

Appendix A

Project Related Documents

**Environmental Risk Assessment
for the City of Saint John -
Morna Heights
Wastewater Treatment Plant
in Accordance with the Canada-Wide Strategy
for the Management of Municipal Wastewater Effluent**

Interim Report

Submitted to: Saint John Water
P.O. Box 1971
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Date: February 15, 2017



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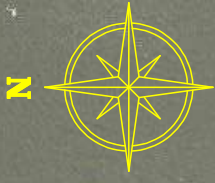
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1. INTRODUCTION

The *Canada-wide Strategy for the Management of Municipal Wastewater Effluent* was released by the Canadian Council of Ministers of the Environment (CCME) in 2009 to improve the protection of human health and the environment, and to provide better clarity in the way municipal wastewater effluent is managed across the country. The strategy is based on preparing a site-specific Environmental Risk Assessment (ERA) for each municipal wastewater treatment plant. The Province of New Brunswick is a signatory to the strategy and has requested that the City of Saint John complete an ERA for the Morna Heights Wastewater Treatment Plant (WWTP). NATECH Environmental Services Inc. was asked by the City to carry out the study.

The objective of this ERA is to assist the New Brunswick Department of Environment and Local Government (NBDELG) with developing Effluent Discharge Objectives for the Morna Heights WWTP, based on the assimilative capacity of the local receiving environment (the Saint John River).

Figure 1-1 shows the location of the WWTP, and Table 1.1 summarizes the WWTP's characteristics.



Saint John River

Municipal Wastewater Treatment Plant
Outfall Location



Environmental Risk Assessment
Saint John - Morne Heights WWTP
Location Map



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Scale:	AS SHOWN	Sheet No.:	N de la feuille: FIGURE 1-1

Table 1.1 Morna Heights WWTP Characteristics

Item		Description
Treatment processes	CBOD ₅	Trickling filter
	TSS removal	Settling
	Pathogens removal	No disinfection system installed
Outfall	Receiving water body	Saint John River
	Description	The end of the outfall pipe is located on the bank, above the average river level
	Coordinates (NB Stereographic)	E 2,526,328 m, N 7,365,766 m

The methodology used to carry out this investigation is in accordance with the ERA framework outlined in the technical supplements of the CCME Strategy:

- ❑ A one year characterisation of the effluent was carried out by the municipality, including effluent flow and effluent quality monitoring.
- ❑ Environmental Quality Objectives (EQOs) were determined based on a review of applicable guidelines. EQOs are concentrations of contaminants in the environment that are low enough to be considered safe for human and ecosystem component exposure.
- ❑ An allocated mixing zone (MZ) in the receiving water body was determined: the MZ is the extent of the water body around the outfall where the effluent is initially diluted, and where contaminant concentrations greater than the EQOs are authorized by the regulators.
- ❑ The target Effluent Discharge Objectives (EDOs) were calculated. The EDOs are maximum acceptable concentrations in the effluent from the WWTP. They are calculated based on worst-case conditions to ensure that EQOs are met at all times at the edge of the MZ.
- ❑ Compliance monitoring requirements were determined. The effluent quality parameters that should be analysed after the completion of the one-year characterization period are identified, as well as the sampling frequency.

The process of determining EDOs involved a combination of documentation review, consultation with stakeholders, field investigations, and mathematical modeling.

2. SUBSTANCES OF POTENTIAL CONCERN

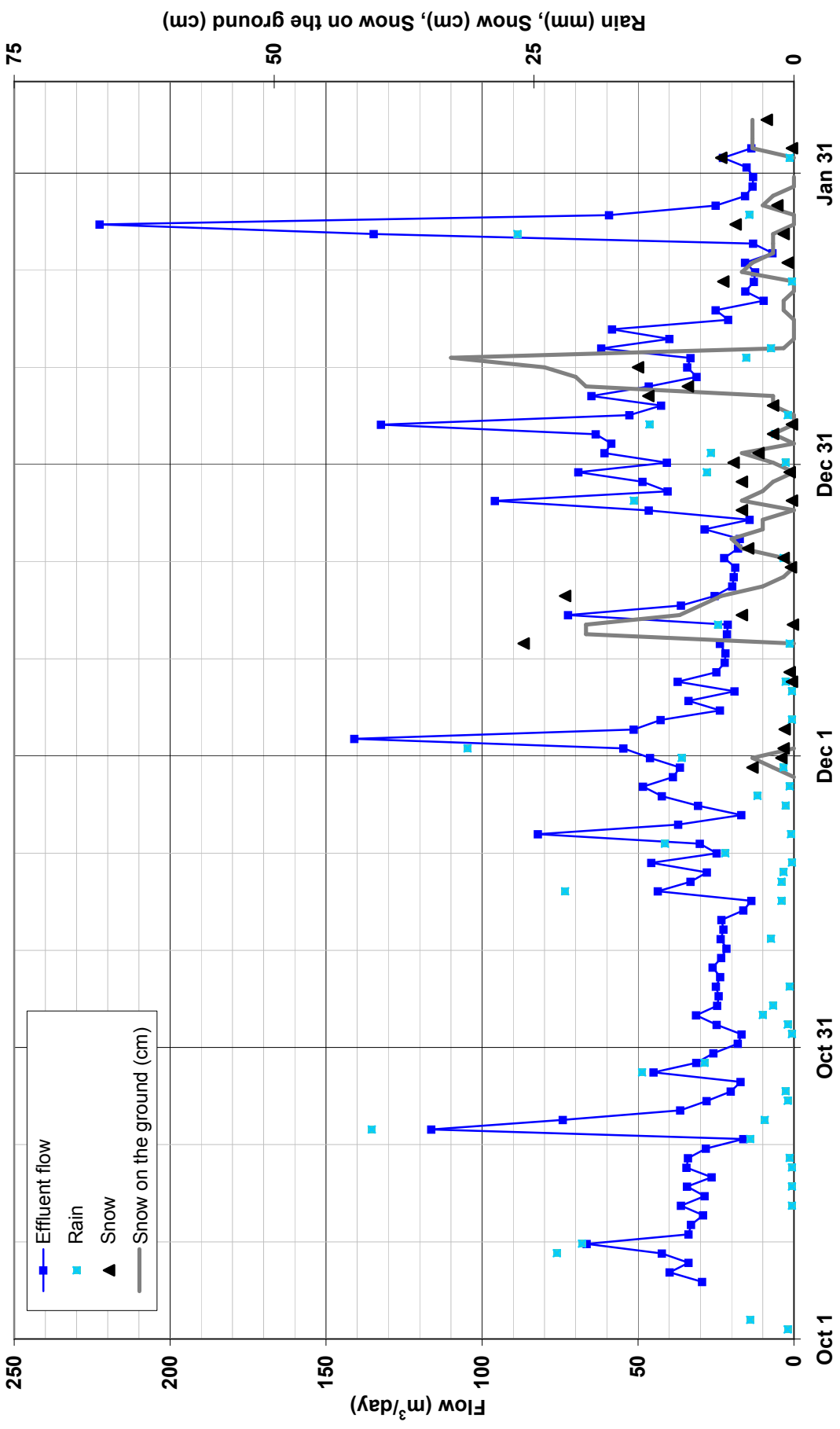
2.1 Facility size categorization

The effluent flows measured at the WWTP from October of 2016 (since a flow meter was installed) to January of 2017 are plotted on Figure 2-1 and summarized in Table 2.1.

Table 2.1 Effluent flow characteristics at the Morna Heights WWTP

Item	Value	Description
Theoretical flow	58 m ³ /day (0.67 L/s)	<u>Assumptions:</u> - 50 homes, 1 m ³ /day/home - Elementary School (125 students, 20 staff), 8 m ³ /day
Flow measurements	40 m ³ /day (0.46 L/s)	Average daily flow from Oct.7, 2016 to January 31, 2017
	220 m ³ /day (2.5 L/s)	Peak daily flow (Jan. 27, 2017) over the same period
Inflow & infiltration	Yes	
Facility size category	Very small	Average wastewater flow between 500 and 2,500 m ³ /day (CCME, 2009)

Saint John - Morna Heights WWTP - Effluent Flows



Environmental Risk Assessment
 Saint John - Morna Heights WWTP
 Measured Effluent Flow in 2016-2017



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FIGURE: 2-1

2.2 Substances of potential concern

The CCME Strategy provides a listing of potential parameters of concern, that must be identified and quantified through testing. The effluent constituents of potential concern to the receiving environment for a “very small” size facility such as the Morna Heights WWTP are:

- Carbonaceous biological oxygen demand (CBOD₅)
- Total suspended solids (TSS)
- Unionized ammonia-nitrogen (NH₃-N unionized)
- Total ammonia-nitrogen (NH₃-N total)
- Total Kjeldahl nitrogen (TKN)
- Total phosphorus (TP)
- pH, and temperature
- Pathogens (E. Coli)

2.3 Additional substances associated with industrial discharges

No additional substances from industrial discharges were identified.

3. INITIAL EFFLUENT CHARACTERIZATION PROGRAM - METHODOLOGY

Table 3.1 lists at which frequency the substances of potential concern are to be measured in the effluent, during a one year characterization period.

Table 3.1 Monitoring requirements for the Morna Heights WWTP

Parameter	Sampling frequency	Procedure
Flow	Daily	Measured by operator (flow meter)
CBOD ₅	Monthly	Sampled by operator, analyzed by laboratory
TSS		
NH ₃ -N Unionized		
NH ₃ -N Total		
TKN		
TP		
E. Coli		
pH		
Temperature		

4. RECEIVING WATER BODY CHARACTERIZATION

4.1 Physical characteristics

The outfall pipe is currently located on the bank of the Saint John River (see Figure 4-1), above the average river level.

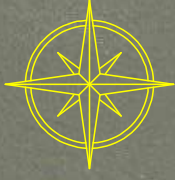
Table 4.1 summarizes the hydraulic characteristics of the Saint John River and its main tributaries (downstream of the Mactaquac dam) at the outfall location. The drainage area of the river upstream of the Morna Heights area is approximately 52,640 km². The average river flow in the Morna Heights area is calculated to be 1,090 m³/s, and the seven day duration - ten year return (7DQ10) low flow is approximately 83.3 m³/s. These flows are calculated as follows:

- ❑ Average flow: the average flow at the Mactaquac dam plus the average flow contributed by tributaries between the Mactaquac dam and the Morna Heights area.
- ❑ Low flow: the minimum maintenance flow at the Mactaquac dam plus the 7DQ10 low flow contributed by tributaries between the Mactaquac dam and the Morna Heights area.

Figure 4-2 illustrates monthly river flow statistics.

Figure 4-3 displays a hydrographic chart of the Saint John River in the outfall area.

N



Saint John River



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	FIGURE 4-1

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Environmental Risk Assessment
 Saint John - Morma Heights WWTP
 Location Map and Sampling Locations

Table 4.1. Hydrological characteristics of Saint John River in the Morna Heights area

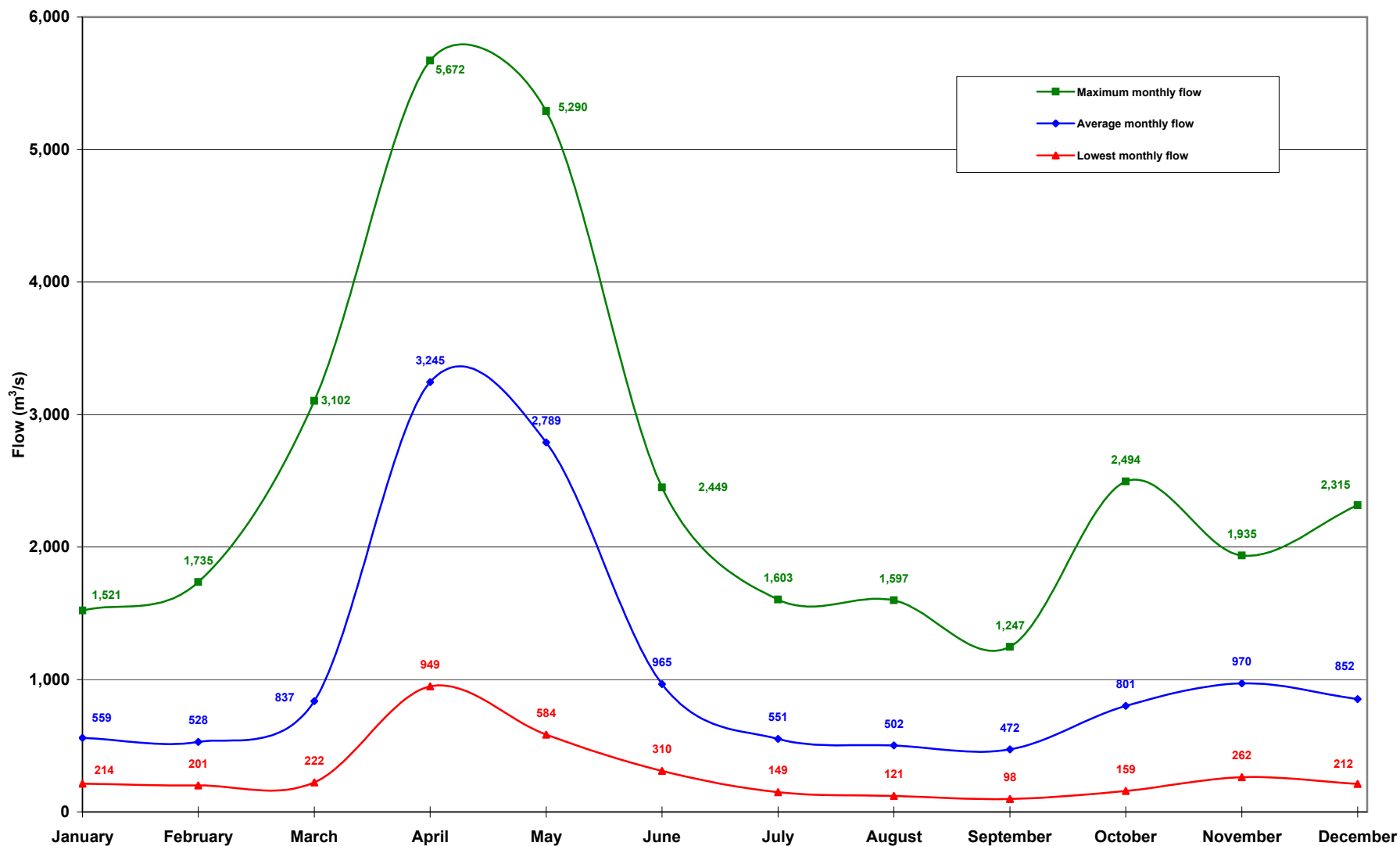
River		Saint John	Nashwaak	North Oromocto	Salmon	Canaan	Saint John
Station (Location)	Unit	01AK004 Mactaquac	01AL002 Durham Bridge	01AM001 Tracy	01AN002 Castaway	01AP002 East Canaan	at Morna Heights outfall
Drainage area (at station)	km ²	39,900	1,450	557	1,050	668	52,640
Flow regime		regulated	natural	natural	natural	natural	regulated
Average flow	m ³ /s	813 ⁽¹⁾	36	12	22	14	1,090
	L/s/km ²	20	25	22	21	20	21
7DQ10 low flow	m ³ /s	50.1 ⁽²⁾ 70.8 ⁽³⁾	2.90	0.06	1.31	0.17	62.6 ⁽²⁾ 83.3⁽³⁾
	L/s/km ²	1.3 ⁽²⁾ 1.8 ⁽³⁾	2.0	0.1	1.2	0.3	1.2 ⁽²⁾ 1.6 ⁽³⁾

(1) Based on data from 1970 to 2010, from Environment Canada.

(2) Calculated flow based on data for non-regulated rivers in NW New Brunswick from Caissie et al. (2011).

(3) Based on minimum maintenance flow at Mactaquac hydroelectric station (from NB Power).

Monthly flow statistics - Saint John River upstream of Morna Heights (drainage area: 52,640 km²)
 (calculated based on data from Environment Canada)



Environmental Risk Assessment
 Saint John - Morna Heights WWTP
 River flow statistics



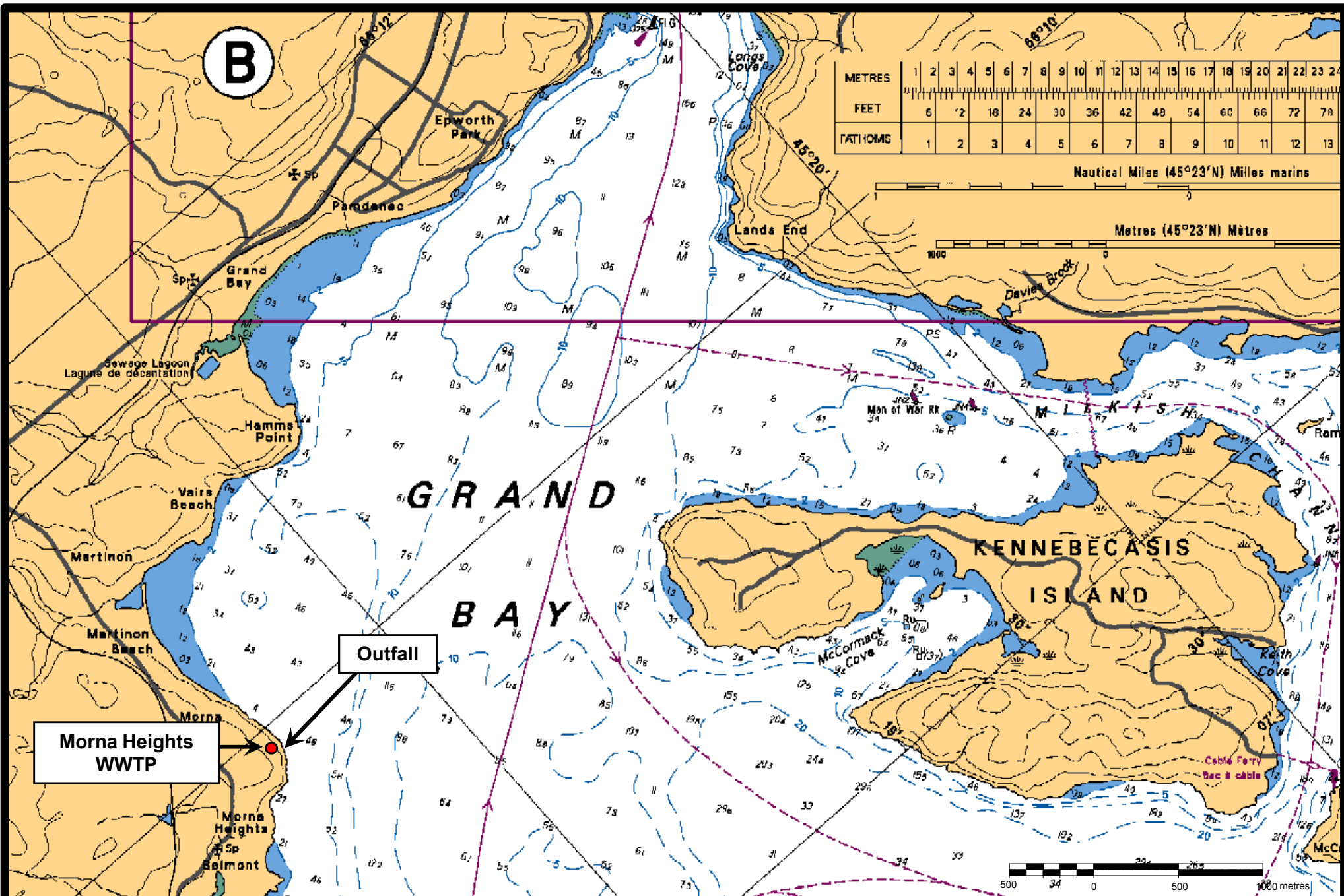
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FIGURE: 4-2



Environmental Risk Assessment
Saint John – Morna Heights WWTP
Hydrographic Chart



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SCALE: Depths in metres,
smaller black digits are
decimals (15₆=15.5m)

FIGURE:
4-3

4.2 Resource usage downstream

The Saint John River is used predominantly for recreation in the Morna Heights area. Boating and fishing appear to be the most common form of recreation. It cannot be precluded that swimming may occur in the vicinity of the outfall, since there are residences located along the shore (Woodside Drive, Bay Crescent Drive) on each side of the outfall. To assess the potential environmental protection components, the Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2016), and the Guidelines for Canadian Recreational Water Quality (Health Canada, 2012) were consulted.

4.3 Background river water quality

Historical water quality information for the Saint John River was obtained from the NB Department of Environment for the closest monitoring station upstream of the Morna Heights area. (Evandale, located 35 km away). The data are summarized in Table 4.2.

Table 4.2. Historical Saint John River water quality in Evandale

Parameter	Unit	Min.	Max.	Average	Number of data
DO	mg/L	7.1	13.9	9.6	25
pH	units	7.0	8.0	7.5	19
Temperature	°C	0.4	24.5	17.0	19
TSS	mg/L	<10	<10	<10	10
NH ₃ -N Total	mg/L	<0.01	0.07	0.02	39
TN	mg/L	0.30	0.70	0.36	39
TP	mg/L	<0.005	0.030	0.014	39
E. Coli	MPN/100mL	<10	100	<18	32

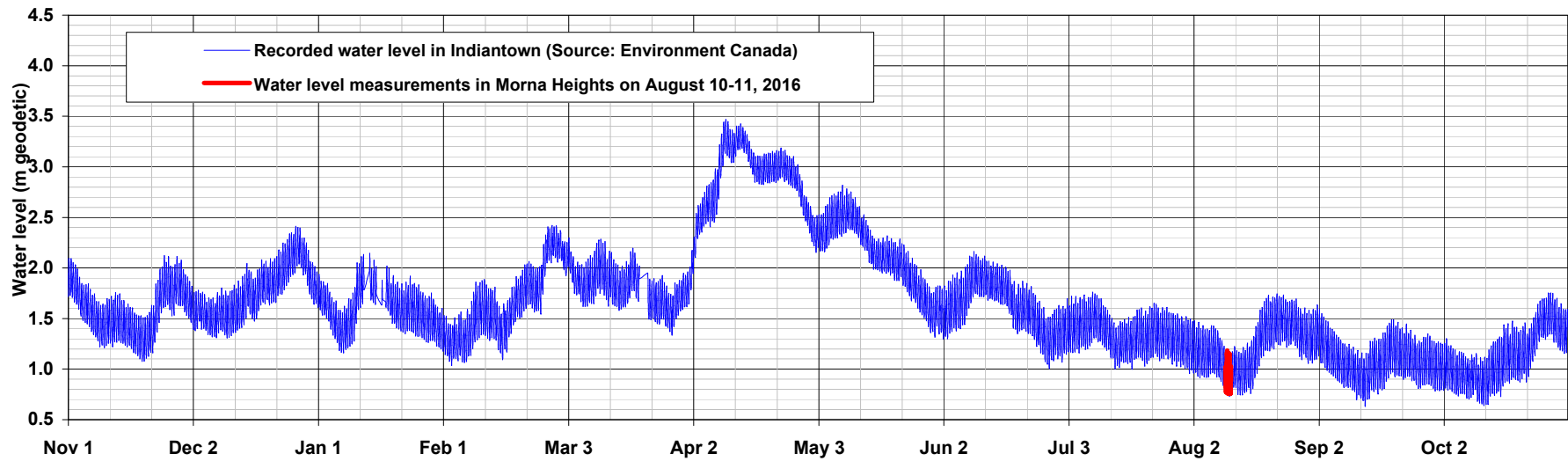
Note: Data from 2008 to 2014 (Source: NBDELG)

4.4 Field reconnaissance

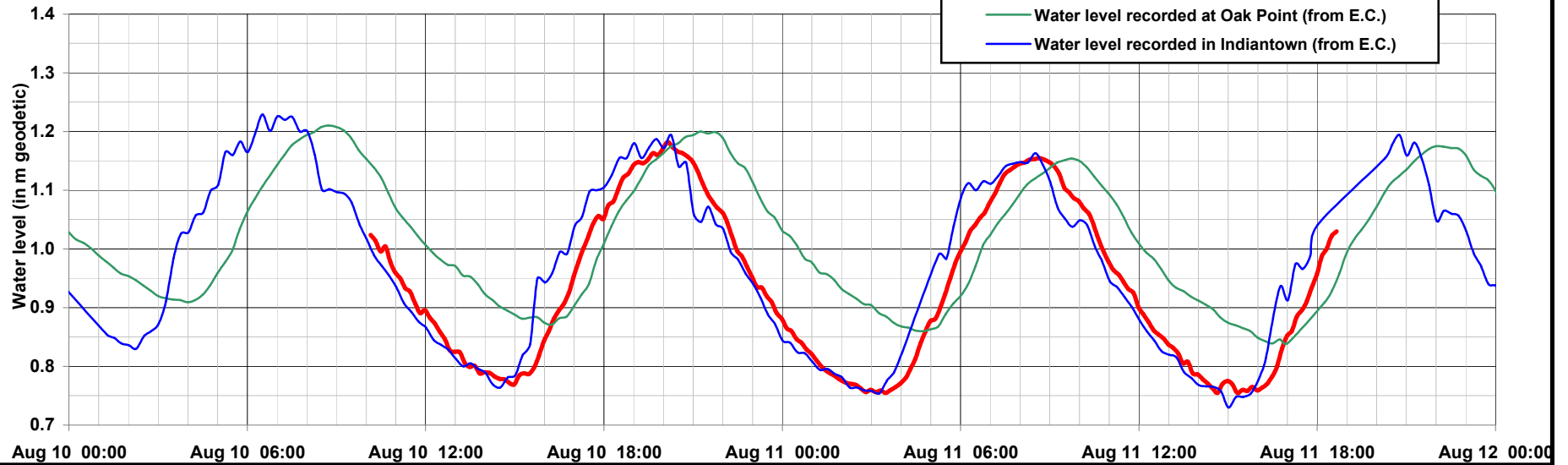
The following conditions were observed during field work carried out on August 10, 2016.

- ❑ The effluent flow was 0.35 L/s at 10:30 am, which corresponds to 30 m³/day.
- ❑ The water level variations of the Saint John River measured in the outfall area are shown on Figure 4-4, and compared to water level variations in Oak Point (30 km upstream) and the Indiantown area in Saint John (6 km downstream, just above the Reversing Falls). The tidal amplitude was 0.4 m during the rising tide on August 10.
- ❑ The bathymetry measured in the outfall area is plotted on Figure 4-5, and a cross-section perpendicular to the shore is displayed on Figure 4-6.
- ❑ Figure 4-7 illustrates where current velocities were recorded in the Saint John River in the outfall area. Drogues equipped with GPS devices were used to carry out the measurements. The measured current speeds varied from 0.02 m/s close to shore to 0.24 m/s 250 m offshore. The current direction appeared to be mainly driven by the tide on that day, as the drogues floated in the opposite direction of the normal river flow during the rising tide.

Water Level Variations from October of 2015 to September of 2016



Water Level Variations on August 10-11, 2016



Environmental Risk Assessment
Saint John - Morna Heights WWTP
Water Level Variations



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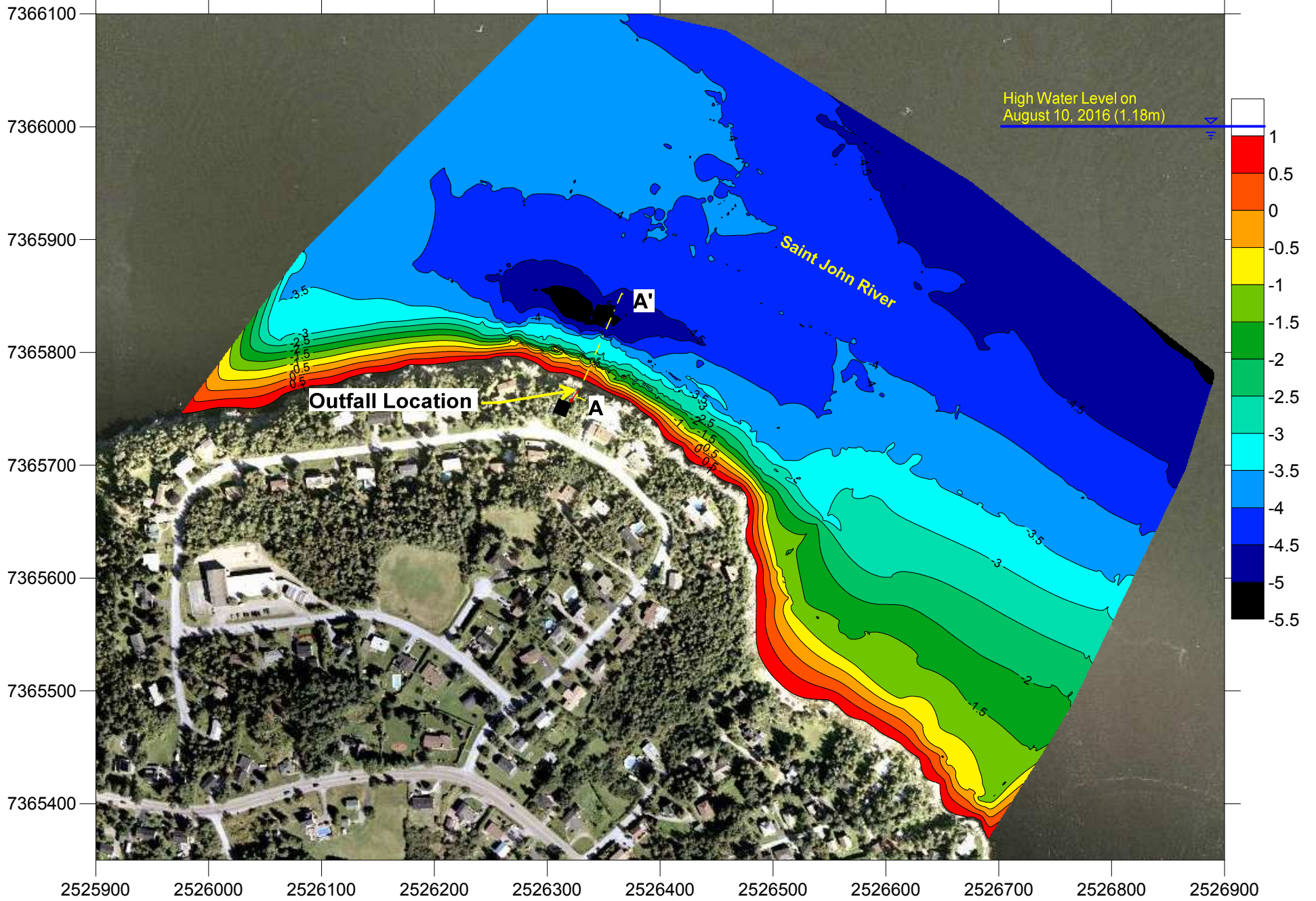
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FIGURE: 4-4



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 Saint John - Morna Heights WWTP
 Bathymetric Survey of August 10, 2016



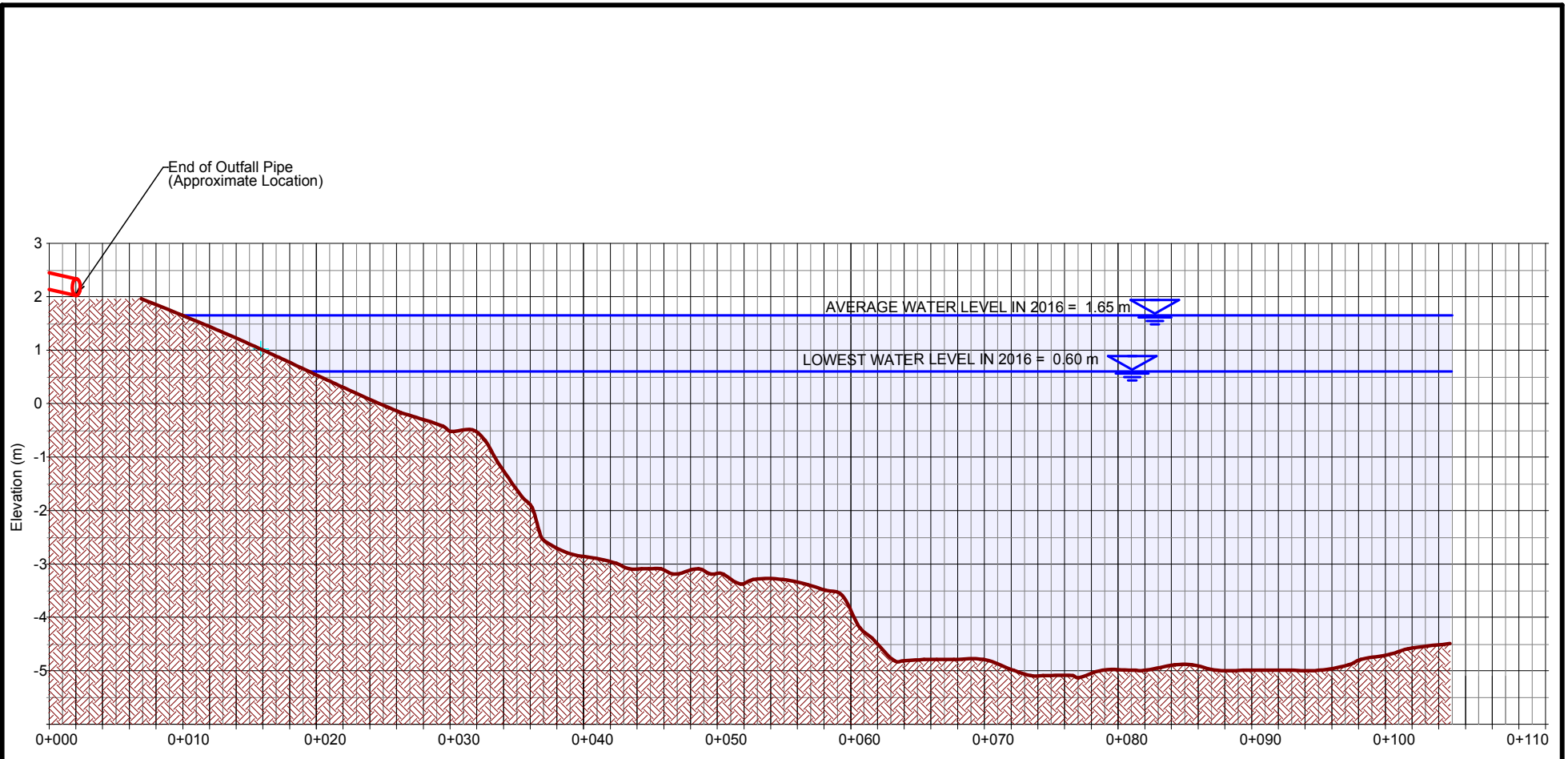
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NB Stereographic
 Coordinates (m)

FIGURE:
 4-5



CROSS SECTION A-A' AT OUTFALL LOCATION
Distance in Metres

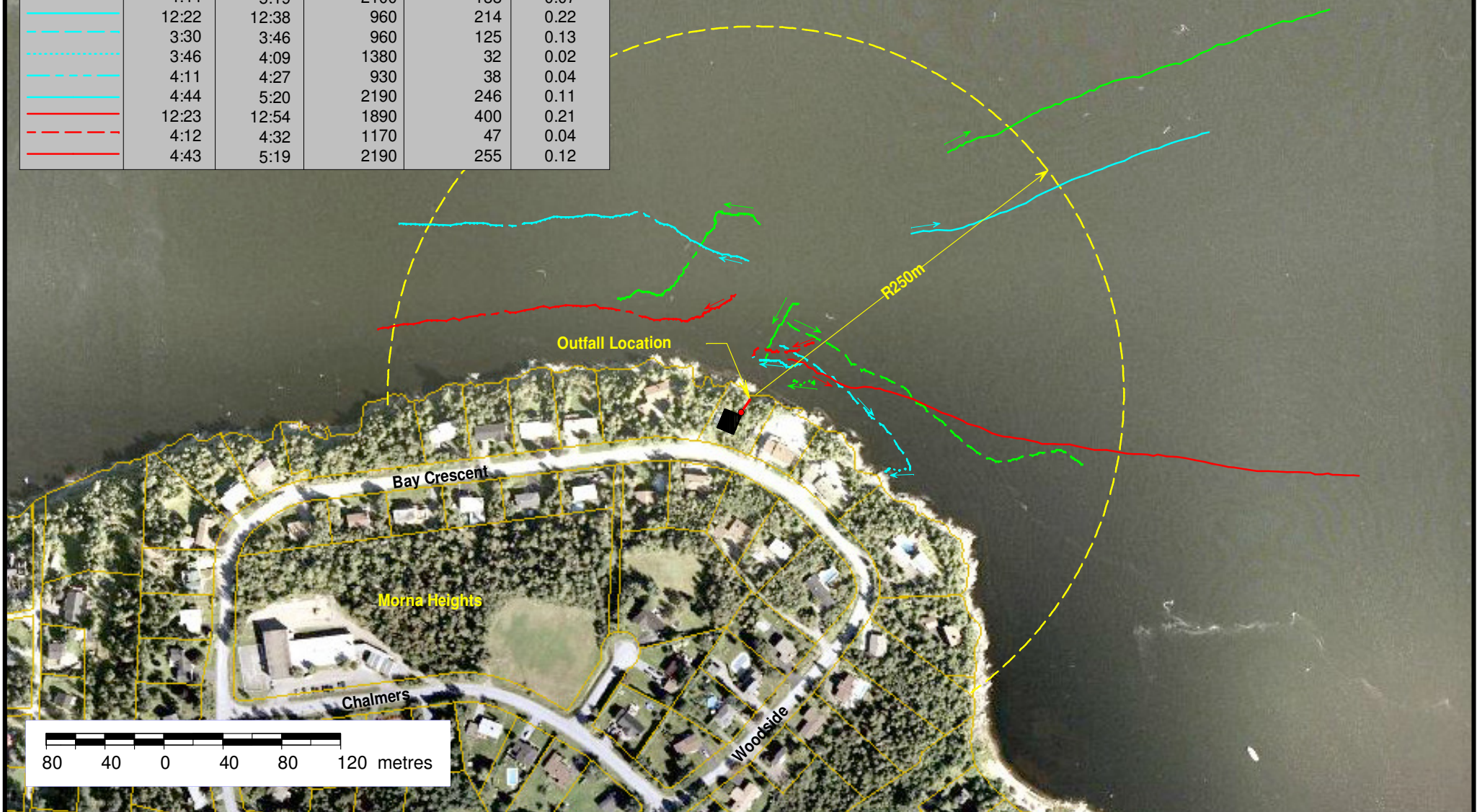
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Saint John - Morna Heights WWTP
Cross Section of River Bottom Perpendicular to Shoreline
Surveyed on August 10, 2016



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Drogue	Start Time	Stop Time	Duration (s)	Distance (m)	Speed (m/s)
—	12:20	12:40	1170	279	0.24
- - -	3:30	4:02	1950	238	0.12
· · ·	4:11	4:23	720	23	0.03
- - -	4:31	4:41	600	28	0.05
—	4:44	5:19	2100	138	0.07
—	12:22	12:38	960	214	0.22
- - -	3:30	3:46	960	125	0.13
· · ·	3:46	4:09	1380	32	0.02
- - -	4:11	4:27	930	38	0.04
—	4:44	5:20	2190	246	0.11
—	12:23	12:54	1890	400	0.21
- - -	4:12	4:32	1170	47	0.04
—	4:43	5:19	2190	255	0.12



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 Saint John - Morna Heights WWTP
 Measured Current Velocities on August 10, 2016



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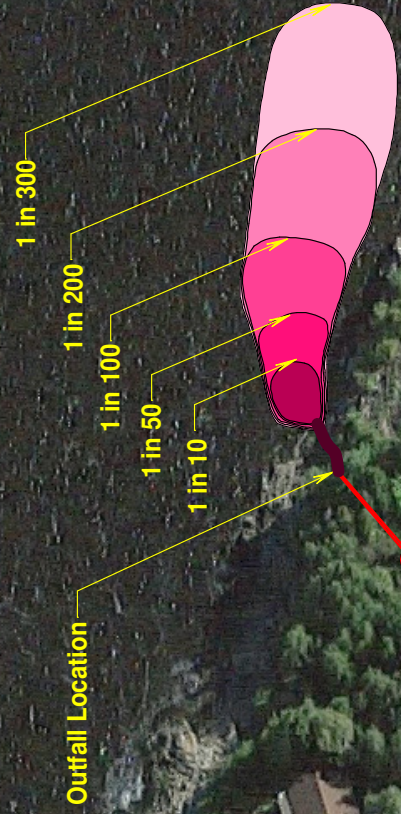
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- A dye tracer (Rhodamine WT) was released into the effluent flow at the outlet manhole from 10:30 until 17:00 on August 10, 2016 at a controlled rate. The plume of effluent mixed with dye remained at the surface, and attached to the shoreline until the edges of the rocky point where the WWTP is located (see Figures 4-8 and 4-9). The plume floated toward the East (downstream) during the falling tide, and toward the West during the rising tide (upstream) (see pictures in Appendix A). Beyond 50 m from the point where the effluent is discharged on the shore, the effluent dilution was observed to be more than one hundred times, both at the end of the falling tide and during the rising tide.

- Water quality measurements were taken in the effluent stream, in the Saint John River upstream of the outfall, and in the river 250 m downstream of the outfall (precise locations are shown Figure 4-1). Samples were also collected and sent to an independent laboratory for additional testing. The results of the water quality testing are listed in Table 4.3.



Saint John River



Bay Crescent



Environmental Risk Assessment
 Saint John - Morna Heights WWTP
 Effluent Dilution at End of Falling Tide
 Measured on August 10, 2016

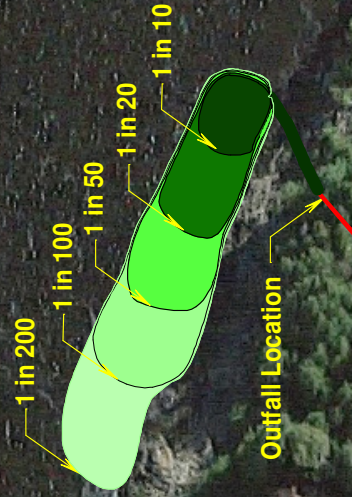


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Saint John River



Bay Crescent



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 Effluent Dilution at End of Falling Tide
 Measured on August 10, 2016



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Table 4.3. Water quality measurements on August 10, 2016.

Parameter	Unit	Saint John River upstream	WWTP Effluent	Saint John River 250 m downstream	
		at surface at 12:30	at outlet at 10:20	at surface at 12:50	at bottom (4 m deep)
Field measurements					
DO	mg/L	9.1	3.7	9.2	8.1
pH	units	8.0	6.6	8.1	7.9
Temperature	°C	21.6	19.0	21.4	18.7
Conductivity	mS/cm/C	12.3	1.1	12.8	22.6
Salinity	ppt	7.1	0.6	7.4	13.8
Laboratory analyses					
CBOD ₅	mg/L	<6	21	<6	ND
TSS	mg/L	6	27	8	ND
NH ₃ -N Unionized at 15 °C	mg/L	<0.001	0.014	<0.001	ND
NH ₃ -N Total	mg/L	<0.05	9.9	<0.05	ND
TKN	mg/L	0.7	13.1	0.9	ND
TP	mg/L	0.012	7.65	0.012	ND
E. Coli	MPN/100 mL	2	>10,000	2	ND

ND = not determined

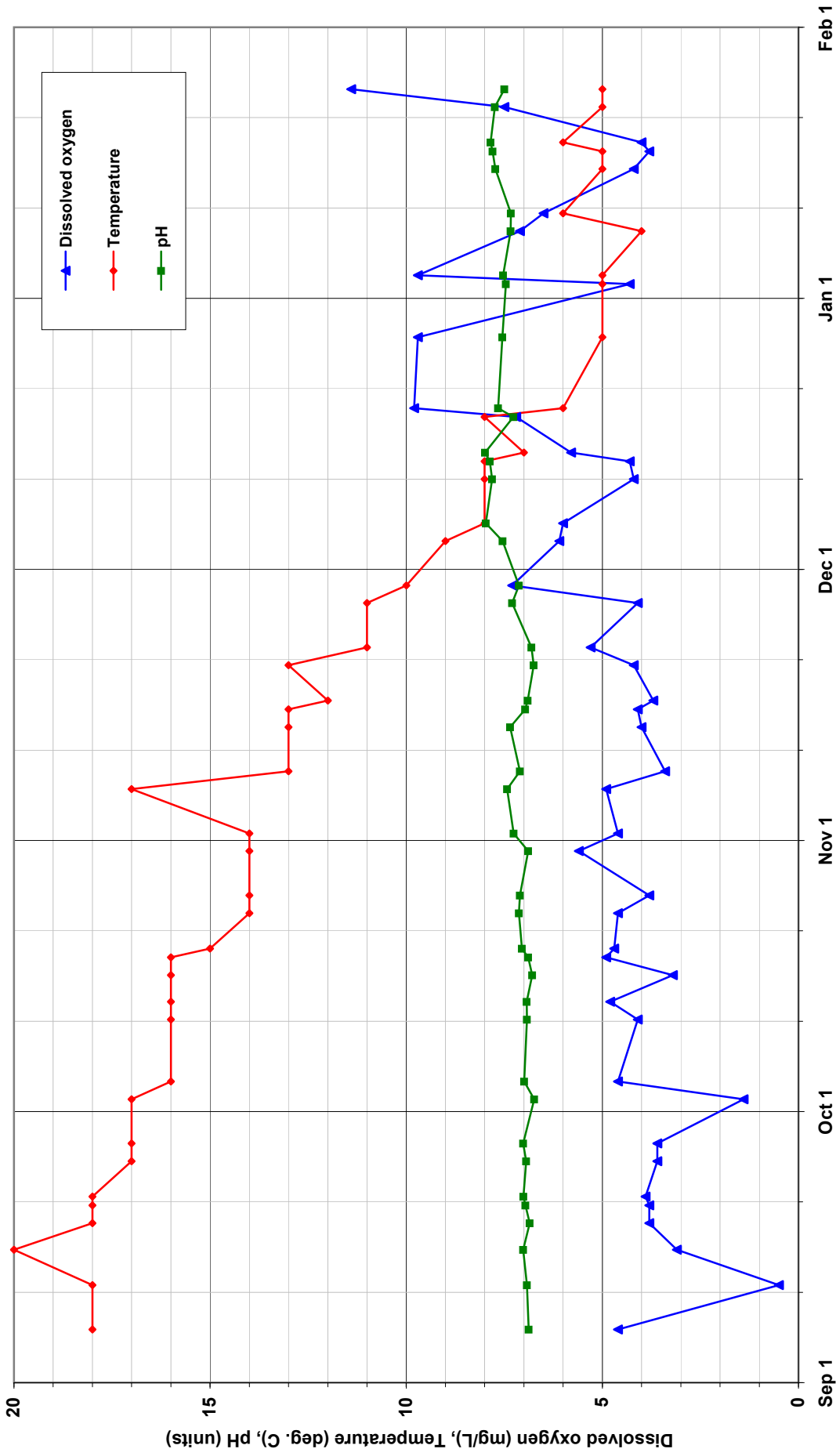
5. INITIAL EFFLUENT CHARACTERIZATION PROGRAM - RESULTS

The initial effluent characterization program was started in September of 2016 and is ongoing. The results available so far are summarized in Table 5.1 and plotted on Figures 5-1 and 5-2.

Table 5.1. Effluent quality at the Morna Heights WWTP in 2016 - 2017

Parameter	Unit	Minimum	Maximum	Average	Number of data
WWTP measurements					
Dissolved oxygen	mg/L	0.5	11.4	5.0	45
Temperature	°C	4	20	12	45
pH	units	6.7	8.0	7.2	45
Laboratory analyses					
CBOD ₅	mg/L	12	119	44	5
TSS	mg/L	22	45	33	5
NH ₃ -N unionized	mg/L	<0.05	0.38	0.16	5
NH ₃ -N Total	mg/L	7	52	25	5
TKN	mg/L	9	63	32	5
TP	mg/L	5.1	7.6	6.6	5
E. Coli (all data)	CFU/ 100 mL	64,000	1,250,000	525,800	5
E. Coli (May-October only)	CFU/ 100 mL	64,000	374,000	219,000	2
Faecal Coliforms	CFU/ 100 mL	94,000	1,450,000	607,000	5

Saint John - Morna Heights WWTP - Measured Effluent Quality in 2016-2017



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 Saint John - Morna Heights WWTP
 Measured Effluent Quality in 2016-2017



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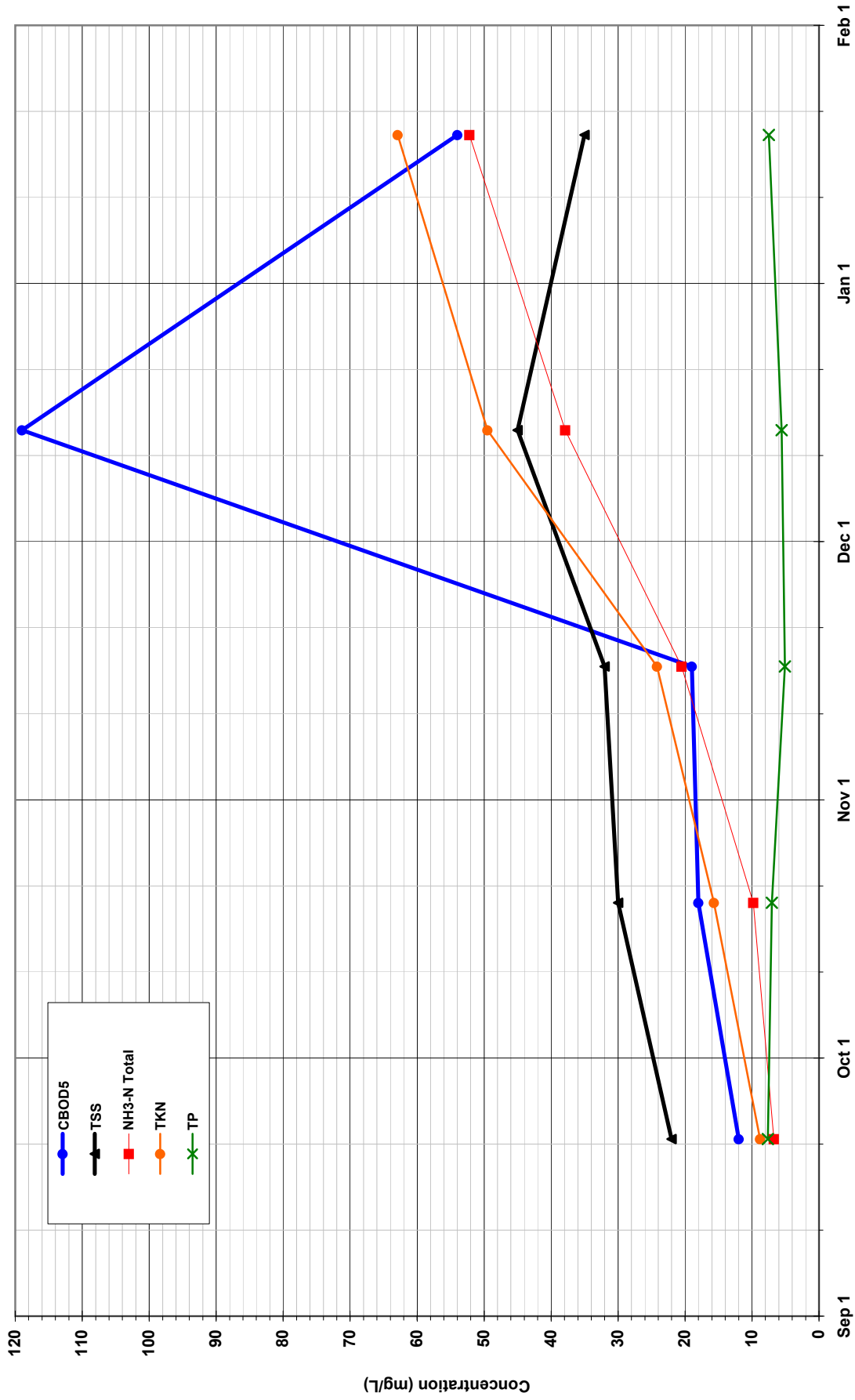
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FIGURE: 5-1

Saint John - Morna Heights WWTP - Measured Effluent Quality in 2016-2017



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Saint John - Morna Heights WWTP
Measured Effluent Quality in 2016-2017



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FIGURE: 5-2

6. DETERMINATION OF EFFLUENT DISCHARGE OBJECTIVES

6.1 Determination of Environmental Quality Objectives (EQOs)

Guideline values for relevant water quality parameters were obtained from the Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2016), and the Guidelines for Canadian Recreational Water Quality (Health Canada, 2012). The values are summarized in Table 6.1.

Table 6.1 Environmental Quality Objectives for the Saint John River

Parameter	Unit	EQOs based on the Canadian Water Quality Guidelines (fresh water)
DO (related to CBOD ₅)	mg/L	Dissolved oxygen (DO) concentration in receiving water body: >6.5 ⁽¹⁾
TSS	mg/L	<5 to <25 above background ⁽²⁾
NH ₃ -N unionized	mg/L	<0.019 ⁽³⁾
NH ₃ -N total	mg/L	<0.29 (June-September) ⁽³⁾ < 2.7 (otherwise)
TKN	mg/L	<0.5 ⁽⁴⁾ (May-October)
TP	mg/L	<0.035 ⁽⁵⁾ (May-October)
pH	units	6.5 - 9.0
E. Coli	MPN/100 mL	<200 ⁽⁶⁾ (May-October)

(1) **Dissolved oxygen:** 6.5 mg/L was chosen as a minimum for cold water fish species in freshwater
Freshwater guideline: “The concentration of dissolved oxygen for early life stages of cold water species shall be equal to or greater than 9.5 ppm and for other life stages shall be equal to or greater than 6.5 ppm; the concentration of dissolved oxygen for early life stages of warm water species shall be equal to or greater than 6.0 ppm and for other life stages shall be equal to or greater than 5.0 ppm.” (New Brunswick Water Classification Regulation, 2002). The Canadian Water Quality Guidelines for the Protection of Aquatic Life (2016) are similar except for warm water species- other life stages where the lowest acceptable dissolved oxygen concentration “shall be equal to or greater than 5.5 ppm”.

(2) Suspended sediments:

“clear flow” : Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d).

high flow: 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. “

From Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2016).

(3) Ammonia:

Freshwater: The guideline for NH₃ (unionized) is a maximum of 0.019 mg/L (CCME, 2016). The corresponding NH₃-N (Total) concentration is given by the following equation:

$$\text{NH}_3\text{-N unionized} = (\text{NH}_3\text{-N total}/0.8224) / (1 + 10^{0.0901821+2729.92/(T+273.15)-\text{pH}})$$

with T the ambient water temperature in deg. C

- Here in the worst-case of a pH of 8.0 and a water temperature of 25°C in the river, NH₃-N total should be less than 0.29 mg/L (in the summer, from June to September).

- For an average case of a pH of 7.5 and a temperature of 10°C in the river, NH₃-N total should be less than 2.7 mg/L.

(4) Total Kjeldahl nitrogen:

0.5 mg/L was chosen based on the “moderately impaired” criteria for the Saint John River proposed by the Canadian Rivers Institute (2011). No criteria is given in the Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2016).

(5) Total Phosphorus:

Freshwater: 0.035 mg/L was chosen based to remain in the meso-eutrophic trigger range.

The trigger ranges are:

- Ultra-oligotrophic: <0.004 mg/L
- Oligotrophic: 0.004 to 0.010 mg/L
- Mesotrophic: 0.010 to 0.020 mg/L,
- Meso-eutrophic: 0.020 to 0.035 mg/L,
- Eutrophic range: 0.035 to 0.100 mg/l

(From Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2016)).

(6) E. coli: less than 200 MPN/100mL for primary contact recreation (swimming). Source: Guidelines for Canadian Recreational Water Quality (Health Canada, 2012).

6.2 Determination of the mixing zone and assessment of dilution

6.2.1 Assessment of average and worst-case scenarios

The following conditions were used to assess the **average-case scenario**:

- An average water level of 1.65 m, and an average flow of 1,090 m³/s in the Saint John River.
- An average effluent discharge of 0.46 L/s (40 m³/day).

The following conditions were used to assess the **worst-case scenario**:

- A low water level of 0.6 m and a seven day - ten year low flow of 83.3 m³/s (83,300 L/s) in the Saint John River.
- An average effluent discharge of 0.46 L/s (40 m³/day).

6.2.2 Mixing zone modeling

The main assumptions used and the CORMIX model results are summarized in Table 6.2.

A dilution greater than 200 times is predicted 250 m downstream of the outfall under all scenarios simulated, which is consistent with the field observations.

Table 6.2. Cormix assumptions and results for various discharge scenarios

Parameter	Unit	Field observations	Field case	Average case	Worst case
CORMIX assumptions					
Receiving water:					
River level	m	0.78 to 1.18	1.00	1.65	0.60
Current speed near shore (influenced by tides)	m/s	0.03 near shore to 0.24 250 m offshore	0.03	0.15	0.03
Temperature	°C	19 (bottom) to 22 (surface)		10	25
Salinity	ppt	14 (bottom) to 7 (surface)			
Outfall:					
Total effluent flow	L/s	0.35	0.35	0.46	0.46
Temperature	°C	19.0	19.0	10	25
Salinity	ppt	0.3	0.6	0.3	0.6
CORMIX predictions					
Distance to 1 in 10	m	5 to 10	20	2	15
Distance to 1 in 50	m	15 to 35	40	15	45
Distance to 1 in 100	m	25 to 50	55	20	65
Distance to 1 in 200	m	40 to 60	80	60	90
Characteristics 250 m downstream:					
Dilution	1 in	>200	>200	>200	>200

ND=Not determined

6.2.3 Allocated mixing zone

In the case of a receiving watercourse like the Saint John River, three conditions limit the size of the mixing zone that can be allocated for the purpose of calculating effluent discharge objectives (CCME, 2009):

- ❑ A mixing zone should not occupy more than 25% of the cross-sectional area or volume of flow of a receiving watercourse, during 7 day - 10 year low flow conditions (Schedule B of Regulation 2002-13 under the NB Clean Water Act).
- ❑ The mixing zone cannot extend past 250 m of the outfall in any direction (NBDELG, 2012).
- ❑ A maximum dilution factor of 1 in 100 is allowed at the edge of the mixing zone (NBDELG, 2011).

The dilution of the effluent flow, after mixing into 25% of the Saint John River flow, would be 1 in 600,000 under the average scenario, and 1 in 45,000 under the worst-case scenario. The modeling results indicate that the dilution 250 m downstream of the outfall is always more than 1 in 100 under all scenarios. Therefore the 1 in 100 dilution is the most limiting condition to define the extent of the allocated mixing zone, and this contour is predicted to extend less than 70 m downstream of the outfall.

6.3 Determination of EDOs

Table 6.3 lists future effluent discharge objectives (EDOs), or effluent quality targets. A distinction is made between three types of targets: National Performance Standard (NPS), Regular Effluent Discharge Objectives (REDOs), and Theoretical Effluent Discharge Objectives (TEDOs):

- ❑ National Performance Standards (“end of pipe” requirements) are set in the federal Wastewater Systems Effluent Regulations (2012), and apply to CBOD₅ (<25 mg/L), TSS (<25 mg/L) and unionized ammonia (<1.25 mg/L).
- ❑ Regular EDOs are effluent quality objectives that should be met in the future. EDOs are calculated based on the Environmental Quality Objectives (EQOs) from Table 6.1, the dilution available at the edge of the allocated mixing zone under the worst-case scenario (1 in 100), and measured background concentrations in the receiving water body (from Tables 4.2 and 4.3).
- ❑ Theoretical EDOs are given for parameters for which a Regular EDO cannot be established due to limited mixing in the receiving environment.

It should be noted that:

- ❑ The NPS of less than 25 mg/L for CBOD₅ and TSS was not always met between September of 2016 and January of 2017.
- ❑ The Regular EDO for E. Coli (200 MPN/100mL from May to October) is strict, because no dilution can be used for the calculations (end-of-pipe standard). The average E. Coli concentration in the effluent exceeded the Regular EDO value significantly in 2016-2017.

- The Theoretical EDOs calculated are strict for TKN and TP due to the low guideline values for the river for these parameters (EQOs) and the maximum 1 in 100 dilution ratio allowed for the calculations. The concentrations of TKN and TP in the effluent exceeded the Theoretical EDOs in 2016-2017.

Table 6.3. Proposed EDOs for the Morna Heights WWTP

Parameter	Unit	Assumed background ⁽¹⁾	EQO ⁽²⁾	Calculated EDO for effluent	Average effluent quality ⁽³⁾
CBOD ₅	mg/L	0	DO > 6.5	< 25 ^(NPS)	44
TSS	mg/L	5	< 5 or < 25 above background	< 25 ^(NPS)	33
NH ₃ -N Unionized	mg/L	0	< 0.019	< 1.25 ^(NPS)	0.16
NH ₃ -N Total	mg/L	0.02	< 0.29 (Jun-Sep.)	< 27 ^(REDO) (Jun-Sep.)	25
TKN	mg/L	0.36	< 0.50 (May-Oct.)	< 14 ^(TEDO) (May-Oct.)	32
TP	mg/L	0.014	< 0.035 (May-Oct.)	< 2.1 ^(TEDO) (May-Oct.)	6.6
pH	mg/L	7.0 - 8.0	6.5 - 9.0	4.7 - 11.0 ^(REDO)	6.6 - 7.5
E. Coli	MPN/100 mL	20	< 200 (May-Oct.)	< 200 ^(REDO) (May-Oct.)	219,000

(1) From Tables 4.2 and 4.3

(2) From Table 6.1

(3) Effluent quality from September of 2016 to January of 2017 from Table 5.1

NPS = National Performance Standard

REDO = Regular Effluent Discharge Objective

TEDO = Theoretical Effluent Discharge Objective

7. SELECTION OF SUBSTANCES FOR COMPLIANCE MONITORING

7.1 Selection of substances

The substances that should be monitored in the effluent after the one-year characterization period is finished, include:

- The daily effluent flow.
- CBOD₅ and TSS, which must be monitored regardless of the initial characterization results.
- In this case, TKN, TP and E. Coli should be monitored also.

7.2 Monitoring frequencies

Table 7.1 lists the recommended effluent monitoring frequencies for the above substances for the Morna Heights WWTP, based on the requirements from the Wastewater Systems Effluent Regulations (2012) and the CCME Strategy (2009).

Table 7.1. Compliance monitoring requirements - Morna Heights WWTP

Parameter	Sampling frequency
CBOD ₅	Quarterly
TSS	
TKN	Monthly from May to October
TP	
E. Coli	

8. CONCLUSIONS AND RECOMMENDATIONS

The effluent from the Morna Heights wastewater treatment plant (WWTP) is discharged on the shore of the Saint John River. Residential properties are located upstream and downstream of the outfall area.

From October of 2016 to January of 2017, the average effluent flow was 40 m³/day (0.46 L/s). The peak flow reached 220 m³/day (2.5 L/s) on January 27, 2017. There appears to be significant inflow and/or infiltration into the sewer system. The sources of inflow/infiltration should be identified and remediated.

From September of 2016 to January of 2017, the average concentrations of CBOD₅ and TSS were above 25 mg/L (the value of the National Performance Standard for both substances). The WWTP should be upgraded to meet the Standards for CBOD₅ and TSS.

The calculated effluent discharge objective (EDO) for E. Coli is strict (<200 MPN/100 mL from May to October), because no dilution can be considered in the EDO calculations when the outfall is close to areas where bodily contact may occur. In the future, E. Coli concentrations should be monitored during the summer months (May-October). If E. Coli concentrations are elevated during the summer, it is recommended to install a disinfection system to remove pathogens. A UV system would be preferable to chlorination. If chlorination was used, dechlorination would have to be provided, and residual chlorine in the effluent would have to be monitored daily to ensure levels below the National Performance Standard of less than 0.02 mg/L.

The theoretical EDOs calculated are strict for nitrogen and phosphorus, due to the relatively low guideline values for the receiving environment for these parameters. The WWTP should be upgraded to reduce nitrogen and phosphorus concentrations in the effluent. Until upgrades are in place, these parameters should be monitored monthly from May to October.

The outfall should be extended so that it is submerged at all times. The outfall pipe should terminate deep enough underwater to not be damaged by ice.

9. REFERENCES

Caissie D., Le Blanc, L., Bourgeois, J., El-Jabi, N., and N. Turkkan. 2011. Low Flow Estimation for New Brunswick Rivers. Canadian Technical Report of Fisheries and Aquatic Sciences 2918, Fisheries and Oceans Canada.

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Health Canada. 2012. Guidelines for Canadian Recreational Water Quality, Third Edition. Prepared by the Federal-Provincial-Territorial Working Group on Recreational Water Quality of the Federal-Provincial-Territorial Committee on Health and the Environment. Ottawa, Ontario, April 2012.

New Brunswick Water Classification Regulation 2002-13, available online at: <http://www.gnb.ca/0062/regs/2002-13.htm>

NBDELG, 2011. Mixing Zone Assessment Framework (personal communication, Stephen Drost, NBDELG, May 2011).

NBDELG, 2012. Clarification of CCME Environmental Risk Assessment Mixing Zone Requirements (personal communication, Scott Lloy, NBDELG, June 2012).

10. GLOSSARY

A

Acutely Lethal (*Létal aigu*)

At 100 percent concentration of effluent, more than 50 percent of the test species subjected to it over the test period are killed when tested in accordance with the acute lethality test set out in the appropriate method. For rainbow trout this is Reference Method EPS 1/RM/13.

Allocated Mixing Zone (*Zone de mélange allouée*): see mixing zone

Ammonia (*Ammoniac*)

Total ammonia expressed as nitrogen. Total ammonia means the sum of the unionized ammonia (NH_3) and ionized ammonia (NH_4^+) species which exist in equilibrium in water. Analytical methods measure and typically report on ammonia nitrogen as opposed to total ammonia. The unionized ammonia (NH_3) is toxic to fish in low concentrations. The amount of NH_3 is calculated as a fraction of the total nitrogen, based on temperature and pH.

C

Canadian Environmental Quality Guidelines (*Recommandations canadiennes pour la qualité de l'environnement*)

Nationally endorsed, science-based goals for the quality of atmospheric, aquatic, and terrestrial ecosystems. Environmental quality guidelines are defined as numerical concentrations or narrative statements that are recommended as levels that should result in negligible risk to biota, their functions, or any interactions that are integral to sustaining the health of ecosystems and the designated resource uses they support. Developed by CCME.

Carbonaceous Biochemical Oxygen Demand (CBOD5, 5-day) (*Demande biochimique en oxygène des matières carbonées [DBO5C, 5 jours]*)

A measure of the quantity of oxygen used in the biochemical oxidation of organic matter in 5 days, at a specific temperature, and under specified conditions. The method of analysis is defined by Method 5210 in Standard Methods. The CBOD is a fraction of the total BOD. This fraction is specific to each effluent.

Chronic Toxicity (*Toxicité chronique*)

The ability of a substance or mixture of substances to cause harmful effects over an extended period, usually upon repeated or continuous exposure sometimes lasting for the entire life of the exposed organism. Chronic toxicity results in reduced reproductive capacity or reduced growth of young, in fish or invertebrate populations.

Combined Sewer (*Égout unitaire*)

A sewer intended to receive both sanitary waste and storm water.

Combined Sewer Overflow (CSO) (*Débordement d'égout unitaire [DEU]*)

A discharge to the environment from a combined sewer system that occurs when the hydraulic capacity of the combined sewer system has been exceeded, usually as a result of rainfall and/or snow melt events.

D

Designated Area (*Zone désignée*)

Sensitive areas as identified by the regulator and that may be affected by municipal wastewater discharges, such as fish spawning sites, beaches, drinking water intakes, etc.

E

Effluent Discharge Objective (EDO) (*Objectif environnemental de rejet [OER]*)

Concentration, load or toxicity units that should be met at the municipal wastewater effluent discharge to adequately protect all water uses in the receiving environment. Effluent discharge objectives are obtained through an environmental risk assessment methodology using the principles of assimilative capacity and mixing zone, in conjunction with environmental quality.

Environmental Quality Objective (EQO) (*Objectif de qualité de l'environnement [OQE]*)

Concentration of a substance considered safe for aquatic life and for the human uses that exist or should exist outside of a determined mixing zone. The *Canadian Environmental Quality Guidelines* (CEQG) are generic EQOs often used in Canada. The numerical concentrations or narrative statements that establish the conditions necessary to support and protect the most sensitive designated use of water at a specified site (CCME, 1987)

Environmental Risk Assessment (ERA) (*Évaluation des risques environnementaux [ERE]*)

A procedure that will enable the establishment of effluent discharge objectives for substances of concern. This process will take into account the characteristics of the effluent and of the site-specific receiving environment. The environmental risk assessment includes a one-year period where a facility will characterize its effluent (initial characterization).

Eutrophication: Excessive growth of aquatic vegetation in response to elevated concentrations of nutrients (often associated with wastewater discharges).

M

Mixing Zone (*Zone de mélange*)

Also called the initial dilution zone. The area contiguous with a point source (effluent discharge site) or a delimited non-point source where the discharge mixes with ambient water and where concentrations of some substances may not comply with water quality guidelines or objectives. For the purpose of the Strategy, “mixing zone” means the “allocated mixing zone” at the edge of which environmental quality objectives should be met.

N

Near-Field Mixing Zone The volume of water between the end of the discharge pipe or the diffuser nozzle, and the point where the energy (mainly momentum and buoyancy) of the effluent has dissipated. Beyond this point - in the far-field - river or coastal current transport takes over.

Nutrient (*Élément nutritif*)

Any substance that is assimilated by organisms and promotes growth; generally applied to nitrogen and phosphorus in wastewater, but also to other essential and trace elements.

R

Receiving Environment (*Milieu récepteur*)

The water body into which effluent is discharged.

S

Streeter Phelps algorithm: A method of predicting oxygen depletion in a receiving water body as a function of organic loadings and existing background condition.

APPENDIX A - Photographs



WWTP entrance



Weir in outlet manhole



Outlet manhole



Outfall area



Effluent stream

Outfall area, looking toward the East



Outfall area, looking toward the West



Effluent and dye during the rising tide



The City of Saint John

March 27, 2017

Kevin O'Brien, P. Eng
Transportation and Environment Services
City of Saint John
P.O. Box 1971
Saint John, NB
E2L 4L1

E-mailed: Kevin.O'Brien@saintjohn.ca

Dear Mr. O'Brien:

**Subject: Zoning Inquiry
139 Bay Crescent Drive**

This is in reply to your inquiry concerning the above-mentioned property, also identified as PID number 00024364. It is my understanding that you are intending to construct a new wastewater treatment facility to replace the existing one on the subject property.

The site is split between the *Rural Settlement Area* designation and *Park and Natural Area* designation on Schedule B of the City's Municipal Plan. The Rural Settlement designation contemplates development of low density housing with private on-site water and wastewater systems. Considering the role of this use provided, the facility is appropriate within the Rural Settlement area and The Parks and Natural Area designations.

Our records show that this property is located in the **Utility Service (US)** zone. A wastewater treatment facility is a permitted use in this zone.

Therefore, the proposed construction of a wastewater facility would be in compliance with the Zoning By-law and Municipal Plan.

Should you have any zoning related questions please contact me at (506) 658-4446 or by e-mail at katelyn.davis@saintjohn.ca.



SAINT JOHN

P.O. Box 1971
Saint John, NB
Canada E2L 4L1

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Saint John, N.-B.
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Page 1 of 2

Sincerely,

A handwritten signature in black ink that reads "Katelyn Davis". The letters are cursive and fluid, with the first letters of "K", "D", and "D" being capitalized and prominent.

Katelyn Davis, EIT
Development and Research Coordinator

Attachment

Project No. 17-061



January 3, 2017

His Worship Donald Darling
Mayor of Saint John
P.O. Box 1971, 15 Market Square
Saint John, NB E2L 4L1

Your Worship:

Subject: Clean Water and Wastewater Fund ("CWWF") Funding Contribution Agreement, Reference No. 6990-1072

I am pleased to inform you that under the *Clean Water and Wastewater Fund*, your project entitled "Modernization of Morna Heights Wastewater Treatment Facility" has been approved. Funds allocated to the project are from the federal and provincial governments. You will receive a financial contribution of 75% of the eligible expenditures for this project, 50% federal and 25% provincial. The maximum eligible expenditure, including the 25% municipal portion, is \$1,497,665. The funds allocated to your project are subject to terms and conditions outlined in the agreement and schedules of the enclosed *Clean Water and Wastewater Fund Funding Contribution Agreement*.

Please be advised that as per the Agreement, all communication activities related to the aforementioned project are to be undertaken jointly by the Federal, Provincial and Local Governments.

I would appreciate if you could confirm your acceptance of the conditions by signing the enclosed agreement, accompanied by your corporate seal, and returning it to our department. Please feel free to contact France Castonguay, Project Engineer, Community Funding Branch at 506-457-4947 if you have any questions or concerns.

I wish you success with your project and am pleased that together, we can make a positive difference in your community.

Sincerely,

A handwritten signature in black ink, appearing to read "Serge Rousselle".

Hon. Serge Rousselle, Q.C.
Minister

Enclosure: Clean Water and Wastewater Fund Funding Contribution Agreement

C. Sara DeGrace, Assistant Deputy Minister



**CLEAN WATER AND WASTEWATER FUND (“CWWF”)
FUNDING CONTRIBUTION AGREEMENT**

This Agreement is made as of the date of last signature.

BETWEEN: **HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF NEW BRUNSWICK,**
as represented by the Minister of Environment and Local Government (the
“**Minister**”)

AND: **THE CITY OF SAINT JOHN, P.O. Box 1971, 15 Market Square, NB, E2L 4L1** a body
corporate in the Province of New Brunswick (the “**Recipient**”)

(each, a “**Party**”)

RECITALS

- A. The Government of Canada announced in Budget 2016 a Canada-wide investment of \$120 billion in infrastructure over 10 years, including \$60 billion in new funding for public transit, green infrastructure, and social infrastructure, to better meet the needs of Canadians and better position Canada's economy for the future;
- B. The Government of Canada and the Province of New Brunswick entered into the Bilateral Agreement - “*Public Transit Infrastructure Fund (PTIF)*” and “*Clean Water and Wastewater Fund (CWWF)*” (the “**PTIF and CWWF Funding Agreement**”) to provide financial support to the Minister for projects under both the PTIF and CWWF programs;
- C. The CWWF will help accelerate short term municipal investments, while supporting the rehabilitation of water, wastewater and storm water infrastructure, and the planning and design of future facilities and upgrades to existing systems.
- D. The Minister of Environment and Local Government is responsible for the administration of the Clean Water and Wastewater Fund component of the PTIF and CWWF Funding Agreement;
- E. This Agreement is made pursuant to the PTIF and CWWF Funding Agreement and therefore all relevant provisions of the PTIF and CWWF Funding Agreement will apply to this Agreement;

In consideration of the mutual responsibilities and obligations in this Agreement the Parties agree as follows:

1. INTERPRETATION

1.1. **Definitions.** In addition to the terms and conditions defined in the recitals and elsewhere in this Agreement, unless the context requires otherwise, capitalized terms in this Agreement will have the following meanings:

- a) **“Agreement”** means this *Clean Water and Wastewater Fund Funding Contribution Agreement* and all schedules, as may be amended from time to time.
- b) **“Agreement End Date”** means March 31, 2019.
- c) **“Applicable Law”** means all applicable federal, provincial and municipal laws, statutes, codes, ordinances, orders, decrees, by-laws, rules, regulations, permits, licenses, authorizations and directives.
- d) **“Asset”** means any real or personal property or immovable or movable asset, acquired, constructed, rehabilitated or improved, in whole or in part, with funds provided under the terms and conditions of this Agreement.
- e) **“Canada”** means the Government of Canada, as represented by the Minister of Infrastructure, Communities and Intergovernmental Affairs.
- f) **“Communications Activities”** include, but are not limited to, public or media events or ceremonies including key milestone events, news releases, reports, web and social media products or postings, blogs, news conferences, public notices, physical and digital signs, publications, success stories and vignettes, photos, videos, multi-media content, advertising campaigns, awareness campaigns, editorials, multi-media products and all related communication materials.
- g) **“Effective Date”** means the date of last signature of this Agreement.
- h) **“Eligible Expenditures”** means, subject to Section 5.7, those costs of the Project, incurred and eligible for reimbursement with funds from the Minister and Canada, as set out in Schedule B (CWWF Program Details), that have been approved as part of Project approval.
- i) **“Fiscal Year”** means from April 1 of a calendar year and ending March 31 of the next calendar year.
- j) **“Good Industry Practice”** means the exercise of a degree of skill, diligence, prudence and foresight that would be expected from a person skilled and

experienced in carrying out projects similar to the Project, in a manner consistent with the most effective current practices;

- k) **“Joint Communications”** are events, news releases, and signage that relate to the promotion of the Program or the Project or both, and are collaboratively developed and approved by Canada, the Minister and the Recipient, and are not operational in nature.
- l) **“Main text”** means the main body of this Agreement from the title to the signatures.
- m) **“Program”** means CWWF as set out in Schedule B (Program Details).
- n) **“Project”** means the project approved by the Minister under the CWWF Funding Contribution Agreement as described in Schedule A.
- o) **“Project Incrementality”** means that the Project that would not otherwise have been undertaken in 2016-17 or 2017-18 or that the Project that would not have been undertaken without federal funding.
- p) **“Project Complete”** means when a Project can be used for the purpose for which it was intended, all required reports have been submitted to the Minister and final payment has been made.
- q) **“PTIF and CWWF Funding Agreement”** means the *Canada – New Brunswick “Public Transit Infrastructure Fund (PTIF) and Clean Water and Wastewater Fund (CWWF)” Bilateral Agreement* dated August 16, 2016 which sets out the roles and responsibilities of Canada and New Brunswick for the delivery of the program(s), including attached Schedules.
- r) **“PTIF and CWWF Funding Agreement End Date”** means March 31, 2019.
- s) **“Total Financial Assistance”** means total Project funding from all sources, including funding from federal, provincial, territorial, and municipal sources, private sources and in-kind contributions.

1.2. **Rules of Interpretation**

- a) In this Agreement:
 - i) The division of the text into sections and paragraphs and the insertion of headings are for the reader’s convenience only and will not affect the interpretation of any provision;

- ii) Words expressed in the singular include the plural and vice versa. Words connoting gender include both genders. A derivative of a defined term will have a corresponding meaning unless the context requires otherwise;
 - iii) In the event of a conflict between a provision of the main text and an attached schedule, the main text will prevail;
 - iv) If there is a conflict between this Agreement and the PTIF and CWWF Funding Agreement, the provisions of the PTIF and CWWF Funding Agreement will apply;
 - v) Citations of “**Sections**” are references to provisions of the main text, and may include articles, sections, paragraphs or sub-paragraphs as indicated by the numbers or letters cited; and
 - vi) Sums of money are expressed in Canadian currency.
- b) The Parties acknowledge that they have participated equally in the preparation of this Agreement. If any term of this Agreement requires judicial interpretation, mediation or arbitration, the court, mediator or arbitrator will not apply a presumption that this Agreement is to be interpreted more strictly against the Party that prepared it.
- c) The following schedules are attached to and form part of this Agreement:
- Schedule A – Project Details
 - Schedule B – CWWF Program Details
 - Schedule C – Attestation for Project Incrementality
 - Schedule D – Progress Report Form
 - Schedule E – Detailed Claim Form
 - Schedule F – Project Completion Form
 - Schedule G – Communications Protocol

2. DURATION

- 2.1. This Agreement will be effective as of the Effective Date and will terminate on the Agreement End Date.

3. OBLIGATIONS OF THE PARTIES

3.1. Commitments by the Minister

- a) The Minister agrees to provide funding from Canada and the Province of New Brunswick to the Recipient in a total amount not to exceed seventy-five percent (75%) of the Eligible Project Expenditures of the Project.

- b) The maximum federal funding for the Project, from all federal sources, will not exceed fifty percent (50%) of the total Eligible Expenditures for the Project. The maximum provincial funding for the Project, from all provincial sources, will not exceed twenty-five percent (25%) of the total Eligible Expenditures for the Project.
- c) Despite any other provision of this Agreement, the Recipient acknowledges and agrees that the Minister's role is limited to providing funding for the Project and that the Minister and Canada will have no involvement in the implementation or operation of the Project. The Minister and Canada are neither decision-makers nor administrators of the Project.

3.2. **Commitments by the Recipient**

- a) Recipient will be responsible for the complete, diligent, and timely implementation of this Agreement, within the costs and deadlines specified in this Agreement and in accordance with the terms and conditions of this Agreement.
- b) Recipient will be responsible for any unapproved expenditures and cost overruns.
- c) Recipient will be responsible for any costs associated with the withdrawal or cancellation of the Project, and any costs related to the Project failing to meet Project Incrementality requirements, and will repay to the Minister any and all disallowed costs, surpluses, unexpended contributions, and overpayments made under and according to the terms and conditions of this Agreement within thirty (30) days of written notification to that effect.
- d) Recipient will allow any authorized representative of the Minister or Canada reasonable access to the Project site to assess the Project's progress, to review all records and accounts maintained and to carry out the evaluation process required for the implementation of this Agreement. The Recipient will provide all records and accounts as requested by the Minister.
- e) Recipient will bear all operating expenditures of the Project.
- f) Recipient acknowledges that funding that may be received from the Minister or Canada is not intended to replace or displace existing sources of funding for the Recipient expenditures on the Project. As such, over the term of this Agreement, the Recipient will ensure that the Recipient expenditures on the Project must result in incremental spending.
- g) Recipient must provide a completed Attestation for Project Incrementality Form as per Schedule C confirming that the Project meets the definition of Project Incrementality.
- h) Recipient will inform the Minister immediately of any fact or event that will compromise wholly, or in part, the Project.

4. APPROPRIATIONS

- 4.1. Notwithstanding any other provision of this agreement, funding is dependent on an appropriation of funds by the Parliament of Canada and the Legislature of the Province of New Brunswick for the fiscal year in which the payment is to be made.
- 4.2. The Minister and Canada may reduce or terminate any payment under this Agreement in response to the reduction of appropriations or departmental funding levels in respect of transfer payments, the program under which this Agreement was made or otherwise, as evidenced by any appropriation act of the federal or provincial Crown's main or supplementary estimates expenditures. The Minister and Canada will not be liable for any direct, indirect, consequential, exemplary or punitive damages, regardless of the form of action, whether in contract, tort or otherwise, arising from any such reduction or termination of funding.

5. PROJECT IMPLEMENTATION

- 5.1. Recipient will not change the project scope, timing or location without the prior written approval of the Minister. The Recipient will promptly inform the Minister should the Project be cancelled.
- 5.2. During the life of the Project, the Recipient will provide the Minister with progress report forms as set out in Schedule D, updated every June 15 and November 15, for the duration of the Agreement.
- 5.3. Recipient will be responsible for arranging the engineering design, calling of public tenders and awarding of the contract to the successful bidder, and overall management of the contract. The Recipient will award and manage all contracts in accordance with their relevant policies and procedures and, if applicable, in accordance with the Agreement on Internal Trade and applicable international and interprovincial trade agreements, and all other Applicable Law, including the *Procurement Act*, SNB 2012, c.20.
- 5.4. Recipient will ensure that the Project work will be carried out in accordance with Applicable Law and Good Industry Practice.
- 5.5. The Minister reserves the right to request additional information for review and approval purposes, including assessment of risks, or to make a determination as per Sections 7 (Environmental Assessment and Licensing) and 8 (Aboriginal Consultation).
- 5.6. The Minister may request additional assurance that the Project can be completed by March 31, 2018. This may include assurances by professionals (e.g. architects, engineers).

- 5.7. Repair, restoration or replacement of the Recipient's property that was required to be removed, damaged or destroyed as part of the Project (the "Collateral Infrastructure") will be carried out to a standard that does not exceed the original quality or quantity of the Collateral Infrastructure. Eligible Expenditures will not include any expenditure for enhancement or improvement of Collateral Infrastructure.

6. DISPOSAL OF ASSETS

- 6.1. Unless otherwise agreed to by the Minister, the Recipient will retain title to and ownership of all Assets for 5 years after the Agreement End Date.
- 6.2. If at any time within 5 years from the Agreement End Date, the Recipient sells, leases, or otherwise disposes of, directly or indirectly, any Asset other than to Canada, or the Minister, or with the Minister's written consent, the Recipient may be required to reimburse Canada and the Minister any funds disbursed under this Agreement for the Project.

7. ENVIRONMENTAL ASSESSMENT AND LICENSING

- 7.1. The Project may be subject to environmental laws, including without limitation, the Minister *Regulation 87-83 Environmental Impact Assessment Regulation – Clean Environment Act* (the "NB EIA Reg") and the *Canadian Environmental Assessment Act* ("CEAA").
- 7.2. If the Project requires registration under the NB EIA Reg or is deemed to be a designated project under the CEAA, no funds will be advanced to the Recipient for expenditures related to construction work until a copy of the signed letter of determination or a copy of the decision statement has been received by the Minister.
- 7.3. Funding for this Project is conditional upon Canada being satisfied that the responsibility of the federal authority or responsible authority under the CEAA and other applicable agreements between Canada and Aboriginal groups is met and continues to be met.
- 7.4. Recipient will obtain all necessary licenses, permits, and approvals required for the Project under Applicable Law.

8. ABORIGINAL CONSULTATION

- 8.1. Funding for the Project is conditional upon the Minister and Canada being satisfied that obligations with respect to the legal duty to consult, and if applicable, requirement to accommodate Aboriginal groups are met.
- 8.2. Recipient will comply with all obligations (i) under Applicable Law; (ii) as required by regulatory bodies having jurisdiction over the subject matter of the Project; and (iii)

under common law, to engage in Aboriginal consultation and consider Aboriginal interests.

9. CLAIMS AND PAYMENT

- 9.1. Each claim for reimbursement of Eligible Expenditures will be submitted by the Recipient on forms provided in Schedule E. Claims will include copies of invoices along with all supporting documents, proof of payment of each invoice submitted for reimbursement, and such other documents as may be requested by the Minister. Requests for payment will be submitted at a minimum on a semi-annual basis in a form acceptable to the Minister, and each request for a payment will include an attestation in a format acceptable to the Minister, signed by a delegated senior financial official, that Eligible Expenditures have been incurred.
- 9.2. The Minister will promptly make a payment to the Recipient upon review and approval of a payment request, subject to the terms and conditions of this Agreement.
- 9.3. When any other federal or provincial assistance is given or is to be given in respect of the Project which was not taken into consideration in the original application, contributions made or to be made under this Agreement by the Minister may be reduced by a corresponding amount.
- 9.4. The Minister reserves the right to withhold reimbursements of Eligible Expenditures until the Project Completion Form provided in Schedule F is completed and returned to the Minister by the Recipient.
- 9.5. No claim for reimbursement will be paid by the Minister unless the claim is received on or before January 20 of the year following the fiscal year in which the Eligible Expenditure is incurred and in all circumstances, no later than June 30, 2018.

10. PAYMENT CONDITIONS

- 10.1. The Minister will not:
 - a) pay interest for failing to make a payment under this Agreement;
 - b) pay any claims until the requirements under Sections 7 and 8 , if applicable, are, in the Minister's opinion, satisfied at the date the claim is submitted to the Minister; or
 - c) pay any claims until all reports as required under this Agreement and supporting documentation required under Section 5 are received and accepted by the Minister.

11. PAYMENT DEADLINE

- 11.1. The Minister will make payments for claims that have met all payment conditions no later than February 28 of the year following the Fiscal Year in which the Eligible Expenditures were incurred;
- 11.2. The Minister will make the final payment no later than July 31, 2018.

12. RETENTION OF CONTRIBUTION

- 12.1. The Minister will retain a minimum of ten percent (10%) (the "Holdback") of its funding for the Project. The Holdback will be released by the Minister when:
 - a) Recipient fulfils all of its obligations for the Project under this Agreement; and
 - b) the Parties carry out a final reconciliation of all claims and payments in respect of that Project and make any adjustments required in the circumstances.

13. REPORTING

- 13.1. Recipient will provide to the Minister at minimum on a semi-annual basis a Project progress report in a format acceptable to the Minister and in accordance with Schedule D (Progress Report Form); and will submit, in a format acceptable to the Minister, no later than July 31, 2018 a final project report in accordance with Schedule F (Project Completion Form).

14. AUDITS

- 14.1. Recipient will allow the Minister reasonable and timely access to all the Recipient's documentation, records and accounts and those of their agents or third parties related to the Project, and all other relevant information and documentation requested by the Minister, or their designated representatives, for the purposes of audit, evaluation, and ensuring compliance with this Agreement.
- 14.2. The Minister may conduct compliance audits during the term of the Agreement and for up to two years after the Agreement End Date.
- 14.3. The Minister reserves the right to undertake any audit in relation to this Agreement at its expense. In the event where the Minister does undertake an audit, it will provide the Recipient reasonable notice.
- 14.4. Recipient will keep proper and accurate financial accounts and records, including but not limited to its contracts, invoices, statements, receipts, and vouchers, in respect of a Project for at least 6 years after the termination of this Agreement and will provide the Minister and its designated representatives with reasonable and timely access to documentation for the purposes of audit and ensuring compliance with this Agreement.

15. DISPUTE RESOLUTION

- 15.1. The Parties will keep each other informed of any issue that could be contentious.
- 15.2. Where the Parties cannot agree on a resolution, the Parties may explore any alternative dispute resolution mechanisms available to them to resolve the issue.
- 15.3. Any payments related to any contentious issue or dispute raised by either Party may be suspended by the Minister together with the obligations related to such issue, pending resolution.
- 15.4. The Parties agree that nothing in this Section will affect, alter or modify the rights of either Party to terminate this Agreement.

16. INDEMNIFICATION

- 16.1. Recipient will at all times indemnify and save harmless the Minister and Canada, their respective directors, officers, employees, or agents, from and against all actions, whether in contract, tort or otherwise, claims and demands, losses, costs, damages, suits or other proceedings by whomsoever brought or prosecuted in any manner based upon or occasioned by any injury to persons, damage to or loss or destruction of property, economic loss or infringement of rights caused by, in connection with or arising directly or indirectly from this Agreement, the PTIF and CWWF Funding Agreement, or the Project, except to the extent to which such actions, claims, demands, losses, costs, damages, suits or other proceedings relate to the negligence or breach of this Agreement or the PTIF and CWWF Funding Agreement by a director, officer, employee or agent of the Minister or Canada in the performance of his or her duties.

17. COMMUNICATIONS

- 17.1. No public announcement of an activity related to the Project will be made by the Recipient without the prior written consent of the Minister.
- 17.2. The Parties will comply with the Communications Protocol set out in Schedule G.

18. ACCOUNTING PRINCIPLES

- 18.1. All accounting terms will have the meanings assigned to them, all calculations will be made and all financial data to be submitted will be prepared, in accordance with the Public Sector Accounting Standards in effect in Canada.

19. OTHER

- 19.1. The Minister and the Recipient acknowledge that the financial contribution by Canada under this Agreement and, in consideration of that contribution and notwithstanding that Canada is not a signatory to this Agreement, the Parties agree that the terms of this Agreement applicable to or with respect to Canada, are for her sole benefit.

- 19.2. Nothing in this Agreement is to be construed as authorizing one party to contract for or to incur any obligation on behalf of the other or to act as an agent for the other. Nothing in this Agreement is to be construed as authorizing the Recipient or any third party to contract for or to incur any obligation on behalf of either party or to act as an agent for either party.
- 19.3. Recipient will ensure that no current or former public servant or public office holder to whom any post-employment, ethics and conflict of interest legislation, guidelines, codes or policies of Canada or the Province of New Brunswick applies will derive direct benefit from the Project's funding, unless the provision or receipt of such benefits is in compliance with such legislation, guidelines, policies or codes.
- 19.4. This Agreement is subject to the provincial *Right to Information and Protection of Privacy Act* as well as the federal *Access to Information Act* and *Privacy Act*.
- 19.5. In the event of a breach of any of the terms and conditions of this Agreement by the Recipient, no further contributions will be made by the Minister and all previous payments will be returned to the Minister within thirty (30) days of written notification to that effect.

20. GENERAL PROVISIONS

- 20.1. **Notices.** Any demand, notice or other communication ("**Notice**") to be given in connection with this Agreement will be in writing and will be given by personal delivery, commercial courier service, registered mail (postage prepaid) or by electronic transmission and addressed to the applicable Party as follows:

To the Recipient	The City of Saint John P.O. Box 1971, 15 Market Square Saint John NB E2L 4L1 Phone: 506-649-6000 Fax: 506-674-4214 Email: jonathan.taylor@saintjohn.ca
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To the Minister	Community Funding Branch Province of New Brunswick Department of Environment and Local Government P.O. Box 6000 Fredericton NB E3B 5H1
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Attention: Assistant Deputy Minister of
Corporate services, Community Funding and
Performance Excellence Process

Phone: 506-457-4947
Fax: 506-444-2734
Email: CWWF-FEPTEU@gnb.ca

For the purpose of this Section 20.1, a Notice will be considered validly given at the following times:

Delivery Method	Time of Notice
- by personal delivery or commercial courier service	day of actual delivery
- by registered mail	the 5 th business day following the deposit in the mail, except that in the event of an actual or threatened disruption of regular postal service, notice will not be effective if given by mail.
- By electronic transmission	on the day of transmission

If the time of delivery is not a business day or if the Notice is received after ordinary office hours at the place of receipt, the Notice will be considered received on the next business day. Either Party may change its address for Notice by giving Notice to the other Party.

- 20.2. **Waiver.** A Party (the "**Waiving Party**") may, at its option, waive in whole or in part any failure by the other Party (the "**Obligated Party**") to perform any of the obligations under this Agreement. A waiver applies only to the specific matter it addresses, extends only to the Waiving Party and will not prejudice the right of the Waiving Party to require the subsequent performance by the Obligated Party of any obligation under this Agreement, including the waived obligation on subsequent occasions.
- 20.3. **Entire Agreement.** This Agreement is a complete and self-contained record of the agreement between the Parties. No promise, representation, commitment, agreement, negotiation or discussion by either Party in any form, express or implied, that occurred before the execution of this Agreement is of any effect with respect to the subject matter of this Agreement. The Parties acknowledge that in entering into this Agreement they have not relied on any promise, representation, commitment, agreement, discussion or information, express or implied, that is not written in this Agreement.
- 20.4. **Assignment.** The Recipient may not assign this Agreement or any part of it without the written consent of the Minister.
- 20.5. **Amendment.** This Agreement may not be amended except by an agreement in writing signed by the Parties or by their successors or permitted assignees.
- 20.6. **Relationship of Parties.**

- a) Nothing in this Agreement that gives the Minister a measure of control over the Project will be interpreted to mean that the Recipient or its employees or agents are employees of the Minister.
- b) Nothing in this Agreement creates a joint venture, agency or partnership between the Minister and the Recipient.
- c) No Party is responsible for the actions of another Party except as agreed in this Agreement.
- d) No Party has any right or authority to speak on behalf of or obligate another Party.

20.7. **Survival of Provisions.** Despite any other provision of this Agreement all provisions which by their nature would continue beyond the termination or expiry of this Agreement will survive and remain in force until the Parties agree to their termination.

20.8. **Severability.** If any term of this Agreement (the "*Invalidated Term*") is found by a court of competent jurisdiction to be invalid or unenforceable for any reason, the Invalidated Term will not affect the remainder of this Agreement. The Invalidated Term will be treated as being modified to the extent necessary to make it enforceable while preserving as much as possible the intent of the Parties expressed in this Agreement.

20.9. **Signed Originals.** Identical copies of this Agreement may be signed separately by the Parties and combined to form fully executed originals. A signed Agreement delivered by electronic means is as valid as if delivered physically and will be treated as an executed original of this Agreement.

20.10. **Time Requirements.** Compliance with provisions of this Agreement that establish deadlines is vital to this Agreement and mandatory.

20.11. **Governing Law.** This Agreement will be governed by the laws of New Brunswick and Canada. In any legal proceeding, this Agreement will be treated as having been performed in New Brunswick. Each Party submits to the exclusive jurisdiction of the courts of New Brunswick for all matters arising from this Agreement.

20.12. **Language.** This Agreement is in English by agreement of the Parties. Les Parties s'accorde et consente que cette entente est en anglais seulement.

20.13. **Further Assurances.** The Parties will promptly take any further steps and execute any other documents that as may be reasonably requested or necessary to give full effect to this Agreement.

Binding Effect. This Agreement is for the benefit of and binds the Parties and their successors and permitted assignees.

THE PARTIES enter into this Agreement by signing below.

**HER MAJESTY THE QUEEN IN RIGHT OF THE
PROVINCE OF NEW BRUNSWICK**

Hon. Serge Rousselle, Q.C.
Minister of Environment and Local
Government

Date: _____

THE CITY OF SAINT JOHN

His Worship Donald Darling, Mayor

Date: _____

Jonathan Taylor, Clerk

Date: _____

SCHEDULE A – Project Details

CANADA – NEW BRUNSWICK BILATERAL AGREEMENT CLEAN WATER AND WASTEWATER FUND

Recipient: The City of Saint John	Project Number: 6990-1072
Project Title: Modernization of Morna Heights Wastewater Treatment Facility	
Project Description: Project will modernize the Morna Heights Wastewater Treatment Facility's mechanical system to increase process efficiency. Project will include design and construction management services to meet effluent requirements that are presently not being met. The existing treatment plant is an older style, gravity fed trickling filter technology. Various new technologies were reviewed as part of a previous study to replace the existing WWTP. The upgrade will include one of the following recommendations from Dillion Consulting: a) Moving Bed Biofilm Reactor (MBBR); or b) Sequencing Batch Reactor (SBR) These technologies are the least complex and normally require less maintenance. Upgrade will reduce the BOD5 and Suspended Solids in the effluent that is discharged to the Saint John River.	
Financing of the Project:	
CWWF Contribution	\$748,832
Provincial Contribution	\$374,416
Recipient Contribution	\$374,417
Other Federal Contributions and Other Contributions	\$0
Total	\$1,497,665
Project Category: Wastewater	
Investment Category: Capital projects for the rehabilitation of water treatment and distribution systems, and wastewater and storm water collection, conveyance and treatment systems.	
Performance Indicator: Number of wastewater systems that have met or exceeded applicable regulations and guidelines as a result of funding.	
Baseline Data: Effluent concentrations of TSS and CBOD exceed regulation requirements on a regular basis.	
Project Nature: Rehabilitation	

Objective the Project will support: Improved environmental outcomes	
Project Location: Saint John	
Forecasted Start Date*(YYYY/MM/DD): 2017/04/01	
Forecasted End Date*(YYYY/MM/DD): 2017/12/31	
*Forecasted dates can change.	
Environment Impact Assessment (EIA) is required (or additional information is needed to determine that it is not required):	Yes
Watercourse and Wetland Alteration Permit (WAWA) is required (or additional information is needed to determine that it is not required):	No
Project located on Federal Land:	No
Project is incremental, meaning a Project that would not otherwise have been undertaken in 2016-17 or 2017-18 and/or a project that would not have been undertaken without federal funding:	Yes
Total value of capital expenditures for water and wastewater system projects for 2015	\$7,353,000

SCHEDULE B – CWWF Program Details

a) Objective:

The CWWF will help accelerate short term municipal investments, while supporting the rehabilitation of water, wastewater and storm water infrastructure, and the planning and design of future facilities and upgrades to existing systems.

b) Recipient

The following are eligible as recipients for funding:

- i. Provinces and territories;
- ii. Organizations designated by a province or territory and agreed to by Canada;
- iii. Municipal or regional governments established by or under a provincial or territorial statute; and
- iv. Other entities providing water or wastewater services to communities as designated by the Minister.

c) Stacking & Cost Sharing

The maximum federal funding to a Project, from all federal sources, will not exceed one half (50%) of the total Eligible Expenditures for that Project. If the federal Crown's total contribution towards a Project exceeds fifty percent (50%) of that Project's total Eligible Expenditures or if the Total Financial Assistance received or due in respect of the total Project costs exceeds one hundred per cent (100%) thereof, the Minister may recover the excess from the Recipient or reduce its contribution by an amount equal to the excess.

d) Eligible Project Funding Categories

- i. Water
- ii. Wastewater
- iii. Storm water

e) Eligible Investments Categories

The following are eligible investments:

- i. Capital projects for the rehabilitation of water treatment and distribution systems, and wastewater and storm water collection, conveyance and treatment systems;
- ii. Separation of existing combined sewers and/or combined sewer overflow control;
- iii. Initiatives that support system optimization and improved asset management including studies and pilot projects related to innovative and transformative technologies;

- iv. Design and planning for upgrades to wastewater treatment infrastructure to meet federal regulatory requirements; and
- v. New construction projects, including the construction of naturalized systems for management and treatment of wastewater and storm water, if the projects will be completed within the program timeframe.

f) **Eligible Expenditures**

Eligible Expenditures will include the following:

- i. All costs considered by Canada and the Minister to be direct and necessary for the successful implementation of an eligible Project, excluding those identified under Schedule B paragraph g) (Ineligible Costs);
- ii. Costs of Aboriginal consultation, and where appropriate, accommodation; and
- iii. Cost incurred between April 1, 2016 and March 31, 2018.

g) **Ineligible Costs**

Ineligible costs include the following:

- i. Costs incurred prior to April 1, 2016 and costs incurred after March 31, 2018;
- ii. Costs incurred for cancelled projects;
- iii. Land acquisition; leasing land, buildings and other facilities; leasing equipment other than equipment directly related to the construction of the project; real estate fees and related costs;
- iv. Financing charges, legal fees and loan interest payments, (including those related to easements (e.g. surveys);
- v. Any goods and services costs which are received through donations or in kind;
- vi. Provincial sales tax and Goods and Services Tax/Harmonized Sales Tax, for which the Recipient is eligible for a rebate, and any other costs eligible for rebates; and
- vii. Costs associated with operating expenses and regularly scheduled maintenance work.

h) The performance indicators for CWWF are as follows:

Outcome	CWWF Performance Indicator
Improved reliability	Average % decrease in unplanned service interruptions per month (not related to weather)
	Average % decrease in volume of water leakage and/or infiltration that can be attributed to funded investments

Improved efficiency	Total estimated kilowatt-hours saved as a result of funded investments
	Average Life Cycle Cost of applicable water treatment systems after construction
	Average Life Cycle Cost of applicable wastewater treatment and storm water systems after construction
Improved rehabilitation	Percentage of assets that have increased their physical condition rating (as per reporting guideline) as a result of funding
	Average number of years of useful life remaining on applicable wastewater treatment and collection components, extended as a result of funded investments
	Average number of years of useful life remaining on applicable storm water components, extended as a result of funded investments
	Average number of years of useful life remaining on applicable water treatment and distribution components, extended as a result of funded investments
Funded plans are being implemented	Number of funded water treatment plans and studies that have resulted in identified capital projects that are either included in capital planning documents with associated funding or that are in the process of being implemented
	Number of funded wastewater plans and studies that have resulted in identified capital projects that are either included in capital planning documents with associated funding or that are in the process of being implemented
Safer drinking water	Number of water treatment facilities that have improved water quality as a result of funded investments
	Number of drinking water systems that have eliminated a boil water advisory as a result of funded investments
	Number of water treatment systems that have met or exceeded applicable regulations and guidelines as a result of funding
Cleaner wastewater and storm water	Number of applicable wastewater systems by treatment level (no treatment, Primary, Secondary, Tertiary) after end of construction
	Number of systems that have improved the quality of wastewater effluent or storm water discharge as a result of funded investments
	Number of wastewater systems that have met or exceeded applicable regulations and guidelines as a result of funding
Projects are incremental	Total value of capital expenditures for water and wastewater system projects for 2016
	Total value of capital expenditures for water and wastewater system projects for 2017

SCHEDULE C – Attestation for Project Incrementality

In the matter of entering into a Clean Water and Wastewater Fund Funding Contribution Agreement with the Minister, I Donald Darling, mayor of the municipality of Saint John in the Province of New Brunswick declares as follows:

I have knowledge of the matters set forth in the application that formed the basis for this contract and believe the declaration to be true. The Modernization of Morna Heights Wastewater Treatment Facility project put forward meets the federal government’s requirement of project incrementality under the Clean Water and Wastewater Fund (CWWF). Under the CWWF, project incrementality means that the project would not otherwise have been undertaken in 2016-17 or 2017-18 or a project that would not have been undertaken without federal funding.

This condition has been met as of the date of this declaration.

Declared at _____ (municipality) in New Brunswick this _____ day of _____, 20_____.

His Worship Donald Darling, Mayor

SCHEDULE D – Progress Report Form

A progress report will be provided to the Minister at a minimum on a semi-annual basis, by **June 15** and by **November 15**. Changes must be highlighted. Changes in the progress report are not an acceptance by the Minister of a change of scope or change of funding from that as set out in the Agreement. An amendment to the Agreement may be required.

Clean Water and Wastewater Fund Progress Report	
Project Number	6990-1072
Recipient Legal Name	The City of Saint John
Project Title	Modernization of Morna Heights Wastewater Treatment Facility
Project Description	<p>Project will modernize the Morna Heights Wastewater Treatment Facility's mechanical system to increase process efficiency. Project will include design and construction management services to meet effluent requirements that are presently not being met. The existing treatment plant is an older style, gravity fed trickling filter technology. Various new technologies were reviewed as part of a previous study to replace the existing WWTP. The upgrade will include one of the following recommendations from Dillion Consulting:</p> <p>a) Moving Bed Biofilm Reactor (MBBR); or b) Sequencing Batch Reactor (SBR)</p> <p>These technologies are the least complex and normally require less maintenance. Upgrade will reduce the BOD5 and Suspended Solids in the effluent that is discharged to the Saint John River.</p>
Federal Contribution (Eligible Expenditures)	\$748,832
Provincial Contribution (Eligible Expenditures)	\$374,416
Municipal Contribution (Eligible Expenditures)	\$374,417
Other Contribution (Eligible Expenditures - must include details on any other sources of federal funding)	\$0
Project Spending Estimate for Next Fiscal Year (Eligible Expenditures)	2017
	2018
Federal Signage Installed (Y/N) If Yes, at What Date?	<input type="checkbox"/> YES <input type="checkbox"/> NO

Capital Expenditure in Water, Wastewater or Storm Water of Previous Fiscal Year	2015	\$7,353,000
	2016	
	2017	
Forecasted Construction/Study Start Date (YYYY/MM/DD)	2017/04/01	
Forecasted Construction/Study End Date (YYYY/MM/DD)	2017/12/31	
Actual Construction/Study Start Date (if known) (YYYY/MM/DD)		
Actual Construction/Study End Date (if known) (YYYY/MM/DD)		
Project Complete? (Y/N)	<input type="checkbox"/> YES <input type="checkbox"/> NO	
Progress Note (Approved, Contract Signed, In Construction, Completed)		
Additional Information		

SCHEDULE F - Project Completion Form

**Canada – New Brunswick Bilateral Agreement – Clean Water and Wastewater Fund /
Entente bilatérale Canada – Nouveau-Brunswick – Fonds pour l’eau potable et le traitement
des eaux usées**

Recipient / Bénéficiaire : The City of Saint John	Project Number / Numéro du projet : 6990-1072
Project Title / Titre du projet : Modernization of Morna Heights Wastewater Treatment Facility	
Contact / Personne-ressource :	Tel. / Tél. :
<p>Project Description / Description du projet : Project will modernize the Morna Heights Wastewater Treatment Facility’s mechanical system to increase process efficiency. Project will include design and construction management services to meet effluent requirements that are presently not being met. The existing treatment plant is an older style, gravity fed trickling filter technology. Various new technologies were reviewed as part of a previous study to replace the existing WWTP. The upgrade will include one of the following recommendations from Dillion Consulting: a) Moving Bed Biofilm Reactor (MBBR); or b) Sequencing Batch Reactor (SBR)</p> <p>These technologies are the least complex and normally require less maintenance. Upgrade will reduce the BOD5 and Suspended Solids in the effluent that is discharged to the Saint John River.</p>	
I hereby certify the following / J’atteste par la présente ce qui suit :	
Has the final claim been submitted to the Minister/ Est-ce que la demande finale de paiement a été soumise auprès du Nouveau-Brunswick?	<input type="checkbox"/> YES / OUI <input type="checkbox"/> NO / NON
Has the project been completed? / Est-ce que le projet a été achevé?	<input type="checkbox"/> YES / OUI <input type="checkbox"/> NO / NON
Have the holdbacks been released? / Est-ce que les retenues ont été débloquées?	<input type="checkbox"/> YES / OUI <input type="checkbox"/> NO / NON If no, when are they due / Si non, quand le seront-elles?
Were necessary environmental mitigation measures adhered to?/ Est-ce que les mesures d’atténuation environnementale nécessaire ont été appliquées?	<input type="checkbox"/> YES / OUI <input type="checkbox"/> NO / NON

<p>What are the quantified results regarding the following Performance Indicators? /</p> <p>Quels sont les résultats quantifiés pour l'indicateur de résultat du projet suivant?</p> <ul style="list-style-type: none"> Number of wastewater systems that have met or exceeded applicable regulations and guidelines as a result of funding. 	
<p>Total value of capital expenditures for water and wastewater system projects for year /</p> <p>Valeur totale des dépenses en capital pour les projets liés aux réseaux d'eau et d'eaux usées dans l'année</p>	
<ul style="list-style-type: none"> 2015 – \$7,353,000 	
<ul style="list-style-type: none"> 2016 – 	
<ul style="list-style-type: none"> 2017 – 	
<p>Final Project Cost / Coût final du Projet :</p>	
<p>Federal Share / Part fédérale :</p>	
<p>Provincial Share / Part provinciale :</p>	
<p>Recipient Share / Part du Bénéficiaire :</p>	
<p>Federal funding was spent on Eligible Expenditures in accordance with the terms and conditions of the Agreement</p> <p>Le financement fédéral a servi à financer des dépenses admissibles, conformément aux modalités de l'Entente.</p>	<input type="checkbox"/> YES / OUI <input type="checkbox"/> NO / NON
<p>Project Incrementality has been respected</p> <p>L'apport différentiel du projet a été respecté</p>	<input type="checkbox"/> YES / OUI <input type="checkbox"/> NO / NON
<p>The undersigned hereby certifies that the information above is accurate, and he /she agrees that the project file will be closed and all unclaimed funds will be decommissioned.</p>	<p>Le/La soussigné(e) atteste par la présente que l'information fournie ci-dessus est exacte, qu'il/elle est d'accord que le dossier du projet soit fermé et que les fonds non réclamés soient désengagés.</p>
<p>_____ Recipient Signature / Signature du Bénéficiaire</p>	<p>_____ Date (YA / M / DJ)</p>

SCHEDULE G – Communications Protocol

G.1 Purpose

- a) This Communications Protocol outlines the roles and responsibilities of each of the Parties to this Agreement, as well as those of Canada, with respect to Communications Activities related to the Project.
- b) This Communications Protocol will guide all Communications Activity planning, development and implementation with a view to ensuring efficient, structured, continuous, consistent and coordinated communications to the Canadian public.
- c) The provisions of this Communications Protocol apply to all Communications Activities related to this Agreement and the Project funded under this Agreement.

G.2 Guiding Principles

- a) Communications Activities undertaken through this Communications Protocol should ensure that Canadians are informed of infrastructure investments made to help improve their quality of life and that they receive consistent information about the funded Project and its benefits.
- b) The Communications Activities undertaken to recognize federal and provincial funding will take into account the financial value and duration of the Project and the feasibility of mounting joint Communications Activities.
- c) The Minister is responsible for communicating the requirements and responsibilities outlined in this Communications Protocol to the Recipient and for ensuring their compliance.
- d) The Minister will communicate to the Recipient any deficiencies and/or corrective actions identified by the Minister or Canada.

G.3 Joint Communications

- a) Canada, the Minister and the Recipient will have Joint Communications about the funding and status of the Project.
- b) Joint Communications related to the Project funded under this Agreement should not occur without the prior knowledge and agreement of all Parties and Canada.
- c) All Joint Communications material will be approved by Canada and will recognize Canada's contribution and/or the Total Financial Assistance received for the Project.
- d) Each of the Parties or Canada may request Joint Communications. The requestor will provide at least 15 business days' notice to the other Parties or Canada. If the Communications Activity is an event, it will take place at a mutually agreed date and location.
- e) The requestor of the Joint Communications will provide the opportunity for the other Parties or Canada to choose to participate and choose their own designated representative (in the case of an event).
- f) Canada has an obligation to communicate in English and French. Communications products related to events must be bilingual and include the Canada word mark and other Parties' logos. In such cases, Canada will provide the translation services and final approval on products.

- g) The conduct of all Joint Communications will follow the *Table of Precedence for Canada* as applicable.

G.4 Individual Communications

- a) Notwithstanding section G.3 of this Communications Protocol (Joint Communications), Canada retains the right to meet its obligations to communicate information to Canadians about the Agreement and the use of funds through its own Communications Activities.
- b) Each Party may include general Program messaging and Project examples in their own Communications Activities. Canada, the Minister and the Recipient will not unreasonably restrict the use of, for their own purposes, Communications Activities related to the Project funded through the Agreement and if web- or social-media based, from linking to it.

G.5 Operational Communications

Recipient is solely responsible for operational communications with respect to the Project, including but not limited to: calls for tender, contract awards, and construction and public safety notices. Operational communications as described above are not subject to the *Official Languages Act* of Canada.

G.6 Media Relations

The Minister and the Recipient will share information promptly with the other Party should significant media inquiries be received or emerging media or stakeholder issues arise.

G.7 Signage

- a) Canada, the Minister and the Recipient may each have signage recognizing their funding contribution to the Project.
- b) Unless otherwise agreed by Canada, the Minister will produce and the Recipient will install a sign to recognize federal funding at each Project site in accordance with current federal signage guidelines. The federal sign design, content, and installation guidelines will be provided by Canada.
- c) Where the Recipient decides to install a permanent plaque or other suitable marker with respect to the Project, it will recognize the federal contribution and be approved by Canada.
- d) Recipient agrees to inform the Minister of sign installations.
- e) If erected, signage recognizing the federal contribution will be installed at the Project site(s) thirty (30) days prior to the start of construction, be visible for the duration of the Project, and remain in place until thirty (30) days after construction is completed and the infrastructure is fully operational or opened for public use.
- f) If erected, signage recognizing the federal contribution will be at least equivalent in size and prominence to Project signage for contributions by other orders of government and be installed in a prominent and visible location that takes into consideration pedestrian and traffic safety and visibility.
- g) The Minister is responsible for the production and the Recipient is responsible for

the installation of Project signage, or as otherwise agreed upon.

- h) In the case of a Project where the deliverable is a document, such as but not limited to plans, reports, studies, strategies, training material, webinars, and workshops, it will clearly recognize Canada's contribution received for the Project under the 'PTIF and CWWF Funding Agreement'.

G.8 Communicating With Canada

The Minister agrees to facilitate, as required, communications between Canada and the Recipient for Communications Activities.

G.9 Advertising Campaigns

Recognizing that advertising can be an effective means of communicating with the public, Canada and the Minister may, at their own cost, organize an advertising or public information campaign related to this Agreement or eligible Projects. However, such a campaign will respect the provisions of this Agreement. In the event of such a campaign, the sponsoring Party or the Recipient will inform the other Parties or the Recipient of its intention no less than twenty-one (21) working days prior to the campaign launch.



APPROVAL TO OPERATE

S-2691

Pursuant to paragraph 8(1) of the *Water Quality Regulation - Clean Environment Act*, this Approval to Operate is hereby issued to:

The City of Saint John
for the operation of the
Wastewater Works - Morna Heights Trickling Filter

Description of Source: **This Approval covers the discharge of effluent from the locations contained in the Federal Effluent Regulatory Reporting Information System for the following system.**

One Trickling Filter Treatment Facility
WWC: Class I / WWT: Class I

Mailing Address: **P.O. Box 1971**
Saint John, NB E2L 4L1

Conditions of Approval: **See attached Schedule "A" of this Approval**

Supersedes Approval: **S-2357**

Valid From: **December 01, 2014**

Valid To: **November 30, 2019**

Recommended by: _____

Bradley J. McKeown
Environment Division

Issued by: _____

[Signature]
for the Minister of Environment and Local Government

December 1, 2014

Date

SCHEDULE "A"

A. DEFINITIONS

1. **"Accredited"** means accreditation to ISO/IEC 17025 by the Standards Council of Canada (SCC), the Canadian Association for Laboratory Accreditation Inc. (CALA), or accreditation to ISO/IEC 17025:2005 from another body that is recognized to grant such accreditation per ISO/IEC 17011 criteria.
2. **"Acutely Lethal"** means that the effluent at 100% concentration kills, during a 96-hour period, more than 50% of the rainbow trout subjected to it.
3. **"Approval Holder"** means the name listed on the Certificate page of this Approval.
4. **"Authorization Officer"** means the Manager of the Water and Wastewater Management Section of the Department of Environment and Local Government, and includes any person designated to act on the Manager's behalf.
5. **"Average Daily Volume"** means a calculation of the sum of the daily volumes of influent or effluent and dividing that sum by the number of days in that calendar year.
6. **"CBOD" or "Carbonaceous Biochemical Oxygen Demanding Matter"** means the carbonaceous matter that consumes, by biochemical oxidation, oxygen dissolved in water.
7. **"Certified"** means a valid certificate of qualification that states the class of the *Operator* issued by the Atlantic Canada Water and Wastewater Voluntary Certification Program.
8. **"Deleterious Substances"** means the following substances or classes of substances: carbonaceous biochemical oxygen demanding matter, suspended solids, total chlorine, and un-ionized ammonia.
9. **"Environmental Emergency"** means a situation where there has been or will be a release, discharge, or deposit of a contaminant or contaminants to the atmosphere, soil, surface water, and/or groundwater environments of such a magnitude or duration that it could cause significant harm to the environment or put the health of the public at risk. This does not include wastewater overflows that are the result of excessive rainfall or snowmelt.
10. **"ERRIS" or "Effluent Regulatory Reporting Information System"** means the web based application developed by Environment Canada to facilitate the reporting of information as required under Regulations.

11. **"Final Discharge Point"** means the point, other than an *Overflow Point*, of a wastewater works beyond which the *Approval Holder* or operator no longer exercises control over the quality of the wastewater before it is deposited as effluent to the environment
12. **"Lagoon"** means a wastewater treatment facility where the average period during which wastewater is retained for treatment within the wastewater system is five days or more.
13. **"Operator"** means a person who directs, adjusts, inspects, tests or evaluates an operation or process that controls the effectiveness or efficiency of the wastewater works.
14. **"Overflow Point"** means a point of a wastewater work via which excess wastewater may be deposited in the environment and beyond which the *Approval Holder* or operator no longer exercises control over the quality of wastewater before it is deposited as effluent.
15. **"Point of Entry"** means any point where effluent is deposited in water frequented by fish via the *Final Discharge Point* or an *Overflow Point*.
16. **"Quarter"** in respect of a year, means any of the four periods of three months that begin on the first day of January, April, July and October.
17. **"Suspended Solids"** means any solid matter contained in effluent that is retained on a filter of 2.0 micrometre (μm) or smaller pore size.
18. **"Total Residual Chlorine"** means the sum of free chlorine and combined chlorine, including inorganic chloramines.

B. TERMS AND CONDITIONS

EMERGENCY REPORTING

19. **Immediately** following the discovery of an *Environmental Emergency*, a designate representing the *Approval Holder* shall notify the Canadian Coast Guard **until personal contact is made** and provide all information, such as: location in latitude and longitudes, flow, time and a brief description known about the *Environmental Emergency*.

The telephone number for the **Canadian Coast Guard** is **1-800-565-1633**.

20. **Within five (5) days** of the time of initial notification, a copy of a Detailed Emergency Report shall be e-mailed or faxed to the Wastewater Approvals Coordinator or Engineer responsible for the regulation of the Approval Holder's wastewater works. The Detailed Emergency Report shall include, as a minimum, the following: i) a description of the problem that occurred; ii) a description of the impact that occurred; iii) a description of what was done to minimize the impact; and iv) a description of what was done to prevent recurrence of the problem.

TEMPORARY BYPASS AUTHORIZATION

21. The *Approval Holder* shall apply to the *Authorization Officer* for a temporary authorization to bypass at least one of the treatment processes normally applied to wastewater in the system. An application **must be made at least 45 days before the day** on which the bypass is required, in the form and format provided in the *ERRIS*.

EFFLUENT PERFORMANCE STANDARDS

22. The *Approval Holder* shall ensure that the average concentration of contaminants in the effluent deposited via the *Final Discharge Point* of the wastewater works does not exceed the following limiting criteria. The average must be calculated by using the applicable calculating period listed in Condition 29:
 - i. *CBOD₅*: 25 mg of *CBOD₅*/L (average); and,
 - ii. *Suspended Solids*: 25 mg/L (average).
23. For a *Lagoon*, the *Approval Holder*, in the determination of the average referred to in Condition 22 is not to take into account the result of any determination of the concentration of *Suspended Solids* in a sample of effluent referred to in Condition 29 that was taken during the month of July, August, September or October, if that result was greater than 25 mg/L.

24. The *Approval Holder* shall **immediately** apply to the *Authorization Officer*, in the form and format specified by the *ERRIS* if any samples of the effluent deposited via the *Final Discharge Point* contain a calculated concentration of un-ionized ammonia that is greater than or equal to 1.25 mg/L, expressed as nitrogen (N) at $15^{\circ}\text{C} \pm 1^{\circ}\text{C}$.
25. **By January 1st, 2016**, for systems that the *Average Daily Volume* of effluent calculated in Condition 27 is less than 5,000 m³, the *Approval Holder* shall submit to the *Authorization Officer* an implementation plan on how the effluent deposited via the *Final Discharge Point* of the wastewater works will not exceed the average concentration of *Total Residual Chlorine* of 0.02 mg/L.
26. **By January 1st, 2015**, for systems that the *Average Daily Volume* of effluent calculated in Condition 27 is greater than or equal to 5,000 m³, the *Approval Holder* shall ensure the average concentration of *Total Residual Chlorine* in the effluent deposited via the *Final Discharge Point* does not exceed 0.02 mg/L if chlorine, or one of its compounds, was used in the treatment of wastewater. For all other systems, where the the *Average Daily Volume* of effluent calculated in Condition 27 is less than 5,000 m³, the *Approval Holder* shall ensure the average concentration of *Total Residual Chlorine* in the effluent deposited via the *Final Discharge Point* does not exceed 0.02 mg/L **by January 1st, 2021**, if chlorine, or one of its compounds, was used in the treatment of wastewater.

MONITORING AND SAMPLING

Pursuant to Section 17 of the *Water Quality Regulation*, this Approval is subject to the following conditions:

27. The *Approval Holder* shall, for each calendar year, calculate and record the *Average Daily Volume* of effluent deposited via the *Final Discharge Point*. The volume of effluent during each day must be determined by using monitoring equipment that provides:
 - i. A continuous measure of the volume of influent or effluent or a measure of the rate of flow of the influent or effluent upon which that daily volume of effluent may be estimated; or,
 - ii. A continuous measure of the volume of influent or effluent if the *Average Daily Volume* measured during the previous calendar year is greater than 2,500 m³.
28. The *Approval Holder* shall collect monitoring samples for the following parameters in accordance with the requirements of Condition 29.
 - i. The concentration of *CBOD*; and,
 - ii. The concentration of *Suspended Solid*.

29. The *Approval Holder* shall collect monitoring samples at the *Final Discharge Point* of the type and at the frequency indicated below based on the *Average Daily Volume* of effluent calculated in Condition 27:

<i>Average Daily Volume (m³)</i>	<i>Treatment Type</i>	<i>Type of Sample to be Taken</i>	<i>Monitoring Frequency</i>	<i>Calculating Period¹</i>	<i>Reporting Frequency</i>
less than 2,500	<i>Lagoon</i>	Grab or composite	Quarterly, but at least 60 days after any other sample	Annual	Annual
	Mechanical	Grab or composite	Monthly, but at least 10 days after any other sample	Quarterly	Quarterly
greater than 2,500 but less than or equal to 17,500	<i>Lagoon</i>	Grab or Composite	Every two weeks, but at least seven days after any other sample	Quarterly	Quarterly
	Mechanical	Composite			
greater than 17,500 but less than or equal to 50,000	<i>Lagoon</i>	Grab or Composite	Weekly, but at least five days after any other sample	Monthly	Quarterly
	Mechanical	Composite			
Greater than 50,000	<i>Lagoon</i>	Grab or Composite	Three days per week, but at least one day after any other sample	Monthly	Quarterly
	Mechanical	Composite			

¹The average must be determined for *CBOD* and *Suspended Solids*

30. The *Approval Holder* shall collect a grab sample at the *Final Discharge Point* for *Acutely Lethal Toxicity* at the frequency indicated below based on the *Average Daily Volume* of effluent calculated in Condition 27:

<i>Average Daily Volume (m³)</i>	<i>Minimum Sampling Frequency</i>
less than or equal to 2,500	n/a
greater than 2,500 but less than or equal to 50,000	Quarterly ¹
greater to 50,000	Monthly ²

¹At least 60 days after any other sample

²At least 21 days after any other sample

31. If a sample is determined to be *Acutely Lethal* at the system's *Final Discharge Point*, the *Approval Holder* shall **immediately** contact the *Authorization Officer*.

32. If the *Final Discharge Point* results are determined not *Acutely Lethal* in accordance to Condition 33, the *Approval Holder* may follow the reduced frequency indicated below, based on the *Average Daily Volume* of effluent calculated in Condition 27:

<i>Average Daily Volume (m³)</i>	Number of Tests Not Acutely Lethal	Reduced Frequency¹
less than or equal to 2,500	n/a	n/a
greater than 2,500 but less than or equal to 50,000	4 consecutive quarters	Yearly ²
greater than 50,000	12 consecutive months	Quarterly ³

¹ Reduced frequency if numbers of consecutive tests of column 2 of table are passed

² At least 6 months after any other sample

³ At least 60 days after any other sample

33. The *Approval Holder* shall ensure the *Acute Lethality* of the effluent be determined in accordance with Reference Method EPS 1/RM/13 or EPS 1/RM/50.
34. **Within six months** of completing the Environmental Risk Assessment, the *Approval Holder* shall submit to the *Authorization Officer* for approval, an Effluent Monitoring Plan based on the wastewater works' Environmental Risk Assessment. This Plan must include the parameters that are Effluent Discharge Objectives and a monitoring frequency for each.
35. The *Approval Holder* shall follow the monitoring requirements outlined in the approved Effluent Monitoring Plan.
36. The *Approval Holder* shall calibrate the flow monitoring equipment at least once in every calendar year and at least five months after a previous calibration.
37. The *Approval Holder* shall ensure that the monitoring equipment is capable to determine the volume or rate of flow with a margin of error of $\pm 15\%$.
38. The *Approval Holder* shall ensure that all samples are collected using the methods described in the latest edition of the ISO 5667-10, Water quality - Sampling - Part 10: Guidance on sampling of waste waters.
39. The *Approval Holder* shall ensure that all parameters that are required to be analysed by this Approval, are analysed by *Accredited* laboratories whose accreditation includes the analytical method used to make the determination.

40. The *Approval Holder* shall ensure that all equipment used for monitoring parameters required by this Approval is calibrated in accordance with manufacturer's recommendations.

OVERFLOW MANAGEMENT

41. **By January 1, 2016**, the *Approval Holder* shall submit to the *Authorization Officer* for Approval a long term plan to reduce combined sewer overflows and reduce overflows from infiltration. The plan must follow, as a minimum, the *Authorization Officer's* CSO/SSO Long-Term Control Plan Guidelines.
42. **By January 1, 2016**, the *Approval Holder* shall ensure that all new lift stations are designed to prevent the release of floatable materials and that existing lift stations are retrofitted for the removal of floatable materials.

OPERATOR CERTIFICATION

43. Pursuant to Section 19 of the *Water Quality Regulation*, the Minister gives notice that the *Approval Holder* shall employ and have available the following *Certified Operators* based on the Class of the wastewater works listed on the Certificate page of this Approval:

Treatment Class	Wastewater Treatment (WWT) <i>Certified Operator</i>	Collection Class	Wastewater Collection (WWC) <i>Certified Operator</i>
I	Minimum one Class I	I	None
II	Minimum one Class II and one Class I	II	One Class I by December 31, 2016
III	Minimum one Class III and one Class II	III	One Class I by December 31, 2016
IV	Minimum one Class IV and one Class III	IV	One Class I by December 31, 2016

RECORD KEEPING

Pursuant to Section 17 of the *Water Quality Regulation*, this Approval is subject to the following conditions:

44. The *Approval Holder* shall record and retain for a period of five years the following information and make it available to the *Authorization Officer* upon request:
 - a. The date of each day when wastewater effluent was not discharged via the *Final Discharge Point* (if applicable);
 - b. For those days when effluent was deposited via the *Final Discharge Point*:
 - i. the daily volume deposited, in m^3 , if that volume is yielded by a continuous measure, or
 - ii. the estimated daily volume deposited, in m^3 , in any other case, and the results of the calculation and measurement used in the estimation, as outlined in Condition 27(i);
 - c. For all discharges from each *Overflow Point*, including those that were directly caused by excessive rain or snow melt:
 - i. the date of each day on which effluent was deposited via the *Overflow Point*,
 - ii. for each of those days, the duration or estimated duration, expressed in hours, of the deposit, along with an indication of whether it is the duration or an estimated duration,
 - iii. the daily volume deposited in m^3 if that volume is yielded by a continuous measure, or an estimate of the daily volume, in m^3 in any other case;
 - d. For all monitoring equipment used to determine the volume or rate of flow:
 - i. A description, including the type,
 - ii. The manufacturer's specifications, the year of manufacture and the model number,
 - iii. the date on which the equipment was calibrated and its degree of accuracy after each calibration,
 - iv. The date the equipment was installed and if applicable, the date on which it ceased to be used for monitoring and on which it was replaced;
 - e. For each monitoring sample determination required by Condition 29, as well as any additional sample determinations made by an *Accredited* laboratory:
 - i. the results of such determinations for each of the parameters listed in Condition 28 and Condition 30 (if applicable),
 - ii. a statement as to whether the sample is a grab sample or a composite sample and the date on which the sample was taken;
 - f. All monitoring sample results for each parameter taken as part of the Effluent Monitoring Plan;
 - g. All monitoring sample results required by Schedule "B", if applicable; and,
 - h. A list identifying the *Operator(s)* and indicating the certification level of each *Operator(s)*.

REPORTING

Pursuant to Section 17 of the *Water Quality Regulation*, this Approval is subject to the following conditions:

45. If the information provided in the *ERRIS* identification report changes, the *Approval Holder* shall send a notice that provides the updated information to the *Authorization Officer* no later than **45 days after the change**.
46. The *Approval Holder* shall submit electronically to the *Authorization Officer*, in the form and format specified by the *ERRIS*, a report for the previous reporting period:
 - i. **within 45 days of the end of each year**, with the period starting on the first day of January each year, for a *Lagoon* with an *Average Daily Volume* of effluent less than 2,500 m³/d;
 - ii. **within 45 days of the end of each quarter**, with the first *quarter* starting on the first day of January each year, for all other wastewater works.

The report must summarize the following:

- a. The number of days during which effluent was deposited;
 - b. The volume of effluent that was deposited, expressed in m³;
 - c. The average *CBOD* due to the quantity of *CBOD* matter in the effluent;
 - d. The average concentration of *Suspended Solids* in the effluent;
 - e. All test results completed as part of the approved Effluent Monitoring Plan required in Condition 35.
 - f. The results of the *Acutely Lethal* toxicity tests; and,
 - g. If a temporary bypass authorization was issued.
47. The *Approval Holder* shall submit to the *Authorization Officer* **within 45 days of the end of each year**:
 - a. A summary of the date, location, duration including whether it is an estimated or measured duration, and estimated or calculated volume of all discharges from *Overflow Points*, including those that were directly caused by excessive rain or snow melt;
 - b. A summary report of *Environmental Emergencies* that were reported through the Emergency Reporting procedure described in this Approval; and,
 - c. All monitoring sample results required by Schedule "B", if applicable.

