32.1 | 51.5 | 55.4 | 37.9 | 68.5 | 70.3 | 54.3 | 56.1 | 48.8 | 59.6 | 66.5 | 56.7 | 43.3 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 8.00 | 2.20 | 1.80 | 14.0 | 8.3 | 12.1 | 13.8 | 10.0 | 5.3 | 1.5 | 8.1 | 3.7 | 4.1 | 4.4 | 2.1 | 6.1 | 0.6 | 2.5 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.23 | -2.35 | -2.33 | -2.37 | -1.85 | -2.6 | -2.3 | -1.9 | -4.1 | -1.82 | -1.65 | -2.26 | -1.98 | -2.17 | -1.72 | -1.66 | -2.26 | -2.83 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -2.55 | -2.67 | -2.65 | -2.69 | -2.17 | -2.9 | -2.6 | -2.2 | -4.4 | -2.14 | -1.97 | -2.58 | -2.30 | -2.49 | -2.04 | -1.98 | -2.58 | -3.15 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.07 | 9.26 | 9.23 | 9.39 | 8.99 | 9.5 | 9.3 | 9.0 | 9.8 | 8.92 | 8.81 | 9.21 | 9.04 | 9.04 | 8.92 | 9.00 | 8.96 | 9.21 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.39 | 9.58 | 9.55 | 9.71 | 9.31 | 9.9 | 9.6 | 9.3 | 10.1 | 9.2 | 9.1 | 9.5 | 9.4 | 9.4 | 9.2 | 9.32 | 9.28 | 9.53 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **69** | **450** | **100** | **72** | **80** | -- | **45** | **93** | **215** | **107** | -- | -- | **66** | -- | -- | ***54*** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 130 | -- | 77 | 68 | 100 | -- | 108 | 104 | 197 | 141 | -- | -- | 110 | -- | -- | 155 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | 24 | 11 | 14 | -- | 10 | 16 | 6 | 11 | -- | -- | 11 | -- | -- | 14 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.032** | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | 1 | -- | 1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | 2 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | **4** | 1 | 1 | <1 | **3** | 1 | 2 | 2 | <1 | <1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 151 | **3,960** | 281 | 85 | **634** | **403** | 122 | **896** | 256 | **429** | **528** | 196 | 193 | 294 | 179 | 289 | 276 | 151 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | <0.5 | 0.8 | <0.5 | -- | <0.5 | 0.7 | 0.9 | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 22 | 511 | 28 | 9 | 99 | 71 | 14 | 62 | 125 | 33 | 41 | 8 | 16 | 34 | 21 | 25 | 44 | 11 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 12 | -- | <2 | 6 | <2 | -- | <2 | <2 | 5 | <2 | -- | -- | 12 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 92 | -- | 76 | 54 | 88 | -- | 93 | 88 | 67 | 102.0 | -- | -- | 89 | -- | -- | 109 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2 | 2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 9 | **37** | 8 | 6 | <5 | 12 | 5 | 8 | 12 | <5 | <5 | <5 | 6 | 8 | <5 | 6 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 914 | >2420 | >2420 | 105 | 9010 | 370.0 | 1,520.0 | 450.0 | 1,128.0 | >2420 | >2420 | 1,200 | >200 | >200 | >200 | >200 | 20,400 | 8,900 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 12 | 14 | 3 | <1 | 10 | 2 | 1 | 3 | 2 | 70 | 33 | 3 | 27 | 34 | 1 | 46 | 400 | 68 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.25 | 4.93 | 1.57 | 0.63 | 0.95 | 1.2 | 1.05 | 0.7 | 13.4 | 0.4 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.56 | 5.32 | 0.62 | 1.57 | 0.86 | 1.11 | 1.88 | 5.55 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 2.04 | 5.48 | 0.99 | 2.62 | -- | * | 1.90 | 5.09 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperat

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Highway 102-2 | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site HWY102-2 | | | | | | | | HWY102-2 | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | | 12:30 | 12:15 | 12:30 | 12:40 | 09:30 | 12:30 | 11:20 | 15:00 | 15:30 | 11:20 | 12:20 | 10:35 | 10:40 | 10:00 | 10:22 | 12:15 | 10:07 | 11:00 | 12:58 | 14:30 | 12:50 | 12:45 | 10:40 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 16.7 | 19.2 | 16.4 | 17.2 | 17.0 | 8.7 | 10.8 | 24.2 | 15.1 | 7.8 | 23.7 | 14.3 | 11.5 | 22.0 | 10.7 | 11.4 | 10.4 | 12.7 | 23.7 | 9.3 | 13.4 | 20.4 | 10.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.01** | 5.90 | **4.80** | **4.91** | **2.45** | **2.99** | 6.92 | 7.03 | **5.09** | **3.73** | **13.10** | **3.28** | 6.30 | **1.57** | **4.20** | **10.50** | 9.25 | **4.24** | 6.11 | **5.28** | 6.77 | 7.06 | 6.80 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.57 | **5.71** | **5.40** | **6.33** | **5.86** | **5.64** | **6.22** | **5.89** | **5.29** | 7.30 | **6.37** | 6.72 | **6.01** | 6.92 | **5.40** | **5.40** | **5.85** | **6.45** | **6.04** | **5.96** | **5.86** | **6.19** | **5.36** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 37.0 | 457.0 | 162.1 | 415.0 | 167.0 | 101.2 | 92.2 | 123.1 | 96.0 | 225.0 | 226.0 | 159.1 | 288.0 | 188.5 | 204.4 | 204.4 | 174.0 | 0.4 | 699.0 | 197.6 | 968.0 | 838.0 | 219.2 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | <5 | 7 | 6 | 5 | <5 | <5 | 5 | <5 | 17 | 7 | <5 | 6 | 14 | 7 | 30 | 8 | 8 | 5 | <5 | 13 | 21 | 6 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 21 | 82 | 83 | **170** | 41 | 18 | 21 | 21 | 17 | 63 | 109 | 45 | 71 | 50 | 52 | 113 | 34 | **260** | **178** | 78 | **236** | **226** | 48 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 120 | 190 | 91 | 96 | 160 | 68 | 65 | 98 | 77 | 32 | 100 | 70 | 11 | 61 | 36 | 13 | 85 | 17 | 9 | 8 | 14 | 39 | 86 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | <0.05 | <0.05 | <0.05 | 0.10 | <0.05 | 0.62 | 0.26 | 1.80 | 3.20 | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 | 0.12 | <0.050 | <0.05 | 0.15 | 0.21 | 0.23 | 0.11 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | <0.05 | -- | -- | 0.10 | <0.05 | -- | 0.26 | -- | -- | 1.54 | <0.05 | 0.14 | 0.17 | <0.05 | <0.05 | <0.05 | 0.12 | <0.050 | <0.05 | 0.15 | <0.05 | <0.05 | 0.11 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | **0.21** | **0.23** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [3] | -- | <0.05 | 0.06 | <0.05 | <0.05 | 0.20 | <0.05 | <0.05 | 0.30 | 0.08 | 0.09 | <0.03 | <0.03 | <0.03 | 0.17 | 0.09 | <0.03 | <0.03 | 0.06 | 0.19 | 0.05 | 0.14 | 0.37 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.6 | 1.1 | 0.5 | -- | 0.7 | 2.0 | 15.3 | <0.4 | 0.3 | 62.6 | 2.0 | 24.3 | 2.1 | 0.6 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 8.5 | 13.0 | 13.0 | 7.2 | 14.0 | 7.4 | 5.7 | 9.2 | 8.4 | 7.0 | 15.8 | 11.2 | 6.1 | 10.6 | 5.1 | 17.4 | 8.0 | 3.0 | 29.0 | 9.9 | 79.3 | 11.1 | 13.4 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **5.43** | **5.96** | **6.30** | **6.05** | **6.32** | **5.47** | **5.93** | **6.18** | **5.92** | **5.90** | 6.70 | 6.80 | 6.61 | 6.59 | **6.34** | 7.20 | **6.40** | **6.12** | 6.64 | **6.18** | **6.46** | 6.80 | **6.15** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.6 | 4.0 | 4.8 | 7.4 | 3.8 | 4.0 | 3.1 | 2.2 | 3.8 | 7.0 | 8.4 | 5.6 | 7.6 | 8.5 | 8.2 | 14.1 | 9.5 | 20,000.0 | 33.3 | 9.8 | 23.9 | 23.8 | 8.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.4 | 0.7 | 0.9 | 1.0 | 0.6 | 1.0 | 0.7 | 0.7 | 1.4 | 1.2 | 1.4 | 1.2 | 1.2 | 1.3 | 2.2 | 3.1 | 1.8 | 2,500.0 | 32.7 | 2.2 | 3.2 | 2.5 | 1.7 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | <0.02 | **0.040** | **0.034** | 0.010 | **0.028** | 0.003 | 0.009 | **0.019** | **0.041** | **0.021** | **0.054** | **0.030** | **0.014** | **0.028** | **0.199** | **0.028** | **0.201** | 0.010 | **1.560** | **0.012** | **0.222** | **0.034** | **0.012** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.5 | 0.8 | 1.1 | 1.0 | 1.0 | 1.4 | 0.8 | 1.3 | 1.9 | 1.2 | 1.7 | 1.6 | 1.3 | 1.5 | 2.5 | 2.9 | 1.7 | 1,900.0 | 12.5 | 1.1 | 4.0 | 2.1 | 1.4 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 15.0 | 51.0 | 55.0 | 83.7 | 32.0 | 12.1 | 13.3 | 13.1 | 13.3 | 41.5 | 63.6 | 20.4 | 39.0 | 19.1 | 34.5 | 69.6 | 24.0 | 150.0 | 124.0 | 36.8 | 149.0 | 124.0 | 26.4 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 2.2 | 4.4 | 4.0 | 3.0 | 6.4 | 5.4 | 2.5 | 6.5 | 6.7 | 4.1 | 6.9 | 5.8 | 1.6 | 6.2 | 6.6 | 1.6 | 5.9 | 2.3 | 7.2 | 5.6 | 2.8 | 9.0 | 4.5 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <2 | 58 | 62 | 34 | 27 | 3 | <1 | 10 | 14 | <5 | 39 | <5 | <5 | <5 | 194 | 34 | <5 | 2 | **3,000** | 15 | **342** | 69 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | <2 | 3 | 8 | 11 | <2 | 7 | 5 | 5 | 8 | 12 | 6 | 10 | 10 | 9 | 10 | 12 | 8 | 15 | 7 | 8 | 22 | 21 | 8 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.7 | 3.8 | 4.2 | 2.6 | 3.1 | 0.5 | 0.4 | **1.2 ( 1 )** | 3.9 | 0.6 | 10.8 | 2.0 | 1.5 | 3.3 | **144.0** | 1.1 | 1.1 | 1.2 | **1,490.0** | 9.9 | **131.0** | **54.2** | 1.1 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 85 | 290 | 310 | 590 | 160 | 94 | 91 | 100 | 110 | 263 | 403 | 179 | 295 | 203 | 223 | 433 | 194 | 920 | 662 | 315 | 817 | 952 | 177 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.60 | 2.37 | 2.62 | 5.13 | 1.27 | 0.70 | 0.73 | 0.91 | 0.86 | 2.48 | 3.34 | 1.49 | 2.34 | 1.88 | 1.81 | 4.04 | 1.29 | 7.88 | 5.27 | 2.38 | 7.39 | 7.25 | 1.65 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <1 | <1 | 7 | 6 | 5 | -- | -- | 5 | -- | 17 | 7 | 6 | 14 | 7 | 30 | 8 | 8 | 5 | -- | 13 | 21 | 6 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 42 | 150 | 165 | 282 | 93 | 52 | 48 | 62 | 67 | 143 | 200 | 86 | 135 | 100 | 145 | 235 | 85 | 460 | 712 | 138 | 473 | 422 | 99 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 0.81 | 2.65 | 2.89 | 4.17 | 1.81 | 0.86 | 0.82 | 0.83 | 0.97 | 2.32 | 2.10 | 1.40 | 2.24 | 1.50 | 3.50 | 4.17 | 1.76 | 7.87 | 29.10 | 2.35 | 9.27 | 7.23 | 1.80 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 6.00 | 13.00 | 16.00 | 23.00 | 12.00 | 14.00 | 11.00 | 8.00 | 15.00 | 22.40 | 26.70 | 18.90 | 23.90 | 26.60 | 29.50 | 48.00 | 31.10 | 59.00 | 218.00 | 33.50 | 72.90 | 69.70 | 28.50 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 14.90 | 5.58 | 4.90 | 10.30 | 17.50 | 10.30 | 5.81 | 4.60 | 6.01 | 3.30 | 3.60 | 3.10 | 2.30 | 11.30 | 31.70 | 1.60 | 15.10 | 0.06 | 69.40 | 0.50 | 11.30 | 0.10 | 4.30 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | -3.57 | -3.72 | -3.70 | NC | NC | -4.07 | NC | -3.63 | -3.15 | -3.34 | -3.33 | -2.92 | -3.50 | -1.80 | -3.30 | -3.18 | -2.81 | -3.73 | -2.70 | -2.15 | -3.72 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | -3.82 | -3.97 | -3.95 | NC | NC | -4.32 | NC | -3.95 | -3.47 | -3.66 | -3.65 | -3.24 | -3.82 | -2.12 | -3.62 | -3.42 | -3.13 | -4.05 | -3.02 | -2.47 | -4.04 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | 9.87 | 9.77 | 10.00 | NC | NC | 10.30 | NC | 9.53 | 9.85 | 10.10 | 9.94 | 9.51 | 9.84 | 9.00 | 9.70 | 9.29 | 9.45 | 9.91 | 9.16 | 8.95 | 9.87 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | NC | NC | 10.10 | 10.00 | 10.30 | NC | NC | 10.50 | NC | 9.85 | 10.20 | 10.50 | 10.30 | 9.83 | 10.20 | 9.32 | 10.00 | 9.54 | 9.77 | 10.20 | 9.48 | 9.27 | 10.20 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **270** | -- | -- | **189** | **368** | -- | **260** | -- | -- | **145** | **466** | **259** | **130** | **138** | **2,760** | **400** | **216** | **100** | -- | **129** | **3,880** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | 2 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | **6** | <2 | <2 | <1.0 | -- | <2 | 3 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 20 | -- | -- | 53 | 28 | -- | 27 | -- | -- | 49 | 74 | 33 | 44 | 43 | 213 | 381 | 63 | 140 | -- | 147 | 762 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | -- | 8 | 8 | -- | <50 | -- | -- | 10 | 17 | 15 | 9 | 10 | 13 | 11 | 12 | <50 | -- | <5 | 9 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.300 | -- | -- | **0.051** | <0.017 | -- | <0.017 | -- | -- | **0.037** | **0.031** | **0.032** | **0.019** | <0.017 | **0.096** | **0.051** | **0.019** | **0.100** | -- | <0.017 | **0.778** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | 1 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | 1 | **9** | **2** | <1 | <1.0 | -- | <1 | **8** | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | 1 | 1 | -- | <0.40 | -- | -- | <1 | 1 | 1 | <1 | 1 | 3 | 1 | <1 | 2 | -- | 3 | 4 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | 2 | -- | -- | 2 | <2.0 | <2.0 | <2.0 | **3** | **3** | <2 | **3** | **3** | <2 | 1 | **12** | **4** | 2 | <2.0 | **404** | 2 | **13** | <1 | 2 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **880** | -- | -- | **1,380** | **3,850** | **303** | 229 | **897** | **1,110** | 214 | **5,210** | **1,550** | **383** | **1,720** | **28,400** | **1,660** | **485** | **960** | **217,000** | **714** | **21,300** | **7,380** | **375** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | **1.9** | -- | -- | **1.6** | **2.7** | -- | 0.6 | -- | -- | <0.5 | **5.2** | **2.1** | 0.6 | 0.7 | **19.4** | **3.5** | 1.0 | <0.50 | -- | 0.6 | **39.7** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 110 | -- | -- | 387 | 135 | 53 | 41 | 106 | 176 | 78 | 219 | 207 | 83 | 173 | 327 | 212 | 93 | 470 | **2,800** | 303 | 586 | 359 | 71 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | 4 | 2 | <2 | <2.0 | -- | <2 | 8 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <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 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 11 | -- | -- | 37 | 21 | -- | 17 | -- | -- | 33 | 45 | 31 | 39 | 40 | 45 | 75 | 43 | 96 | -- | 38 | 96 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 4 | -- | -- | <2 | 6 | -- | 5 | -- | -- | <2 | 10 | 4 | 4 | <2 | 60 | 9 | 6 | <2 | -- | <2 | 41 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | 0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | 2 | <2 | <2 | <2 | **11** | <2 | <2 | <2.0 | -- | <2 | **18** | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 12 | -- | -- | 14 | 12 | 9 | 6 | 9 | 13 | <5 | 7 | 12 | 12 | <5 | **46** | **36** | 17 | 27 | **1,210** | 10 | **170** | 22 | 11 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 28 | >250 | -- | >250 | 75 | 41 | 110 | >250 | -- | 1,553 | >2420 | >2420 | 2,420 | 1,990 | >2420 | 687 | >2420 | --- | >2420 | 328 | >2420 | >2420 | >2420 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 4 | 230 | -- | 9 | 5 | <1 | 7 | **>250** | <100 | <1 | 16 | 50 | 111 | 9 | 4 | <1 | <1 | <10 | 201 | 2 | 1 | 20 | 11 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.90 | 82.63 | 48.17 | 0.85 | 16.36 | 0.25 | 0.97 | 4.91 | 1.90 | 2.07 | 21.03 | 0.33 | 2.41 | 1.10 | 21.62 | 10.34 | 0.46 | 0.53 | 119.14 | 6.24 | 539.78 | 54.98 | 0.43 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.91 | 81.20 | 52.50 | 0.85 | 17.35 | 0.23 | 0.87 | 4.49 | 2.15 | 2.27 | 17.26 | 0.50 | 3.02 | 1.30 | 27.02 | 11.09 | 0.55 | 0.58 | 129.77 | 2.23 | 793.90 | 73.67 | 0.56 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - HWY102-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Highway 102 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site HWY102-2 | | | | | | | | HWY102-2 | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/8/2107 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | hh:mm | | | | | | | 11:45 | 15:25 | 12:25 | 12:30 | 11:30 | 14;15 PM | 3:55PM | 12:20PM | 16:30 | 10:00 AM | 1:54 PM | 9:01 AM | 1:38 PM | 1:22 PM | 12:34 PM | 1:15 PM | 12:10 PM | 1:15 PM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA** | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 13.0 | 22.4 | 15.2 | 14.9 | 18.3 | 10.6 | 11.4 | 23.1 | 9.7 | 18.8 | 17.7 | 7.5 | 14.9 | 18.5 | 13.7 | 14.9 | 18.4 | 12.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 5.68 | **1.81** | **11.32** | 8.75 | **2.29** | 5.62 | ** | **3.81** | **12.70** | **4.92** | 7.96 | **5.45** | 17.91 | **4.27** | 15.05 | **3.92** | **2.27** | **5.05** |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.04** | 7.56 | 8.32 | **6.13** | **5.88** | 7.24 | 6.83 | **6.19** | 6.98 | **5.99** | **5.56** | **6.18** | 6.52 | **5.99** | **6.07** | 6.71 | 7.29 | 7.86 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 400.0 | 414.0 | 338.0 | 355.6 | 394.7 | 246.4 | 501.0 | 720.0 | 202.0 | 461.0 | 472.0 | 399.0 | 424.0 | 729.0 | 728.0 | 693.0 | 689.0 | 450.2 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 22 | 11 | 9 | 21 | 13 | <5 | 17 | <5 | 18.0 | 11.0 | 11.0 | 16 | 11 | 8 | 8 | 13 | 9 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | **136** | 107 | 92 | 79 | 90 | 30 | **161** | **223** | 74 | **172** | **200** | 99 | 103 | 94 | **199** | **251** | **186** | 108 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 | -- | <0.12 | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 20 | 41 | 22 | 25 | 85 | 85 | 22 | 42 | 45 | 27 | 56 | 26 | 22.9 | 86.6 | 24.8 | 33 | 45.8 | 42.6 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.20 | 0.09 | 0.07 | 0.33 | 0.21 | 0.76 | 0.60 | 0.14 | 0.58 | 0.08 | <0.05 | 0.30 | 0.11 | <0.05 | 0.06 | 0.06 | 0.09 | 0.08 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | <0.05 | 0.09 | 0.07 | 0.16 | <0.05 | 0.76 | 0.17 | 0.07 | 0.58 | 0.08 | <0.05 | 0.30 | 0.11 | <0.05 | 0.06 | 0.06 | 0.09 | 0.08 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.20** | <0.05 | <0.05 | **0.17** | **0.21** | <0.05 | **0.43** | **0.07** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [3] | -- | <0.03 | 0.09 | 0.14 | <0.03 | 0.24 | 0.06 | 0.04 | 0.29 | 0.05 | 0.25 | 0.31 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.09 | 0.22 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | <0.4 | 0.7 | 0.6 | 1.4 | 0.9 | <0.4 | <0.4 | 0.7 | 1.2 | <0.4 | 4.10 | 9.80 | 0.35 | 0.4 | 0.1 | 0.23 | 0.64 | 0.25 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.4 | 9.2 | 5.9 | 5.6 | 7.5 | 8.0 | 3.2 | 8.2 | 6.8 | 4.90 | 21.20 | 6.30 | 9.0 | 10.4 | 4.7 | 5.7 | 9.4 | 7.8 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.13 | 0.01 | 0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.22** | 6.73 | 6.51 | 6.79 | 6.79 | 7.07 | **6.36** | 6.67 | **6.37** | 6.86 | 6.86 | 6.77 | 7.05 | **6.40** | 6.66 | 6.99 | 6.44 | **6.75** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 13.3 | 14.7 | 14.7 | 11.5 | 12.5 | 16.5 | 22.8 | 17.2 | 7.9 | 23.2 | 9.8 | 19.2 | 19.3 | 11.9 | 17.1 | 16.6 | 16 | 11.1 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.5 | 1.9 | 2.1 | 1.4 | 1.7 | 1.9 | 3.6 | 2.2 | 1.4 | 3.1 | 3.40.0 | 2.8 | 2.8 | 1.8 | 2.1 | 2.4 | 2.4 | 2.1 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.013** | **0.042** | **0.011** | **0.034** | **0.025** | **0.014** | 0.006 | **0.037** | **0.022** | **0.018** | 0.008 | **0.013** | **0.018** | **0.036** | **0.018** | **0.020** | **0.033** | **0.030** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.1 | 1.6 | 1.6 | 1.3 | 1.6 | 1.7 | 2.2 | 2.1 | 1.1 | 2.1 | 3.7 | 2.1 | 1.9 | 1.2 | 2.0 | 2 | 2.1 | 1.9 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 68.8 | 66.0 | 55.2 | 59.4 | 81.6 | 29.4 | 148.0 | 139.0 | 31.7 | 96.7 | 118.0 | 57.8 | 64.7 | 61.9 | 98.1 | 123 | 107 | 63 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 3.1 | 5.7 | 6.4 | 1.6 | 8.8 | 4.6 | 3.1 | 7.2 | 4.4 | 5.7 | 7.6 | 6.7 | 3.3 | 6.6 | 4.5 | 4.8 | 9.4 | 5.3 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 6 | 7 | 8 | 12 | <5 | <5 | <5 | 16 | <5 | <5 | 57.0 | <5 | 9 | 14 | <5 | 13 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 10 | 7 | 9 | 9 | 4 | 16 | 13 | 11 | 9 | 12.0 | 10.0 | 16.0 | 13 | 6 | 8 | 13 | 16 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 2.4 | 9.9 | 12.5 | 7.0 | 13.8 | 1.1 | 1.2 | 26.8 | 4.4 | 9.7 | 32.9 | 3.0 | 2.6 | 1.7 | 6.8 | 1.1 | 5.4 | 2.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 451 | 413 | 366 | 422 | 444 | 208 | 737 | 782 | 204 | 629 | 742 | 412 | 436 | 430 | 546 | 746 | 647 | 413 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 4.06 | 3.61 | 3.01 | 2.62 | 3.06 | 1.5 | 4.9 | 6.9 | 2.3 | 5.47 | 6.07 | 3.37 | 3.50 | 3.00 | 5.94 | 7.52 | 5.85 | 3.44 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 22 | 11 | 9 | 21 | 13.0 | <5 | 17.0 | <5 | 18 | 11 | 11 | 16 | 11 | 8 | 8 | 13 | 9 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 233 | 215 | 187 | 170 | 209 | 107.0 | 354.0 | 415.0 | 129.0 | 324 | 359 | 206 | 217 | 185 | 335 | 414 | 339 | 203 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 3.92 | 3.93 | 3.60 | 3.36 | 4.53 | 2.3 | 8.0 | 7.5 | 2.0 | 5.83 | 6.25 | 3.81 | 4.13 | 3.54 | 5.49 | 6.46 | 5.78 | 3.56 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 43.50 | 44.50 | 45.40 | 34.5 | 38.2 | 49.0 | 71.8 | 52.0 | 25.5 | 70.7 | 33.1 | 59.5 | 59.7 | 37.1 | 51.3 | 51.3 | 49.8 | 36.4 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 1.80 | 4.20 | 8.90 | 12.4 | 19.4 | 21.8 | 24.3 | 4.4 | 8.0 | 3.2 | 1.5 | 6.2 | 8.2 | 8.4 | 4.0 | 7.6 | 0.6 | 1.7 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.58 | -2.38 | -2.90 | -2.81 | -2.41 | -2.2 | -3.2 | -2.5 | -3.6 | -2.16 | -2.75 | -2.52 | -2.08 | -3.10 | -2.84 | -2.54 | -2.88 | -3.47 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.90 | -2.70 | -3.22 | -3.13 | -2.73 | -2.5 | -3.6 | -2.8 | -4.0 | -2.48 | -3.07 | -2.84 | -2.40 | -3.42 | -3.16 | -2.86 | -3.20 | -3.79 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.80 | 9.11 | 9.41 | 9.60 | 9.2 | 9.3 | 9.6 | 9.2 | 10.0 | 9.02 | 9.61 | 9.29 | 9.13 | 9.50 | 9.50 | 9.53 | 9.32 | 9.62 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.10 | 9.43 | 9.73 | 9.92 | 9.52 | 9.6 | 9.9 | 9.5 | 10.3 | 9.3 | 9.9 | 9.6 | 9.45 | 9.82 | 9.82 | 9.85 | 9.64 | 9.94 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **99** | **149** | **542** | **167** | **152** | -- | **126** | **194** | **306** | **99** | -- | -- | **112** | -- | -- | *98* | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | 4 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 151 | -- | 122 | 96 | 146 | -- | 272 | 138 | 100 | 266.0 | -- | -- | 174 | -- | -- | 180 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | 12 | 7 | 11 | -- | 7 | 9 | 6 | 11.0 | -- | -- | 10 | -- | -- | 9 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.019** | -- | **0.048** | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | -- | **2** | <1 | **2** | -- | <1 | 1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | 2 | <1 | 2 | -- | <1 | 3 | <1 | <1 | -- | -- | <1 | -- | -- | 1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | 1 | **3** | 2 | 1 | 2 | 2 | 1 | **3** | **3** | **4** | 2.0 | 2 | 2 | **5** | 2 | 2 | 2 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **369** | **2,650** | **4,760** | **870** | **3,600** | 93 | **728** | **8,440** | **506** | **3,260** | **7,640** | **1,030** | **1,600** | **1,080** | **2,400** | ***367*** | ***1250*** | ***309*** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | **3.3** | **2.3** | 1.0 | -- | **1.4** | **1.4** | **1.9** | 0.7 | -- | -- | 0.6 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 125 | 160 | 215 | 55 | 262 | 10 | 137 | 625 | 50 | 341 | 340 | 99 | 100 | 328 | 562 | 134 | 148 | 40 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 6 | -- | 3 | <2 | <2 | -- | 3 | <2 | 2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 72 | -- | 80 | 53 | 81 | -- | 129 | 95 | 49 | 112.0 | -- | -- | 97 | -- | -- | 82 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | 15 | 4 | 3 | -- | <2 | 3 | 7 | 2.0 | -- | -- | 3 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | 2 | -- | 3 | <2 | 2 | -- | 4 | 5 | <2 | <2 | -- | -- | <2 | -- | -- | 2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 14 | 9 | 19 | 12 | 6 | **69** | 16 | 15 | 13 | <5 | 24.0 | 7.0 | 6 | 6 | **16** | *11* | 7 | 7 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | >2420 | >2420 | >2420 | 6 | 410 | 81.0 | 930.0 | NDOGT | 1,152.0 | >2420 | >2420 | 816 | >200 | >200 | >200 | >200 | 10,500 | 4,700 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | <1 | 8 | 41 | 1 | 26 | 3 | <10 | 30 | 18 | 365 | 172 | <1 | 14 | 31 | <1 | 33 | 49 | 22 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.32 | 2.89 | 206 | 0.81 | 1.1 | 0.77 | 4.99 | 8.2 | 1.2 | <0.3 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.40 | 2.11 | 28.94 | 2.56 | 2.58 | 0.53 | 3.06 | 23.70 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.74 | 3.20 | 37.67 | 4.28 | -- | * | 3.04 | 20.50 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperat

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - LSD**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Lake Shore Drive | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LSD | | | | | | | | LSD | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/17/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/15/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | | 12:00 | 09:30 | 11:45 | 09:00 | 11:28 | 10:00 | 08:45 | 13:20 | 9:00 | 9:15 | 13:00 | 9:10 | 08:40 | 15:30 | 11:55 | 9:30 | 13:30 | 09:50 | 16:02 | 13:40 | 15:00 | 12:10 | 12:25 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 13.1 | 16.7 | 15.3 | 13.4 | 21.3 | 7.3 | 10.2 | 21.0 | 12.0 | 5.7 | 25.7 | 13.4 | 7.7 | 20.2 | 8.8 | 8.9 | 10.5 | 12.5 | 24.3 | 5.8 | 13.2 | 24.0 | 9.4 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.84** | 5.70 | 5.50 | 8.60 | **5.41** | 8.47 | 9.44 | 7.87 | 8.16 | **4.06** | **2.69** | 7.58 | 8.77 | 7.26 | 7.60 | **14.78** | 7.22 | 6.26 | 7.25 | 7.21 | 8.22 | **1.86** | 8.67 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.88 | 6.74 | **6.34** | **6.42** | 6.64 | **6.17** | 7.09 | 6.88 | 6.63 | 8.22 | 7.16 | 6.92 | **5.19** | 7.28 | **6.23** | 7.02 | **6.31** | 6.88 | **6.34** | **6.48** | 6.63 | **6.16** | **6.25** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 723.0 | 210.0 | 167.7 | 217.8 | 203.2 | 110.3 | 145.9 | 126.4 | 111.9 | 62.0 | 177.5 | 116.7 | 123.6 | 132.5 | 147.8 | 180.0 | 111.0 | 0.1 | 155.3 | 132.3 | 162.0 | 254.0 | 162.2 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 13 | 16 | 12 | 13 | 21 | 9 | 9 | 15 | 12 | 21 | 14 | 11 | 8 | 20 | 11 | 35 | 10 | 11 | 7 | 9 | 11 | 22 | 8 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 41 | 34 | 31 | 49 | 45 | 25 | 38 | 27 | 22 | 22 | 33 | 23 | 39 | 32 | 23 | 29 | 23 | 32 | 27 | 26 | 39 | 45 | 31 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 32 | 27 | 37 | 20 | 26 | 33 | 32 | 41 | 49 | 13 | 20 | 40 | 10 | 21 | 25 | 9 | 31 | 20 | 11 | 26 | 25 | 26 | 24 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.14 | 0.14 | 0.06 | 0.23 | 0.10 | 0.12 | 0.25 | 0.17 | 0.09 | 0.13 | 0.80 | <0.05 | 0.18 | 0.20 | <0.05 | 0.09 | 0.11 | 0.15 | 0.25 | 0.30 | 0.08 | 0.08 | <0.05 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.14 | -- | -- | 0.23 | 0.10 | -- | 0.25 | -- | -- | 0.13 | 0.80 | <0.05 | 0.18 | 0.20 | <0.05 | 0.09 | 0.11 | 0.15 | 0.16 | 0.30 | 0.08 | 0.08 | <0.05 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | **0.09** | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.06 | 0.03 | <0.03 | <0.03 | <0.03 | 0.03 | 0.03 | 0.04 | <0.03 | <0.050 | 0.11 | <0.03 | 0.06 | 0.10 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.5 | 3.5 | 0.5 | -- | 0.7 | 3.0 | 1.0 | <0.4 | 0.3 | 77.4 | 2.8 | 2.2 | 11.8 | 0.5 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.0 | 3.8 | 6.8 | 3.7 | 6.0 | 5.3 | 4.7 | 7.1 | 7.5 | 3.1 | 8.0 | 7.7 | 4.7 | 6.3 | 6.9 | 5.2 | 8.1 | 3.2 | 14.1 | 9.9 | 5.5 | 14.0 | 8.9 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.69 | 6.69 | 6.93 | 7.10 | 7.30 | 6.67 | 6.72 | 6.79 | **6.49** | **6.20** | 6.90 | 6.90 | 6.94 | 6.95 | **6.49** | **6.47** | 6.72 | 7.02 | 6.59 | 6.68 | 6.65 | 7.01 | **6.38** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 6.5 | 6.9 | 5.4 | 8.0 | 10.5 | 5.3 | 5.9 | 5.1 | 5.0 | 2.6 | 18.1 | 5.1 | 6.4 | 6.0 | 5.6 | 5.4 | 5.1 | 6,100.0 | 52.2 | 5.4 | 6.6 | 9.9 | 4.8 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.4 | 1.6 | 1.3 | 2.0 | 2.1 | 1.2 | 1.3 | 1.2 | 1.2 | 0.7 | 3.3 | 1.4 | 1.2 | 1.4 | 1.6 | 1.5 | 1.1 | 1,300.0 | 23.0 | 1.5 | 1.4 | 1.8 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | <0.02 | **0.030** | 0.009 | **0.018** | **0.100** | 0.009 | **0.018** | **0.028** | **0.014** | **0.022** | **0.063** | 0.003 | 0.007 | **0.015** | **0.078** | **0.100** | **0.031** | **0.011** | **0.501** | **0.095** | **1.250** | **0.023** | **0.012** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.2 | 1.1 | 1.3 | 1.2 | 1.2 | 1.0 | 1.1 | 1.0 | 1.2 | 0.6 | 1.9 | 1.3 | 1.2 | 1.1 | 1.4 | 1.1 | 1.1 | 1,100.0 | 9.7 | 1.0 | 1.2 | 1.3 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 24.0 | 21.0 | 18.0 | 24.8 | 26.9 | 15.2 | 23.2 | 14.3 | 13.8 | 11.3 | 18.6 | 15.2 | 21.9 | 26.6 | 14.6 | 23.4 | 18.1 | 19.0 | 24.4 | 13.4 | 25.1 | 23.4 | 19.7 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 3.1 | 4.2 | 4.0 | 3.2 | 3.4 | 4.3 | 2.6 | 3.9 | 3.8 | 3.1 | 2.9 | 4.9 | 2.6 | 3.9 | 5.0 | 2.9 | 4.2 | 2.4 | 4.2 | 4.4 | 1.6 | 3.3 | 3.5 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 16 | 98 | 5 | 6 | 110 | 7 | 4 | 77 | 5 | <5 | 16 | 19 | <5 | 17 | 9 | 51 | 8 | 5 | **719** | 69 | 93 | **9,020** | 15 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 6 | 4 | 5 | 7 | 3 | 4 | 6 | 4 | 4 | 5 | 5 | 5 | 6 | 7 | 5 | 5 | 4 | 5 | <2 | 3 | 5 | 6 | 7 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.6 | 12.0 | 2.5 | 12.0 | 6.2 | 1.0 | 0.6 | 2.5 | 1.7 | 6.7 | **283.0** | 2.1 | 1.1 | 31.6 | **82.6** | 6.6 | 1.4 | 1.2 | **4,430.0** | 5.4 | **65.3** | **206.0** | 7.9 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 170 | 150 | 140 | 200 | 200 | 110 | 150 | 130 | 110 | 96 | 161 | 110 | 168 | 136 | 105 | 122 | 125 | 140 | 129 | 136 | 160 | 236 | 133 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.56 | 0.82 | 1.22 | 1.80 | 1.77 | 0.97 | 1.39 | 1.14 | 0.96 | 1.15 | 1.37 | 0.97 | 1.40 | 1.46 | 0.97 | 1.63 | 0.94 | 1.22 | 0.92 | 1.00 | 1.43 | 1.84 | 1.18 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 13 | 8 | 12 | 13 | 21 | 9 | 9 | 15 | 12 | 21 | 14 | 11 | 8 | 20 | 11 | 35 | 10 | 11 | 7 | 9 | 11 | 22 | 8 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 92 | 55 | 74 | 104 | 107 | 62 | 84 | 66 | 60 | 56 | 163 | 58 | 82 | 87 | 66 | 88 | 59 | 74 | 498 | 65 | 91 | 107 | 70 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.53 | 0.99 | 1.20 | 1.69 | 1.94 | 1.05 | 1.44 | 1.02 | 1.00 | 0.76 | 3.59 | 1.10 | 1.43 | 1.62 | 1.62 | 1.52 | 1.19 | 1.28 | 31.00 | 1.42 | 1.94 | 2.04 | 1.27 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 22.00 | 15.00 | 19.00 | 28.00 | 35.00 | 18.00 | 20.00 | 18.00 | 18.00 | 9.40 | 58.80 | 18.50 | 20.90 | 20.70 | 20.60 | 19.70 | 17.30 | 21.00 | 225.00 | 19.70 | 22.20 | 32.10 | 17.30 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 0.97 | 9.39 | 0.83 | 3.15 | 4.58 | 3.96 | 1.77 | 5.56 | 2.04 | 20.70 | 63.00 | 6.10 | 1.00 | 5.20 | 25.00 | 3.40 | 11.80 | 2.40 | 94.20 | 17.50 | 15.20 | 5.30 | 3.80 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.74 | -3.20 | -2.60 | -2.22 | -1.71 | -2.99 | -2.88 | -2.64 | -3.05 | -3.62 | -2.30 | -2.91 | -2.93 | -2.55 | -3.29 | -2.84 | -3.14 | -2.50 | -2.50 | -3.20 | -2.97 | -2.24 | -3.61 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -2.99 | -3.45 | -2.85 | -2.47 | -1.96 | -3.24 | -3.13 | -2.89 | -3.31 | -3.94 | -2.62 | -3.23 | -3.25 | -2.87 | -3.61 | -3.16 | -3.46 | -2.75 | -2.82 | -3.52 | -3.29 | -2.56 | -3.93 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.43 | 9.78 | 9.53 | 9.32 | 9.01 | 9.66 | 9.60 | 9.43 | 9.54 | 9.82 | 9.20 | 9.81 | 9.87 | 9.50 | 9.78 | 9.31 | 9.86 | 9.51 | 9.09 | 9.88 | 9.72 | 9.25 | 9.99 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.68 | 10.00 | 9.78 | 9.57 | 9.26 | 9.91 | 9.85 | 9.68 | 9.80 | 10.10 | 9.52 | 10.10 | 10.20 | 9.82 | 10.10 | 9.63 | 10.20 | 9.77 | 9.41 | 10.20 | 10.00 | 9.57 | 10.30 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **259** | -- | -- | **349** | **189** | -- | **217** | -- | -- | **490** | **19,200** | **186** | **131** | **93** | **3,420** | **487** | **141** | **120** | -- | **1,960** | **2,150** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | **8** | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 13 | -- | -- | 15 | 19 | -- | 14 | -- | -- | 11 | 86 | 12 | 12 | 7 | 24 | 15 | 11 | 12 | -- | 27 | 34 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | < 1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | 2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 9 | -- | -- | 41 | 22 | -- | <50 | -- | -- | 6 | 24 | 16 | 10 | 15 | 15 | 14 | 16 | <50 | -- | <5 | 12 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.019** | -- | -- | **0.018** | <0.017 | -- | <0.017 | -- | -- | **0.029** | **1.050** | **0.023** | <0.017 | <0.017 | **0.073** | **0.032** | <0.017 | **0.011** | -- | <0.017 | **0.120** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | **11** | <1 | <1 | <1 | **2** | <1 | <1 | <1.0 | -- | **3** | **2** | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | <0.40 | 1 | -- | <0.40 | -- | -- | <1 | 34 | <1 | <1 | <1 | 1 | <1 | <1 | <0.40 | -- | 4 | 4 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | 2 | -- | -- | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2 | **22** | 2 | <2 | 1 | **12** | 2 | **3** | <2.0 | **183** | **6** | **3** | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **523** | -- | -- | **554** | **965** | 120 | 211 | **388** | **384** | 161 | **38,900** | **312** | 236 | 254 | **4,200** | **593** | **363** | 230 | **176,000** | **4,570** | **2,790** | **2,190** | **303** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **3.0** | 0.5 | -- | <0.5 | -- | -- | 0.6 | **82.4** | <0.5 | <0.5 | <0.5 | **5.2** | 0.5 | <0.5 | <0.5 | -- | **5.9** | **4.3** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 53 | -- | -- | 113 | 632 | 23 | 30 | 53 | 39 | 26 | **13,200** | 67 | 71 | 81 | 124 | 140 | 60 | 130 | **13,800** | **985** | **921** | **2,420** | 75 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | 13 | <2 | <2 | <2 | 2 | <2 | <2 | <2.0 | -- | 5 | 2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | **2** | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 0.100 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 12 | -- | -- | 36 | 42 | -- | 24 | -- | -- | 12 | 82 | 22 | 24 | 24 | 25 | 26 | 19 | 25 | -- | 16 | 29 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 2 | -- | -- | 7 | 4 | -- | 5 | -- | -- | 3 | 405 | 4 | <2 | 2 | 36 | 6 | 3 | 3 | -- | 41 | 30 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | 1.6 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | -- | 0.2 | 0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | **30** | <2 | <2 | <2 | 2 | <2 | <2 | <2 | -- | 6 | 4 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | <5 | -- | -- | 7 | 7 | <5.0 | <5.0 | <5.0 | 5 | <5 | **110** | 7 | 6 | <5 | 15 | <5 | <5 | <5.0 | **799** | 11 | 17 | 14 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 53 | >250 | -- | >250 | >250 | 280 | 85 | >250 | -- | 1,414 | >2420 | >2420 | 1,990 | >2420 | >2420 | 1,203 | 8 | --- | >2420 | >2420 | >2420 | >2420 | >2420 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 22 | 24 | -- | 4 | 45 | 6 | 10 | **>250** | <100 | 2 | 26 | 10 | 10 | 20 | 2 | <1 | **>2420** | <10 | 16 | 17 | 9 | 30 | 16 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.46 | 10.70 | 4.68 | 1.21 | 6.64 | 0.21 | 1.19 | 1.93 | 1.41 | 1.88 | 6.62 | 0.13 | <0.50 | 1.60 | 2.02 | 1.91 | 0.32 | 1.02 | 90.33 | 5.12 | 8.22 | 127.14 | 0.38 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.85 | 11.10 | 5.62 | 1.32 | 7.71 | 0.19 | 1.07 | 1.73 | 1.18 | 2.28 | 7.58 | 0.22 | <0.50 | 2.00 | 2.98 | 1.91 | 0.33 | 1.07 | 121.83 | 4.62 | 13.77 | 185.98 | 0.48 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - LSD**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Lake Shore Drive | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LSD | | | | | | | | LSD | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | hh:mm | | | | | | | 10:20 | 11:55 | 11:05 | 11:30 | 10:30 | 10:50 AM | 11:26 AM | 10:44 AM | 1:45 PM | 12:15 PM | 1:08 PM | 11:22 AM | 10:52 PM | 11:07 AM | 10:38 AM | 11:20 AM | 1:00 PM | 11:07 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NA | NA** | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 15.6 | 23.0 | 9.7 | 14.4 | 22.4 | 9.3 | 10.2 | 25.0 | 8.3 | 26.5 | 18.3 | 6.8 | 13.9 | 18.6 | 10.5 | 15.7 | 19.2 | 11.7 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **11.35** | 6.95 | **5.34** | 9.08 | 6.85 | 7.24 | ** | **4.93** | 7.90 | **2.66** | **3.24** | **11.40** | 12.45 | 6.46 | 12.45 | 8.69 | **4.09** | 9.27 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.78 | 6.57 | **5.91** | **5.82** | **6.41** | **5.90** | 7.01 | 6.51 | **6.40** | **6.31** | **6.05** | **6.41** | 6.75 | 6.55 | **5.95** | 7.58 | 7.52 | 8.94 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 150.0 | 188.0 | 92.0 | 75.0 | 182.9 | 108.1 | 99.7 | 368.0 | 171.0 | 195.0 | 158.0 | 145.8 | 120.0 | 137.0 | 129.0 | 246.9 | 141.0 | 171.4 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 12 | 26 | 20 | 9 | 27 | 9 | 12 | 33 | <5 | 30.0 | 21.0 | 13.0 | 15 | 13 | 17 | 16 | 14 | 10 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 43 | 38 | 36 | 23 | 32 | 20 | 30 | 29 | 20 | 35 | 35 | 32 | 27 | 26 | 33 | 60 | 42 | 37 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 | -- | <0.12 | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 25 | 31 | 21 | 36 | 40 | 65 | 39 | 86 | 38 | 56 | 60 | 30 | 17.0 | 50.8 | 31.1 | 25.1 | 16.7 | 31.5 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.19 | 0.48 | 0.22 | 0.32 | <0.05 | 0.10 | 0.08 | 0.07 | 0.07 | <0.05 | <0.05 | 0.05 | 0.10 | <0.05 | <0.05 | 0.08 | 0.31 | <0.05 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.10 | 0.39 | 0.22 | 0.32 | <0.05 | 0.10 | 0.08 | 0.07 | 0.07 | <0.05 | <0.05 | 0.05 | 0.10 | <0.05 | <0.05 | 0.08 | 0.31 | <0.05 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.09** | **0.09** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.08 | 0.04 | <0.03 | 0.06 | <0.03 | <0.03 | 0.53 | 0.06 | 0.60 | 0.68 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.13 | 0.14 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | 1.0 | 34.5 | 10.0 | <0.4 | 1.7 | <0.4 | <0.4 | 1.6 | 1.6 | 0.70 | 4.10 | 0.60 | 0.64 | 0.3 | <0.10 | 0.23 | 0.61 | 0.3 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 7.7 | 8.1 | 6.9 | 5.8 | 5.8 | 8.0 | 5.9 | 12.1 | 6.2 | 7.50 | 8.70 | 6.90 | 7.3 | 6.4 | 3.7 | 5.4 | 6.1 | 7.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | 0.13 | <0.01 | 0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.92 | 7.08 | 7.01 | 6.91 | 7.20 | 6.99 | 6.93 | 7.11 | 6.55 | 7.19 | 7.04 | 6.75 | 6.88 | 6.54 | 7.15 | 7.35 | 6.7 | ***6.34*** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 7.1 | 8.0 | 6.7 | 4.4 | 10.2 | 3.5 | 6.0 | 9.6 | 2.7 | 8.4 | 4.5 | 6.3 | 7.5 | 6.3 | 8.4 | 8.9 | 8.1 | 6.4 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.6 | 1.7 | 1.6 | 1.1 | 2.3 | 0.9 | 1.5 | 2.6 | 0.7 | 1.8 | 1,190.0 | 1.5 | 1.6 | 1.4 | 1.7 | 2 | 1.9 | 1.6 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.102** | **0.059** | **0.015** | **0.052** | **0.305** | **0.018** | 0.008 | **0.031** | 0.008 | **0.028** | **0.084** | 0.010 | **0.044** | **0.043** | **0.034** | **0.020** | **0.064** | **0.030** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.3 | 1.4 | 1.2 | 0.9 | 1.6 | 0.8 | 1.3 | 1.7 | 0.6 | 1.2 | 0.9 | 1.2 | 1.1 | 1.0 | 1.4 | 1.6 | 1.4 | 1.5 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 25.2 | 26.0 | 23.0 | 16.5 | 21.7 | 15.4 | 24.4 | 20.7 | 9.8 | 21.4 | 25.1 | 21.9 | 17.9 | 19.9 | 20.2 | 34 | 24 | 22 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 1.1 | 2.7 | 4.0 | 2.4 | 2.4 | 3.3 | 1.7 | 4.2 | 3.5 | 3.9 | 2.0 | 3.9 | 3.0 | 4.9 | 3.4 | 3.9 | 4.3 | 3.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 138 | 41 | <5 | <5 | **444** | 6 | 8 | 150 | <5 | 56.0 | 132.0 | <5 | 19 | 32 | <5 | <5 | 6 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 4 | 3 | 4 | 5 | <2 | 5 | 4 | <2 | 5 | 3.0 | 3.0 | 5.0 | 4 | 4 | 4 | 7 | 5 | 7 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | **53.8** | 21.3 | 15.1 | 2.0 | **72.2** | 2.5 | 5.0 | 44.4 | 1.2 | 6.4 | 18.2 | 0.7 | 8.2 | 0.9 | 1.2 | 1.4 | 4.6 | 2.9 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 178 | 192 | 171 | 122 | 192 | 123 | 151 | 170 | 63 | 197 | 193 | 150 | 139 | 146 | 163 | 243 | 197 | 170 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.55 | 1.69 | 1.51 | 0.96 | 1.44 | 0.9 | 1.2 | 1.5 | 0.7 | 1.65 | 1.47 | 1.27 | 1.15 | 1.08 | 1.35 | 2.16 | 1.59 | 1.39 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 12 | 26 | 20 | 9 | 27 | 9.0 | 12.0 | 33.0 | < | 30 | 21 | 13 | 15 | 13 | 17 | 16 | 14 | 10 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 92 | 97 | 87 | 58 | 95 | 52.0 | 76.0 | 96.0 | 39.0 | 96 | 90 | 77 | 70 | 67 | 80 | 124 | 94 | 82 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.75 | 1.74 | 1.59 | 1.08 | 2.27 | 1.0 | 1.6 | 2.1 | 0.7 | 1.83 | 1.76 | 1.45 | 1.40 | 1.35 | 1.51 | 2.15 | 1.71 | 1.49 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 24.30 | 27.00 | 23.30 | 15.5 | 34.9 | 12.4 | 21.2 | 34.7 | 9.6 | 28.4 | 17.0 | 21.9 | 25.3 | 21.5 | 28.0 | 30.5 | 28.0 | 22.6 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 6.10 | 1.40 | 2.30 | 6.0 | 22.2 | 6.6 | 14.2 | 17.9 | 1.0 | 5.1 | 9.0 | 6.6 | 9.6 | 11.3 | 5.4 | 0.3 | 3.6 | 3.5 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.73 | -2.19 | -2.44 | -3.06 | -1.94 | -3.1 | -2.8 | -2.0 | -3.9 | -1.99 | -2.57 | -2.91 | -2.64 | -3.12 | -2.27 | -2.09 | -2.83 | -3.43 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.05 | -2.51 | -2.76 | -3.38 | -2.26 | -3.4 | -3.1 | -2.3 | -4.2 | -2.31 | -2.89 | -3.23 | -2.96 | -3.44 | -2.59 | -2.41 | -3.15 | -3.75 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.65 | 9.27 | 9.45 | 9.97 | 9.14 | 10.1 | 9.7 | 9.1 | 10.4 | 9.18 | 9.61 | 9.66 | 9.52 | 9.66 | 9.42 | 9.44 | 9.53 | 9.77 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.97 | 9.59 | 9.77 | 10.3 | 9.46 | 10.4 | 10.0 | 9.4 | 10.7 | 9.5 | 9.9 | 10.0 | 9.84 | 9.98 | 9.74 | 9.76 | 9.85 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **731** | **48** | **401** | **142** | **2,590** | -- | **124** | **665** | **154** | **248** | -- | -- | **199** | -- | -- | 92 | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | 3 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 32 | -- | 11 | 8 | 53 | -- | 13 | 53 | 7 | 42.0 | -- | -- | 18 | -- | -- | 17 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | 20 | 10 | 20 | -- | 9 | 21 | 9 | 18.0 | -- | -- | 14 | -- | -- | 20 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.031** | -- | <0.017 | <0.09 | **0.130** | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | -- | 1 | <1 | **2** | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | 1 | -- | <1 | <1 | 6 | -- | <1 | 6 | <1 | 2.0 | -- | -- | 1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | 1 | <1 | **4** | 1 | <1 | 2 | 1 | <1 | 1.0 | 1.0 | 1 | 2 | <1 | 1 | <1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **1,080** | **375** | **874** | 239 | **5,460** | 164 | **560** | **5,530** | 118 | **3,510** | **4,550** | **378** | **1,020** | **356** | **440** | 239 | ***761*** | 245 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | 0.6 | -- | 0.7 | 0.7 | **4.3** | -- | <0.5 | **3.2** | <0.5 | 0.8 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 436 | 212 | 250 | 55 | **2,630** | 58 | 368 | **5,050** | 8 | **2,840** | **1,190** | 102 | 678 | 74 | 308 | 112 | 529 | 27 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | <2 | <2 | 4 | -- | <2 | <2 | 9 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | **0.200** | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <2 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 28 | -- | 31 | 17 | 54 | -- | 27 | 56 | 15 | 32.0 | -- | -- | 30 | -- | -- | 36 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 14 | -- | 7 | 3 | 36 | -- | <2 | 6 | <2 | 5.0 | -- | -- | 4 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | <0.1 | <0.1 | 0.2 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | <2 | <2 | 4 | -- | <2 | 2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 8 | <5 | 7 | <5 | 23 | <5 | <5 | 10 | <5 | <5 | <5 | <5 | 8 | 8 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 534 | >2420 | 641 | 46 | 3020 | 2,380.0 | 1120 | NDOGT | 932 | >2420 | >2420 | 1,200 | >200 | >200 | >200 | >200 | 23,000 | 7,900 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 1 | **479** | 1 | 23 | 20 | 20 | 7 | 50 | 12 | 12 | 172 | 2 | **>200** | 27 | 18 | 109 | >200 | 53 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.25 | 4.42 | 12.5 | 0.32 | 5.06 | 2.3 | 0.79 | 4.2 | 3 | 0.5 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 18.67 | 20.15 | 1.85 | 0.93 | 141.49 | 0.60 | 2.47 | 14.60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 25.84 | 24.37 | 2.89 | 1.60 | -- | * | 2.51 | 15.40 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperat

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - LU**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Larry Uteck Blvd | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LU | | | | | | | | LU | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 10/17/2011 | 5/1/2012 | 8/15/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/15/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 | 6/8/2017 | 8/15/2017 | 10/18/2017 |
| Sampling Time | hh:mm | | | | | | | 10:30 | 15:20 | 11:30 | 10:10 | 14:30 | 14:30 | 13:00 | 11:45 | 10:45 | 9:54 | 13:45 | 10:23 | 10:05 | 12:20 | 11:20 | 11:45 | 11:25 | 10:15 AM | 12:00 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 11.3 | 12.8 | 27.3 | 14.6 | 13.9 | 18.3 | 10.9 | 15.0 | 22.8 | 10.2 | 16.1 | 23.4 | 8.2 | 13.3 | 21.9 | 11.6 | 18.2 | 22.4 | 13.3 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **4.24** | 6.17 | 8.20 | 9.04 | **10.15** | 8.29 | **4.50** | **11.96** | 8.08 | 7.55 | 7.28 | 9.49 | 8.50 | 8.75 | **16.62** | **9.68** | **9.56** | 8.34 | 7.43 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.07** | 7.82 | 6.65 | 6.78 | **6.39** | 7.49 | **5.45** | 6.50 | 7.23 | **6.17** | 6.57 | 6.80 | 6.99 | 7.17 | **6.24** | **6.23** | 6.80 | 7.11 | 6.90 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 203.0 | 955.0 | 480.0 | 262.0 | 670.0 | 320.0 | 845.0 | 999.0 | 611.0 | 371.0 | 0.6 | 569.0 | 436.2 | 588.0 | 574.0 | 483.4 | 755.0 | 660.0 | 590.0 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 34 | **224** | 116 | 52 | **190** | 99 | **258** | **243** | 104 | 70 | **210** | **132** | 93 | **154** | **164** | 92 | **247** | **154** | **143** |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 94 | 18 | 14 | 18 | 7 | 7 | 19 | 6 | 8 | 18 | 8 | 8 | 6 | 17 | 13 | 26 | 12 | 12 | 8 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.61 | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.47 | 2.61 | 1.35 | 0.87 | 1.72 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | -- | 1.00 | 0.64 | 1.89 | 1.11 | 2.57 | 0.34 | 1.22 | 0.47 | 1.97 | 0.53 | 0.59 | 1.63 | 1.01 | 0.41 | 2.61 | 1.01 | 0.51 | 1.72 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | **0.34** | **0.36** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | 0.06 | 0.04 | 0.16 | <0.03 | <0.03 | 0.04 | 0.04 | 0.05 | <0.03 | <0.03 | <0.050 | 0.05 | <0.03 | 0.05 | 0.05 | <0.03 | <0.03 | 0.09 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | 0.4 | 4.2 | 0.7 | -- | 0.5 | <0.4 | 1.2 | 1.7 | <0.4 | 0.3 | 8.0 | 0.7 | 1.2 | 1.1 | 0.6 | 0.7 | 3.8 | 0.6 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 11.0 | 3.7 | 22.8 | 4.8 | 3.1 | 4.5 | 2.9 | 6.9 | 4.7 | 4.7 | 2.2 | 7.6 | 6.5 | 3.9 | 5.3 | 7.6 | 6.1 | 6.8 | 5.4 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.03 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.43** | 6.70 | 7.20 | 7.20 | 6.92 | 7.11 | **6.49** | **6.42** | 7.42 | **6.41** | 6.95 | 7.30 | 7.15 | 6.94 | 7.42 | 6.96 | 7.26 | 7.40 | 7.13 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 7.6 | 30.7 | 22.1 | 14.5 | 22.0 | 17.6 | 21.8 | 23.9 | 27.6 | 12.6 | 27,000.0 | 20.3 | 15.9 | 20.6 | 17.2 | 17.9 | 25.7 | 23.8 | 22.8 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.3 | 4.2 | 3.6 | 2.2 | 2.8 | 2.7 | 4.0 | 4.2 | 3.8 | 2.2 | 3,800.0 | 3.4 | 1.9 | 2.9 | 3.4 | 2.6 | 3.8 | 3.0 | 2.5 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.034** | **0.043** | **0.036** | **0.030** | 0.006 | **0.027** | **0.046** | **0.260** | **0.028** | **0.039** | 0.007 | 0.009 | **0.011** | **0.029** | **0.011** | **0.012** | **0.024** | **0.027** | 0.008 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.1 | 3.2 | 3.6 | 2.5 | 2.6 | 2.8 | 2.9 | 3.1 | 3.7 | 3.0 | 3,300.0 | 2.8 | 1.6 | 2.8 | 2.6 | 2.7 | 3.2 | 3.0 | 2.6 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 22.7 | 124.0 | 62.2 | 32.3 | 95.1 | 51.7 | 170.0 | 147.0 | 88.1 | 62.7 | 110.0 | 102.0 | 57.8 | 96.4 | 81.1 | 65.6 | 137.0 | 113.0 | 86.9 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 6.9 | 4.9 | 0.7 | 6.3 | 5.1 | 8.6 | 7.0 | 2.1 | 2.5 | 6.9 | 3.6 | 4.9 | 6.9 | 4.2 | 1.3 | 6.7 | 4.6 | 3.6 | 5.9 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 13 | 5 | 165 | <5 | <5 | <5 | <5 | **626** | <5 | <5 | <1.0 | <5 | 6 | 29 | <5 | <5 | 22 | 16 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 21 | 26 | 25 | 23 | 26 | 29 | 33 | 29 | 20 | 27 | 27 | 31 | 30 | 28 | 23 | 41 | 32 | 18 | 33 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 3.3 | 4.1 | 23.0 | 2.3 | 1.8 | 1.6 | 0.7 | 42.7 | 10.1 | 1.6 | 0.3 | 2.8 | 2.4 | 15.8 | 3.0 | 3.3 | 7.3 | 6.6 | 3.0 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 190 | 813 | 482 | 255 | 732 | 433 | 840 | 819 | 605 | 394 | 790 | 575 | 462 | 582 | 739 | 371 | 849 | 673 | 610 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.69 | 7.21 | 4.12 | 2.36 | 6.10 | 4.02 | 8.13 | 8.15 | 3.80 | 2.68 | 6.77 | 4.73 | 3.62 | 5.26 | 5.68 | 3.91 | 7.99 | 5.32 | 5.24 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 12 | 14 | 14 | 14 | 6 | 22 | 7 | 30 | 21 | <5 | 13 | 16 | 13 | 13 | 27 | 14 | 13 | 27 | 20 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 109 | 426 | 246 | 144 | 347 | 229 | 496 | 477 | 262 | 187 | 400 | 305 | 216 | 321 | 310 | 242 | 463 | 341 | 311 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.70 | 7.40 | 4.30 | 2.43 | 5.55 | 3.51 | 8.90 | 8.24 | 5.64 | 3.64 | 6.69 | 5.86 | 3.52 | 5.78 | 4.76 | 4.06 | 7.65 | 6.74 | 5.21 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 29.00 | 94.00 | 70.00 | 45.30 | 66.50 | 55.10 | 70.90 | 77.00 | 84.60 | 40.50 | 84.00 | 64.70 | 47.50 | 63.40 | 56.90 | 55.40 | 79.80 | 71.80 | 67.20 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 0.29 | 1.30 | 2.20 | 1.40 | 4.70 | 6.80 | 4.50 | 0.60 | 19.40 | 15.20 | 0.59 | 10.60 | 1.40 | 4.70 | 8.80 | 1.80 | 2.20 | 11.80 | 0.30 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.95 | -2.32 | -1.94 | -2.10 | -2.60 | -1.93 | -2.98 | -2.38 | -1.45 | -3.41 | -1.95 | -1.82 | -2.16 | -2.27 | -1.55 | -2.27 | -1.87 | -1.43 | -1.85 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.20 | -2.64 | -2.26 | -2.42 | -2.92 | -2.25 | -3.30 | -2.70 | -1.77 | -3.73 | -2.20 | -2.14 | -2.48 | -2.59 | -1.87 | -2.59 | -2.19 | -1.75 | -2.17 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.38 | 9.02 | 9.14 | 9.30 | 9.52 | 9.04 | 9.47 | 8.80 | 8.87 | 9.82 | 8.90 | 9.12 | 9.31 | 9.21 | 8.97 | 9.23 | 9.13 | 8.83 | 8.98 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.63 | 9.34 | 9.46 | 9.62 | 9.84 | 9.36 | 9.79 | 9.12 | 9.19 | 10.10 | 9.15 | 9.44 | 9.63 | 9.53 | 9.29 | 9.55 | 9.45 | 9.15 | 9.30 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | -- | **218** | **227** | **252** | **107** | **447** | **31** | **1,400** | **46** | **109** | **59** | -- | **66** | **1,420** | -- | -- | **61** | **978** | **29** |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | -- | 225 | 201 | 116 | 133 | 134 | 119 | 185 | 157 | 80 | 150 | -- | 111 | 127 | -- | -- | 132 | -- | 111 |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | -- | 11 | 17 | 22 | 10 | 22 | 18 | 22 | 20 | 21 | <50 | -- | 9 | 14 | -- | -- | <5 | -- | 19 |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | -- | **0.538** | **0.171** | **0.168** | **0.300** | **0.236** | **0.148** | **0.171** | **0.031** | **0.079** | **0.150** | -- | **0.176** | **0.426** | -- | -- | **0.069** | -- | **0.052** |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | -- | <1 | <1 | <1 | <1 | 1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | **3** | -- | -- | <1 | -- | 1 |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | -- | <1 | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.40 | -- | <1 | 2 | -- | -- | <1 | -- | <1 |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | **3** | <2 | **3** | **16** | 2 | **6** | 2 | 2 | <1 | **4** | **2** | **3** | **3** | **10** | <1 | **3** | <1 | **14** | **3** |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **2,150** | **347** | **1,320** | **500** | 194 | **890** | 157 | **2,000** | 207 | 229 | 170 | **671** | 171 | **1,940** | **374** | 223 | <50 | **3,540** | 289 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | -- | 0.8 | 0.7 | 1.0 | <0.5 | **1.4** | <0.5 | **1.8** | <0.5 | <0.5 | <0.5 | -- | <0.5 | **3.4** | -- | -- | <0.5 | -- | <0.5 |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 129 | 182 | 485 | 120 | 87 | 89 | 26 | 71 | 182 | 36 | 110 | 371 | 61 | 444 | 148 | 35 | 77 | **1,870** | 91 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | 3 | <2 | <2 | <2.0 | -- | <2 | 3 | -- | -- | <2 | -- | <2 |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- | <1 | -- | <1 |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | -- | <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 |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | -- | 112 | 94 | 60 | 93 | 90 | 96 | 116 | 111 | 54 | 120 | -- | 43 | 89 | -- | -- | 104 | -- | 111 |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | -- | <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 |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- | <2 | -- | <2 |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | -- | 4 | 3 | 7 | 3 | 11 | 2 | 22 | <2 | 3 | <2 | -- | <2 | 31 | -- | -- | <2 | -- | <2 |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | -- | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | 0.2 | -- | -- | <0.1 | -- | <0.1 |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | 4 | -- | -- | 3 | -- | <2 |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 9 | **79** | **92** | **39** | **57** | **49** | 26 | 17 | 8 | 23 | 27 | 17 | 16 | **64** | 7 | **52** | 21 | **120** | 22 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | -- | >2420 | >2420 | 2,420 | 866 | >2420 | 866 | >2420 | 961 | >2420 | --- | >2420 | >2420 | >2420 | >2420 | >2420 | 488 | >2420 | 1,990 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | <100 | <1 | 2 | 19 | 3 | 86 | <1 | <1 | 7 | **1,730** | <10 | 19 | 6 | <1 | 40 | 50 | 6 | 51 | 4 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.99 | 2.44 | 32.52 | 1.80 | 1.54 | 2.30 | 0.12 | 99.13 | 2.54 | 0.96 | 0.69 | 3.14 | 4.94 | 5.43 | 4.57 | 1.55 | 25.83 | 21.03 | 2.47 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 2.08 | 2.71 | 31.31 | 2.15 | 1.77 | 2.50 | 0.11 | 98.00 | 2.51 | 0.96 | 0.68 | 3.10 | 2.71 | 6.73 | 5.23 | 1.61 | 31.14 | 24.37 | 2.85 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - LU**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Larry Uteck Blvd | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - LU | | | | | | | | LU | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | hh:mm | | | | | | | 10:00 | 8:40 | 12:25 PM | 3:20PM | 11:45 AM | 12:15 PM | 11:00 AM | 11:00 AM | 12:22 PM | 10:05 AM | 10:18 AM | 10:08 AM | 10:45 AM | 9:35 AM | 10:25 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | N/A | N/A | N/A | N/A | N/A | N/A | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 14.3 | 23.1 | 12.4 | 13.8 | 25.8 | 10.8 | 24.5 | 21.6 | 10.2 | 16.4 | 18.8 | 14.0 | 18.3 | 21.0 | 13.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **11.34** | 6.76 | **9.79** | ** | 5.54 | **10.30** | **3.53** | 6.44 | 8.12 | 18.71 | 10.02 | 12.39 | 7.40 | **3.55** | 7.47 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.73 | 6.85 | 7.09 | 7.22 | 6.92 | 6.62 | **6.36** | **6.24** | **6.27** | 6.89 | **6.03** | **6.33** | 7.51 | 7.60 | 8.80 |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 434.6 | 588.0 | 384.4 | 621.0 | 710.0 | 196.0 | 945.0 | 710.0 | 511.8 | 618.0 | 507.0 | 503.0 | 770.0 | 190.0 | 419.6 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 11 | 23 | 13 | 10 | 23 | 10 | 26.0 | 21.0 | 17.0 | 15 | 17 | 24 | 12 | 24 | 16 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 96 | **124** | 74 | **174** | **202** | 75 | **297** | **221** | **147** | **189** | **132** | **153** | **243** | **167** | 97 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 | -- | <0.12 | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 28 | 21 | 24 | 18 | 14 | 16 | 17 | 16 | 11 | 6.12 | 26.2 | 12.2 | 14.7 | 24.6 | 26.4 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 1.01 | 0.41 | 1.26 | 1.27 | 0.37 | 1.77 | 0.20 | 0.24 | 1.23 | 0.69 | 1.09 | 0.71 | 0.41 | 0.24 | 0.75 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.87 | 0.16 | 1.26 | 0.80 | 0.30 | 1.24 | 0.20 | 0.24 | 1.23 | 0.60 | 1.09 | 0.71 | 0.41 | 0.24 | 0.75 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.14** | **0.25** | <0.05 | **0.47** | **0.07** | **0.53** | <0.05 | <0.05 | <0.05 | **0.09** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | 0.17 | <0.03 | <0.03 | 0.09 | 0.15 | 0.24 | 0.11 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.14 | 0.06 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | 1.1 | 0.6 | <0.4 | 0.6 | <0.4 | 0.7 | <0.4 | 1.60 | 6.40 | 0.27 | <0.10 | <0.10 | 0.34 | 0.77 | 0.33 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 9.3 | 5.5 | 5.0 | 4.3 | 5.7 | 3.9 | 4.80 | 6.60 | 3.90 | 5.7 | 3.5 | 4.4 | 4.8 | 6.3 | 5.9 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 | <0.01 | <0.01 | 0.13 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.01 | 7.46 | 7.29 | 7.17 | 7.45 | 7.01 | 7.37 | 7.28 | 7.19 | 7.36 | 6.75 | 7.38 | 7.13 | 6.73 | ***6.42*** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 12.7 | 20.8 | 14.9 | 25.2 | 30.2 | 9.6 | 33.4 | 33.7 | 16.7 | 20.2 | 19.8 | 18.0 | 20.1 | 18.7 | 11.8 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.6 | 2.7 | 2.1 | 3.5 | 4.2 | 1.5 | 4.6 | 18.0 | 2.3 | 2.7 | 2.8 | 2.4 | 2.9 | 2.8 | 1.9 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.078** | **0.019** | **0.021** | 0.010 | **0.014** | **0.013** | **0.011** | **0.013** | **0.160** | 0.007 | **0.018** | **0.011** | **0.019** | **0.062** | **0.030** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 2.2 | 2.9 | 2.3 | 3.2 | 3.4 | 1.7 | 3.4 | 3.2 | 2.5 | 2.3 | 2.7 | 2.2 | 2.8 | 2.7 | 2.2 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 73.0 | 94.7 | 69.9 | 159.0 | 129.0 | 44.0 | 183.0 | 150.0 | 86.1 | 120 | 102 | 81.2 | 119 | 91 | 60 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 3.5 | 5.4 | 4.7 | 3.7 | 3.0 | 4.4 | 3.8 | 1.8 | 5.2 | 4.0 | 6.8 | 3.2 | 3.5 | 3.4 | 2.8 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 52 | 11 | <5 | 7 | 6 | <5 | <5 | <5 | <5 | <5 | 8 | <5 | <5 | 6 | 7 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 19 | 15 | 24 | 22 | 23 | 23 | 21.0 | 23.0 | 30.0 | 25 | 27 | 29 | 22 | 17 | 21 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 21.4 | 2.4 | 4.5 | 3.6 | 3.7 | 3.8 | 3.6 | 2.4 | 1.7 | 1.6 | 2.9 | 1.4 | 2.2 | 2.8 | 3.8 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 518 | 620 | 422 | 871 | 765 | 256 | 1,030 | 928 | 558 | 717 | 620 | 568 | 758 | 605 | 420 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 3.40 | 4.3 | 2.9 | 5.7 | 6.7 | 2.9 | 9.35 | 7.15 | 5.20 | 6.20 | 4.70 | 5.45 | 7.58 | 5.56 | 3.55 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 11 | 23 | 13.0 | 10.0 | 23.0 | 10.0 | 26 | 21 | 17 | 15 | 17 | 24 | 12 | 24 | 16 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 216 | 277 | 201.0 | 399.0 | 408.0 | 169.0 | 561 | 449 | 301 | 372 | 302 | 304 | 419 | 316 | 207 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 4.04 | 5.52 | 4.1 | 8.6 | 7.6 | 2.6 | 10.20 | 8.61 | 4.86 | 6.53 | 5.77 | 4.70 | 6.51 | 5.23 | 3.45 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 38.3 | 63.1 | 45.9 | 77.3 | 92.7 | 30.1 | 102.0 | 99.0 | 51.2 | 61.6 | 61.0 | 54.8 | 62.1 | 58.2 | 37.3 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 8.7 | 12.5 | 15.9 | 20.4 | 6.5 | 5.8 | 4.2 | 9.3 | 3.4 | 2.6 | 10.2 | 7.4 | 7.6 | 3.0 | 1.5 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -2.47 | -1.49 | -2.0 | -2.1 | -1.4 | -2.6 | -1.35 | -1.52 | -1.99 | -1.80 | -2.36 | -1.62 | -2.14 | -2.26 | -2.92 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -2.79 | -1.81 | -2.4 | -2.4 | -1.7 | -2.9 | -1.67 | -1.84 | -2.31 | -2.12 | -2.68 | -1.94 | -2.46 | -2.58 | -3.24 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.48 | 8.95 | 9.3 | 9.3 | 8.8 | 9.6 | 8.72 | 8.80 | 9.18 | 9.16 | 9.11 | 9.00 | 9.27 | 8.99 | 9.34 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 9.80 | 9.27 | 9.7 | 9.6 | 9.1 | 10.0 | 9.0 | 9.1 | 9.5 | 9.48 | 9.43 | 9.32 | 9.59 | 9.31 | 9.66 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **231** | **94** | -- | **84** | **31** | **169** | **32** | -- | -- | **52** | -- | -- | *56* | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 110 | 143 | -- | 135 | 184 | 63 | 350.0 | -- | -- | 116 | -- | -- | 118 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 9 | 16 | -- | 11 | 16 | 10 | 13.0 | -- | -- | 11 | -- | -- | 9 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.140** | <0.09 | -- | **0.120** | <0.09 | <0.09 | **0.025** | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | **4** | 2 | **5** | **3** | 2 | **4** | <1 | 1 | **3** | 2 | **3** | 2 | 2 | 2 | 3 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | **494** | **1,090** | 206 | 290 | **556** | **313** | **1,210** | **429** | **432** | 289 | **650** | 231 | 235 | ***633*** | ***360*** |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | **1.3** | <0.5 | -- | <0.5 | <0.5 | 0.8 | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 91 | 240 | 40 | 51 | 66 | 33 | 291 | 18 | 63 | 77 | 103 | 59 | 58 | 147 | 56 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | 2 | -- | 10 | <2 | 3 | 3.0 | -- | -- | 3 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 56 | 115 | -- | 107 | 134 | 58 | 146.0 | -- | -- | 96 | -- | -- | 95 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 6 | 2 | -- | <2 | <2 | 4 | 2.0 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | 2 | <2 | -- | 5 | <2 | 2 | 2.0 | -- | -- | <2 | -- | -- | 2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | **41** | 13 | **38** | 27 | 8 | 23 | 6.0 | 5 | 22.0 | **31** | 26 | **13** | *13* | *10* | *18* |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 210 | 5020 | 330.0 | 540.0 | NDOGT | 984.0 | >2420 | >2420 | 921 | <1 | >200 | >200 | >200 | 18,700 | 12,300 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | <1 | 20 | 30 | <10 | 26 | 8 | 11 | 2 | <1 | <1 | 60 | 70 | 32 | 500 | 500 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.25 | 2.41 | 4.41 | 3.78 | 10.9 | 3.4 | 2.37 | 7.5 | 5.3 | 6.1 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 78.76 | 5.50 | 2.39 | 4.19 | 6.38 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 131.56 | -- | * | 4.24 | 6.19 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperat

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Paper Mill Lake | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - PML-1 | | | | | | | | PML-1 | | | | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 10/11/2012 | 5/15/2013 | 8/15/2013 | 10/16/2013 | 5/15/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | | 13:45 | 13:00 | 13:00 | 13:35 | 15:15 | 13:00 | 13:00 | 16:50 | 17:00 | 12:50 | 10:55 | 10:51 | 11:35 | 10:45 | 10:30 | 14:45 | 12:35 | 12:45 | 08:45 | 8:20 | 13:15 | 9:30 | 9:15 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 3.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | NCC | N/A | 2.9 | 2.7 | 4.2 | 3.8 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 15.7 | 17.1 | 16.2 | 13.2 | 22.7 | 9.1 | 10.3 | 22.1 | 13.6 | 8.3 | 14.9 | 11.6 | 22.5 | 12.3 | 12.1 | 23.6 | 12.4 | 15.1 | 24.0 | 9.3 | 12.8 | 21.6 | 12.1 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.56** | 8.10 | 6.90 | 8.76 | 7.83 | **10.43** | **10.39** | 8.17 | **9.54** | 8.41 | 8.60 | **9.98** | 7.65 | **9.90** | **12.08** | 7.49 | 8.06 | 7.16 | 8.04 | 8.63 | 8.84 | 6.53 | **12.96** |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 7.39 | 6.57 | 6.64 | 7.06 | 7.35 | **5.89** | **6.28** | **6.20** | **6.11** | 7.58 | 6.63 | **6.39** | 7.20 | **6.32** | 6.60 | 7.42 | 6.60 | 6.90 | **6.34** | 7.98 | 7.57 | **5.94** | **4.63** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 561.0 | 279.0 | 223.0 | 265.0 | 234.0 | 124.5 | 176.6 | 173.6 | 105.5 | 366.0 | 186.4 | 215.1 | 199.0 | 250.5 | 431.0 | 263.0 | 210.0 | 0.2 | 432.1 | 289.1 | 231.0 | 289.0 | 234.3 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 | <5 | 8 | 7 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 39 | 64 | 58 | 67 | 61 | 24 | 44 | 43 | 18 | 55 | 45 | 57 | 57 | 48 | 63 | 50 | 46 | 65 | 57 | 56 | 59 | 67 | 50 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 54 | 15 | 21 | 19 | 12 | 57 | 32 | 38 | 65 | 38 | 29 | 8 | 15 | 11 | 17 | 10 | 30 | 31 | 7 | 15 | 18 | 16 | 20 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.49 | 0.10 | 0.17 | 0.42 | 0.27 | 0.66 | 0.55 | 0.15 | 0.62 | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 | 0.19 | 0.09 | 0.16 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.49 | -- | -- | 0.42 | 0.27 | -- | 0.55 | -- | -- | 0.22 | 0.14 | 0.21 | 0.18 | 0.18 | 0.22 | 0.24 | 0.18 | 0.18 | 0.14 | 0.24 | 0.19 | <0.05 | 0.16 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.05 | <0.05 | <0.05 | **0.09** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.06 | <0.05 | 0.06 | <0.03 | <0.03 | 0.04 | <0.03 | 0.04 | <0.03 | <0.03 | <0.050 | <0.03 | 0.03 | 0.06 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | 0.4 | -- | 0.4 | 0.8 | 0.4 | 0.4 | <5 | 0.5 | 1.2 | 6.0 | 2.6 | 3.4 | 0.4 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 6.5 | 3.6 | 4.7 | 0.7 | 3.3 | 6.7 | 4.6 | 5.0 | 8.3 | 5.7 | 5.3 | 4.2 | 4.1 | 5.1 | 4.0 | 2.0 | 4.4 | 2.7 | 5.4 | 5.8 | 7.1 | 6.1 | 8.7 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | **6.36** | 6.75 | 6.79 | 6.63 | 7.04 | 6.58 | 6.54 | 6.83 | 6.67 | 6.60 | 6.80 | 6.71 | 6.92 | 6.88 | 6.66 | 7.00 | 6.64 | 6.67 | 6.95 | 6.84 | **6.36** | 6.86 | 6.87 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 4.5 | 6.9 | 6.4 | 8.4 | 9.0 | 5.9 | 6.0 | 5.0 | 4.6 | 6.0 | 6.0 | 6.8 | 6.6 | 6.9 | 6.9 | 9.1 | 7.0 | 6,900.0 | 7.8 | 4.8 | 7.9 | 10.5 | 7.6 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.6 | 1.1 | 1.0 | 1.3 | 1.2 | 0.8 | 1.0 | 0.9 | 0.8 | 1.0 | 1.1 | 1.0 | 0.9 | 1.5 | 1.3 | 1.4 | 1.0 | 970.0 | 1.4 | 0.9 | 1.5 | 1.8 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | <0.02 | <0.02 | 0.002 | **0.018** | 0.002 | <0.002 | **0.014** | **0.011** | **0.030** | **0.019** | **0.030** | 0.006 | 0.007 | **0.047** | **0.012** | **0.030** | **0.021** | 0.005 | **0.060** | **0.018** | **0.173** | **0.104** | **0.013** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.9 | 0.9 | 0.9 | 1.2 | 1.1 | 1.3 | 1.2 | 0.8 | 1.4 | 0.8 | 1.0 | 0.8 | 1.0 | 1.5 | 0.9 | 1.3 | 0.9 | 800.0 | 1.0 | 0.6 | 1.0 | 1.3 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 25.0 | 38.0 | 34.0 | 35.2 | 40.2 | 18.4 | 26.8 | 22.8 | 13.7 | 33.6 | 29.8 | 35.3 | 28.5 | 32.2 | 38.1 | 41.6 | 33.7 | 35.0 | 38.6 | 25.6 | 37.6 | 35.1 | 32.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 4.5 | 2.6 | 2.8 | 3.8 | 3.4 | 5.9 | 3.7 | 2.6 | 5.4 | 2.9 | 3.2 | 2.8 | 2.6 | 2.6 | 2.5 | 2.3 | 2.7 | 2.4 | 2.4 | 2.5 | 2.5 | 0.8 | 2.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <2 | 3 | 9 | 7 | <2 | <1 | 1 | <2 | 5 | 9 | 6 | <5 | <5 | 23 | 6 | <5 | <5 | 1 | 149 | 6 | **531** | 10 | 18 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 13 | 11 | 11 | 13 | 12 | 12 | 12 | 10 | 12 | 7 | 10 | 8 | 10 | 10 | 10 | 8 | 8 | 8 | 9 | 8 | 11 | 11 | 11 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 0.4 | 0.5 | 0.6 | 8.2 | 0.9 | 0.5 | 0.6 | 1.0 | 1.2 | 0.7 | 1.0 | 0.7 | 1.1 | 19.2 | 1.4 | 0.9 | 1.5 | 0.5 | 3.8 | 24.2 | **199.0** | **112.0** | 2.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 170 | 250 | 230 | 260 | 250 | 130 | 180 | 170 | 100 | 214 | 179 | 227 | 218 | 209 | 230 | 261 | 224 | 240 | 246 | 241 | 224 | 310 | 189 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.51 | 2.18 | 1.99 | 2.34 | 2.15 | 1.09 | 1.62 | 1.56 | 0.92 | 2.11 | 1.49 | 1.79 | 1.95 | 1.71 | 2.62 | 1.73 | 1.62 | 2.11 | 1.93 | 1.88 | 1.91 | 2.29 | 1.79 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 6 | 7 | 7 | 7 | 9 | 5 | 6 | 7 | 7 | 20 | <5 | <5 | 6 | 7 | 31 | 7 | 7 | 5 | 6 | 6 | <5 | 8 | 7 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 93 | 129 | 118 | 137 | 134 | 75 | 100 | 90 | 63 | 117 | 95 | 110 | 109 | 115 | 140 | 117 | 102 | 120 | 126 | 109 | 141 | 148 | 108 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <1.0 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 1.40 | 2.11 | 1.89 | 2.11 | 2.33 | 1.20 | 1.58 | 1.35 | 0.95 | 1.89 | 1.78 | 2.00 | 1.69 | 2.56 | 2.18 | 2.45 | 1.94 | 1.98 | 2.61 | 1.93 | 3.54 | 3.33 | 1.93 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 14.00 | 22.00 | 20.00 | 26.00 | 28.00 | 18.00 | 19.00 | 16.00 | 15.00 | 19.10 | 19.50 | 21.10 | 20.20 | 23.40 | 22.60 | 28.50 | 21.60 | 21.00 | 25.20 | 15.70 | 25.90 | 33.60 | 24.30 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 3.78 | 1.63 | 2.58 | 5.17 | 4.02 | 4.80 | 1.25 | 7.22 | 1.60 | 5.50 | 9.00 | 5.50 | 7.00 | 19.80 | 9.20 | 17.00 | 9.20 | 3.18 | 15.20 | 1.20 | 30.00 | 18.60 | 3.80 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.57 | -2.90 | -2.94 | -2.96 | -2.43 | -3.25 | -3.27 | -2.94 | -3.13 | -2.91 | -3.31 | -3.35 | -3.07 | -3.03 | -2.61 | -2.79 | -3.26 | -3.13 | -2.98 | -3.29 | -3.65 | -2.82 | -2.99 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.82 | -3.15 | -3.19 | -3.21 | -2.68 | -3.50 | -3.53 | -3.19 | -3.38 | -3.23 | -3.63 | -3.67 | -3.39 | -3.35 | -2.93 | -3.11 | -3.58 | -3.38 | -3.30 | -3.61 | -3.97 | -3.14 | -3.31 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.93 | 9.65 | 9.73 | 9.59 | 9.47 | 9.83 | 9.81 | 9.77 | 9.80 | 9.51 | 10.10 | 10.10 | 9.99 | 9.91 | 9.27 | 9.79 | 9.90 | 9.80 | 9.93 | 10.10 | 10.00 | 9.68 | 9.86 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.20 | 9.90 | 9.98 | 9.84 | 9.72 | 10.10 | 10.10 | 10.00 | 10.10 | 9.83 | 10.40 | 10.40 | 10.30 | 10.20 | 9.59 | 10.10 | 10.20 | 10.10 | 10.20 | 10.50 | 10.30 | 10.00 | 10.20 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **260** | -- | -- | **665** | **46** | -- | **233** | -- | -- | **177** | **306** | **141** | **103** | **3,920** | **305** | **129** | **142** | **140** | -- | **2,320** | **7,690** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | 2 | <2 | <2 | <2 | <1.0 | -- | <2 | 4 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 23 | -- | -- | 35 | 24 | -- | 27 | -- | -- | 22 | 19 | 20 | 12 | 40 | 23 | 23 | 18 | 21 | -- | 34 | 60 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 8 | -- | -- | 11 | 9 | -- | <50 | -- | -- | 6 | 9 | 6 | 8 | 9 | 8 | 13 | 11 | <50 | -- | <5 | 10 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.300 | -- | -- | **0.032** | <0.017 | -- | <0.017 | -- | -- | <0.017 | **0.066** | **0.021** | **0.018** | **0.430** | <0.017 | **0.020** | <0.017 | **0.025** | -- | **0.146** | **0.227** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | **3** | <1 | <1 | <1 | <1.0 | -- | **2** | **6** | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- | <1 | 2 | <1 | <1 | 9 | <1 | <1 | <1 | <0.40 | -- | 3 | 6 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2 | -- | -- | 2 | <2.0 | <2.0 | **4** | <2.0 | **2** | <2 | <2 | <2 | 1 | **6** | 1 | <1 | 2 | <2.0 | **3** | **4** | **10** | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 140 | -- | -- | **837** | 89 | 161 | 141 | **315** | **528** | 137 | **742** | 130 | 205 | **5,300** | 239 | 296 | 182 | 93 | **4,460** | **6,020** | **13,600** | **8,250** | 171 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **1.7** | <0.5 | -- | <0.5 | -- | -- | <0.5 | 0.9 | <0.5 | <0.5 | **13.5** | 0.9 | <0.5 | <0.5 | <0.5 | -- | **6.3** | **13.9** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 17 | -- | -- | 142 | 69 | 41 | 14 | 128 | 62 | 48 | 214 | 33 | 58 | 693 | 54 | 260 | 49 | 34 | 296 | 278 | 424 | 281 | 53 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | 2 | <2 | <2 | 9 | <2 | <2 | <2 | <2.0 | -- | 5 | 7 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | 1 | 1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <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 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 18 | -- | -- | 36 | 37 | -- | 25 | -- | -- | 26 | 30 | 31 | 25 | 34 | 35 | 37 | 30 | 32 | -- | 22 | 40 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | 8 | <2.0 | -- | 4 | -- | -- | <2 | 4 | <2 | <2 | 65 | 4 | <2 | 3 | <2 | -- | 25 | 106 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | 0.1 | <0.1 | <0.1 | <0.1 | 0.6 | <0.1 | <0.1 | <0.1 | <0.1 | -- | 0.6 | 0.9 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | **10** | <2 | <2 | <2 | <2 | -- | **7** | **16** | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 8 | -- | -- | 10 | 5 | 6 | 6 | 6 | 5 | <5 | 13 | 8 | <5 | **62** | <5 | <5 | 6 | 11 | 13 | 12 | **34** | 20 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 200 | 73 | -- | >250 | >250 | >250 | 85 | >250 | -- | 411 | 2,420 | 866 | 1,730 | 1,011 | 613 | 2,420 | >2420 | --- | **>2420** | >2420 | >2420 | 1,410 | >2420 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 33 | 45 | -- | 19 | **>250** | 2 | 2 | 34 | <100 | 2 | 20 | 12 | 4 | 6 | 6 | 10 | 10 | <10 | 3 | 6 | **>2420** | 34 | 10 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.62 | 2.31 | 0.57 | 0.82 | 1.12 | 0.07 | 2.85 | 0.86 | 0.15 | 1.03 | 0.69 | 1.17 | 1.10 | 5.07 | 0.67 | 0.64 | 0.91 | 0.57 | 8.84 | 4.67 | 8.00 | 4.71 | 1.70 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 0.64 | 2.21 | 0.64 | 0.74 | 1.04 | 0.06 | 2.75 | 0.76 | 0.15 | 1.10 | 0.91 | 1.37 | 1.10 | 6.39 | 0.65 | 0.65 | 0.87 | 0.54 | 9.54 | 3.69 | 12.31 | 10.82 | 1.76 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

| | |
|---|---|
| **Bold (black shaded)** | = Present Result - Parameter concentration exceeds CCME FWAL Guideline. |
| Underlined (black shaded) | = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality |
| *Italics* (black shaded) | = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations |
| **Blue shaded** | = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality |

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-1**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Paper Mill Lake | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site - PML-1 | | | | | | | | PML-1 | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/8/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | hh:mm | | | | | | | 13:40 | 13:45 | 13:25 | 13:00 | 11:40 | 14:45 PM | 1:10PM | 4:20 PM | 2:45 PM | 8:20 AM | 9:07 AM | 10:02 AM | 8:13 AM | 8:39 AM | 8:44 AM | 9:04 AM | 8:35 AM | 9:15 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 4.1 | 4.7 | 3.9 | 4.1 | 2.4 | 2.9 | 1.9 | 4.30 | N/A | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 17.2 | 23.0 | 14.4 | 14.4 | 24.7 | 12.3 | 12.0 | 28.1 | 11.1 | 23.1 | 23.5 | 10.5 | 15.8 | 21.9 | 13.7 | 17.0 | 22.5 | 14.3 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | 6.97 | 7.76 | 8.19 | 9.44 | 5.57 | 8.36 | ** | 6.07 | 9.20 | 8.35 | 6.72 | **10.80** | 16.27 | 9.16 | 20.65 | 8.67 | 6.70 | 9.57 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.91 | 6.74 | 7.31 | **6.29** | 6.75 | 7.19 | 7.38 | 6.53 | 7.05 | **5.77** | **5.62** | 6.56 | **6.10** | **5.35** | **5.60** | 7.61 | 7.53 | ***9.61*** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 234.0 | 273.0 | 255.0 | 203.7 | 203.8 | 208.1 | 177.9 | 257.0 | 201.0 | 267.0 | 271.0 | 224.5 | 199.0 | 219.0 | 266.0 | 308.0 | 75.0 | 275.3 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 13 | 9 | <5 | 10 | 8 | <5 | 11 | 6 | 8.0 | 9.0 | 5.0 | 6 | 9 | 13 | 7 | 14 | 11 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 66 | 63 | 59 | 57 | 54 | 47 | 55 | 64 | 53 | 74 | 72 | 60 | 55 | 50 | 55 | 86 | 78 | 62 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 | -- | <0.12 | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 20 | 18 | 24 | 28 | 7 | 31 | 46 | 16 | 21 | 14 | 15 | 14 | 15.0 | 8.19 | 7.50 | 19 | 7.76 | 13.5 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.28 | 0.28 | 0.20 | 0.51 | 0.15 | 0.24 | 0.18 | 0.05 | 0.49 | 0.13 | <0.05 | 0.19 | 0.20 | 0.21 | 0.25 | 0.23 | 0.11 | 0.21 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.17 | 0.13 | 0.20 | 0.40 | 0.05 | 0.24 | 0.18 | 0.05 | 0.49 | 0.13 | <0.05 | 0.19 | 0.20 | 0.21 | 0.25 | 0.23 | 0.11 | 0.21 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.11** | **0.15** | <0.05 | **0.11** | **0.10** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | <0.03 | 0.05 | <0.03 | 0.04 | <0.03 | <0.03 | 0.10 | 0.08 | 0.07 | 0.10 | <0.03 | 0.04 | <0.03 | <0.03 | <0.03 | 0.2 | 0.04 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | 0.5 | 0.8 | 1.1 | <0.4 | <0.4 | <0.4 | 0.6 | <0.4 | 0.7 | <0.4 | 1.00 | 0.60 | 0.11 | <0.10 | <0.10 | 0.18 | 0.29 | 0.16 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.7 | 4.7 | 6.3 | 4.9 | 3.2 | 4.0 | 4.2 | 4.2 | 4.4 | 3.10 | 4.10 | 4.30 | 4.6 | 2.9 | 14.8 | 3.8 | 3.5 | 4.1 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.13 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.80 | 7.15 | 6.75 | 6.84 | 7.28 | 7.16 | 6.78 | 7.22 | 6.85 | 7.01 | 7.11 | 6.85 | 6.80 | 6.50 | 7.15 | 6.98 | 7.12 | 7.18 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 8.0 | 8.2 | 9.5 | 6.3 | 8.7 | 8.4 | 7.0 | 8.3 | 5.3 | 8.8 | 8.2 | 7.4 | 8.9 | 7.8 | 9.9 | 9.2 | 9.8 | 8.5 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.3 | 1.2 | 1.5 | 1.1 | 1.4 | 1.4 | 1.2 | 1.3 | 0.9 | 1.3 | 61.0 | 1.1 | 1.2 | 1.3 | 1.3 | 1.4 | 1.6 | 1.4 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.041** | **0.036** | **0.099** | **0.032** | **0.011** | **0.012** | 0.007 | 0.008 | **0.012** | <0.006 | **0.011** | **0.020** | **0.017** | 0.01 | 0.010 | **0.015** | **0.070** | **0.030** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.0 | 1.1 | 1.3 | 0.9 | 1.2 | 1.1 | 0.9 | 1.2 | 0.8 | 0.9 | 1.1 | 1.0 | 1.0 | 0.9 | 1.1 | 1.3 | 1.4 | 1.3 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 40.9 | 45.3 | 36.0 | 35.5 | 37.5 | 39.2 | 42.6 | 45.4 | 27.8 | 41.6 | 8.2 | 36.3 | 35.4 | 32.8 | 31.6 | 49 | 49 | 38 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 1.9 | 1.3 | 1.8 | 2.7 | 1.2 | 2.3 | 2.3 | 0.9 | 2.5 | 0.9 | 0.7 | 2.3 | 2.7 | 4.3 | 2.1 | 3.2 | 2.2 | 1.8 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | 20 | 5 | 104 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 10 | 9 | 11 | 9 | 7 | 9 | 7 | 9 | 10 | 9.0 | 19.0 | 10.0 | 8 | 9 | 11 | 10 | 9 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 3.3 | 3.2 | 31.3 | 0.7 | 0.5 | 2.1 | 1.2 | 1.2 | 1.7 | 1.1 | 1.0 | 0.6 | 0.6 | 0.7 | <0.5 | 0.7 | 0.5 | 0.7 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 256 | 277 | 248 | 242 | 274 | 232 | 256 | 264 | 156 | 298 | 334 | 243 | 227 | 238 | 238 | 320 | 323 | 256 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.09 | 2.24 | 2.09 | 1.83 | 1.88 | 1.7 | 1.7 | 2.2 | 1.9 | 2.44 | 2.61 | 2.01 | 1.85 | 1.79 | 2.06 | 2.79 | 2.68 | 2.19 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | <5 | 13 | 9 | <5 | 10 | 8.0 | <5 | 11.0 | 6.0 | 8 | 9 | 5 | 6 | 9 | 13 | 7 | 14 | 11 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 129 | 137 | 142 | 112 | 117 | 112.0 | 115.0 | 136.0 | 104.0 | 141 | 156 | 120 | 114 | 108 | 119 | 162 | 158 | 129 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.35 | 2.53 | 3.15 | 1.99 | 2.23 | 2.3 | 2.4 | 2.6 | 1.6 | 2.40 | 2.68 | 2.08 | 2.14 | 1.96 | 2.01 | 2.76 | 2.81 | 2.24 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 25.30 | 25.40 | 29.90 | 20.3 | 27.5 | 26.7 | 22.4 | 26.1 | 16.9 | 27.3 | 26.7 | 23.0 | 27.2 | 24.8 | 30.1 | 28.7 | 31.1 | 27.0 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 5.80 | 6.10 | 20.30 | 4.2 | 8.4 | 14.9 | 15.7 | 6.9 | 7.7 | 0.9 | 1.4 | 1.5 | 7.1 | 4.3 | 1.2 | 0.6 | 2.5 | 1.0 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.20 | -2.42 | -2.92 | -3.26 | -2.37 | -2.6 | -3.3 | -2.4 | -3.2 | -2.74 | -2.63 | -3.18 | -3.07 | -3.24 | -2.34 | -2.82 | -2.35 | -2.45 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.52 | -2.74 | -3.24 | -3.58 | -2.69 | -2.9 | -3.6 | -2.7 | -3.6 | -3.06 | -2.95 | -3.50 | -3.39 | -3.56 | -2.66 | -3.14 | -2.67 | -2.77 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 10.00 | 9.57 | 9.67 | 10.1 | 9.65 | 9.8 | 10.1 | 9.6 | 10.1 | 9.75 | 9.74 | 10.00 | 9.87 | 9.74 | 9.49 | 9.80 | 9.47 | 9.63 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.30 | 9.89 | 9.99 | 10.4 | 9.97 | 10.1 | 10.4 | 10.0 | 10.4 | 10.1 | 10.1 | 10.3 | 10.2 | 10.1 | 9.81 | 10.1 | 9.8 | 10.0 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **250** | **94** | **4,190** | **151** | **26** | -- | **139** | **25** | **133** | **35** | -- | -- | **114** | -- | -- | 97 | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | 3 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 22 | -- | 58 | 19 | 12 | -- | 21 | 16 | 17 | 25.0 | -- | -- | 22 | -- | -- | 34 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | 12 | 6 | 11 | -- | 7 | 10 | 7 | 8.0 | -- | -- | 14 | -- | -- | 8 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | **0.041** | -- | **0.179** | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | -- | **5** | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | 6 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | **8** | <1 | <1 | 1 | 1 | <1 | 1 | <1 | <1 | <1 | 1 | 1 | 2 | <1 | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 206 | **359** | **12,600** | 93 | 184 | 82 | 136 | 187 | 108 | 164 | 224 | 108 | 169 | 74 | 65 | 121 | 139 | 86 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | **9.1** | **1.2** | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 64 | 125 | **894** | 21 | 64 | 22 | 26 | 115 | 28 | 220 | 61 | 21 | 52 | 25 | 19 | 64 | 126 | 21 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 22 | -- | 6 | 2 | <2 | -- | 5 | 2 | <2 | <2 | -- | -- | **60** | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <2 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 34 | -- | 47 | 27 | 42 | -- | 35 | 37 | 30 | 38.0 | -- | -- | 37 | -- | -- | 41 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | 2 | -- | 75 | <2 | <2 | -- | <2 | <2 | 2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | 0.6 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | **12** | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 11 | <5 | 29 | 6 | 6 | <5 | 7 | <5 | <5 | <5 | <5 | <5 | **120** | <5 | <5 | <5 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 665 | >2420 | 166 | 9 | 400 | 4,000.0 | 128 | 500 | 864 | 166 | 548 | 250 | >200 | >200 | >200 | >200 | 2,500 | 5,500 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 6 | 2 | <1 | 1 | 10 | 13 | <1 | 4 | 14 | 3 | 10 | 2 | 2 | 23 | 2 | 29 | 48 | 44 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.32 | 1.89 | 1.1 | 0.63 | 0.47 | 1.1 | <0.25 | 0.9 | 2.9 | <0.3 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 4.97 | 4.40 | 4.86 | 1.93 | 1.14 | 1.12 | 1.53 | 1.84 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 6.45 | 4.96 | 6.58 | 0.98 | -- | * | 1.44 | 1.56 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperat

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Paper Mill Lake | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site PML-2 | | | | | | | | PML-2 | | | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 2009/06/29 | 8/13/2009 | 10/1/2009 | 5/31/2010 | 8/24/2010 | 11/1/2010 | 5/13/2011 | 8/14/2011 | 10/16/2011 | 5/1/2012 | 5/15/2013 | 10/16/2013 | 5/15/2014 | 8/14/2014 | 10/27/2014 | 5/20/2015 | 8/25/2015 | 10/22/2015 | 5/16/2016 | 8/16/2016 | 10/25/2016 |
| Sampling Time | hh:mm | | | | | | | 13:15 | 13:40 | 13:45 | 14:30 | 16:20 | 13:00 | 12:40 | 16:20 | 16:15 | 13:16 | 13:40 | 11:20 | 11:00 | 9:20 | 8:30 | 11:30 | 13:45 | 9:08 | 13:45 | 10:00 | 9:50 |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | -- | 1.2 | -- | -- | 2.8 | 2.2 | 2.3 | N/A | 3.0 | 2.0 | 2.2 | 2.3 | 2.2 | 2.4 | 3.2 | N/A | N/A | N/A | 3.1 | NCC | N/A | 2.4 | 2.7 | 2.3 | 2.6 |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | -- | 14.8 | 24.2 | 19.7 | 17.8 | 25.3 | 10.1 | 10.9 | 23.1 | 15.2 | 11.6 | 14.8 | 12.6 | 14.4 | 21.1 | 12.1 | 15.1 | 27.0 | 9.0 | 13.8 | 22.1 | 11.8 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | -- | **10.20** | 8.30 | 8.40 | 8.78 | 8.09 | **10.58** | **9.88** | 8.70 | 8.94 | 7.75 | 9.26 | 8.90 | **12.44** | 6.95 | 7.92 | 8.06 | **9.76** | 8.28 | 8.55 | 7.69 | **10.31** |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | -- | **6.36** | 6.82 | 6.84 | 7.09 | 7.39 | 6.53 | **6.31** | 6.67 | **6.13** | 8.61 | **6.49** | **6.13** | 6.50 | 7.22 | **5.92** | 6.56 | 6.76 | 7.25 | 7.57 | **5.93** | **5.37** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | -- | 267.0 | 264.0 | 241.0 | 237.0 | 234.0 | 200.5 | 158.7 | 173.2 | 155.9 | 231.0 | 234.0 | 250.5 | 966.0 | 266.0 | 215.0 | 0.2 | 255.6 | 454.9 | 264.0 | 298.0 | 230.3 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | -- | 5 | 7 | 7 | 6 | 8 | 7 | <5 | 8 | 7 | 21 | <5 | 8 | 32 | 10 | 26 | <5.0 | 5 | 7 | 7 | 10 | 8 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | -- | 63 | 63 | 58 | 62 | 58 | 50 | 44 | 43 | 34 | 55 | 63 | 64 | **245** | 50 | 42 | 69 | 59 | 57 | 67 | 67 | 50 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | -- | 22 | 17 | 19 | 20 | 13 | 23 | 35 | 38 | 48 | 39 | 18 | 8 | 6 | 7 | 31 | 26 | 10 | 9 | 22 | 13 | 22 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | -- | 0.14 | 0.07 | 0.09 | 0.19 | 0.11 | 0.23 | 0.33 | 0.14 | 0.22 | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.32 | 0.23 | 0.10 | 0.11 | 0.18 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | -- | 0.14 | -- | -- | 0.19 | 0.11 | -- | 0.33 | -- | -- | 0.24 | 0.22 | <0.05 | 0.13 | 0.18 | 0.18 | 0.11 | 0.17 | 0.23 | 0.10 | <0.05 | 0.18 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | -- | <0.01 | -- | -- | <0.01 | <0.01 | -- | <0.01 | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | **0.15** | <0.05 | <0.05 | **0.11** | <0.05 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | -- | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.03 | 0.03 | 0.23 | 0.05 | 0.03 | <0.03 | <0.050 | <0.03 | <0.03 | 0.05 | <0.03 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.4 | -- | 1.7 | <0.4 | 0.4 | <5 | 0.2 | 1.2 | 3.0 | 0.6 | <0.4 | 0.5 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | -- | 3.6 | 2.6 | 4.5 | 3.2 | 3.4 | 3.6 | 4.0 | 6.0 | 5.6 | 5.9 | 4.4 | 4.0 | 2.7 | 2.4 | 5.8 | 2.8 | 6.0 | 6.1 | 4.0 | 3.6 | 8.3 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | -- | 6.50 | 6.81 | 6.82 | 6.66 | 7.02 | 6.83 | **6.37** | 6.60 | 6.60 | 6.60 | 6.68 | 6.73 | 7.13 | 7.04 | 6.77 | 6.64 | 6.98 | 6.98 | 6.83 | 7.23 | 6.93 |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | -- | 6.1 | 7.1 | 6.1 | 7.2 | 7.7 | 8.0 | 5.3 | 4.8 | 5.0 | 6.1 | 6.7 | 7.7 | 19.2 | 8.8 | 6.9 | 7,300.0 | 8.2 | 6.2 | 8.9 | 8.1 | 7.4 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | -- | 1.1 | 1.1 | 1.1 | 1.3 | 1.2 | 1.2 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 1.4 | 1.7 | 1.4 | 1.0 | 1,000.0 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | -- | <0.02 | <0.02 | 0.002 | 0.010 | 0.002 | <0.002 | 0.009 | 0.009 | 0.007 | **0.025** | 0.006 | **0.026** | **0.011** | **0.026** | **0.018** | 0.008 | **0.012** | 0.008 | **0.012** | 0.003 | 0.005 |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | -- | 0.9 | 1.0 | 0.9 | 1.0 | 0.9 | 1.0 | 0.9 | 0.8 | 1.0 | 0.8 | 0.8 | 1.3 | 1.4 | 1.2 | 1.1 | 830.0 | 1.0 | 0.9 | 1.0 | 1.0 | 1.1 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | -- | 35.0 | 40.0 | 34.0 | 31.1 | 35.1 | 30.8 | 25.7 | 21.3 | 20.9 | 34.6 | 37.5 | 42.0 | 133.0 | 42.6 | 33.9 | 38.0 | 43.3 | 31.3 | 42.9 | 37.5 | 32.1 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | -- | 2.6 | 2.5 | 2.3 | 2.6 | 2.3 | 3.3 | 2.9 | 2.5 | 3.0 | 2.8 | 2.7 | 4.2 | 2.4 | 2.3 | 2.9 | 1.9 | 1.8 | 2.8 | 2.3 | 0.6 | 2.6 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | -- | 2 | 3 | <1 | 15 | <2 | 11 | <1 | 8 | <1 | <5 | <5 | <5 | 16 | <5 | <5 | 1 | <5 | <5 | 45 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | -- | 11 | 11 | 11 | 10 | 10 | 10 | 9 | 10 | 9 | 7 | 9 | 11 | 27 | 7 | 7 | 8 | 9 | 9 | 12 | 7 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | -- | 0.8 | 0.7 | 0.6 | 1.0 | 0.8 | 0.4 | 0.4 | 3.4 | 0.5 | 0.7 | 1.0 | 3.3 | 2.6 | 0.7 | 1.0 | 0.9 | 1.9 | 1.3 | 9.4 | 1.1 | 1.4 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | -- | 240 | 250 | 230 | 230 | 230 | 210 | 170 | 170 | 150 | 213 | 254 | 277 | 777 | 273 | 212 | 260 | 251 | 246 | 263 | 319 | 190 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | -- | 2.11 | 2.17 | 1.99 | 2.07 | 2.01 | 1.77 | 1.46 | 1.58 | 1.30 | 2.13 | 1.98 | 2.19 | 8.12 | 1.77 | 1.86 | 2.13 | 1.97 | 1.95 | 2.29 | 2.24 | 1.79 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | -- | 5 | 7 | 7 | 6 | 8 | 7 | <1 | 8 | 7 | 21 | <5 | 8 | 32 | 10 | 26 | <1.0 | 5 | 7 | 7 | 10 | 8 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | -- | 123 | 131 | 117 | 120 | 120 | 110 | 91 | 89 | 79 | 119 | 119 | 137 | 448 | 118 | 109 | 130 | 127 | 112 | 139 | 129 | 108 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | -- | 1.94 | 2.23 | 1.88 | 1.88 | 2.03 | 1.86 | 1.48 | 1.28 | 1.27 | 1.94 | 2.09 | 2.55 | 6.96 | 2.47 | 1.95 | 2.14 | 2.44 | 1.84 | 2.53 | 2.17 | 1.92 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | -- | 20.00 | 22.00 | 20.00 | 23.00 | 24.00 | 25.00 | 17.00 | 15.00 | 16.00 | 19.30 | 20.80 | 25.00 | 54.90 | 27.70 | 21.30 | 23.00 | 25.80 | 20.40 | 27.20 | 25.20 | 23.80 |
| Ion Balance (% Difference) | % | N/A | N/A | -- | -- | -- | -- | -- | 4.20 | 1.36 | 2.84 | 4.81 | 0.50 | 2.48 | 0.68 | 10.50 | 1.17 | 4.80 | 2.80 | 7.50 | 7.70 | 16.50 | 2.20 | 0.23 | 10.60 | 3.00 | 5.10 | 1.70 | 3.40 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -- | -3.33 | -2.83 | -2.93 | -3.06 | -2.55 | -2.80 | NC | -3.18 | -3.17 | -2.89 | -3.39 | -3.08 | -1.73 | -2.61 | -2.57 | NC | -3.00 | -2.97 | -2.98 | -2.46 | -2.89 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -- | -3.59 | -3.08 | -3.18 | -3.31 | -2.80 | -3.05 | NC | -3.43 | -3.42 | -3.21 | -3.71 | -3.40 | -2.05 | -2.93 | -2.89 | NC | -3.32 | -3.29 | -3.30 | -2.78 | -3.21 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -- | 9.83 | 9.64 | 9.75 | 9.72 | 9.57 | 9.63 | NC | 9.78 | 9.77 | 9.49 | 10.10 | 9.81 | 8.86 | 9.65 | 9.34 | NC | 9.98 | 9.95 | 9.81 | 9.69 | 9.82 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -- | 10.10 | 9.89 | 10.00 | 9.97 | 9.82 | 9.88 | NC | 10.00 | 10.00 | 9.81 | 10.40 | 10.10 | 9.18 | 9.97 | 9.66 | NC | 10.30 | 10.30 | 10.10 | 10.00 | 10.10 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **130** | -- | -- | **1,030** | **56** | -- | **202** | -- | -- | **189** | **131** | **107** | **181** | **52** | **122** | **130** | -- | **278** | **610** | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 16 | -- | -- | 23 | 12 | -- | 23 | -- | -- | -- | 22 | 22 | 37 | 50 | 27 | 19 | 25 | -- | 24 | 35 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <1.0 | -- | <2 | <2 | -- | <2 |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | 5 | -- | -- | 8 | 9 | -- | <50 | -- | -- | 6 | 6 | 9 | 7 | 13 | 11 | <50 | -- | <5 | 8 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.300 | -- | -- | **0.037** | <0.017 | -- | **0.028** | -- | -- | **0.023** | **0.039** | **0.060** | **0.062** | **0.019** | **0.018** | **0.023** | -- | **0.145** | **0.042** | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | -- | 1 | <0.4 | -- | <0.4 | -- | -- | <1 | <1 | 2 | <1 | <1 | <1 | <0.40 | -- | <1 | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <2 | -- | -- | **3** | <2 | <2 | <2 | <2 | <2 | <2 | <2 | **1,380** | 1 | <1 | 2 | <2.0 | 2 | 2 | <1 | <1 | 1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | 100 | -- | -- | **1,090** | 151 | 76 | 143 | **699** | 181 | 178 | 181 | **1,760** | 264 | **316** | 134 | 170 | **334** | **368** | **647** | 174 | 123 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | -- | **2.4** | <0.5 | -- | <0.5 | -- | -- | <0.5 | <0.5 | **49.7** | 0.7 | <0.5 | <0.5 | <0.5 | -- | 0.5 | **1.1** | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 58 | -- | -- | 159 | 81 | 28 | 34 | 89 | 31 | 22 | 87 | **866** | 206 | 278 | 24 | 43 | 67 | 61 | 109 | 36 | 23 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | -- | <2.0 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2.0 | -- | <2 | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 2 | -- | -- | 2 | <2.0 | -- | <2.0 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2.0 | -- | 2 | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <2 | -- | -- | <1.0 | <1.0 | -- | <1.0 | -- | -- | <1 | <1 | <1 | <1 | <1 | <1 | <1.0 | -- | <1 | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.5 | -- | -- | <0.1 | <0.1 | -- | <0.1 | -- | -- | <0.1 | <0.1 | 0.100 | <0.1 | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 30 | -- | -- | 35 | 33 | -- | 26 | -- | -- | 27 | 31 | 35 | 68 | 37 | 29 | 34 | -- | 21 | 38 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <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 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | 3 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | -- | 21 | <2 | -- | 4 | -- | -- | <2 | <2 | 2 | 3 | <2 | <2 | 2 | -- | 4 | 7 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <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 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | -- | <2 | <2 | -- | <2 | -- | -- | <2 | <2 | <2 | <2 | <2 | <2 | <2 | -- | <2 | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 12 | -- | -- | 18 | <5.0 | 6 | 7 | 8 | 10 | 8 | 11 | **762** | <5 | <5 | 5 | 14 | <5 | 8 | 7 | <5 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 49 | 40 | -- | >250 | 46 | 97 | 64 | >250 | -- | 261 | 1,410 | 411 | 291 | 517 | >2420 | --- | >2420 | 1,120 | 687 | >2420 | >2420 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 10 | 31 | -- | 69 | <1 | 6 | 17 | **>250** | <100 | 1 | 12 | 2 | <1 | 3 | 16 | <0.10 | 5 | 2 | 4 | 47 | 30 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.15 | 1.36 | 0.59 | 3.50 | 1.54 | 0.53 | 0.55 | 2.48 | 1.33 | 0.76 | 1.18 | 0.25 | 0.99 | 0.48 | 0.72 | 1.67 | 4.79 | 1.50 | 3.82 | 1.09 | 2.02 |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 1.22 | 1.33 | 0.66 | 3.39 | 1.51 | 0.42 | 0.51 | 2.26 | 1.13 | 0.76 | 1.34 | 0.27 | 1.13 | 0.44 | 0.70 | 1.56 | 4.59 | 0.74 | 5.04 | 1.42 | 2.12 |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh Water.

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperature). The value is converted to mg/L total ammonia-N by multiplying by 0.8224.

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If a results was exceeding the minimum value of the range, the specific hardness for that location was used to determine the exceedance.

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites Regulations and/or Health Canada Guideline for Recreational Water Quality

**Table C2: Statistical Presentation of Key Water Quality Parameters - PML-2**

| Tested Parameters | Units | RDL (2021) | NSE ESQs for Surface Water 2016 [1] | NSE ESQs for Surface Water September 2021 [2] | Health Canada Guideline for Recreational Water Quality [3] | CCME Guideline FWAL [4] | HRM Phosphorus Trigger Range [5] | Paper Mill Lake | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Site PML-2 | | | | | | | | PML-2 | | | | | | | | | | | | | | | |
| Sampling Date | yyyy-mm-dd | | | | | | | 6/8/2017 | 8/15/2017 | 10/18/2017 | 5/9/2018 | 8/17/2018 | 10/17/2018 | 05/09/2019 | 08-20-19 | 11/8/2019 | 02-Jul-20 | 17-Aug-20 | 29-Oct-20 | 27-May-21 | 09-Aug-21 | 22-Oct-21 | 31-May-22 | 18-Aug-22 | 21-Oct-22 |
| Sampling Time | hh:mm | | | | | | | 14:30 | 14:30 | 14:00 | 13:30 | 12:10 | 14:15 PM | 12:50PM | 3:40 PM | 3:15 PM | 8:50 AM | 9:27 AM | 10:25 AM | 8:25 AM | 8:56 AM | 8:59 AM | 9:25 AM | 8:10 AM | 9:00 AM |
| **FIELD DATA** | | | | | | | | | | | | | | | | | | | | | | | |
| Secchi Depth | Meters | -- | -- | -- | 1.2 | -- | -- | 2.5 | 2.5 | 2.9 | 2.9 | 3.0 | 2.2 | 2.4 | 2.20 | N/A | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* | NA* |
| Water Temp | Celsius | -- | -- | -- | -- | -- | -- | 17.1 | 24.0 | 14.0 | 15.3 | 5.4 | 12.2 | 12.7 | 27.4 | 11.3 | 23.9 | 23.7 | 10.4 | 17.0 | 21.9 | 14.1 | 18.5 | 22.6 | 15.2 |
| Dissolved Oxygen | mg/L | -- | -- | -- | -- | 5.5 - 9.5 | -- | **10.44** | 8.89 | 6.56 | **9.91** | 6.97 | 8.70 | ** | 6.06 | **9.80** | 7.79 | 7.58 | **10.16** | 16.06 | 9.01 | 11.88 | 8.36 | 7.53 | 9.04 |
| pH (in Situ) | pH | -- | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.73 | 7.01 | 6.87 | **6.33** | **24.70** | 7.00 | 6.76 | **6.39** | 7.40 | **6.07** | **6.08** | 6.64 | **6.41** | **5.53** | **6.22** | 6.95 | 7.54 | ***10.44*** |
| Specific Conductance | uS/cm | -- | -- | -- | -- | -- | -- | 242.0 | 285.0 | 252.0 | 214.4 | 293.8 | 297.3 | 6.1 | 239.0 | 193.0 | 275.0 | 270.0 | 228.7 | 209.0 | 219.0 | 207.0 | 333.4 | 76.0 | 287.7 |
| **INORGANICS** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Alkalinity (as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 5 | 12 | 11 | 5 | 11 | 8 | <5 | 11 | 8 | 9.0 | 10.0 | 7.0 | 6 | 10 | 13 | 8 | 11 | 10 |
| Dissolved Chloride (Cl) | mg/L | 1 | -- | 120 | -- | 120 | -- | 67 | 72 | 60 | 46 | 55 | 43 | 50 | 64 | 64 | 76 | 72 | 61 | 58 | 47 | 59 | 94 | 82 | 69 |
| Fluoride | mg/L | 0.12 | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.12 | -- | <0.12 | <0.12 |
| Colour | TCU | 5 | -- | -- | -- | -- | -- | 18 | 7 | 19 | 31 | 21 | 21 | 43 | 14 | 19 | <5 | 12 | 15 | 12.4 | 5.50 | 12.00 | 15.5 | 6.1 | 15.9 |
| Nitrite + Nitrate | mg/L | 0.05 | -- | -- | -- | -- | -- | 0.27 | 0.07 | 0.16 | 0.17 | 0.13 | 0.20 | 0.14 | 0.07 | 0.38 | <0.05 | <0.05 | 0.18 | 0.17 | 0.25 | 0.22 | 0.20 | 0.07 | 0.18 |
| Nitrate (N) | mg/L | 0.05 | -- | 13 | -- | 13 | -- | 0.16 | 0.07 | 0.16 | 0.17 | <0.05 | 0.20 | 0.14 | 0.07 | 0.38 | <0.05 | <0.05 | 0.18 | 0.17 | 0.25 | 0.22 | 0.20 | 0.07 | 0.18 |
| Nitrite (N) | mg/L | 0.05 | -- | 0.06 | -- | 0.06 | -- | **0.11** | <0.05 | <0.05 | <0.05 | **0.13** | <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 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 0.03 | -- | -- | -- | 1.15 note [5] | -- | <0.03 | <0.03 | <0.03 | <0.03 | 0.04 | 0.05 | 0.06 | 0.08 | 0.06 | 0.06 | 0.08 | <0.03 | <0.03 | <0.03 | <0.03 | 0.07 | 0.05 | <0.03 |
| Total Kjeldahl Nitrogen as N | mg/L | 0.4 | -- | -- | -- | -- | -- | 0.6 | 0.6 | <0.4 | <0.4 | <0.4 | <0.4 | 1.3 | <0.4 | 1.9 | <0.4 | 1.40 | <0.4 | 0.12 | <0.10 | <0.10 | 0.16 | 0.33 | 0.18 |
| Total Organic Carbon | mg/L | 0.5 | -- | -- | -- | -- | -- | 5.5 | 5.4 | 4.1 | 4.9 | 3.5 | 4.0 | 4.3 | 4.4 | 4.5 | 3.00 | 4.10 | 4.20 | 4.7 | 3.0 | 2.8 | 3.6 | 3.7 | 4.2 |
| Orthophosphate (as P) | mg/L | 0.01 | -- | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.13 | <0.01 | 0.01 |
| pH (units) | pH | N/A | -- | 6.5 - 9.0 | 5.0-9.0 | 6.5 - 9.0 | -- | 6.86 | 7.23 | 6.99 | 6.81 | 7.29 | 7.05 | 6.78 | 7.20 | 6.89 | 7.00 | 7.11 | 6.85 | 6.84 | 6.54 | 7.17 | 6.98 | 6.64 | **6.29** |
| Total Calcium (Ca) | mg/L | 0.1 | -- | -- | -- | -- | -- | 8.1 | 8.5 | 8.1 | 6.7 | 8.1 | 7.7 | 7.1 | 9.1 | 5.6 | 8.6 | 7.2 | 8.3 | 8.5 | 8.2 | 8.8 | 9.0 | 10.2 | 9.4 |
| Total Magnesium (Mg) | mg/L | 0.1 | -- | -- | -- | -- | -- | 1.3 | 1.1 | 1.2 | 1.1 | 1.2 | 1.3 | 1.2 | 1.4 | 0.9 | 1.3 | 40.0 | 1.3 | 1.2 | 1.3 | 1.3 | 1.4 | 1.6 | 1.4 |
| Total Phosphorus | mg/L | 0.002 | -- | -- | -- | 0.01 note [6] | 0.010 | **0.018** | **0.013** | 0.006 | **0.047** | 0.005 | **0.012** | 0.008 | 0.005 | 0.008 | <0.006 | **0.017** | 0.004 | 0.006 | **0.022** | 0.009 | **0.027** | **0.010** | **0.030** |
| Total Potassium (K) | mg/L | 0.1 | -- | -- | -- | -- | -- | 0.9 | 1.4 | 1.1 | 0.9 | 1.1 | 1.1 | 0.9 | 1.2 | 0.8 | 0.9 | 1.1 | 1.2 | 1.0 | 1.5 | 1.2 | 1.4 | 1.5 | 1.4 |
| Total Sodium (Na) | mg/L | 0.1 | -- | -- | -- | -- | -- | 41.5 | 47.2 | 35.5 | 37.5 | 37.7 | 39.6 | 42.9 | 46.7 | 29.9 | 40.7 | 50.2 | 39.6 | 38.6 | 34.8 | 34.2 | 52.0 | 49.0 | 41.0 |
| Reactive Silica (SiO2) | mg/L | 0.5 | -- | -- | -- | -- | -- | 1.7 | 0.8 | 2.0 | 2.5 | 1.0 | 2.3 | 2.0 | 0.9 | 2.4 | 0.9 | 0.6 | 2.4 | 2.6 | 4.2 | 1.8 | 2.1 | 1.6 | 2.7 |
| Total Suspended Solids | mg/L | 5 | -- | -- | -- | note [7] | -- | <5 | 14 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Dissolved Sulphate (SO4) | mg/L | 2 | -- | 128 | -- | -- | -- | 10 | 8 | 11 | 7 | 7 | 8 | 7 | 9 | 11 | 9.0 | 8.0 | 10.0 | 9 | 9 | 11 | 10 | 9 | 10 |
| Turbidity (NTU) | NTU | 0.1 | -- | -- | 50 | -- | -- | 1.9 | 1.9 | 1.8 | 1.4 | 0.7 | 1.2 | 1.0 | 1.2 | 2.2 | 1.1 | 0.8 | 0.7 | 1.0 | 0.6 | 0.6 | 0.7 | 0.8 | 0.6 |
| Conductivity (uS/cm) | µS/cm | 1 | -- | -- | -- | -- | -- | 259 | 286 | 255 | 249 | 289 | 227 | 261 | 268 | 189 | 302 | 335 | 249 | 241 | 238 | 252 | 349 | 328 | 271 |
| **Calculated Parameters** | | | | | | | | | | | | | | | | | | | | | | | |
| Anion Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.22 | 2.44 | 2.15 | 1.56 | 1.93 | 1.6 | 1.57 | 2.2 | 2.2 | 2.51 | 2.40 | 2.08 | 1.96 | 1.73 | 2.17 | 3.03 | 2.73 | 2.37 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | 5 | -- | -- | -- | -- | -- | 5 | 12 | 11 | 5 | 11 | 8.0 | -- | 11.0 | 8.0 | 9 | 10 | 7 | 6 | 10 | 13 | 8 | 11 | 10 |
| Calculated TDS | mg/L | 1 | -- | -- | -- | -- | -- | 133 | 146 | 124 | 103 | 118 | 107.0 | 110 | 139.0 | 119.0 | 142 | 146 | 127 | 121 | 109 | 125 | 174 | 160 | 139 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | 10 | -- | -- | -- | -- | -- | <10 | <10 | <10 | <10 | <10 | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Cation Sum | me/L | N/A | -- | -- | -- | -- | -- | 2.37 | 2.62 | 2.09 | 2.10 | 2.19 | 2.3 | 2.37 | 2.7 | 1.7 | 2.35 | 2.69 | 2.29 | 2.24 | 2.08 | 2.08 | 2.88 | 2.82 | 2.41 |
| Hardness (CaCO3) | mg/L | N/A | -- | -- | -- | -- | -- | 25.60 | 25.80 | 25.20 | 21.3 | 25.2 | 24.6 | 22.70 | 28.5 | 17.7 | 26.8 | 22.9 | 26.1 | 26.2 | 25.8 | 27.3 | 28.2 | 32.1 | 29.2 |
| Ion Balance (% Difference) | % | N/A | -- | -- | -- | -- | -- | 3.20 | 3.50 | 1.60 | 14.9 | 6.4 | 18.7 | 20.40 | 9.0 | 13.6 | 3.3 | 5.7 | 4.7 | 6.9 | 9.1 | 2.2 | 2.6 | 1.7 | 0.9 |
| Langelier Index (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | -3.13 | -2.37 | -2.66 | -3.25 | -2.35 | -2.8 | -3.26 | -2.4 | -3.1 | -2.71 | -2.64 | -2.98 | -3.05 | -3.14 | -2.37 | -2.77 | -2.92 | -3.34 |
| Langelier Index (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | -3.45 | -2.69 | -2.98 | -3.57 | -2.67 | -3.1 | -3.58 | -2.7 | -3.4 | -3.03 | -2.96 | -3.30 | -3.37 | -3.46 | -2.69 | -3.09 | -3.24 | -3.66 |
| Saturation pH (@ 20C) | N/A | N/A | -- | -- | -- | -- | -- | 9.99 | 9.60 | 9.65 | 10.1 | 9.64 | 9.8 | 10.00 | 9.6 | 9.9 | 9.71 | 9.75 | 9.83 | 9.89 | 9.68 | 9.54 | 9.75 | 9.56 | 9.63 |
| Saturation pH (@ 4C) | N/A | N/A | -- | -- | -- | -- | -- | 10.30 | 9.92 | 9.97 | 10.4 | 9.96 | 10.1 | 10.40 | 9.9 | 10.3 | 10.0 | 10.1 | 10.2 | 10.2 | 10.0 | 9.86 | 10.1 | 9.9 | 10.0 |
| **Metals (ICP-MS)** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Aluminum (Al) | µg/L | 5 | 5 | 5 | -- | 100 (pH based) | -- | **215** | **40** | **34** | **141** | **75** | -- | **134** | **27** | **79** | **36** | -- | -- | **93** | -- | -- | *63* | -- | -- |
| Total Antimony (Sb) | µg/L | 2 | 20 | 9 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Arsenic (As) | µg/L | 2 | 5.0 | 5.0 | -- | 5 | -- | <3 | -- | <3 | <3 | <3 | -- | <3 | <3 | <3 | <3 | -- | -- | <2 | -- | -- | <3 | -- | -- |
| Total Barium (Ba) | µg/L | 5 | 1000 | 1000 | -- | -- | -- | 27 | -- | 23 | 21 | 8 | -- | 25 | 19 | 17 | 28.0 | -- | -- | 25 | -- | -- | 42 | -- | -- |
| Total Beryllium (Be) | µg/L | 2 | 5.3 | 0.15 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Bismuth (Bi) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Boron (B) | µg/L | 5 | 1200 | 1500 | -- | 1500 | -- | <5 | -- | 11 | 6 | 10 | -- | 6 | 11 | 6 | 8.0 | -- | -- | 8 | -- | -- | 8 | -- | -- |
| Total Cadmium (Cd) | µg/L | 0.017 | 0.01 | 0.09 | -- | 0.04 - 0.16 note [8] | -- | <0.017 | -- | <0.017 | <0.09 | <0.09 | -- | <0.09 | <0.09 | <0.09 | <0.017 | -- | -- | <0.09 | -- | -- | <0.09 | -- | -- |
| Total Chromium (Cr) | µg/L | 1 | --- | 8.9 | -- | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Cobalt (Co) | µg/L | 1 | 10 | 1 | -- | -- | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Copper (Cu) | µg/L | 1 | 2 | 2 | -- | 2 - 2.41 note [8] | -- | <1 | <1 | 1 | <1 | <1 | 2 | <1 | 1 | 1 | <1 | <1 | <1 | 2 | 2 | 2 | <1 | <1 | <1 |
| Total Iron (Fe) | µg/L | 50 | 300 | 300 | -- | 300 | -- | <50 | 203 | 145 | 104 | 163 | 165 | 128 | 258 | <50 | 172 | 224 | 124 | 142 | 74 | 213 | 134 | 93 | 76 |
| Total Lead (Pb) | µg/L | 0.5 | 1 | 1 | -- | 1 - 3.26 note [8] | -- | <0.5 | -- | <0.5 | <0.5 | <0.5 | -- | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | <0.5 | -- | -- | <0.5 | -- | -- |
| Total Manganese (Mn) | µg/L | 2 | 820 | 430 | -- | -- | -- | 85 | 68 | 26 | 20 | 42 | 74 | 28 | 139 | 30 | 192 | 40 | 32 | 48 | 20 | 33 | 78 | 58 | 28 |
| Total Molybdenum (Mo) | µg/L | 2 | 73 | 73 | -- | 73 | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Nickel (Ni) | µg/L | 2 | 25 | 25 | -- | 25 - 97.03 note [8] | -- | 4 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Selenium (Se) | µg/L | 1 | 1.0 | 1.0 | -- | 1 | -- | <1 | -- | <1 | <1 | <1 | -- | <1 | <1 | <1 | <1 | -- | -- | <1 | -- | -- | <1 | -- | -- |
| Total Silver (Ag) | µg/L | 0.1 | 0.1 | 0.25 | -- | 0.25 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Strontium (Sr) | µg/L | 5 | 21000 | 21000 | -- | -- | -- | 35 | -- | 39 | 29 | 38 | -- | 35 | 42 | 27 | 40.0 | -- | -- | 36 | -- | -- | 45 | -- | -- |
| Total Thallium (Tl) | µg/L | 0.1 | 0.8 | 0.8 | -- | 0.8 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.1 | -- | -- | <0.1 | -- | -- |
| Total Tin (Sn) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Titanium (Ti) | µg/L | 2 | -- | -- | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | <2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Uranium (U) | µg/L | 0.1 | 300 | 15 | -- | 15 | -- | <0.1 | -- | <0.1 | <0.1 | <0.1 | -- | <0.1 | <0.1 | <0.1 | <0.1 | -- | -- | <0.2 | -- | -- | <0.2 | -- | -- |
| Total Vanadium (V) | µg/L | 2 | 6 | 120 | -- | -- | -- | <2 | -- | <2 | <2 | <2 | -- | 2 | <2 | <2 | <2 | -- | -- | <2 | -- | -- | <2 | -- | -- |
| Total Zinc (Zn) | µg/L | 5 | 30 | 7 | -- | 30 | -- | 8 | 9 | 5 | 5 | <5 | 6 | 7 | <5 | <5 | <5 | <5 | <5 | 5 | <5 | 7 | <5 | 6 | <5 |
| **MICROBIOLOGICAL** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Coliform | MPN/100mL | 1 | -- | -- | -- | -- | -- | 1,990 | >2420 | 1,730 | 1 | 4000 | 3,030.0 | 106.0 | NDOGT | 1134 | 249 | 192 | 285 | >200 | >200 | >200 | >200 | 2,600 | 1,700 |
| E. coli | MPN/100mL | 1 | -- | -- | 400 | -- | -- | 1 | 11 | 5 | <1 | 1 | 30 | <1 | 3 | 20 | 2 | 7 | 2 | 2 | 19 | 9 | 6 | 10 | 50 |
| Chlorophyll A - Spectrophotometer | µg/L | 0.25 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.47 | 1.89 | 1.1 | 0.95 | 2.84 | 0.64 | 1.05 | 1.3 | 1.3 | 0.6 |
| Chlorophyll A - Acidification method | µg/L | 0.05 | -- | -- | -- | -- | -- | 5.31 | 4.30 | 1.27 | 1.37 | 1.28 | 1.78 | 1.58 | 1.62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorophyll A - Welschmeyer method | µg/L | 0.05 | -- | -- | -- | -- | -- | 6.60 | 4.23 | 1.47 | 2.22 | -- | * | 1.50 | 1.44 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

N/A - Not Applicable; NC - Not Calculable; NCC Not Collected

RDL = Reported Detection Limit (represents most recent sampling event)

" -- " = no guideline available / Not Tested.

[1] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE 2016) Table A2 Reference for Pathway Specific Standards for Surface Water (ug/L) - Fresh W

[2] Nova Scotia Environmental Quality Standards (EQS) for Contaminated Sites (NSE September 2021) Tier 1 Table 3 Surface Water Standards (ug/L) for Fresh Water.

[3] Health Canada Guidelines for Canadian Recreational Water Quality (Third Edition 2012).

[4] CCME FAL Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life - Freshwater (Updated 2015).

[5] CCME FAL Guideline for Ammonia-N varies based on water pH and Temperature. The most stringent guideline is shown (calculated using the highest water pH and temperat

[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.

[7] CCME FAL TSS reference values between 25-250 mg/L, and >250 mg/L.

[8] CCME FAL Guidelines for cadmium, copper, lead, and nickel are related to water hardness. The range shown represents the guideline range based on the hardness results. If

(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.

(**) Dissolved oxygen field data not recorded - Post-calibration failure of field equipment for DO sensor.

**Bold (black shaded)** = Present Result - Parameter concentration exceeds CCME FWAL Guideline.

Underlined (black shaded) = Present Result - Parameter concentration exceeds Health Canada Guideline for Recreational Water Quality

*Italics* (black shaded) = Present Result - Parameter concentration exceeds NSE EQS Contaminated Sites Regulations

**Blue shaded** = Past Result - Parameter concentration exceeds CCME FWAL Guideline and/or NSE EQS Contaminated Sites R

# APPENDIX

# D LABORATORY CERTIFICATES OF ANALYSIS

AGAT Laboratories

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CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848

ATTENTION TO: Charlotte Clark

PROJECT: TE201017

AGAT WORK ORDER: 22X901528

MICROBIOLOGY ANALYSIS REVIEWED BY: Sara Knox, Data Reviewer

WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

DATE REPORTED: Jun 15, 2022

PAGES (INCLUDING COVER): 21

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

VERSION 2:Version 2 supersedes version 1. Workorder 22X901528, version 1, issued June 9, 2022. Complete results June 15, 2022. AC

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.
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- 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.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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# Certificate of Analysis

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2022-05-31 09:04 | 2022-05-31 09:25 | 2022-05-31 10:20 | 2022-05-31 13:15 | 2022-05-31 10:45 | 2022-05-31 11:20 | 2022-05-31 13:00 | 2022-05-31 12:00 |
| Parameter | Unit | G / S | RDL | | 3914106 | 3914194 | 3914195 | 3914196 | 3914197 | 3914198 | 3914199 | 3914200 |
| Total Coliforms (MF) | CFU/100 mL | 1 | 1 | | >200 | >200 | >200 | >200 | >200 | >200 | >200 | >200 |
| E. Coli (MF) | CFU/100 mL | 1 | 1 | | 29 | 6 | 46 | 33 | 32 | 109 | 18 | 36 |

| | | | | SAMPLE DESCRIPTION: | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water |
| | | | | DATE SAMPLED: | 2022-05-31 12:15 | 2022-05-31 12:30 | 2022-05-31 12:50 |
| Parameter | Unit | G / S | RDL | | 3914201 | 3914202 | 3914203 |
| Total Coliforms (MF) | CFU/100 mL | 1 | 1 | | >200 | >200 | >200 |
| E. Coli (MF) | CFU/100 mL | 1 | 1 | | 41 | 37 | 4 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2021-03
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.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Lara Knox



Results relate only to the items tested. Results apply to samples as received.

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PROJECT: TE201017

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ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Subcontracted Data Received - Chlorophyll a

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
| | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | DATE SAMPLED: | 2022-05-31 09:04 | 2022-05-31 09:25 | 2022-05-31 10:20 | 2022-05-31 13:15 | 2022-05-31 10:45 | 2022-05-31 11:20 | 2022-05-31 13:00 | 2022-05-31 12:00 |
| Parameter | Unit | G / S | RDL | 3914106 | 3914194 | 3914195 | 3914196 | 3914197 | 3914198 | 3914199 | 3914200 |
| Subcontracted Data | | | | Y | Y | Y | Y | Y | Y | Y | Y |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | SAMPLE DESCRIPTION: | KL-3 | KL-4 | KL-5 |
| | | | SAMPLE TYPE: | Water | Water | Water |
| | | | DATE SAMPLED: | 2022-05-31 12:15 | 2022-05-31 12:30 | 2022-05-31 12:50 |
| Parameter | Unit | G / S | RDL | 3914201 | 3914202 | 3914203 |
| Subcontracted Data | | | | Y | Y | Y |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## AGAT Halifax - Low Level Total Phosphorous- 0.002mg/L & TKN

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2022-05-31 09:04 | 2022-05-31 09:25 | 2022-05-31 10:20 | 2022-05-31 13:15 | 2022-05-31 10:45 | 2022-05-31 11:20 | 2022-05-31 13:00 | 2022-05-31 12:00 |
| Parameter | Unit | G / S | RDL | | 3914106 | 3914194 | 3914195 | 3914196 | 3914197 | 3914198 | 3914199 | 3914200 |
| Total Phosphorus | mg/L | | 0.002 | | 0.015 | 0.027 | 0.029 | 0.020 | 0.019 | 0.020 | 0.015 | 0.018 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | | 0.18 | 0.16 | 0.29 | 0.23 | 0.34 | 0.23 | 0.18 | 0.23 |

| | | | | SAMPLE DESCRIPTION: | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water |
| | | | | DATE SAMPLED: | 2022-05-31 12:15 | 2022-05-31 12:30 | 2022-05-31 12:50 |
| Parameter | Unit | G / S | RDL | | 3914201 | 3914202 | 3914203 |
| Total Phosphorus | mg/L | | 0.002 | | 0.016 | 0.016 | 0.015 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | | 0.18 | 0.16 | 0.12 |

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

3914106-3914203 Total Phosphorous RDL is the calculated MDL.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| SAMPLE DESCRIPTION: | | | | PML-1 | | PML-2 | | HWY102-1 | | HWY102-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | | Water | | Water | | Water |
| DATE SAMPLED: | | | | 2022-05-31 09:04 | | 2022-05-31 09:25 | | 2022-05-31 10:20 | | 2022-05-31 13:15 |
| Parameter | Unit | G / S | RDL | 3914106 | RDL | 3914194 | RDL | 3914195 | RDL | 3914196 |
| pH | | | | 6.98 | | 6.98 | | 7.34 | | 6.99 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 3.2 | 0.5 | 2.1 | 0.5 | 3.8 | 0.5 | 4.8 |
| Chloride | mg/L | | 1 | 86 | 1 | 94 | 2 | 171 | 5 | 251 |
| Fluoride | mg/L | | 0.12 | <0.12 | 0.12 | <0.12 | 0.12 | <0.12 | 0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 10 | 2 | 10 | 2 | 14 | 2 | 13 |
| Alkalinity | mg/L | | 5 | 7 | 5 | 8 | 5 | 20 | 5 | 8 |
| True Color | TCU | | 5.00 | 19.0 | 5.00 | 15.5 | 5.00 | 34.4 | 5.00 | 33.0 |
| Turbidity | NTU | | 0.5 | 0.7 | 0.5 | 0.7 | 0.5 | 1.1 | 0.5 | 1.1 |
| Electrical Conductivity | umho/cm | | 1 | 320 | 1 | 349 | 1 | 573 | 1 | 746 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.23 | 0.05 | 0.20 | 0.05 | 0.16 | 0.05 | 0.06 |
| Nitrate as N | mg/L | | 0.05 | 0.23 | 0.05 | 0.20 | 0.05 | 0.16 | 0.05 | 0.06 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | 0.03 | 0.07 | 0.03 | <0.03 | 0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 3.8 | 0.5 | 3.6 | 0.5 | 6.0 | 0.5 | 5.7 |
| Ortho-Phosphate as P | mg/L | | 0.01 | 0.13 | 0.01 | 0.13 | 0.01 | 0.13 | 0.01 | 0.13 |
| Total Sodium | mg/L | | 1 | 49 | 1 | 52 | 1 | 80 | 1 | 123 |
| Total Potassium | mg/L | | 0.1 | 1.3 | 0.1 | 1.4 | 0.1 | 2.6 | 0.1 | 2.0 |
| Total Calcium | mg/L | | 0.1 | 9.2 | 0.8 | 9.0 | 0.8 | 21.5 | 0.8 | 16.6 |
| Total Magnesium | mg/L | | 0.1 | 1.4 | 0.1 | 1.4 | 0.1 | 3.1 | 0.1 | 2.4 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 7 | 5 | 8 | 5 | 20 | 5 | 8 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | 10 | <10 | 10 | <10 | 10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | 5 | <5 | 5 | <5 | 5 | <5 |
| Calculated TDS | mg/L | | 1 | 162 | 1 | 174 | 1 | 305 | 1 | 414 |
| Hardness | mg/L | | | 28.7 | | 28.2 | | 66.5 | | 51.3 |
| Langelier Index (@20C) | NA | | | -2.82 | | -2.77 | | -1.66 | | -2.54 |
| Langelier Index (@ 4C) | NA | | | -3.14 | | -3.09 | | -1.98 | | -2.86 |
| Saturation pH (@ 20C) | NA | | | 9.80 | | 9.75 | | 9.00 | | 9.53 |
| Saturation pH (@ 4C) | NA | | | 10.1 | | 10.1 | | 9.32 | | 9.85 |
| Anion Sum | me/L | | | 2.79 | | 3.03 | | 5.53 | | 7.52 |

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| | | SAMPLE DESCRIPTION: | | PML-1 | | PML-2 | | HWY102-1 | | HWY102-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | | Water | | Water |
| | | DATE SAMPLED: | | 2022-05-31 09:04 | | 2022-05-31 09:25 | | 2022-05-31 10:20 | | 2022-05-31 13:15 |
| Parameter | Unit | G / S | RDL | 3914106 | RDL | 3914194 | RDL | 3914195 | RDL | 3914196 |
| Cation sum | me/L | | | 2.76 | | 2.88 | | 4.89 | | 6.46 |
| % Difference/ Ion Balance | % | | | 0.6 | | 2.6 | | 6.1 | | 7.6 |
| Total Copper | ug/L | | 1 | <1 | 1 | <1 | 1 | 1 | 1 | 2 |
| Total Iron | ug/L | | 50 | 121 | 50 | 134 | 50 | 289 | 50 | 367 |
| Total Manganese | ug/L | | 2 | 64 | 2 | 78 | 2 | 25 | 38 | 134 |
| Total Phosphorous | mg/L | | 0.02 | 0.03 | 0.02 | 0.03 | 0.02 | 0.03 | 0.02 | 0.03 |
| Total Zinc | ug/L | | 5 | <5 | 5 | <5 | 5 | 6 | 5 | 11 |

Certified By:



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ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| SAMPLE DESCRIPTION: | | | | LU | | LSD | | KL-1 | KL-2 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | | Water | | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2022-05-31 10:45 | | 2022-05-31 11:20 | | 2022-05-31 13:00 | 2022-05-31 12:00 | 2022-05-31 12:15 | 2022-05-31 12:30 |
| Parameter | Unit | G / S | RDL | 3914197 | RDL | 3914198 | RDL | 3914199 | 3914200 | 3914201 | 3914202 |
| pH | | | | 7.13 | | 7.35 | | 6.94 | 7.7 | 6.97 | 6.82 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 3.5 | 0.5 | 3.9 | 0.5 | 2.6 | 4.2 | 3.1 | 3.2 |
| Chloride | mg/L | | 5 | 243 | 1 | 60 | 1 | 84 | 24 | 79 | 80 |
| Fluoride | mg/L | | 0.12 | <0.12 | 0.12 | <0.12 | 0.12 | <0.12 | <0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 22 | 2 | 7 | 2 | 9 | 6 | 9 | 9 |
| Alkalinity | mg/L | | 5 | 12 | 5 | 16 | 5 | 6 | 95 | 9 | 6 |
| True Color | TCU | | 5.00 | 14.7 | 5.00 | 25.1 | 5.00 | 16.1 | 58.7 | 27.8 | 23.6 |
| Turbidity | NTU | | 0.5 | 2.2 | 0.5 | 1.4 | 0.5 | 1.0 | 1.2 | 1.4 | 0.6 |
| Electrical Conductivity | umho/cm | | 1 | 758 | 1 | 243 | 1 | 313 | 350 | 115 | 289 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.41 | 0.05 | 0.08 | 0.05 | 0.16 | 0.29 | 0.20 | 0.18 |
| Nitrate as N | mg/L | | 0.05 | 0.41 | 0.05 | 0.08 | 0.05 | 0.16 | 0.29 | 0.20 | 0.18 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | 0.05 | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | 0.03 | <0.03 | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 4.8 | 0.5 | 5.4 | 0.5 | 3.8 | 6.7 | 4.1 | 4.0 |
| Ortho-Phosphate as P | mg/L | | 0.01 | 0.13 | 0.01 | 0.13 | 0.01 | 0.13 | 0.13 | 0.13 | 0.13 |
| Total Sodium | mg/L | | 1 | 119 | 1 | 34 | 1 | 48 | 17 | 44 | 42 |
| Total Potassium | mg/L | | 0.1 | 2.8 | 0.1 | 1.6 | 0.1 | 1.1 | 1.0 | 1.1 | 1.1 |
| Total Calcium | mg/L | | 0.8 | 20.1 | 0.1 | 8.9 | 0.1 | 8.3 | 6.4 | 8.3 | 8.1 |
| Total Magnesium | mg/L | | 0.1 | 2.9 | 0.1 | 2.0 | 0.1 | 1.3 | 1.4 | 1.3 | 1.3 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 12 | 5 | 16 | 5 | 6 | 95 | 9 | 6 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | 10 | <10 | 10 | <10 | <10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | 5 | <5 | 5 | <5 | <5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 419 | 1 | 124 | 1 | 156 | 115 | 149 | 146 |
| Hardness | mg/L | | | 62.1 | | 30.5 | | 26.1 | 21.7 | 26.1 | 25.6 |
| Langelier Index (@20C) | NA | | | -2.14 | | -2.09 | | -2.97 | -1.11 | -2.76 | -3.10 |
| Langelier Index (@ 4C) | NA | | | -2.46 | | -2.41 | | -3.29 | -1.43 | -3.08 | -3.42 |
| Saturation pH (@ 20C) | NA | | | 9.27 | | 9.44 | | 9.91 | 8.81 | 9.73 | 9.92 |
| Saturation pH (@ 4C) | NA | | | 9.59 | | 9.76 | | 10.2 | 9.13 | 10.1 | 10.2 |
| Anion Sum | me/L | | | 7.58 | | 2.16 | | 2.69 | 2.72 | 2.61 | 2.58 |

Certified By:



Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories
11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

# Certificate of Analysis

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| | | SAMPLE DESCRIPTION: | | LU | | LSD | | KL-1 | KL-2 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2022-05-31 10:45 | | 2022-05-31 11:20 | | 2022-05-31 13:00 | 2022-05-31 12:00 | 2022-05-31 12:15 | 2022-05-31 12:30 |
| Parameter | Unit | G / S | RDL | 3914197 | RDL | 3914198 | RDL | 3914199 | 3914200 | 3914201 | 3914202 |
| Cation sum | me/L | | | 6.51 | | 2.15 | | 2.66 | 1.24 | 2.49 | 2.38 |
| % Difference/ Ion Balance | % | | | 7.6 | | 0.3 | | 0.6 | 37.5 | 2.5 | 3.9 |
| Total Copper | ug/L | | 1 | 2 | 1 | 1 | 1 | <1 | <1 | <1 | <1 |
| Total Iron | ug/L | | 50 | 235 | 50 | 239 | 50 | 138 | 338 | 143 | 124 |
| Total Manganese | ug/L | | 2 | 58 | 38 | 112 | 2 | 53 | 46 | 54 | 41 |
| Total Phosphorous | mg/L | | 0.02 | 0.03 | 0.02 | 0.03 | 0.02 | 0.03 | 0.04 | 0.03 | 0.02 |
| Total Zinc | ug/L | | 5 | 13 | 5 | <5 | 5 | <5 | <5 | <5 | <5 |

Certified By:



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AGAT WORK ORDER: 22X901528

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

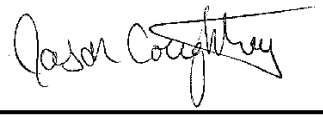
## Standard Water Analysis (Total)

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| | | SAMPLE DESCRIPTION: | | KL-5 |
|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water |
| | | DATE SAMPLED: | | 2022-05-31 12:50 |
| Parameter | Unit | G / S | RDL | 3914203 |
| pH | | | | 6.82 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 3.0 |
| Chloride | mg/L | | 1 | 80 |
| Fluoride | mg/L | | 0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 9 |
| Alkalinity | mg/L | | 5 | 6 |
| True Color | TCU | | 5.00 | 23.2 |
| Turbidity | NTU | | 0.5 | 0.7 |
| Electrical Conductivity | umho/cm | | 1 | 290 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.17 |
| Nitrate as N | mg/L | | 0.05 | 0.17 |
| Nitrite as N | mg/L | | 0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 3.9 |
| Ortho-Phosphate as P | mg/L | | 0.01 | 0.13 |
| Total Sodium | mg/L | | 1 | 47 |
| Total Potassium | mg/L | | 0.1 | 1.1 |
| Total Calcium | mg/L | | 0.1 | 8.3 |
| Total Magnesium | mg/L | | 0.1 | 1.2 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 6 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 |
| Hydroxide | mg/L | | 5 | <5 |
| Calculated TDS | mg/L | | 1 | 151 |
| Hardness | mg/L | | | 25.7 |
| Langelier Index (@20C) | NA | | | -3.09 |
| Langelier Index (@ 4C) | NA | | | -3.41 |
| Saturation pH (@ 20C) | NA | | | 9.91 |
| Saturation pH (@ 4C) | NA | | | 10.2 |
| Anion Sum | me/L | | | 2.58 |

Certified By:





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# Certificate of Analysis

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

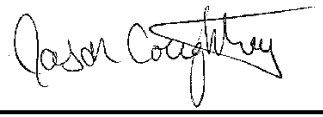
| | | | SAMPLE DESCRIPTION: | KL-5 |
|---|---|---|---|---|
| | | | SAMPLE TYPE: | Water |
| | | | DATE SAMPLED: | 2022-05-31 12:50 |
| Parameter | Unit | G / S | RDL | 3914203 |
| Cation sum | me/L | | | 2.60 |
| % Difference/ Ion Balance | % | | | 0.5 |
| Total Copper | ug/L | | 1 | <1 |
| Total Iron | ug/L | | 50 | 96 |
| Total Manganese | ug/L | | 2 | 21 |
| Total Phosphorous | mg/L | | 0.02 | 0.03 |
| Total Zinc | ug/L | | 5 | <5 |

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

3914106-3914203 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:





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# Certificate of Analysis

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TSS

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2022-05-31 09:04 | 2022-05-31 09:25 | 2022-05-31 10:20 | 2022-05-31 13:15 | 2022-05-31 10:45 | 2022-05-31 11:20 | 2022-05-31 13:00 | 2022-05-31 12:00 |
| Parameter | Unit | G / S | RDL | 3914106 | 3914194 | 3914195 | 3914196 | 3914197 | 3914198 | 3914199 | 3914200 |
| Total Suspended Solids | mg/L | | 5 | <5 | <5 | <5 | 13 | <5 | <5 | <5 | <5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | KL-3 | KL-4 | KL-5 |
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2022-05-31 12:15 | 2022-05-31 12:30 | 2022-05-31 12:50 |
| Parameter | Unit | G / S | RDL | 3914201 | 3914202 | 3914203 |
| Total Suspended Solids | mg/L | | 5 | <5 | 12 | <5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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# Certificate of Analysis

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ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Metals

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| | | SAMPLE DESCRIPTION: | | PML-1 | | PML-2 | | HWY102-1 | | HWY102-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | | Water | | Water |
| | | DATE SAMPLED: | | 2022-05-31 09:04 | | 2022-05-31 09:25 | | 2022-05-31 10:20 | | 2022-05-31 13:15 |
| Parameter | Unit | G / S | RDL | 3914106 | RDL | 3914194 | RDL | 3914195 | RDL | 3914196 |
| Total Aluminum | ug/L | | 5 | 91 | 5 | 63 | 5 | 54 | 5 | 98 |
| Total Antimony | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | 2 | <2 |
| Total Arsenic | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | 2 | <2 |
| Total Barium | ug/L | | 5 | 34 | 5 | 42 | 5 | 155 | 5 | 180 |
| Total Beryllium | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | 2 | <2 |
| Total Bismuth | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | 2 | <2 |
| Total Boron | ug/L | | 5 | 8 | 5 | 8 | 5 | 14 | 5 | 9 |
| Total Cadmium | ug/L | | 0.09 | <0.09 | 0.09 | <0.09 | 0.09 | <0.09 | 0.09 | <0.09 |
| Total Chromium | ug/L | | 1 | <1 | 1 | <1 | 1 | <1 | 1 | <1 |
| Total Cobalt | ug/L | | 1 | <1 | 1 | <1 | 1 | <1 | 1 | 1 |
| Total Copper | ug/L | | 1 | <1 | 1 | <1 | 1 | 1 | 1 | 2 |
| Total Iron | ug/L | | 50 | 121 | 50 | 134 | 50 | 289 | 50 | 367 |
| Total Lead | ug/L | | 0.5 | <0.5 | 0.5 | <0.5 | 0.5 | <0.5 | 0.5 | <0.5 |
| Total Manganese | ug/L | | 2 | 64 | 2 | 78 | 2 | 25 | 38 | 134 |
| Total Molybdenum | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | 2 | <2 |
| Total Nickel | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | 2 | <2 |
| Total Selenium | ug/L | | 1 | <1 | 1 | <1 | 1 | <1 | 1 | <1 |
| Total Silver | ug/L | | 2 | <2 | 0.1 | <0.1 | 2 | <2 | 0.1 | <0.1 |
| Total Strontium | ug/L | | 5 | 41 | 5 | 45 | 5 | 109 | 5 | 82 |
| Total Thallium | ug/L | | 0.1 | <0.1 | 0.1 | <0.1 | 0.1 | <0.1 | 0.1 | <0.1 |
| Total Tin | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | 2 | <2 |
| Total Titanium | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | 2 | <2 |
| Total Uranium | ug/L | | 0.2 | <0.2 | 0.2 | <0.2 | 0.2 | <0.2 | 0.2 | <0.2 |
| Total Vanadium | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | 2 | 2 |
| Total Zinc | ug/L | | 5 | <5 | 5 | <5 | 5 | 6 | 5 | 11 |

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Metals

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| SAMPLE DESCRIPTION: | | | | LU | | LSD | | KL-1 | KL-2 | | KL-3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | | Water | | Water | Water | | Water |
| DATE SAMPLED: | | | | 2022-05-31 10:45 | | 2022-05-31 11:20 | | 2022-05-31 13:00 | 2022-05-31 12:00 | | 2022-05-31 12:15 |
| Parameter | Unit | G / S | RDL | 3914197 | RDL | 3914198 | RDL | 3914199 | 3914200 | RDL | 3914201 |
| Total Aluminum | ug/L | | 5 | 56 | 5 | 92 | 5 | 123 | 231 | 5 | 137 |
| Total Antimony | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 | 2 | <2 |
| Total Arsenic | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 | 2 | <2 |
| Total Barium | ug/L | | 5 | 118 | 5 | 17 | 5 | 22 | 23 | 5 | 29 |
| Total Beryllium | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 | 2 | <2 |
| Total Bismuth | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 | 2 | <2 |
| Total Boron | ug/L | | 5 | 9 | 5 | 20 | 5 | 7 | 16 | 5 | 7 |
| Total Cadmium | ug/L | | 0.09 | <0.09 | 0.09 | <0.09 | 0.09 | <0.09 | <0.09 | 0.09 | <0.09 |
| Total Chromium | ug/L | | 1 | <1 | 1 | <1 | 1 | <1 | <1 | 1 | <1 |
| Total Cobalt | ug/L | | 1 | <1 | 1 | <1 | 1 | <1 | <1 | 1 | <1 |
| Total Copper | ug/L | | 1 | 2 | 1 | 1 | 1 | <1 | <1 | 1 | <1 |
| Total Iron | ug/L | | 50 | 235 | 50 | 239 | 50 | 138 | 338 | 50 | 143 |
| Total Lead | ug/L | | 0.5 | <0.5 | 0.5 | <0.5 | 0.5 | <0.5 | <0.5 | 0.5 | <0.5 |
| Total Manganese | ug/L | | 2 | 58 | 38 | 112 | 2 | 53 | 46 | 2 | 54 |
| Total Molybdenum | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 | 2 | <2 |
| Total Nickel | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 | 2 | <2 |
| Total Selenium | ug/L | | 1 | <1 | 1 | <1 | 1 | <1 | <1 | 1 | <1 |
| Total Silver | ug/L | | 0.1 | <0.1 | 2 | <2 | 0.1 | <0.1 | <0.1 | 2 | <2 |
| Total Strontium | ug/L | | 5 | 95 | 5 | 36 | 5 | 39 | 22 | 5 | 36 |
| Total Thallium | ug/L | | 0.1 | <0.1 | 0.1 | <0.1 | 0.1 | <0.1 | <0.1 | 0.1 | <0.1 |
| Total Tin | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | <2 | 2 | <2 |
| Total Titanium | ug/L | | 2 | <2 | 2 | <2 | 2 | <2 | 3 | 2 | <2 |
| Total Uranium | ug/L | | 0.2 | <0.2 | 0.2 | <0.2 | 0.2 | <0.2 | <0.2 | 0.2 | <0.2 |
| Total Vanadium | ug/L | | 2 | 2 | 2 | <2 | 2 | <2 | <2 | 2 | <2 |
| Total Zinc | ug/L | | 5 | 13 | 5 | <5 | 5 | <5 | <5 | 5 | <5 |

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Metals

DATE RECEIVED: 2022-05-31

DATE REPORTED: 2022-06-15

| | | | | SAMPLE DESCRIPTION: | | KL-5 |
|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | | Water |
| | | | | DATE SAMPLED: | | 2022-05-31 12:50 |
| Parameter | Unit | G / S | RDL | 3914202 | RDL | 3914203 |
| Total Aluminum | ug/L | | 5 | 116 | 5 | 115 |
| Total Antimony | ug/L | | 2 | <2 | 2 | <2 |
| Total Arsenic | ug/L | | 2 | <2 | 2 | <2 |
| Total Barium | ug/L | | 5 | 30 | 5 | 26 |
| Total Beryllium | ug/L | | 2 | <2 | 2 | <2 |
| Total Bismuth | ug/L | | 2 | <2 | 2 | <2 |
| Total Boron | ug/L | | 5 | 7 | 5 | 7 |
| Total Cadmium | ug/L | | 0.09 | <0.09 | 0.09 | <0.09 |
| Total Chromium | ug/L | | 1 | <1 | 1 | <1 |
| Total Cobalt | ug/L | | 1 | <1 | 1 | <1 |
| Total Copper | ug/L | | 1 | <1 | 1 | <1 |
| Total Iron | ug/L | | 50 | 124 | 50 | 96 |
| Total Lead | ug/L | | 0.5 | <0.5 | 0.5 | <0.5 |
| Total Manganese | ug/L | | 2 | 41 | 2 | 21 |
| Total Molybdenum | ug/L | | 2 | <2 | 2 | <2 |
| Total Nickel | ug/L | | 2 | <2 | 2 | <2 |
| Total Selenium | ug/L | | 1 | <1 | 1 | <1 |
| Total Silver | ug/L | | 0.1 | <0.1 | 2 | <2 |
| Total Strontium | ug/L | | 5 | 37 | 5 | 36 |
| Total Thallium | ug/L | | 0.1 | <0.1 | 0.1 | <0.1 |
| Total Tin | ug/L | | 2 | <2 | 2 | <2 |
| Total Titanium | ug/L | | 2 | <2 | 2 | <2 |
| Total Uranium | ug/L | | 0.2 | <0.2 | 0.2 | <0.2 |
| Total Vanadium | ug/L | | 2 | <2 | 2 | <2 |
| Total Zinc | ug/L | | 5 | <5 | 5 | <5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



Results relate only to the items tested. Results apply to samples as received.

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# Exceedance Summary

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd. ATTENTION TO: Charlotte Clark

| SAMPLEID | SAMPLE TITLE | GUIDELINE | ANALYSIS PACKAGE | PARAMETER | UNIT | GUIDEVALUE | RESULT |
|---|---|---|---|---|---|---|---|
| 3914106 | PML-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 29 |
| 3914194 | PML-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 6 |
| 3914195 | HWY102-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 46 |
| 3914196 | HWY102-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 33 |
| 3914197 | LU | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 32 |
| 3914198 | LSD | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 109 |
| 3914199 | KL-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 18 |
| 3914200 | KL-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 36 |
| 3914201 | KL-3 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 41 |
| 3914202 | KL-4 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 37 |
| 3914203 | KL-5 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 4 |



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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of
AGAT WORK ORDER: 22X901528
PROJECT: TE201017
ATTENTION TO: Charlotte Clark
SAMPLING SITE:
SAMPLED BY:

## Water Analysis

RPT Date: Jun 15, 2022

| PARAMETER | Batch | Sample Id | DUPLICATE | | | Method Blank | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dup #1 | Dup #2 | RPD | | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| pH | 3904847 | | 8.06 | 7.98 | 1.0% | < | 100% | 80% | 120% | | 80% | 120% | | 80% | 120% |
| Reactive Silica as SiO2 | 3913856 | | 16.4 | 17.4 | 5.8% | < 1.0 | 119% | 80% | 120% | 109% | 80% | 120% | 116% | 80% | 120% |
| Chloride | 3914106 | 3914106 | 86 | 85 | 0.7% | < 1 | 101% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Fluoride | 3914106 | 3914106 | <0.12 | <0.12 | NA | < 0.12 | 112% | 80% | 120% | NA | 80% | 120% | 103% | 70% | 130% |
| Sulphate | 3914106 | 3914106 | 10 | 10 | 1.2% | < 2 | 110% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Alkalinity | 3904847 | 3904847 | 370 | 378 | 2.1% | < 5 | 93% | 80% | 120% | | | | | | |
| True Color | 3913856 | | <5.00 | <5.00 | NA | < 5 | 102% | 80% | 120% | 106% | 80% | 120% | NA | | |
| Turbidity | 3912386 | | 0.6 | 0.6 | NA | < 0.5 | 99% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 3904847 | | 752 | 755 | 0.4% | < 1 | 99% | 90% | 110% | | | | | | |
| Nitrate as N | 3914106 | 3914106 | 0.23 | 0.21 | NA | < 0.05 | 99% | 80% | 120% | NA | 80% | 120% | 93% | 70% | 130% |
| Nitrite as N | 3914106 | 3914106 | <0.05 | <0.05 | NA | < 0.05 | 87% | 80% | 120% | NA | 80% | 120% | 78% | 70% | 130% |
| Ammonia as N | 3910017 | | <0.03 | <0.03 | NA | < 0.03 | 115% | 80% | 120% | 99% | 80% | 120% | 105% | 70% | 130% |
| Total Organic Carbon | 3926698 | | 2.4 | 2.3 | NA | < 0.5 | 99% | 80% | 120% | NA | 80% | 120% | 88% | 80% | 120% |
| Ortho-Phosphate as P | 3892329 | | <0.01 | <0.01 | NA | < 0.01 | 106% | 80% | 120% | 112% | 80% | 120% | 100% | 80% | 120% |
| Total Sodium | 3913767 | | 7.0 | 7.2 | 3.0% | < 0.1 | 109% | 80% | 120% | 105% | 80% | 120% | NA | 70% | 130% |
| Total Potassium | 3913767 | | 1.5 | 1.6 | 2.2% | < 0.1 | 112% | 80% | 120% | 108% | 80% | 120% | NA | 70% | 130% |
| Total Calcium | 3913767 | | 39.0 | 39.3 | 0.8% | < 0.1 | 106% | 80% | 120% | 102% | 80% | 120% | NA | 70% | 130% |
| Total Magnesium | 3913767 | | 4.3 | 4.5 | 3.3% | < 0.1 | 109% | 80% | 120% | 105% | 80% | 120% | NA | 70% | 130% |
| Bicarb. Alkalinity (as CaCO3) | 3904847 | 3904847 | 370 | 378 | 2.1% | < 5 | NA | 80% | 120% | | 80% | 120% | | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 3904847 | 3904847 | < 10 | < 10 | 0.0% | < 10 | NA | 80% | 120% | | 80% | 120% | | 80% | 120% |
| Hydroxide | 3904847 | 3904847 | < 5 | < 5 | 0.0% | < 5 | NA | 80% | 120% | | 80% | 120% | | 80% | 120% |
| Total Copper | 3913767 | | 5 | 5 | NA | < 1 | 108% | 80% | 120% | 108% | 80% | 120% | 105% | 70% | 130% |
| Total Iron | 3913767 | | 73 | 62 | NA | < 50 | 107% | 80% | 120% | 109% | 80% | 120% | 112% | 70% | 130% |
| Total Manganese | 3913767 | | 7 | 8 | NA | < 2 | 105% | 80% | 120% | 106% | 80% | 120% | 119% | 70% | 130% |
| Total Phosphorous | 3913767 | | <0.4 | <0.4 | NA | < 0.02 | 114% | 80% | 120% | 112% | 80% | 120% | 128% | 70% | 130% |
| Total Zinc | 3913767 | | 6 | 7 | NA | < 5 | 103% | 80% | 120% | 105% | 80% | 120% | 98% | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TSS | | | | | | | | | | | | | | | |
| Total Suspended Solids | 3914106 | 3914106 | <5 | <5 | NA | < 5 | 100% | 80% | 120% | NA | | | 99% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGAT Halifax - Low Level Total Phosphorous- 0.002mg/L & TKN | | | | | | | | | | | | | | | |
| Total Phosphorus | 3922531 | | 0.027 | 0.027 | 0.0% | < 0.002 | 101% | 70% | 130% | 100% | 80% | 120% | 101% | 70% | 130% |
| Total Kjeldahl Nitrogen | 3912385 | | <0.10 | <0.10 | NA | < 0.10 | 100% | 70% | 130% | 101% | 80% | 120% | 99% | 70% | 130% |

Comments: If the RPD value is NA, the results of the duplicates are less than 5X the RDL and will not be calculated.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Metals | | | | | | | | | | | | | | | |
| Total Aluminum | 3913767 | | <5 | 5 | NA | < 5 | 111% | 80% | 120% | 106% | 80% | 120% | 118% | 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.

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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Jun 15, 2022 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Total Antimony | 3913767 | | 2 | 3 | NA | < 2 | 80% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Total Arsenic | 3913767 | | 82 | 86 | 4.9% | < 2 | 101% | 80% | 120% | 100% | 80% | 120% | NA | 70% | 130% |
| Total Barium | 3913767 | | 6 | 6 | NA | < 5 | 106% | 80% | 120% | 111% | 80% | 120% | 103% | 70% | 130% |
| Total Beryllium | 3913767 | | <2 | <2 | NA | < 2 | 112% | 80% | 120% | 107% | 80% | 120% | 114% | 70% | 130% |
| Total Bismuth | 3913767 | | <2 | <2 | NA | < 2 | 102% | 80% | 120% | 118% | 80% | 120% | 119% | 70% | 130% |
| Total Boron | 3913767 | | 12 | 12 | NA | < 5 | 111% | 80% | 120% | 110% | 80% | 120% | 122% | 70% | 130% |
| Total Cadmium | 3913767 | | <0.09 | <0.09 | NA | < 0.09 | 102% | 80% | 120% | 104% | 80% | 120% | 100% | 70% | 130% |
| Total Chromium | 3913767 | | <1 | <1 | NA | < 1 | 103% | 80% | 120% | 105% | 80% | 120% | 111% | 70% | 130% |
| Total Cobalt | 3913767 | | <1 | <1 | NA | < 1 | 102% | 80% | 120% | 102% | 80% | 120% | 107% | 70% | 130% |
| Total Copper | 3913767 | | 5 | 5 | NA | < 1 | 108% | 80% | 120% | 108% | 80% | 120% | 105% | 70% | 130% |
| Total Iron | 3913767 | | 73 | 62 | NA | < 50 | 107% | 80% | 120% | 109% | 80% | 120% | 112% | 70% | 130% |
| Total Lead | 3913767 | | <0.5 | <0.5 | NA | < 0.5 | 113% | 80% | 120% | 118% | 80% | 120% | 109% | 70% | 130% |
| Total Manganese | 3913767 | | 7 | 8 | NA | < 2 | 105% | 80% | 120% | 106% | 80% | 120% | 119% | 70% | 130% |
| Total Molybdenum | 3913767 | | <2 | <2 | NA | < 2 | 94% | 80% | 120% | 94% | 80% | 120% | 106% | 70% | 130% |
| Total Nickel | 3913767 | | 3 | 3 | NA | < 2 | 107% | 80% | 120% | 120% | 80% | 120% | 120% | 70% | 130% |
| Total Selenium | 3913767 | | <1 | <1 | NA | < 1 | 99% | 80% | 120% | 94% | 80% | 120% | 99% | 70% | 130% |
| Total Silver | 3913767 | | <0.1 | <0.1 | NA | < 0.1 | 100% | 80% | 120% | 97% | 80% | 120% | 94% | 70% | 130% |
| Total Strontium | 3913767 | | 269 | 273 | NA | < 5 | 95% | 80% | 120% | 95% | 80% | 120% | NA | 70% | 130% |
| Total Thallium | 3913767 | | <0.1 | <0.1 | NA | < 0.1 | 111% | 80% | 120% | 119% | 80% | 120% | 110% | 70% | 130% |
| Total Tin | 3913767 | | <2 | <2 | NA | < 2 | 98% | 80% | 120% | 97% | 80% | 120% | 103% | 70% | 130% |
| Total Titanium | 3913767 | | <2 | <2 | NA | < 2 | 104% | 80% | 120% | 100% | 80% | 120% | 111% | 70% | 130% |
| Total Uranium | 3913767 | | 1.6 | 1.7 | 7.3% | < 0.2 | 96% | 80% | 120% | 101% | 80% | 120% | 85% | 70% | 130% |
| Total Vanadium | 3913767 | | <2 | <2 | NA | < 2 | 99% | 80% | 120% | 100% | 80% | 120% | 108% | 70% | 130% |
| Total Zinc | 3913767 | | 6 | 7 | NA | < 5 | 103% | 80% | 120% | 105% | 80% | 120% | 98% | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MF) | MIC-121-7002 | Sm 9222 H | MF/INCUBATOR |
| E. Coli (MF) | MIC-121-7002 | SM 9222 H | MF/INCUBATOR |
| Miscellaneous Analysis | | | |
| Subcontracted Data | | | |



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Total Phosphorus | INOR-93-6022 | modified from SM 4500-P B and SM 4500-P E | SPECTROPHOTOMETER |
| Total Kjeldahl Nitrogen | INOR-93-6048 | modified from EPA 351.2 and SM 4500-NORG D | LACHAT FIA |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Fluoride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| True Color | INOR-121-6008 | SM 2120 B | LACHAT FIA |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Potassium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Hydroxide | INORG-121-6001 | SM 2320 B | PC-TITRATE |
| Calculated TDS | | SM 1030E | CALCULATION |
| Hardness | | SM 2340B | CALCULATION |
| Langelier Index (@20C) | | | CALCULATION |
| Langelier Index (@ 4C) | | | CALCULATION |
| Saturation pH (@ 20C) | | | CALCULATION |
| Saturation pH (@ 4C) | | | CALCULATION |
| Anion Sum | | SM 1030E | CALCULATION |
| Cation sum | | SM 1030E | CALCULATION |
| % Difference/ Ion Balance | | SM 1030E | CALCULATION |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorous | MET-121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |
| Total Aluminum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of

AGAT WORK ORDER: 22X901528

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Total Antimony | MET121-6104 & MET-121-6105 | SM 3125 | ICP-MS |
| Total Arsenic | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Barium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Beryllium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Bismuth | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Boron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cadmium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Chromium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Cobalt | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Lead | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Molybdenum | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Nickel | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Selenium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Silver | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Strontium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Thallium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Tin | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Titanium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Uranium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Vanadium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |



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# Chain of Custody Record

**Laboratory Use Only**
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 8.3, 9.1, 9.2
Hold Time:
AGAT Job Number: 22X901528
Notes:

**Report Information**
Company: WOOD
Contact: Charlotte Clark
Address: 50 Troop Dr
Dartmouth,NS
Phone: 902-468-2848 Fax:
Client Project #: TE201017
AGAT Quotation: 335022B
Please Note: If quotation number is not provided client will be billed full price for analysis.

**Report Information** (Please print):
1. Name: Charlotte Clark
Email: charlotte.clark@woodplc.com
2. Name: Leah Darche
Email: leah.darche@woodplc.com

**Report Format**
☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

**Turnaround Time Required (TAT)**
**Regular TAT** ☑ 5 to 7 working days
**Rush TAT** ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
22MAY31 2:07PM
Date Required:

**Invoice To** Same Yes ☐ / No ☐
Company:
Contact: APInvoice.Canada@woodplc.com
Address:
Phone: Fax:
PO/Credit Card#: TE201017.****.****.5290.573000

**Regulatory Requirements** (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

**Drinking Water Sample:** ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

| Sample Identification | Date/Time Sampled | Sample Matrix | # Containers | Comments – Site/Sample Info. Sample Containment | Standard Water Analysis | LLTotal Phosphorous | TSS | TKN | TC/EC (MF) | Chlorophyll A & Pheophytin |
|---|---|---|---|---|---|---|---|---|---|---|
| PML-1 | 31 May 2022 9:04 | SW | 7 | | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| PML-2 | 9:25 | SW | 7 | | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| HWY102-1 | 10:20 | SW | 7 | | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| HWY102-2 | 13:15 | SW | 7 | | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| LU | 10:45 | SW | 7 | | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| LSD | 11:20 | SW | 7 | | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| KL-1 | 13:00 | SW | 7 | | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| KL-2 | 12:06 | SW | 7 | | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| KL-3 | 12:15 | SW | 7 | | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| KL-4 | 12:30 | SW | 7 | | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| KL-5 | 12:50 | SW | 7 | | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| | | | | | | | | | | |

| Samples Relinquished By (Print Name) | Date/Time | Samples Received By (Print Name) | Date/Time |
|---|---|---|---|
| LEAH DARCHE | 31 May 2022 | | |
| Samples Relinquished By (Sign) | Date/Time | Samples Received By (Sign) | Date/Time |
| | | | |

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1
N°:

Document ID: DIV-133-1502.002
Date revised: May 19, 2016

AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA LTD
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848
ATTENTION TO: Charlotte Clark
PROJECT: TE201017
AGAT WORK ORDER: 22X934461
MICROBIOLOGY ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor
MISCELLANEOUS ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor
WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor
DATE REPORTED: Sep 15, 2022
PAGES (INCLUDING COVER): 15
VERSION*: 3

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

VERSION 3:Version 2 supersedes version 1. Workorder 22X934461, version 1, issued August 29, 2022. Complete results September 15, 2022. AC

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.
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- The test results reported herewith relate only to the samples as received by the laboratory.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



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# Certificate of Analysis

AGAT WORK ORDER: 22X934461

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA LTD

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2022-08-18

DATE REPORTED: 2022-09-15

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | | HWY102-1 | | HWY102-2 | | LU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | | Water | | Water | | Water |
| | | | | DATE SAMPLED: | 2022-08-18 08:35 | 2022-08-18 08:10 | | 2022-08-18 09:15 | | 2022-08-18 12:40 | | 2022-08-18 09:35 |
| Parameter | Unit | G / S | RDL | | 4215169 | 4215194 | RDL | 4215195 | RDL | 4215196 | RDL | 4215197 |
| Total Coliforms (MF) | CFU/100 mL | 1 | 100 | | 2500 | 2600 | 100 | 20400 | 100 | 10500 | 100 | 18700 |
| E. Coli (MF) | CFU/100 mL | 1 | 1 | | 48 | 10 | 100 | 400 | 1 | 49 | 100 | 500 |

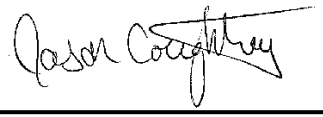
| | | | | SAMPLE DESCRIPTION: | LSD | | KL-1 | | KL-2 | KL-3 | KL-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | | Water | | Water | Water | Water |
| | | | | DATE SAMPLED: | 2022-08-18 10:20 | | 2022-08-18 11:22 | | 2022-08-18 11:40 | 2022-08-18 11:58 | 2022-08-18 12:46 |
| Parameter | Unit | G / S | RDL | | 4215198 | RDL | 4215199 | RDL | 4215200 | 4215201 | 4215202 |
| Total Coliforms (MF) | CFU/100 mL | 1 | 100 | | 23000 | 100 | 8600 | 100 | 21600 | 2700 | 4600 |
| E. Coli (MF) | CFU/100 mL | 1 | 1 | | >200 | 100 | 1500 | 1 | 13 | 173 | 100 |

| | | | | SAMPLE DESCRIPTION: | KL-5 |
|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water |
| | | | | DATE SAMPLED: | 2022-08-18 11:05 |
| Parameter | Unit | G / S | RDL | | 4215203 |
| Total Coliforms (MF) | CFU/100 mL | 1 | 1 | | 300 |
| E. Coli (MF) | CFU/100 mL | 1 | 1 | | 13 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
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.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:





Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 22X934461

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA LTD

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Subcontracted Data Received

DATE RECEIVED: 2022-08-18

DATE REPORTED: 2022-09-15

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2022-08-18 08:35 | 2022-08-18 08:10 | 2022-08-18 09:15 | 2022-08-18 12:40 | 2022-08-18 09:35 | 2022-08-18 10:20 | 2022-08-18 11:22 | 2022-08-18 11:40 |
| Parameter | Unit | G / S | RDL | 4215169 | 4215194 | 4215195 | 4215196 | 4215197 | 4215198 | 4215199 | 4215200 |
| Subcontracted Data | | | | Y | Y | Y | Y | Y | Y | Y | Y |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | KL-3 | KL-4 | KL-5 |
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2022-08-18 11:58 | 2022-08-18 12:46 | 2022-08-18 11:05 |
| Parameter | Unit | G / S | RDL | 4215201 | 4215202 | 4215203 |
| Subcontracted Data | | | | Y | Y | Y |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 22X934461

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA LTD

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## AGAT Halifax - Low Level Total Phosphorous- 0.002mg/L & TKN

DATE RECEIVED: 2022-08-18

DATE REPORTED: 2022-09-15

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2022-08-18 08:35 | 2022-08-18 08:10 | 2022-08-18 09:15 | 2022-08-18 12:40 | 2022-08-18 09:35 | 2022-08-18 10:20 | 2022-08-18 11:22 | 2022-08-18 11:40 |
| Parameter | Unit | G / S | RDL | | 4215169 | 4215194 | 4215195 | 4215196 | 4215197 | 4215198 | 4215199 | 4215200 |
| Total Phosphorus | mg/L | | 0.002 | | 0.070 | 0.010 | 0.284 | 0.033 | 0.062 | 0.064 | 0.298 | 0.063 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | | 0.29 | 0.33 | 0.44 | 0.64 | 0.77 | 0.61 | 0.22 | 0.43 |

| | | | | SAMPLE DESCRIPTION: | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water |
| | | | | DATE SAMPLED: | 2022-08-18 11:58 | 2022-08-18 12:46 | 2022-08-18 11:05 |
| Parameter | Unit | G / S | RDL | | 4215201 | 4215202 | 4215203 |
| Total Phosphorus | mg/L | | 0.002 | | 0.021 | 0.013 | 0.023 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | | 0.32 | 0.27 | 0.27 |

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

4215169-4215203 Total Phosphorous RDL is the calculated MDL.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 22X934461

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA LTD

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

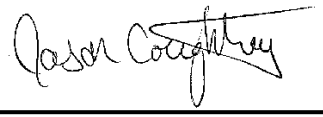
## Standard Water Analysis (Total)

DATE RECEIVED: 2022-08-18

DATE REPORTED: 2022-09-15

| SAMPLE DESCRIPTION: | | | | PML-1 | | PML-2 | HWY102-1 | | HWY102-2 | LU |
|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | | Water | Water | | Water | Water |
| DATE SAMPLED: | | | | 2022-08-18 08:35 | | 2022-08-18 08:10 | 2022-08-18 09:15 | | 2022-08-18 12:40 | 2022-08-18 09:35 |
| Parameter | Unit | G / S | RDL | 4215169 | RDL | 4215194 | 4215195 | RDL | 4215196 | 4215197 |
| pH | | | | 7.12 | | 6.64 | 6.70 | | 6.44 | 6.73 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 2.2 | 0.5 | 1.6 | 4.6 | 0.5 | 9.4 | 3.4 |
| Chloride | mg/L | | 1 | 78 | 1 | 82 | 101 | 2 | 186 | 167 |
| Fluoride | mg/L | | 0.12 | <0.12 | 0.12 | <0.12 | <0.12 | 0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 9 | 2 | 9 | 10 | 2 | 16 | 17 |
| Alkalinity | mg/L | | 5 | 14 | 5 | 11 | 25 | 5 | 13 | 24 |
| True Color | TCU | | 5.00 | 7.76 | 5.00 | 6.05 | 23.9 | 5.00 | 45.8 | 24.6 |
| Turbidity | NTU | | 0.5 | 0.5 | 0.5 | 0.8 | 1.9 | 0.5 | 5.4 | 2.8 |
| Electrical Conductivity | umho/cm | | 1 | 323 | 1 | 328 | 418 | 1 | 647 | 605 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.11 | 0.05 | 0.07 | 0.06 | 0.05 | 0.09 | 0.24 |
| Nitrate as N | mg/L | | 0.05 | 0.11 | 0.05 | 0.07 | 0.06 | 0.05 | 0.09 | 0.24 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | 0.05 | <0.05 | <0.05 | 0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | 0.20 | 0.03 | 0.05 | 0.05 | 0.03 | 0.09 | 0.14 |
| Total Organic Carbon | mg/L | | 0.5 | 3.5 | 0.5 | 3.7 | 6.9 | 0.5 | 9.4 | 6.3 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | 0.01 | <0.01 | <0.01 | 0.01 | 0.01 | <0.01 |
| Total Sodium | mg/L | | 1 | 49 | 1 | 49 | 55 | 1 | 107 | 91 |
| Total Potassium | mg/L | | 0.1 | 1.4 | 0.1 | 1.5 | 2.4 | 0.1 | 2.1 | 2.7 |
| Total Calcium | mg/L | | 0.1 | 9.8 | 0.8 | 10.2 | 18.4 | 0.8 | 16.0 | 18.7 |
| Total Magnesium | mg/L | | 0.1 | 1.6 | 0.1 | 1.6 | 2.6 | 0.1 | 2.4 | 2.8 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 14 | 5 | 11 | 25 | 5 | 13 | 24 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | 10 | <10 | <10 | 10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | 5 | <5 | <5 | 5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 158 | 1 | 160 | 205 | 1 | 339 | 316 |
| Hardness | mg/L | | | 31.1 | | 32.1 | 56.7 | | 49.8 | 58.2 |
| Langelier Index (@20C) | NA | | | -2.35 | | -2.92 | -2.26 | | -2.88 | -2.26 |
| Langelier Index (@ 4C) | NA | | | -2.67 | | -3.24 | -2.58 | | -3.20 | -2.58 |
| Saturation pH (@ 20C) | NA | | | 9.47 | | 9.56 | 8.96 | | 9.32 | 8.99 |
| Saturation pH (@ 4C) | NA | | | 9.79 | | 9.88 | 9.28 | | 9.64 | 9.31 |
| Anion Sum | me/L | | | 2.68 | | 2.73 | 3.56 | | 5.85 | 5.56 |

Certified By:





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# Certificate of Analysis

AGAT WORK ORDER: 22X934461

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA LTD

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2022-08-18

DATE REPORTED: 2022-09-15

| SAMPLE DESCRIPTION: | | | | PML-1 | | PML-2 | HWY102-1 | | HWY102-2 | LU |
|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | | Water | Water | | Water | Water |
| DATE SAMPLED: | | | | 2022-08-18 08:35 | | 2022-08-18 08:10 | 2022-08-18 09:15 | | 2022-08-18 12:40 | 2022-08-18 09:35 |
| Parameter | Unit | G / S | RDL | 4215169 | RDL | 4215194 | 4215195 | RDL | 4215196 | 4215197 |
| Cation sum | me/L | | | 2.81 | | 2.82 | 3.61 | | 5.78 | 5.23 |
| % Difference/ Ion Balance | % | | | 2.5 | | 1.7 | 0.6 | | 0.6 | 3.0 |
| Total Copper | ug/L | | 1 | <1 | 1 | <1 | 1 | 1 | 2 | 2 |
| Total Iron | ug/L | | 50 | 139 | 50 | 93 | 276 | 50 | 1250 | 633 |
| Total Manganese | ug/L | | 38 | 126 | 2 | 58 | 44 | 38 | 148 | 147 |
| Total Phosphorous | mg/L | | 0.02 | <0.02 | 0.02 | <0.02 | <0.02 | 0.02 | 0.03 | 0.02 |
| Total Zinc | ug/L | | 5 | <5 | 5 | 6 | <5 | 5 | 7 | 10 |

Certified By:



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PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA LTD

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2022-08-18

DATE REPORTED: 2022-09-15

| | | SAMPLE DESCRIPTION: | | LSD | | KL-1 | KL-2 | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2022-08-18 10:20 | | 2022-08-18 11:22 | 2022-08-18 11:40 | 2022-08-18 11:58 | 2022-08-18 12:46 | 2022-08-18 11:05 |
| Parameter | Unit | G / S | RDL | 4215198 | RDL | 4215199 | 4215200 | 4215201 | 4215202 | 4215203 |
| pH | | | | 6.70 | | 6.55 | 6.75 | 6.61 | 6.57 | 6.59 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 4.3 | 0.5 | 2.0 | 6.0 | 2.1 | 2.1 | 2.1 |
| Chloride | mg/L | | 1 | 42 | 1 | 73 | 19 | 73 | 75 | 72 |
| Fluoride | mg/L | | 0.12 | <0.12 | 0.12 | <0.12 | <0.12 | <0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 5 | 2 | 9 | 7 | 9 | 9 | 9 |
| Alkalinity | mg/L | | 5 | 14 | 5 | 9 | 24 | 10 | 10 | 9 |
| True Color | TCU | | 5.00 | 16.7 | 5.00 | 9.48 | 64.6 | 11.5 | 11.4 | 11.0 |
| Turbidity | NTU | | 0.5 | 4.6 | 0.5 | 1.4 | 1.4 | 0.5 | <0.5 | <0.5 |
| Electrical Conductivity | umho/cm | | 1 | 197 | 1 | 286 | 135 | 291 | 300 | 284 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.31 | 0.05 | 0.17 | 0.12 | 0.09 | 0.13 | 0.11 |
| Nitrate as N | mg/L | | 0.05 | 0.31 | 0.05 | 0.17 | 0.12 | 0.09 | 0.13 | 0.11 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | 0.13 | 0.03 | <0.03 | 0.04 | 0.04 | <0.03 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 6.1 | 0.5 | 4.2 | 8.5 | 4.0 | 3.7 | 3.9 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | 0.01 | <0.01 | <0.01 | 0.01 | <0.01 | 0.01 |
| Total Sodium | mg/L | | 1 | 24 | 1 | 44 | 13 | 45 | 44 | 43 |
| Total Potassium | mg/L | | 0.1 | 1.4 | 0.1 | 1.2 | 1.5 | 1.3 | 1.3 | 1.2 |
| Total Calcium | mg/L | | 0.1 | 8.1 | 0.1 | 8.3 | 9.3 | 9.4 | 9.1 | 8.4 |
| Total Magnesium | mg/L | | 0.1 | 1.9 | 0.1 | 1.3 | 2.0 | 1.5 | 1.4 | 1.3 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 14 | 5 | 9 | 24 | 10 | 10 | 9 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | 10 | <10 | <10 | <10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | 5 | <5 | <5 | <5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 94 | 1 | 143 | 68 | 146 | 147 | 141 |
| Hardness | mg/L | | | 28.0 | | 26.1 | 31.5 | 29.6 | 28.5 | 26.3 |
| Langelier Index (@20C) | NA | | | -2.83 | | -3.18 | -2.47 | -3.02 | -3.07 | -3.13 |
| Langelier Index (@ 4C) | NA | | | -3.15 | | -3.50 | -2.79 | -3.34 | -3.39 | -3.45 |
| Saturation pH (@ 20C) | NA | | | 9.53 | | 9.73 | 9.22 | 9.63 | 9.64 | 9.72 |
| Saturation pH (@ 4C) | NA | | | 9.85 | | 10.0 | 9.54 | 9.95 | 9.96 | 10.0 |
| Anion Sum | me/L | | | 1.59 | | 2.44 | 1.17 | 2.45 | 2.51 | 2.41 |

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 22X934461

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA LTD

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2022-08-18

DATE REPORTED: 2022-09-15

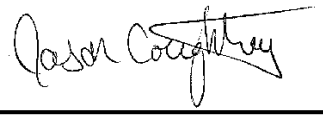
| | | SAMPLE DESCRIPTION: | | LSD | | KL-1 | KL-2 | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2022-08-18 10:20 | | 2022-08-18 11:22 | 2022-08-18 11:40 | 2022-08-18 11:58 | 2022-08-18 12:46 | 2022-08-18 11:05 |
| Parameter | Unit | G / S | RDL | 4215198 | RDL | 4215199 | 4215200 | 4215201 | 4215202 | 4215203 |
| Cation sum | me/L | | | 1.71 | | 2.47 | 1.28 | 2.60 | 2.52 | 2.43 |
| % Difference/ Ion Balance | % | | | 3.6 | | 0.7 | 4.4 | 2.9 | 0.2 | 0.6 |
| Total Copper | ug/L | | 1 | <1 | 1 | <1 | <1 | <1 | <1 | 1 |
| Total Iron | ug/L | | 50 | 761 | 50 | 82 | 631 | 178 | 96 | 56 |
| Total Manganese | ug/L | | 38 | 529 | 2 | 37 | 92 | 97 | 42 | 16 |
| Total Phosphorous | mg/L | | 0.02 | 0.02 | 0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Total Zinc | ug/L | | 5 | <5 | 5 | <5 | <5 | <5 | <5 | <5 |

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

4215169-4215203 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:





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AGAT Laboratories
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# Certificate of Analysis

AGAT WORK ORDER: 22X934461

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA LTD

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TSS

DATE RECEIVED: 2022-08-18

DATE REPORTED: 2022-09-15

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2022-08-18 08:35 | 2022-08-18 08:10 | 2022-08-18 09:15 | 2022-08-18 12:40 | 2022-08-18 09:35 | 2022-08-18 10:20 | 2022-08-18 11:22 | 2022-08-18 11:40 |
| Parameter | Unit | G / S | RDL | 4215169 | 4215194 | 4215195 | 4215196 | 4215197 | 4215198 | 4215199 | 4215200 |
| Total Suspended Solids | mg/L | | 5 | <5 | <5 | <5 | <5 | 6 | 6 | <5 | <5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | SAMPLE DESCRIPTION: | | KL-3 | KL-4 | KL-5 |
| | | SAMPLE TYPE: | | Water | Water | Water |
| | | DATE SAMPLED: | | 2022-08-18 11:58 | 2022-08-18 12:46 | 2022-08-18 11:05 |
| Parameter | Unit | G / S | RDL | 4215201 | 4215202 | 4215203 |
| Total Suspended Solids | mg/L | | 5 | <5 | <5 | <5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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# Exceedance Summary

AGAT WORK ORDER: 22X934461

PROJECT: TE201017

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA LTD

ATTENTION TO: Charlotte Clark

| SAMPLEID | SAMPLE TITLE | GUIDELINE | ANALYSIS PACKAGE | PARAMETER | UNIT | GUIDEVALUE | RESULT |
|---|---|---|---|---|---|---|---|
| 4215169 | PML-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 48 |
| 4215169 | PML-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 2500 |
| 4215194 | PML-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 10 |
| 4215194 | PML-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 2600 |
| 4215195 | HWY102-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 400 |
| 4215195 | HWY102-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 20400 |
| 4215196 | HWY102-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 49 |
| 4215196 | HWY102-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 10500 |
| 4215197 | LU | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 500 |
| 4215197 | LU | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 18700 |
| 4215198 | LSD | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 23000 |
| 4215199 | KL-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 1500 |
| 4215199 | KL-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 8600 |
| 4215200 | KL-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 13 |
| 4215200 | KL-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 21600 |
| 4215201 | KL-3 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 173 |
| 4215201 | KL-3 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 2700 |
| 4215202 | KL-4 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 100 |
| 4215202 | KL-4 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 4600 |
| 4215203 | KL-5 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 13 |
| 4215203 | KL-5 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 300 |



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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA
AGAT WORK ORDER: 22X934461
PROJECT: TE201017
ATTENTION TO: Charlotte Clark
SAMPLING SITE:
SAMPLED BY:

## Water Analysis

RPT Date: Sep 15, 2022

| PARAMETER | Batch | Sample Id | DUPLICATE Dup #1 | Dup #2 | RPD | Method Blank | REFERENCE MATERIAL Measured Value | Acceptable Limits Lower | Upper | METHOD BLANK SPIKE Recovery | Acceptable Limits Lower | Upper | MATRIX SPIKE Recovery | Acceptable Limits Lower | Upper |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| pH | 4216615 | | 7.04 | 7.06 | 0.3% | < | 100% | 80% | 120% | | 80% | 120% | | 80% | 120% |
| Reactive Silica as SiO2 | 4214037 | | 9.9 | 10.7 | 7.8% | < 0.5 | 98% | 80% | 120% | 98% | 80% | 120% | 108% | 80% | 120% |
| Chloride | 4215226 | | 9 | 7 | 18.3% | < 1 | 87% | 80% | 120% | NA | 80% | 120% | 86% | 70% | 130% |
| Fluoride | 4215226 | | 0.28 | 0.29 | NA | < 0.12 | 112% | 80% | 120% | NA | 80% | 120% | 94% | 70% | 130% |
| Sulphate | 4215226 | | 3 | 3 | NA | < 2 | 105% | 80% | 120% | NA | 80% | 120% | 95% | 70% | 130% |
| Alkalinity | 4216615 | | 56 | 58 | 3.5% | < 5 | 91% | 80% | 120% | | | | | | |
| True Color | 4214037 | | <5.00 | <5.00 | NA | < 5 | 87% | 80% | 120% | 102% | 80% | 120% | NA | | |
| Turbidity | 4216615 | | 0.6 | 0.7 | NA | < 0.5 | 95% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 4216615 | | 168 | 170 | 1.2% | < 1 | 104% | 90% | 110% | | | | | | |
| Nitrate as N | 4215226 | | 0.11 | 0.08 | NA | < 0.05 | 106% | 80% | 120% | NA | 80% | 120% | 87% | 70% | 130% |
| Nitrite as N | 4215226 | | <0.05 | <0.05 | NA | < 0.05 | 96% | 80% | 120% | NA | 80% | 120% | 95% | 70% | 130% |
| Ammonia as N | 4215169 | 4215169 | 0.20 | 0.07 | NA | < 0.03 | 112% | 80% | 120% | 99% | 80% | 120% | 99% | 70% | 130% |
| Total Organic Carbon | 4209919 | | 5.1 | 4.9 | 3.1% | < 0.5 | 101% | 80% | 120% | NA | 80% | 120% | 102% | 80% | 120% |
| Total Sodium | 4218511 | | 11 | 11 | 1.0% | < 0.1 | 101% | 80% | 120% | 100% | 80% | 120% | NA | 70% | 130% |
| Total Potassium | 4218511 | | 0.9 | 0.9 | 0.6% | < 0.1 | 102% | 80% | 120% | 101% | 80% | 120% | 121% | 70% | 130% |
| Total Calcium | 4218511 | | 8.2 | 8.4 | 2.4% | < 0.1 | 97% | 80% | 120% | 99% | 80% | 120% | NA | 70% | 130% |
| Total Magnesium | 4218511 | | 5.2 | 5.3 | 2.5% | < 0.1 | 102% | 80% | 120% | 101% | 80% | 120% | NA | 70% | 130% |
| Bicarb. Alkalinity (as CaCO3) | 4216615 | | 56 | 58 | 3.5% | < 5 | NA | 80% | 120% | | 80% | 120% | | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 4216615 | | < 10 | < 10 | 0.0% | < 10 | NA | 80% | 120% | | 80% | 120% | | 80% | 120% |
| Hydroxide | 4216615 | | < 5 | < 5 | 0.0% | < 5 | NA | 80% | 120% | | 80% | 120% | | 80% | 120% |
| Total Copper | 4218511 | | <1 | <1 | NA | < 1 | 101% | 80% | 120% | 101% | 80% | 120% | 106% | 70% | 130% |
| Total Iron | 4218511 | | 11300 | 11300 | 0.6% | < 50 | 101% | 80% | 120% | 100% | 80% | 120% | NA | 70% | 130% |
| Total Manganese | 4218511 | | 307 | 307 | 0.1% | < 2 | 96% | 80% | 120% | 96% | 80% | 120% | NA | 70% | 130% |
| Total Phosphorous | 4218511 | | 0.08 | 0.08 | NA | < 0.02 | 100% | 80% | 120% | 102% | 80% | 120% | NA | 70% | 130% |
| Total Zinc | 4218511 | | 25 | 25 | NA | < 5 | 101% | 80% | 120% | 98% | 80% | 120% | 99% | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TSS | | | | | | | | | | | | | | | |
| Total Suspended Solids | 4215169 | 4215169 | <5 | <5 | NA | < 5 | 108% | 80% | 120% | NA | | | 100% | 80% | 120% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| Chloride | 4215192 | | 10 | 10 | 0.4% | < 1 | 88% | 80% | 120% | NA | 80% | 120% | 95% | 70% | 130% |
| Fluoride | 4215192 | | <0.12 | <0.12 | NA | < 0.12 | 113% | 80% | 120% | NA | 80% | 120% | 107% | 70% | 130% |
| Sulphate | 4215192 | | 29 | 30 | 5.4% | < 2 | 106% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Nitrate as N | 4215192 | | 0.36 | 0.37 | 3.7% | < 0.05 | 103% | 80% | 120% | NA | 80% | 120% | 88% | 70% | 130% |
| Nitrite as N | 4215192 | | <0.05 | <0.05 | NA | < 0.05 | 97% | 80% | 120% | NA | 80% | 120% | 98% | 70% | 130% |

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

AGAT Halifax - Low Level Total Phosphorous- 0.002mg/L & TKN



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.

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# Quality Assurance

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA

AGAT WORK ORDER: 22X934461

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

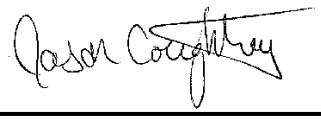
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: Sep 15, 2022 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| Total Phosphorus | 4213918 | | 1.39 | 1.38 | 0.7% | < 0.002 | 105% | 70% | 130% | 106% | 80% | 120% | NA | 70% | 130% |
| Total Kjeldahl Nitrogen | 4211734 | | 0.29 | 0.24 | NA | < 0.10 | 103% | 70% | 130% | 102% | 80% | 120% | 100% | 70% | 130% |

Comments: If the RPD value is NA, the results of the duplicates are less than 5X the RDL and will not be calculated.
Matrix spike: Spike level < native concentration. Matrix spike acceptance limits do not apply.

Certified By:





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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA

AGAT WORK ORDER: 22X934461

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MF) | MIC-121-7002 | Sm 9222 H | MF/INCUBATOR |
| E. Coli (MF) | MIC-121-7002 | SM 9222 H | MF/INCUBATOR |
| Miscellaneous Analysis | | | |
| Subcontracted Data | | | |



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# Method Summary

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS CANADA

AGAT WORK ORDER: 22X934461

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Total Phosphorus | INOR-93-6022 | modified from SM 4500-P B and SM 4500-P E | SPECTROPHOTOMETER |
| Total Kjeldahl Nitrogen | INOR-93-6048 | modified from EPA 351.2 and SM 4500-NORG D | LACHAT FIA |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Fluoride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| True Color | INOR-121-6008 | SM 2120 B | LACHAT FIA |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Potassium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Hydroxide | INORG-121-6001 | SM 2320 B | PC-TITRATE |
| Calculated TDS | | SM 1030E | CALCULATION |
| Hardness | | SM 2340B | CALCULATION |
| Langelier Index (@20C) | | | CALCULATION |
| Langelier Index (@ 4C) | | | CALCULATION |
| Saturation pH (@ 20C) | | | CALCULATION |
| Saturation pH (@ 4C) | | | CALCULATION |
| Anion Sum | | SM 1030E | CALCULATION |
| Cation sum | | SM 1030E | CALCULATION |
| % Difference/ Ion Balance | | SM 1030E | CALCULATION |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorous | MET-121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |



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20.1, 20.1, 21.1

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## Chain of Custody Record

**Laboratory Use Only**
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 16.9, 16.5, 15.8
Hold Time:
AGAT Job Number: 22x934461
Notes: Cool ice 22AUG18 1:09PM

**Report Information**
Company: Wood Environment and Infrastructure Solutions
Contact: Charlotte Clark
Address: 50 Troop Avenue, Dartmouth
Nova Scotia, Canada, B3B 1Z1
Phone: Fax:
Client Project #: TE201017
AGAT Quotation: 335022BP
Please Note: If quotation number is not provided client will be billed full price for analysis.

**Report Information** (Please print):
1. Name: Leah Darche
Email: leah.darche@woodplc.com
2. Name: Charlotte Clark
Email: charlotte.clark@woodplc.com

**Report Format**
☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included

**Turnaround Time Required (TAT)**
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

**Invoice To** Same Yes ☐ / No ☐
Company: Wood Environment and Infrastructure Solutions
Contact: APInvoice.Canada@woodplc.com
Address:
Phone: 709-722-7023 Fax:
PO/Credit Card#: TE201017.****.****.5290.573000

**Regulatory Requirements** (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NL DOEC GW
☐ Commercial
☐ Res/Park ☐ NLDOEC Discharge
☐ Agricultural
☐ FWAL
☐ Sediment ☐ Other

**Drinking Water Sample:** ☐ Yes ☑ No **Salt Water:** ☐ Yes ☑ No
Reg. No.:

| Sample Identification | Date/Time Sampled | Sample Matrix | # Containers | Comments – Site/Sample Info. Sample Containment | Field Filtered/Preserved | Standard Water Analysis | Metals: ☐ Total ☐ Diss ☐ Available | Mercury | ☐ BOD ☐ CBOD | pH | ☑ TSS ☐ TDS ☐ VSS | TKN | Total Phosphorus | Phenols | Tier 1: TPH/BTEX (PIRI) ☐ low level | Tier 2: TPH/BTEX Fractionation | CCME-CWS TPH/BTEX | VOC | THM | HAA | PAH | PCB | TC + EC ☐ P/A ☑ MF | ☐ HPC ☐ Pseudomonas | Fecal Coliform ☐ MPN ☐ MF | Other: Chlorophyll a (Innotech) | Other: LL Total Phosphorus | Hazardous (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PML-1 | 18/08/22 9:35 | SW | 7 | Ca, Cu, Fe, Mg, Mn, K, Na, Zn | | ☑ | | | | | ☑ | ☑ | | | | | | | | | | | ☑ | | | ☑ | ☑ | |
| PML-2 | " 8:10 | SW | 7 | Ca, Cu, Fe, Mg, Mn, K, Na, Zn | | ☑ | | | | | ☑ | ☑ | | | | | | | | | | | ☑ | | | ☑ | ☑ | |
| HWY102-1 | " 9:15 | SW | 7 | Ca, Cu, Fe, Mg, Mn, K, Na, Zn | | ☑ | | | | | ☑ | ☑ | | | | | | | | | | | ☑ | | | ☑ | ☑ | |
| HWY102-2 | 18/08/22 12:40 | SW | 7 | Ca, Cu, Fe, Mg, Mn, K, Na, Zn | | ☑ | | | | | ☑ | ☑ | | | | | | | | | | | ☑ | | | ☑ | ☑ | |
| LU | " 9:35 | SW | 7 | Ca, Cu, Fe, Mg, Mn, K, Na, Zn | | ☑ | | | | | ☑ | ☑ | | | | | | | | | | | ☑ | | | ☑ | ☑ | |
| LSD | " 10:20 | SW | 7 | Ca, Cu, Fe, Mg, Mn, K, Na, Zn | | ☑ | | | | | ☑ | ☑ | | | | | | | | | | | ☑ | | | ☑ | ☑ | |
| KL-1 | " 11:22 | SW | 7 | Ca, Cu, Fe, Mg, Mn, K, Na, Zn | | ☑ | | | | | ☑ | ☑ | | | | | | | | | | | ☑ | | | ☑ | ☑ | |
| KL-2 | " 11:40 | SW | 7 | Ca, Cu, Fe, Mg, Mn, K, Na, Zn | | ☑ | | | | | ☑ | ☑ | | | | | | | | | | | ☑ | | | ☑ | ☑ | |
| KL-3 | " 11:58 | SW | 7 | Ca, Cu, Fe, Mg, Mn, K, Na, Zn | | ☑ | | | | | ☑ | ☑ | | | | | | | | | | | ☑ | | | ☑ | ☑ | |
| KL-4 | " 12:46 | SW | 7 | Ca, Cu, Fe, Mg, Mn, K, Na, Zn | | ☑ | | | | | ☑ | ☑ | | | | | | | | | | | ☑ | | | ☑ | ☑ | |
| KL-5 | " 11:05 | SW | 7 | Ca, Cu, Fe, Mg, Mn, K, Na, Zn | | ☑ | | | | | ☑ | ☑ | | | | | | | | | | | ☑ | | | ☑ | ☑ | |
| | " | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Samples Relinquished By (Print Name) | Date/Time | Samples Received By (Print Name) | Date/Time |
|---|---|---|---|
| Samantha Henry | 1:00 pm | | |
| **Samples Relinquished By (Sign):** | **Date/Time** | **Samples Received By (Sign):** | **Date/Time** |
| | 18/08/22 | | |

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page ☐ of ☐
N°:

Document ID: DW-196-150X652 Date revised: March 16, 2018

AGAT Laboratories

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CLIENT NAME: WSP E&I CANADA LIMITED
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848
ATTENTION TO: Charlotte Clark
PROJECT: TE201017
AGAT WORK ORDER: 22X960295
MICROBIOLOGY ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer
WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor
DATE REPORTED: Nov 01, 2022
PAGES (INCLUDING COVER): 16
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

VERSION 1:Please note: Attached is your partial report only. Complete results, including Chlorophyll a to follow.

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# Certificate of Analysis

AGAT WORK ORDER: 22X960295

PROJECT: TE201017

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2022-10-21

DATE REPORTED: 2022-10-22

| | | | | SAMPLE DESCRIPTION: | PML-1 | PML-2 | HWY102-1 | HWY102-2 | | LU | | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | | Water | | Water |
| | | | | DATE SAMPLED: | 2022-10-21 09:15 | 2022-10-21 09:00 | 2022-10-21 09:55 | 2022-10-21 13:05 | | 2022-10-21 10:25 | | 2022-10-21 11:07 |
| Parameter | Unit | G / S | RDL | | 4439615 | 4439627 | 4439628 | 4439629 | RDL | 4439630 | RDL | 4439631 |
| Total Coliforms (MF) | CFU/100 mL | 1 | 100 | | 5500 | 1700 | 8900 | 4700 | 100 | 12300 | 100 | 7900 |
| E. Coli (MF) | CFU/100 mL | 1 | 1 | | 44 | 50 | 68 | 22 | 100 | 500 | 1 | 53 |

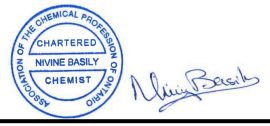
| | | | | SAMPLE DESCRIPTION: | KL-1 | KL-2 | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2022-10-21 11:55 | 2022-10-21 12:10 | 2022-10-21 12:28 | 2022-10-21 12:45 | 2022-10-21 11:43 |
| Parameter | Unit | G / S | RDL | | 4439632 | 4439633 | 4439634 | 4439635 | 4439636 |
| Total Coliforms (MF) | CFU/100 mL | 1 | 100 | | 4800 | 8600 | 3900 | 3000 | 400 |
| E. Coli (MF) | CFU/100 mL | 1 | 1 | | 86 | 28 | 62 | 50 | 12 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
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.

4439615-4439636 RDL > 1 indicates dilutions of the sample.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:






Results relate only to the items tested. Results apply to samples as received.

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# Certificate of Analysis

AGAT WORK ORDER: 22X960295

PROJECT: TE201017

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Subcontracted Data Received - Chlorophyll a

DATE RECEIVED: 2022-10-21

DATE REPORTED:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2022-10-21 09:15 | 2022-10-21 09:00 | 2022-10-21 09:55 | 2022-10-21 13:05 | 2022-10-21 10:25 | 2022-10-21 11:07 | 2022-10-21 11:55 | 2022-10-21 12:10 |
| Parameter | Unit | G / S | RDL | 4439615 | 4439627 | 4439628 | 4439629 | 4439630 | 4439631 | 4439632 | 4439633 |
| Subcontracted Data | | | | | | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | KL-3 | KL-4 | KL-5 |
| SAMPLE TYPE: | | | | Water | Water | Water |
| DATE SAMPLED: | | | | 2022-10-21 12:28 | 2022-10-21 12:45 | 2022-10-21 11:43 |
| Parameter | Unit | G / S | RDL | 4439634 | 4439635 | 4439636 |
| Subcontracted Data | | | | | | |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 22X960295

PROJECT: TE201017

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## AGAT Halifax - Low Level Total Phosphorous- 0.002mg/L

DATE RECEIVED: 2022-10-21

DATE REPORTED: 2022-10-27

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2022-10-21 09:15 | 2022-10-21 09:00 | 2022-10-21 09:55 | 2022-10-21 13:05 | 2022-10-21 10:25 | 2022-10-21 11:07 | 2022-10-21 11:55 | 2022-10-21 12:10 |
| Parameter | Unit | G / S | RDL | 4439615 | 4439627 | 4439628 | 4439629 | 4439630 | 4439631 | 4439632 | 4439633 |
| Total Phosphorus | mg/L | | 0.002 | 0.006 | <0.002 | 0.011 | 0.006 | 0.016 | 0.002 | 0.004 | <0.002 |

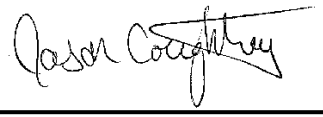
| | | | | | | |
|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | KL-3 | KL-4 | KL-5 |
| SAMPLE TYPE: | | | | Water | Water | Water |
| DATE SAMPLED: | | | | 2022-10-21 12:28 | 2022-10-21 12:45 | 2022-10-21 11:43 |
| Parameter | Unit | G / S | RDL | 4439634 | 4439635 | 4439636 |
| Total Phosphorus | mg/L | | 0.002 | 0.006 | 0.004 | 0.003 |

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

4439615-4439636 Total Phosphorous RDL is the calculated MDL.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:





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# Certificate of Analysis

AGAT WORK ORDER: 22X960295

PROJECT: TE201017

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

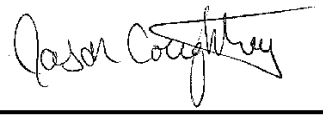
## Standard Water Analysis (Total)

DATE RECEIVED: 2022-10-21

DATE REPORTED: 2022-10-29

| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | | HWY102-1 | HWY102-2 | LU | | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | | Water | Water | Water | | Water |
| DATE SAMPLED: | | | | 2022-10-21 09:15 | 2022-10-21 09:00 | | 2022-10-21 09:55 | 2022-10-21 13:05 | 2022-10-21 10:25 | | 2022-10-21 11:07 |
| Parameter | Unit | G / S | RDL | 4439615 | 4439627 | RDL | 4439628 | 4439629 | 4439630 | RDL | 4439631 |
| pH | | | | 7.18 | 6.29 | | 6.38 | 6.15 | 6.42 | | 6.34 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 1.8 | 2.7 | 0.5 | 3.2 | 5.3 | 2.8 | 0.5 | 3.9 |
| Chloride | mg/L | | 1 | 62 | 69 | 1 | 71 | 108 | 97 | 1 | 37 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | 0.12 | <0.12 | <0.12 | <0.12 | 0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 10 | 10 | 2 | 12 | 10 | 21 | 2 | 7 |
| Alkalinity | mg/L | | 5 | 11 | 10 | 5 | 18 | 9 | 16 | 5 | 10 |
| True Color | TCU | | 5.00 | 13.5 | 15.9 | 5.00 | 46.0 | 42.6 | 26.4 | 5.00 | 31.5 |
| Turbidity | NTU | | 0.5 | 0.7 | 0.6 | 0.5 | 1.0 | 2.0 | 3.8 | 0.5 | 2.9 |
| Electrical Conductivity | umho/cm | | 1 | 256 | 271 | 1 | 303 | 413 | 420 | 1 | 170 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.21 | 0.18 | 0.05 | 0.30 | 0.08 | 0.75 | 0.05 | <0.05 |
| Nitrate as N | mg/L | | 0.05 | 0.21 | 0.18 | 0.05 | 0.30 | 0.08 | 0.75 | 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 |
| Ammonia as N | mg/L | | 0.03 | 0.04 | <0.03 | 0.03 | <0.03 | 0.22 | 0.06 | 0.03 | 0.14 |
| Total Organic Carbon | mg/L | | 0.5 | 4.1 | 4.2 | 0.5 | 7.9 | 7.8 | 5.9 | 0.5 | 7.3 |
| Ortho-Phosphate as P | mg/L | | 0.01 | <0.01 | 0.01 | 0.01 | 0.01 | 0.01 | <0.01 | 0.01 | 0.01 |
| Total Sodium | mg/L | | 1 | 38 | 41 | 1 | 36 | 63 | 60 | 1 | 22 |
| Total Potassium | mg/L | | 0.1 | 1.3 | 1.4 | 0.1 | 2.4 | 1.9 | 2.2 | 0.1 | 1.5 |
| Total Calcium | mg/L | | 0.1 | 8.5 | 9.4 | 0.8 | 13.7 | 11.1 | 11.8 | 0.1 | 6.4 |
| Total Magnesium | mg/L | | 0.1 | 1.4 | 1.4 | 0.1 | 2.2 | 2.1 | 1.9 | 0.1 | 1.6 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 11 | 10 | 5 | 18 | 9 | 16 | 5 | 10 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | 10 | <10 | <10 | <10 | 10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | 5 | <5 | <5 | <5 | 5 | <5 |
| Calculated TDS | mg/L | | 1 | 129 | 139 | 1 | 150 | 203 | 207 | 1 | 82 |
| Hardness | mg/L | | | 27.0 | 29.2 | | 43.3 | 36.4 | 37.3 | | 22.6 |
| Langelier Index (@20C) | NA | | | -2.45 | -3.34 | | -2.83 | -3.47 | -2.92 | | -3.43 |
| Langelier Index (@ 4C) | NA | | | -2.77 | -3.66 | | -3.15 | -3.79 | -3.24 | | -3.75 |
| Saturation pH (@ 20C) | NA | | | 9.63 | 9.63 | | 9.21 | 9.62 | 9.34 | | 9.77 |
| Saturation pH (@ 4C) | NA | | | 9.95 | 9.95 | | 9.53 | 9.94 | 9.66 | | 10.1 |
| Anion Sum | me/L | | | 2.19 | 2.37 | | 2.63 | 3.44 | 3.55 | | 1.39 |

Certified By:





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# Certificate of Analysis

AGAT WORK ORDER: 22X960295

PROJECT: TE201017

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2022-10-21

DATE REPORTED: 2022-10-29

| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | | HWY102-1 | HWY102-2 | LU | | LSD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | Water | | Water | Water | Water | | Water |
| DATE SAMPLED: | | | | 2022-10-21 09:15 | 2022-10-21 09:00 | | 2022-10-21 09:55 | 2022-10-21 13:05 | 2022-10-21 10:25 | | 2022-10-21 11:07 |
| Parameter | Unit | G / S | RDL | 4439615 | 4439627 | RDL | 4439628 | 4439629 | 4439630 | RDL | 4439631 |
| Cation sum | me/L | | | 2.24 | 2.41 | | 2.51 | 3.56 | 3.45 | | 1.49 |
| % Difference/ Ion Balance | % | | | 1.0 | 0.9 | | 2.5 | 1.7 | 1.5 | | 3.5 |
| Total Copper | ug/L | | 1 | <1 | <1 | 1 | 1 | 2 | 3 | 1 | 1 |
| Total Iron | ug/L | | 50 | 86 | 76 | 50 | 151 | 309 | 360 | 50 | 245 |
| Total Manganese | ug/L | | 2 | 21 | 28 | 2 | 11 | 40 | 56 | 2 | 27 |
| Total Phosphorous | mg/L | | 0.02 | 0.03 | 0.03 | 0.02 | 0.03 | 0.03 | 0.03 | 0.02 | 0.03 |
| Total Zinc | ug/L | | 5 | <5 | <5 | 5 | <5 | 7 | 18 | 5 | <5 |

Certified By:



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AGAT WORK ORDER: 22X960295

PROJECT: TE201017

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

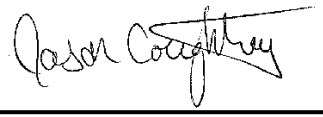
## Standard Water Analysis (Total)

DATE RECEIVED: 2022-10-21

DATE REPORTED: 2022-10-29

| | | SAMPLE DESCRIPTION: | | KL-1 | KL-2 | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|---|
| | | SAMPLE TYPE: | | Water | Water | Water | Water | Water |
| | | DATE SAMPLED: | | 2022-10-21 11:55 | 2022-10-21 12:10 | 2022-10-21 12:28 | 2022-10-21 12:45 | 2022-10-21 11:43 |
| Parameter | Unit | G / S | RDL | 4439632 | 4439633 | 4439634 | 4439635 | 4439636 |
| pH | | | | 6.23 | 6.29 | 6.30 | 6.30 | 6.30 |
| Reactive Silica as SiO2 | mg/L | | 0.5 | 1.7 | 5.3 | 2.3 | 2.4 | 2.2 |
| Chloride | mg/L | | 1 | 67 | 19 | 65 | 65 | 65 |
| Fluoride | mg/L | | 0.12 | <0.12 | <0.12 | <0.12 | <0.12 | <0.12 |
| Sulphate | mg/L | | 2 | 9 | 8 | 9 | 10 | 9 |
| Alkalinity | mg/L | | 5 | 7 | 10 | 8 | 9 | 8 |
| True Color | TCU | | 5.00 | 11.0 | 79.8 | 20.8 | 16.4 | 14.4 |
| Turbidity | NTU | | 0.5 | 0.6 | 2.0 | <0.5 | <0.5 | 1.0 |
| Electrical Conductivity | umho/cm | | 1 | 257 | 105 | 252 | 254 | 257 |
| Nitrate + Nitrite as N | mg/L | | 0.05 | 0.10 | 0.10 | 0.19 | 0.19 | 0.18 |
| Nitrate as N | mg/L | | 0.05 | 0.10 | 0.10 | 0.19 | 0.19 | 0.18 |
| Nitrite as N | mg/L | | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ammonia as N | mg/L | | 0.03 | <0.03 | <0.03 | 0.09 | 0.19 | <0.03 |
| Total Organic Carbon | mg/L | | 0.5 | 3.8 | 10.2 | 4.3 | 4.3 | 4.1 |
| Ortho-Phosphate as P | mg/L | | 0.01 | 0.02 | 0.01 | 0.01 | <0.01 | 0.01 |
| Total Sodium | mg/L | | 1 | 38 | 13 | 39 | 38 | 39 |
| Total Potassium | mg/L | | 0.1 | 1.0 | 1.2 | 1.3 | 1.2 | 1.1 |
| Total Calcium | mg/L | | 0.1 | 7.3 | 5.6 | 8.3 | 8.2 | 7.9 |
| Total Magnesium | mg/L | | 0.1 | 1.2 | 1.4 | 1.3 | 1.3 | 1.3 |
| Bicarb. Alkalinity (as CaCO3) | mg/L | | 5 | 7 | 10 | 8 | 9 | 8 |
| Carb. Alkalinity (as CaCO3) | mg/L | | 10 | <10 | <10 | <10 | <10 | <10 |
| Hydroxide | mg/L | | 5 | <5 | <5 | <5 | <5 | <5 |
| Calculated TDS | mg/L | | 1 | 128 | 55 | 130 | 130 | 129 |
| Hardness | mg/L | | | 23.2 | 19.7 | 26.1 | 25.8 | 25.1 |
| Langelier Index (@20C) | NA | | | -3.66 | -3.52 | -3.48 | -3.43 | -3.50 |
| Langelier Index (@ 4C) | NA | | | -3.98 | -3.84 | -3.80 | -3.75 | -3.82 |
| Saturation pH (@ 20C) | NA | | | 9.89 | 9.81 | 9.78 | 9.73 | 9.80 |
| Saturation pH (@ 4C) | NA | | | 10.2 | 10.1 | 10.1 | 10.1 | 10.1 |
| Anion Sum | me/L | | | 2.22 | 0.91 | 2.19 | 2.24 | 2.19 |

Certified By:





Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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# Certificate of Analysis

AGAT WORK ORDER: 22X960295

PROJECT: TE201017

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis (Total)

DATE RECEIVED: 2022-10-21

DATE REPORTED: 2022-10-29

| | | | | SAMPLE DESCRIPTION: | KL-1 | KL-2 | KL-3 | KL-4 | KL-5 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | SAMPLE TYPE: | Water | Water | Water | Water | Water |
| | | | | DATE SAMPLED: | 2022-10-21 11:55 | 2022-10-21 12:10 | 2022-10-21 12:28 | 2022-10-21 12:45 | 2022-10-21 11:43 |
| Parameter | Unit | G / S | RDL | | 4439632 | 4439633 | 4439634 | 4439635 | 4439636 |
| Cation sum | me/L | | | | 2.15 | 1.03 | 2.27 | 2.22 | 2.24 |
| % Difference/ Ion Balance | % | | | | 1.7 | 6.4 | 1.6 | 0.3 | 1.0 |
| Total Copper | ug/L | | 1 | | <1 | 1 | <1 | <1 | <1 |
| Total Iron | ug/L | | 50 | | 99 | 339 | 73 | 75 | 62 |
| Total Manganese | ug/L | | 2 | | 26 | 50 | 28 | 24 | 19 |
| Total Phosphorous | mg/L | | 0.02 | | 0.03 | 0.03 | 0.03 | 0.03 | 0.02 |
| Total Zinc | ug/L | | 5 | | <5 | <5 | <5 | <5 | <5 |

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

4439615-4439636 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 22X960295

PROJECT: TE201017

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TKN

DATE RECEIVED: 2022-10-21

DATE REPORTED: 2022-10-28

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2022-10-21 09:15 | 2022-10-21 09:00 | 2022-10-21 09:55 | 2022-10-21 13:05 | 2022-10-21 10:25 | 2022-10-21 11:07 | 2022-10-21 11:55 | 2022-10-21 12:10 |
| Parameter | Unit | G / S | RDL | 4439615 | 4439627 | 4439628 | 4439629 | 4439630 | 4439631 | 4439632 | 4439633 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | 0.16 | 0.18 | 0.29 | 0.25 | 0.33 | 0.30 | 0.14 | 0.27 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | KL-3 | KL-4 | KL-5 |
| SAMPLE TYPE: | | | | Water | Water | Water |
| DATE SAMPLED: | | | | 2022-10-21 12:28 | 2022-10-21 12:45 | 2022-10-21 11:43 |
| Parameter | Unit | G / S | RDL | 4439634 | 4439635 | 4439636 |
| Total Kjeldahl Nitrogen | mg/L | | 0.10 | 0.14 | 0.13 | 0.17 |

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



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# Certificate of Analysis

AGAT WORK ORDER: 22X960295

PROJECT: TE201017

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

## TSS

DATE RECEIVED: 2022-10-21

DATE REPORTED: 2022-10-28

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | PML-1 | PML-2 | HWY102-1 | HWY102-2 | LU | LSD | KL-1 | KL-2 |
| SAMPLE TYPE: | | | | Water | Water | Water | Water | Water | Water | Water | Water |
| DATE SAMPLED: | | | | 2022-10-21 09:15 | 2022-10-21 09:00 | 2022-10-21 09:55 | 2022-10-21 13:05 | 2022-10-21 10:25 | 2022-10-21 11:07 | 2022-10-21 11:55 | 2022-10-21 12:10 |
| Parameter | Unit | G / S | RDL | 4439615 | 4439627 | 4439628 | 4439629 | 4439630 | 4439631 | 4439632 | 4439633 |
| Total Suspended Solids | mg/L | | 5 | <5 | <5 | <5 | <5 | 7 | <5 | <5 | <5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAMPLE DESCRIPTION: | | | | KL-3 | KL-4 | KL-5 |
| SAMPLE TYPE: | | | | Water | Water | Water |
| DATE SAMPLED: | | | | 2022-10-21 12:28 | 2022-10-21 12:45 | 2022-10-21 11:43 |
| Parameter | Unit | G / S | RDL | 4439634 | 4439635 | 4439636 |
| Total Suspended Solids | mg/L | | 5 | <5 | <5 | <5 |

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

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



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# Exceedance Summary

AGAT WORK ORDER: 22X960295

PROJECT: TE201017

CLIENT NAME: WSP E&I CANADA LIMITED

ATTENTION TO: Charlotte Clark

| SAMPLEID | SAMPLE TITLE | GUIDELINE | ANALYSIS PACKAGE | PARAMETER | UNIT | GUIDEVALUE | RESULT |
|---|---|---|---|---|---|---|---|
| 4439615 | PML-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 44 |
| 4439615 | PML-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 5500 |
| 4439627 | PML-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 50 |
| 4439627 | PML-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 1700 |
| 4439628 | HWY102-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 68 |
| 4439628 | HWY102-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 8900 |
| 4439629 | HWY102-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 22 |
| 4439629 | HWY102-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 4700 |
| 4439630 | LU | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 500 |
| 4439630 | LU | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 12300 |
| 4439631 | LSD | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 53 |
| 4439631 | LSD | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 7900 |
| 4439632 | KL-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 86 |
| 4439632 | KL-1 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 4800 |
| 4439633 | KL-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 28 |
| 4439633 | KL-2 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 8600 |
| 4439634 | KL-3 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 62 |
| 4439634 | KL-3 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 3900 |
| 4439635 | KL-4 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 50 |
| 4439635 | KL-4 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 3000 |
| 4439636 | KL-5 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | E. Coli (MF) | CFU/100 mL | 1 | 12 |
| 4439636 | KL-5 | NS-CDWQ excl [AO] | Total Coliforms and E.coli Membrane Filtration | Total Coliforms (MF) | CFU/100 mL | 1 | 400 |



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# Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED
AGAT WORK ORDER: 22X960295

PROJECT: TE201017
ATTENTION TO: Charlotte Clark

SAMPLING SITE:
SAMPLED BY:

## Water Analysis

| RPT Date: | | | 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 |
| TSS | | | | | | | | | | | | | | | |
| Total Suspended Solids | 4441894 | | 6 | 6 | NA | < 5 | 100% | 80% | 120% | NA | | | 115% | 80% | 120% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| pH | 4460796 | | 6.85 | 7.02 | 2.4% | < | 100% | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Reactive Silica as SiO2 | 4455759 | | 16.9 | 17.1 | 1.2% | < 0.5 | 99% | 80% | 120% | 104% | 80% | 120% | 105% | 80% | 120% |
| Chloride | 4439615 | 4439615 | 62 | 66 | 5.9% | < 1 | 96% | 80% | 120% | NA | 80% | 120% | NA | 70% | 130% |
| Fluoride | 4439615 | 4439615 | <0.12 | <0.12 | NA | < 0.12 | 100% | 80% | 120% | NA | 80% | 120% | 99% | 70% | 130% |
| Sulphate | 4439615 | 4439615 | 10 | 10 | NA | < 2 | 99% | 80% | 120% | NA | 80% | 120% | 92% | 70% | 130% |
| Alkalinity | 4460796 | | 100 | 101 | 0.6% | < 5 | 95% | 80% | 120% | NA | | | NA | | |
| True Color | 4455759 | | <5.00 | <5.00 | NA | < 5 | 93% | 80% | 120% | 105% | 80% | 120% | NA | | |
| Turbidity | 4437965 | | 38.8 | 43.6 | 11.7% | < 0.5 | 98% | 80% | 120% | NA | | | NA | | |
| Electrical Conductivity | 4460796 | | 263 | 267 | 1.5% | < 1 | 101% | 90% | 110% | NA | | | NA | | |
| Nitrate as N | 4439615 | 4439615 | 0.21 | 0.22 | NA | < 0.05 | 101% | 80% | 120% | NA | 80% | 120% | 89% | 70% | 130% |
| Nitrite as N | 4439615 | 4439615 | <0.05 | <0.05 | NA | < 0.05 | 92% | 80% | 120% | NA | 80% | 120% | 100% | 70% | 130% |
| Ammonia as N | 4437931 | | 0.07 | 0.19 | NA | < 0.03 | NA | 80% | 120% | NA | 80% | 120% | 106% | 70% | 130% |
| Total Organic Carbon | 4437966 | | 12 | 12 | 2.0% | < 0.5 | 104% | 80% | 120% | NA | 80% | 120% | 96% | 80% | 120% |
| Ortho-Phosphate as P | 4455759 | | 0.03 | 0.03 | NA | 0.01 | 102% | 80% | 120% | 95% | 80% | 120% | 104% | 80% | 120% |
| Total Sodium | 4448139 | | 45 | 44 | 2.9% | < 0.1 | 108% | 80% | 120% | 111% | 80% | 120% | NA | 70% | 130% |
| Total Potassium | 4448139 | | <0.1 | <0.1 | NA | < 0.1 | 108% | 80% | 120% | 111% | 80% | 120% | 106% | 70% | 130% |
| Total Calcium | 4448139 | | <0.1 | <0.1 | NA | < 0.1 | 102% | 80% | 120% | 108% | 80% | 120% | 106% | 70% | 130% |
| Total Magnesium | 4448139 | | <0.1 | <0.1 | NA | < 0.1 | 102% | 80% | 120% | 110% | 80% | 120% | 105% | 70% | 130% |
| Bicarb. Alkalinity (as CaCO3) | 4460796 | | 100 | 101 | 0.6% | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Carb. Alkalinity (as CaCO3) | 4460796 | | <10 | <10 | NA | < 10 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Hydroxide | 4460796 | | <5 | <5 | NA | < 5 | NA | 80% | 120% | NA | 80% | 120% | NA | 80% | 120% |
| Total Copper | 4448139 | | 7 | 6 | 3.5% | < 1 | 101% | 80% | 120% | 107% | 80% | 120% | 104% | 70% | 130% |
| Total Iron | 4448139 | | 180 | 173 | NA | < 50 | 96% | 80% | 120% | 101% | 80% | 120% | 108% | 70% | 130% |
| Total Manganese | 4448139 | | <2 | <2 | NA | < 2 | 96% | 80% | 120% | 102% | 80% | 120% | 103% | 70% | 130% |
| Total Phosphorous | 4448139 | | 0.02 | 0.02 | NA | < 0.02 | 109% | 80% | 120% | 107% | 80% | 120% | 100% | 70% | 130% |
| Total Zinc | 4448139 | | 37 | 36 | 3.4% | < 5 | 100% | 80% | 120% | 101% | 80% | 120% | 96% | 70% | 130% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| Standard Water Analysis (Total) | | | | | | | | | | | | | | | |
| Total Organic Carbon | 4439628 | 4439628 | 7.9 | 7.9 | 0.6% | < 0.5 | 101% | 80% | 120% | NA | 80% | 120% | 95% | 80% | 120% |
| Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated. | | | | | | | | | | | | | | | |
| AGAT Halifax - Low Level Total Phosphorous- 0.002mg/L | | | | | | | | | | | | | | | |
| Total Phosphorus | 4433937 | | 0.005 | 0.006 | NA | < 0.002 | 100% | 70% | 130% | 98% | 80% | 120% | 100% | 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.

Results relate only to the items tested. Results apply to samples as received.

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# Quality Assurance

CLIENT NAME: WSP E&I CANADA LIMITED
AGAT WORK ORDER: 22X960295
PROJECT: TE201017
ATTENTION TO: Charlotte Clark
SAMPLING SITE:
SAMPLED BY:

## Water Analysis (Continued)

| RPT Date: | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| TKN | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen | 4455737 | | 8.91 | 8.87 | 0.4% | < 0.10 | 101% | 70% | 130% | 104% | 80% | 120% | NA | 70% | 130% |

Comments: Matrix spike: Spike level < native concentration. Matrix spike acceptance limits do not apply.

Certified By:



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# Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 22X960295

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Microbiology Analysis | | | |
| Total Coliforms (MF) | MIC-121-7002 | Sm 9222 H | MF/INCUBATOR |
| E. Coli (MF) | MIC-121-7002 | SM 9222 H | MF/INCUBATOR |
| Miscellaneous Analysis | | | |
| Subcontracted Data | | | |



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# Method Summary

CLIENT NAME: WSP E&I CANADA LIMITED

AGAT WORK ORDER: 22X960295

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| Total Phosphorus | INOR-93-6022 | modified from SM 4500-P B and SM 4500-P E | SPECTROPHOTOMETER |
| pH | INOR-121-6001 | SM 4500 H+B | PC TITRATE |
| Reactive Silica as SiO2 | INOR-121-6027 | SM 4500-SiO2 F | COLORIMETER |
| Chloride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Fluoride | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Alkalinity | INOR-121-6001 | SM 2320 B | |
| True Color | INOR-121-6008 | SM 2120 B | LACHAT FIA |
| Turbidity | INOR-121-6022 | SM 2130 B | NEPHELOMETER |
| Electrical Conductivity | INOR-121-6001 | SM 2510 B | PC TITRATE |
| Nitrate + Nitrite as N | INORG-121-6005 | SM 4110 B | CALCULATION |
| Nitrate as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Nitrite as N | INORG-121-6005 | SM 4110 B | ION CHROMATOGRAPH |
| Ammonia as N | INOR-121-6047 | SM 4500-NH3 H | COLORIMETER |
| Total Organic Carbon | INOR-121-6026 | SM 5310 B | TOC ANALYZER |
| Ortho-Phosphate as P | INOR-121-6012 | SM 4500-P G | COLORIMETER |
| Total Sodium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Potassium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Calcium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Magnesium | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Bicarb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Carb. Alkalinity (as CaCO3) | INORG-121-6001 | SM 2320 B | PC TITRATE |
| Hydroxide | INORG-121-6001 | SM 2320 B | PC-TITRATE |
| Calculated TDS | | SM 1030E | CALCULATION |
| Hardness | | SM 2340B | CALCULATION |
| Langelier Index (@20C) | | | CALCULATION |
| Langelier Index (@ 4C) | | | CALCULATION |
| Saturation pH (@ 20C) | | | CALCULATION |
| Saturation pH (@ 4C) | | | CALCULATION |
| Anion Sum | | SM 1030E | CALCULATION |
| Cation sum | | SM 1030E | CALCULATION |
| % Difference/ Ion Balance | | SM 1030E | CALCULATION |
| Total Copper | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Iron | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Manganese | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Phosphorous | MET-121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Zinc | MET121-6104 & MET-121-6105 | modified from SM 3125/SM 3030 B/SM 3030 D | ICP-MS |
| Total Kjeldahl Nitrogen | INOR-93-6048 | modified from EPA 351.2 and SM 4500-NORG D | LACHAT FIA |
| Total Suspended Solids | INOR-121-6024, 6025 | SM 2540C, D | GRAVIMETRIC |



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# AGAT Laboratories

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## Chain of Custody Record

**Laboratory Use Only**
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 12.5, 13.1, 12.0
Hold Time:
AGAT Job Number: 22x960295
Notes:
'22OCT21 1:42PM

**Report Information**
Company: WSP E&I
Contact: Charlotte Clark
Address: 50 Troop Avenue, Dartmouth
Nova Scotia, Canada, B3B 1Z1
Phone: Fax:
Client Project #: TE201017
AGAT Quotation: 335022BP
Please Note: If quotation number is not provided client will be billed full price for analysis.

**Report Information** (Please print):
1. Name: Samantha Henry
Email: samantha.henry@wsp.com
2. Name: Charlotte Clark
Email: charlotte.clark@wsp.com

**Report Format**
☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included

**Turnaround Time Required (TAT)**
**Regular TAT** ☑ 5 to 7 working days
**Rush TAT** ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

**Invoice To** Same Yes ☐ / No ☐
Company:
Contact: APInvoice.Canada@woodplc.com
Address:
Phone: 709-722-7023 Fax:
PO/Credit Card#: TE201017.****.****.5290.573000

**Regulatory Requirements** (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NL DOEC GW
☐ Commercial
☐ Res/Park ☐ NLDOEC Discharge
☐ Agricultural
☐ FWAL
☐ Sediment ☐ Other

**Drinking Water Sample:** ☐ Yes ☑ No **Salt Water:** ☐ Yes ☑ No
Reg. No.:

| Sample Identification | Date/Time Sampled | Sample Matrix | # Containers | Comments – Site/Sample Info. Sample Containment |
|---|---|---|---|---|
| PML-1 | Oct 21/22 9:15 | SW | 1 | Cu, Fe, Mn, Zn only |
| PML-2 | " 9:00 | SW | 1 | Cu, Fe, Mn, Zn only |
| HWY102-1 | " 9:55 | SW | 1 | Cu, Fe, Mn, Zn only |
| HWY102-2 | " 1:05 pm | SW | 1 | Cu, Fe, Mn, Zn only |
| LU | " 10:25 | SW | 1 | Cu, Fe, Mn, Zn only |
| LSD | " 11:07 | SW | 1 | Cu, Fe, Mn, Zn only |
| KL-1 | " 11:55 | SW | 1 | Cu, Fe, Mn, Zn only |
| KL-2 | " 12:10 | SW | 1 | Cu, Fe, Mn, Zn only |
| KL-3 | " 12:28 | SW | 1 | Cu, Fe, Mn, Zn only |
| KL-4 | " 12:45 | SW | 1 | Cu, Fe, Mn, Zn only |
| KL-5 | " 11:43 | SW | 1 | Cu, Fe, Mn, Zn only |

| Field Filtered/Preserved | Standard Water Analysis ✓ | Metals: ☑ Total ☐ Diss ☐ Available | Mercury | ☐ BOD ☐ CBOD | pH | ☑ TSS ☐ TDS ☐ VSS | TKN | Total Phosphorus | Phenols | Tier 1: TPH/BTEX (PIRI) ☐ low level | Tier 2: TPH/BTEX Fractionation | CCME-CWS TPH/BTEX | VOC | THM | HAA | PAH | PCB | TC + EC ☐ P/A ☑ MPN ☑ MF | ☐ HPC ☐ Pseudomonas | Fecal Coliform ☑ MPN ☐ MF | Other: Chlorophyll a (Innotech) | Other: Cation Scan (Ca, Mg, K, Na) | Hazardous (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ✓ | ☑ | | | | ☑ | ☑ | ☑ | | | | | | | | | | ☑ | | ☑ | ☑ | ☑ | |
| | ✓ | ☑ | | | | ☑ | ☑ | ☑ | | | | | | | | | | ☑ | | ☑ | ☑ | ☑ | |
| | ✓ | ☑ | | | | ☑ | ☑ | ☑ | | | | | | | | | | ☑ | | ☑ | ☑ | ☑ | |
| | ✓ | ☑ | | | | ☑ | ☑ | ☑ | | | | | | | | | | ☑ | | ☑ | ☑ | ☑ | |
| | ✓ | ☑ | | | | ☑ | ☑ | ☑ | | | | | | | | | | ☑ | | ☑ | ☑ | ☑ | |
| | ✓ | ☑ | | | | ☑ | ☑ | ☑ | | | | | | | | | | ☑ | | ☑ | ☑ | ☑ | |
| | ✓ | ☑ | | | | ☑ | ☑ | ☑ | | | | | | | | | | ☑ | | ☑ | ☑ | ☑ | |
| | ✓ | ☑ | | | | ☑ | ☑ | ☑ | | | | | | | | | | ☑ | | ☑ | ☑ | ☑ | |
| | ✓ | ☑ | | | | ☑ | ☑ | ☑ | | | | | | | | | | ☑ | | ☑ | ☑ | ☑ | |
| | ✓ | ☑ | | | | ☑ | ☑ | ☑ | | | | | | | | | | ☑ | | ☑ | ☑ | ☑ | |
| | ✓ | ☑ | | | | ☑ | ☑ | ☑ | | | | | | | | | | ☑ | | ☑ | ☑ | ☑ | |

| Samples Relinquished By (Print Name) | Date/Time | Samples Received By (Print Name) | Date/Time |
|---|---|---|---|
| Samantha Henry | Oct 21/22 | | |
| **Samples Relinquished By (Sign)** | **Date/Time** | **Samples Received By (Sign)** | **Date/Time** |
| | 1:45pm | | |

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page ☐ of ☐
N°:

Document ID: EBC-296-1970-000

Date revised: March 26, 2018

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Vegreville, Alberta
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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



**RESULTS:** Andrea Canning
AGAT Laboratories Ltd
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

**INVOICE:** Accounts Payable
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

**CLIENT SAMPLE ID:** 3914106 - PML-1

**Matrix:** Water

**CANISTER ID:**

**PRIORITY:** Normal

**DESCRIPTION:** Project #: 22X901528

**DATE SAMPLED:** 31-May-22

**DATE RECEIVED:** 03-Jun-22

**REPORT CREATED:** 15-Jun-22

**REPORT NUMBER:** 22060024

**VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22060024-001 | Chlorophylla (Phytoplankton) | | 0.9 | ug/L | 0.3 | AC-020 | 13-Jun-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: June 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 3914194 - PML-2 | | Water | 31-May-22 |

**DESCRIPTION:** Project #: 22X901528

**REPORT NUMBER:** 22060024 **REPORT CREATED:** 15-Jun-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22060024-002 | Chlorophylla (Phytoplankton) | | 1.3 | ug/L | 0.3 | AC-020 | 13-Jun-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: June 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 3914195 - HWY102-1 | | Water | 31-May-22 |

**DESCRIPTION:** Project #: 22X901528

**REPORT NUMBER:** 22060024 **REPORT CREATED:** 15-Jun-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22060024-003 | Chlorophylla (Phytoplankton) | | 0.7 | ug/L | 0.3 | AC-020 | 13-Jun-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: June 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 3914196 - HWY102-2 | | Water | 31-May-22 |

**DESCRIPTION:** Project #: 22X901528

**REPORT NUMBER:** 22060024 **REPORT CREATED:** 15-Jun-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22060024-004 | Chlorophylla (Phytoplankton) | | 8.2 | ug/L | 0.3 | AC-020 | 13-Jun-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: June 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 3914197 - LU | | Water | 31-May-22 |

**DESCRIPTION:** Project #: 22X901528

**REPORT NUMBER:** 22060024 **REPORT CREATED:** 15-Jun-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22060024-005 | Chlorophylla (Phytoplankton) | | 7.5 | ug/L | 0.3 | AC-020 | 13-Jun-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: June 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 3914198 - LSD | | Water | 31-May-22 |

**DESCRIPTION:** Project #: 22X901528

**REPORT NUMBER:** 22060024 **REPORT CREATED:** 15-Jun-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22060024-006 | Chlorophylla (Phytoplankton) | | 4.2 | ug/L | 0.3 | AC-020 | 13-Jun-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: June 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 3914199 - KL-1 | | Water | 31-May-22 |

**DESCRIPTION:** Project #: 22X901528

**REPORT NUMBER:** 22060024 **REPORT CREATED:** 15-Jun-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22060024-007 | Chlorophylla (Phytoplankton) | | 1.4 | ug/L | 0.3 | AC-020 | 13-Jun-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: June 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 3914200 - KL-2 | | Water | 31-May-22 |

**DESCRIPTION:** Project #: 22X901528

**REPORT NUMBER:** 22060024 **REPORT CREATED:** 15-Jun-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22060024-008 | Chlorophylla (Phytoplankton) | | 0.6 | ug/L | 0.3 | AC-020 | 13-Jun-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: June 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 3914201 - KL-3 | | Water | 31-May-22 |

**DESCRIPTION:** Project #: 22X901528

**REPORT NUMBER:** 22060024 **REPORT CREATED:** 15-Jun-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22060024-009 | Chlorophylla (Phytoplankton) | | 1.6 | ug/L | 0.3 | AC-020 | 13-Jun-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: June 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 3914202 - KL-4 | | Water | 31-May-22 |

**DESCRIPTION:** Project #: 22X901528

**REPORT NUMBER:** 22060024 **REPORT CREATED:** 15-Jun-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22060024-010 | Chlorophylla (Phytoplankton) | | 2.0 | ug/L | 0.3 | AC-020 | 13-Jun-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: June 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 3914203 - KL-5 | | Water | 31-May-22 |

**DESCRIPTION:** Project #: 22X901528

**REPORT NUMBER:** 22060024 **REPORT CREATED:** 15-Jun-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22060024-011 | Chlorophylla (Phytoplankton) | | 1.1 | ug/L | 0.3 | AC-020 | 13-Jun-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: June 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

## Revision History

| Order ID | Ver | Date | Reason |
|---|---|---|---|
| 22060024 | 01 | 15-Jun-22 | Report created |

# Methods

| Method | Description |
|---|---|
| AC-020 | Chlorophyll-a Phytoplankton (Fluorometric Analysis) |

# Qualifiers

| Data Qualifier | Translation |
|---|---|
| B | Blank contamination; Analyte detected above the method reporting limit in an associated blank |
| I | The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit |
| J1 | Reported value is estimated; Surrogate recoveries limits were exceeded |
| J2 | Reported value is estimated; No known QC criteria for this component |
| J3 | Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy |
| J4 | Reported value is estimated; The sample matrix interfered with the analysis |
| K | Off-scale low. Actual value is known to be less than the value given |
| L | Off-scale high. Actual value is known to be greater than value given |
| N | Non-target analyte; Tentatively identified compound (using mass spectroscopy) |
| Q | Sample held beyond the accepted holding time |
| R | Rejected data; Not suitable for the projects intended use |
| T | Value reported is less than the laboratory method detection limit |
| U | Compound was analyzed for but not detected |
| V | Analyte was detected in both the sample and the associated method blank |

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## Order Comments

22060024

Project #: 22X901528

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## Sample Comments

## Result Comments

*Note:*

*1. Results relate only to items tested and apply to the sample as received.*

*2. This report shall not be reproduced, except in full, without the explicit approval of the laboratory.*

22060024-004 AQ Chlorophyll Phyt

QA/QC ran within range. Sample was green in color.

22060024-005 AQ Chlorophyll Phyt

QA/QC ran within range. Sample was green in color.

22060024-006 AQ Chlorophyll Phyt

QA/QC ran within range. Sample was green in color.

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Canada T9C 1T4
(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



**RESULTS:** Andrea Canning
AGAT Laboratories Ltd
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

**INVOICE:** Accounts Payable
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

**CLIENT SAMPLE ID:** 4215169 - PML-1
**Matrix:** Water
**CANISTER ID:**
**PRIORITY:** Normal
**DESCRIPTION:**
**DATE SAMPLED:** 18-Aug-22 8:35
**DATE RECEIVED:** 23-Aug-22
**REPORT CREATED:** 14-Sep-22
**REPORT NUMBER:** 22080264
**VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22080264-001 | Chlorophylla (Phytoplankton) | | 2.9 | ug/L | 0.3 | AC-020 | 05-Sep-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: September 14, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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Vegreville, Alberta
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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4215194 - PML-2 | | Water | 18-Aug-22 8:10 |

**DESCRIPTION:**

**REPORT NUMBER:** 22080264 **REPORT CREATED:** 14-Sep-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22080264-002 | Chlorophylla (Phytoplankton) | | 1.3 | ug/L | 0.3 | AC-020 | 05-Sep-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: September 14, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4215195 - HWY102-1 | | Water | 18-Aug-22 9:15 |

**DESCRIPTION:**

**REPORT NUMBER:** 22080264 **REPORT CREATED:** 14-Sep-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22080264-003 | Chlorophylla (Phytoplankton) | | 13.4 | ug/L | 0.3 | AC-020 | 05-Sep-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: September 14, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4215196 - HWY102-2 | | Water | 18-Aug-22 12:40 |

**DESCRIPTION:**

**REPORT NUMBER:** 22080264 **REPORT CREATED:** 14-Sep-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22080264-004 | Chlorophylla (Phytoplankton) | | 1.2 | ug/L | 0.3 | AC-020 | 05-Sep-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: September 14, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4215197 - LU | | Water | 18-Aug-22 9:35 |

**DESCRIPTION:**

**REPORT NUMBER:** 22080264 **REPORT CREATED:** 14-Sep-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22080264-005 | Chlorophylla (Phytoplankton) | | 5.3 | ug/L | 0.3 | AC-020 | 05-Sep-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: September 14, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4215198 - LSD | | Water | 18-Aug-22 10:20 |

**DESCRIPTION:**

**REPORT NUMBER:** 22080264 **REPORT CREATED:** 14-Sep-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22080264-006 | Chlorophylla (Phytoplankton) | | 3.0 | ug/L | 0.3 | AC-020 | 05-Sep-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: September 14, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4215199 - KL-1 | | Water | 18-Aug-22 11:22 |

**DESCRIPTION:**

**REPORT NUMBER:** 22080264 **REPORT CREATED:** 14-Sep-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22080264-007 | Chlorophylla (Phytoplankton) | | 2.3 | ug/L | 0.3 | AC-020 | 05-Sep-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: September 14, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4215200 - KL-2 | | Water | 18-Aug-22 11:40 |

**DESCRIPTION:**

**REPORT NUMBER:** 22080264 **REPORT CREATED:** 14-Sep-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22080264-008 | Chlorophylla (Phytoplankton) | | 2.0 | ug/L | 0.3 | AC-020 | 05-Sep-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: September 14, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4215201 - KL-3 | | Water | 18-Aug-22 11:58 |

**DESCRIPTION:**

**REPORT NUMBER:** 22080264 **REPORT CREATED:** 14-Sep-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22080264-009 | Chlorophylla (Phytoplankton) | | 1.4 | ug/L | 0.3 | AC-020 | 05-Sep-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: September 14, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

PO Bag 4000
Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4215203 - KL-5 | | Water | 18-Aug-22 11:05 |

**DESCRIPTION:**

**REPORT NUMBER:** 22080264 **REPORT CREATED:** 14-Sep-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22080264-011 | Chlorophylla (Phytoplankton) | | 2.3 | ug/L | 0.3 | AC-020 | 05-Sep-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: September 14, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4215502 - KL-4 | | Water | 18-Aug-22 12:46 |

**DESCRIPTION:**

**REPORT NUMBER:** 22080264 **REPORT CREATED:** 14-Sep-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22080264-010 | Chlorophylla (Phytoplankton) | | 0.6 | ug/L | 0.3 | AC-020 | 05-Sep-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: September 14, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

## Revision History

| Order ID | Ver | Date | Reason |
|---|---|---|---|
| 22080264 | 01 | 14-Sep-22 | Report created |

# Methods

| Method | Description |
|---|---|
| AC-020 | Chlorophyll-a Phytoplankton (Fluorometric Analysis) |

# Qualifiers

| Data Qualifier | Translation |
|---|---|
| B | Blank contamination; Analyte detected above the method reporting limit in an associated blank |
| I | The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit |
| J1 | Reported value is estimated; Surrogate recoveries limits were exceeded |
| J2 | Reported value is estimated; No known QC criteria for this component |
| J3 | Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy |
| J4 | Reported value is estimated; The sample matrix interfered with the analysis |
| K | Off-scale low. Actual value is known to be less than the value given |
| L | Off-scale high. Actual value is known to be greater than value given |
| N | Non-target analyte; Tentatively identified compound (using mass spectroscopy) |
| Q | Sample held beyond the accepted holding time |
| R | Rejected data; Not suitable for the projects intended use |
| T | Value reported is less than the laboratory method detection limit |
| U | Compound was analyzed for but not detected |
| V | Analyte was detected in both the sample and the associated method blank |

## Order Comments

22080264

Project 22X934461

PO Bag 4000
Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211



## Sample Comments

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Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211



## Result Comments

*Note:*

*1. Results relate only to items tested and apply to the sample as received.*

*2. This report shall not be reproduced, except in full, without the explicit approval of the laboratory.*

22080264-003 AQ Chlorophyll Phyt

QA/QC ran within range. Sample was green in color.

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Canada T9C 1T4
(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



**RESULTS:** Andrea Canning
AGAT Laboratories Ltd
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

**INVOICE:** Accounts Payable
11 Morris Dr. Unit 122

Dartmouth
NS B3B 1M2

**CLIENT SAMPLE ID:** 4439615 - PML-1
**Matrix:** Water
**CANISTER ID:**
**PRIORITY:** Normal
**DESCRIPTION:** Project # 22X960295
**DATE SAMPLED:** 21-Oct-22
**DATE RECEIVED:** 07-Nov-22
**REPORT CREATED:** 15-Nov-22
**REPORT NUMBER:** 22110049
**VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22110049-001 | Chlorophylla (Phytoplankton) | K, T, U | < 0.3 | ug/L | 0.3 | AC-020 | 14-Nov-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: November 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4439627 - PML-2 | | Water | 21-Oct-22 |

**DESCRIPTION:** Project # 22X960295

**REPORT NUMBER:** 22110049 **REPORT CREATED:** 15-Nov-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22110049-002 | Chlorophylla (Phytoplankton) | | 0.6 | ug/L | 0.3 | AC-020 | 14-Nov-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: November 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4439628 - HWY102-1 | | Water | 21-Oct-22 |

**DESCRIPTION:** Project # 22X960295

**REPORT NUMBER:** 22110049 **REPORT CREATED:** 15-Nov-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22110049-003 | Chlorophylla (Phytoplankton) | | 0.4 | ug/L | 0.3 | AC-020 | 14-Nov-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: November 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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Vegreville, Alberta
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(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4439629 - HWY102-2 | | Water | 21-Oct-22 |

**DESCRIPTION:** Project # 22X960295

**REPORT NUMBER:** 22110049 **REPORT CREATED:** 15-Nov-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22110049-004 | Chlorophylla (Phytoplankton) | K, T, U | < 0.3 | ug/L | 0.3 | AC-020 | 14-Nov-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: November 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4439630 - LU | | Water | 21-Oct-22 |

**DESCRIPTION:** Project # 22X960295

**REPORT NUMBER:** 22110049 **REPORT CREATED:** 15-Nov-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22110049-005 | Chlorophylla (Phytoplankton) | | 6.1 | ug/L | 0.3 | AC-020 | 14-Nov-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: November 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4439631 - LSD | | Water | 21-Oct-22 |

**DESCRIPTION:** Project # 22X960295

**REPORT NUMBER:** 22110049 **REPORT CREATED:** 15-Nov-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22110049-006 | Chlorophylla (Phytoplankton) | | 0.5 | ug/L | 0.3 | AC-020 | 14-Nov-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: November 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4439632 - KL-1 | | Water | 21-Oct-22 |

**DESCRIPTION:** Project # 22X960295

**REPORT NUMBER:** 22110049 **REPORT CREATED:** 15-Nov-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22110049-007 | Chlorophylla (Phytoplankton) | | 1.5 | ug/L | 0.3 | AC-020 | 14-Nov-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: November 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4439633 - KL-2 | | Water | 21-Oct-22 |

**DESCRIPTION:** Project # 22X960295

**REPORT NUMBER:** 22110049 **REPORT CREATED:** 15-Nov-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22110049-008 | Chlorophylla (Phytoplankton) | | 0.5 | ug/L | 0.3 | AC-020 | 14-Nov-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: November 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4439634 - KL-3 | | Water | 21-Oct-22 |

**DESCRIPTION:** Project # 22X960295

**REPORT NUMBER:** 22110049 **REPORT CREATED:** 15-Nov-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22110049-009 | Chlorophylla (Phytoplankton) | | 0.7 | ug/L | 0.3 | AC-020 | 14-Nov-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: November 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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Canada T9C 1T4
(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4439635 - KL-4 | | Water | 21-Oct-22 |

**DESCRIPTION:** Project # 22X960295

**REPORT NUMBER:** 22110049 **REPORT CREATED:** 15-Nov-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22110049-010 | Chlorophylla (Phytoplankton) | | 0.4 | ug/L | 0.3 | AC-020 | 14-Nov-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: November 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

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Canada T9C 1T4
(780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT



| CLIENT SAMPLE ID | CANISTER ID | Matrix | DATE SAMPLED |
|---|---|---|---|
| 4439636 - KL-5 | | Water | 21-Oct-22 |

**DESCRIPTION:** Project # 22X960295

**REPORT NUMBER:** 22110049 **REPORT CREATED:** 15-Nov-22 **VERSION:** Version 01

| Lab ID | Parameter | Qualifier | Result | Units | RDL | Method | Analysis Date |
|---|---|---|---|---|---|---|---|
| 22110049-011 | Chlorophylla (Phytoplankton) | | 0.7 | ug/L | 0.3 | AC-020 | 14-Nov-22 |

Report certified by: Rebecca Dasilva, Account Coordinator On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: November 15, 2022

Inquiries: (780) 632 8455 E-mail: EAS.Results@innotechalberta.ca

## Revision History

| Order ID | Ver | Date | Reason |
|---|---|---|---|
| 22110049 | 01 | 15-Nov-22 | Report created |

# Methods

| Method | Description |
|---|---|
| AC-020 | Chlorophyll-a Phytoplankton (Fluorometric Analysis) |

# Qualifiers

| Data Qualifier | Translation |
|---|---|
| B | Blank contamination; Analyte detected above the method reporting limit in an associated blank |
| I | The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit |
| J1 | Reported value is estimated; Surrogate recoveries limits were exceeded |
| J2 | Reported value is estimated; No known QC criteria for this component |
| J3 | Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy |
| J4 | Reported value is estimated; The sample matrix interfered with the analysis |
| K | Off-scale low. Actual value is known to be less than the value given |
| L | Off-scale high. Actual value is known to be greater than value given |
| N | Non-target analyte; Tentatively identified compound (using mass spectroscopy) |
| Q | Sample held beyond the accepted holding time |
| R | Rejected data; Not suitable for the projects intended use |
| T | Value reported is less than the laboratory method detection limit |
| U | Compound was analyzed for but not detected |
| V | Analyte was detected in both the sample and the associated method blank |

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## Order Comments

22110049

Project # 22X960295

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## Sample Comments

## Result Comments

*Note:*

*1. Results relate only to items tested and apply to the sample as received.*

*2. This report shall not be reproduced, except in full, without the explicit approval of the laboratory.*

22110049-001 AQ Chlorophyll Phyt

QA/QC ran within range. Sample was white in color.\

22110049-004 AQ Chlorophyll Phyt

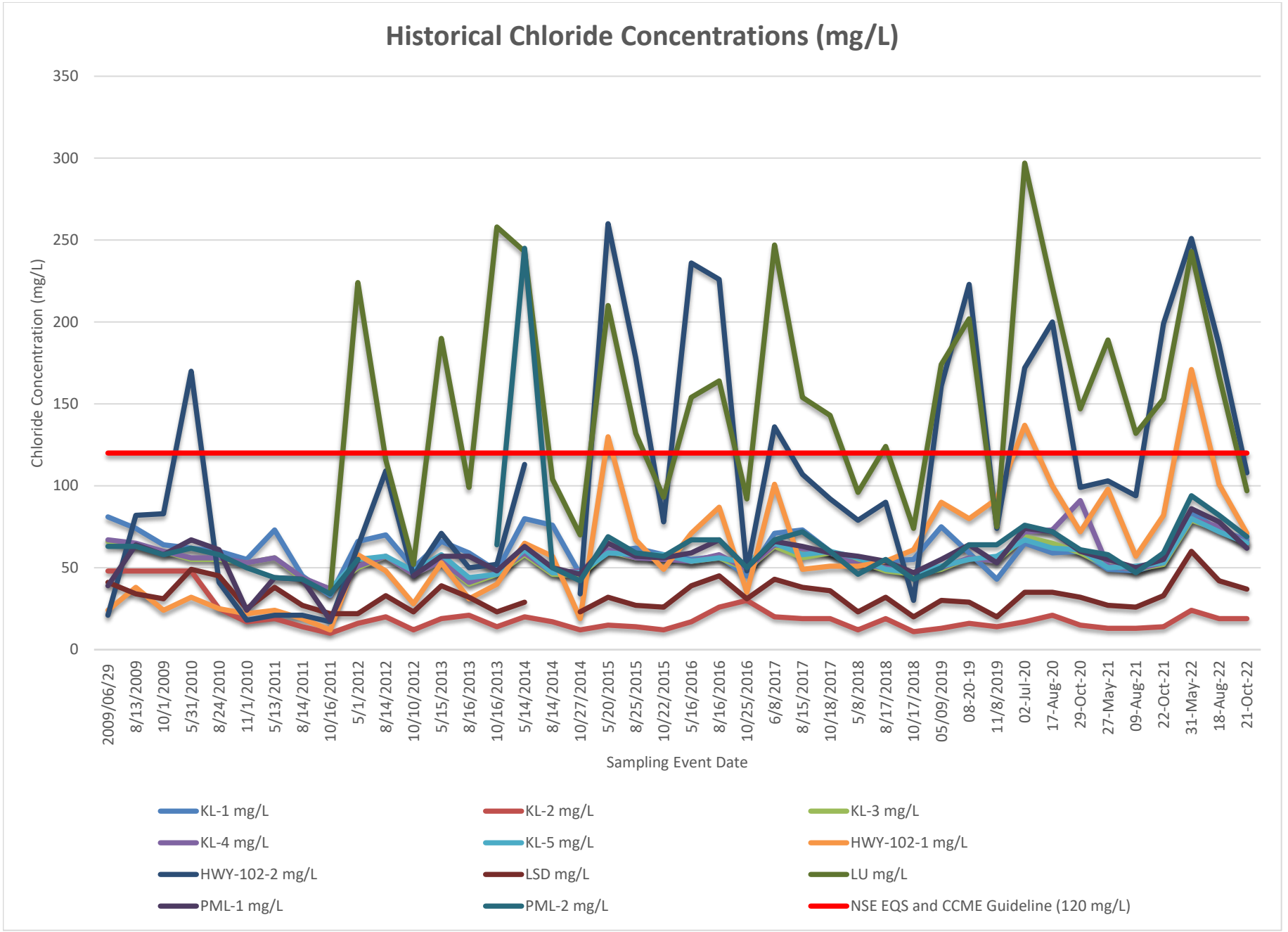
QA/QC ran within range. Sample was white in color.

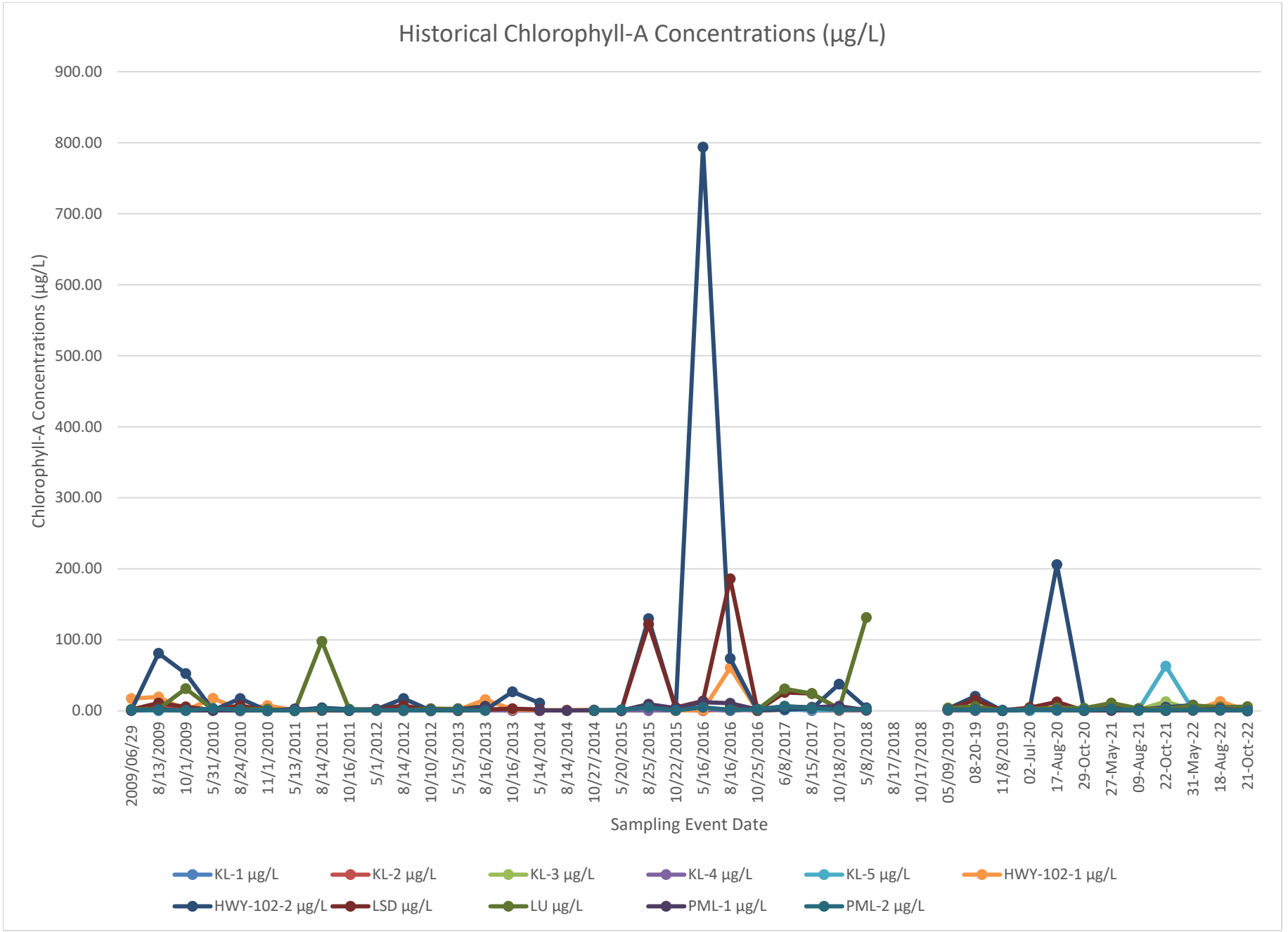
22110049-005 AQ Chlorophyll Phyt

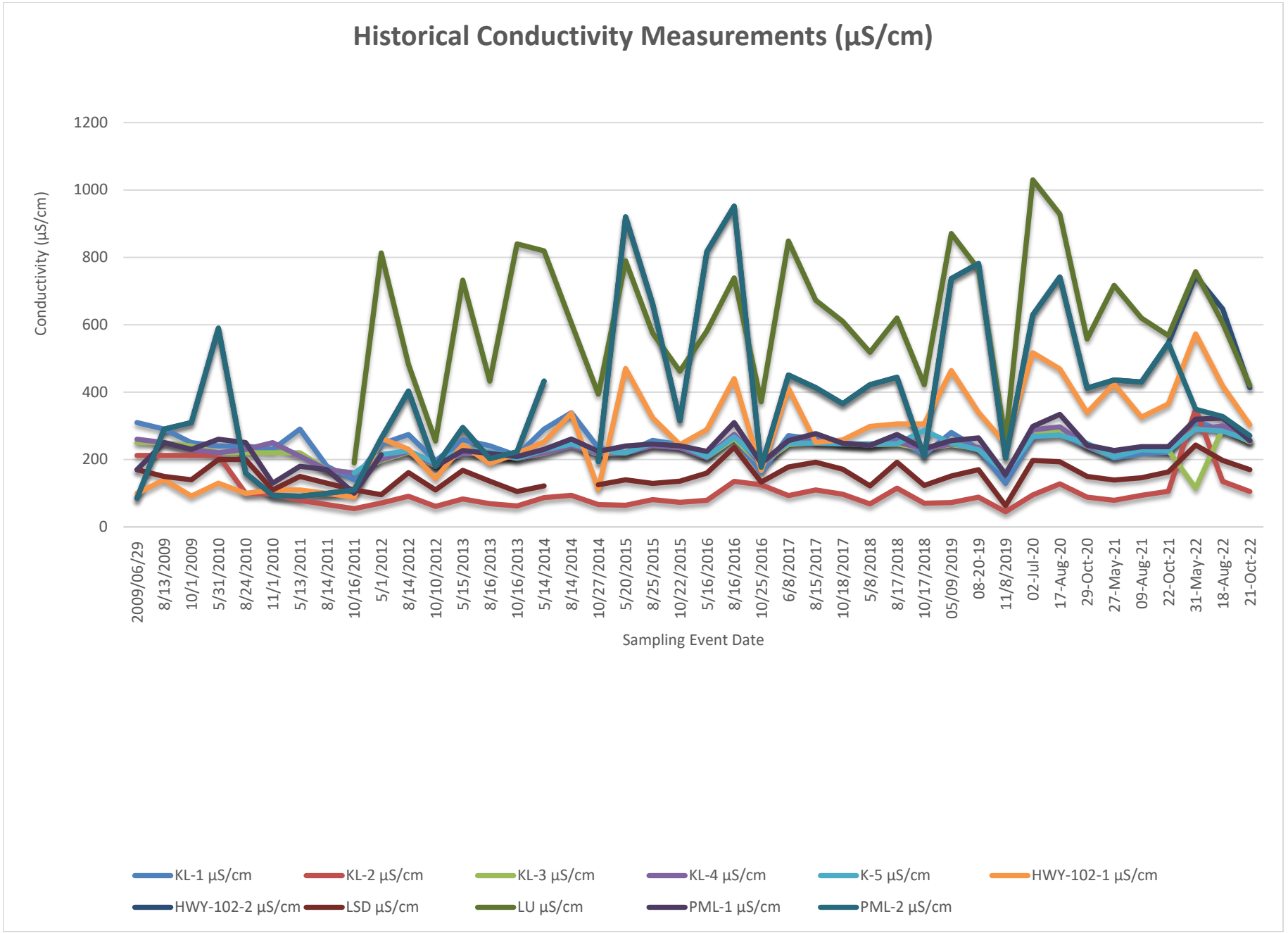
QA/QC ran within range. Sample was light green in color.

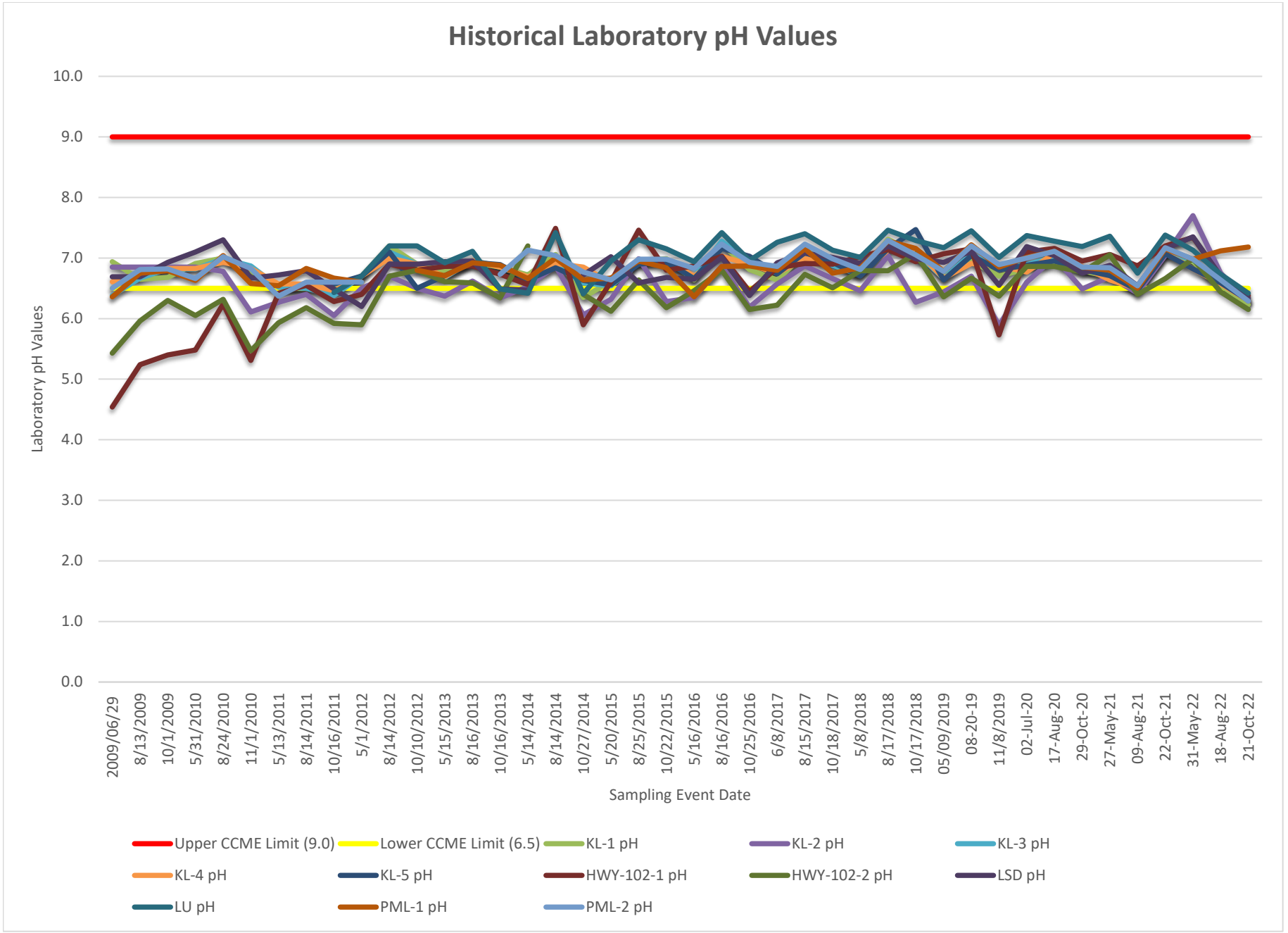
# APPENDIX

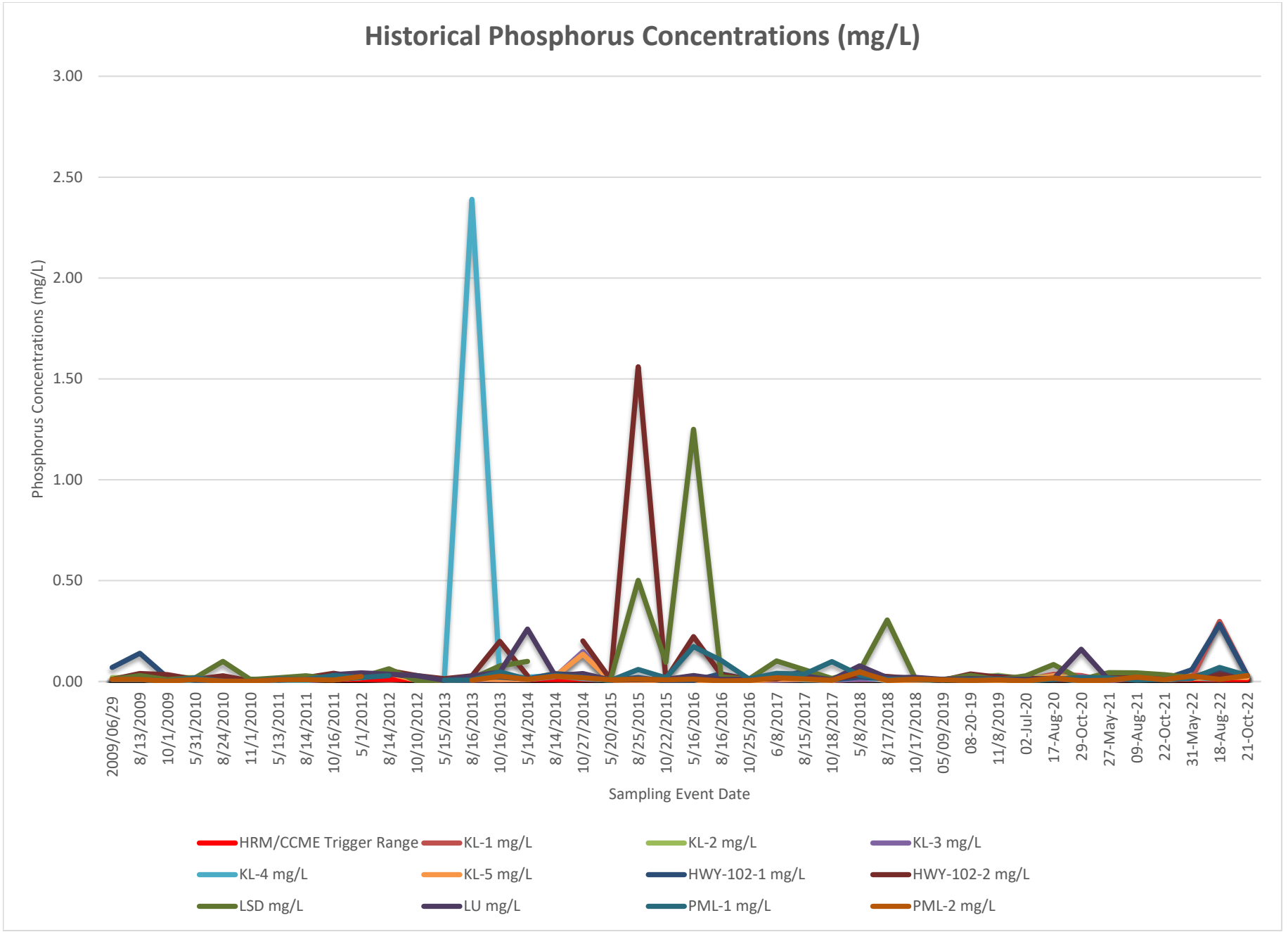
# E GRAPHS

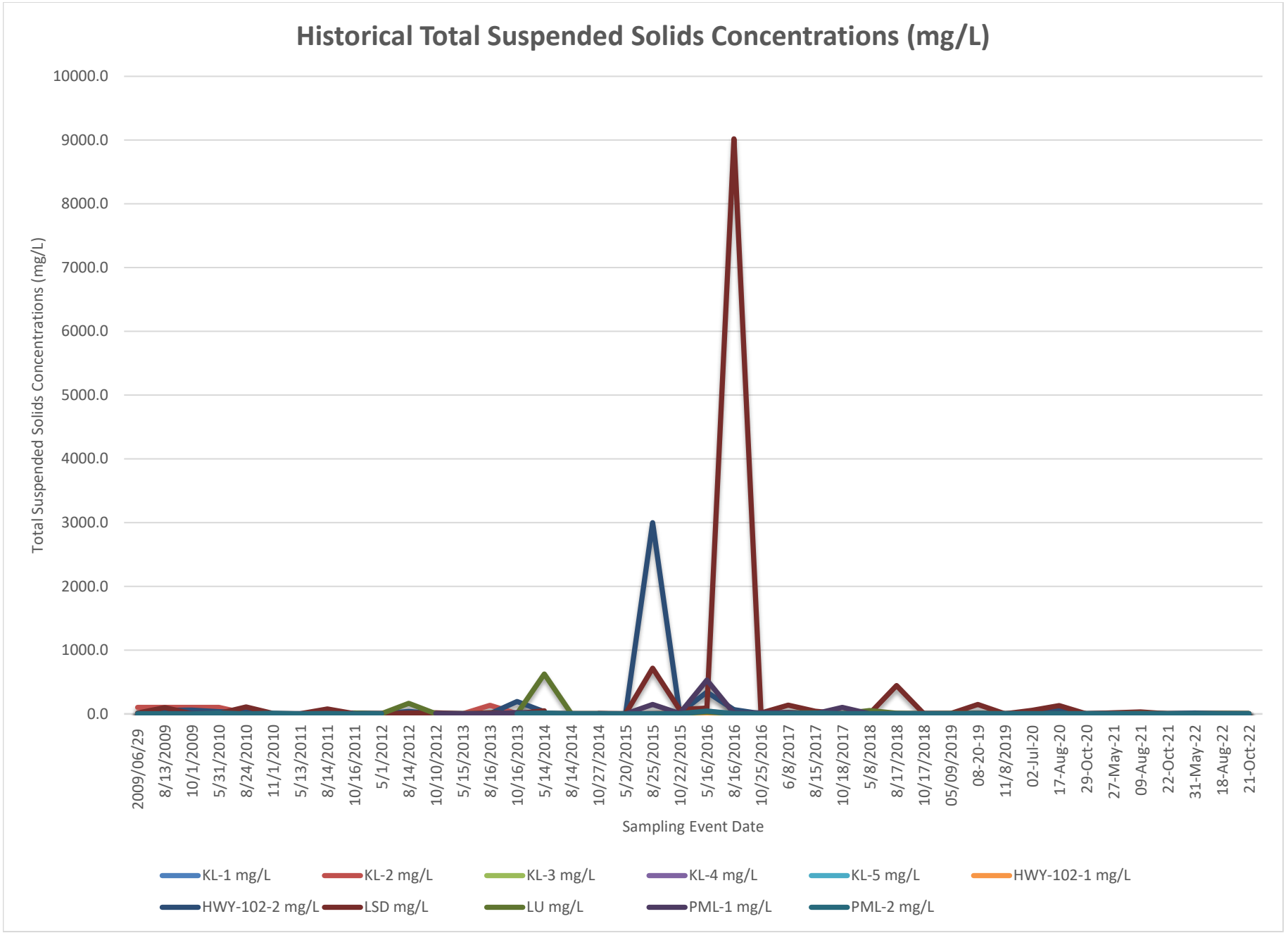

Historical Chloride Concentrations (mg/L)
Chloride Concentration (mg/L)
350
300
250
200
150
100
50
0
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
31-May-22
18-Aug-22
21-Oct-22
Sampling Event Date
KL-1 mg/L
KL-2 mg/L
KL-3 mg/L
KL-4 mg/L
KL-5 mg/L
HWY-102-1 mg/L
HWY-102-2 mg/L
LSD mg/L
LU mg/L
PML-1 mg/L
PML-2 mg/L
NSE EQS and CCME Guideline (120 mg/L)


Historical Chlorophyll-A Concentrations (µg/L)
Chlorophyll-A Concentrations (µg/L)
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
31-May-22
18-Aug-22
21-Oct-22
Sampling Event Date
KL-1 µg/L
KL-2 µg/L
KL-3 µg/L
KL-4 µg/L
KL-5 µg/L
HWY-102-1 µg/L
HWY-102-2 µg/L
LSD µg/L
LU µg/L
PML-1 µg/L
PML-2 µg/L


Historical Conductivity Measurements (µS/cm)
Conductivity (µS/cm)
1200
1000
800
600
400
200
0
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
31-May-22
18-Aug-22
21-Oct-22
Sampling Event Date
KL-1 µS/cm
KL-2 µS/cm
KL-3 µS/cm
KL-4 µS/cm
K-5 µS/cm
HWY-102-1 µS/cm
HWY-102-2 µS/cm
LSD µS/cm
LU µS/cm
PML-1 µS/cm
PML-2 µS/cm


Historical Laboratory pH Values
Laboratory pH Values
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
31-May-22
18-Aug-22
21-Oct-22
Sampling Event Date
Upper CCME Limit (9.0)
Lower CCME Limit (6.5)
KL-1 pH
KL-2 pH
KL-3 pH
KL-4 pH
KL-5 pH
HWY-102-1 pH
HWY-102-2 pH
LSD pH
LU pH
PML-1 pH
PML-2 pH


Historical Phosphorus Concentrations (mg/L)
Phosphorus Concentrations (mg/L)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
31-May-22
18-Aug-22
21-Oct-22
Sampling Event Date
HRM/CCME Trigger Range
KL-1 mg/L
KL-2 mg/L
KL-3 mg/L
KL-4 mg/L
KL-5 mg/L
HWY-102-1 mg/L
HWY-102-2 mg/L
LSD mg/L
LU mg/L
PML-1 mg/L
PML-2 mg/L


Historical Total Suspended Solids Concentrations (mg/L)
Total Suspended Solids Concentrations (mg/L)
10000.0
9000.0
8000.0
7000.0
6000.0
5000.0
4000.0
3000.0
2000.0
1000.0
0.0
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
31-May-22
18-Aug-22
21-Oct-22
Sampling Event Date
KL-1 mg/L
KL-2 mg/L
KL-3 mg/L
KL-4 mg/L
KL-5 mg/L
HWY-102-1 mg/L
HWY-102-2 mg/L
LSD mg/L
LU mg/L
PML-1 mg/L
PML-2 mg/L

# APPENDIX

# F STANDARD OPERATING PROCEDURES

# Standard Operation Procedure No.1

# Surface Water Sampling

| Owner: Halifax Regional Municipality | Issue No.: 1 | Creation Date: May 2021 |
|---|---|---|
| | | Revision Date: |

## 1.0 Objective

This document describes the required procedures for collecting surface water samples from a water body during environmental monitoring.

## 2.0 Scope

This procedure applies to all Wood personnel who conduct environmental monitoring for the Halifax Regional Municipality as part of the Bedford West Surface Water Monitoring Program.

## 3.0 Introduction

To ensure complete and accurate data, surface water samples must be properly collected, handled and stored prior to analysis. Records of the sampling must also be kept for reporting and auditing purposes.

## 4.0 Preparation

| | |
|---|---|
| **Hazards** | Water hazard, falling into stream, pond or lake.<br>Slips, trips, and falls.<br>Splashes from contaminated water. |
| **Tools** | Water meter (for field-measured parameters), secchi disk, camera, sample bottles, cooler/ice packs, field data sheets.<br>For water depth measurements: measuring stick or tape.<br>For boat accessed sample locations: canoe, paddles, life jackets, boat safety kit including bailer bucket, rope with floatation devises, whistle, and flashlight. |
| **Requirements** | Review required field QA/QC procedures for any sampling to be completed at this property **(See: T-1 QA-QC Table.)**<br>Experience completing environmental monitoring including using various types of environmental monitoring equipment. |

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## 5.0 Tasks

| | |
|---|---|
| **1. Preparation for Sampling** | • Conduct site inspection and monitoring prior to sampling.<br>• On arriving at the location, perform an inspection noting any conditions that may have changed since the last visit. Look for indications of new or continuing impacts such as seeps, stressed vegetation, staining or new contaminant sources such as debris or discarded materials. Inspect shoreline, water level and water surface. Note any sheen / colour / odour / snow cover/ changes / damage on the Field Report.<br>• Take photographs to document conditions and/or changes at the site.<br>• Record time of sampling and weather conditions. Provide comments regarding weather or other events/conditions that may affect sample results. Record observations and results on the field report including air temperature and cloud cover. Record any wildlife sightings.<br>• Wear fresh disposable latex or other suitable gloves and safety glasses when collecting and preserving samples for each location.<br>• Measure pH, dissolved oxygen (mg/L), water temperature (°) and electrical conductivity using calibrated meters. Observe meter readings until field parameters become steady. Take secchi depth using secchi disk on metered line. Record final readings on Field Report.<br>• Record field observations (color, odour [include type of odour], turbidity, sheen [include type of sheen], surface water depth), on the Field Report. |
| **2. Sample Labelling** | • Label each sample container prior to filling.<br>See: **T-2 Sample Labelling Table.** |
| **3. Collecting a Sample** | • Collect the surface water sample in mid-stream (if steam-like condition) or collect grab sample at least 1m from shore line.<br>• Avoid stirring up sediments or debris during sampling. Avoid collecting any floating debris and do not sample immediately downstream of a bridge, etc.<br>• Remain downstream of the sampling location in order to prevent contamination of sample and point the mouth of the bottle upstream.<br>• Unless the preservative is supplied in the container, rinse the bottle and cap in the water by inserting the bottle with closed cap into the water. Immerse the bottle orientated vertically to 50 to 100 mm below the water surface. Remove the cap, collect some water and recap the bottle before removing from the water. Shake, rinse and empty. Repeat the rinsing process twice more before collecting the sample for analysis. Add preservative if required.<br>• If the preservative is supplied in the bottle, do not pre-rinse the bottle. Rinse a laboratory-supplied disposable syringe three |

| | |
|---|---|
| | times by submerging the tip to between 50 mm and 100 mm below surface and drawing in water by pulling up on the plunger. Remove the sample bottle cap and use the rinsed syringe to collect the sample for analysis. |
| **5. QA/QC Requirements** | • Complete required field QA/QC procedures for any sampling at this sample location. **See: T-2 QA-QC Table.**<br>• Duplicate samples should be collected as sequential samples; the first bottle from each set should be filled sequentially followed by the second bottle from each set, etc. |
| **6. Sample Storage and Delivery** | • Immediately following collection, all samples are to be placed in a chilled cooler with ice.<br>• Samples should be delivered under chain of custody documentation to the analytical laboratory as soon as possible (i.e. bacteria samples must be submitted to laboratory before 3 p.m. and other samples preferably the same day). |

## Table T-1: QA/QC Table

| QA/QC Protocol | Purpose | Procedures |
|---|---|---|
| **Quality Assurance (QA) Protocol** | To ensure accuracy and precision of samples collected. | • Use of Standard Operating Procedures (SOP).<br>• Use of Laboratory supplied sterile collection containers and Laboratory preservatives.<br>• Decontamination of all sampling equipment between wells and other sample locations.<br>• Dedicated sterile gloves for each well worn during sample collection.<br>• Dedicated inline disposable filters for each sample that requires filtering.<br>• Control of external contaminate sources when sampling such as; running motors, location of sampling equipment, wind direction, container handling. |
| **Quality Control (QC) Protocol** | To evaluate the reproducibility, accuracy and level of contamination introduced by field procedures. | • Laboratory receiving samples will follow their own internal QA / QC program. A copy of the results to be included with results for samples submitted. |

## Table T-1: Sample Labelling

| Label Requirement | Comments |
|---|---|
| | |
| A specific identification code used for each site | Specific HRM nomenclature for each site. |
| Site or Property ID | Identify to which of multiple sites or properties the sample belongs. |
| Sample Location or Monitoring Well ID | Identify which of multiple sampling locations within a site or property the sample represents. |
| Date Collected | Include date in a standard format to eliminate confusion (e.g. DD/MMM/YYYY or 02MAR2009). |
| Time Collected | Important for parameters with a very short holding time. |
| Filtering | Identify whether sample was field-filtered, needs lab filtering or does not require any filtering. |
| Preservatives Added | Identify any preservatives added. |
| Sampler Initials | Identify sampler. |
| | |
| This information is to be included on sample bottles or the chain of custody as appropriate. | |

*Water Quality Monitoring Program*

5.4.1 The Parties agree that a water quality monitoring program shall be undertaken in conformity with the following requirements:

(a) the consultant shall be selected by the Municipality and the Developer agrees to pay for all required costs;

(b) except as required by clause (d), monitoring shall be undertaken at each location shown on Schedule O three (3) times per year. Spring testing shall include the RCAp-MS suite, Total Phosphorus (0.002 mg/L detection limit) , Total Suspended Solids, E. Coli, Total Coliforms and Chlorophyll A (acidification and Welschmeyer methodologies), plus standard field measurements (pH, dissolved oxygen (mg/L), conductivity, temperature, Secchi Depth, total dissolved solids, salinity). Summer and Fall testing shall include the RCAp suite (without MS), Total Phosphorus, Total Suspended Solids, E.Coli and Chlorophyll A (Acidification and Welschmeyer techniques), plus standard field measurements (pH, dissolved oxygen (mg/L), conductivity, temperature, Secchi Depth, total dissolved solids, salinity);

(c) monitoring shall be undertaken at least one time at each location illustrated on Schedule O prior to any initial disturbance being commenced within the upstream watershed of the Lands;

(d) in the event that threshold levels specified under 5.4.2(b) are exceeded, the Municipality may direct the consultant to undertake further testing deemed reasonable to verify results;

(e) except as provided for by clause (f), the program shall be undertaken until two (2) years after subdivision approval has been granted for the final phase of development permitted by this Agreement and, prior to subdivision approval being granted for the first phase, the Developer shall post a security in an amount of 110 percent of the cost to complete the monitoring program for a period of one year. This security shall be maintained for the term of testing. Should this security have to be used by the Municipality because of default of payment, no further subdivision shall be permitted until bonding for another year is provided;

(f) where further development agreement applications are approved within the Paper Mill Lake watershed which require that a water quality monitoring program be undertaken pursuant to the requirements of the Secondary Planning Strategy, the Parties agree that the Developer may seek amendments to the requirements of this Section in accordance with the provisions of Clause 6.1 of this Agreement; and

(g) The water quality monitoring program shall commence a minimum of six months prior to initial disturbance and the developer shall pay all costs associated. The developer shall give the Municipality an additional 30 days notice to prepare for the program.

5.4.2 The Municipality will designate a person to administer the requirements of Section 5.4.1 and receive the test results of the monitoring program. The designated person shall submit the test results to the Developer, the Community Council and the Waters Advisory Board within:

(a) three (3) months of being received from the consultant; or

(b) if any total phosphorous measurement meets or exceeds ten (10) micrograms per liter or if the geometric mean of any E. coli measurement within a given calendar year exceeds two hundred (200) counts per 100ml at any location or if any fecal coliform measurement exceeds four hundred (400) counts per 100ml, the findings will be reported immediately to the Developer and to the Waters Advisory Board and the Community Council at the next scheduled meeting. The Municipality shall make all reports provided to the Waters Advisory Board and the Community Council available to the public.

*Subdivision and Lot Grading Plans*

5.5.1 Any Subdivision Grading Plan submitted for subdivision approval shall be certified by a qualified professional that the plan conforms with the recommendations of the Master Stormwater Management Plan;

5.5.2 Any riparian buffer area established pursuant to Section 3.8 of this Agreement shall be shown on any lot grading plan submitted pursuant to the requirements of the Municipality's Grade Alteration By-Law.

5.5.3 The Developer shall prepare lot grading plans which comply with the Subdivision Grading Plan. Modifications to the site grading and proposed finished elevations may be approved by the Development Engineer. The Developer shall provide written confirmation of compliance that the lot has been graded in accordance with the lot grading plan and, where it has been determined that any lot grading has not been properly carried out, remedial or corrective measures shall be carried out by the Developer at it's cost.

5.5.4 No occupancy permit shall be granted unless the requirements of Section 5.5.3 have been satisfied or a security deposit for the completion of the work has been provided in accordance with the requirements of the Municipality's Grade Alteration By-Law

## PART 6: AMENDMENTS

### 6.1 Non-Substantive Amendments

6.1.1 The following items are considered by both parties to be not substantive and may be amended by resolution of Council:

(a) the granting of an extension to the date of commencement of construction as identified in Section 7.3 of this Agreement;
(b) the length of time for the completion of the development as identified in Section 7.5 of this Agreement;
(c) amendments to the development standards in Sections 3.4.1 and 3.4.2 of this Agreement;