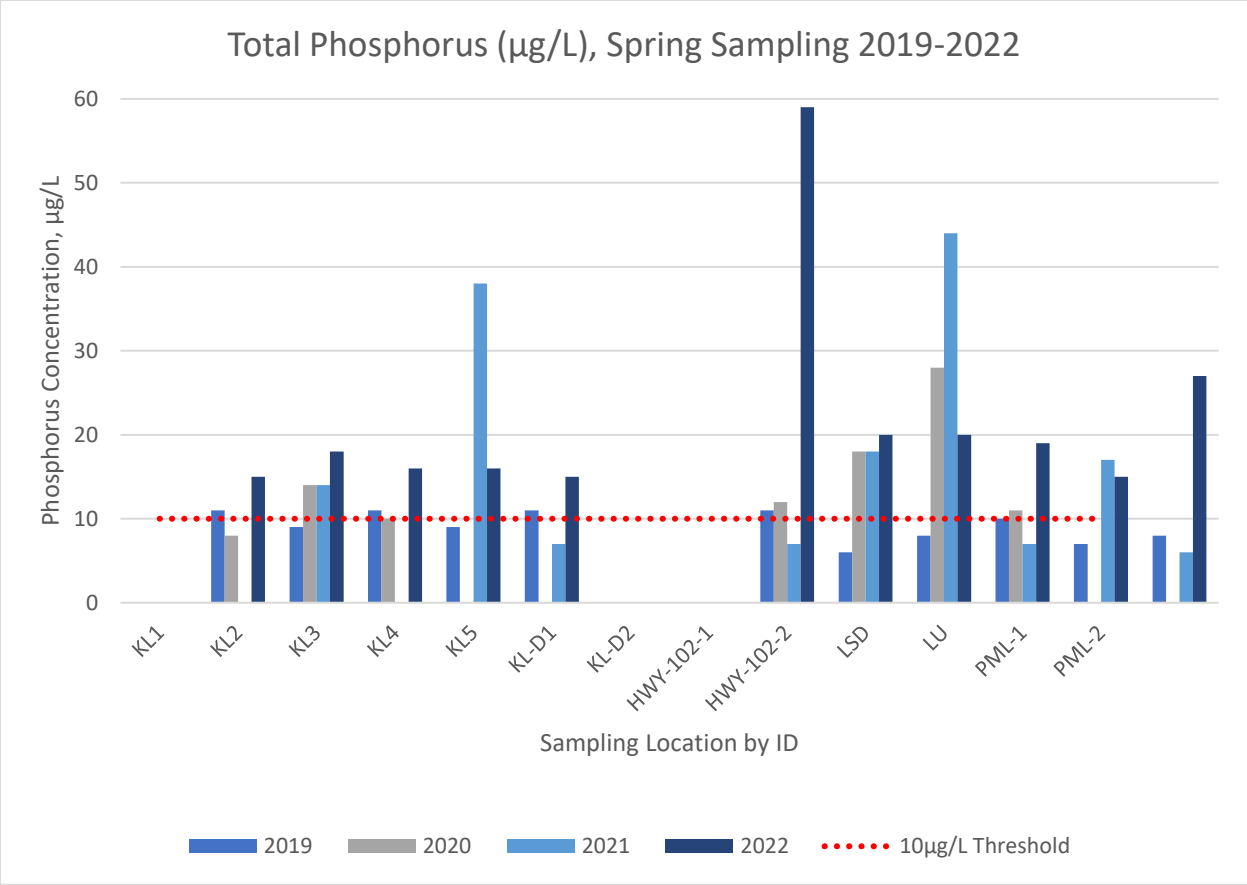

Figure 1: Total Phosphorus Concentrations from the Bedford West Water Quality Monitoring Program, Spring Sampling Events, 2019-2022

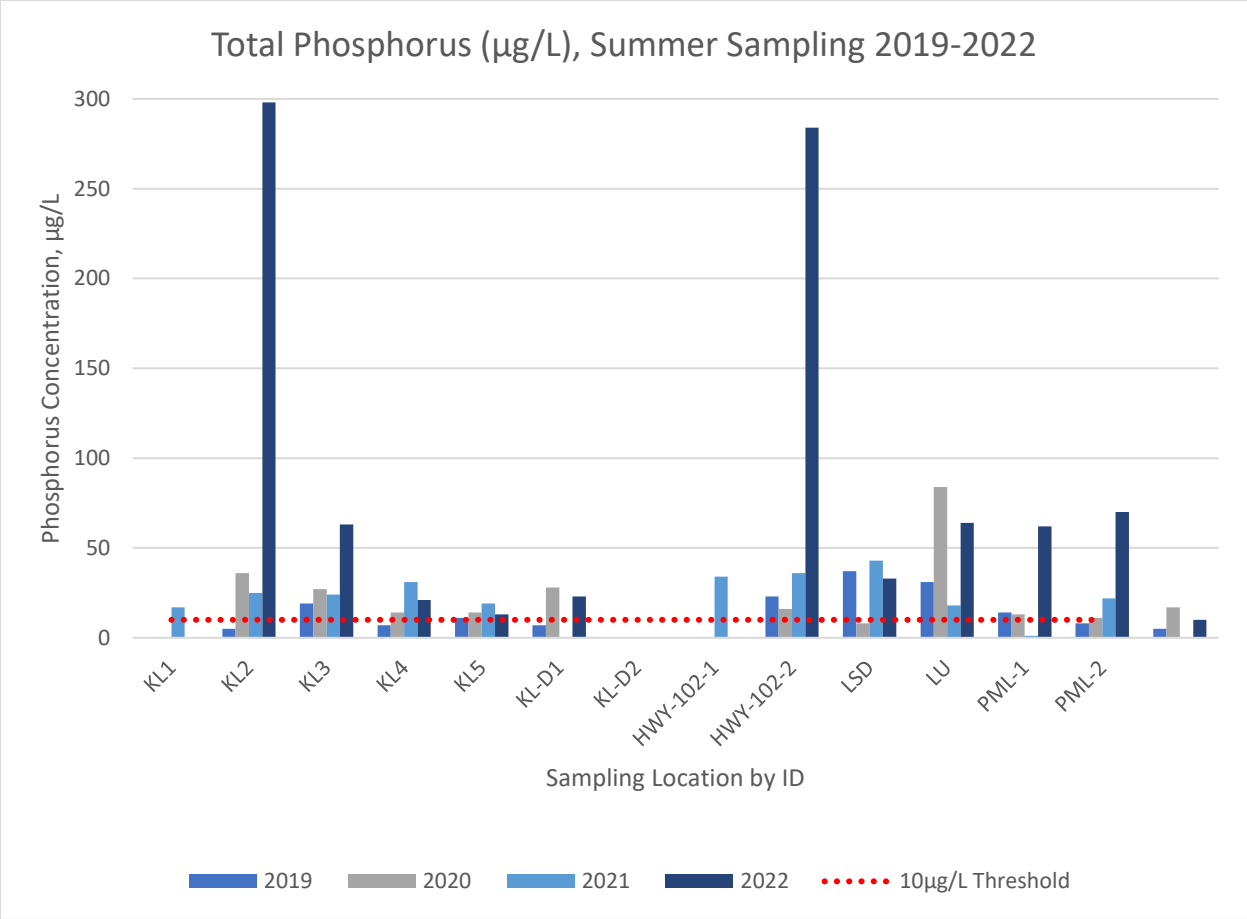

Figure 2: Total Phosphorus Concentrations from the Bedford West Water Quality Monitoring Program, Summer Sampling Events, 2019-2022

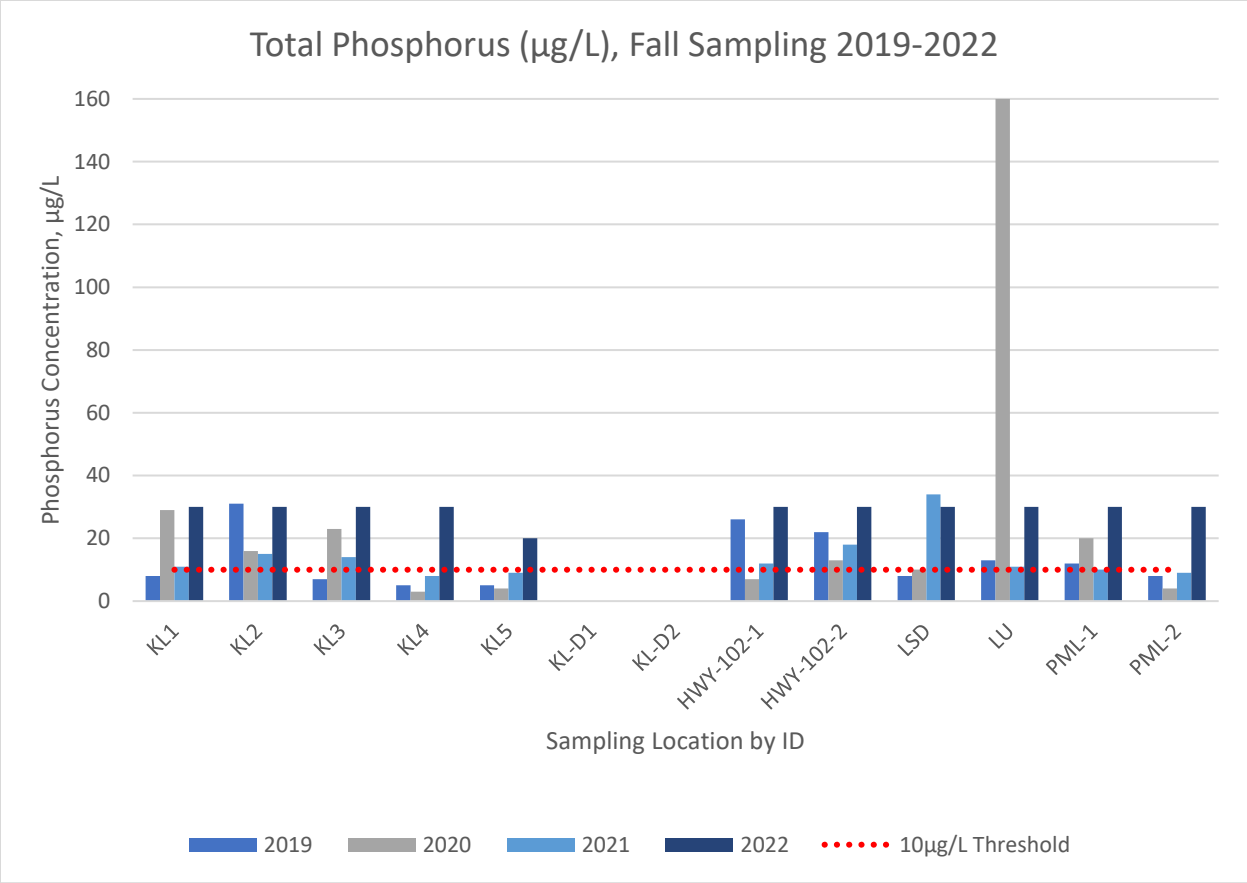

Figure 3: Total Phosphorus Concentrations from the Bedford West Water Quality Monitoring Program, Fall Sampling Event, 2019-2022

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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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:

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5657 Spring Garden Road, Suite 200

Halifax, NS, B3J 3R4

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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 A Instrument Calibration Report

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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

HWY102-1

PML2

PAPER MILL LAKE

PML1

KL4

KL3

LSD

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

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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

[redacted]

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	233.0	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	<0.010	<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	5.5	6.6	6.5	8.4	6.3	7.5	6.6	6.5	8.1	11.0	6.0	6,400.0	7.9	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	0.012	0.008	0.011	0.026	0.013	0.008	0.002	0.014	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
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	<5	38	<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
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)	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
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	115	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	-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
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)	ug/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)	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
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
Total Barium (Ba)	ug/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)	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
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
Total Boron (B)	ug/L	5	1200	--	1500		11	--	--	11	9	--	<50	--	--	<5	11	33	6	10	9	7	22	10	<50	--	<5	8	--	--	<5	10	--	26	5	10	--	5.0
Total Cadmium (Cd)	ug/L	0.017	0.01	--	0.09		<0.3	--	--	0.053	<0.017	--	0.056	--	--	0.012	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)	ug/L	1	--	--	1		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	<1	6	<1	<1	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1
Total Cobalt (Co)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	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	<2	<2	<2	<2	<2	<2	<2	<2	<2	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2
Total Titanium (Ti)	ug/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)	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	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	--	<2	<2	--	--	2	--	<2	<2	<2	--	2.0
Total Zinc (Zn)	ug/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	ug/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	ug/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
Sampling Time	hh:mm	--					11:00	10:30	10:45	10:15	12:25	10:50	09:30	14:00	13:15	9:50
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
Water Temp	Celsius	--	--	--	--		16.8	18.2	15.4	13.5	20.4	8.0	9.9	19.1	14.1	7.6
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
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
Specific Conductance	uS/cm	--	--	--	--		46.0	106.0	89.2	198.5	104.0	75.1	79.7	66.7	54.3	58.0
INORGANICS																
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--		8	8	8	8	7	<5	<5	7	<5	20
Dissolved Chloride (Cl)	mg/L	1	--	--	120		48	48	48	48	25	17	19	14	10	16
Colour	TCU	5	--	--	--		20	20	20	20	63	95	80	110	120	52
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
Nitrate (N)	mg/L	0.05	--	--	13		0.19	0.19	0.19	0.19	0.07	--	0.12	--	--	0.11
Nitrite (N)	mg/L	0.05	--	--	0.06		<0.05	<0.05	<0.05	<0.05	<0.01	--	<0.01	--	--	<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
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--		--	--	--	--	--	--	--	--	--	<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
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
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
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
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
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
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
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
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
Total Suspended Solids	mg/L	5	--	--	Comment 1		103	103	103	103	7	<1	<1	<2	<1	<5
Dissolved Sulphate (SO4)	mg/L	2	--	--	--		9	9	9	9	<2	<2	<2	<2	<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
Conductivity (uS/cm)	µS/cm	1	--	--	--		212	212	212	212	100	97	79	66	54	71
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
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--		<1	8	<1	5	7	<1	<1	7	<1	20
Calculated TDS	mg/L	1	--	--	--		36	55	35	46	55	38	37	34	25	45
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--		<1	<1	<1	<1	<1	<1	<1	<1	<1	<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
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
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
Langelier Index (@ 20C)	N/A	N/A	--	--	--		NC	-3.20	NC	-3.44	-3.05	NC	NC	-3.66	NC	-3.37
Langelier Index (@ 4C)	N/A	N/A	--	--	--		NC	-3.45	NC	-3.70	-3.30	NC	NC	-3.91	NC	-3.69
Saturation pH (@ 20C)	N/A	N/A	--	--	--		NC	9.78	NC	10.00	9.83	NC	NC	10.10	NC	9.87
Saturation pH (@ 4C)	N/A	N/A	--	--	--		NC	10.00	NC	10.30	10.10	NC	NC	10.30	NC	10.20
Metals (ICP-MS)																
Total Aluminum (Al)	µg/L	5	5	--	5 - 100		290	--	--	175	151	--	271	--	--	209
Total Antimony (Sb)	µg/L	2	20	--	--		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2
Total Arsenic (As)	µg/L	2	5.0	--	5		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2
Total Barium (Ba)	µg/L	5	1000	--	--		9	--	--	12	14	--	10	--	--	9
Total Beryllium (Be)	µg/L	2	5.3	--	--		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2
Total Bismuth (Bi)	µg/L	2	--	--	--		<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2
Total Boron (B)	µg/L	5	1200	--	1500		8	--	--	15	13	--	<50	--	--	6
Total Cadmium (Cd)	µg/L	0.017	0.01	--	0.09		<0.3	--	--	0.018	<0.017	--	<0.017	--	--	<0.017
Total Chromium (Cr)	µg/L	1	---	--	1		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1
Total Cobalt (Co)	µg/L	1	10	--	--		<1	--	--	<0.40	<0.40	--	<0.40	--	--	<1
Total Copper (Cu)	µg/L	1	2	--	2		<2	--	--	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2
Total Iron (Fe)	µg/L	50	300	--	300		250	--	--	227	403	238	202	418	358	154
Total Lead (Pb)	µg/L	0.5	1	--	1.0 - 7.0		<0.5	--	--	1.0	<0.50	--	<0.50	--	--	<0.5
Total Manganese (Mn)	µg/L	2	820	--	--		26	--	--	43	83	35	12	68	23	17
Total Molybdenum (Mo)	µg/L	2	73	--	73		<2	--	--	<2	<2	--	<2	--	--	<2
Total Nickel (Ni)	µg/L	2	25	--	25 - 150		<2	--	--	<2	<2	--	<2	--	--	<2
Total Selenium (Se)	µg/L	1	1.0	--	1		<2	--	--	<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
Total Strontium (Sr)	µg/L	5	21000	--	--		14	--	--	18	20	--	12	--	--	10
Total Thallium (Tl)	µg/L	0.1	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	--	3	--	--	<2
Total Uranium (U)	µg/L	0.1	300	--	15		<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
Total Zinc (Zn)	µg/L	5	30	--	30		8	--	--	5	5	7	<5.0	<5.0	<5.0	<5
MICROBIOLOGICAL																
Total Coliform	MPN/100mL	1	--	--	--		1,800	170	--	>250	11	>250	59	>250	--	>2420
E. coli	MPN/100mL	1	--	400	--		1,500	100	--	>250	6	6	2	>250	<100	3
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
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

Tested Parameters	Kearney Lake (KL2)									
Sampling Date	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
Sampling Time	10:30	10:20	09:10	16:10	14:30	10:45	9:20	14:04	09:15	13:29
FIELD DATA										
Secchi Depth	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NCC	N/A
Water Temp	21.8	12.3	10.1	22.9	9.7	11.7	21.1	10.8	13.1	24.7
Dissolved Oxygen	5.8	7.6	9.4	6.4	7.4	14.9	7.0	7.7	8.4	7.3
pH (in Situ)	6.41	6.29	5.75	7.47	5.57	6.60	7.22	5.79	6.36	5.88
Specific Conductance	96.6	61.1	77.9	65.3	64.5	188.0	266.0	63.0	0.1	107.9
INORGANICS										
Total Alkalinity (as CaCO3)	<5	8	<5	<5	<5	29	7	28	<5.0	7
Dissolved Chloride (Cl)	20	12	19	21	14	20	17	12	15	14
Colour	60	94	37	90	71	25	44	168	50	63
Nitrite + Nitrate	0.08	<0.05	0.12	<0.05	<0.05	0.08	<0.05	<0.05	0.06	0.08
Nitrate (N)	0.08	<0.05	0.12	<0.05	<0.05	0.08	<0.05	<0.05	0.06	0.08
Nitrite (N)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05
Nitrogen (Ammonia Nitrogen) *	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	0.04	<0.03	<0.050	<0.03
Total Kjeldahl Nitrogen as N	2.2	0.7	--	1.1	<0.4	<0.4	0.4	<0.4	0.4	0.8
Total Organic Carbon	7.1	10.9	7.5	11.1	10.9	6.2	6.6	12.9	4.0	13.3
Orthophosphate (as P)	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
pH (Lab)	6.70	6.50	6.37	6.62	6.34	6.53	6.87	6.06	6.32	6.99
Total Calcium (Ca)	3.6	2.9	2.7	2.5	2.4	3.4	4.0	2.4	2,600.0	3.4
Total Magnesium (Mg)	1.0	1.0	0.7	0.5	0.8	1.1	1.0	0.6	640.0	0.9
Total Phosphorus	0.059	0.013	0.010	0.020	0.029	0.013	0.039	0.025	0.008	0.012
Total Potassium (K)	0.7	0.8	0.5	0.5	0.7	0.7	0.9	0.7	540.0	0.7
Total Sodium (Na)	14.2	9.5	8.9	7.0	7.9	17.5	14.0	7.6	8.4	11.5
Reactive Silica (SiO2)	4.0	4.9	2.8	4.4	4.9	2.4	3.3	4.6	2.0	3.7
Total Suspended Solids	<5	<5	<5	135	<5	<5	<5	<5	<1.0	<5
Dissolved Sulphate (SO4)	3	2	4	5	4	4	2	3	3	<2
Turbidity (NTU)	1.1	1.0	1.9	2.2	1.0	0.9	0.8	1.2	<1.0	1.6
Conductivity (uS/cm)	91	61	83	69	62	87	94	66	64	81
Calculated Parameters										
Anion Sum	0.63	0.54	0.63	0.70	0.48	1.23	0.66	0.96	0.48	0.54
Bicarb. Alkalinity (calc. as CaCO3)	<5	8	<5	<5	<5	29	7	28	<1.0	7
Calculated TDS	44	34	37	37	31	65	44	44	32	36
Carb. Alkalinity (calc. as CaCO3)	<10	<10	<10	<10	<10	<10	<10	<10	<1.0	<10
Cation Sum	0.94	0.73	0.63	0.54	0.60	1.07	0.97	0.57	0.57	0.82
Hardness (CaCO3)	13.10	11.40	9.60	8.30	9.30	13.00	14.10	8.50	9.10	12.20
Ion Balance (% Difference)	19.70	15.10	0.30	12.90	11.00	7.10	19.10	25.70	8.57	20.50
Langelier Index (@ 20C)	-3.60	-3.68	-4.05	-3.83	-4.12	-3.04	-3.23	-3.66	NC	-3.18
Langelier Index (@ 4C)	-3.92	-4.00	-4.37	-4.15	-4.44	-3.36	-3.55	-3.98	NC	-3.50
Saturation pH (@ 20C)	10.30	10.20	10.40	10.50	10.50	9.57	10.10	9.72	NC	10.20
Saturation pH (@ 4C)	10.60	10.50	10.70	10.80	10.80	9.89	10.40	10.00	NC	10.50
Metals (ICP-MS)										
Total Aluminum (Al)	205	338	256	270	259	205	236	340	180	--
Total Antimony (Sb)	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--
Total Arsenic (As)	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--
Total Barium (Ba)	11	10	8	<5	13	13	18	9	9	--
Total Beryllium (Be)	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--
Total Bismuth (Bi)	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--
Total Boron (B)	14	22	6	11	9	11	12	12	<50	--
Total Cadmium (Cd)	<0.017	<0.017	<0.017	<0.017	0.019	<0.017	<0.017	0.018	0.014	--
Total Chromium (Cr)	<1	<1	<1	<1	<1	9	<1	<1	<1.0	--
Total Cobalt (Co)	<1	<1	<1	<1	<1	<1	<1	<1	<0.40	--
Total Copper (Cu)	<2	<2	<2	<1	2	<1	<1	4	<2.0	<1
Total Iron (Fe)	541	813	269	528	523	174	723	305	250	641
Total Lead (Pb)	<0.5	1.1	<0.5	0.5	<0.5	5.8	<0.5	0.5	<0.5	--
Total Manganese (Mn)	90	114	24	67	53	33	146	25	47	120
Total Molybdenum (Mo)	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--
Total Nickel (Ni)	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--
Total Selenium (Se)	<1	1	<1	<1	<1	<1	<1	<1	<1.0	--
Total Silver (Ag)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	--
Total Strontium (Sr)	18	15	12	9	12	16	17	12	12	--
Total Thallium (Tl)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--
Total Tin (Sn)	<2	3	<2	<2	<2	<2	<2	<2	<2.0	--
Total Titanium (Ti)	2	3	4	<2	2	2	<2	3	3	--
Total Uranium (U)	<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	<2.0	--
Total Zinc (Zn)	<5	7	<5	<5	<5	<5	<5	<5	<5.0	<5
MICROBIOLOGICAL										
Total Coliform	1,986	>2420	>2420	>2420	>2420	525	>2420	>2420	---	>2420
E. coli	7	3	12	6	2	<1	18	11	30	11
Chlorophyll A - Acidification method	2.20	0.07	0.62	1.00	0.73	0.13	0.83	0.41	0.34	0.96
Chlorophyll A - Welschmeyer method	2.20	0.12	0.72	1.00	0.74	0.14	0.86	0.41	---	1.26

Tested Parameters	Kearney Lake (KL2)										
Sampling Date	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	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	1.3	2.1	1.8	1.9	2.0	1.5	1.2	2.1	1.4	1.4	2.2
Water Temp	8.1	10.7	20.3	10.2	15.7	21.2	10.6	11.7	21.6	10.3	10.3
Dissolved Oxygen	7.1	7.9	4.2	9.7	9.7	6.6	6.2	9.4	4.2	7.5	**
pH (in Situ)	6.43	7.64	5.97	5.54	6.69	6.00	6.29	6.21	5.16	5.84	8.50
Specific Conductance	73.6	82.0	117.0	103.7	78.0	114.0	109.0	57.4	109.9	67.2	48.3
INORGANICS											
Total Alkalinity (as CaCO3)	<5	<5	10	6	5	12	9	<5	11	<5	<5
Dissolved Chloride (Cl)	12	17	26	30	20	19	19	12	19	11	13
Colour	61	47	48	93	46	46	57	82	59	123	76
Nitrite + Nitrate	<0.05	<0.05	0.06	0.19	0.05	0.08	<0.05	0.07	0.05	<0.05	0.1
Nitrate (N)	<0.05	<0.05	<0.05	0.19	<0.05	0.08	<0.05	0.07	<0.05	<0.05	0.1
Nitrite (N)	<0.05	<0.05	0.06	<0.05	0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen) *	<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	0.8	0.4	0.9	0.5	<0.4	0.5	<0.4	<0.4	<0.4	<0.4	0.5
Total Organic Carbon	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)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH (Lab)	6.28	6.35	6.87	6.19	6.57	6.87	6.66	6.46	7.04	6.27	6.44
Total Calcium (Ca)	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)	0.7	0.7	1.1	1.5	1.0	1.2	0.9	0.7	1.1	0.8	0.7
Total Phosphorus	0.008	0.009	0.016	0.013	0.012	0.028	0.010	0.014	0.015	0.004	0.009
Total Potassium (K)	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)	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)	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	17	<5	<5	<5	<5	12	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	3	4	3	7	3	2	3	3	<2	3.0	3.0
Turbidity (NTU)	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)	73	79	135	125	93	110	97	68	115	70	72
Calculated Parameters											
Anion Sum	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)	<5	<5	10	6	5	12	9	<5	11	<5	<5
Calculated TDS	25	38	59	68	46	51	47	28	47	31.0	32.0
Carb. Alkalinity (calc. as CaCO3)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	0.47	0.76	1.09	1.25	0.91	1.05	0.90	0.62	0.97	0.8	0.7
Hardness (CaCO3)	5.60	10.10	15.80	20.20	13.10	15.70	13.40	8.6	15	10.5	8.6
Ion Balance (% Difference)	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)	-4.51	-4.04	-3.04	-3.85	-3.73	-2.98	-3.35	-4.02	-2.85	-4.1	-4.0
Langelier Index (@ 4C)	-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)	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)	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)	284	187	--	--	185	150	240	228	123	--	156.0
Total Antimony (Sb)	<2	<2	--	--	<2	--	<2	<2	<2	--	<2
Total Arsenic (As)	<2	<2	--	--	<2	--	<2	<2	<2	--	<2
Total Barium (Ba)	9	10	--	--	10	--	14	7	14	--	10.0
Total Beryllium (Be)	<2	<2	--	<2	<2	--	<2	<2	<2	--	<2
Total Bismuth (Bi)	<2	<2	--	--	<2	--	<2	<2	<2	--	<2
Total Boron (B)	<5	9	--	--	<5	--	17	7	13	--	7.0
Total Cadmium (Cd)	0.176	<0.017	--	--	0.041	--	<0.017	<0.09	<0.09	--	<0.09
Total Chromium (Cr)	<1	1	--	--	<1	--	1	<1	<1	--	<1
Total Cobalt (Co)	<1	<1	--	--	<1	--	<1	<1	<1	--	<1
Total Copper (Cu)	<1	<1	<1	2	<1	1	1	<1	<1	1.0	<1
Total Iron (Fe)	478	232	1,000	290	168	759	572	148	783	336.0	227.0
Total Lead (Pb)	0.6	<0.5	--	--	<0.5	--	<0.5	1.2	<0.5	--	<0.5
Total Manganese (Mn)	57	21	109	39	39	96	64	17	78	29.0	28.0
Total Molybdenum (Mo)	<2	<2	--	--	<2	--	<2	<2	<2	--	<2
Total Nickel (Ni)	<2	<2	--	--	<2	--	<2	<2	<2	--	<2
Total Selenium (Se)	<1	<1	--	--	<1	--	<1	<1	<1	--	<1
Total Silver (Ag)	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1
Total Strontium (Sr)	8	12	--	--	15	--	20	10	24	--	13.0
Total Thallium (Tl)	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1
Total Tin (Sn)	<2	<2	--	--	<2	--	<2	<2	<2	--	<2
Total Titanium (Ti)	<2	<2	--	--	<2	--	<2	<2	<2	--	<2
Total Uranium (U)	<0.1	<0.1	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1
Total Vanadium (V)	<2	<2	--	--	<2	--	<2	<2	<2	--	<2
Total Zinc (Zn)	<5	<5	<5	8	<5	8	6	<5	<5	20.0	<5
MICROBIOLOGICAL											
Total Coliform	>2420	>2420	>2420	>2420	>2420	>2420	659	10	2420	140.0	1960
E. coli	5	4	15	25	31	16	3	4	20	50.0	<10
Chlorophyll A - Acidification method	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	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	11:30	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	N/A	NCC	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
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	7.24	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	20.30	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
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	-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
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	--	139.0
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
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	9	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.

Underline (dark 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	4.2	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	0.021	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	6.0
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	-3.21	-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
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	--	--	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		<0.3	--	--	0.031	<0.017	--	0.025	--	--	0.021	<0.017	0.027	0.022	0.017	0.058	0.027	<0.017	<0.017	0.018	--	<0.017	0.026	--	--	0.021	--	<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
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
Total Copper (Cu)	µg/L	1	2	--	2		<2	--	--	<2.0	2	<2.0	2	<2.0	<2.0	<2	<2	3	<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	3	2	<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	NDDGT	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 (grey 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	1.1	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
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)	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
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	9	7	9	9	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	
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	0.11	<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	0.022	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	6	<5	<5	<1.0	<5	<5	<5	10	<5	<5	11	<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	--	--	--		<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	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	--	--	0.032	--	<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																										
							HWY102-2																										
Sample Sites																																	
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	5.76	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	1.4	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	144.0	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	<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	--	--	--		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	4	<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

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)	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
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
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
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
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	4.3	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	**
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
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
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
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
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
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
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
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
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
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
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
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		6.69	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	6.92	7.08	7.01	6.91	7.20	6.99	6.93
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
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
Total Phosphorus	mg/L	0.002	--	--	--	0.010	<0.02	0.010	0.009	0.018	0.100	0.009	0.018	0.028	0.014	0.022	0.043	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
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
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	25.2	26.0	23.0	16.5	21.7	15.4	24.4
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
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	9,000	15	138	41	<5	<5	444	6.0	8.0
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
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	53.8	21.3	15.1	2.0	72.2	2.5	5.0
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
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
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
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
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	--	--	--		1.53	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
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
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
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
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
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
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
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
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	--	5		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	8	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<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
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		13	--	--	41	22	--	<50	--	--	6	24	16	10	15	15	14	16	<50	--	<5	12	--	--	<5	--	20	10	20	--	9.0
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
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
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	--	--	1	--	<1	<1	6	--	<1
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
Total Iron (Fe)	µg/L	50	300	--	300		180	--	--	554	965	120	211	318	164	161	38,000	312	236	254	4,200	593	363	230	376,000	4,570	2,790	2,190	303	1,080	375	878	239	5460	164.0	560.0
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
Total Manganese (Mn)	µg/L	2	820	--	--		51	--	--	113	632	23	30	53	39	26	13,200	67	71	81	124	140	60	130	13,800	985	921	2,420	75	436	212	250	55	2630	58.0	368.0
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	13	<2	<2	<2	2	<2	<2	<2.0	--	5	2	--	--	<2	--	<2	<2	4	--	<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
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	--	--		30	--	--	36	42	--	24	--	--	12	82	22	24	24	25	26	19	25	--	16	29	--	--	28	--	31	17	54	--	27.0
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
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	--	--	--		<2	--	--	7	4	--	5	--	--	3	405	4	<2	2	36	6	3	3	--	41	30	--	--	14	--	7	3	36	--	<2
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
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
Total Zinc (Zn)	µg/L	5	30	--	30		7	--	--	7	7	<5.0	<5.0	<5.0	<5.0	<5	110	7	6	<5	15	<5	<5	<5.0	799	11	17	14	<5	8	<5	7	<5	23	<5	<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	534	>2420	641	46	3020	2,380.0	1120
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	479	1	23	20	20.0	7
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
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

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)	µS/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)	µg/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)	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	--	5		--	<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
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
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	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)	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	0.14	<0.09	--	0.1
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
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
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	5.0	3.0
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	494	1090	206.0	290.0
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	3.1	--	--	<0.5	--	<0.5	1.3	<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
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	<2	<2	<2	<2	3	<2	<2	<2.0	--	<2	3	--	--	<2	--	<2	<2	2	--	10.0
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
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
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
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	3	7	3	11	2	22	<2	3	<2	--	<2	31	--	--	<2	--	<2	6	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
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
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
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	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
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

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	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	1.9	1.3	1.8	2.7	1.2	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)	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
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	--	--	<2	--	3	<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
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

AGAT Laboratories

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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: [redacted]

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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: [redacted]

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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: [redacted]

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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: [redacted]

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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: [redacted]

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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: [redacted]

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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: [redacted]

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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			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 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:

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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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AGAT WORK ORDER: 19X465476

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 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

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
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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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	Sar	Date/Time	Special Instructions
MARIA GUTIERREZ	MAY 9/19	[redacted]	09/05/19	
Sample Relinquished By (print name & sign)	Date/Time	Sar	Date/Time	SNC Bedford West Package
			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)

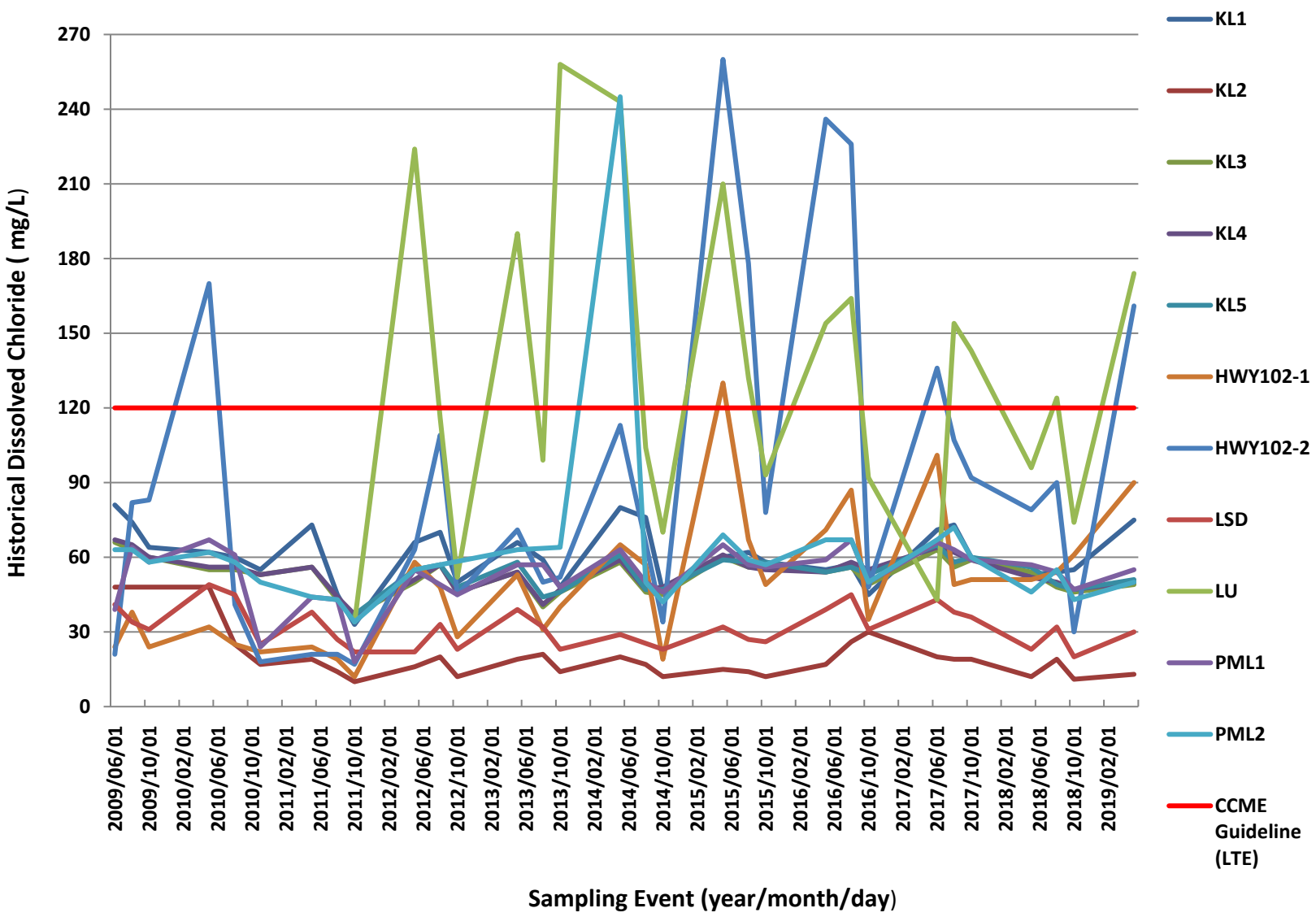

Figure 1 - Historical Dissolved Chloride Concentrations for Water Quality Monitoring Program.

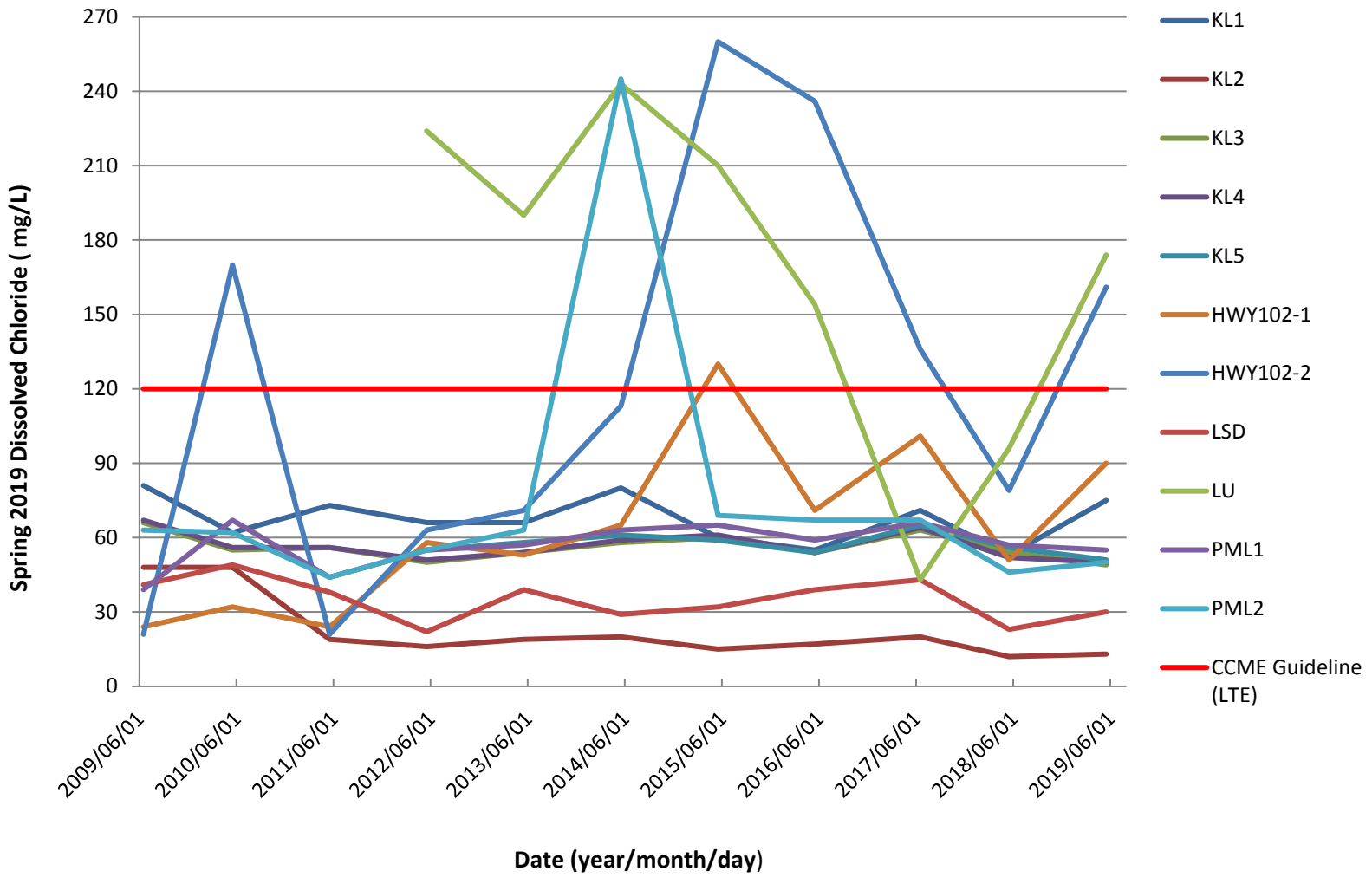

Figure 2 – Seasonal Dissolved Chloride Concentrations for Water Quality Monitoring Program.

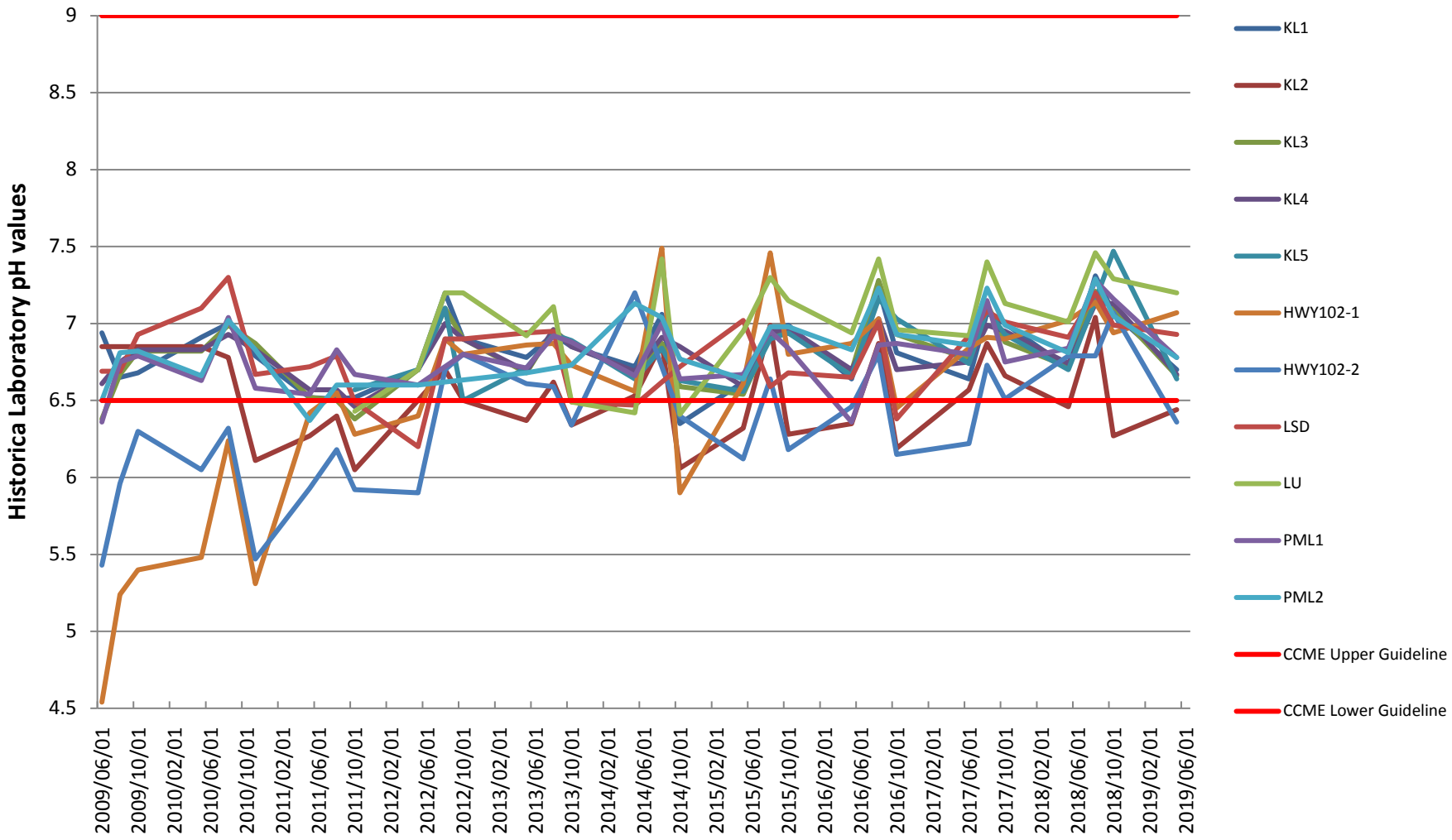

Figure 3 –Historical pH Measurements for Water Quality Monitoring Program

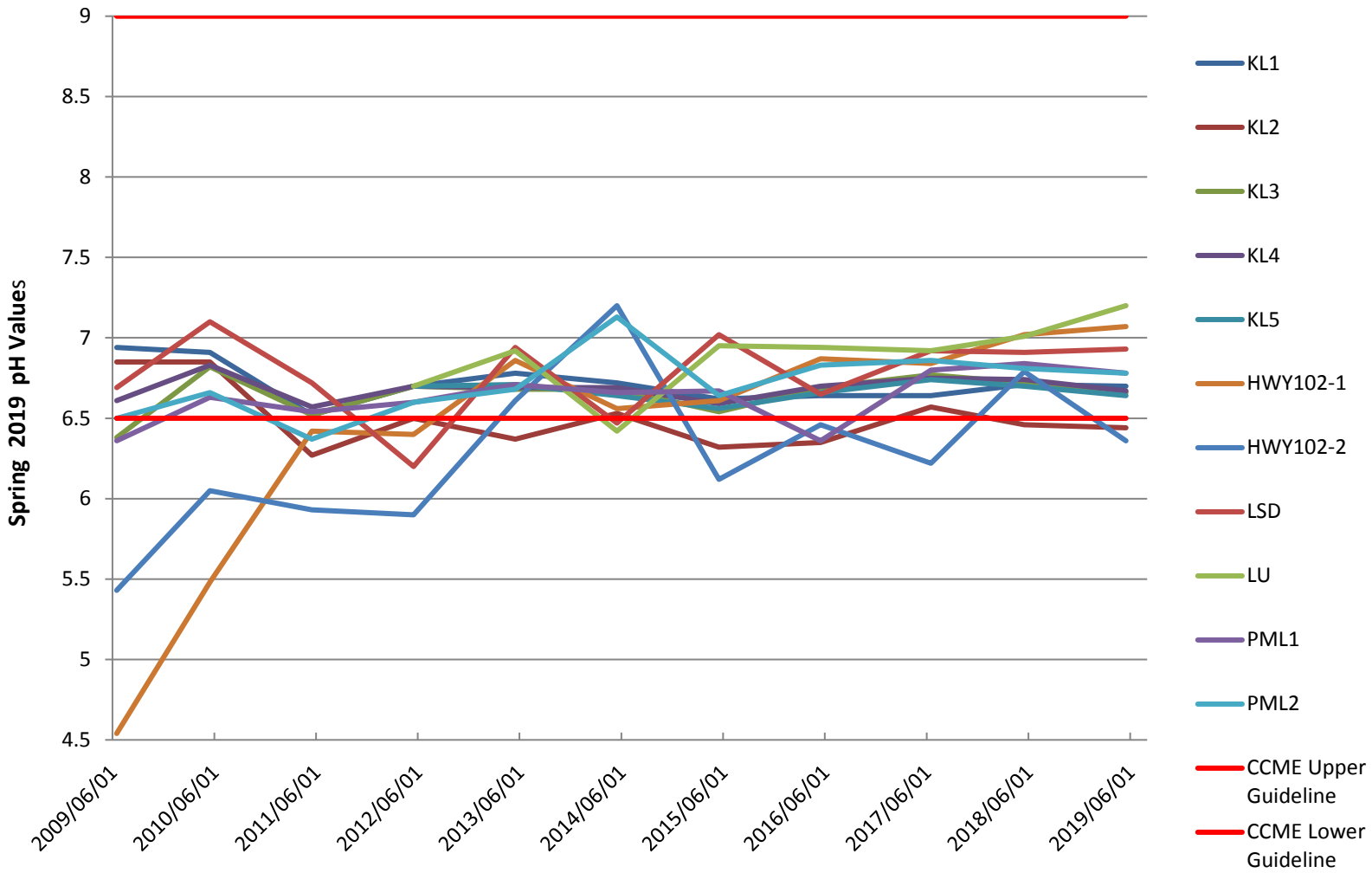

Figure 4 – Seasonal pH Measurements for Water Quality Monitoring Program.

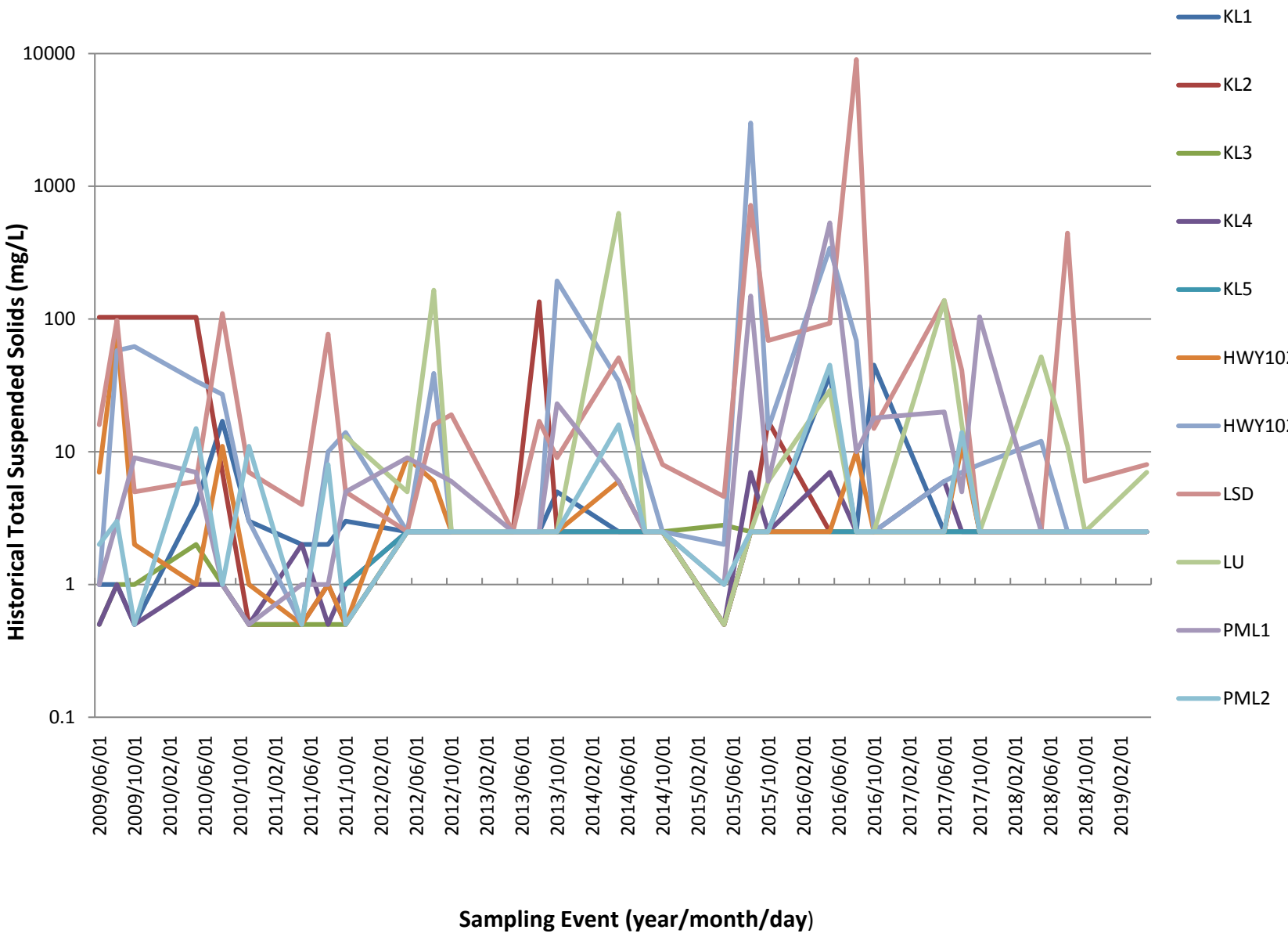

Figure 5 – Historical Total Suspended Solids Concentrations for Water Quality Monitoring Program.

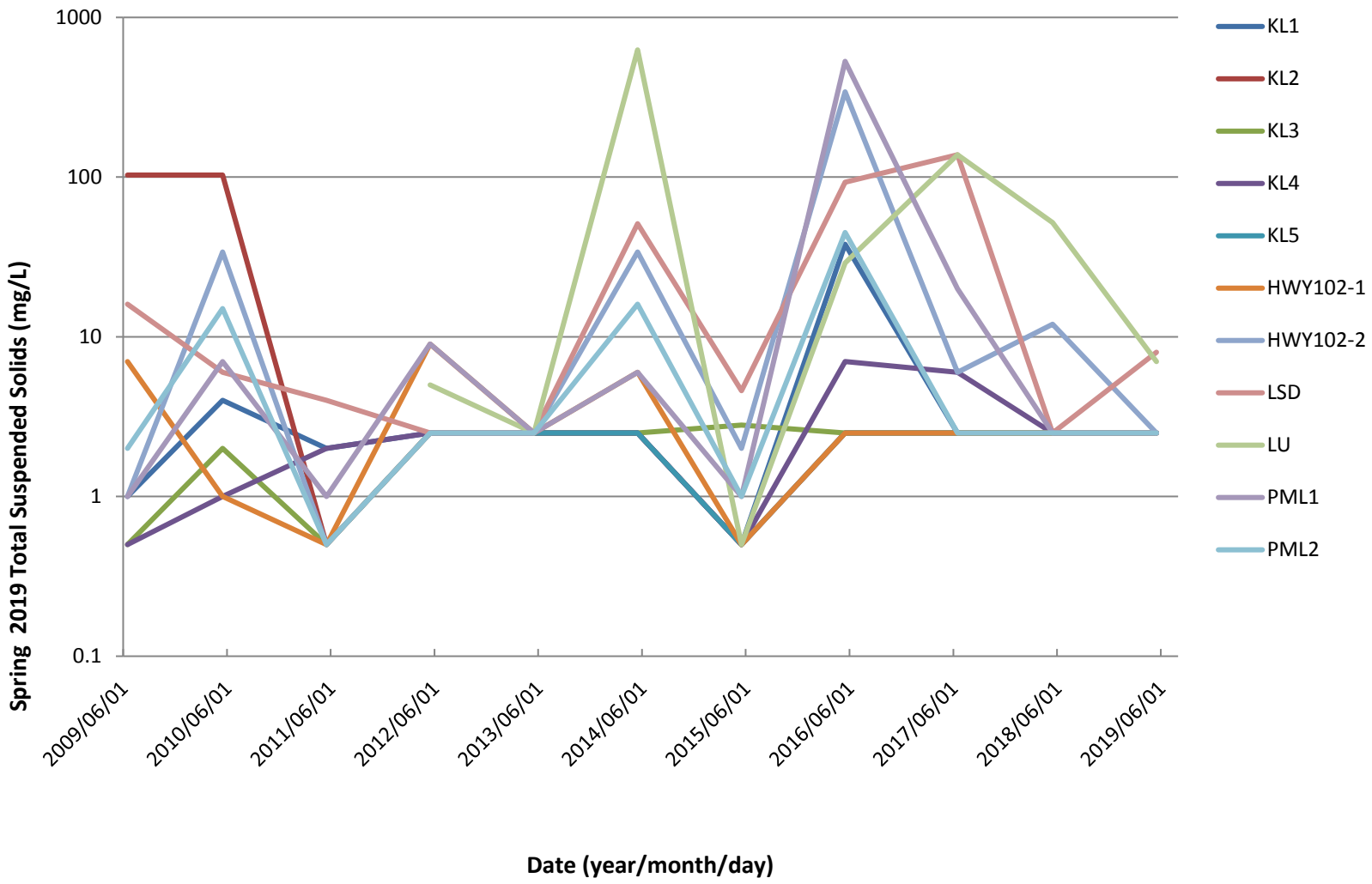

Figure 6 – Seasonal Total Suspended Solids Concentrations for Water Quality Monitoring Program.

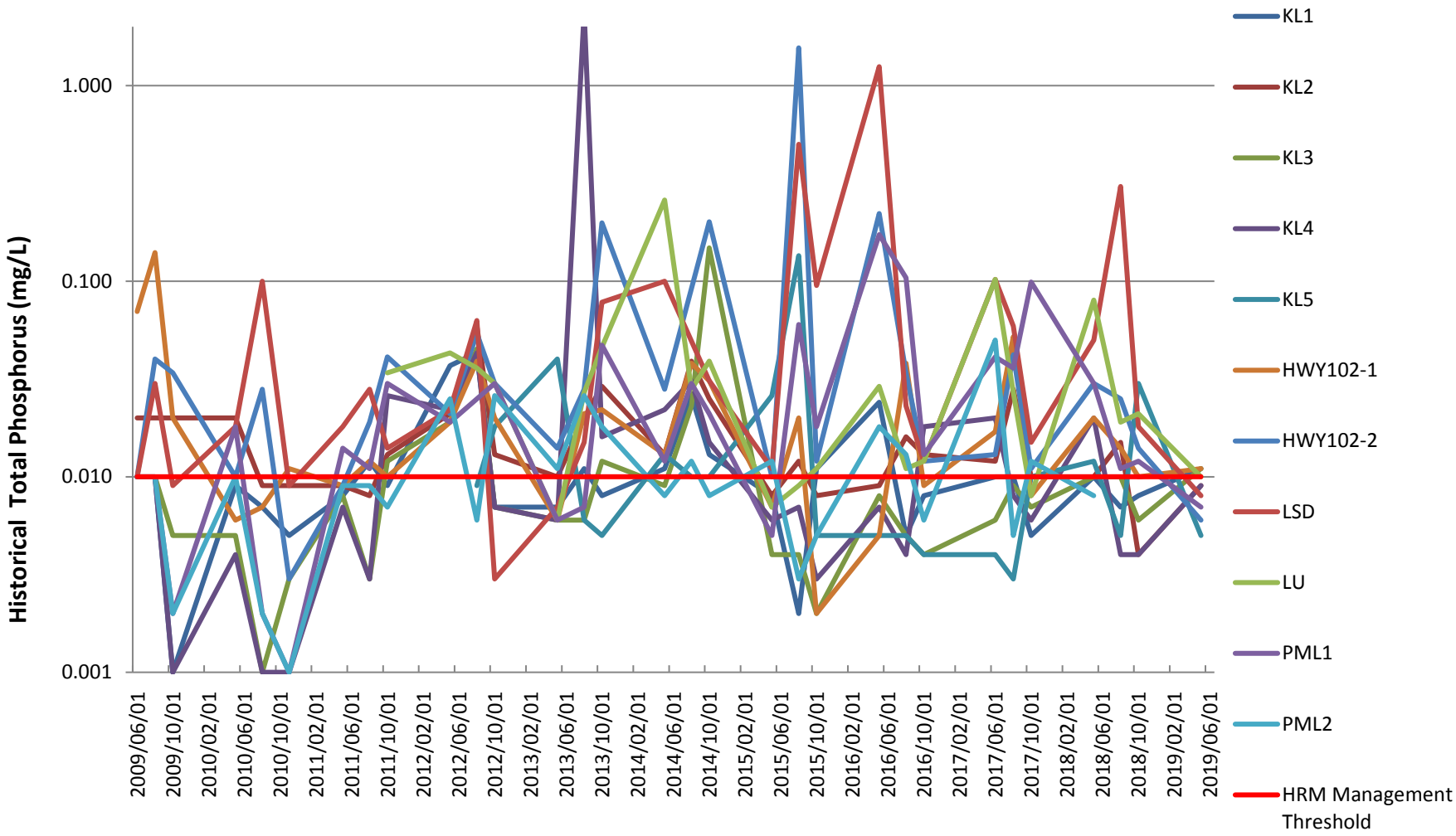

Figure 7 – Historical Total Phosphorus Concentrations for Water Quality Monitoring Program.

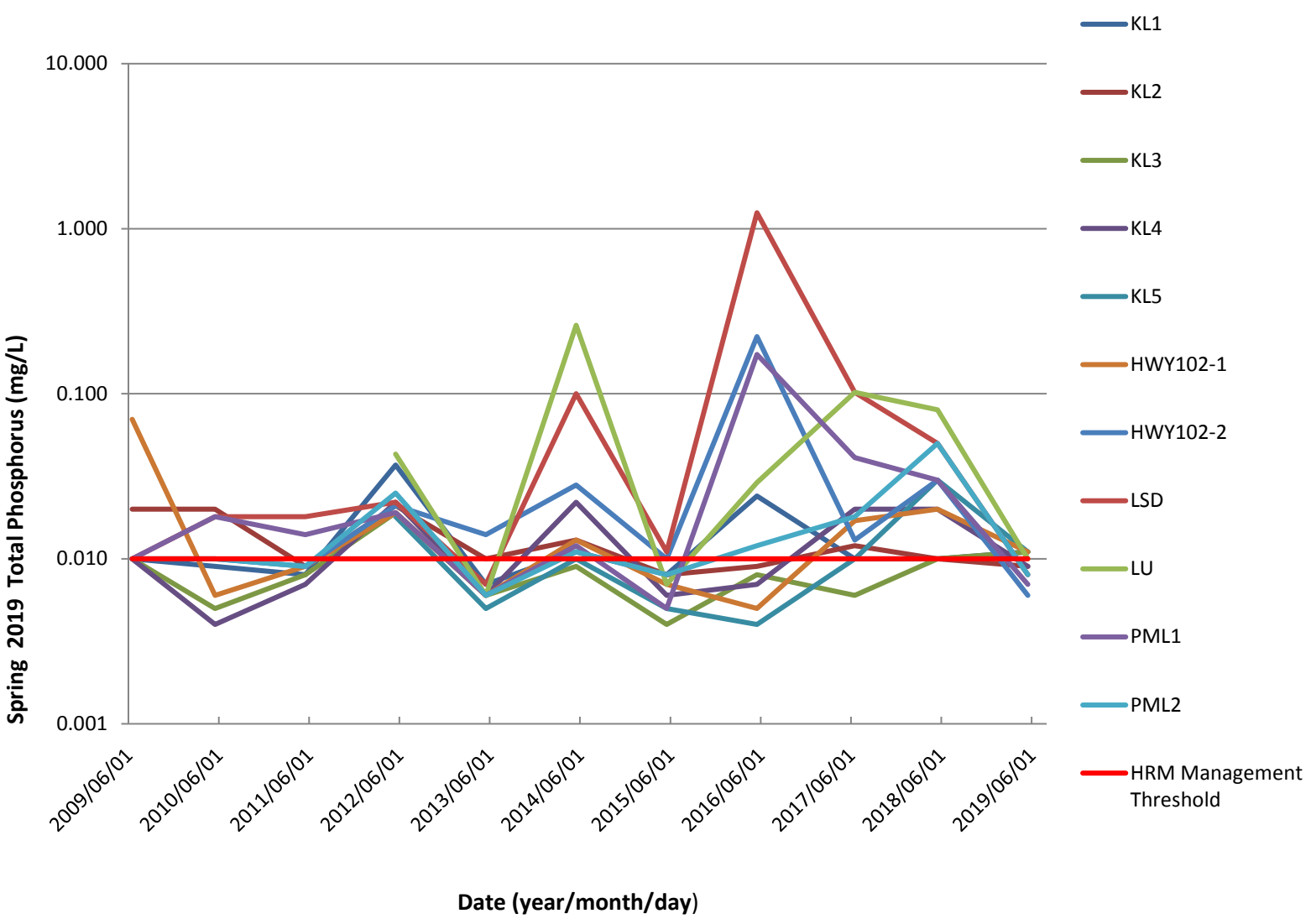

Figure 8 – Seasonal Total Phosphorus Concentrations for Water Quality Monitoring Program.

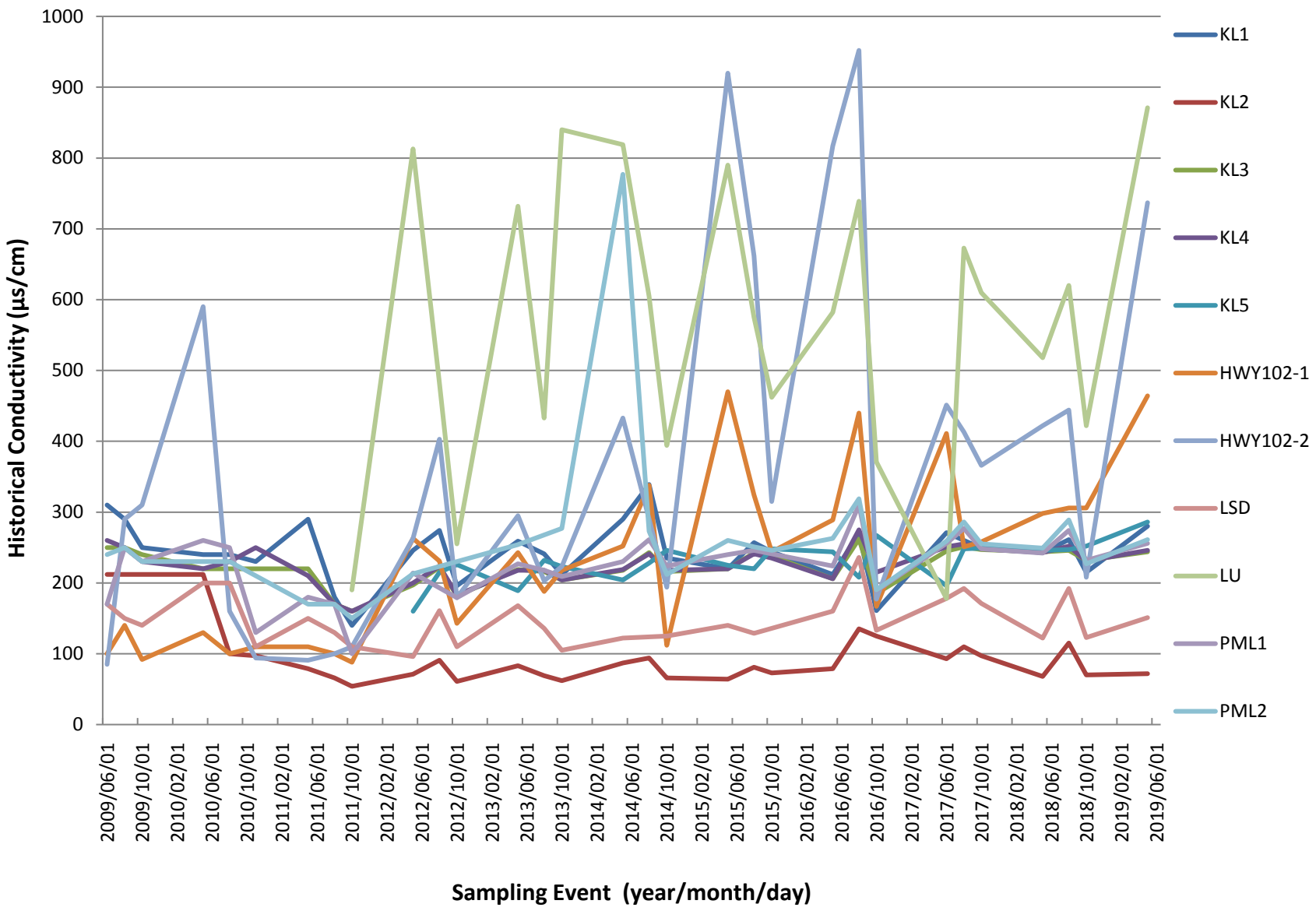

Figure 9 – Historical Measurement of Conductivity for Water Quality Monitoring Program.

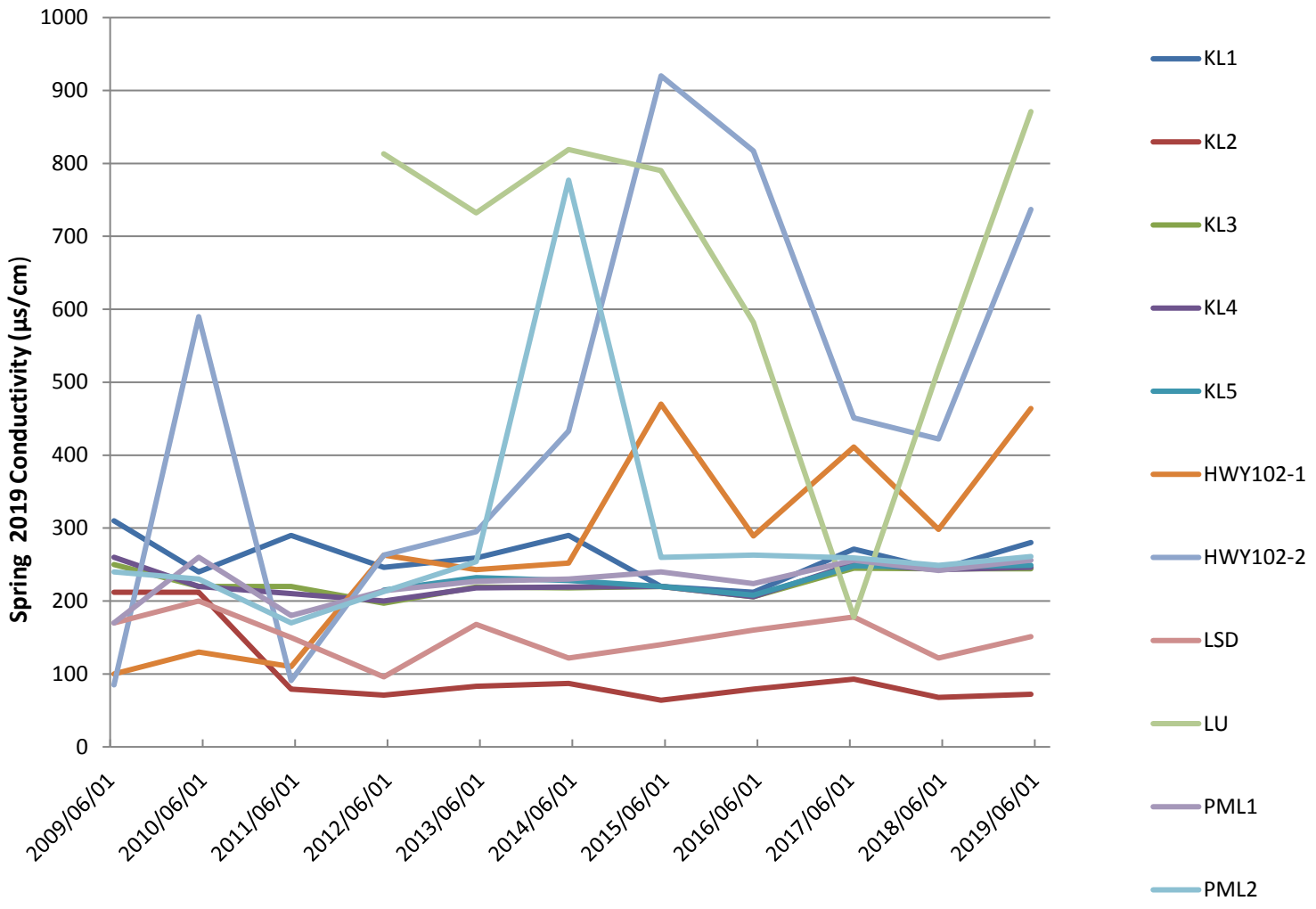

Figure 10 – Seasonal Conductivity Measurements for Water Quality Monitoring Program.

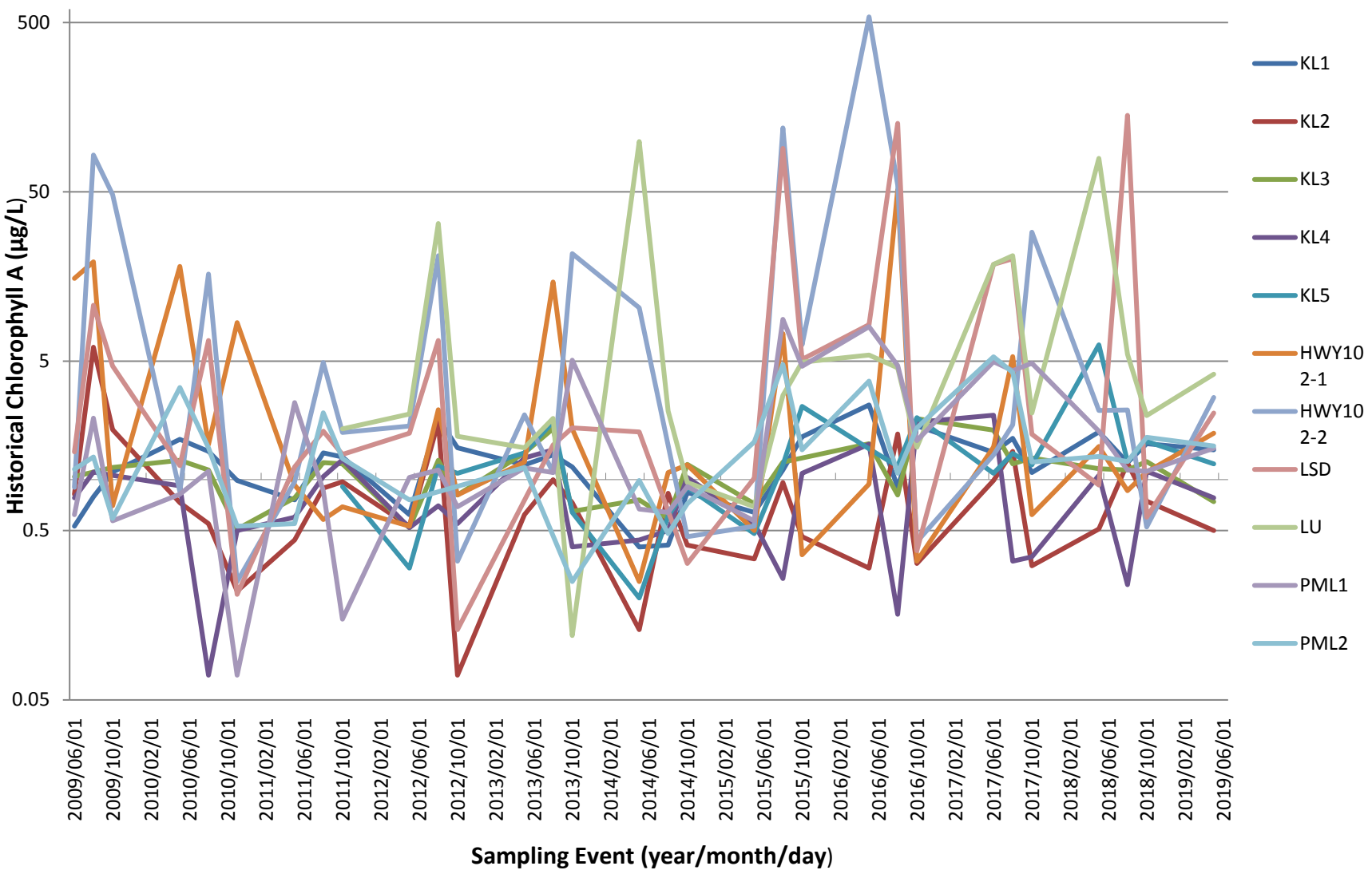

Figure 11 – Historical Chlorophyll A Concentrations for Water Quality Monitoring Program.

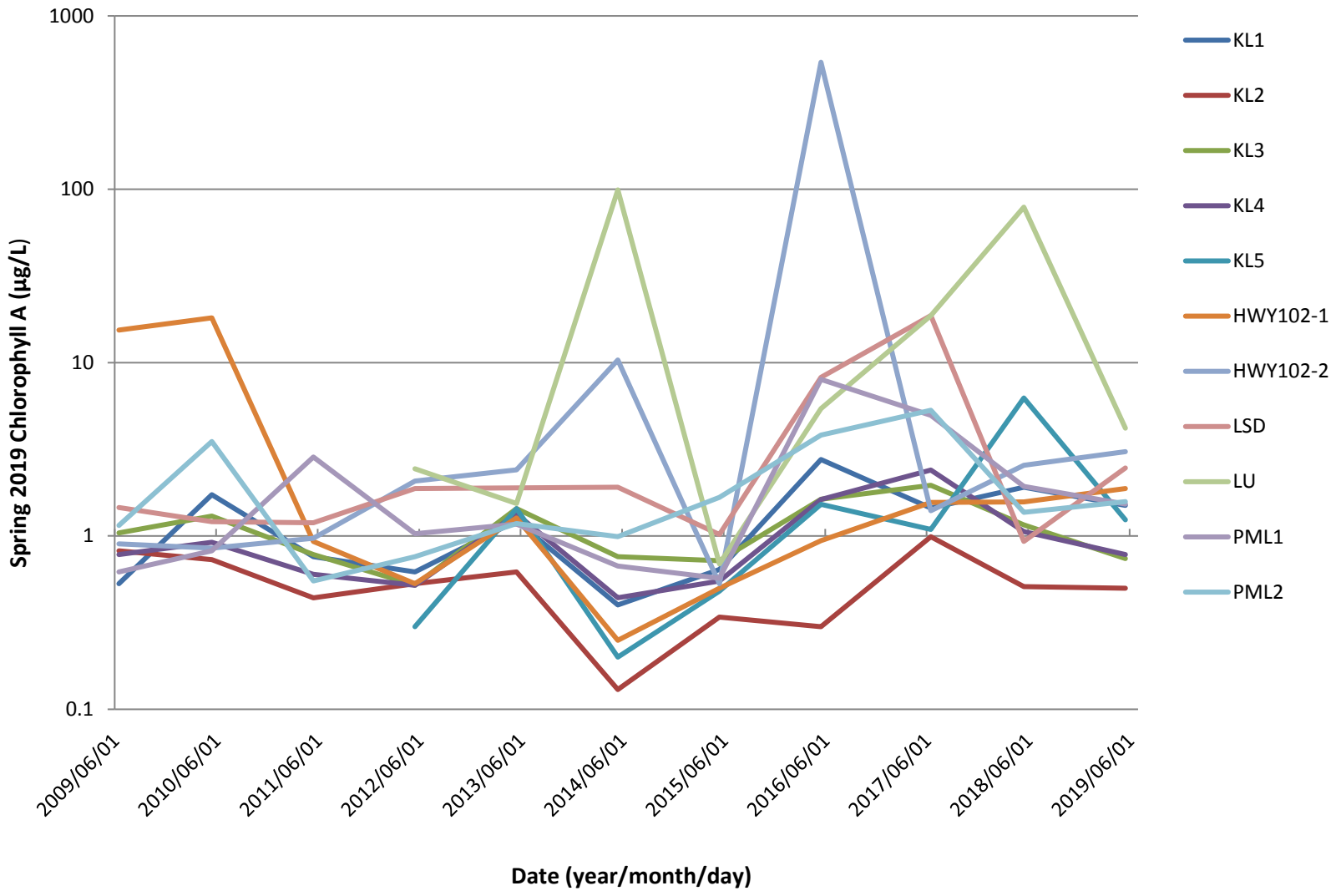

Figure 12 – Seasonal Chlorophyll A Concentrations for Water Quality Monitoring Program.

SNC·LAVALIN

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902.492.4544 902.492.4540

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.

5657 Spring Garden Road, Suite 200

Halifax, NS, B3J 3R4

PH: (902) 492-4544

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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Appendices

Appendix A Instrument Calibration Report

Appendix B Field Reports

Appendix C Site Photographs

Appendix D Summary Table Results

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

HWY102-1

PML2

PAPER MILL LAKE

PML1

KL4

KL3

LSD

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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Halifax, Nova Scotia, Canada
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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 · TDS · Dissolved Oxygen · Temperature · Secchi Depth · Conductance · Air Temperature · Cloud Cover · Incidental Wildlife Sightings	· Total Alkalinity (as $CaCO_3$) · Dissolved Chloride · Colour · Total Kjeldahl Nitrogen · Nitrate + Nitrite · Nitrate · Nitrite · Nitrogen (as NH4) · Total Organic Carbon · Orthophosphate (P) · pH · Low Total Phosphorus · Reactive Silica · Total Suspended Solids · Dissolved Sulphate · Turbidity · Conductivity	· Anion Sum · Cation Sum · Ion Balance · Bicarbonate Alkalinity(as $CaCO_3$) · Carbonate Alkalinity (as $CaCO_3$) · Hardness · Total Dissolved Solids · Saturation pH (@4°C & 20°C) · Langelier Index (@4°C & 20°C)	· Calcium · Copper · Iron · Magnesium · Manganese · Potassium · Sodium · Zinc	· Chlorophyll A · E. coli · 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

[redacted]

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 - Welschmever 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	11.4	8.6	8.3	11.5	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	9.23	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	0.07	<0.05	0.12	<0.05	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	0.6
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	7.7	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	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	0.8	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	--	--	9		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	--	--	--		<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	<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	8	--	--	<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	<2.0	<1	<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	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	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	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	14.3	7.0	7.7	8.4	7.3	7.1	7.9	9.2	8.7	9.2	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	0.06	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	<0.05	<0.01	--	<0.01	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<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	0.05	0.06	0.06	<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	0.010	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	--	--	--		1.3	1.1	1.1	1.1	1.1	0.6	0.8	0.5	0.5	0.7	0.5	0.7	0.7	0.8	0.5	0.5	0.7	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	8.5	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	10.8	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	<5	17	<5	<5	<5	<5	12	<5	<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	3.0	3.0	<2	<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	19.10	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	NC	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	<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		<0.1	--	--	0.018	0.018	<0.017	<0.017	--	--	<0.017	<0.017	<0.017	<0.017	<0.017	0.019	<0.017	0.018	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	<1	4	<2.0	<1	<1	<1	<1	2	<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	21	109	39	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	3	--	--		<2	--	--	<2	<2	--	<2	--	--	<2	<2	3	<2	<2	<2	<2	<2	<2	<2.0	--	<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	<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	--		1,500	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	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

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
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
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
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
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
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
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
INORGANICS																	
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--		<5	7	7	6	7	7	6	7	7	23	6
Dissolved Chloride (Cl)	mg/L	1	--	--	120		66	63	60	55	55	53	56	43	37	50	57
Colour	TCU	5	--	--	--		22	20	20	28	12	20	31	38	40	57	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
Nitrate (N)	mg/L	0.05	--	--	13		0.14	--	--	0.24	0.15	--	0.24	--	--	0.19	0.09
Nitrite (N)	mg/L	0.05	--	--	0.06		<0.01	--	--	<0.01	<0.01	--	<0.01	--	--	<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
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--		--	--	--	--	--	--	--	--	--	<0.4	2.8
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
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 (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
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
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
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
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
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
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
Total Suspended Solids	mg/L	5	--	--	Comment 1		<1	1	1	2	<2	<1	<1	<1	<1	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	--	--		11	12	12	10	10	10	9	10	8	7	8
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
Conductivity (uS/cm)	µS/cm	1	--	--	--		250	250	240	220	220	220	220	170	160	197	222
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
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--		<1	7	7	6	7	7	6	7	7	23	6
Calculated TDS	mg/L	1	--	--	--		128	130	123	110	117	116	115	88	82	111	113
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--		<1	<1	<1	<1	<1	<1	<1	<1	<1	<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
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
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
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
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
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
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
Metals (ICP-MS)																	
Total Aluminum (Al)	µg/L	5	5	--	5 - 100		259	259	--	124	54	--	266	--	--	199	54
Total Antimony (Sb)	µg/L	2	20	--	--		<2	<2	--	<1.0	<1.0	--	<1.0	--	--	<2	<2
Total Arsenic (As)	µg/L	2	5.0	--	5		<2	<2	--	<1.0	<1.0	--	<1.0	--	--	<2	<2
Total Barium (Ba)	µg/L	5	1000	--	--		13	13	--	16	13	--	19	--	--	18	17
Total Beryllium (Be)	µg/L	2	5.3	--	--		<2	<2	--	<1.0	<1.0	--	<1.0	--	--	<2	<2
Total Bismuth (Bi)	µg/L	2	--	--	--		<2	<2	--	<2.0	<2.0	--	<2.0	--	--	<2	<2
Total Boron (B)	µg/L	5	1200	--	1500		9	9	--	8	9	--	<50	--	--	5	9
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
Total Chromium (Cr)	µg/L	1	---	--	1		<1	<1	--	<1.0	<1.0	--	<1.0	--	--	<1	<1
Total Cobalt (Co)	µg/L	1	10	--	--		<1	<1	--	<0.40	<0.40	--	<0.40	--	--	<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
Total Iron (Fe)	µg/L	50	300	--	300		523	523	--	73	133	58	136	104	154	137	136
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
Total Manganese (Mn)	µg/L	2	820	--	--		53	53	--	37	67	32	42	33	33	25	47
Total Molybdenum (Mo)	µg/L	2	73	--	73		<2	<2	--	<2.0	<2.0	--	<2.0	--	--	<2	<2
Total Nickel (Ni)	µg/L	2	25	--	25 - 150		<2	<2	--	2	<2.0	--	2	--	--	<2	<2
Total Selenium (Se)	µg/L	1	1.0	--	1		<1	<1	--	<1.0	<1.0	--	<1.0	--	--	<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
Total Strontium (Sr)	µg/L	5	21000	--	--		12	12	--	34	36	--	33	--	--	25	33
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	--	<2.0	<2.0	--	<2.0	--	--	<2	<2
Total Titanium (Ti)	µg/L	2	--	--	--		2	2	--	<2.0	<2.0	--	5	--	--	<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
Total Vanadium (V)	µg/L	2	6	--	--		<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
MICROBIOLOGICAL																	
Total Coliform	MPN/100mL	1	--	--	--		120	24	--	190	16	58	72	110	--	291	1,553
E. coli	MPN/100mL	1	--	400	--		1	17	--	2	<1	8	5	37	<100	2	<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
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

Tested Parameters	Kearney Lake										
Sample Sites	KL3										
Sampling Date	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
Sampling Time	11:20	9:50	10:00	14:00	11:00	11:50	14:25	10:35	11:45	10:40	11:00
FIELD DATA											
Secchi Depth	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NCC	N/A	N/A	N/A
Water Temp	15.6	11.7	21.5	13.6	11.0	22.7	12.8	14.7	25.0	8.4	12.1
Dissolved Oxygen	7.7	10.2	9.2	8.9	5.9	7.9	8.1	8.0	9.9	8.7	9.3
pH (in Situ)	6.51	5.86	7.25	6.49	6.55	7.37	6.67	6.84	6.87	7.17	7.40
Specific Conductance	177.2	207.3	194.4	210.6	405.0	252.0	208.0	0.2	245.1	236.6	213.0
INORGANICS											
Total Alkalinity (as CaCO3)	5	<5	5	7	15	5	6	<5.0	6	6	<5
Dissolved Chloride (Cl)	46	54	40	46	58	46	45	60	56	56	54
Colour	31	19	23	20	16	13	20	34	13	14	29
Nitrite + Nitrate	0.09	0.21	0.11	<0.05	0.17	0.13	0.13	0.16	0.12	0.21	0.14
Nitrate (N)	0.09	0.21	0.11	<0.05	0.17	0.13	0.13	0.16	0.12	0.21	0.14
Nitrite (N)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen) *	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.050	<0.03	<0.03	0.06
Total Kjeldahl Nitrogen as N	<0.4	--	1.3	<0.4	0.6	0.4	0.4	0.2	1.2	0.9	<0.4
Total Organic Carbon	4.9	4.3	4.4	4.6	4.6	2.8	4.5	3.4	5.7	5.8	4.3
Orthophosphate (as P)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01
pH (Lab)	6.90	6.68	6.96	6.86	6.68	6.87	6.59	6.54	6.92	6.94	6.69
Total Calcium (Ca)	6.0	7.0	5.3	6.8	6.4	7.9	6.8	6,600.0	7.8	5.2	6.2
Total Magnesium (Mg)	1.3	1.0	0.9	1.3	1.4	1.2	1.0	940.0	1.2	0.9	1.0
Total Phosphorus	0.007	0.006	0.006	0.012	0.009	0.023	0.148	0.004	0.004	0.002	0.008
Total Potassium (K)	0.9	0.8	0.6	1.2	0.8	1.1	0.9	770.0	0.9	0.7	0.7
Total Sodium (Na)	26.4	35.1	20.1	32.1	36.4	39.0	35.3	34.0	40.0	27.1	32.1
Reactive Silica (SiO2)	2.6	2.9	2.6	2.7	2.6	1.9	2.4	2.5	2.4	2.6	2.6
Total Suspended Solids	<5	<5	<5	<5	<5	<5	<5	3	<5	<5	<5
Dissolved Sulphate (SO4)	7	7	7	8	9	7	7	8	9	8	10
Turbidity (NTU)	1.0	0.7	2.4	0.4	0.4	0.3	0.9	0.7	0.5	0.7	1.1
Conductivity (uS/cm)	182	219	216	204	218	243	216	220	242	238	206
Calculated Parameters											
Anion Sum	1.55	1.68	1.38	1.60	2.14	1.55	1.54	1.87	1.90	1.88	1.74
Bicarb. Alkalinity (calc. as CaCO3)	5	<5	5	7	15	5	6	<1.0	6	6	<5
Calculated TDS	91	106	78	100	122	106	100	110	119	103	105
Carb. Alkalinity (calc. as CaCO3)	<10	<10	<10	<10	<10	<10	<10	<1.0	<10	<10	<10
Cation Sum	1.60	2.00	1.24	1.89	2.07	2.23	2.00	1.89	2.27	1.55	1.83
Hardness (CaCO3)	20.30	21.60	16.90	22.30	21.70	24.70	21.10	20.00	24.40	16.70	19.60
Ion Balance (% Difference)	1.60	8.60	5.50	8.30	1.50	17.90	12.80	0.53	9.00	9.80	2.60
Langelier Index (@ 20C)	-3.21	-3.37	-3.19	-3.05	-2.93	-3.12	-3.39	NC	-3.00	-3.15	-3.41
Langelier Index (@ 4C)	-3.53	-3.69	-3.51	-3.37	-3.25	-3.44	-3.71	NC	-3.32	-3.47	-3.73
Saturation pH (@ 20C)	10.10	10.00	10.20	9.91	9.61	9.99	9.98	NC	9.92	10.10	10.10
Saturation pH (@ 4C)	10.40	10.40	10.50	10.20	9.93	10.30	10.30	NC	10.20	10.40	10.40
Metals (ICP-MS)											
Total Aluminum (Al)	153	140	65	100	260	52	105	180	--	90	163
Total Antimony (Sb)	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2
Total Arsenic (As)	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2
Total Barium (Ba)	15	19	9	18	17	17	16	19	--	19	15
Total Beryllium (Be)	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2
Total Bismuth (Bi)	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2	<2
Total Boron (B)	17	7	7	10	8	10	12	<50	--	<5	8
Total Cadmium (Cd)	0.027	0.028	<0.017	<0.017	0.038	<0.017	0.017	0.033	--	<0.017	0.021
Total Chromium (Cr)	<1	<1	<1	<1	7	<1	<1	<1.0	--	<1	<1
Total Cobalt (Co)	<1	<1	<1	<1	<1	<1	<1	<0.40	--	<1	<1
Total Copper (Cu)	<2	<2	<1	1	1	<1	2	<2.0	1	<1	2
Total Iron (Fe)	119	131	71	172	137	96	118	120	165	115	112
Total Lead (Pb)	0.7	<0.5	<0.5	0.9	3.6	<0.5	<0.5	<0.5	--	<0.5	<0.5
Total Manganese (Mn)	46	37	20	92	41	45	27	36	48	24	31
Total Molybdenum (Mo)	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2	<2
Total Nickel (Ni)	<2	<2	<2	<2	2	<2	<2	<2.0	--	<2	2
Total Selenium (Se)	<1	<1	<1	<1	<1	<1	<1	<1.0	--	<1	<1
Total Silver (Ag)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	--	<0.1	<0.1
Total Strontium (Sr)	29	33	18	32	31	32	29	29	--	21	28
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	<2.0	--	<2	<2
Total Titanium (Ti)	<2	<2	<2	2	3	<2	2	3	--	<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
Total Vanadium (V)	<2	<2	<2	<2	<2	<2	<2	<2	--	<2	<2
Total Zinc (Zn)	8	10	5	7	10	<5	6	9	7	8	8
MICROBIOLOGICAL											
Total Coliform	178	345	2,420	1,300	86	1,730	>2420	---	2,420	285	548
E. coli	3	8	21	<1	<1	<1	13	<0.10	7	6	2
Chlorophyll A - Acidification method	0.81	1.44	2.00	0.65	0.76	0.59	1.23	0.72	1.27	1.34	1.63
Chlorophyll A - Welschmeyer method	1.14	1.62	2.30	0.61	0.69	0.51	1.12	0.68	1.34	0.69	2.00

Tested Parameters	Kearney Lake									
Sample Sites	KL3									
Sampling Date	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	11:30	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Temp	21.7	12.5	16.1	22.5	13.8	12.1	23.8	12.4	9.6	23.3
Dissolved Oxygen	7.7	11.4	9.0	7.4	8.2	7.3	6.9	8.6	**	7.28
pH (in Situ)	6.82	5.58	7.02	7.04	6.97	6.66	6.94	6.64	8.25	7.05
Specific Conductance	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)	9	8	<5	8	9	<5	8	7.0	<5	8.0
Dissolved Chloride (Cl)	56	49	63	56	59	54	48	46	49	56
Colour	13	21	24	13	15	63	26	27	53	13
Nitrite + Nitrate	0.13	0.10	0.24	0.30	0.24	0.17	0.06	0.1	0.1	0.10
Nitrate (N)	0.06	0.10	0.13	0.17	0.24	0.17	0.06	0.1	0.1	0.10
Nitrite (N)	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	<0.03	0.03	0.03	<0.03	0.04	0.03	<0.03	0.08
Total Kjeldahl Nitrogen as N	<0.4	0.4	<0.4	0.8	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Total Organic Carbon	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	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH (Lab)	7.28	6.93	6.77	7.13	6.88	6.72	7.21	7.10	6.66	7.07
Total Calcium (Ca)	8.3	7.3	6.9	7.2	8.1	6.0	7.3	8.4	5.9	7.6
Total Magnesium (Mg)	1.3	1.3	1.0	1.1	1.2	1.0	1.2	1.4	1.0	1.2
Total Phosphorus	0.005	0.004	0.006	0.009	0.007	0.010	0.010	0.006	0.011	0.007
Total Potassium (K)	1.0	1.0	0.8	0.9	1.0	0.7	1.0	1.1	0.7	1.0
Total Sodium (Na)	37.2	32.8	44.0	41.4	35.9	35.9	36.6	39.9	44.3	38.9
Reactive Silica (SiO2)	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	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	10	10	10	9	10	8	7.0	7.0	6.0	9.0
Turbidity (NTU)	1.1	1.0	1.0	1.3	2.6	1.0	0.5	1.2	0.9	2.0
Conductivity (uS/cm)	262	185	245	251	247	244	246	232	244	233
Calculated Parameters										
Anion Sum	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)	9	8	<5	8	9	<5	8	<5	<5	8.0
Calculated TDS	120	107	127	122	122	107	106	109.0	108.0	119.0
Carb. Alkalinity (calc. as CaCO3)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	2.18	1.94	2.38	2.28	2.10	1.98	2.09	2.3	2.3	2.2
Hardness (CaCO3)	26.10	23.60	21.30	22.50	25.20	19.1	23.2	26.7	18.9	23.9
Ion Balance (% Difference)	4.80	4.90	8.60	7.90	0.80	7.6	11.4	18.4	21.4	6.7
Langelier Index (@ 20C)	-2.44	-2.89	-3.29	-2.71	-2.85	-3.39	-2.61	-2.7	-3.5	-2.7
Langelier Index (@ 4C)	-2.76	-3.21	-3.61	-3.03	-3.17	-3.71	-2.93	-3.0	-3.8	-3.1
Saturation pH (@ 20C)	9.72	9.82	10.10	9.84	9.73	10.1	9.82	9.8	10.1	9.8
Saturation pH (@ 4C)	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)	--	--	128	36	43	164	26	--	139.0	39.0
Total Antimony (Sb)	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Arsenic (As)	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Barium (Ba)	--	--	17	--	20	14	15	--	17.0	16.0
Total Beryllium (Be)	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Bismuth (Bi)	--	<2	<2	--	<2	<2	<2	--	<2	<2
Total Boron (B)	--	--	7	--	12	5	10	--	6.0	9.0
Total Cadmium (Cd)	--	--	0.020	--	<0.017	<0.09	<0.09	--	<0.09	<0.09
Total Chromium (Cr)	--	--	<1	--	<1	<1	<1	--	<1	<1
Total Cobalt (Co)	--	--	<1	--	<1	<1	<1	--	<1	<1
Total Copper (Cu)	<1	<1	<1	<1	1	<1	<1	1.0	<1	1.0
Total Iron (Fe)	117	99	125	83	130	81	148	<50	123.0	93.0
Total Lead (Pb)	--	--	<0.5	--	<0.5	0.7	<0.5	--	<0.5	<0.5
Total Manganese (Mn)	41	20	30	35	54	21	50	22.0	26.0	44.0
Total Molybdenum (Mo)	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Nickel (Ni)	--	--	<2	--	<2	<2	<2	--	3.0	<2
Total Selenium (Se)	--	--	<1	--	<1	<1	<1	--	<1	<1
Total Silver (Ag)	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1
Total Strontium (Sr)	--	--	33	--	41	27	38	--	30.0	34.0
Total Thallium (Tl)	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1
Total Tin (Sn)	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Titanium (Ti)	--	--	<2	--	<2	<2	<2	--	<2	<2
Total Uranium (U)	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1
Total Vanadium (V)	--	--	<2	--	<2	<2	<2	--	2.0	<2
Total Zinc (Zn)	<5	<5	6	6	6	6	<5	<5	16.0	<5
MICROBIOLOGICAL										
Total Coliform	1,990	2,420	687	2,420	411	<1	NDOGT	5,020.0	103.0	NDOGT
E. coli	38	30	7	13	46	<1	51	20.0	1.0	15.0
Chlorophyll A - Acidification method	0.81	2.29	1.96	1.24	1.34	1.16	1.14	1.28	0.74	1.94
Chlorophyll A - Welschmeyer method	0.99	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 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
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	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	(**)	8.9	9.6	14.5	5.9	7.5	9.8	9.1	8.8	8.3	5.5	10.3	8.3	6.4	7.3	11.2	4.7	8.5	**	2.5
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	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	32	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	--	<0.01	<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	<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	6.46	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	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	7.0	7.1	7.3	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	1.2	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	1.3	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	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
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	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	<1.0	<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	2.11	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	-2.86	-3.22	-3.37	-3.21	-3.21	-2.63	-3.08	-2.45	NC	-2.98	-3.20	-3.38	-2.76	-2.83	-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	--	--	--		<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		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	2	2	--	1	1	<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	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	58	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	10.3	7.6	7.9	8.3	8.8	7.6	10.3	8.4	9.7	8.7	7.1	7.2	10.4	6.42	7.6	**	14.4
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	1.91	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	---	79	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	8	10	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	0.017	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	<0.05	<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	0.011	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	<5	10	<5	<5	11	<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	1.3	1.2	0.6	1.1	0.9	0.6	1.1	1.9	0.9	0.5	1.6	1.6	0.5	0.7	1.6	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	--	--	<10	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	2018/05/09	2018/08/17	2018/10/17	05/09/2019	08-20-19
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	12:20PM
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	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	--	--	--	--		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	23.1
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	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	8.8	2.3	5.6	**	3.81
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	6.13	5.88	7.24	6.83	6.19
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	720.0
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	17.0
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	223
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	42
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	0.14
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	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	0.17	0.21	<0.05	0.43	0.07
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	0.29
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	0.70
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	8.20
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	<0.01	<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		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	6.67
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	17.2
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	2.2
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	0.034	0.025	0.014	0.006	0.037
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	1.1	1.6	1.6	1.3	1.6	1.7	2.2	2.1
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	139.0
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	7.2
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	6	7	8	12	<5	<5	<5	16.0
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	9	4.0	16.0	13.0	11.0
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	144.0	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	26.8
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	782
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	6.9
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	17.0
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	415.0
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	--	--	--		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	7.5
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	52.0
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	4.4
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	-2.5
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	-2.8
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	9.2
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	9.5
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	194.0
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	2	--	<1.0	--	--	<2	<2	<2	<2	<2	6	<2	<2	<1.0	--	<2	3	--	--	<2	--	<2	<2	<2	--	<2	4.0
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	138.0
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		<5	--	--	8	8	--	<50	--	--	10	17	15	9	10	13	11	12	<50	--	<5	9	--	--	<5	--	12	7	11	--	7.0	9.0
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	<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	1.0
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	3.0
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	1.0
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	369	2,650	4,760	870	3600	93.0	728.0	8,440.0
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	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	625.0
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	<2	<2	<2	<2	4	2	<2	<2.0	--	<2	8	--	--	6	--	3	<2	<2	--	3.0	<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
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	--	--	37	21	--	17	--	--	33	45	31	39	40	45	75	43	96	--	38	96	--	--	72	--	80	53	81	--	129.0	95.0
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
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	3.0
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	<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	11	<2	<2	<2.0	--	<2	18	--	--	2	--	3	<2	2	--	4.0	5.0
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	15.0
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	NDOGT
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	30.0
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	23.70
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	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

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)	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	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	6.49	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	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	11.3	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	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	719	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	4,430.0	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	665.0
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	--	<2	3.0
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	34	<1	<1	<1	1	<1	<1	<0.40	--	4	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	13,800	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	479	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	143	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	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	--	--	0.068	--	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

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	08-20-19	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	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	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	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	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	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	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	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	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	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	0.14
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	0.14
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	<0.01
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	<0.05
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	--
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	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
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	6.50
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	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	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	<0.02
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	0.9
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	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	2.6
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	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	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	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	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	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	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	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	<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	1.94
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	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	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	-3.33
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	-3.59
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	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	10.10
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	25.0	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
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
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	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
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
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	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	<0.300
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	<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
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	<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	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
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	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
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
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	<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	<0.5
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
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	--	--	<2.0	<2.0	--	<2.0	--	--	<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	--	--	8	<2.0	--	4	--	--	<2	4	<2	<2	65	4	<2	3	<2	--	25	106	--	--	2	--	75	<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	0.6	<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
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
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	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	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	10
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

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	0.11	<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
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)	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
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	-3.00	-2.97	-2.98	-2.46	-2.89	-3.13	-2.37	-2.66	-3.25	-2.35	-2.8	-3.26	-2.4
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

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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: [redacted]

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:

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: [redacted]

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: [redacted]

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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

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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

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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 SAMPLE TYPE: Water DATE SAMPLED: 2019-08-20 456873	LU Water 2019-08-20 456874	PML-1 Water 2019-08-20 456875	PML-2 Water 2019-08-20 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.
Chlorophyll A was analysed by a sub-contracted laboratory.

456867 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.

456868-456872 Total Phosphorus was analysed at AGAT Mississauga.
Chlorophyll A was analysed by a sub-contracted laboratory.

456873 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.

456874-456876 Total Phosphorus was analysed at AGAT Mississauga.
Chlorophyll A was analysed by a sub-contracted laboratory.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

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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: [redacted]

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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%

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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 (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: [redacted]

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.

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: 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			

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

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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
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

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

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Unit 122 - 11 Morris Dr.
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

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): CALLY BAXTER Date/Time: Aug 20/19 Samples Received By: [redacted]
Sample Relinquished By (print name & sign): Date/Time: Samples Received By:

Date/Time: Aug 20/19 17:25
Special Instructions: SNC Bedford West Package
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, 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)

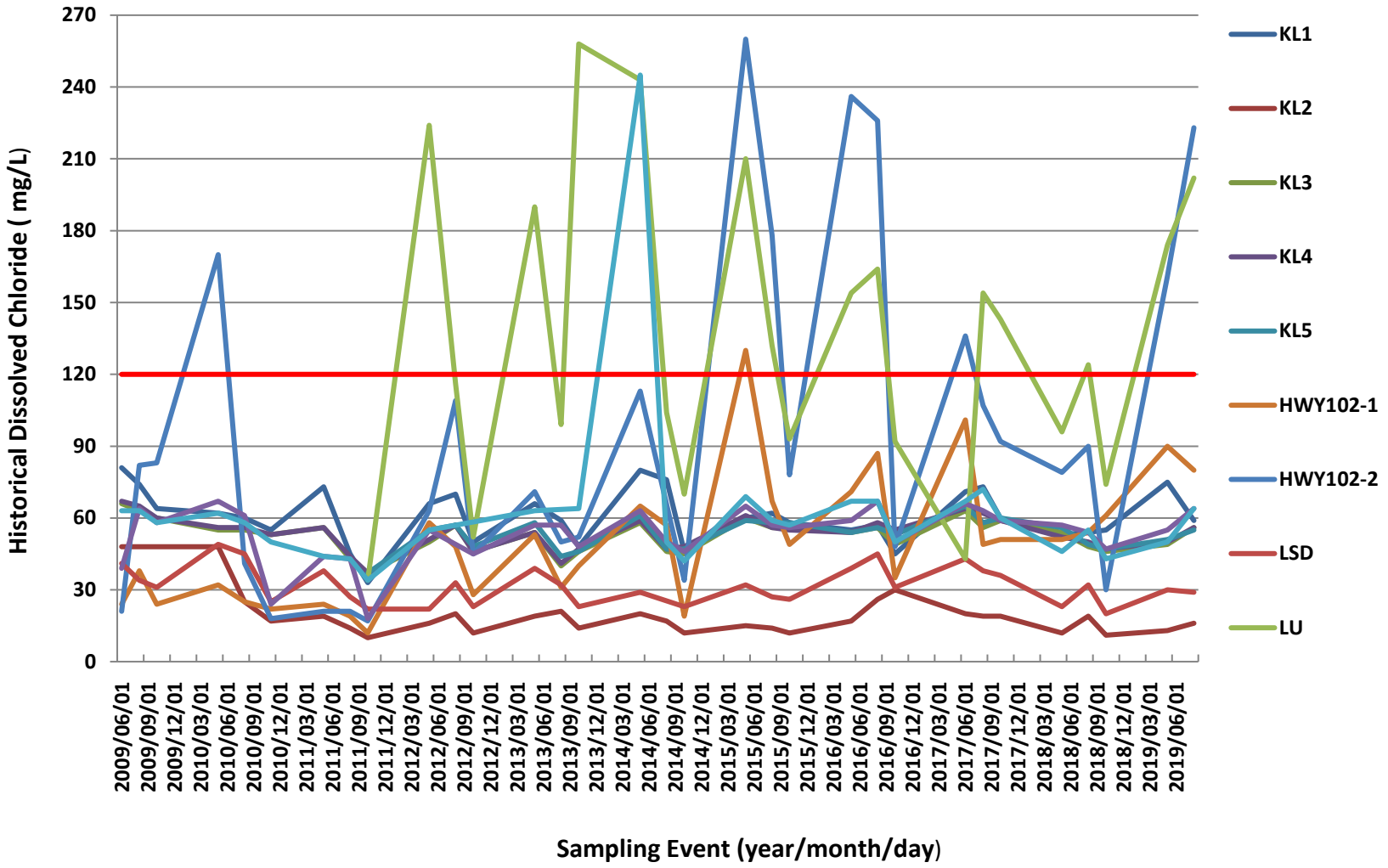

Figure 1 - Historical Dissolved Chloride Concentrations for Water Quality Monitoring Program.

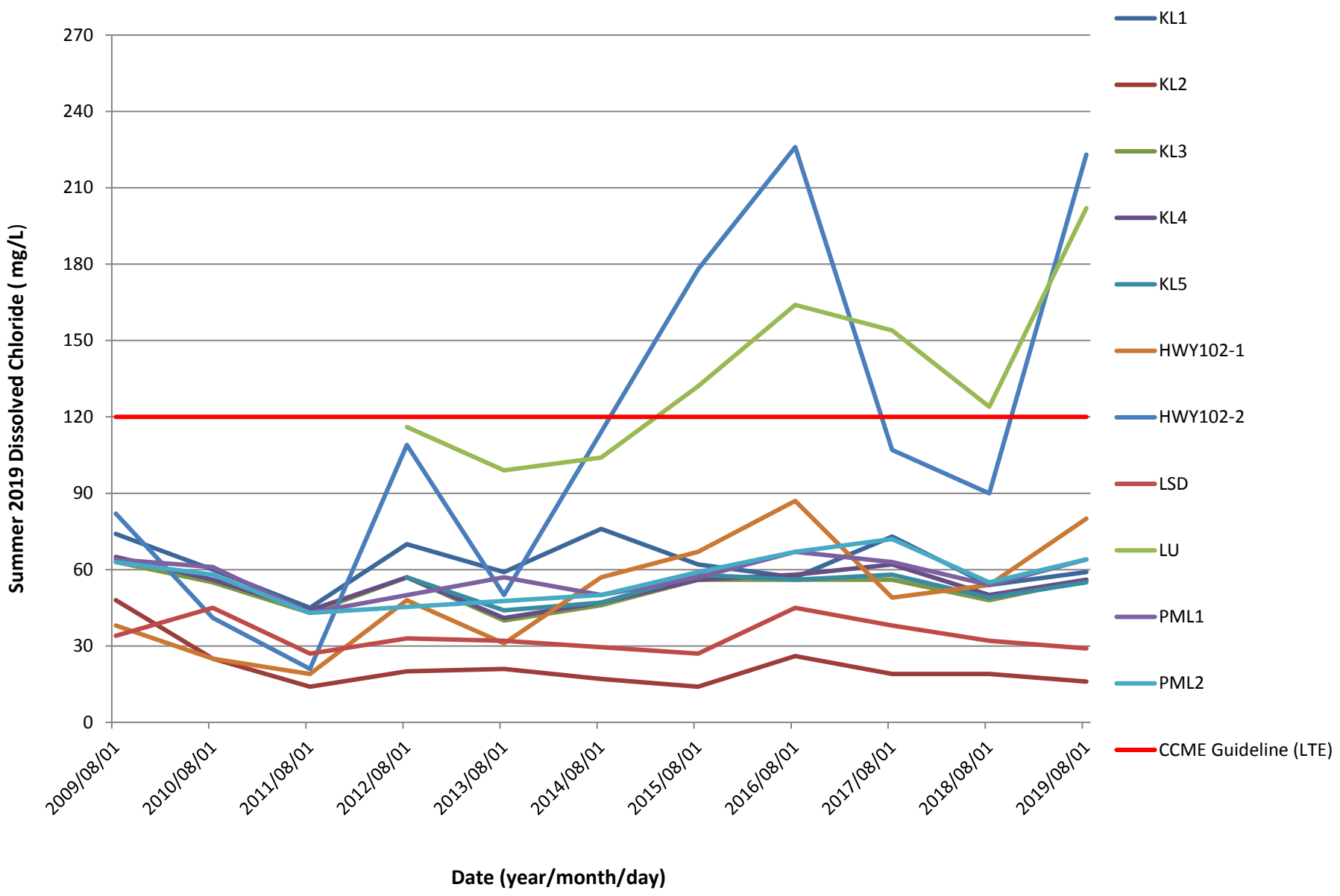

Figure 2 – Seasonal Dissolved Chloride Concentrations for Water Quality Monitoring Program.

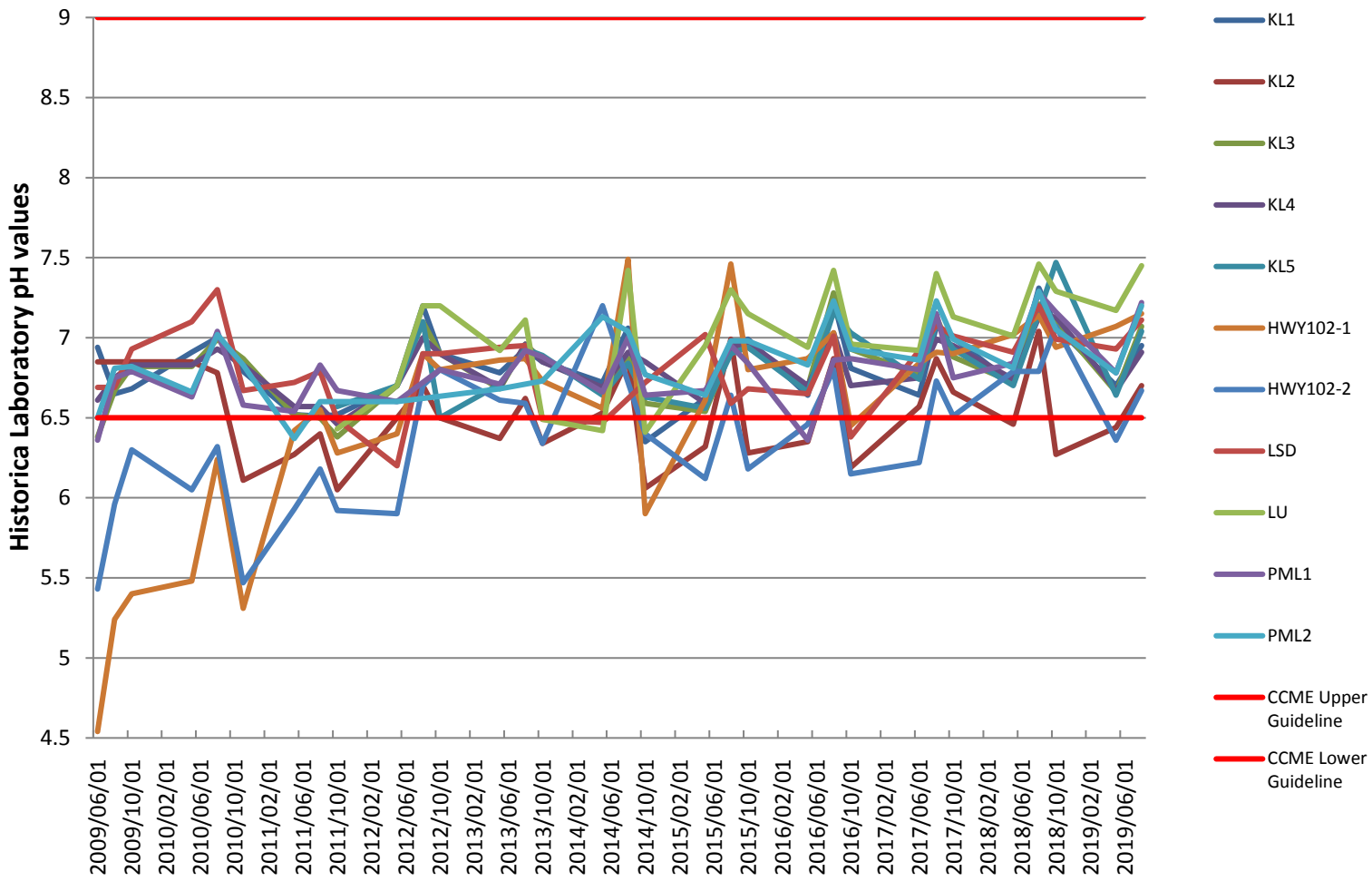

Figure 3 –Historical pH Measurements for Water Quality Monitoring Program

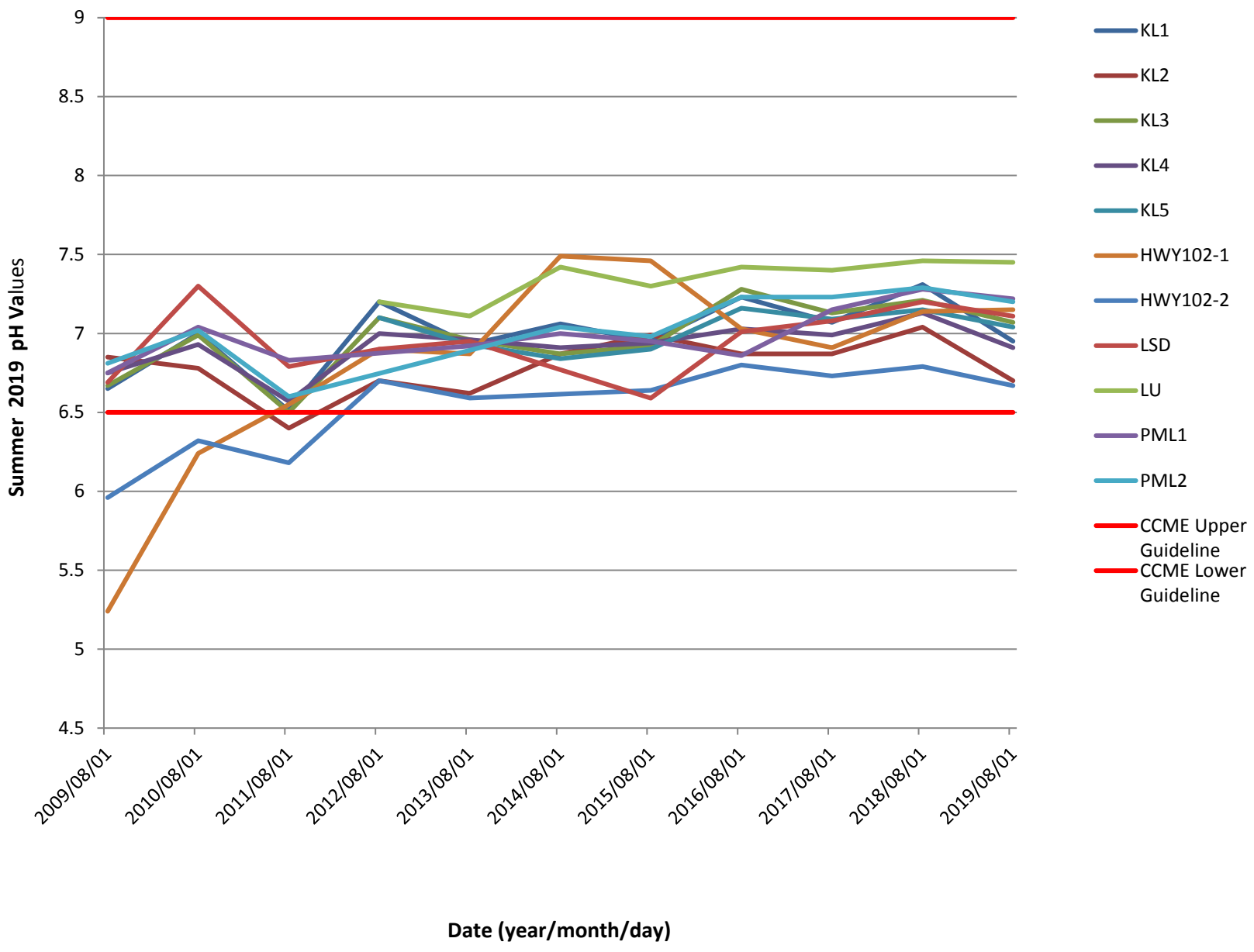

Figure 4 – Seasonal pH Measurements for Water Quality Monitoring Program.

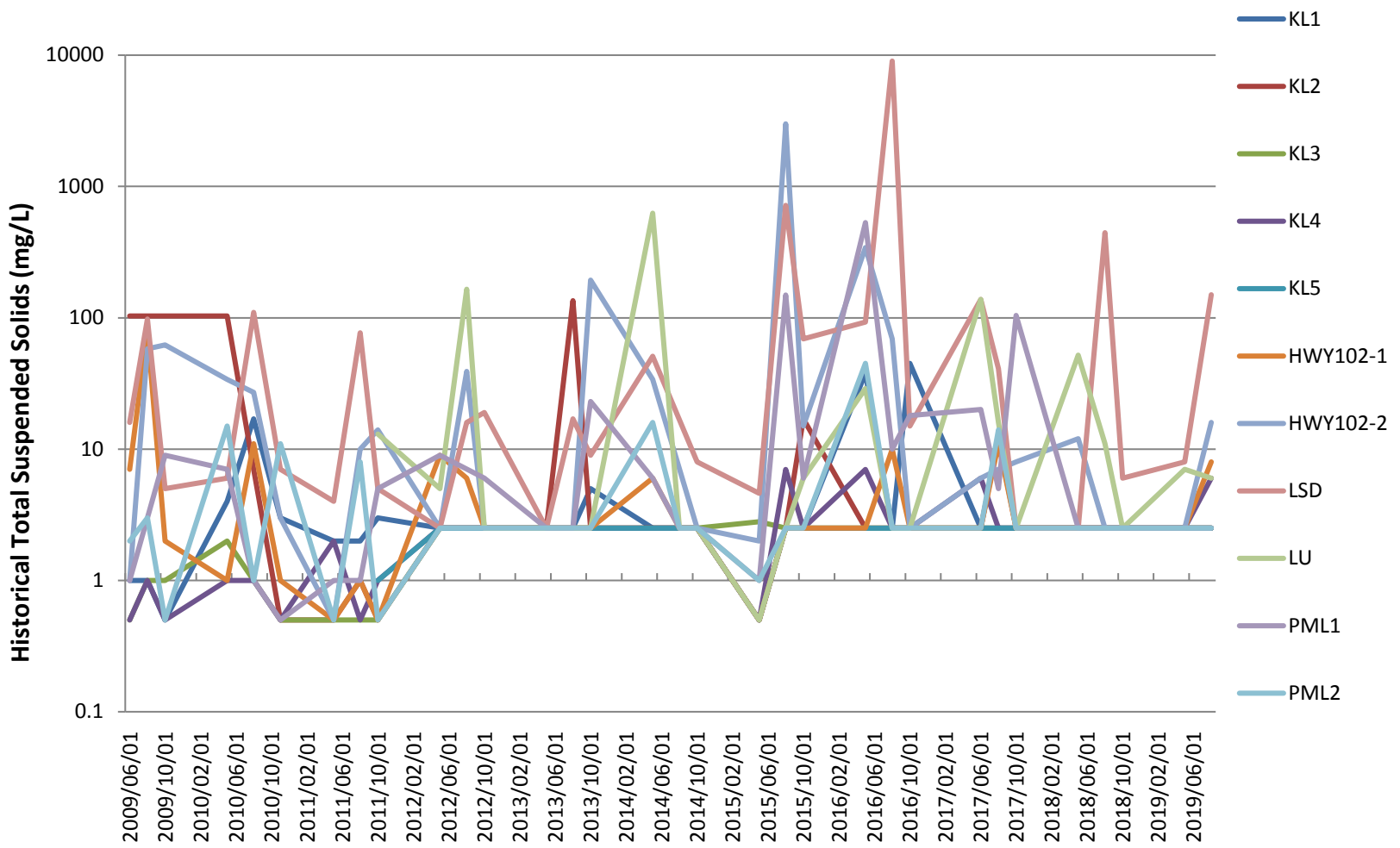

Figure 5 – Historical Total Suspended Solids Concentrations for Water Quality Monitoring Program.

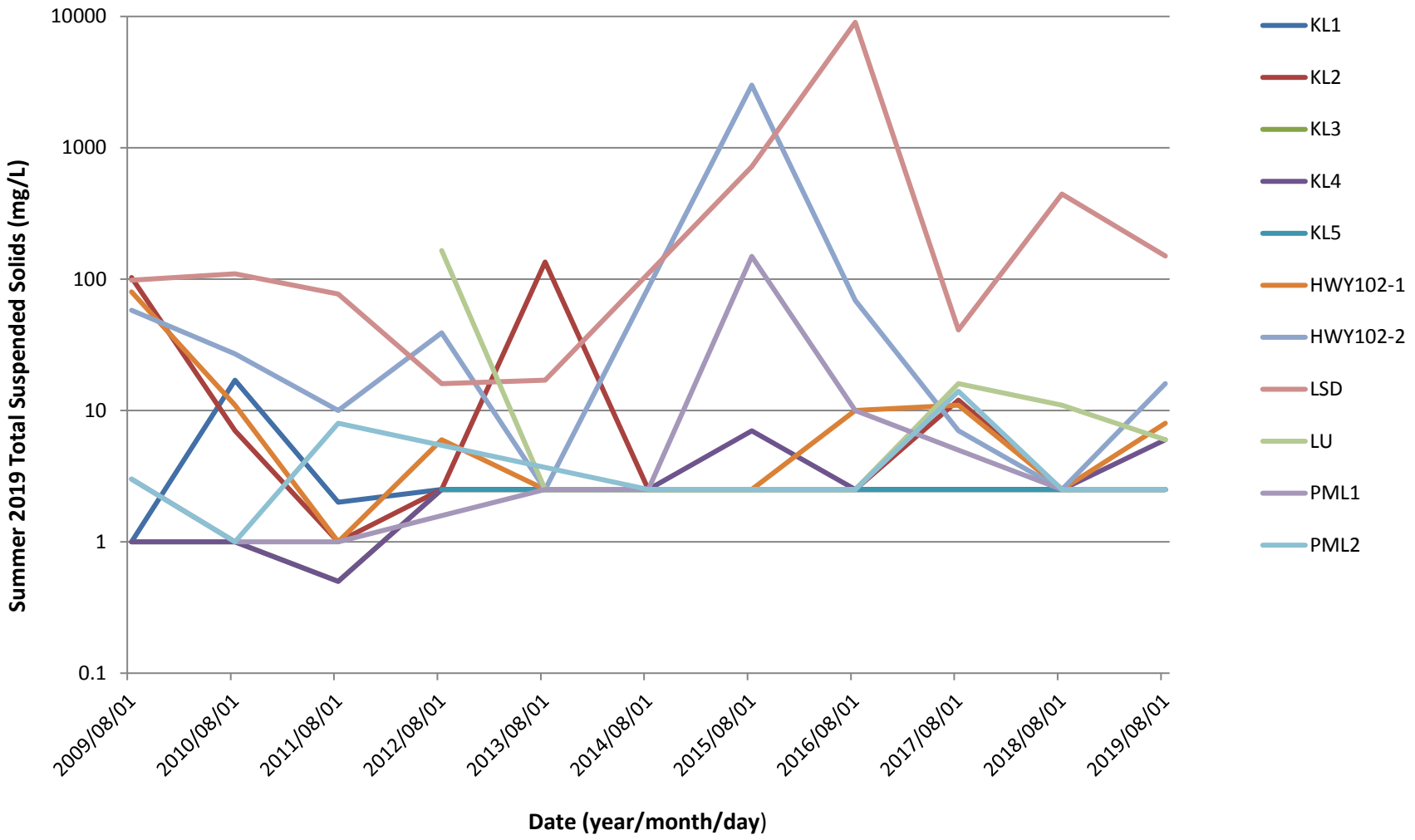

Figure 6 – Seasonal Total Suspended Solids Concentrations for Water Quality Monitoring Program.

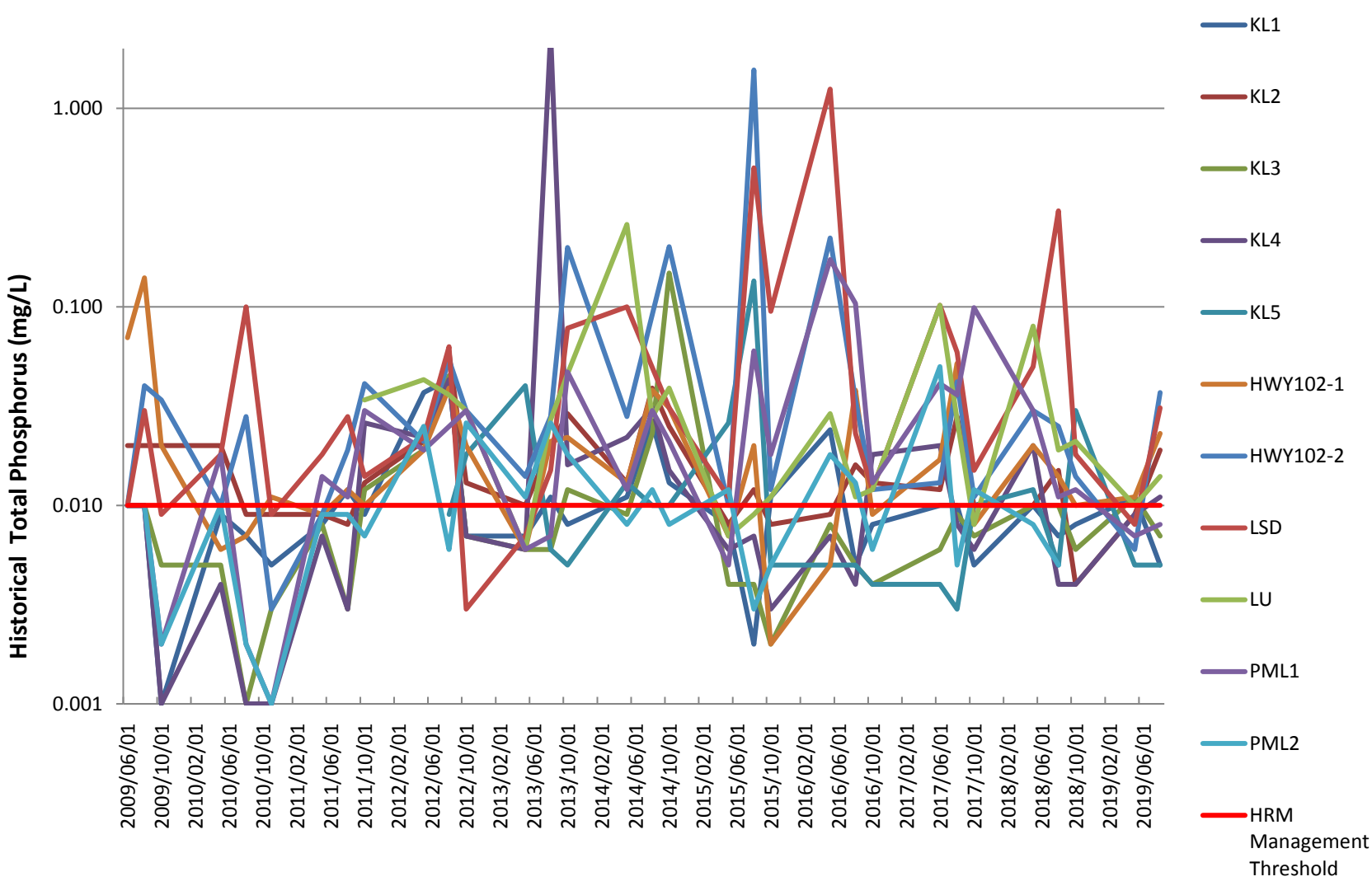

Figure 7 – Historical Total Phosphorus Concentrations for Water Quality Monitoring Program.

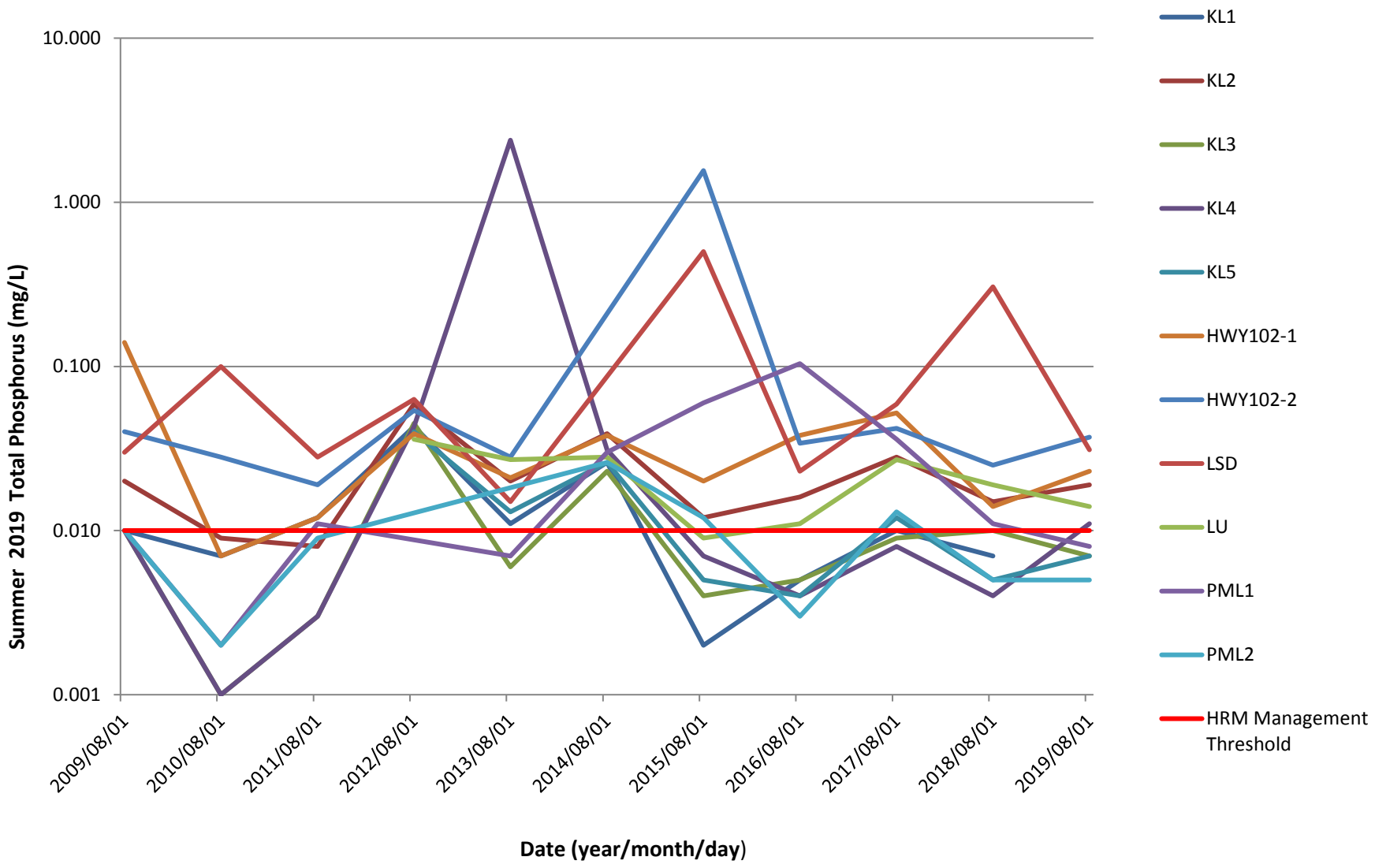

Figure 8 – Seasonal Total Phosphorus Concentrations for Water Quality Monitoring Program.

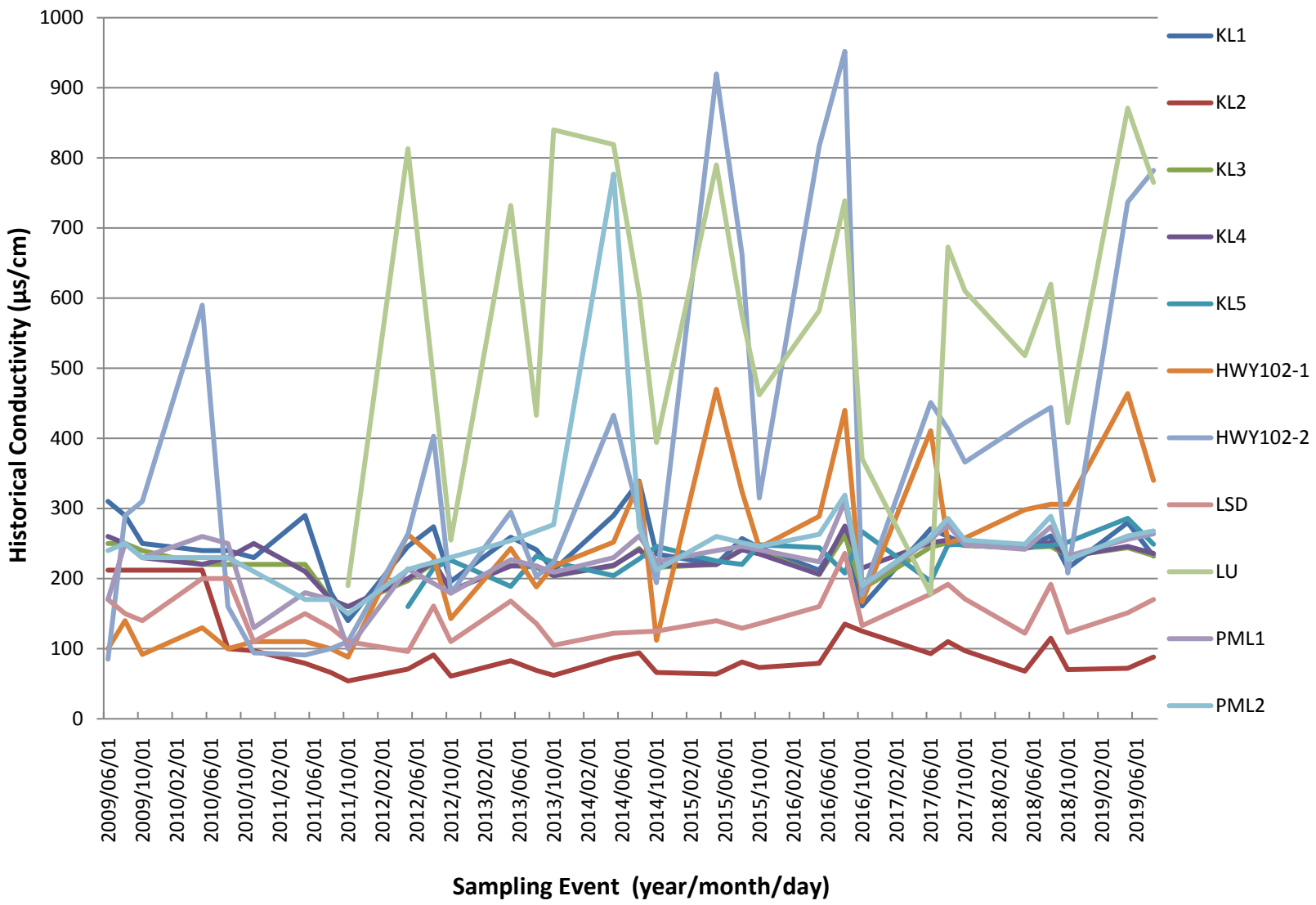

Figure 9 – Historical Measurement of Conductivity for Water Quality Monitoring Program.

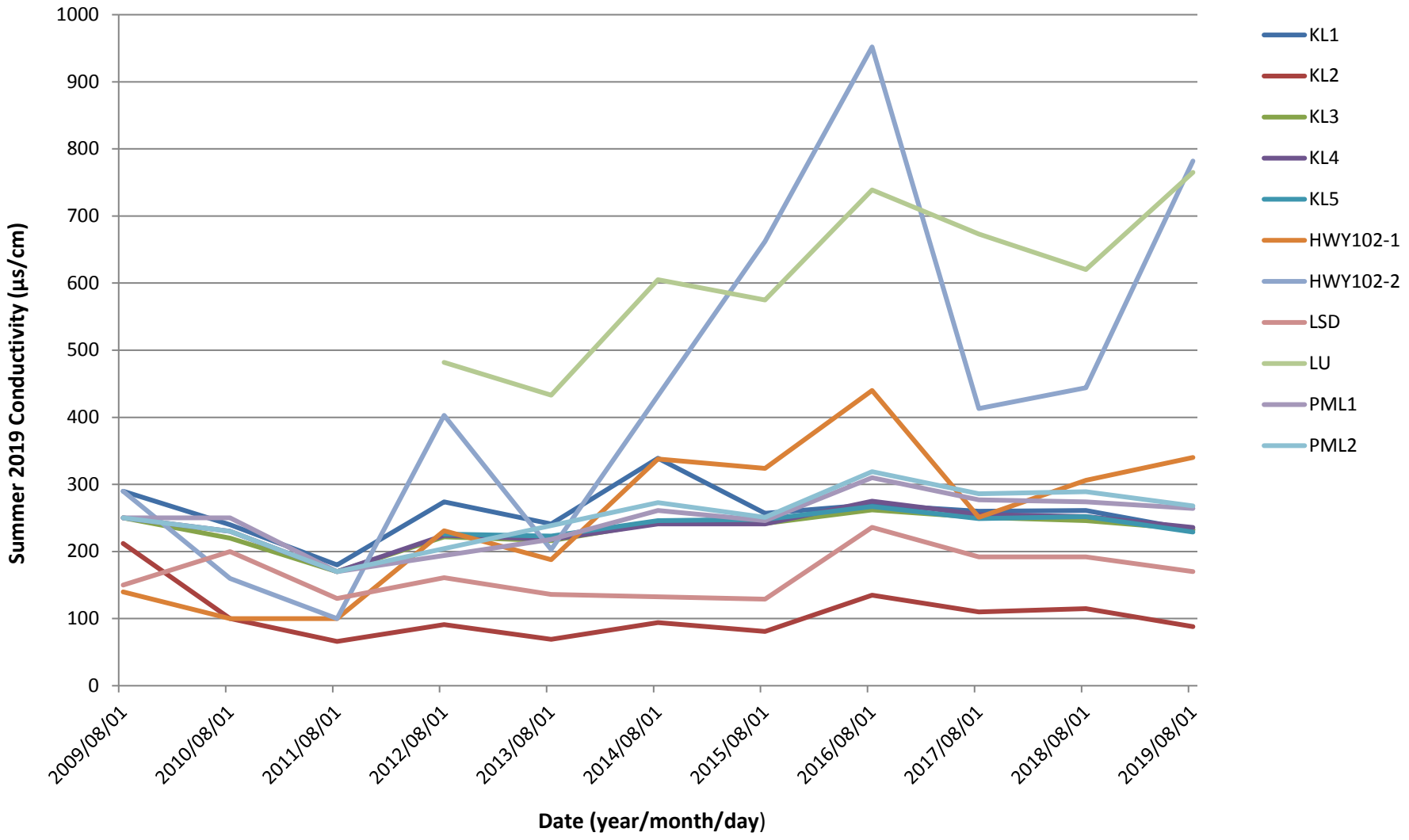

Figure 10 – Seasonal Conductivity Measurements for Water Quality Monitoring Program.

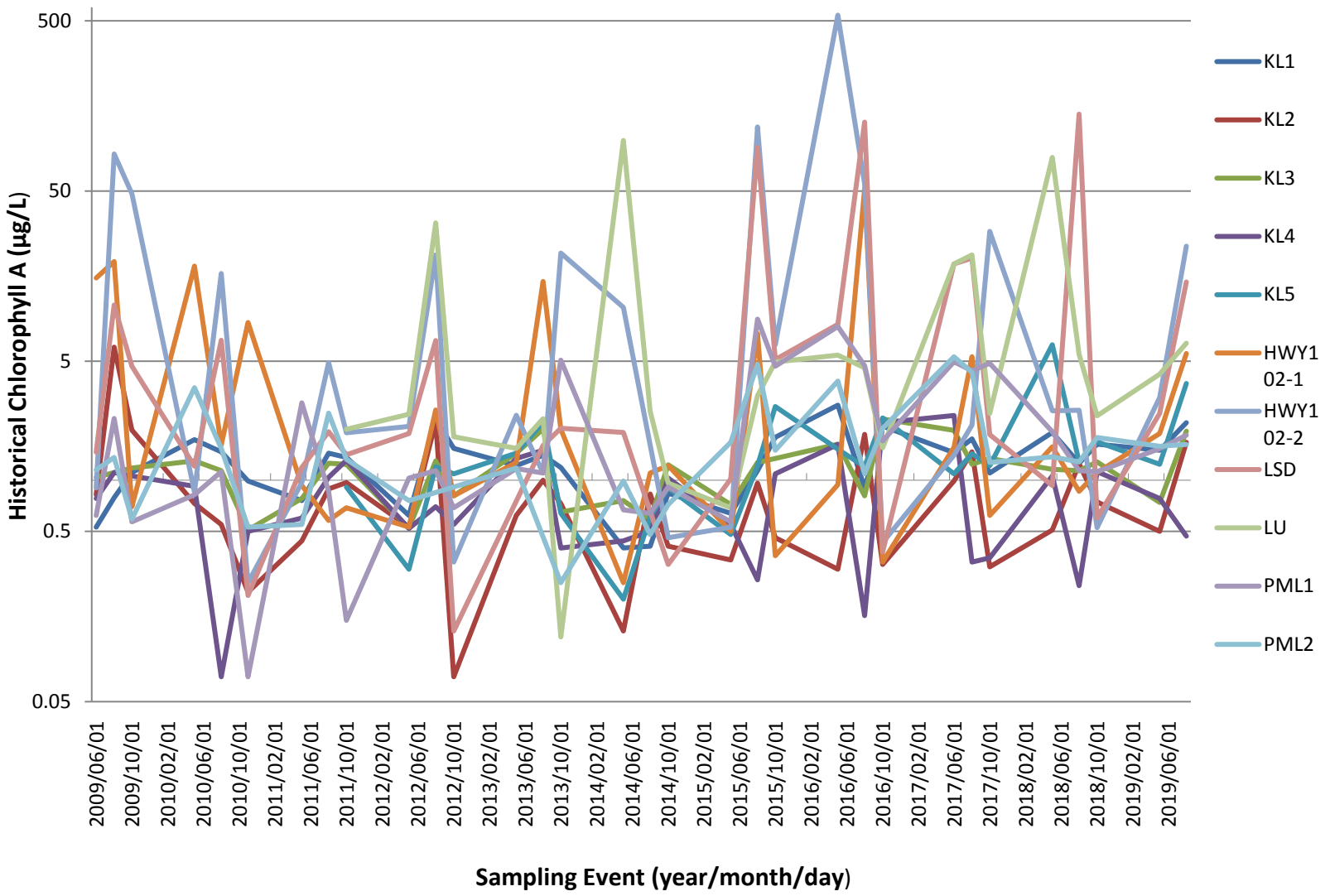

Figure 11 – Historical Chlorophyll A Concentrations for Water Quality Monitoring Program.

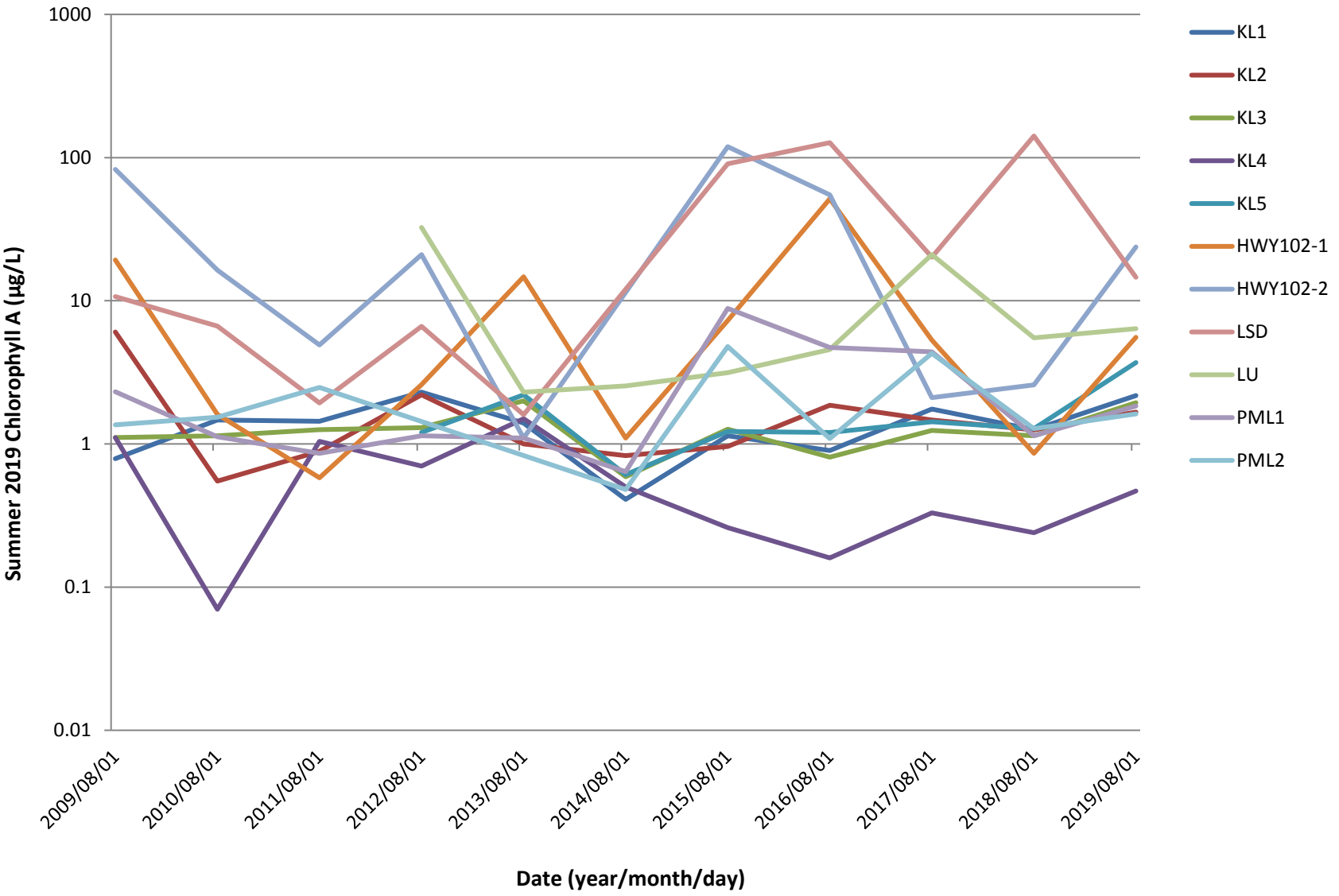

Figure 12 – Seasonal Chlorophyll A Concentrations for Water Quality Monitoring Program.

SNC·LAVALIN

5657 Spring Garden Road, Suite 200 Park Lane Terraces
Halifax, Nova Scotia B3J 3R4
1.902.492-4544 - 1.902.492.4540

SNC-Lavalin Inc.
Suite 200, Park Lane Terraces
5657 Spring Garden Road
Halifax, Nova Scotia, Canada, B3J 3R4
902.492.4544 902.492.4540

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:

SNC-Lavalin Inc.

5657 Spring Garden Road, Suite 200

Halifax, NS, B3J 3R4

PH: (902) 492-4544

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

Appendix B Summary Table Results

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

Table B2 - Historical Results, Bedford West Water Quality Sampling Program

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

HWY102-1

PML2

PAPER MILL LAKE

PML1

KL4

KL3

LSD

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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Telephone: (902) 492-4544
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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 · TDS · Dissolved Oxygen · Temperature · Secchi Depth · Conductance · Air Temperature · Cloud Cover · Incidental Wildlife Sightings	· Total Alkalinity (as $CaCO_3$) · Dissolved Chloride · Colour · Total Kjeldahl Nitrogen · Nitrate + Nitrite · Nitrate · Nitrite · Nitrogen (as NH4) · Total Organic Carbon · Orthophosphate (P) · pH · Low Total Phosphorus · Reactive Silica · Total Suspended Solids · Dissolved Sulphate · Turbidity · Conductivity	· Anion Sum · Cation Sum · Ion Balance · Bicarbonate Alkalinity(as $CaCO_3$) · Carbonate Alkalinity (as $CaCO_3$) · Hardness · Total Dissolved Solids · Saturation pH (@4°C & 20°C) · Langelier Index (@4°C & 20°C)	· Calcium · Copper · Iron · Magnesium · Manganese · Potassium · Sodium · Zinc	· Chlorophyll A · E. coli · 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	--	--	--	6.5 - 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	<5	8	30	14	<5	5	6	7	5	8	6	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	0.16	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	6.39	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	0.041	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	0.7	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	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	1.0	<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	2.5	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	-2.69	-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	-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	<2.0	<2.0	<2.0	<2	<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	--	--	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	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	--	--		<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	--	<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																																
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	08-20-19	2019/11/08
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	3:01 PM	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	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	1.20
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	10.1
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	**	2.58	7.9
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	6.11
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	214.0
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	<5	11	<5	<5	9.0	<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	16	14
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	106	77
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	0.05	<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	<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	<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	0.12	0.07
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	2.70
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	9.40
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	0.09	<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	<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	6.46	7.04	6.27	6.44	6.70	5.89
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	4.3	2.0
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	0.6
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	0.014	0.015	0.004	0.009	0.019	0.031
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	0.5	0.8	0.6	0.6	0.8	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	10.0	7.5
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	3.5
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	17	<5	<5	<5	<5	12	<5	<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	<2	4.0
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	3.5	1.3
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	68	115	70	72	88	45
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	0.5
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	9.0	<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	40.0	29.0
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	--	--	--		0.71	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	0.5
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	7.5
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	14.6	6.4
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	-4.02	-2.85	-4.1	-4.0	-3.3	-4.7
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	-5.0
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	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	10.3	10.9
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	228	123	--	156.0	257.0	318.0
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	--	--		9	--	--	12	14	--	10	--	--	9	11	10	8	<5	13	13	18	9	9	--	9	10	--	--	10	--	14	7	14	--	10.0	37.0	9.0
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		8	--	--	15	13	--	<50	--	--	6	14	22	6	11	9	11	12	12	<50	--	<5	9	--	--	<5	--	17	7	13	--	7.0	11.0	7.0
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	<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	9	<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	<0.40	--	<1	<1	--	--	<1	--	<1	<1	<1	--	<1	1.0	<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	<1	<1	1.0	<1	<1	1.0
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	1,210.0	277.0
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	1.6
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	17	78	29.0	28.0	295.0	23.0
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	<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	<2.0	--	<2	<2	--	--	<2	--	<2	<2	<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	<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	<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	13.0
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	3	<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	--	3	--	--	<2	2	3	4	<2	2	2	<2	3	3	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	2.0	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	<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	<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	<5	8	<5	8	6	<5	<5	20.0	<5	9.0	6.0
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	1240
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	2	12
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--																																		<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	0.51	1.25	0.75	0.47	1.67	
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	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 (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 B2: Historical Data - Bedford West Water Quality Sampling Program

Kearney Lake – Sample Site KL3

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)	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
Sample Sites							KL3	KL3	KL3	KL3	KL3	KL3	KL3	KL3	KL3	KL3	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
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
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
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
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
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
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
INORGANICS																	
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--		<5	7	7	6	7	7	6	7	7	23	6
Dissolved Chloride (Cl)	mg/L	1	--	--	120		66	63	60	55	55	53	56	43	37	50	57
Colour	TCU	5	--	--	--		22	20	20	28	12	20	31	38	40	57	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
Nitrate (N)	mg/L	0.05	--	--	13		0.14	--	--	0.24	0.15	--	0.24	--	--	0.19	0.09
Nitrite (N)	mg/L	0.05	--	--	0.06		<0.01	--	--	<0.01	<0.01	--	<0.01	--	--	<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
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--		--	--	--	--	--	--	--	--	--	<0.4	2.8
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
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 (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
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
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
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
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
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
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
Total Suspended Solids	mg/L	5	--	--	Comment 1		<1	1	1	2	<2	<1	<1	<1	<1	<5	<5
Dissolved Sulphate (SO4)	mg/L	2	--	--	--		11	12	12	10	10	10	9	10	8	7	8
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
Conductivity (uS/cm)	µS/cm	1	--	--	--		250	250	240	220	220	220	220	170	160	197	222
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
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--		<1	7	7	6	7	7	6	7	7	23	6
Calculated TDS	mg/L	1	--	--	--		128	130	123	110	117	116	115	88	82	111	113
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--		<1	<1	<1	<1	<1	<1	<1	<1	<1	<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
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
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
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
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
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
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
Metals (ICP-MS)																	
Total Aluminum (Al)	µg/L	5	5	--	5 - 100		259	259	--	124	54	--	266	--	--	199	54
Total Antimony (Sb)	µg/L	2	20	--	--		<2	<2	--	<1.0	<1.0	--	<1.0	--	--	<2	<2
Total Arsenic (As)	µg/L	2	5.0	--	5		<2	<2	--	<1.0	<1.0	--	<1.0	--	--	<2	<2
Total Barium (Ba)	µg/L	5	1000	--	--		13	13	--	16	13	--	19	--	--	18	17
Total Beryllium (Be)	µg/L	2	5.3	--	--		<2	<2	--	<1.0	<1.0	--	<1.0	--	--	<2	<2
Total Bismuth (Bi)	µg/L	2	--	--	--		<2	<2	--	<2.0	<2.0	--	<2.0	--	--	<2	<2
Total Boron (B)	µg/L	5	1200	--	1500		9	9	--	8	9	--	<50	--	--	5	9
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
Total Chromium (Cr)	µg/L	1	---	--	1		<1	<1	--	<1.0	<1.0	--	<1.0	--	--	<1	<1
Total Cobalt (Co)	µg/L	1	10	--	--		<1	<1	--	<0.40	<0.40	--	<0.40	--	--	<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
Total Iron (Fe)	µg/L	50	300	--	300		523	523	--	73	133	58	136	104	154	137	136
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
Total Manganese (Mn)	µg/L	2	820	--	--		53	53	--	37	67	32	42	33	33	25	47
Total Molybdenum (Mo)	µg/L	2	73	--	73		<2	<2	--	<2.0	<2.0	--	<2.0	--	--	<2	<2
Total Nickel (Ni)	µg/L	2	25	--	25 - 150		<2	<2	--	2	<2.0	--	2	--	--	<2	<2
Total Selenium (Se)	µg/L	1	1.0	--	1		<1	<1	--	<1.0	<1.0	--	<1.0	--	--	<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
Total Strontium (Sr)	µg/L	5	21000	--	--		12	12	--	34	36	--	33	--	--	25	33
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	--	<2.0	<2.0	--	<2.0	--	--	<2	<2
Total Titanium (Ti)	µg/L	2	--	--	--		2	2	--	<2.0	<2.0	--	5	--	--	<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
Total Vanadium (V)	µg/L	2	6	--	--		<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
MICROBIOLOGICAL																	
Total Coliform	MPN/100mL	1	--	--	--		120	24	--	190	16	58	72	110	--	291	1,553
E. coli	MPN/100mL	1	--	400	--		1	17	--	2	<1	8	5	37	<100	2	<1
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
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

Tested Parameters	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
Sample Sites	KL3	KL3	KL3	KL3	KL3	KL3	KL3	KL3	KL3	KL3	KL3
Sampling Date	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
Sampling Time	11:20	9:50	10:00	14:00	11:00	11:50	14:25	10:35	11:45	10:40	11:00
FIELD DATA											
Secchi Depth	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NCC	N/A	N/A	N/A
Water Temp	15.6	11.7	21.5	13.6	11.0	22.7	12.8	14.7	25.0	8.4	12.1
Dissolved Oxygen	7.7	10.2	9.2	8.9	5.9	7.9	8.1	8.0	9.9	8.7	9.3
pH (in Situ)	6.51	5.86	7.25	6.49	6.55	7.37	6.67	6.84	6.87	7.17	7.40
Specific Conductance	177.2	207.3	194.4	210.6	405.0	252.0	208.0	0.2	245.1	236.6	213.0
INORGANICS											
Total Alkalinity (as CaCO3)	5	<5	5	7	15	5	6	<5.0	6	6	<5
Dissolved Chloride (Cl)	46	54	40	46	58	46	45	60	56	56	54
Colour	31	19	23	20	16	13	20	34	13	14	29
Nitrite + Nitrate	0.09	0.21	0.11	<0.05	0.17	0.13	0.13	0.16	0.12	0.21	0.14
Nitrate (N)	0.09	0.21	0.11	<0.05	0.17	0.13	0.13	0.16	0.12	0.21	0.14
Nitrite (N)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen) *	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.050	<0.03	<0.03	0.06
Total Kjeldahl Nitrogen as N	<0.4	--	1.3	<0.4	0.6	0.4	0.4	0.2	1.2	0.9	<0.4
Total Organic Carbon	4.9	4.3	4.4	4.6	4.6	2.8	4.5	3.4	5.7	5.8	4.3
Orthophosphate (as P)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01
pH (Lab)	6.90	6.68	6.96	6.86	6.68	6.87	6.59	6.54	6.92	6.94	6.69
Total Calcium (Ca)	6.0	7.0	5.3	6.8	6.4	7.9	6.8	6,600.0	7.8	5.2	6.2
Total Magnesium (Mg)	1.3	1.0	0.9	1.3	1.4	1.2	1.0	940.0	1.2	0.9	1.0
Total Phosphorus	0.007	0.006	0.006	0.012	0.009	0.023	0.148	0.004	0.004	0.002	0.008
Total Potassium (K)	0.9	0.8	0.6	1.2	0.8	1.1	0.9	770.0	0.9	0.7	0.7
Total Sodium (Na)	26.4	35.1	20.1	32.1	36.4	39.0	35.3	34.0	40.0	27.1	32.1
Reactive Silica (SiO2)	2.6	2.9	2.6	2.7	2.6	1.9	2.4	2.5	2.4	2.6	2.6
Total Suspended Solids	<5	<5	<5	<5	<5	<5	<5	3	<5	<5	<5
Dissolved Sulphate (SO4)	7	7	7	8	9	7	7	8	9	8	10
Turbidity (NTU)	1.0	0.7	2.4	0.4	0.4	0.3	0.9	0.7	0.5	0.7	1.1
Conductivity (uS/cm)	182	219	216	204	218	243	216	220	242	238	206
Calculated Parameters											
Anion Sum	1.55	1.68	1.38	1.60	2.14	1.55	1.54	1.87	1.90	1.88	1.74
Bicarb. Alkalinity (calc. as CaCO3)	5	<5	5	7	15	5	6	<1.0	6	6	<5
Calculated TDS	91	106	78	100	122	106	100	110	119	103	105
Carb. Alkalinity (calc. as CaCO3)	<10	<10	<10	<10	<10	<10	<10	<1.0	<10	<10	<10
Cation Sum	1.60	2.00	1.24	1.89	2.07	2.23	2.00	1.89	2.27	1.55	1.83
Hardness (CaCO3)	20.30	21.60	16.90	22.30	21.70	24.70	21.10	20.00	24.40	16.70	19.60
Ion Balance (% Difference)	1.60	8.60	5.50	8.30	1.50	17.90	12.80	0.53	9.00	9.80	2.60
Langelier Index (@ 20C)	-3.21	-3.37	-3.19	-3.05	-2.93	-3.12	-3.39	NC	-3.00	-3.15	-3.41
Langelier Index (@ 4C)	-3.53	-3.69	-3.51	-3.37	-3.25	-3.44	-3.71	NC	-3.32	-3.47	-3.73
Saturation pH (@ 20C)	10.10	10.00	10.20	9.91	9.61	9.99	9.98	NC	9.92	10.10	10.10
Saturation pH (@ 4C)	10.40	10.40	10.50	10.20	9.93	10.30	10.30	NC	10.20	10.40	10.40
Metals (ICP-MS)											
Total Aluminum (Al)	153	140	65	100	260	52	105	180	--	90	163
Total Antimony (Sb)	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2
Total Arsenic (As)	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2
Total Barium (Ba)	15	19	9	18	17	17	16	19	--	19	15
Total Beryllium (Be)	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2
Total Bismuth (Bi)	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2	<2
Total Boron (B)	17	7	7	10	8	10	12	<50	--	<5	8
Total Cadmium (Cd)	0.027	0.028	<0.017	<0.017	0.038	<0.017	0.017	0.033	--	<0.017	0.021
Total Chromium (Cr)	<1	<1	<1	<1	7	<1	<1	<1.0	--	<1	<1
Total Cobalt (Co)	<1	<1	<1	<1	<1	<1	<1	<0.40	--	<1	<1
Total Copper (Cu)	<2	<2	<1	1	1	<1	2	<2.0	1	<1	2
Total Iron (Fe)	119	131	71	172	137	96	118	120	165	115	112
Total Lead (Pb)	0.7	<0.5	<0.5	0.9	3.6	<0.5	<0.5	<0.5	--	<0.5	<0.5
Total Manganese (Mn)	46	37	20	92	41	45	27	36	48	24	31
Total Molybdenum (Mo)	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2	<2
Total Nickel (Ni)	<2	<2	<2	<2	2	<2	<2	<2.0	--	<2	2
Total Selenium (Se)	<1	<1	<1	<1	<1	<1	<1	<1.0	--	<1	<1
Total Silver (Ag)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	--	<0.1	<0.1
Total Strontium (Sr)	29	33	18	32	31	32	29	29	--	21	28
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	<2.0	--	<2	<2
Total Titanium (Ti)	<2	<2	<2	2	3	<2	2	3	--	<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
Total Vanadium (V)	<2	<2	<2	<2	<2	<2	<2	<2	--	<2	<2
Total Zinc (Zn)	8	10	5	7	10	<5	6	9	7	8	8
MICROBIOLOGICAL											
Total Coliform	178	345	2,420	1,300	86	1,730	>2420	---	2,420	285	548
E. coli	3	8	21	<1	<1	<1	13	<0.10	7	6	2
Chlorophyll A - Spectrophotometer											
Chlorophyll A - Acidification method	0.81	1.44	2.00	0.65	0.76	0.59	1.23	0.72	1.27	1.34	1.63
Chlorophyll A - Welschmeyer method	1.14	1.62	2.30	0.61	0.69	0.51	1.12	0.68	1.34	0.69	2.00

Tested Parameters	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
Sample Sites	KL3	KL3	KL3	KL3	KL3	KL3	KL3	KL3	KL3	KL3	KL3
Sampling Date	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	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Temp	21.7	12.5	16.1	22.5	13.8	12.1	23.8	12.4	9.6	23.3	11.3
Dissolved Oxygen	7.7	11.4	9.0	7.4	8.2	7.3	6.9	8.6	**	7.28	9.30
pH (in Situ)	6.82	5.58	7.02	7.04	6.97	6.66	6.94	6.64	8.25	7.05	6.61
Specific Conductance	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)	9	8	<5	8	9	<5	8	7.0	<5	8.0	6.0
Dissolved Chloride (Cl)	56	49	63	56	59	54	48	46	49	56	54
Colour	13	21	24	13	15	63	26	27	53	13	21
Nitrite + Nitrate	0.13	0.10	0.24	0.30	0.24	0.17	0.06	0.1	0.1	0.10	0.29
Nitrate (N)	0.06	0.10	0.13	0.17	0.24	0.17	0.06	0.1	0.1	0.10	0.29
Nitrite (N)	0.07	<0.05	0.11	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrogen (Ammonia Nitrogen) *	<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	<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	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)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH (Lab)	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)	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)	1.3	1.3	1.0	1.1	1.2	1.0	1.2	1.4	1.0	1.2	0.9
Total Phosphorus	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)	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)	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)	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	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Sulphate (SO4)	10	10	10	9	10	8	7.0	7.0	6.0	9.0	9.0
Turbidity (NTU)	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)	262	185	245	251	247	244	246	232	244	233	160
Calculated Parameters											
Anion Sum	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)	9	8	<5	8	9	<5	8	<5	<5	8.0	6.0
Calculated TDS	120	107	127	122	122	107	106	109.0	108.0	119.0	105.0
Carb. Alkalinity (calc. as CaCO3)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	2.18	1.94	2.38	2.28	2.10	1.98	2.09	2.3	2.3	2.2	1.7
Hardness (CaCO3)	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)	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)	-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)	-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)	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)	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)	--	--	128	36	43	164	26	--	139.0	39	80.0
Total Antimony (Sb)	--	--	<2	--	<2	<2	<2	--	<2	<2	<2
Total Arsenic (As)	--	--	<2	--	<2	<2	<2	--	<2	<2	<2
Total Barium (Ba)	--	--	17	--	20	14	15	--	17.0	16.0	15.0
Total Beryllium (Be)	--	--	<2	--	<2	<2	<2	--	<2	<2	<2
Total Bismuth (Bi)	--	<2	<2	--	<2	<2	<2	--	<2	<2	<2
Total Boron (B)	--	--	7	--	12	5	10	--	6.0	9.0	6.0
Total Cadmium (Cd)	--	--	0.020	--	<0.017	<0.09	<0.09	--	<0.09	<0.09	<0.09
Total Chromium (Cr)	--	--	<1	--	<1	<1	<1	--	<1	<1	<1
Total Cobalt (Co)	--	--	<1	--	<1	<1	<1	--	<1	<1	<1
Total Copper (Cu)	<1	<1	<1	<1	1	<1	<1	1.0	<1	1.0	<1
Total Iron (Fe)	117	99	125	83	130	81	148	<50	123.0	93.0	<50
Total Lead (Pb)	--	--	<0.5	--	<0.5	0.7	<0.5	--	<0.5	<0.5	<0.5
Total Manganese (Mn)	41	20	30	35	54	21	50	22.0	26.0	44.0	18.0
Total Molybdenum (Mo)	--	--	<2	--	<2	<2	<2	--	<2	<2	<2
Total Nickel (Ni)	--	--	<2	--	<2	<2	<2	--	3.0	<2	2.0
Total Selenium (Se)	--	--	<1	--	<1	<1	<1	--	<1	<1	<1
Total Silver (Ag)	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1
Total Strontium (Sr)	--	--	33	--	41	27	38	--	30.0	34.0	31.0
Total Thallium (Tl)	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1
Total Tin (Sn)	--	--	<2	--	<2	<2	<2	--	<2	<2	<2
Total Titanium (Ti)	--	--	<2	--	<2	<2	<2	--	<2	<2	<2
Total Uranium (U)	--	--	<0.1	--	<0.1	<0.1	<0.1	--	<0.1	<0.1	<0.1
Total Vanadium (V)	--	--	<2	--	<2	<2	<2	--	2.0	<2	<2
Total Zinc (Zn)	<5	<5	6	6	6	6	<5	<5	16.0	<5	<5
MICROBIOLOGICAL											
Total Coliform	1,990	2,420	687	2,420	411	<1	NDOGT	5,020.0	103.0	NDOGT	628.0
E. coli	38	30	7	13	46	<1	51	20.0	1.0	15.0	6.0
Chlorophyll A - Spectrophotometer											0.47
Chlorophyll A - Acidification method	0.81	2.29	1.96	1.24	1.34	1.16	1.14	1.28	0.74	1.94	
Chlorophyll A - Welschmeyer method	0.99	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
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	11.1	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	<0.05	<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	0.10	<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	7.13	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	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	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	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	<5.0	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	1.23	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	2.3	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	-3.38	-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	--	9	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	0.025	--	--	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	<1	2	7	1	1	--	<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	<2.0	--	<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.

<u>Underlined (black shaded)</u> = 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 <u>and/or</u> NSE EQS Contaminated Sites Regulations <u>and/or</u> 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	7.9	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	<0.05	<0.010	<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	0.06	<0.050	<0.03	0.04	0.06	<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	2.22	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	<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)	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	08-20-19	2019/11/08
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	12:20PM	16:30
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	--	--	--			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	23.1	9.7
Dissolved Oxygen	mg/L	--	--	--	5.5 - 9.5		10.0	5.9	4.8	4.9	2.2	3.0	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	8.8	2.3	5.6	**	3.81	12.70
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	6.18	5.36	6.04	7.56	8.32	6.13	5.88	7.24	6.83	6.19	6.98
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	720.0	202.0
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	17.0	<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	223	74
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	42	45
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	0.14	0.58
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	0.07	0.58
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	0.17	0.21	<0.05	0.43	0.07	<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	<0.03	0.24	0.06	0.04	0.29	0.05
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	0.70	1.20
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	8.20	6.80
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
pH (units)	pH	N/A	--	5.0-9.0	6.5 - 9.0		6.43	5.76	6.30	6.05	6.12	6.42	5.93	6.38	5.72	6.50	6.70	6.80	6.61	6.59	6.34	7.20	6.60	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	6.57	6.37
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	17.2	7.9
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	2.2	1.4
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	0.139	0.028	0.201	0.010	3.560	0.012	0.022	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)	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	1.1	1.6	1.6	1.3	1.6	1.7	2.2	2.1	1.1
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	139.0	31.7
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	7.2	4.4
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	342	69	<5	6	7	8	12	<5	<5	<5	16.0	<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	10	7	9	9	9	4.0	16.0	13.0	11.0	9.0
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	144.0	1.1	1.1	1.2	1,490.0	9.9	119.0	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)	µS/cm	1	--	--	--		85	290	310	590	160	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	782	204
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	6.9	2.3
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	17.0	<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	415.0	129.0
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	--	--	--		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	7.5	2.0
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	52.0	25.5
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	4.4	8.0
Langelier Index (@ 20C)	N/A	N/A	--	--	--		NC	NC	-3.57	-3.72	-3.70	NC	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	-2.5	-3.6
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	-2.8	-4.0
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	9.2	10.0
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	9.5	10.3
Metals (ICP-MS)																																				
Total Aluminum (Al)	µg/L	5	5	--	5 - 100		270	--	--	189	368	--	260	--	--	145	466	259	130	138	2,710	400	216	100	--	129	3,880	--	--	99	149	541	167	152	--	126.0	194.0	306.0
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	<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	<2	<2	--	<2	4.0	<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	138.0	100.0
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	<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
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	9.0	6.0
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	<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	1.0	<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	3.0	<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	1.0	3.0
Total Iron (Fe)	µg/L	50	300	--	300		880	--	--	1,380	3,850	303	229	3	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	8,440.0	506.0
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	1.4	1.9
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	625.0	50.0
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	<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	<2	2.0
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	<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	--	--	37	21	--	17	--	--	33	45	31	39	40	45	75	43	96	--	38	96	--	--	72	--	80	53	81	--	129.0	95.0	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	<0.1	<0.1	<0.1	<0.1	<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	--	--	--		4	--	--	<2	6	--	5	--	--	<2	10	4	4	<2	60	9	6	<2	--	<2	41	--	--	<2	--	15	4	3	--	<2	3.0	7.0
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	<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)	µg/L	2	6	--	--		<2	--	--	<2	<2	--	<2	--	--	<2	2	<2	<2	<2	11	<2	<2	<2.0	--	<2	41	--	--	2	--	3	<2	2	--	4.0	5.0	<2
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	15.0	13.0
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	NDOGT	1,152.0
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	30.0	18.0
Chlorophyll A - Spectrophotometer	µg/L	0.25																																			0.32
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	23.70	
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	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															
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
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
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	--	--	--	--		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
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
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
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
INORGANICS																						
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--		13	16	12	13	21	9	9	15	12	21	14	11	8	20	11	35
Dissolved Chloride (Cl)	mg/L	1	--	--	120		41	34	31	49	45	25	38	27	22	22	33	23	39	32	23	29
Colour	TCU	5	--	--	--		32	27	37	20	26	33	32	41	49	13	20	40	10	21	25	9
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
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
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	0.06	0.03	<0.03	<0.03	<0.03	0.03	0.03	0.04
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--		--	--	--	--	--	--	--	--	--	0.5	3.5	0.5	--	0.7	3.0	1.0
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
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 (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
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
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
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
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
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
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
Total Suspended Solids	mg/L	5	--	--	Comment 1		16	98	5	6	110	7	4	77	5	<5	16	19	<5	17	9	51
Dissolved Sulphate (SO4)	mg/L	2	--	--	--		6	4	5	7	3	4	6	4	4	5	5	5	6	7	5	5
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
Conductivity (uS/cm)	µS/cm	1	--	--	--		170	150	140	200	200	110	150	130	110	96	161	110	168	136	105	122
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
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--		13	8	12	13	21	9	9	15	12	21	14	11	8	20	11	35
Calculated TDS	mg/L	1	--	--	--		92	55	74	104	107	62	84	66	60	56	163	58	82	87	66	88
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	--	--	--		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
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
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
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
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
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
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
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
Total Antimony (Sb)	µg/L	2	20	--	--		<2	--	--	<1.0	<1.0	--	<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	8	<2	<2	<2	<2	<2
Total Barium (Ba)	µg/L	5	1,000	--	--		14	--	--	15	19	--	14	--	--	11	86	12	12	7	24	15
Total Beryllium (Be)	µg/L	2	5	--	--		<2	--	--	<1.0	<1.0	--	<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
Total Boron (B)	µg/L	5	1,200	--	1,500		13	--	--	41	22	--	<50	--	--	6	24	16	10	15	15	14
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
Total Chromium (Cr)	µg/L	1	1	--	1		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	11	<1	<1	<1	2	<1
Total Cobalt (Co)	µg/L	1	10	--	--		<1	--	--	<0.40	1	--	<0.40	--	--	<1	34	<1	<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	22	2	<2	1	12	2
Total Iron (Fe)	µg/L	50	300	--	300		180	--	--	554	965	120	211	388	384	161	38,900	312	236	254	4,200	593
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
Total Manganese (Mn)	µg/L	2	820	--	--		51	--	--	113	632	23	30	53	39	26	13,200	67	71	81	124	140
Total Molybdenum (Mo)	µg/L	2	73	--	73		<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2
Total Nickel (Ni)	µg/L	2	25	--	25 - 150		<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	13	<2	<2	<2	2	<2
Total Selenium (Se)	µg/L	1	1	--	1		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	2	<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
Total Strontium (Sr)	µg/L	5	21,000	--	--		30	--	--	36	42	--	24	--	--	12	82	22	24	24	25	26
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
Total Tin (Sn)	µg/L	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
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
Total Vanadium (V)	µg/L	2	6	--	--		<2	--	--	<2	<2	--	<2	--	--	<2	30	<2	<2	<2	2	<2
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
MICROBIOLOGICAL																						
Total Coliform	MPN/100mL	1	--	--	--		53	>250	--	>250	>250	280	85	>250	--	1,414	>2420	>2420	1,990	>2420	>2420	1,203
E. coli	MPN/100mL	1	--	400	--		22	24	--	4	45	6	10	>250	<100	2	26	10	10	20	2	<1
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
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

Tested Parameters	Lake Shore Drive															
Sample Sites	LSD															
Sampling Date	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	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	1:45 PM
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	NA
Water Temp	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	8.3
Dissolved Oxygen	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	7.9
pH (in Situ)	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	6.40
Specific Conductance	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	171.0
INORGANICS																
Total Alkalinity (as CaCO3)	10	11	7	9	11	22	8	12	26	20	9	27	9.0	12.0	33.0	<5
Dissolved Chloride (Cl)	23	32	27	26	39	45	31	43	38	36	23	32	20	30	29	20
Colour	31	20	11	26	25	26	24	25	31	21	36	40	65	39	86	38
Nitrite + Nitrate	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	0.07
Nitrate (N)	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	0.07
Nitrite (N)	<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	<0.05
Nitrogen (Ammonia Nitrogen)	<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	0.06
Total Kjeldahl Nitrogen as N	<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	1.60
Total Organic Carbon	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	6.20
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)	6.72	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	6.55
Total Calcium (Ca)	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	2.7
Total Magnesium (Mg)	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	0.7
Total Phosphorus	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	0.008
Total Potassium (K)	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	0.6
Total Sodium (Na)	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	9.8
Reactive Silica (SiO2)	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	3.5
Total Suspended Solids	8	5	719	69	93	9,020	15	138	41	<5	<5	444	6.0	8.0	150.0	<5
Dissolved Sulphate (SO4)	4	5	<2	3	5	6	7	4	3	4	5	<2	5.0	4.0	<2	5.0
Turbidity (NTU)	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	44.4	1.2
Conductivity (uS/cm)	125	140	129	136	160	236	133	178	192	171	122	192	123	151	170	63
Calculated Parameters																
Anion Sum	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	0.7
Bicarb. Alkalinity (calc. as CaCO3)	10	11	7	9	11	22	8	12	26	20	9	27	9.0	12.0	33.0	<5
Calculated TDS	59	74	498	65	91	107	70	92	97	87	58	95	52.0	76.0	96.0	39.0
Carb. Alkalinity (calc. as CaCO3)	<10	<1.0	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	1.19	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	0.7
Hardness (CaCO3)	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	9.6
Ion Balance (% Difference)	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	1.0
Langelier Index (@ 20C)	-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	-3.9
Langelier Index (@ 4C)	-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	-4.2
Saturation pH (@ 20C)	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	10.4
Saturation pH (@ 4C)	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	10.7
Metals (ICP-MS)																
Total Aluminum (Al)	141	120	--	1,960	2,150	--	--	731	48	401	142	2590	--	124.0	665.0	154.0
Total Antimony (Sb)	<2	<1.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2
Total Arsenic (As)	<2	<1.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	3.0	<2
Total Barium (Ba)	11	12	--	27	34	--	--	32	--	11	8	53	--	13.0	53.0	7.0
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)	16	<50	--	<5	12	--	--	<5	--	20	10	20	--	9.0	21.0	9.0
Total Cadmium (Cd)	<0.017	0.011	--	<0.017	0.120	--	--	0.031	--	<0.017	<0.09	0.13	--	<0.09	<0.09	<0.09
Total Chromium (Cr)	<1	<1.0	--	3	2	--	--	<1	--	1	<1	2	--	<1	<1	<1
Total Cobalt (Co)	<1	<0.40	--	4	4	--	--	1	--	<1	<1	6	--	<1	6.0	<1
Total Copper (Cu)	3	<2.0	183	6	3	<1	<1	<1	<1	1	<1	4	1.0	<1	2.0	1.0
Total Iron (Fe)	363	230	176,000	4,570	2,790	2,190	303	1,080	375	874	239	5460	164.0	560.0	5,530.0	118.0
Total Lead (Pb)	<0.5	<0.5	--	5.9	4.3	--	--	0.6	--	0.7	0.7	4.3	--	<0.5	3.2	<0.5
Total Manganese (Mn)	60	130	13,800	985	921	2,420	75	436	212	250	55	2630	58.0	368.0	5,050.0	8.0
Total Molybdenum (Mo)	<2	<2.0	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2
Total Nickel (Ni)	<2	<2.0	--	5	2	--	--	<2	--	<2	<2	4	--	<2	<2	9.0
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	0.2	<0.1
Total Strontium (Sr)	19	25	--	16	29	--	--	28	--	31	17	54	--	27.0	56.0	15.0
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)	3	3	--	41	30	--	--	14	--	7	3	36	--	<2	6.0	<2
Total Uranium (U)	<0.1	<0.1	--	0.2	0.2	--	--	<0.1	--	<0.1	<0.1	0.2	--	<0.1	<0.1	<0.1
Total Vanadium (V)	<2	<2	--	6	4	--	--	<2	--	<2	<2	4	--	<2	2.0	<2
Total Zinc (Zn)	<5	<5.0	799	11	17	14	<5	8	<5	7	<5	23	<5	<5	10.0	<5
MICROBIOLOGICAL																
Total Coliform	8	---	>2420	>2420	>2420	>2420	>2420	534	>2420	641	46	3020	2,380.0	1120	NDOGT	932
E. coli	>2420	<10	16	17	9	30	16	1	479	1	23	20	20.0	7	50	12
Chlorophyll A - Spectrophotometer																<0.25
Chlorophyll A - Acidification method	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	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

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	0.22	<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	0.078	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	1,420	--	--	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	1	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

Paper Mill Lake — Sample Site PML1

Part 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)	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
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
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
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
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
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
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
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
INORGANICS																	
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--		6	7	7	7	9	5	6	7	7	20	<5
Dissolved Chloride (Cl)	mg/L	1	--	--	120		39	64	58	67	61	24	44	43	18	55	45
Colour	TCU	5	--	--	--		54	15	21	19	12	57	32	38	65	38	29
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
Nitrate (N)	mg/L	0.05	--	--	13		0.49	--	--	0.42	0.27	--	0.55	--	--	0.22	0.14
Nitrite (N)	mg/L	0.05	--	--	0.06		<0.01	--	--	<0.01	<0.01	--	<0.01	--	--	<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
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--		--	--	--	--	--	--	--	--	--	<0.4	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
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		6.36	6.75	6.79	6.63	7.04	6.58	6.54	6.83	6.67	6.60	6.80
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
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
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
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
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
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
Total Suspended Solids	mg/L	5	--	--	Comment 1		<2	3	9	7	<2	<1	1	<2	5	9	6
Dissolved Sulphate (SO4)	mg/L	2	--	--	--		13	11	11	13	12	12	12	10	12	7	10
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
Conductivity (uS/cm)	µS/cm	1	--	--	--		170	250	230	260	250	130	180	170	100	214	179
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
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--		6	7	7	7	9	5	6	7	7	20	<5
Calculated TDS	mg/L	1	--	--	--		93	129	118	137	134	75	100	90	63	117	95
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--		<1	<1	<1	<1	<1	<1	<1	<1	<1	<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
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
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
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
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
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
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
Metals (ICP-MS)																	
Total Aluminum (Al)	µg/L	5	5	--	5 - 100		260	--	--	665	46	--	233	--	--	177	306
Total Antimony (Sb)	µg/L	2	20	--	--		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2
Total Arsenic (As)	µg/L	2	5	--	5		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2
Total Barium (Ba)	µg/L	5	1,000	--	--		23	--	--	35	24	--	27	--	--	22	19
Total Beryllium (Be)	µg/L	2	5	--	--		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<2	<2
Total Bismuth (Bi)	µg/L	2	--	--	--		<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2
Total Boron (B)	µg/L	5	1,200	--	1,500		8	--	--	11	9	--	<50	--	--	6	9
Total Cadmium (Cd)	µg/L	0.017	0.010	--	0.090		<0.300	--	--	0.032	<0.017	--	<0.017	--	--	<0.017	0.066
Total Chromium (Cr)	µg/L	1	1	--	1		<2	--	--	<1.0	<1.0	--	<1.0	--	--	<1	<1
Total Cobalt (Co)	µg/L	1	10	--	--		<1	--	--	1	<0.4	--	<0.4	--	--	<1	2
Total Copper (Cu)	µg/L	1	2	--	2		<2	--	--	2	<2.0	<2.0	4	<2.0	2	<2	<2
Total Iron (Fe)	µg/L	50	300	--	300		140	--	--	837	89	161	141	315	528	137	742
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
Total Manganese (Mn)	µg/L	2	820	--	--		17	--	--	142	69	41	14	128	62	48	214
Total Molybdenum (Mo)	µg/L	2	73	--	73		<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2
Total Nickel (Ni)	µg/L	2	25	--	25 - 150		<2	--	--	<2.0	<2.0	--	<2.0	--	--	<2	2
Total Selenium (Se)	µg/L	1	1	--	1		<2	--	--	<1.0	<1.0	--	<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
Total Strontium (Sr)	µg/L	5	21,000	--	--		18	--	--	36	37	--	25	--	--	26	30
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	--	--	<2.0	<2.0	--	<2.0	--	--	<2	<2
Total Titanium (Ti)	µg/L	2	--	--	--		<2	--	--	8	<2.0	--	4	--	--	<2	4
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	<2	--	<2	--	--	<2	<2
Total Zinc (Zn)	µg/L	5	30	--	30		8	--	--	10	5	6	6	6	5	<5	13
MICROBIOLOGICAL																	
Total Coliform	MPN/100mL	1	--	--	--		200	73	--	>250	>250	>250	85	>250	--	411	2,420
E. coli	MPN/100mL	1	--	400	--		33	45	--	19	>250	2	2	34	<100	2	20
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
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

Part 2

Tested Parameters	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
Sampling Time	10:51	11:35	10:45	10:30	14:45	12:35	12:45	08:45	8:20	13:15	9:30
FIELD DATA											
Secchi Depth	N/A	N/A	N/A	N/A	N/A	N/A	NCC	N/A	2.9	2.7	4.2
Water Temp	11.6	22.5	12.3	12.1	23.6	12.4	15.1	24.0	9.3	12.8	21.6
Dissolved Oxygen	10.0	7.7	9.9	12.1	7.5	8.1	7.2	8.0	8.6	8.8	6.5
pH (in Situ)	6.39	7.20	6.32	6.60	7.42	6.60	6.90	6.34	7.98	7.57	5.94
Specific Conductance	215.1	199.0	250.5	431.0	263.0	210.0	0.2	432.1	289.1	231.0	289.0
INORGANICS											
Total Alkalinity (as CaCO3)	<5	6	7	31	7	7	5	6	6	<5	8
Dissolved Chloride (Cl)	57	57	48	63	50	46	65	57	56	59	67
Colour	8	15	11	17	10	30	31	7	15	18	16
Nitrite + Nitrate	0.21	0.18	0.18	0.22	0.24	0.18	0.18	0.14	0.24	0.19	0.09
Nitrate (N)	0.21	0.18	0.18	0.22	0.24	0.18	0.18	0.14	0.24	0.19	<0.05
Nitrite (N)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05	0.09
Nitrogen (Ammonia Nitrogen)	<0.03	0.04	<0.03	0.04	<0.03	<0.03	<0.050	<0.03	0.03	0.06	<0.03
Total Kjeldahl Nitrogen as N	--	0.4	0.8	0.4	0.4	<5	0.5	1.2	6.0	2.6	3.4
Total Organic Carbon	4.2	4.1	5.1	4.0	2.0	4.4	2.7	5.4	5.8	7.1	6.1
Orthophosphate (as P)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.01
pH (units)	6.71	6.92	6.88	6.66	7.00	6.64	6.67	6.95	6.84	6.36	6.86
Total Calcium (Ca)	6.8	6.6	6.9	6.9	9.1	7.0	6,900.0	7.8	4.8	7.9	10.5
Total Magnesium (Mg)	1.0	0.9	1.5	1.3	1.4	1.0	970.0	1.4	0.9	1.5	1.8
Total Phosphorus	0.006	0.007	0.047	0.012	0.030	0.021	0.005	0.060	0.018	0.173	0.104
Total Potassium (K)	0.8	1.0	1.5	0.9	1.3	0.9	800.0	1.0	0.6	1.0	1.3
Total Sodium (Na)	35.3	28.5	32.2	38.1	41.6	33.7	35.0	38.6	25.6	37.6	35.1
Reactive Silica (SiO2)	2.8	2.6	2.6	2.5	2.3	2.7	2.4	2.4	2.5	2.5	0.8
Total Suspended Solids	<5	<5	23	6	<5	<5	1	149	6	531	10
Dissolved Sulphate (SO4)	8	10	10	10	8	8	8	9	8	11	11
Turbidity (NTU)	0.7	1.1	19.2	1.4	0.9	1.5	0.5	3.8	24.2	199.0	112.0
Conductivity (uS/cm)	227	218	209	230	261	224	240	246	241	224	310
Calculated Parameters											
Anion Sum	1.79	1.95	1.71	2.62	1.73	1.62	2.11	1.93	1.88	1.91	2.29
Bicarb. Alkalinity (calc. as CaCO3)	<5	6	7	31	7	7	5	6	6	<5	8
Calculated TDS	110	109	115	140	117	102	120	126	109	141	148
Carb. Alkalinity (calc. as CaCO3)	<10	<10	<10	<10	<10	<10	<1.0	<10	<10	<10	<10
Cation Sum	2.00	1.69	2.56	2.18	2.45	1.94	1.98	2.61	1.93	3.54	3.33
Hardness (CaCO3)	21.10	20.20	23.40	22.60	28.50	21.60	21.00	25.20	15.70	25.90	33.60
Ion Balance (% Difference)	5.50	7.00	19.80	9.20	17.00	9.20	3.18	15.20	1.20	30.00	18.60
Langelier Index (@ 20C)	-3.35	-3.07	-3.03	-2.61	-2.79	-3.26	-3.13	-2.98	-3.29	-3.65	-2.82
Langelier Index (@ 4C)	-3.67	-3.39	-3.35	-2.93	-3.11	-3.58	-3.38	-3.30	-3.61	-3.97	-3.14
Saturation pH (@ 20C)	10.10	9.99	9.91	9.27	9.79	9.90	9.80	9.93	10.10	10.00	9.68
Saturation pH (@ 4C)	10.40	10.30	10.20	9.59	10.10	10.20	10.10	10.20	10.50	10.30	10.00
Metals (ICP-MS)											
Total Aluminum (Al)	141	103	3,920	305	129	142	140	--	2,320	7,690	--
Total Antimony (Sb)	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2	--
Total Arsenic (As)	<2	<2	2	<2	<2	<2	<1.0	--	<2	4	--
Total Barium (Ba)	20	12	40	23	23	18	21	--	34	60	--
Total Beryllium (Be)	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2	--
Total Bismuth (Bi)	<2	<2	<2	<2	<2	<2	<2.0	--	<2	<2	--
Total Boron (B)	6	8	9	8	13	11	<50	--	<5	10	--
Total Cadmium (Cd)	0.021	0.018	0.430	<0.017	0.020	<0.017	0.025	--	0.146	0.227	--
Total Chromium (Cr)	<1	<1	3	<1	<1	<1	<1.0	--	2	6	--
Total Cobalt (Co)	<1	<1	9	<1	<1	<1	<0.40	--	3	6	--
Total Copper (Cu)	<2	1	6	1	<1	2	<2.0	3	4	10	<1
Total Iron (Fe)	130	205	5,300	239	296	182	93	4,460	6,020	13,600	8,250
Total Lead (Pb)	<0.5	<0.5	13.5	0.9	<0.5	<0.5	<0.5	--	6.3	13.9	--
Total Manganese (Mn)	33	58	693	54	260	49	34	296	278	424	281
Total Molybdenum (Mo)	<2	<2	<2	<2	<2	<2	<2.0	--	<2	<2	--
Total Nickel (Ni)	<2	<2	9	<2	<2	<2	<2.0	--	5	7	--
Total Selenium (Se)	<1	<1	<1	<1	<1	<1	<1.0	--	1	1	--
Total Silver (Ag)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	<0.1	<0.1	--
Total Strontium (Sr)	31	25	34	35	37	30	32	--	22	40	--
Total Thallium (Tl)	<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	<2.0	--	<2	<2	--
Total Titanium (Ti)	<2	<2	65	4	<2	3	<2	--	25	106	--
Total Uranium (U)	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	--	0.6	0.9	--
Total Vanadium (V)	<2	<2	10	<2	<2	<2	<2	--	7	16	--
Total Zinc (Zn)	8	<5	62	<5	<5	6	11	13	12	34	20
MICROBIOLOGICAL											
Total Coliform	866	1,730	1,011	613	2,420	>2420	---	>2420	>2420	>2420	1,410
E. coli	12	4	6	6	10	10	<10	3	6	>2420	34
Chlorophyll A - Spectrophotometer											
Chlorophyll A - Acidification method	1.17	1.10	5.07	0.67	0.64	0.91	0.57	8.84	4.67	8.00	4.71
Chlorophyll A - Welschmeyer method	1.37	1.10	6.39	0.65	0.65	0.87	0.54	9.54	3.69	12.31	10.82

Part 3

Tested Parameters	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	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	3.8	4.1	4.7	3.9	4.1	2.4	2.9	1.9	4.30	N/A	2.8
Water Temp	12.1	17.2	23.0	14.4	14.4	24.7	12.3	12.0	28.1	11.1	14.8
Dissolved Oxygen	13.0	7.0	7.8	8.2	9.4	5.6	8.4	**	6.07	9.20	10.2
pH (in Situ)	4.63	6.91	6.74	7.31	6.29	6.75	7.19	7.38	6.53	7.05	6.36
Specific Conductance	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)	7	<5	13	9	<5	10	8.0	<5	11.0	6.0	5
Dissolved Chloride (Cl)	50	66	63	59	57	54	47	55	64	53	63
Colour	20	20	18	24	28	7	31	46	16	21	22
Nitrite + Nitrate	0.16	0.28	0.28	0.20	0.51	0.15	0.2	0.2	0.05	0.49	0.14
Nitrate (N)	0.16	0.17	0.13	0.20	0.40	0.05	0.2	0.2	0.05	0.49	0.14
Nitrite (N)	<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)	<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	0.4	0.5	0.8	1.1	<0.4	<0.4	<0.4	0.6	<0.4	0.70	--
Total Organic Carbon	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)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH (units)	6.87	6.80	7.15	6.75	6.84	7.28	7.16	6.78	7.22	6.85	6.50
Total Calcium (Ca)	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)	1.3	1.3	1.2	1.5	1.1	1.4	1.4	1.2	1.3	0.9	1.1
Total Phosphorus	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)	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)	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)	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	18	20	5	104	<5	<5	<5	<5	<5	<5	2
Dissolved Sulphate (SO4)	11	10	9	11	9	7.0	9.0	7.0	9.0	10.0	11
Turbidity (NTU)	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)	189	256	277	248	242	274	232	256	264	156	240
Calculated Parameters											
Anion Sum	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)	7	<5	13	9	<5	10	8.0	<5	11.0	6.0	5
Calculated TDS	108	129	137	142	112	117	112.0	115.0	136.0	104.0	123
Carb. Alkalinity (calc. as CaCO3)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<1
Cation Sum	1.93	2.35	2.53	3.15	1.99	2.23	2.3	2.4	2.6	1.6	1.94
Hardness (CaCO3)	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)	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)	-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)	-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)	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)	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)	--	250	94	4,190	151	26	--	139.0	25	133.0	130
Total Antimony (Sb)	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2
Total Arsenic (As)	--	<2	--	3	<2	<2	--	<2	<2	<2	<2
Total Barium (Ba)	--	22	--	58	19	12	--	21.0	16.0	17.0	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)	--	<5	--	12	6	11	--	7.0	10.0	7.0	5
Total Cadmium (Cd)	--	0.041	--	0.179	<0.09	<0.09	--	<0.09	<0.09	<0.09	<0.300
Total Chromium (Cr)	--	<1	--	5	<1	<1	--	<1	<1	<1	<2
Total Cobalt (Co)	--	<1	--	6	<1	<1	--	<1	<1	<1	<1
Total Copper (Cu)	<1	<1	<1	8	<1	<1	1.0	1.0	<1	1.0	<2
Total Iron (Fe)	171	206	359	12,600	93	184	82.0	136.0	187.0	108.0	100
Total Lead (Pb)	--	<0.5	--	9.1	1.2	<0.5	--	<0.5	<0.5	<0.5	<0.5
Total Manganese (Mn)	53	64	125	894	21	64	22.0	26.0	115.0	28.0	58
Total Molybdenum (Mo)	--	<2	--	<2	<2	<2	--	<2	<2	<2	<2
Total Nickel (Ni)	--	22	--	6	2	<2	--	5.0	2.0	<2	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)	--	34	--	47	27	42	--	35.0	37.0	30.0	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)	--	2	--	75	<2	<2	--	<2	<2	2.0	<2
Total Uranium (U)	--	<0.1	--	0.6	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1
Total Vanadium (V)	--	<2	--	12	<2	<2	--	2.0	<2	<2	<2
Total Zinc (Zn)	<5	11	<5	29	6	6	<5	7.0	<5	<5	12
MICROBIOLOGICAL											
Total Coliform	>2420	665	>2420	166	9	400	4,000.0	128	500	864	49
E. coli	10	6	2	<1	1	10	13.0	<1	4	14	10
Chlorophyll A - Spectrophotometer										0.32	
Chlorophyll A - Acidification method	1.70	4.97	4.40	4.86	1.93	1.14	1.12	1.53	1.84		1.15
Chlorophyll A - Welschmeyer method	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	7.23	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	1.2	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)	ug/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	2930
Total Antimony (Sb)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	ug/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)	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	--	--		--	--	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)	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	3	<2	<2	<2	<2	--	<2	<2	--	--	<2	--	<2	<2	<2	--	<2	<2	<2
Total Titanium (Ti)	ug/L	2	--	--	--		--	--	21	<2	--	4	--	--	<2	<2	2	3	<2	<2	2	--	4	7	--	--	<2	--	<2	<2	<2	--	<2	<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	<0.1	--	--	<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	<2
Total Zinc (Zn)	ug/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)

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: 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: [redacted]

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: 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: [redacted]

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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:		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: [redacted]

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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: [redacted]

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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. 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. 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. 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. Ion Balance is biased high, contributing parameters have been confirmed.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: [redacted]

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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: [redacted]

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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: [redacted]

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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

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
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%

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: 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: [redacted]

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

Laboratory use Only
Arrival Condition: ☐ Good ☐ Poor (complete 'notes') 19X543022
Arrival Temperature: 7.6, 7.1, 7.1 AGAT Job Number:
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
Site Info (check all that apply): ☐ Pol ☐ Coarse ☐ N/Pot ☐ Fine
☐ Teir 1 ☐ Res
☐ Teir 2 ☐ Com
☐ 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		

[redacted]

Date/Time: 2019-11-1 Samples Received By (print name and sign): [redacted]
Date/Time: Samples Received:
Date/Time: 1000 13
Date/Time: 9:15

Special Instructions
SNC Bedford West Package
Page of

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: 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.

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

11 Morris Drive, Unit 122
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FAX (902)468-8924
http://www.agatlabs.com

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: [redacted]

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: 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: [redacted]

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

AGAT Laboratories

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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:

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

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CANADA B3B 1M2
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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.

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Unit 122 - 11 Morris Dr.
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)

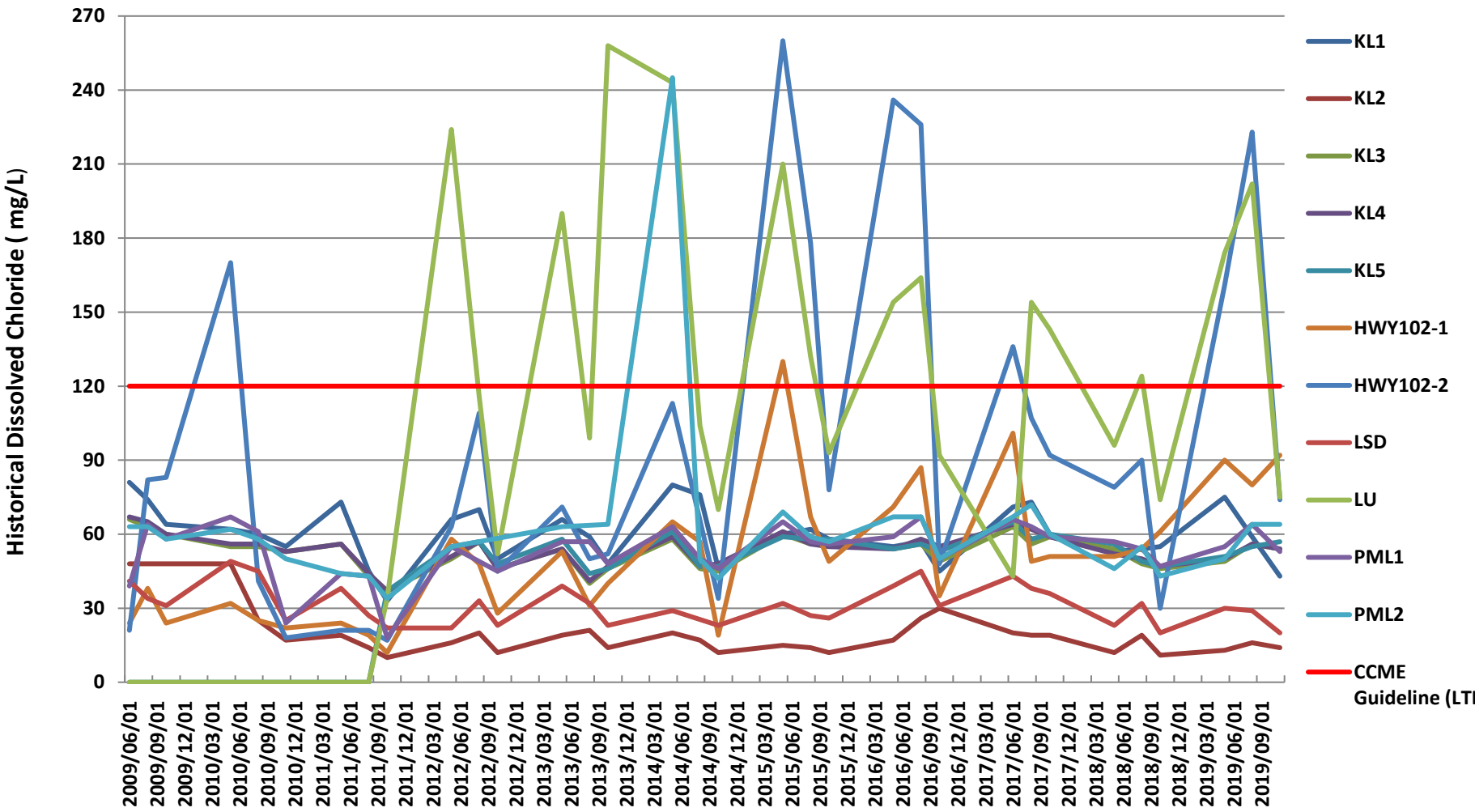

Figure 1 - Historical Dissolved Chloride Concentrations for Water Quality Monitoring Program.

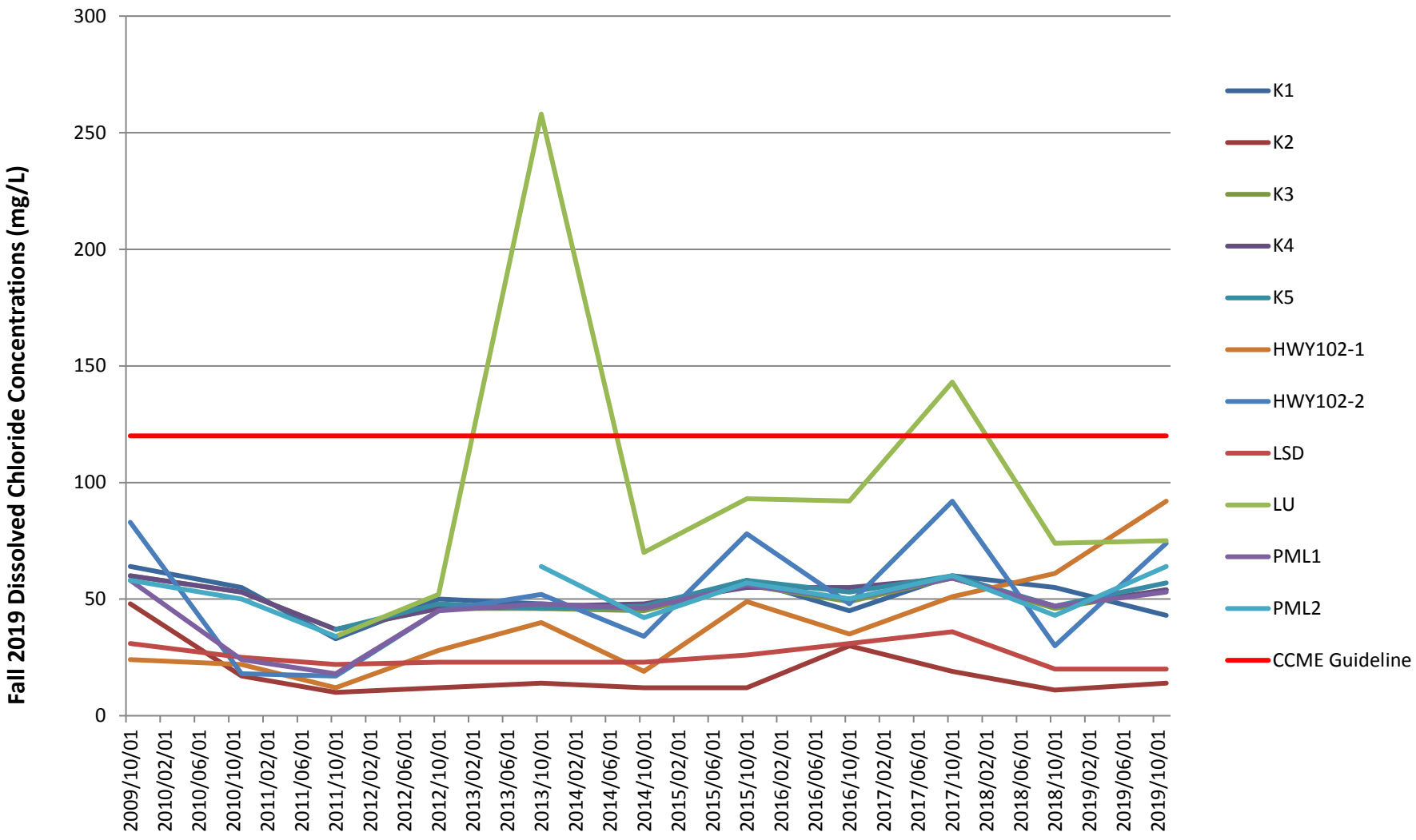

Figure 2 – Seasonal Dissolved Chloride Concentrations for Water Quality Monitoring Program.

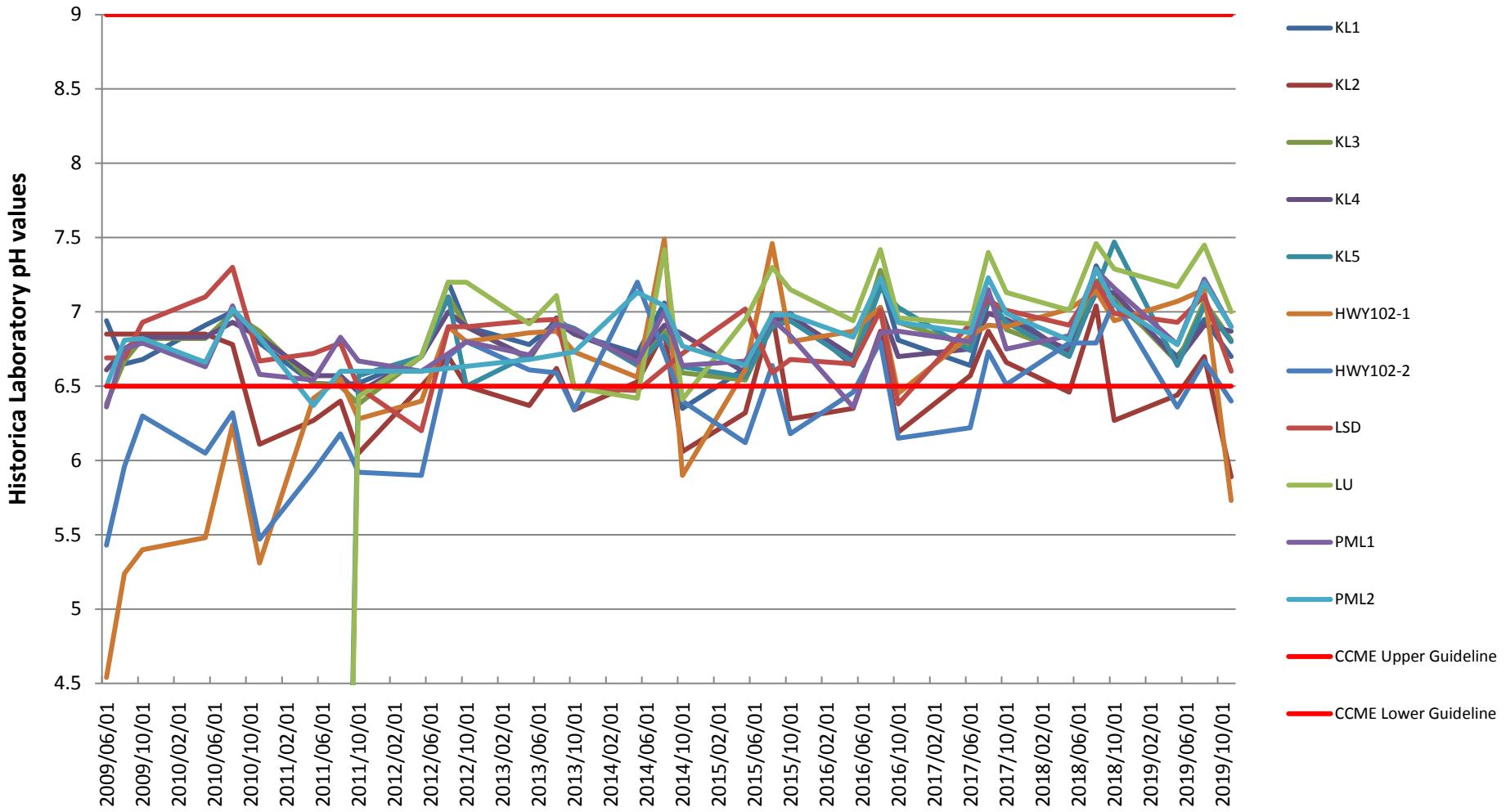

Figure 3 –Historical pH Measurements for Water Quality Monitoring Program

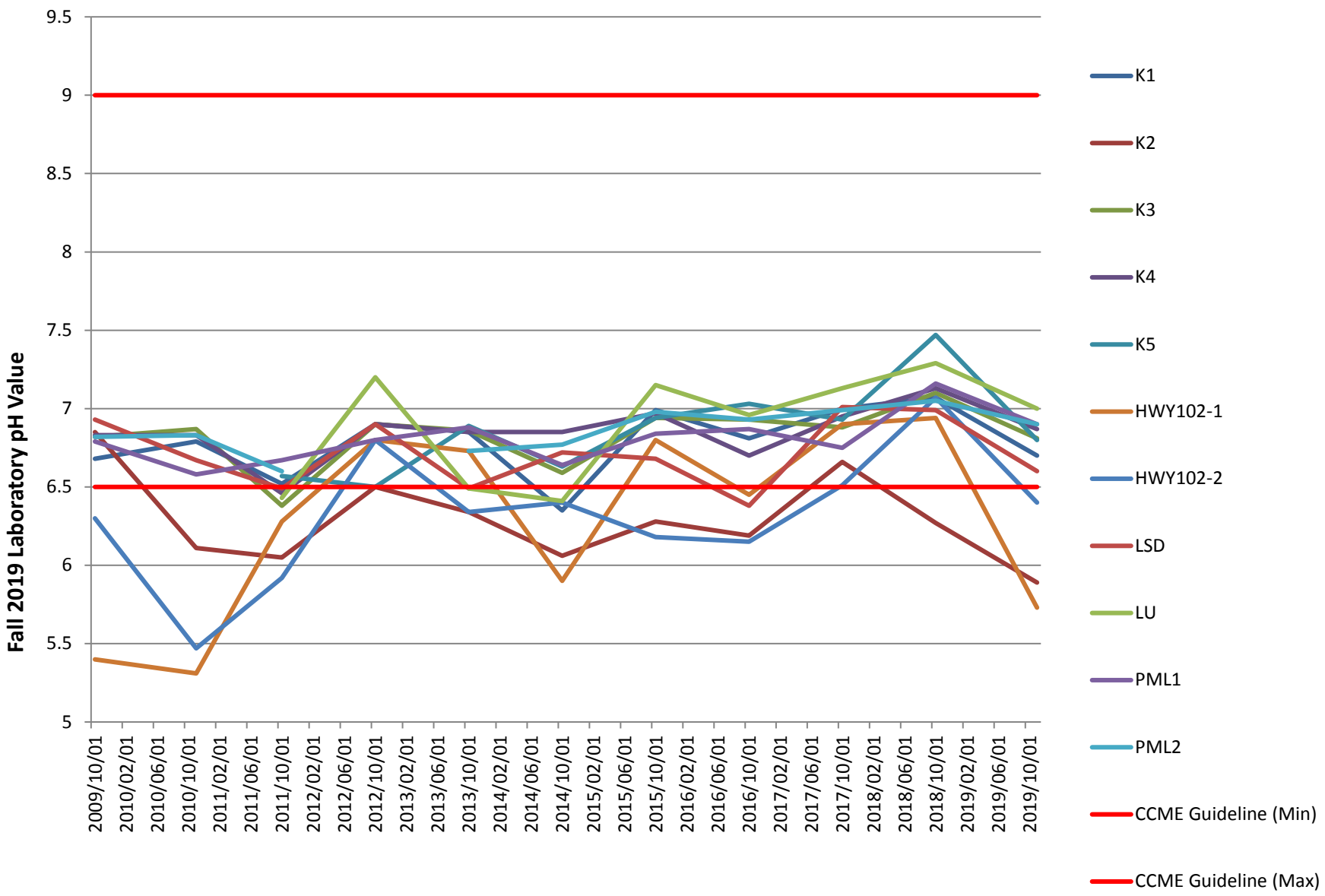

Figure 4 – Seasonal pH Measurements for Water Quality Monitoring Program.

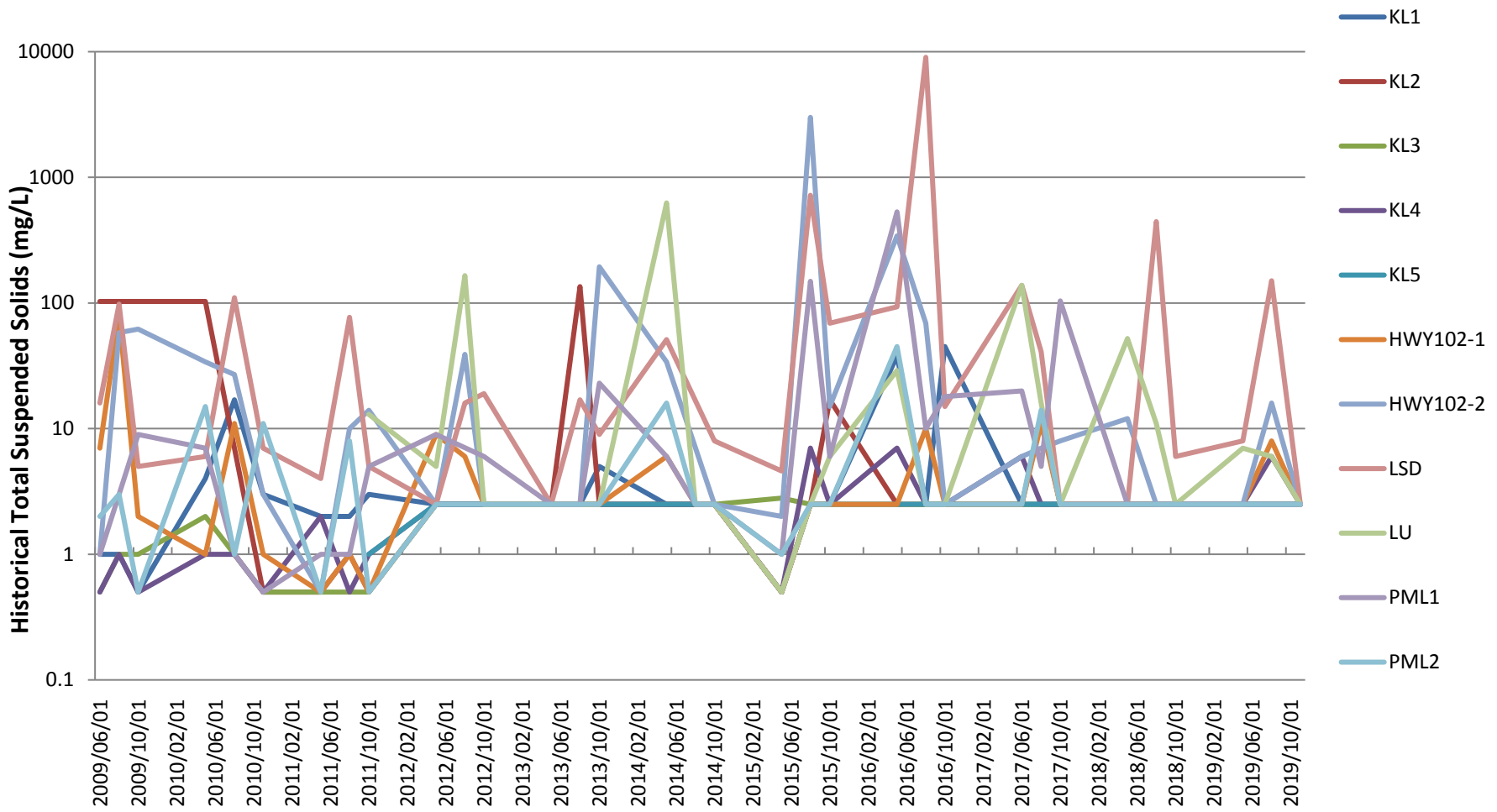

Figure 5 – Historical Total Suspended Solids Concentrations for Water Quality Monitoring Program.

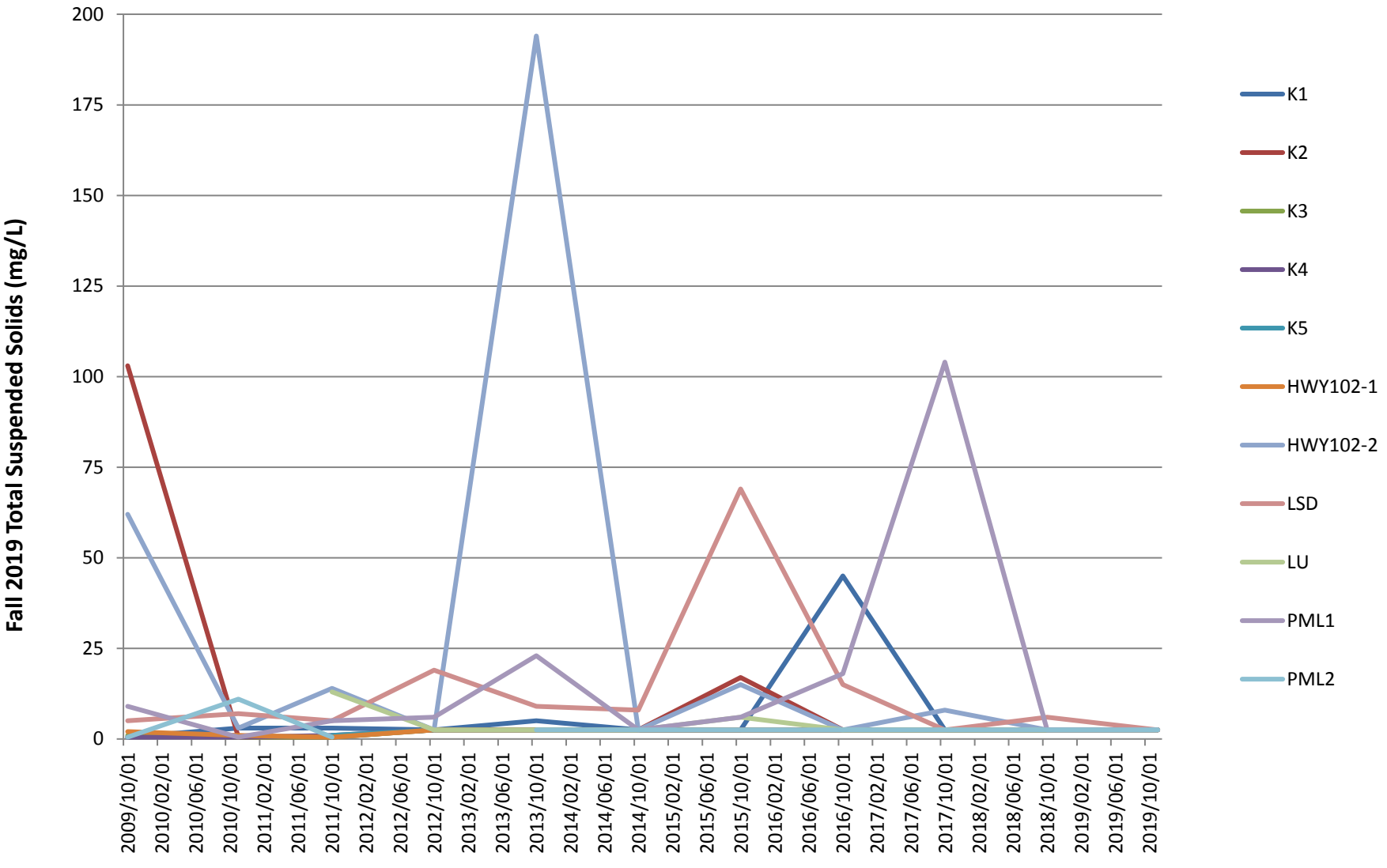

Figure 6 – Seasonal Total Suspended Solids Concentrations for Water Quality Monitoring Program.

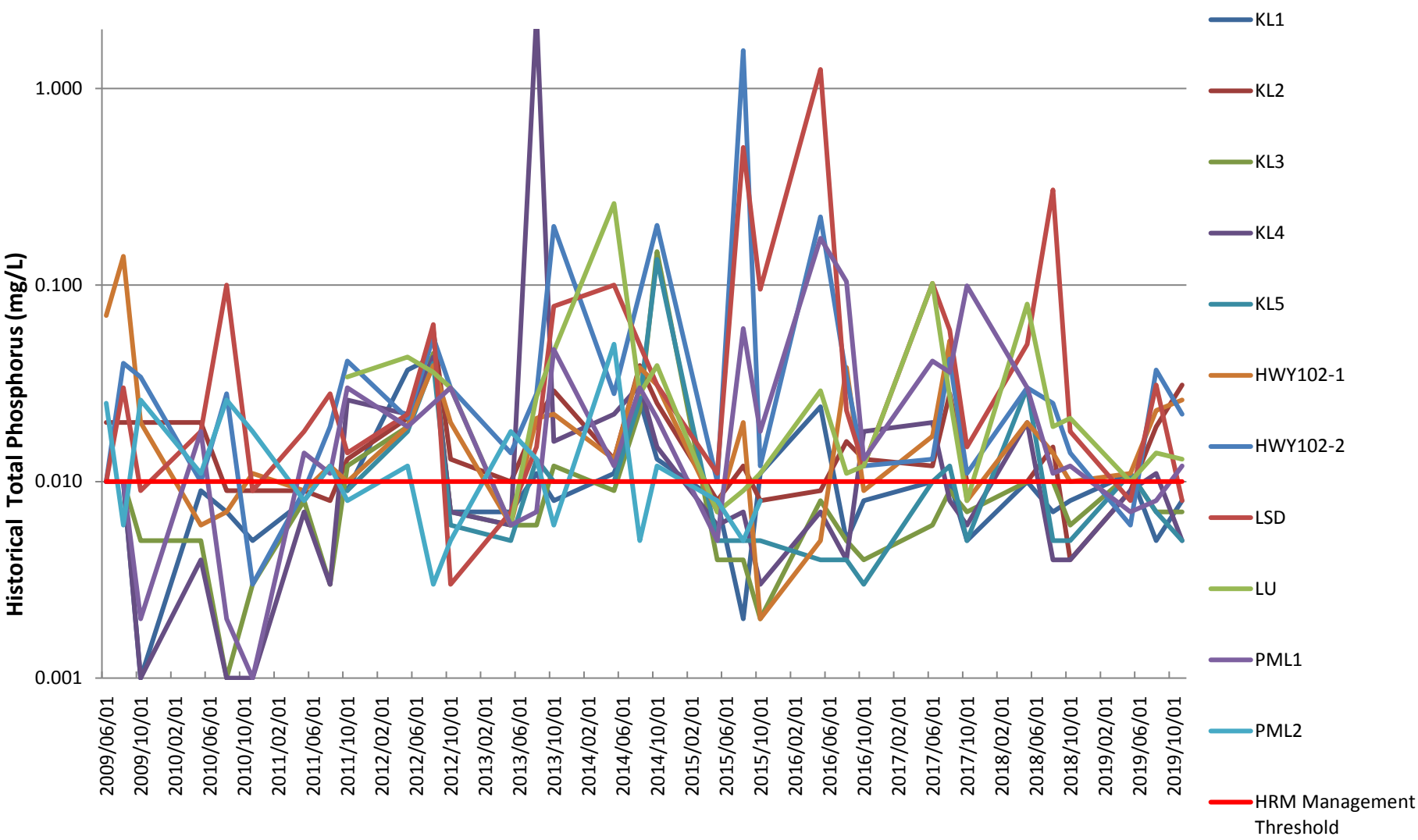

Figure 7 – Historical Total Phosphorus Concentrations for Water Quality Monitoring Program.

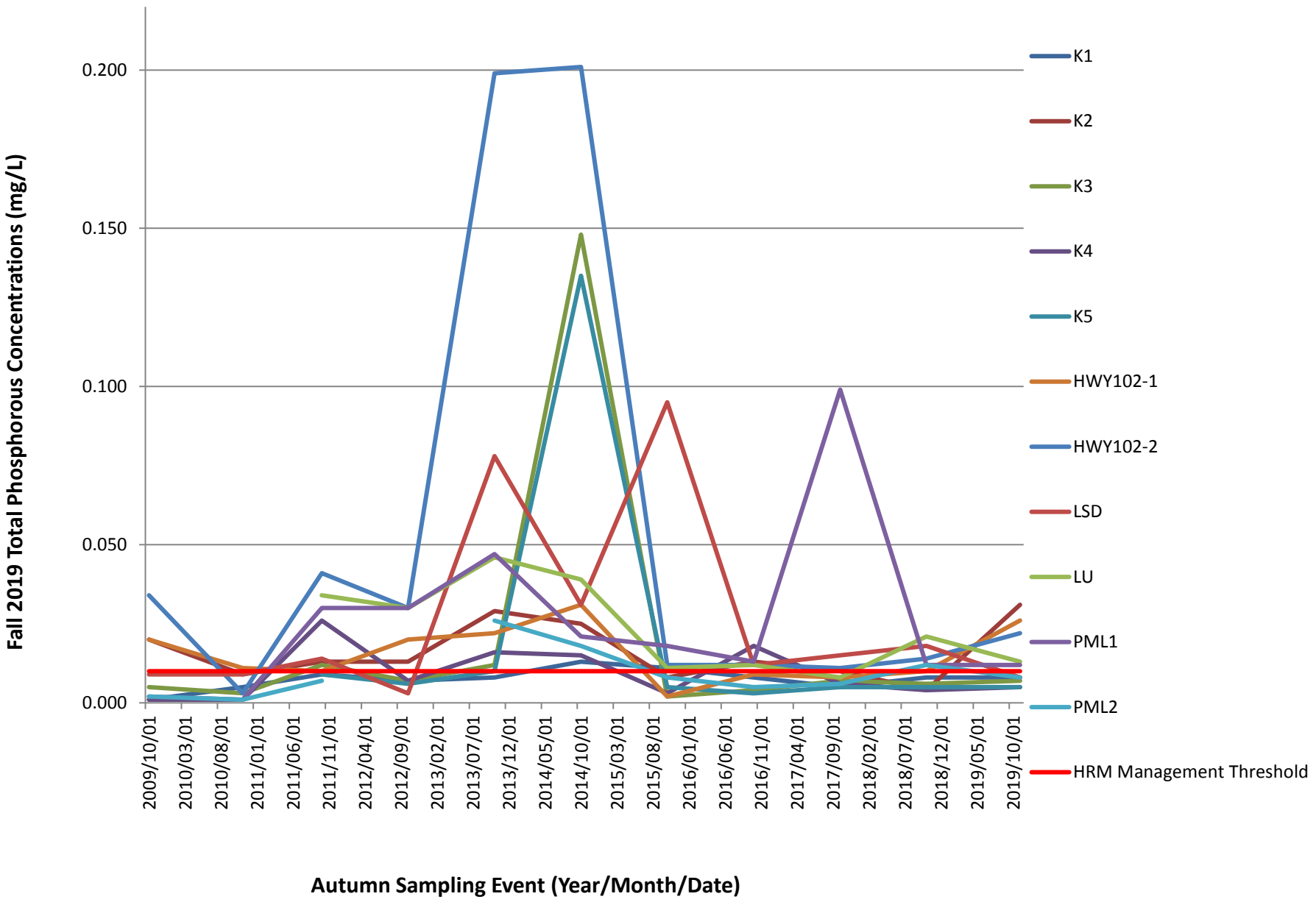

Figure 8 – Seasonal Total Phosphorus Concentrations for Water Quality Monitoring Program.

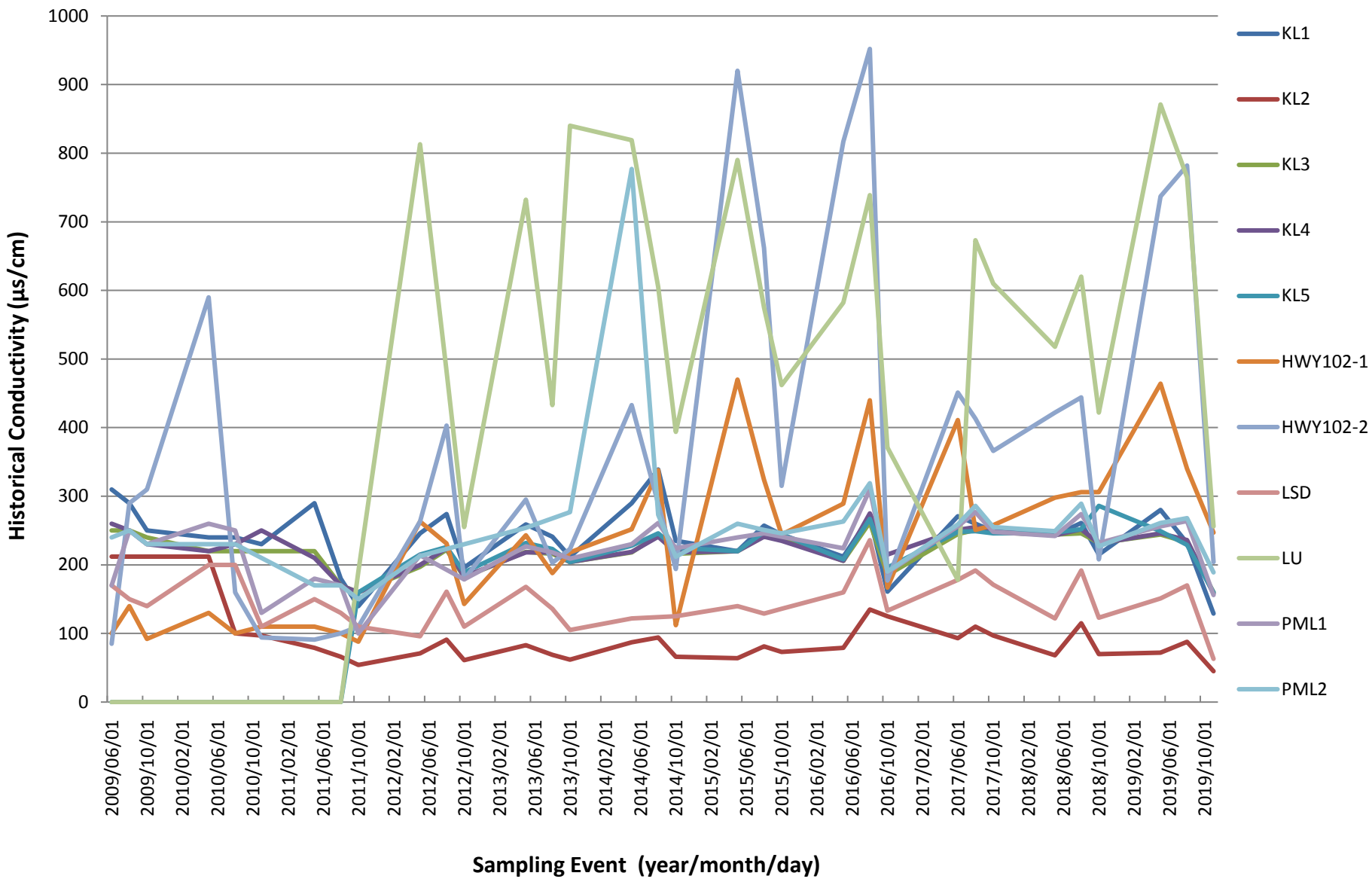

Figure 9 – Historical Measurement of Conductivity for Water Quality Monitoring Program.

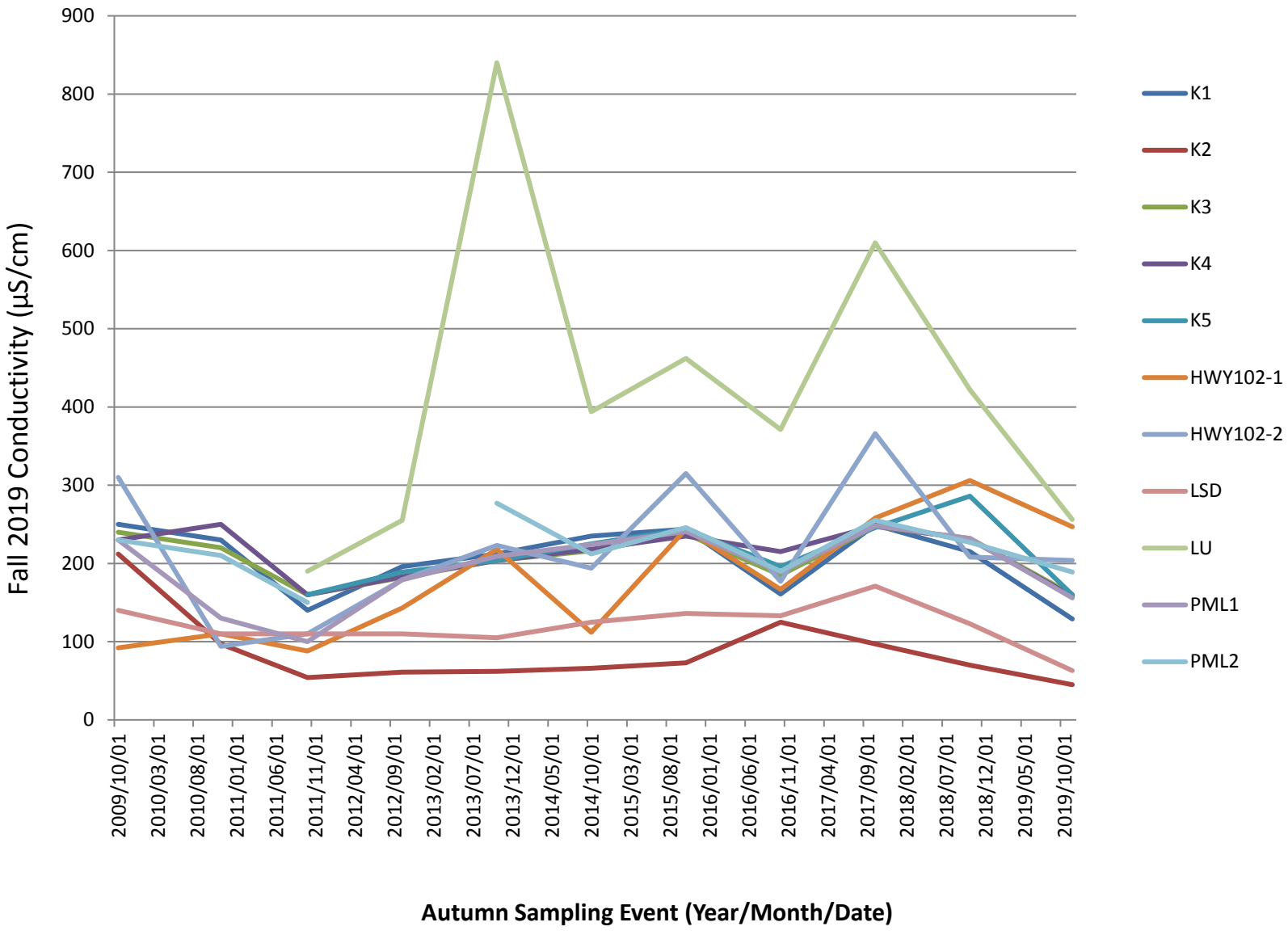

Figure 10 – Seasonal Conductivity Measurements for Water Quality Monitoring Program.

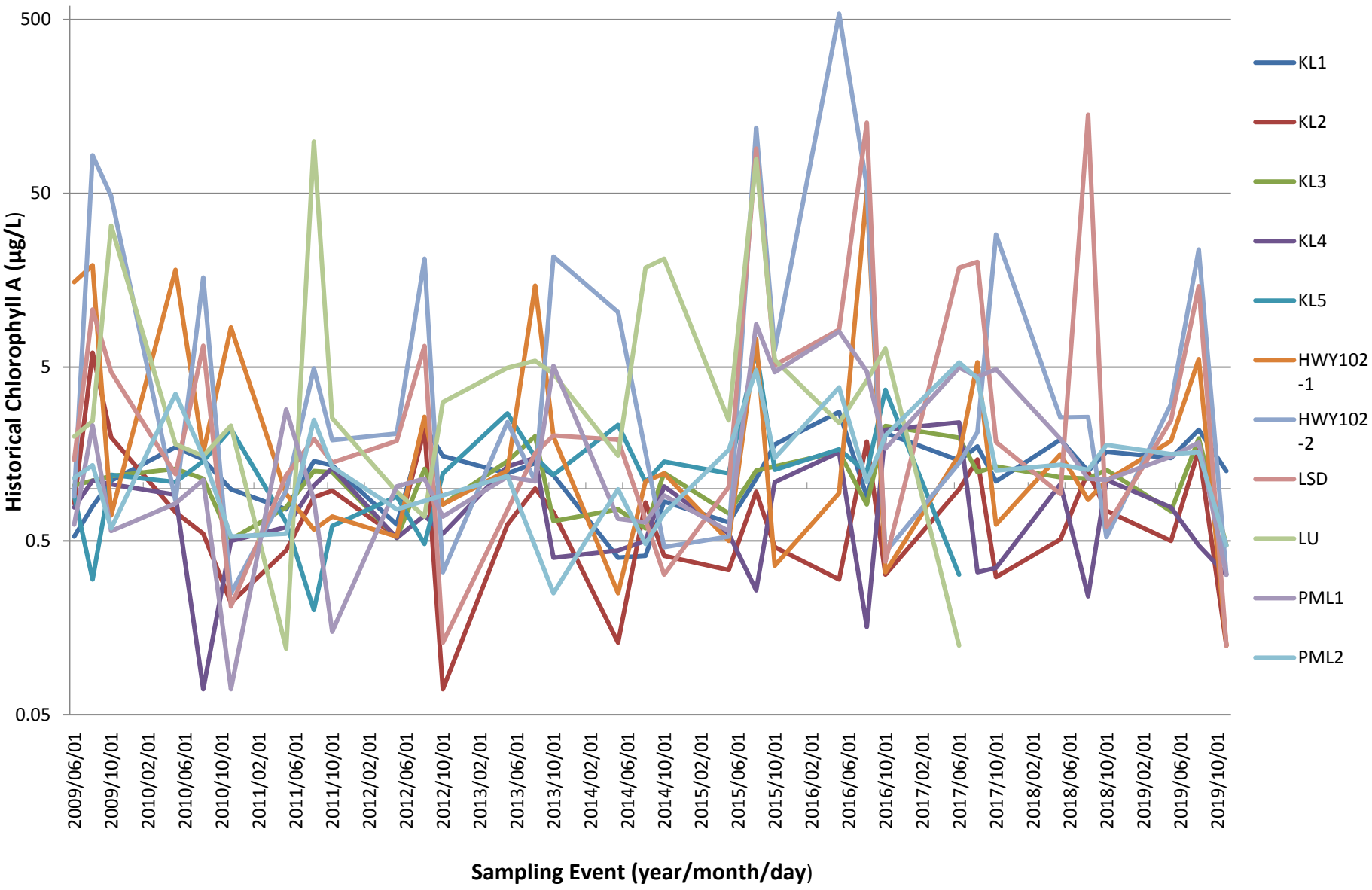

Figure 11 – Historical Chlorophyll A Concentrations for Water Quality Monitoring Program.

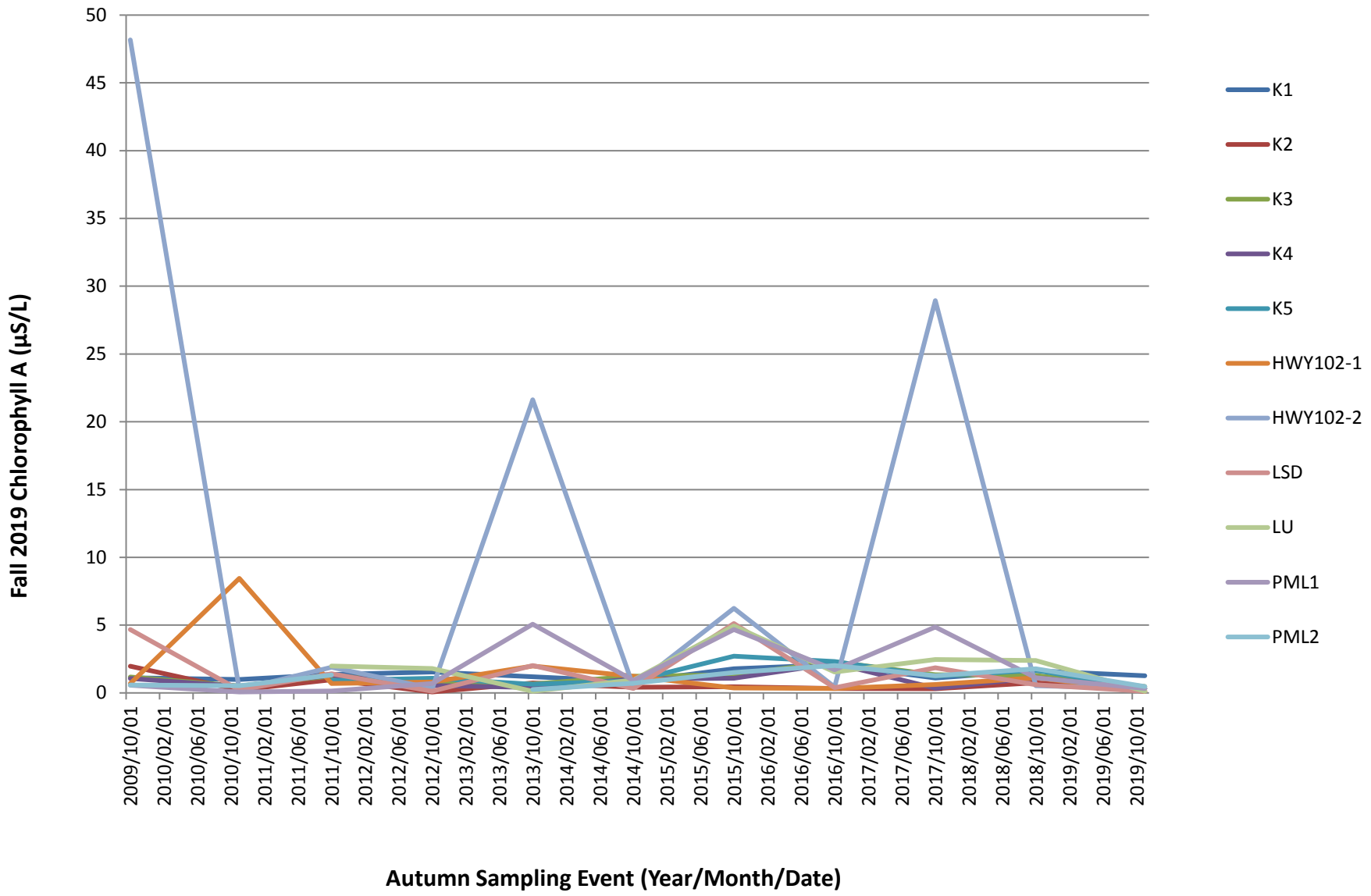

Figure 12 – Seasonal Chlorophyll A Concentrations for Water Quality Monitoring Program.

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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:
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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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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 • TDS • Dissolved Oxygen • Temperature • Secchi Depth • Conductance • Air Temperature • Cloud Cover • Incidental Wildlife Sightings	• Total Alkalinity (as CaCO3) • Dissolved Chloride • Total Kjeldahl Nitrogen • Nitrate + Nitrite • Nitrate • Nitrite • Nitrogen (as NH4) • Total Organic Carbon • Orthophosphate (P) • pH • Low Total Phosphorus • Reactive Silica • Total Suspended Solids • Dissolved Sulphate • Turbidity • Conductivity	• Anion Sum • Cation Sum • Ion Balance • Bicarbonate Alkalinity (as CaCO3) • Carbonate Alkalinity (as CaCO3) • Hardness • Total Dissolved Solids • Saturation pH (@4°C & 20°C) • Langelier Index (@4°C & 20°C)	• Calcium • Copper • Iron • Magnesium • Manganese • Potassium • Sodium • Zinc	• Chlorophyll-A • E. coli • 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.

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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.

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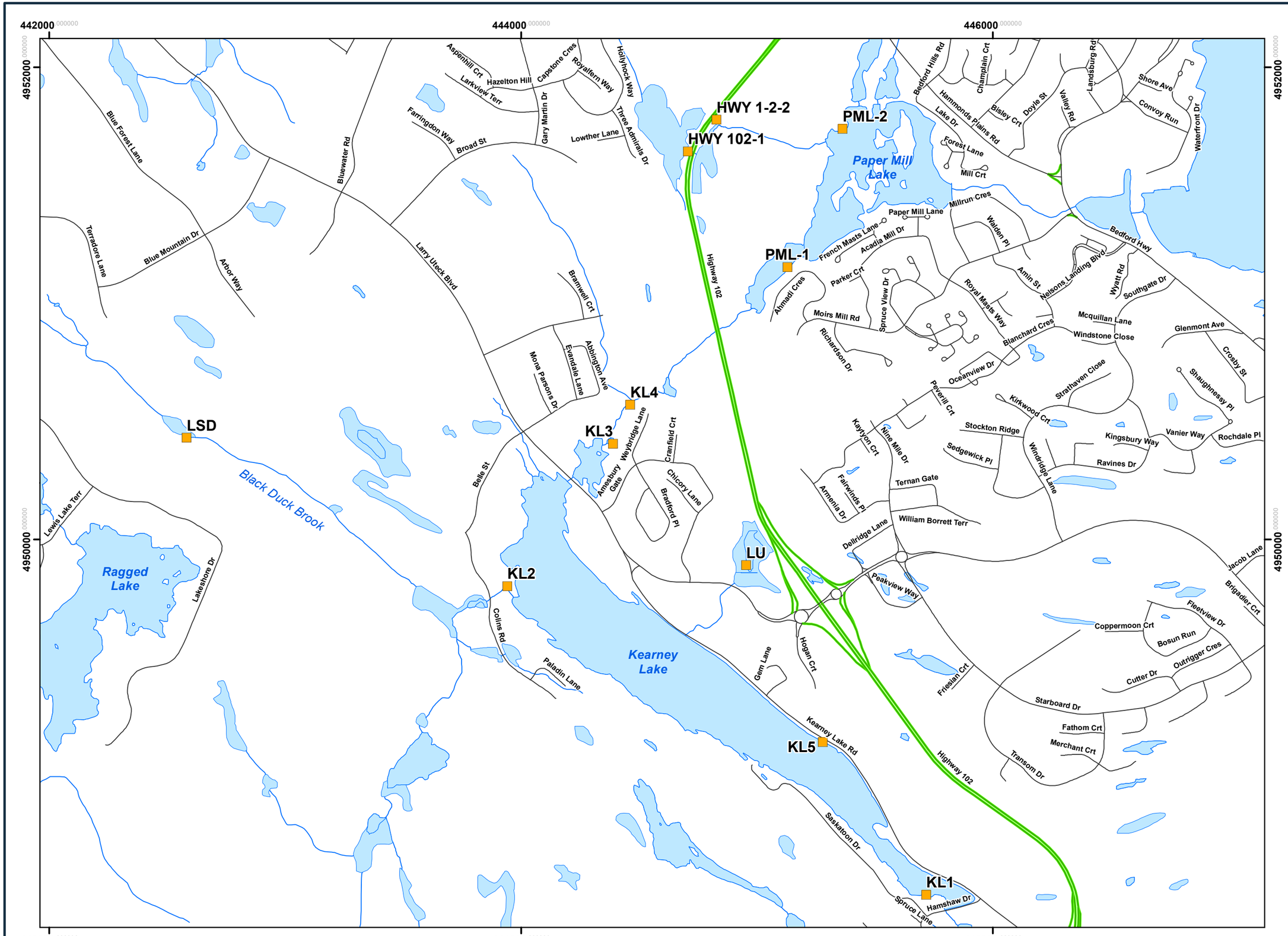
Appendix A

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: 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

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):	0.5 m
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 tab 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):	17Aug2020
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 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 EML		
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 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:	Surface.		
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 103.6 ~~mV~~ °C 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 246.1mV 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, forecast
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):	49.3% 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):	11:25
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	<6	9	7	24	7	<6	<6	<6	8	30	14	<6	5	6	7	5	8	6	<6	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)	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	<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.

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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	<0.02	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	--	--	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
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	0.9	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
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		<5	1	<1	<5	<2	<5	2	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1.0	7	7	7	<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
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**	**107**	--	--
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	**429**	**528**	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

Underlined (black shaded) = 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	<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.
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 - 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	<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**	<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		**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: [redacted]

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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: [redacted]

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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:

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: [redacted]

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:

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: [redacted]

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:

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: [redacted]

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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

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: PML-1 SAMPLE TYPE: Water DATE SAMPLED: 2020-07-02 08:20 1238134	PML-2 Water 2020-07-02 08:50 1238138	Hwy102-2 Water 2020-07-02 10:00 1238139	Hwy102-1 Water 2020-07-02 10:22 1238140	L4 Water 2020-07-02 11:00 1238141	LSD Water 2020-07-02 12:15 1238142	KL-2 Water 2020-07-02 13:10 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: [redacted]

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:

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: [redacted]

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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:

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: [redacted]

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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			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	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

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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: 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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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: 20X62090
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
☐ Industrial
☐ Commercial
☐ Res/Park
☐ Agricultural
☐ FWAL
☐ Sediment
☐ CDWQ
☐ NSEQS-Cont Sites
☐ HRM 101
☐ Storm Water
☐ Waste Water
☐ 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	↓	↓		✓	✓	✓	✓	✓	✓
HWY102-2	10:00	↓	↓		✓	✓	✓	✓	✓	✓
HWY102-1	10:22	↓	↓		✓	✓	✓	✓	✓	✓
LU	11:00	↓	↓		✓	✓	✓	✓	✓	✓
LSD	12:15	↓	↓		✓	✓	✓	✓	✓	✓
KL-2	13:10	↓	↓		✓	✓	✓	✓	✓	✓

[redacted]

	Date/Time		Date/Time		
[redacted]	2 July 2020	[redacted]	July 2	Pink Copy - Client	Page 1 of 1
	2:13pm		2:15	Yellow Copy - AGAT White Copy- AGAT	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: 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.

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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: 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: [redacted]

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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: [redacted]

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:

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: [redacted]

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: [redacted]

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

Certified By: [redacted]

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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: [redacted]

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:

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: [redacted]

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: [redacted]

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: 20X620183
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	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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Method Summary

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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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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:

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: Wood-Dartmouth
Contact: Denise Hurtle
Address:
Phone: Fax:
PO/Credit Card#:

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									

[redacted]

Date/Time: 2 July 2020 1650
Date/Time: July 2 16:50

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1
Nº:

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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: 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)

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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: [redacted]

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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: [redacted]

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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: [redacted]

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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: [redacted]

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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

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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:

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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: [redacted]

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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:

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: [redacted]

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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:

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: [redacted]

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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

RPT Date: Aug 26, 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)															
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%

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: 20X638653

PROJECT: TE201017 - August Event
ATTENTION TO: Charlotte Clark

SAMPLING SITE:
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: [redacted]

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.

11 Morris Drive, Unit 122
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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: 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: 20AUG17 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

[redacted] Date/Time 17 Aug 20 14:29

[redacted] Date/Time Aug 17

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1
No:

AGAT Laboratories

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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: 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.
- 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)

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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: [redacted]

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:

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: [redacted]

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: [redacted]

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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
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:

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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:

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: [redacted]

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:

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: [redacted]

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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: [redacted]

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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%

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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

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: [redacted]

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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

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
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	

[redacted] Date/Time 17Aug2 Date/Time 17:40 [redacted] Date/Time Aug17 Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1
N°:

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 - 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.
- 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)

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Certificate of Analysis

AGAT WORK ORDER: 20X670982

PROJECT: TE201017 - Fall 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: 2020-10-29

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: [redacted]

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

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Certificate of Analysis

AGAT WORK ORDER: 20X670982

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: [redacted]

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

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Certificate of Analysis

AGAT WORK ORDER: 20X670982

PROJECT: TE201017 - Fall 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: 2020-10-29

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: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 20X670982

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:		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

Certified By:

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AGAT Laboratories

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 20X670982

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:				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

Certified By: [redacted]

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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
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:

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Certificate of Analysis

AGAT WORK ORDER: 20X670982

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: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 20X670982

PROJECT: TE201017 - Fall Event

CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, a div. of Wood Canada Ltd.

ATTENTION TO: Charlotte Clark

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: [redacted]

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Quality Assurance

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:

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		

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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

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
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: [redacted]

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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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PROJECT: TE201017 - Fall Event

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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

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: $-1, 33.6°C
Hold Time:
AGAT Job Number: 20x670982 '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
☐ Industrial
☐ Commercial
☐ Res/Park
☐ Agricultural
☐ FWAL
☐ Sediment

☐ CDWQ
☐ NSEQS-Cont Sites
☐ HRM 101
☐ Storm Water
☐ Waste Water
☐ 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
LV	" /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								

[redacted]

Date/Time: 29 Oct 20
Date/Time: 14:49

Samples Received By (Print Name): [redacted]

Date/Time
Date/Time

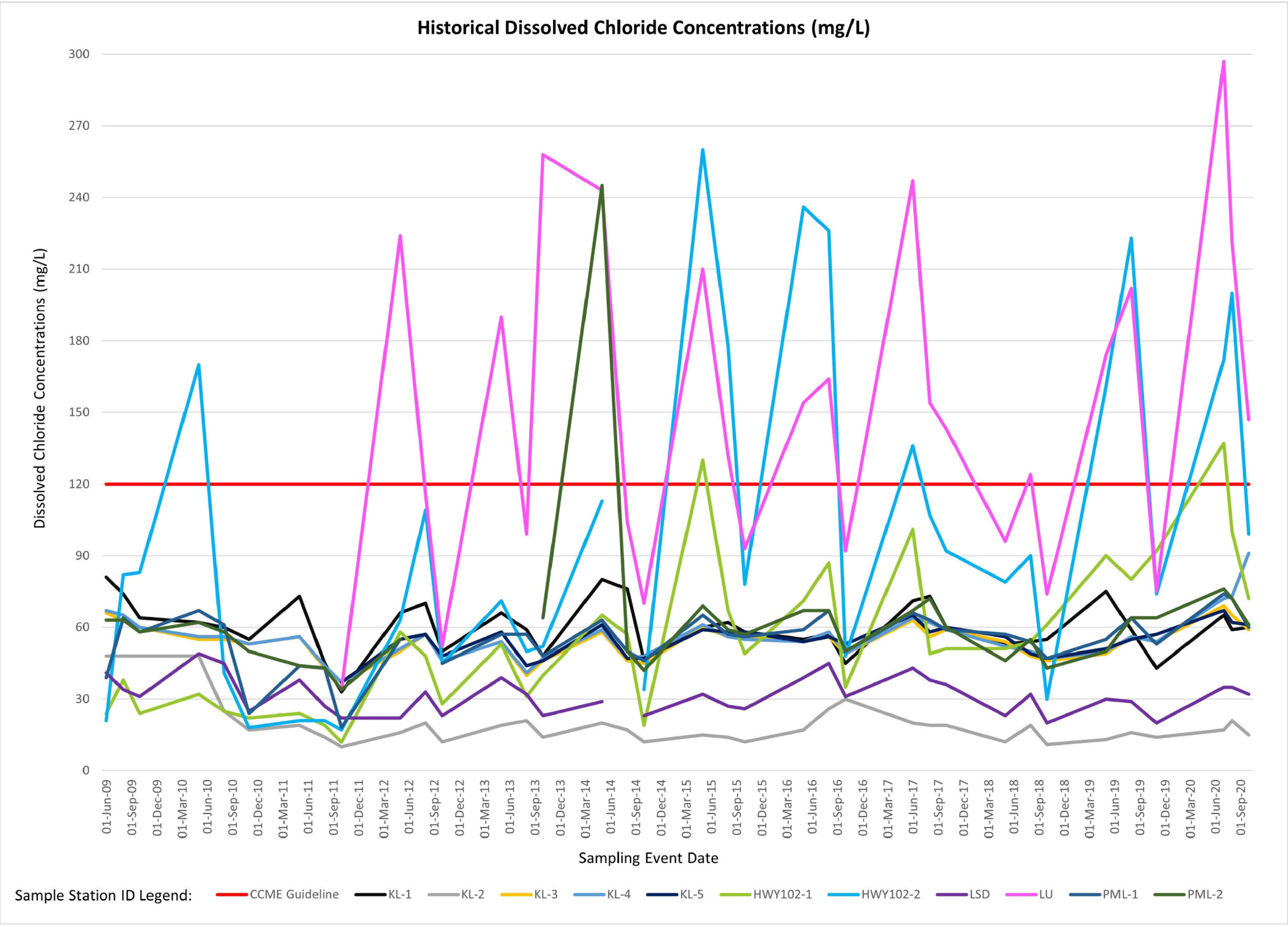
Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

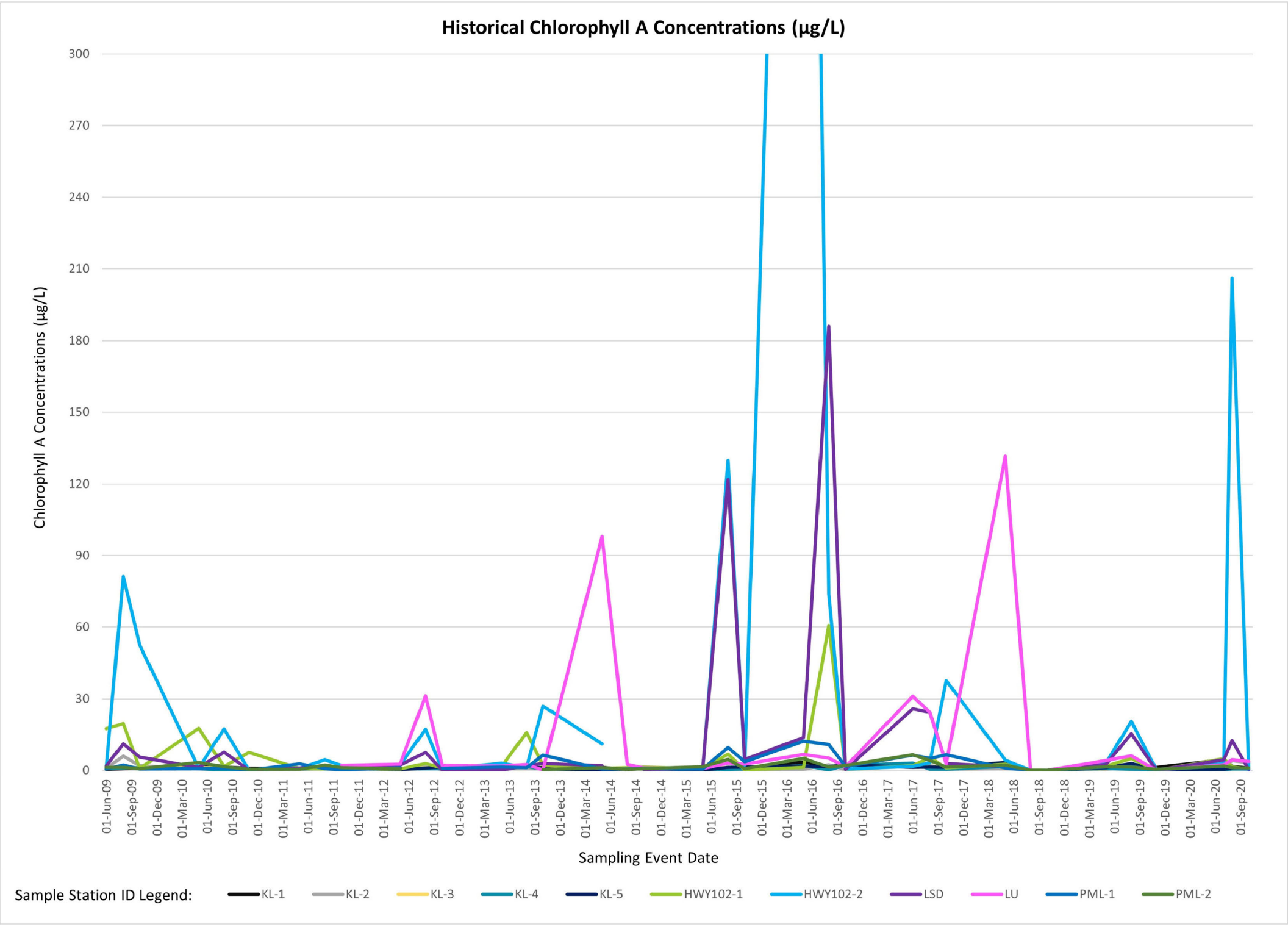
Page 1 of 1
N°:

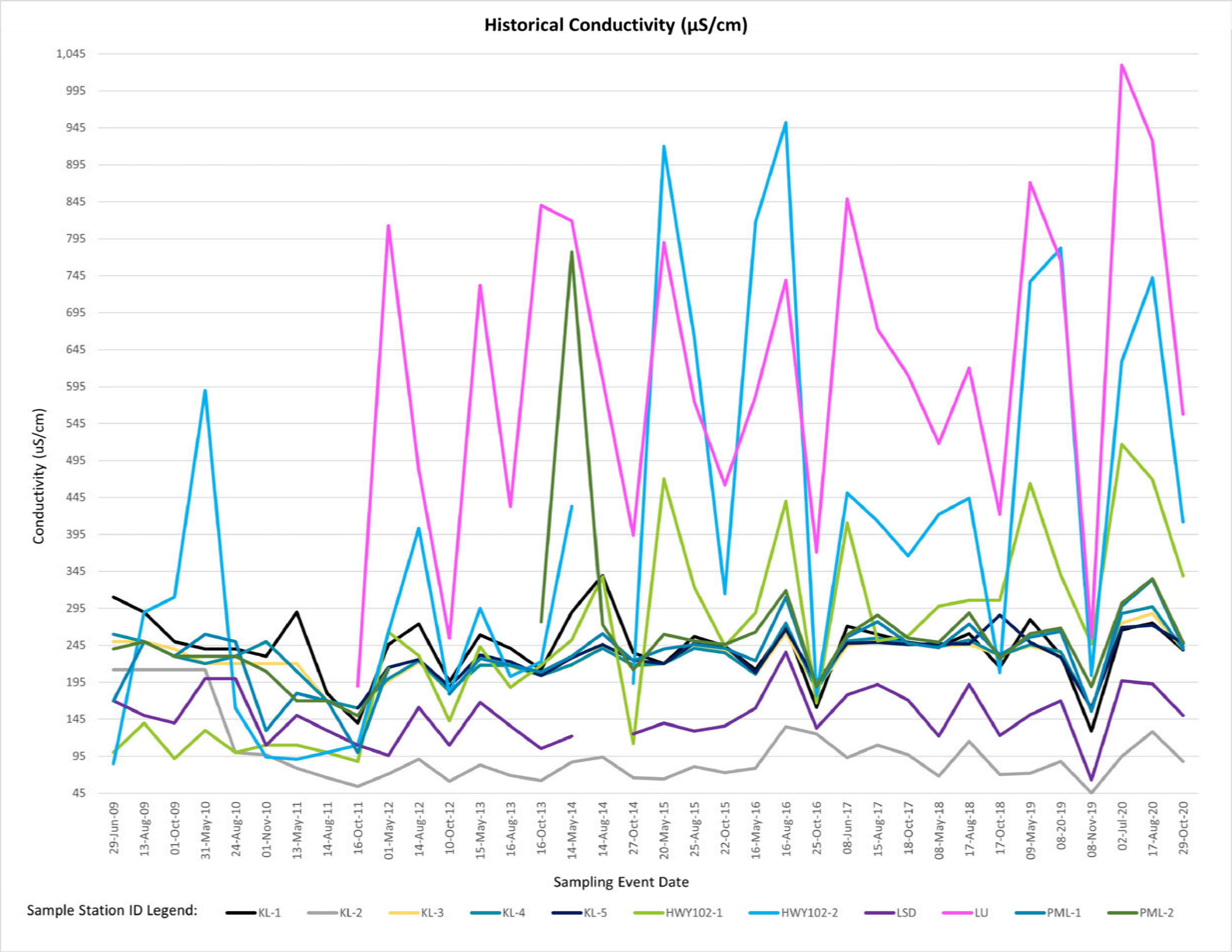
Date revised: May 19, 2020

Appendix E

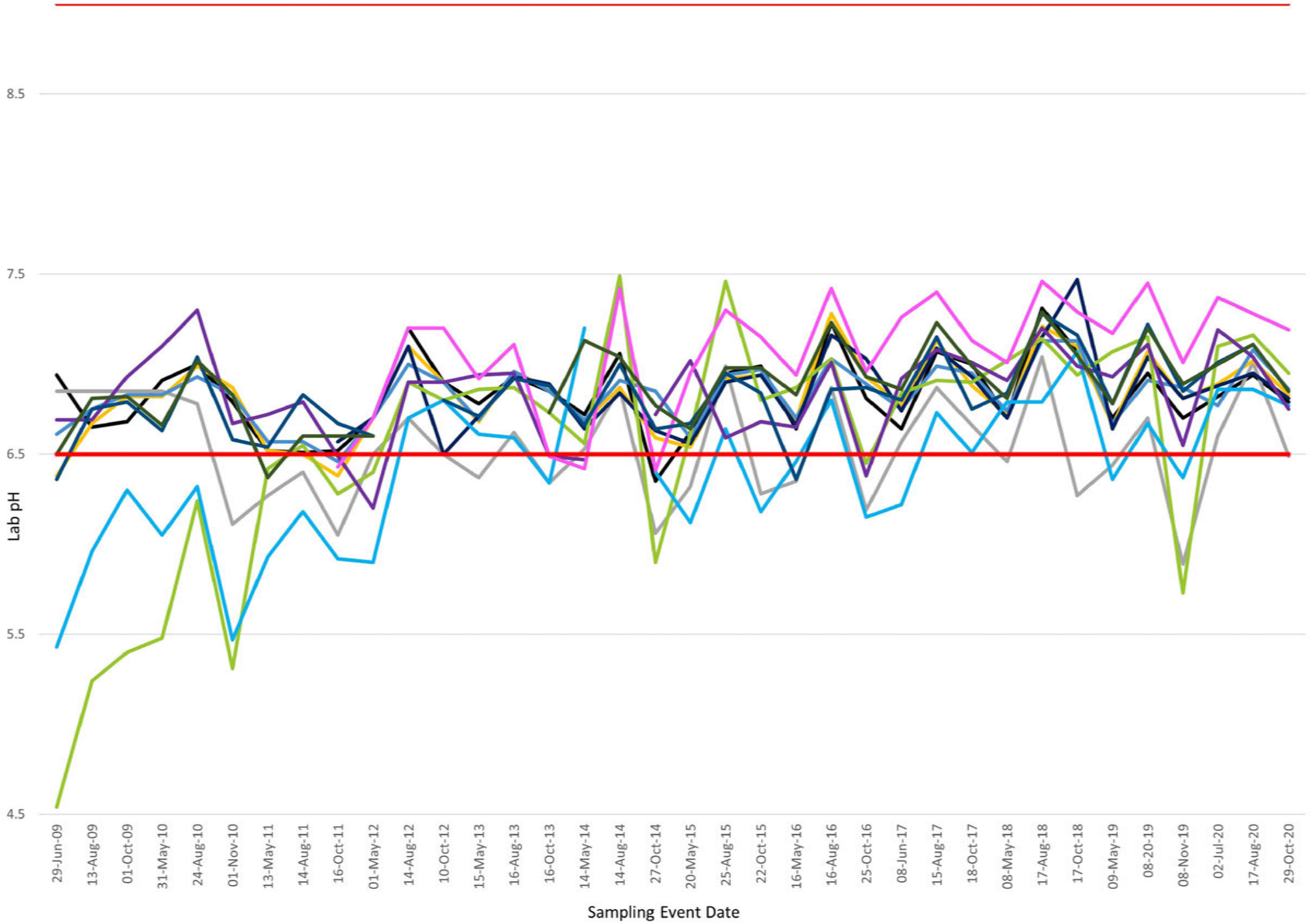
Graphs


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

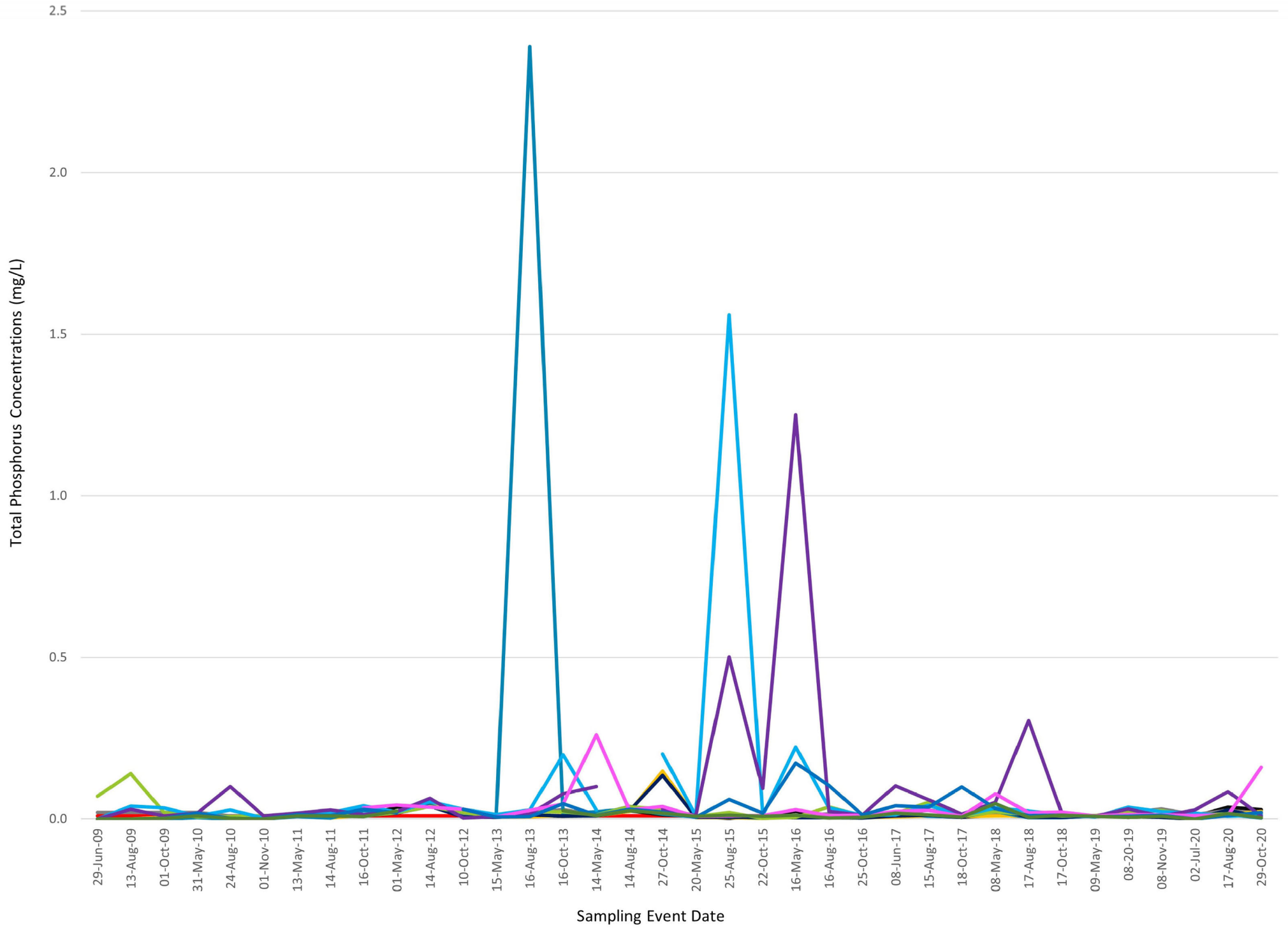
Historical Laboratory pH Units

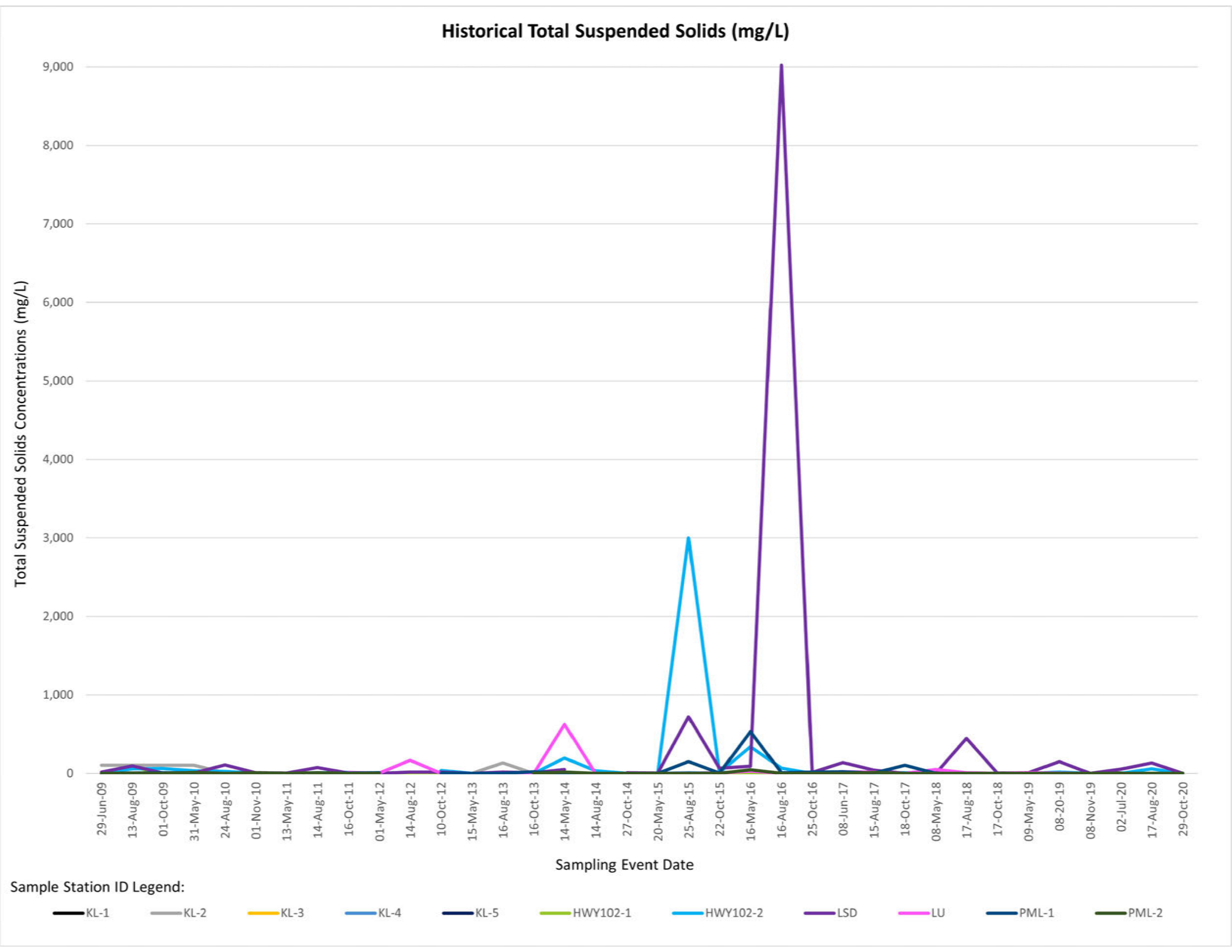


Sample Station ID Legend:

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)




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

RENTALS, SALES, SUPPORT
Maxim
1-888-285-2324
ENVIRONMENTAL AND SAFETY INC.
"Exceptional Customer Service!"

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 [redacted]

RENTALS, SALES, SERVICE, SUPPORT

9 - 170 AMBASSADOR DR., MISSISSAUGA, ONTARIO L5T 2H9
PHONE: (905) 670-1304 TOLL FREE: (888) 285-2324
E-MAIL: SALES@MAXIMENVIRONMENTAL.COM

9 - 148 COLONNADE RD., OTTAWA, ONTARIO K2E 7R4
PHONE: (613) 224-4747 TOLL FREE: (888) 285-2324
E-MAIL: SALES@MAXIMENVIRONMENTAL.COM

WWW.MAXIMENVIRONMENTAL.COM

wood.

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 • TDS • Dissolved Oxygen • Temperature • Secchi Depth • Conductance • Air Temperature • Cloud Cover • Incidental Wildlife Sightings	• Total Alkalinity (as CaCO3) • Dissolved Chloride • Total Kjeldahl Nitrogen • Nitrate + Nitrite • Nitrate • Nitrite • Nitrogen (as NH4) • Total Organic Carbon • Orthophosphate (P) • pH • Low Total Phosphorus • Reactive Silica • Total Suspended Solids • Dissolved Sulphate • Turbidity • Conductivity	• Anion Sum • Cation Sum • Ion Balance • Bicarbonate Alkalinity (as CaCO3) • Carbonate Alkalinity (as CaCO3) • Hardness • Total Dissolved Solids • Saturation pH (@4°C & 20°C) • Langelier Index (@4°C & 20°C)	• Calcium • Copper • Iron • Magnesium • Manganese • Potassium • Sodium • Zinc	• Chlorophyll-A • *E. coli* • 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,
a Division of Wood Canada Limited

[redacted]

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Junior Environmental Engineer

[redacted]

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.

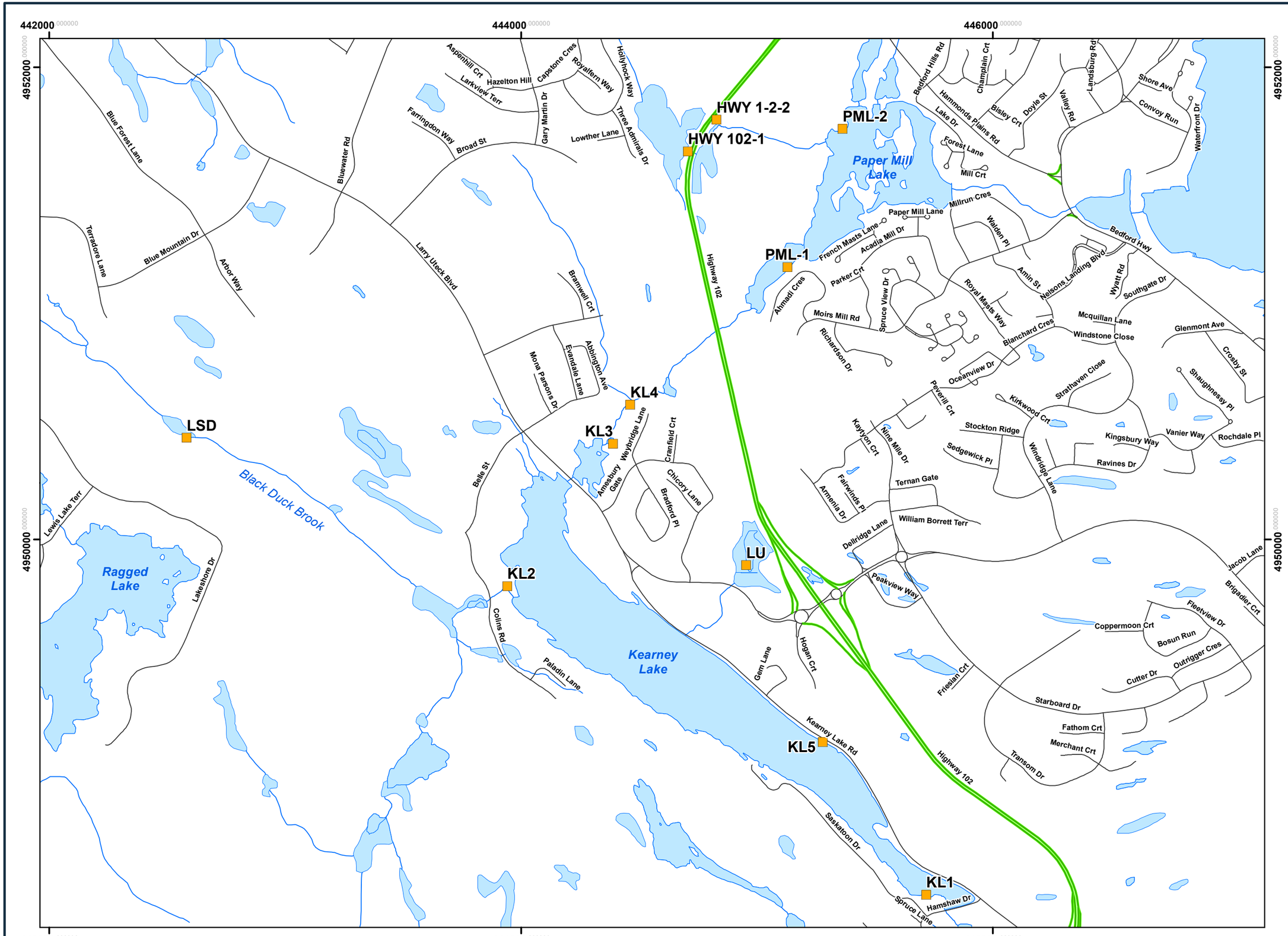
Health Canada, 2012. Canadian Guidelines for Recreation Water Quality, Third Edition.

Nova Scotia Environment, 2020. Environmental Quality Standards for Surface Water (Notification of Contamination Protocol 100, Table 3).

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: 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

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 , 0.195 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):	27 may 2
Time (hh:mm):	10:05
Sample Depth (m):	0.1 m
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 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. Barely 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.

7/11

HRM Bedford West - Field Report Event: FALL (October 2021

Project:	Water Quality Monitoring - Bedford West	Sub-Area(s):	
Client:	Halifax Regional Munipality		
Site:	KL-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.

5/11

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:	LDa 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	2011/05/31	2010/08/24	2010/11/01	2011/05/13	2011/08/14	2012/10/16	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	--	--	<0.01	<0.01	<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	--	--	--	--	--	<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	10.20	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	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	<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	--	--	--	--	--	<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
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	<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	<3
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.

[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-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	1.2	1.0	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.

[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-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	--
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	<0.01	<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	<5	<1.0	<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	<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 [5]	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] CME 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 [5]	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 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 - 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	1.5	1.6	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).

[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 - 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	--	--	<3	<3	<3	<3	<3	<3	<3	<3	<3	<1.0	--	<3	<3	--	--	<3	--	<3
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.

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[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.

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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	<0.02	<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	--	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	<0.006	**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: [redacted]

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: [redacted]

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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:

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
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:

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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:

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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:

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AGAT Laboratories

11 Morris Drive, Unit 122
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CANADA B3B 1M2
TEL (902)468-8718
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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: [redacted]

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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: [redacted]

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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: [redacted]

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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: [redacted]

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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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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: [redacted]

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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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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
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:

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: 4
Contact: DENISE HIRTLE
Address:
Phone: Fax:
PO/Credit Card#:

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 ☐ TDS ☐ VSS~~	TKN, Nitrogen:	Total Phosphorus (low level) Ecol	~~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																											

[redacted]	Date/Time 2:20	Samples R[redacted]	Date/Time	Pink Copy - Client
Samples Relinquished by (sign):	Date/Time 27 May 2021	Samples R[redacted]	Date/Time	Yellow Copy - AGAT White Copy- AGAT

Page 1 of 1
Nº: 69453

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.

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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: 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: [redacted]

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:

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: [redacted]

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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http://www.agatlabs.com

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: [redacted]

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:

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:

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

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
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TEL (902)468-8718
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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:

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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:

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: [redacted]

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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: [redacted]

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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: [redacted]

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: 21X785297
PROJECT: TE201017
ATTENTION TO: Charlotte Clark
SAMPLING SITE:
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									

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: 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: Cools, 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:

Invoice To Same Yes ☐ / No ☐

Company: APinvoice.Canada@woodplc.com
Contact:
Address: + Charlotte Clark
Phone: Fax:
PO/Credit Card#: TE201017.****.****.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	Field Filtered/Preserved	Standard Water Analysis	Metals: ☐ Total ☐ Diss ☐ Available	~~Mercury~~ LL Total Phos	~~☐ BOD ☐ CBOD~~ TSS	~~pH~~ Total Coliforms/Ecoli (MPN)	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	~~Phenols~~ Chlorophyll A + phosphorus	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)
HW102-1	9 AUG 21 / 9:53	SW	7			X		X	X	X		X		X														
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																											

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time	Pink Copy - Client	Page ___ of ___
[redacted]	9 Aug 2021	[redacted]		Yellow Copy - AGAT	
[redacted]	2:21	[redacted]		White Copy- AGAT	Nº: 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)

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: 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: [redacted]

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: [redacted]

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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:

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: 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

Certified By: [redacted]

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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: 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:

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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: [redacted]

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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:

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: [redacted]

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:

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: [redacted]

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:

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: [redacted]

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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%

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: 21X819711

PROJECT: TE201017

ATTENTION TO: Charlotte Clark

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Nov 08, 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
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: [redacted]

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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

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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: 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.

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Unit 122 • 11 Morris Drive
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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:

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:
Contact:
Address:
Phone: Fax:
PO/Credit Card#: TE201017.0000.0000.5290.573000

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									

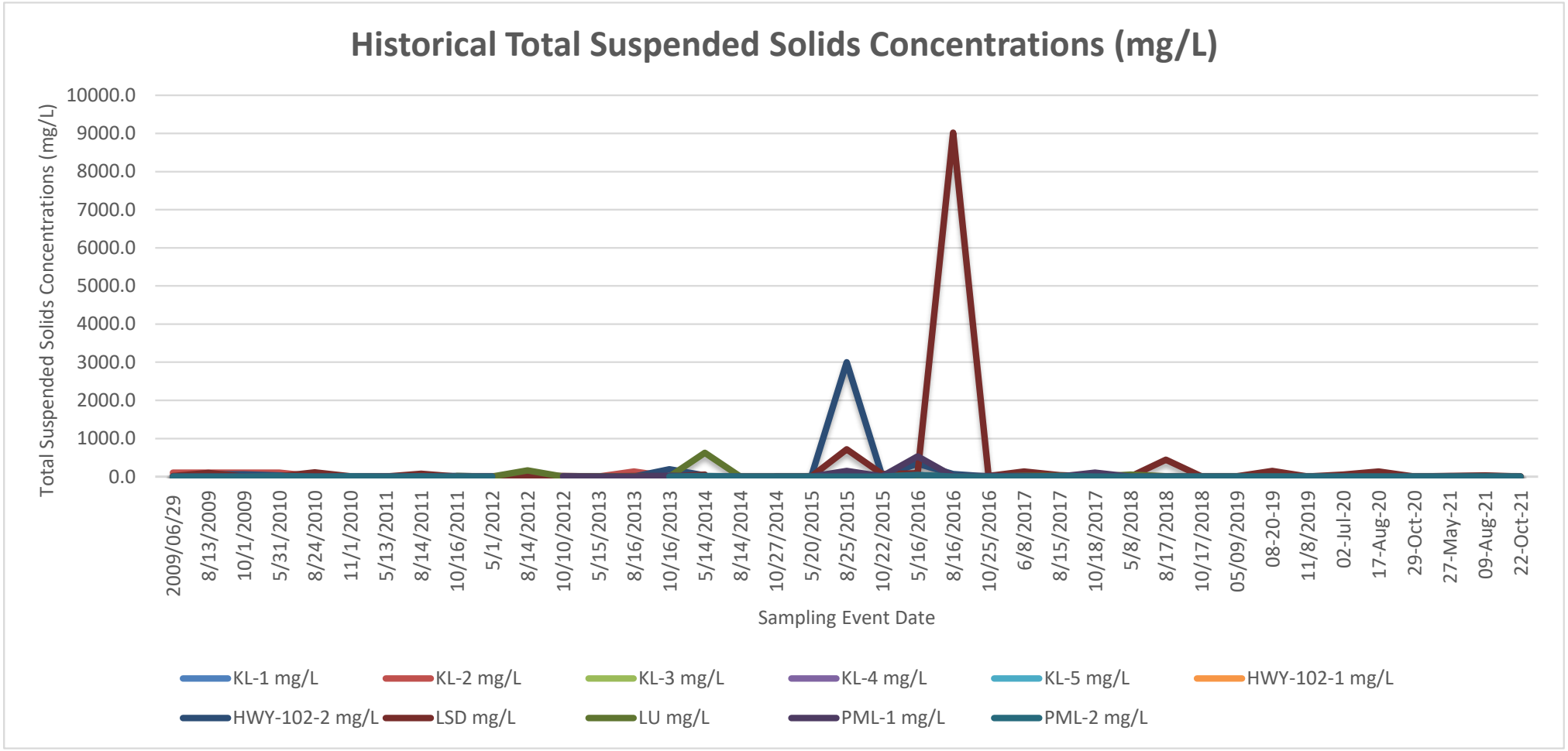
Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
[redacted]	22OCT2021		
	1:16	[redacted]	

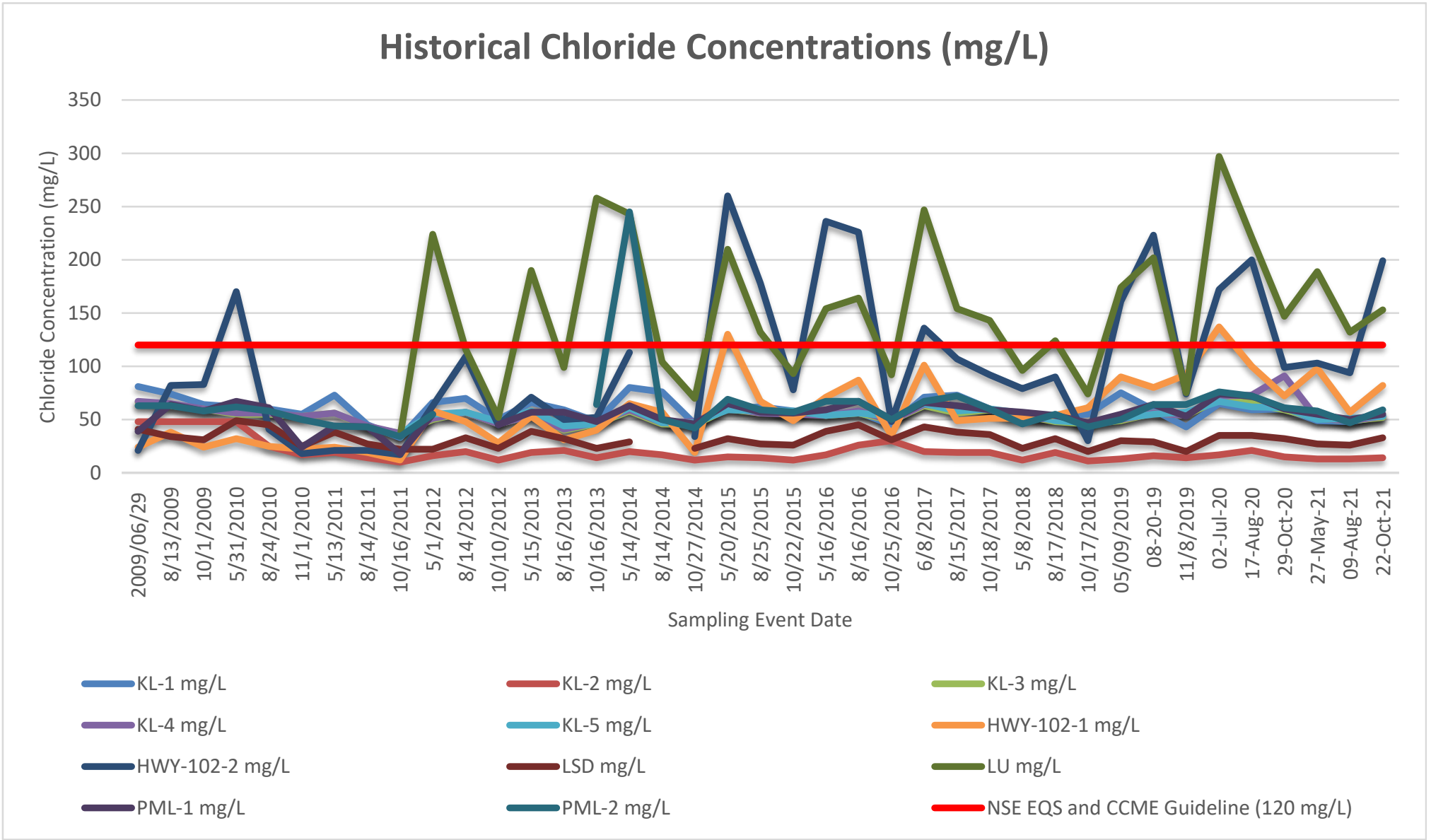
Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

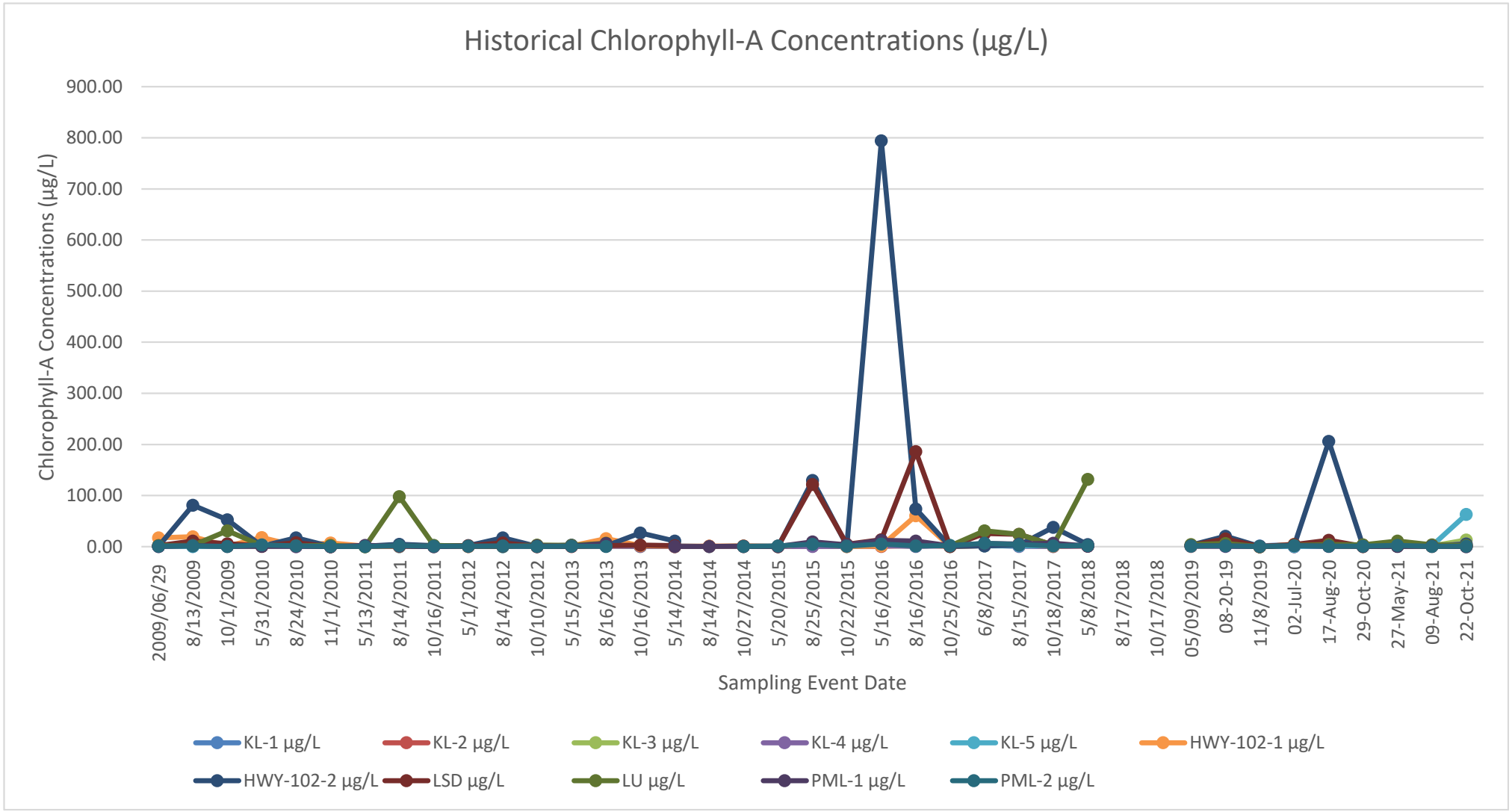
Page 1 of 1
No:

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
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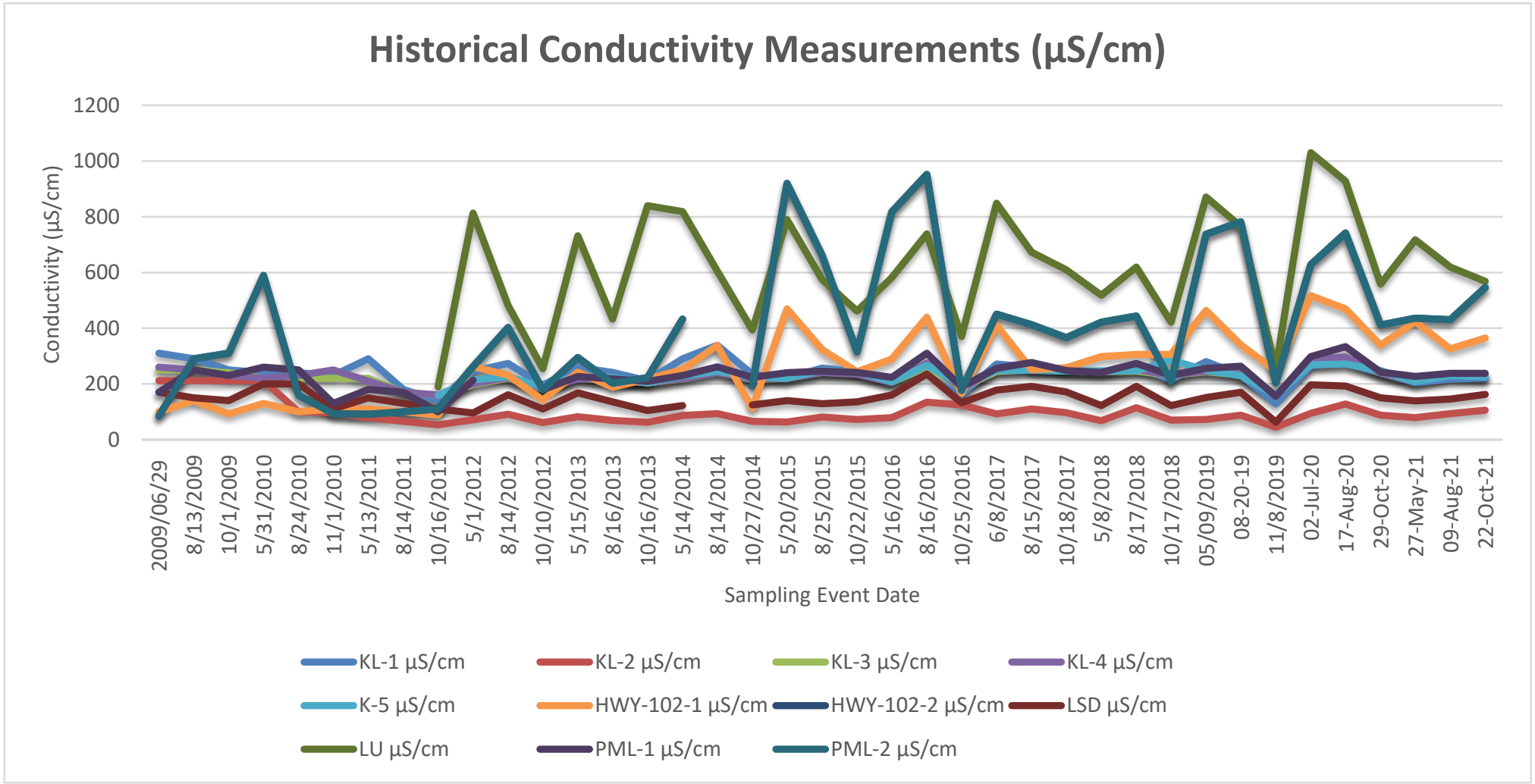
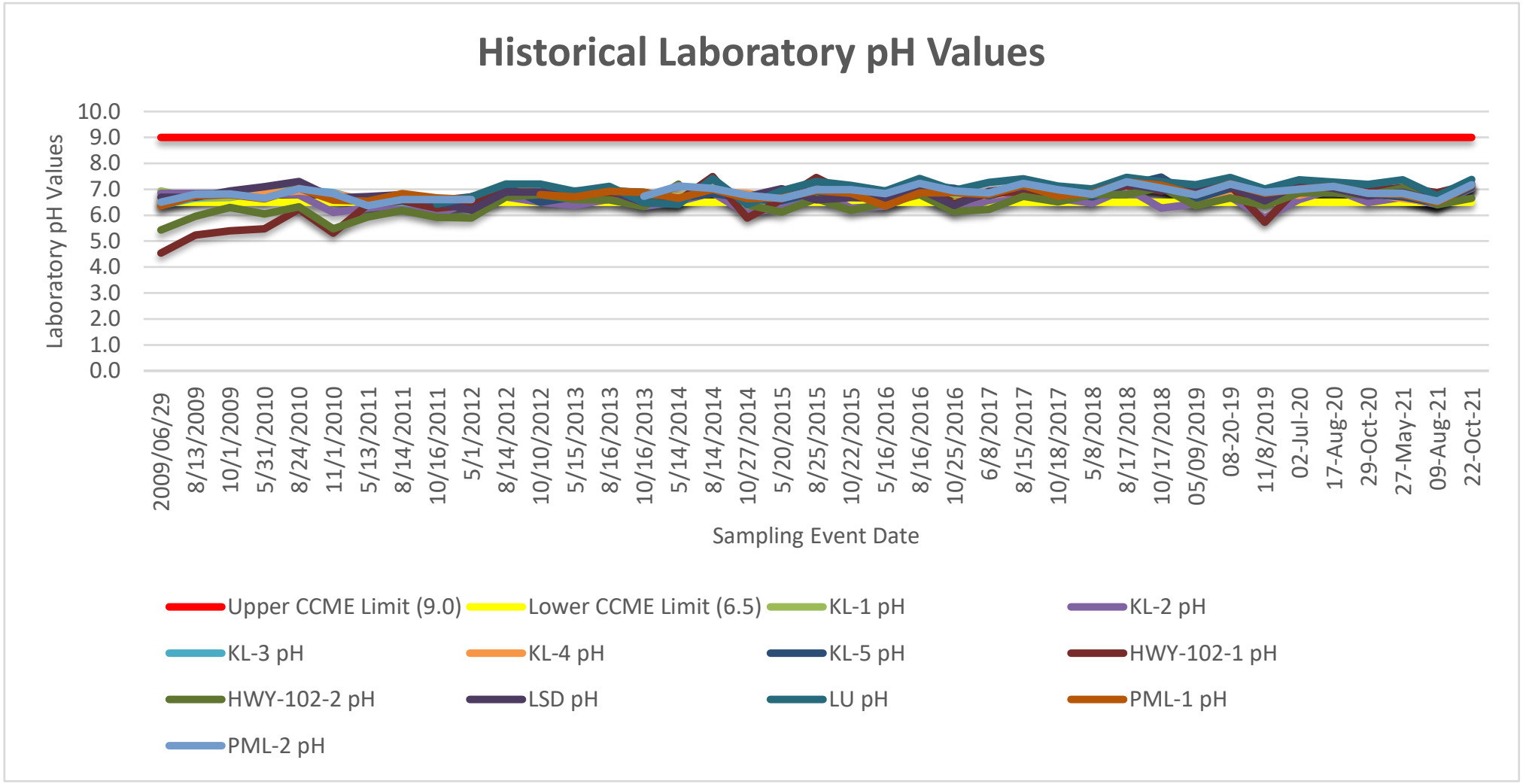
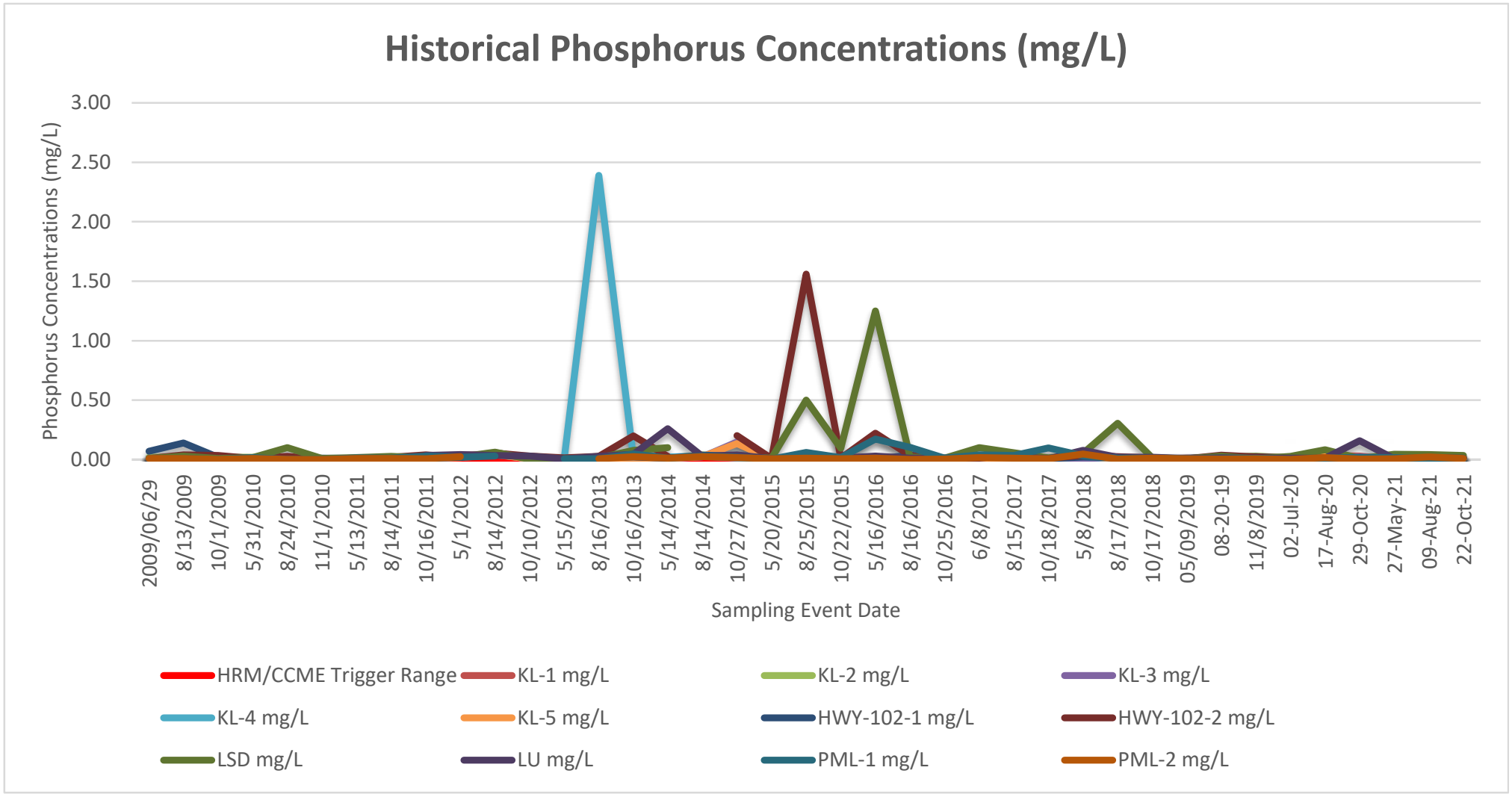
5/20/2015
8/25/2015
10/22/2015
5/16/2016
8/16/2016
10/25/2016
6/8/2017
8/15/2017
10/18/2017
5/8/2018
8/17/2018
10/17/2018
05/09/2019
08-20-19
11/8/2019
02-Jul-20
17-Aug-20
29-Oct-20
27-May-21
09-Aug-21
22-Oct-21
Sampling Event Date
KL-1 µg/L
KL-2 µg/L
KL-3 µg/L
KL-4 µg/L
KL-5 µg/L
HWY-102-1 µg/L
HWY-102-2 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

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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	Last Cal Date/ Opened Date	Next Cal Date / Expiration 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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Please call 800-301-9663 for Technical Assistance

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. Slips, trips, and falls. Splashes from contaminated water.
Tools	Water meter (for field-measured parameters), secchi disk, camera, sample bottles, cooler/ice packs, field data sheets. For water depth measurements: measuring stick or tape. 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.)** Experience completing environmental monitoring including using various types of environmental monitoring equipment.

'Wood' is a trading name for John Wood Group PLC and its subsidiaries
Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited
Registered office: 2020 Winston Park Drive, Suite 700, Oakville, Ontario L6H 6X7
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. • 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. • Take photographs to document conditions and/or changes at the site. • 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. • Wear fresh disposable latex or other suitable gloves and safety glasses when collecting and preserving samples for each location. • 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. • 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. 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. • Avoid stirring up sediments or debris during sampling. Avoid collecting any floating debris and do not sample immediately downstream of a bridge, etc. • Remain downstream of the sampling location in order to prevent contamination of sample and point the mouth of the bottle upstream. • 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. • 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.** • 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. • 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). • Use of Laboratory supplied sterile collection containers and Laboratory preservatives. • Decontamination of all sampling equipment between wells and other sample locations. • Dedicated sterile gloves for each well worn during sample collection. • Dedicated inline disposable filters for each sample that requires filtering. • 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

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

WSP E&I CANADA LIMITED
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B 1Z1

T: +1-902-468-2848
WSP.COM

"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."

WSP E&I Canada Limited prepared this report solely for the use of the intended recipient, Halifax Regional Municipality, in accordance with the professional services agreement. The intended recipient is solely responsible for the disclosure of any information contained in this report. The content and opinions contained in the present report are based on the observations and/or information available to WSP E&I Canada Limited at the time of preparation. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. WSP E&I Canada Limited does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report. This limitations statement is considered an integral part of this report.

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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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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.

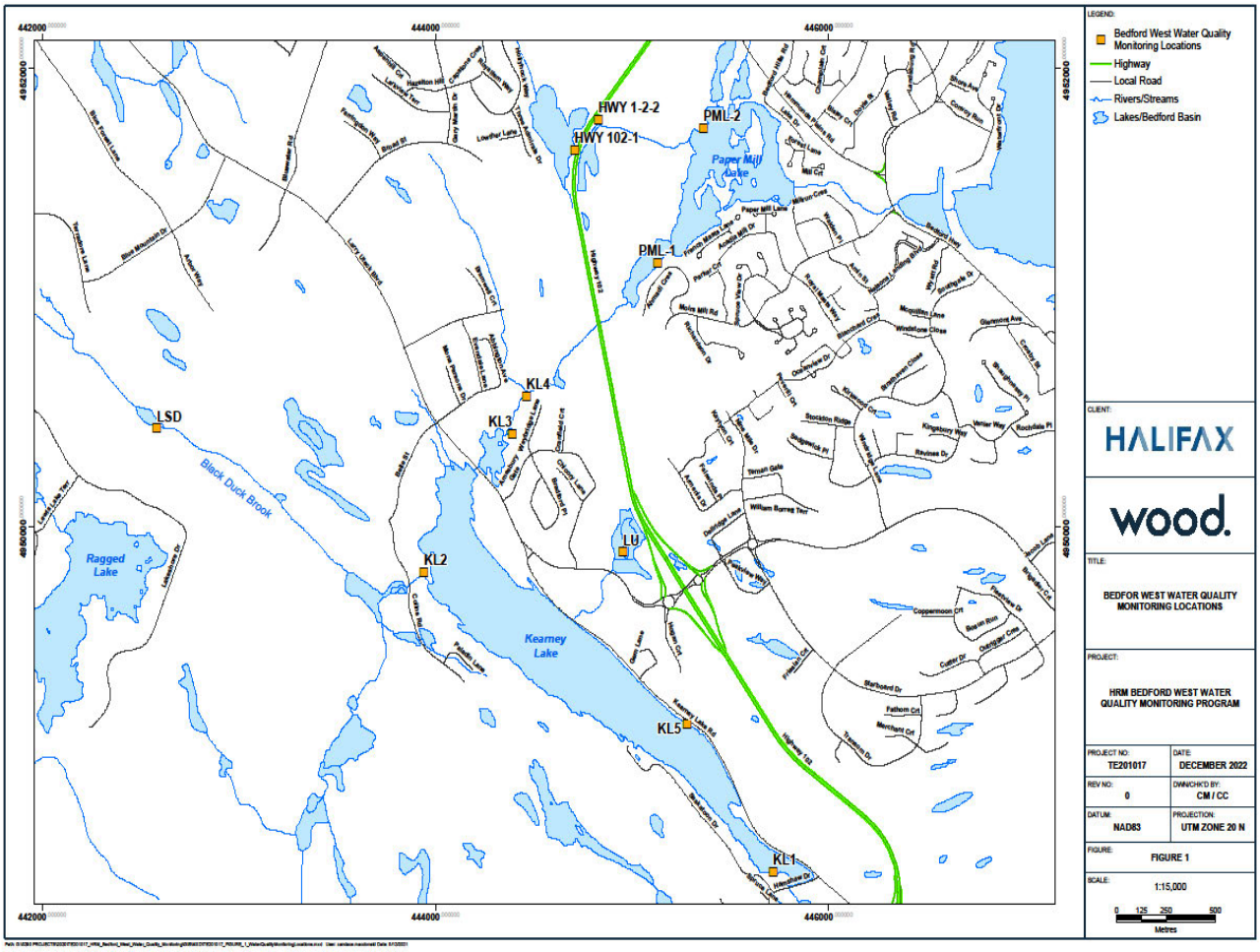

442000
444000
446000
4952000
4950000
HWY 1-2-2
HWY 102-1
PML-2
PML-1
Paper Mill Lake
KL4
KL3
KL2
KL1
KL5
LU
LSD
Black Duck Brook
Ragged Lake
Kearney Lake
LEGEND:
Bedford West Water Quality Monitoring Locations
Highway
Local Road
Rivers/Streams
Lakes/Bedford Basin
CLIENT:
HALIFAX
wood.
TITLE:
BEDFOR WEST 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 • TDS • Dissolved Oxygen • Temperature • Secchi Depth • Conductance • Air Temperature • Cloud Cover • Incidental Wildlife Sightings	• Total Alkalinity (as CaCO3) • Dissolved Chloride • Total Kjeldahl Nitrogen • Nitrate + Nitrite • Nitrate • Nitrite • Nitrogen (as NH4) • Total Organic Carbon • Orthophosphate (P) • pH • Low Total Phosphorus • Reactive Silica • Total Suspended Solids • Dissolved Sulphate • Turbidity • Conductivity	• Anion Sum • Cation Sum • Ion Balance • Bicarbonate Alkalinity (as CaCO3) • Carbonate Alkalinity (as CaCO3) • Hardness • Total Dissolved Solids • Saturation pH (@4°C & 20°C) • Langelier Index (@4°C & 20°C)	• Calcium • Copper • Iron • Magnesium • Manganese • Potassium • Sodium • Zinc	• Chlorophyll-A • E. coli • 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

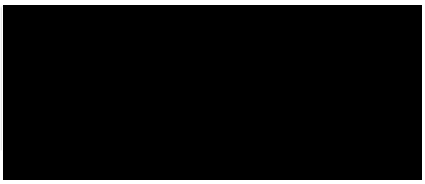
This report was prepared for the exclusive use of Halifax Regional Municipality and is intended to provide a water quality results for the program. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should 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.

WSP E&I Canada Limited

Prepared by:



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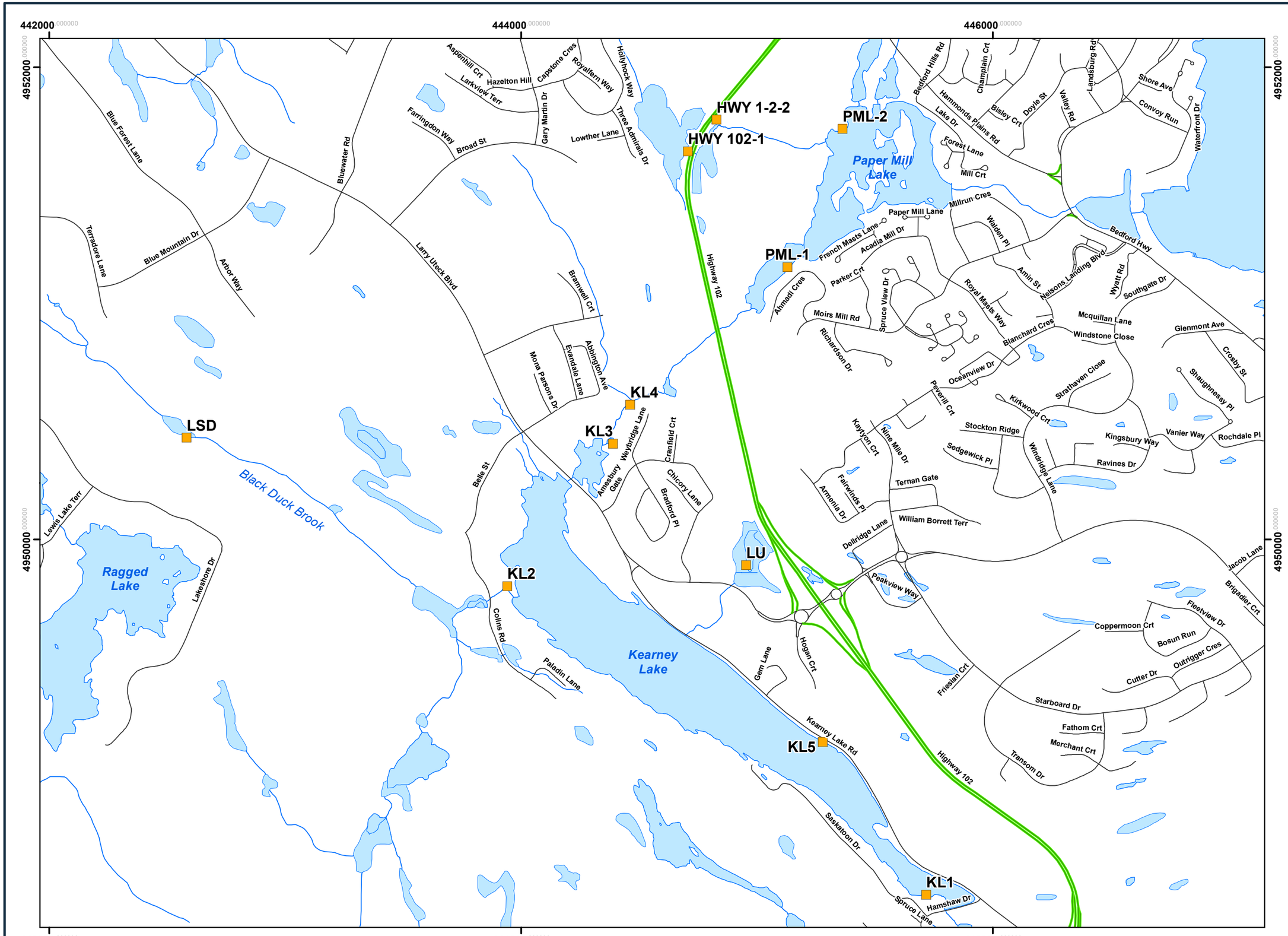
Nova Scotia Environment, September 2021. Environmental Quality Standards for Surface Water (Notification of Contamination Protocol 100, Table 3).

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	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 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 -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 -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):	0.2 m
pH:	7.48
Dissolved Oxygen (mg/L):	5.45 mg/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:	dragonflies
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 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:	Low.
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	21/10/22
Time (hh:mm):	11:55
Sample Depth (m):	surface.
pH:	9.41.
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:	8.62
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:	Partly cloudy.
Wildlife Sightings:	(none)
Site Accessibility:	OASL
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:	8.06.
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°.
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:	Mostly Normal
Wildlife Sightings:	[illegible]
Site Accessibility:	[illegible]
Site Access Detail :	Same as previous events.

Field Parameter Data

Date (d.m.y):	21/10/22
Time (hh:mm):	11:45
Sample Depth (m):	surface.
pH:	7.94
Dissolved Oxygen (mg/L):	9.94
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:	HWM-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:	cloudy.
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
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

Sulphur 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):	n/a
Water Temp (degrees C):	12.8°C
Conductivity (µs/cm):	450.2 SC 84.1 ORP

Additional Comments/Notes

Fairly 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 - paved.
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:	9.69
Dissolved Oxygen (mg/L):	9.57.
Secchi Depth (m):	bottom (2m)
Water Temp (degrees C):	14.8
Conductivity (µs/cm):	275.2 SPC 217.9 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:	15 °C
Cloud Cover:	cloudy.
Wildlife Sightings:	Mallard.
Site Accessibility:	easy - carry.
Site Access Detail :	Same as previous events.

Field Parameter Data 21/10/22

Date (d.m.y):	~~21.10.22~~
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 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 - some patches of blue
Wildlife Sightings:	[illegible]
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%
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:	[illegible]
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):	152

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:	BL-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 based
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:	KL-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:	Easy
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:	Misty/Rain (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

Musty 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:	BML - 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:	HWY 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	<0.050	<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	--	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	4	17	3	2	2	3	<5	<5	5	5	<5	5	<5	<5	38	<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	--	--	--	--	--	<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	--	<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 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	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	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	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	--	--	--	--	--	<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	--	<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	<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	<2	<2	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.
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[6] CCME FAL Phosphorus Trigger Range (Applied) of 0.01 mg/L.
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(*) Chlorophyll A - Welschmeyer Method not completed due to laboratory's instrument failure.
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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
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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*
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	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
Sampling Time	hh:mm							12:30
FIELD DATA								
Secchi Depth	Meters	--	--	--	1.2	--	--	N/A
Water Temp	Celsius	--	--	--	--	--	--	16.7
Dissolved Oxygen	mg/L	--	--	--	--	5.5 - 9.5	--	**10.01**
pH (in Situ)	pH	--	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	6.57
Specific Conductance	uS/cm	--	--	--	--	--	--	37.0
INORGANICS								
Total Alkalinity (as CaCO3)	mg/L	5	--	--	--	--	--	<5
Dissolved Chloride (Cl)	mg/L	1	--	120	--	120	--	21
Fluoride	mg/L	0.12	--	--	--	0.12	--	--
Colour	TCU	5	--	--	--	--	--	120
Nitrite + Nitrate	mg/L	0.05	--	--	--	--	--	<0.05
Nitrate (N)	mg/L	0.05	--	13	--	13	--	<0.05
Nitrite (N)	mg/L	0.05	--	0.06	--	0.06	--	<0.01
Nitrogen (Ammonia Nitrogen)	mg/L	0.03	--	--	--	1.15 note [5]	--	<0.05
Total Kjeldahl Nitrogen as N	mg/L	0.4	--	--	--	--	--	--
Total Organic Carbon	mg/L	0.5	--	--	--	--	--	8.5
Orthophosphate (as P)	mg/L	0.01	--	--	--	--	--	<0.01
pH (units)	pH	N/A	--	6.5 - 9.0	5.0-9.0	6.5 - 9.0	--	**5.43**
Total Calcium (Ca)	mg/L	0.1	--	--	--	--	--	1.6
Total Magnesium (Mg)	mg/L	0.1	--	--	--	--	--	0.4
Total Phosphorus	mg/L	0.002	--	--	--	0.01 note [6]	0.010	<0.02
Total Potassium (K)	mg/L	0.1	--	--	--	--	--	0.5
Total Sodium (Na)	mg/L	0.1	--	--	--	--	--	15.0
Reactive Silica (SiO2)	mg/L	0.5	--	--	--	--	--	2.2
Total Suspended Solids	mg/L	5	--	--	--	note [7]	--	<2
Dissolved Sulphate (SO4)	mg/L	2	--	128	--	--	--	<2
Turbidity (NTU)	NTU	0.1	--	--	50	--	--	0.7
Conductivity (uS/cm)	µS/cm	1	--	--	--	--	--	85
Calculated Parameters								
Anion Sum	me/L	N/A	--	--	--	--	--	0.60
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5	--	--	--	--	--	<5
Calculated TDS	mg/L	1	--	--	--	--	--	42
Carb. Alkalinity (calc. as CaCO3)	mg/L	10	--	--	--	--	--	<10
Cation Sum	me/L	N/A	--	--	--	--	--	0.81
Hardness (CaCO3)	mg/L	N/A	--	--	--	--	--	6.00
Ion Balance (% Difference)	%	N/A	--	--	--	--	--	14.90
Langelier Index (@ 20C)	N/A	N/A	--	--	--	--	--	NC
Langelier Index (@ 4C)	N/A	N/A	--	--	--	--	--	NC
Saturation pH (@ 20C)	N/A	N/A	--	--	--	--	--	NC
Saturation pH (@ 4C)	N/A	N/A	--	--	--	--	--	NC
Metals (ICP-MS)								
Total Aluminum (Al)	µg/L	5	5	5	--	100 (pH based)	--	**270**
Total Antimony (Sb)	µg/L	2	20	9	--	--	--	<2
Total Arsenic (As)	µg/L	2	5.0	5.0	--	5	--	<2
Total Barium (Ba)	µg/L	5	1000	1000	--	--	--	20
Total Beryllium (Be)	µg/L	2	5.3	0.15	--	--	--	<2
Total Bismuth (Bi)	µg/L	2	--	--	--	--	--	<2
Total Boron (B)	µg/L	5	1200	1500	--	1500	--	<5
Total Cadmium (Cd)	µg/L	0.017	0.01	0.09	--	0.04 - 0.16 note [8]	--	<0.300
Total Chromium (Cr)	µg/L	1	---	8.9	--	--	--	<2
Total Cobalt (Co)	µg/L	1	10	1	--	--	--	<1
Total Copper (Cu)	µg/L	1	2	2	--	2 - 2.41 note [8]	--	2
Total Iron (Fe)	µg/L	50	300	300	--	300	--	**880**
Total Lead (Pb)	µg/L	0.5	1	1	--	1 - 3.26 note [8]	--	**1.9**
Total Manganese (Mn)	µg/L	2	820	430	--	--	--	110
Total Molybdenum (Mo)	µg/L	2	73	73	--	73	--	<2
Total Nickel (Ni)	µg/L	2	25	25	--	25 - 97.03 note [8]	--	<2
Total Selenium (Se)	µg/L	1	1.0	1.0	--	1	--	<2
Total Silver (Ag)	µg/L	0.1	0.1	0.25	--	0.25	--	<0.5
Total Strontium (Sr)	µg/L	5	21000	21000	--	--	--	11
Total Thallium (Tl)	µg/L	0.1	0.8	0.8	--	0.8	--	<0.1
Total Tin (Sn)	µg/L	2	--	--	--	--	--	<2
Total Titanium (Ti)	µg/L	2	--	--	--	--	--	4
Total Uranium (U)	µg/L	0.1	300	15	--	15	--	<0.1
Total Vanadium (V)	µg/L	2	6	120	--	--	--	<2
Total Zinc (Zn)	µg/L	5	30	7	--	30	--	12
MICROBIOLOGICAL								
Total Coliform	MPN/100mL	1	--	--	--	--	--	28
E. coli	MPN/100mL	1	--	--	400	--	--	4
Chlorophyll A - Spectrophotometer	µg/L	0.25	--	--	--	--	--	--
Chlorophyll A - Acidification method	µg/L	0.05	--	--	--	--	--	0.90
Chlorophyll A - Welschmeyer method	µg/L	0.05	--	--	--	--	--	0.91

Tested Parameters	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 Date	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
Sampling Time	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	N/A	N/A	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	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	**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)	**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	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)	6	5	<5	<5	5	<5	17	7	<5	6	14	7	30	8	8	5	<5	13	21	6
Dissolved Chloride (Cl)	**170**	41	18	21	21	17	63	109	45	71	50	52	113	34	**260**	**178**	78	**236**	**226**	48
Fluoride	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colour	96	160	68	65	98	77	32	100	70	11	61	36	13	85	17	9	8	14	39	86
Nitrite + Nitrate	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)	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)	<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)	0.20	<0.05	<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	--	--	--	--	--	--	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	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)	<0.01	<0.01	0.01	<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)	**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)	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)	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	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)	1.1	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)	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)	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	34	27	3	<1	10	14	<5	39	<5	<5	<5	194	34	<5	2	**3,000**	15	**342**	69	<5
Dissolved Sulphate (SO4)	11	<2	7	5	5	8	12	6	10	10	9	10	12	8	15	7	8	22	21	8
Turbidity (NTU)	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)	590	160	94	91	100	110	263	403	179	295	203	223	433	194	920	662	315	817	952	177
Calculated Parameters																				
Anion Sum	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)	6	5	<5	<5	5	<5	17	7	<5	6	14	7	30	8	8	5	<5	13	21	6
Calculated TDS	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)	<5	<5	<5	<5	<5	<5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cation Sum	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)	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)	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)	-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)	-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)	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)	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)	**189**	**368**	--	**260**	--	--	**145**	**466**	**259**	**130**	**138**	**2,760**	**400**	**216**	**100**	--	**129**	**3,880**	--	--
Total Antimony (Sb)	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2	--	--
Total Arsenic (As)	<1.0	2	--	<1.0	--	--	<2	<2	<2	<2	<2	**6**	<2	<2	<1.0	--	<2	3	--	--
Total Barium (Ba)	53	28	--	27	--	--	49	74	33	44	43	213	381	63	140	--	147	762	--	--
Total Beryllium (Be)	<1.0	<1.0	--	<1.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<1.0	--	<2	<2	--	<2
Total Bismuth (Bi)	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2	<2	--	--
Total Boron (B)	8	8	--	<50	--	--	10	17	15	9	10	13	11	12	<50	--	<5	9	--	--
Total Cadmium (Cd)	**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)	<1.0	1	--	<1.0	--	--	<1	<1	<1	<1	1	**9**	**2**	<1	<1.0	--	<1	**8**	--	--
Total Cobalt (Co)	1	1	--	<0.40	--	--	<1	1	1	<1	1	3	1	<1	2	--	3	4	--	--
Total Copper (Cu)	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)	**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)	**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)	387	135	53	41	106	176	78	219	207	83	173	327	212	93	470	**2,800**	303	586	359	71
Total Molybdenum (Mo)	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2	<2	--	--
Total Nickel (Ni)	<2.0	<2.0	--	<2.0	--	--	<2	<2	<2	<2	<2	4	2	<2	<2.0	--	<2	8	--	--
Total Selenium (Se)	<1.0	<1.0	--	<1.0	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1.0	--	<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	<0.1	--	<0.1	<0.1	--	--
Total Strontium (Sr)	37	21	--	17	--	--	33	45	31	39	40	45	75	43	96	--	38	96	--	--
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	<0.1	--	<0.1	<0.1	--	--
Total Tin (Sn)	<2	<2	--	<2	--	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	--	<2	<2	--	--
Total Titanium (Ti)	<2	6	--	5	--	--	<2	10	4	4	<2	60	9	6	<2	--	<2	41	--	--
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	<0.1	--	<0.1	0.2	--	--
Total Vanadium (V)	<2	<2	--	<2	--	--	<2	2	<2	<2	<2	**11**	<2	<2	<2.0	--	<2	**18**	--	--
Total Zinc (Zn)	14	12	9	6	9	13	<5	7	12	12	<5	**46**	**36**	17	27	**1,210**	10	**170**	22	11
MICROBIOLOGICAL																				
Total Coliform	>250	75	41	110	>250	--	1,553	>2420	>2420	2,420	1,990	>2420	687	>2420	---	>2420	328	>2420	>2420	>2420
E. coli	9	5	<1	7	**>250**	<100	<1	16	50	111	9	4	<1	<1	<10	201	2	1	20	11
Chlorophyll A - Spectrophotometer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophyll A - Acidification method	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	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 [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	<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	--	--	--	--	--	--	22	11	9	21	13.0	--	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	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	<2.0	<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	--	--	--	--	--	<0.01	<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 [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	<0.03	<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	--	--	--	--	--	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	--	<2	--	<2	<2	<2	--	<2	<2	<3	<2	--	--	<2	--	--	<2	--	--
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

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: 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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- 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: 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: [redacted]

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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:

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:

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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:

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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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: [redacted]

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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: [redacted]

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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: [redacted]

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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:		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: [redacted]

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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:		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: [redacted]

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TEL (902)468-8718
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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: [redacted]

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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: [redacted]

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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:

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

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AGAT WORK ORDER: 22X901528

PROJECT: TE201017

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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:		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

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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:

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: [redacted]

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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 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	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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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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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

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
☐ 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	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		☑	☑	☑	☑	☑	☑

[redacted]

Date/Time: 31 May 2022
Date/Time

[redacted]

Date/Time
Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1
N°:

Date revised: May 19, 2016

AGAT Laboratories

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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.
- 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)

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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: [redacted]

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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: [redacted]

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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: [redacted]

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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: [redacted]

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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:

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: [redacted]

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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
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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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: [redacted]

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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: [redacted]

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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			

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

AGAT Laboratories

11 Morris Drive, Unit 122
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TEL (902)468-8718
FAX (902)468-8924
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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

AGAT Laboratories

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P: 709.747.8573 • F: 709.747.2139

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 12 AUG 22 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
PML-1	18/08/22 8:35	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
	"			

	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: LL Total Phosphorus	Hazardous (Y/N)
PML-1		☑					☑	☑											☑			☑	☑	
PML-2		☑					☑	☑											☑			☑	☑	
HWY102-1		☑					☑	☑											☑			☑	☑	
HWY102-2		☑					☑	☑											☑			☑	☑	
LU		☑					☑	☑											☑			☑	☑	
LSD		☑					☑	☑											☑			☑	☑	
KL-1		☑					☑	☑											☑			☑	☑	
KL-2		☑					☑	☑											☑			☑	☑	
KL-3		☑					☑	☑											☑			☑	☑	
KL-4		☑					☑	☑											☑			☑	☑	
KL-5		☑					☑	☑											☑			☑	☑	

[redacted] Date/Time: 1:00 pm
Date/Time: 18/08/22
[redacted] Date/Time:
Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page ___ of ___
No:

Date revised: March 10, 2015

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.

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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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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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: [redacted]

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:

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

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: [redacted]

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:

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: [redacted]

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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: [redacted]

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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

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

AGAT Laboratories

Unit 1, 57 Old Pennywell Rd
St John's, NL
A1E 6A8
webearth.agatlabs.com • www.agatlabscom

P: 709.747.8573 • F: 709.747.2139

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:
'22 OCT 21 1442pm

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): [redacted] Date/Time: Oct 21/22 Samples Received By (Print Name): [redacted] Date/Time:
Date/Time: 1:45pm Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page of
N°:

Document ID: [illegible] Date Issued: March 26, 2018

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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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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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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

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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

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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

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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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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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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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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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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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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

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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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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)

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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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Canada T9C 1T4
(780) 632-8211

Order Comments

22080264

Project 22X934461

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Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

Sample Comments

PO Bag 4000
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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(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
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(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

PO Bag 4000
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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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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(780) 632-8211

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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Vegreville, Alberta
Canada T9C 1T4
(780) 632-8211

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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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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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

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

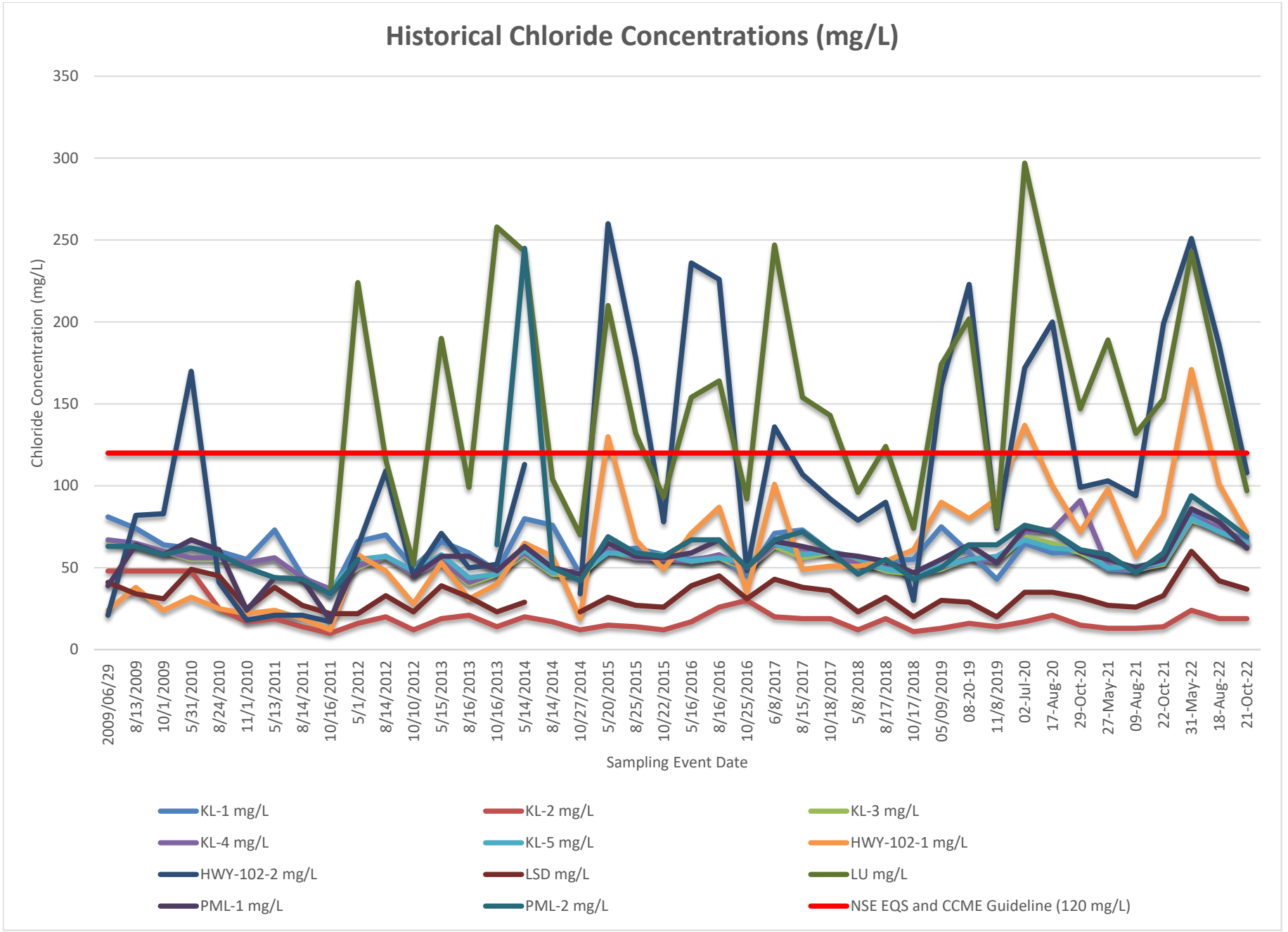
QA/QC ran within range. Sample was white in color.

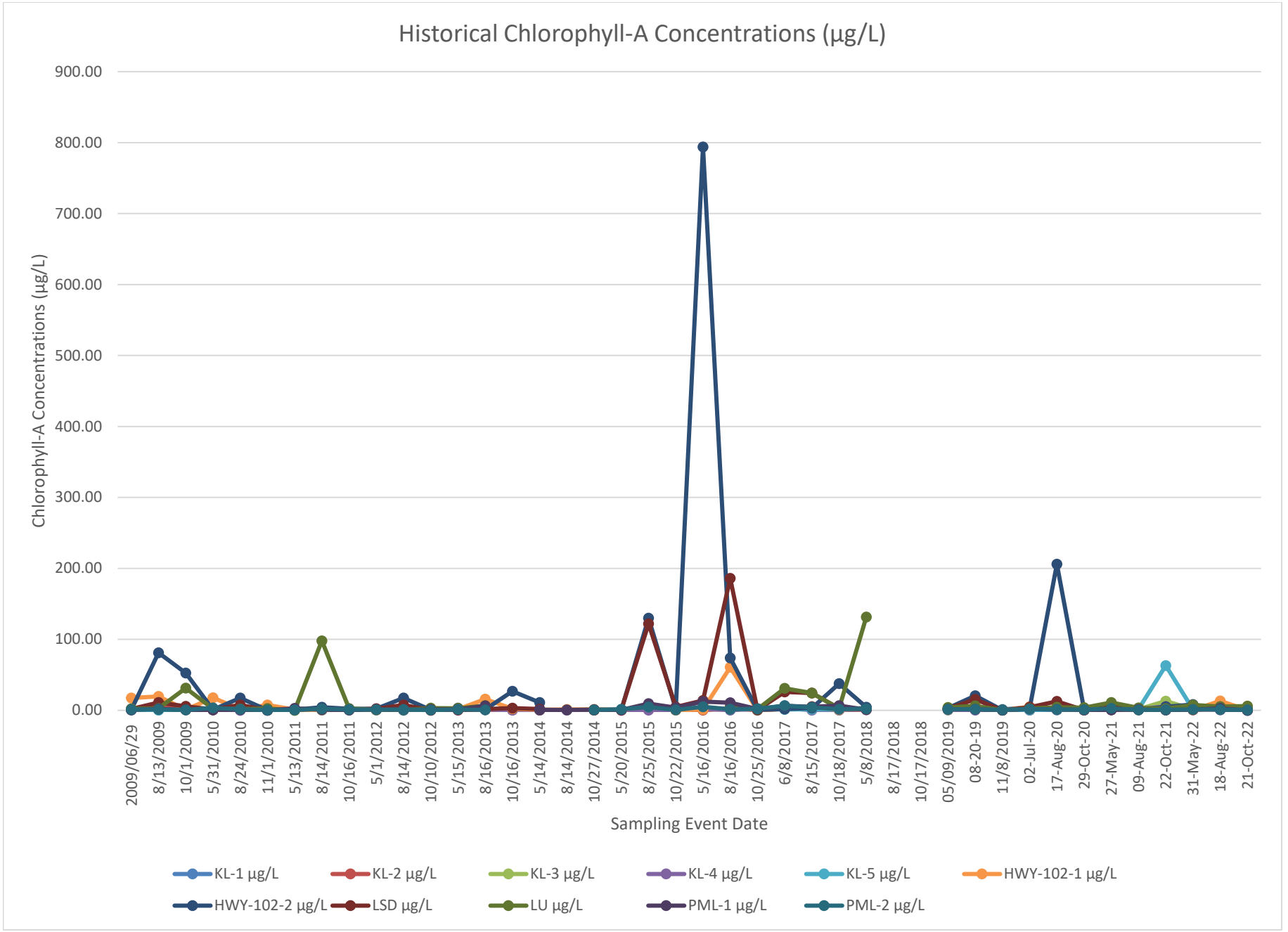
22110049-005 AQ Chlorophyll Phyt

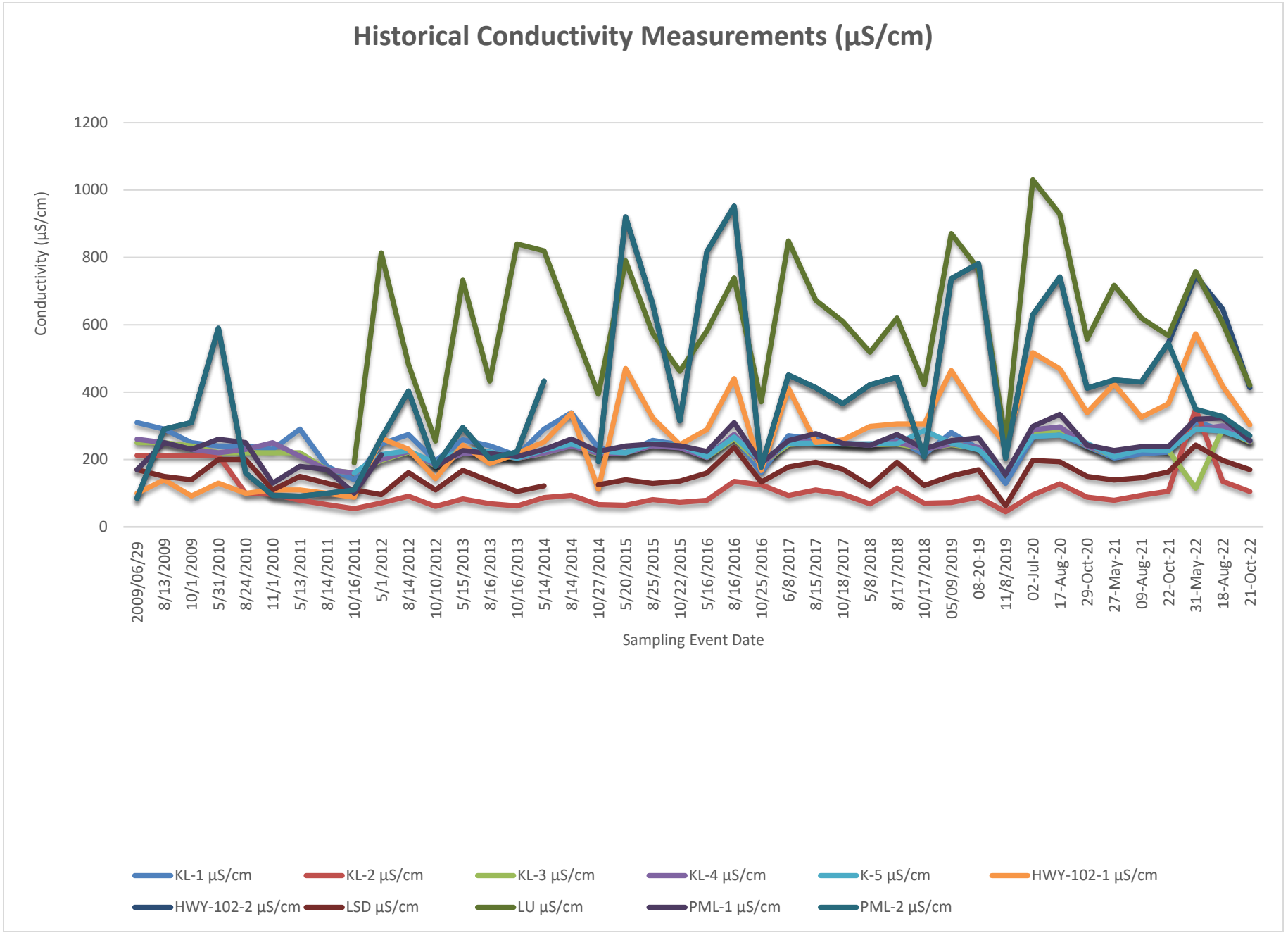
QA/QC ran within range. Sample was light green in color.

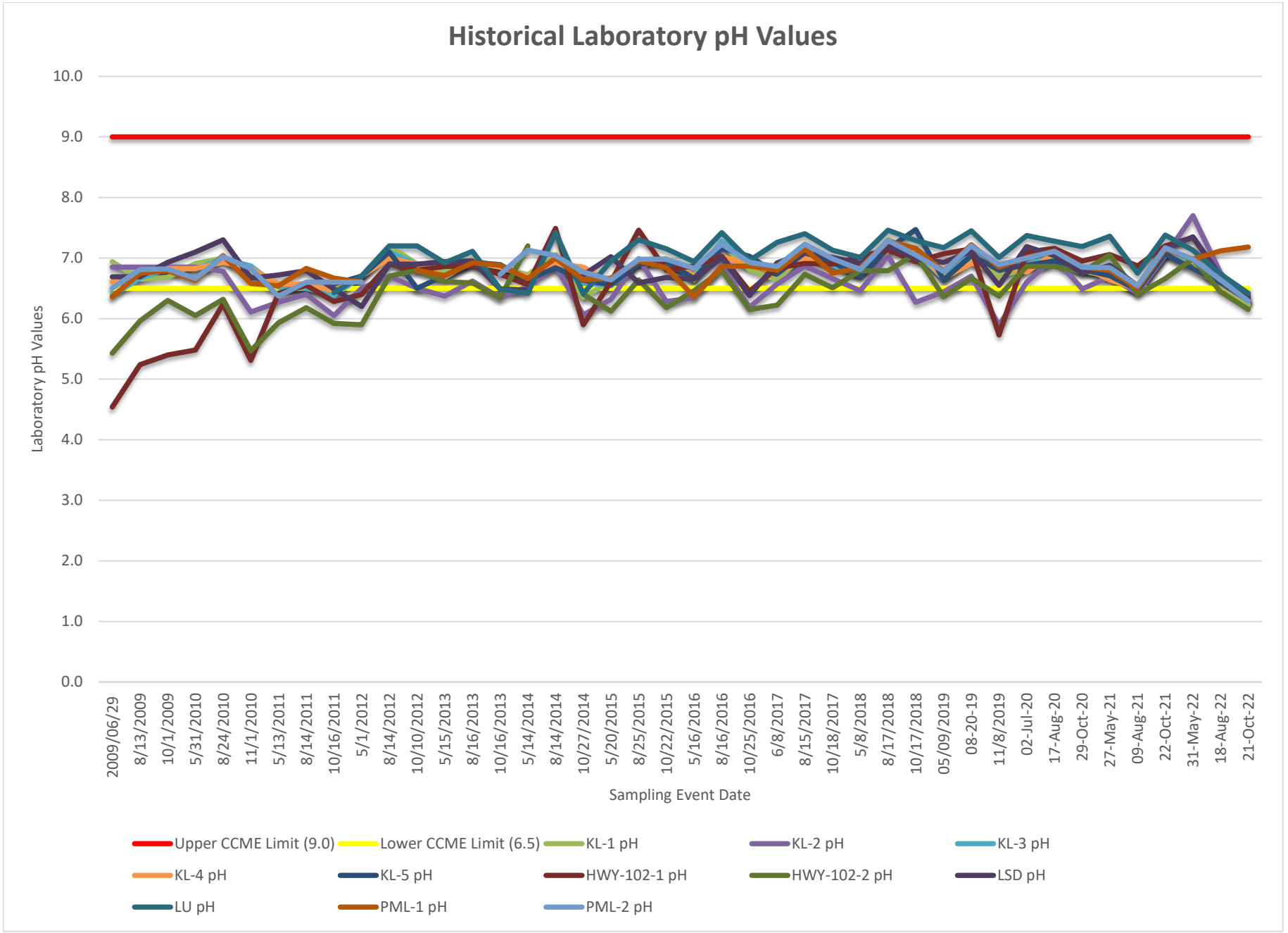
APPENDIX

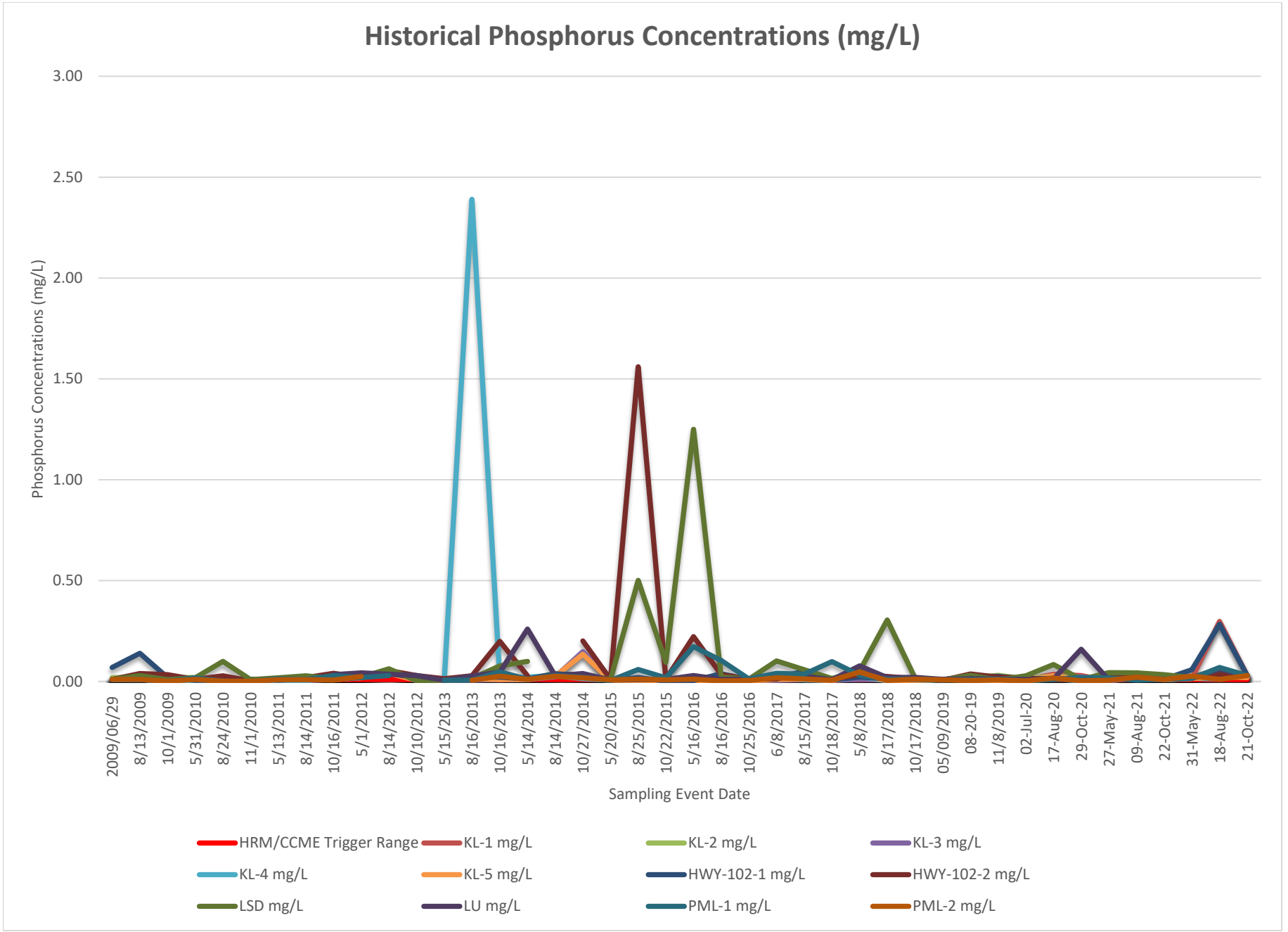
E GRAPHS

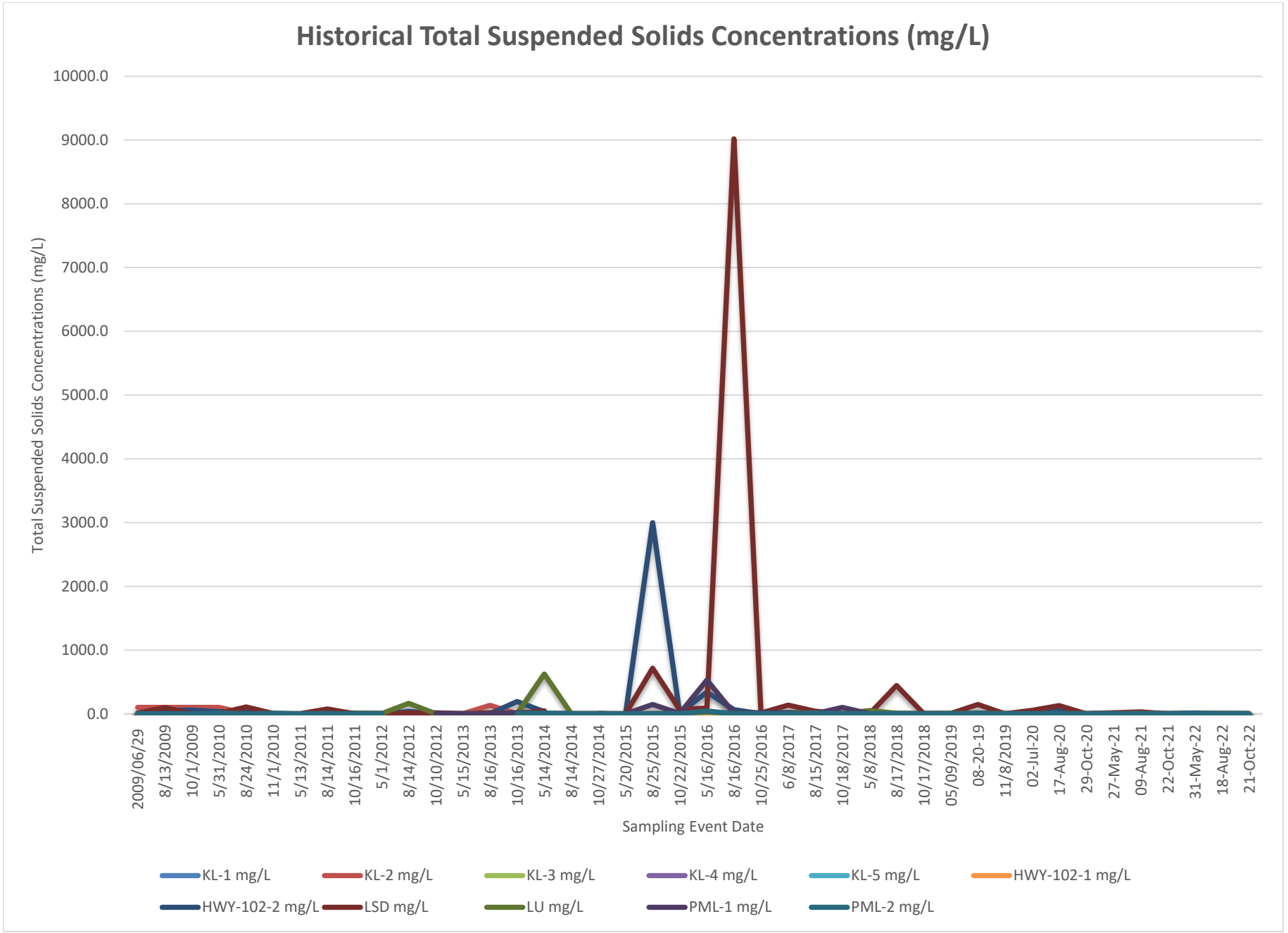

Historical Chloride Concentrations (mg/L)
Chloride Concentration (mg/L)
350
300
250
200
150
100
50
0
2009/06/29
8/13/2009
10/1/2009
5/31/2010
8/24/2010
11/1/2010
5/13/2011
8/14/2011
10/16/2011
5/1/2012
8/14/2012
10/10/2012
5/15/2013
8/16/2013
10/16/2013
5/14/2014
8/14/2014
10/27/2014
5/20/2015
8/25/2015
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. Slips, trips, and falls. Splashes from contaminated water.
Tools	Water meter (for field-measured parameters), secchi disk, camera, sample bottles, cooler/ice packs, field data sheets. For water depth measurements: measuring stick or tape. 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.)** Experience completing environmental monitoring including using various types of environmental monitoring equipment.

'Wood' is a trading name for John Wood Group PLC and its subsidiaries
Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited
Registered office: 2020 Winston Park Drive, Suite 700, Oakville, Ontario L6H 6X7
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. • 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. • Take photographs to document conditions and/or changes at the site. • 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. • Wear fresh disposable latex or other suitable gloves and safety glasses when collecting and preserving samples for each location. • 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. • 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. 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. • Avoid stirring up sediments or debris during sampling. Avoid collecting any floating debris and do not sample immediately downstream of a bridge, etc. • Remain downstream of the sampling location in order to prevent contamination of sample and point the mouth of the bottle upstream. • 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. • 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.** • 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. • 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). • Use of Laboratory supplied sterile collection containers and Laboratory preservatives. • Decontamination of all sampling equipment between wells and other sample locations. • Dedicated sterile gloves for each well worn during sample collection. • Dedicated inline disposable filters for each sample that requires filtering. • 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;