DILLON CONSULTING

CITY OF SAINT JOHN

Environmental Impact Assessment (Final)

Morna Heights Subdivision Wastewater Treatment Facility Upgrades

May 2017 – 17-5184

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References

1.0 The Proponent

1.1 Project Title

Morna Heights Subdivision Wastewater Treatment Facility Upgrades - Environmental Impact Assessment

1.2 Proponent Contact

The proponent for the proposed project is:

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The project manager is:

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Kevin.O'Brien@saintjohn.ca
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The principal contact for the Environmental Impact Assessment is:

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The subject site is located at 139 Bay Crescent Drive (Property Identification Number 00024364) in Saint John and is owned by the City of Saint John (Contact: Mr. Kevin O'Brien).

2.0 The Undertaking

2.1 Project Overview and Purpose

The City of Saint John (the City) intends to replace the existing Morna Heights Subdivision Wastewater Treatment Facility (WWTF), located at 139 Bay Crescent Drive in Saint John, NB.

The existing WWTF was constructed and commissioned in 1972 and consists of trickling filters with rock media. The facility treats wastewater from the Morna Heights area which currently includes 51 residential lots the community elementary school. City of Saint John personnel operate the current WWTF under an Approval to Operate (Permit No. S2691) from the New Brunswick Department of Environment and Local Government (NBDELG). The facility has experienced problems with the mechanical systems in recent years and, despite upgrades, is unable to consistently meet the requirements for Carbonaceous Biological Oxygen Demand ($CBOD_5$) and Suspended Solids in the effluent that discharges to the bank of the Saint John River.

The City of Saint John proposes to replace the existing WWTF with a new Moving Bed Biofilm Reactor (MBBR) treatment system. The new facility will modernize treatment, include ultra violet disinfection of the effluent, allow for better effluent sampling, and will have a submerged discharge that will allow for immediate dilution of the effluent. To be able to continue to service the Morna Heights area and minimize disturbance of greenfield space, the new facility will be constructed on the same land parcel next to the existing facility.

Dillon Consulting Limited (Dillon) completed an engineering review of the Morna facility in 2017 and outlined multiple options for improving the facility that included, a 'do nothing' approach, upgrades and modernization of the treatment process and replacement of the WWTF. The City selected to replace the WWTF, after considering the possible treatment options, forecasted service requirements, existing and potential environmental impacts, and financial implications.

The City of Saint John is required to complete an Environmental Impact Assessment for the proposed project in accordance with the NB *Environmental Impact Assessment Regulation 87-83,* under item (n) "construction, or demolition, of all sewage disposal or sewage treatment facilities, other than domestic, on-site facilities".

2.2 Project Location

The project proposes to construct the new WWTF occur on the same land parcel on which the current WWTF currently operates (**Figure 1**). The property is owned by the City of Saint John and identified by civic number 139 Bay Crescent Drive, in the Morna Heights subdivision area of Saint John, NB (PID No. 00024364; latitude N45° 17' 29.9" and longitude W66° 09' 52.6"). The property has an approximate area of 1,275 m^2, a maximum length of approximately 37 m and a maximum width of 35 m.

The proposed project location is bound to the north by the Saint John River, the south by Bay Crescent Drive and to the east and west by privately owned residential properties (**Figure 2**).

Physical components of the project will be contained within the land parcel with the exception of the submerged effluent discharge pipe which will extend approximately 40m into the Saint John River (**Figure 2**).

2.3 Siting Considerations

As the intent of the project is to continue to be able to service the Morna Heights area, the new WWTF will need to be in close proximity to the community it serves, be accessible by road, have an adequate power supply, and have access to an appropriate discharge location. Because the current WWTF property (PID No. 00024364) is already owned by the City, is appropriately zoned, has been operating as a WWTF, it satisfies these minimum needs (see the attached letter in Appendix A). The City also considered the following prior to selecting the current WWTF property as the preferred property for the proposed development;

- A location that would require minimal ground disturbance for development and to connect the proposed system to the existing collection system;
- A property that could supply approximately 25m by 30m for the project footprint;
- Construction on developed lands to reduce, or minimizes, clearing/grubbing requirements;
- Construction on previously disturbed lands to minimize potential for environmental and cultural impacts;
- The current WWTF property has shallow soil coverage (patchy coverage up to 15cm in thickness) and is not expected to contain historical artefacts;
- Requirement to reclassify the land use zoning if another property is selected;
- Development on current WWTF will minimize new impacts to viewscape;
- Potential for flooding;
- Location within a mapped wetland or within a protected wellfield;
- Location in proximity to watercourses and/or wetlands;
- Location in proximity to other environmentally sensitive features or unique habitats;
- Appropriate setbacks from adjacent residential properties; and,
- Future anticipated development in the area.

Where possible, the WWTF was located and/or adjusted to minimize impacts to the natural environment. The following considerations were incorporated into the design concept to minimize the overall impact of the project:

- Infrastructure locations were selected such that minimal ground disturbance would be required to connect to the existing collection system;

- Viewscapes will be minimally impacted;
- Infrastructure locations were selected such that noise levels would be mitigated;
- Infrastructure locations were selected such that maximum setback distances from adjacent properties could be maintained; and,
- Construction activities will occur as far back from the Saint John River as feasible, with the exception of the submerged discharge pipe;

2.4 Physical Components and Dimensions of the Project

The City of Saint John has selected the moving bed biofilm reactor (MBBR) as the preferred treatment system. The facility is anticipated to include the following components;

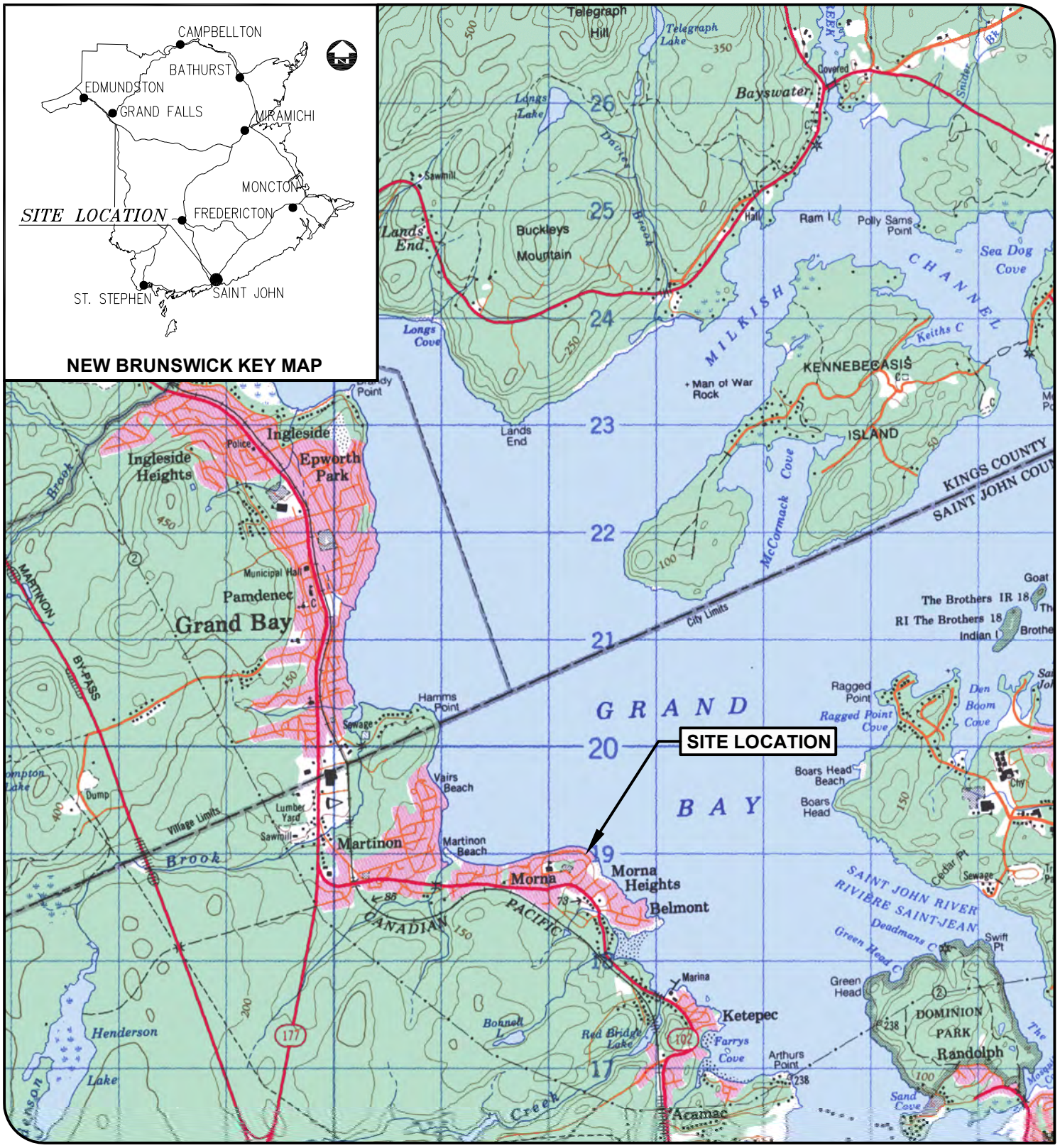
- a small WWTF building (approximately 36 m^2);
- four underground tanks;
- buried/submerged effluent outfall in the Saint John River;
- piping for connection to the existing wastewater collection system;
- drilled groundwater well for non-potable use;
- driveway, retaining wall, fencing and gate; and,
- removal of existing infrastructure.

WWTF Building

The WWTF control building will be constructed of masonry or pre-engineered steel supported on a poured concrete foundation. The exterior of the building will be designed to blend into local architecture. Civil work to prepare the area for the building foundation will be carried out by an excavator. Construction activities will occur as far back from the Saint John River as feasible. It is anticipated that a 20 m buffer from the Saint John River will be maintained (**Figure 3**). Appropriate setbacks from adjacent residential properties will be applied in accordance with City bylaws.

Although the system is currently under design, it is anticipated that the WWTF building will house blowers, electrical equipment, future chemical feed systems, a UV disinfection system in an open channel and an effluent sampling station. A space will be provided for chemical feed storage.

Because pumping and Ultra Violet (UV) disinfection will be required at the site the WWTF building will house a SCADA system that will be connected to the City's current monitoring system. Power will be supplied to the facility from overhead power lines that supply single phase 240 VAC. The building will also be fitted for backup power via a mobile generator, however no generators will be stored onsite.



CITY OF SAINT JOHN
ENVIRONMENTAL IMPACT ASSESSMENT
139 BAY CRESCENT DRIVE
MORNA HEIGHTS
WASTEWATER TREATMENT FACILITY
UPGRADES
MORNA HEIGHTS SUBDIVISION

SITE LOCATION MAP
FIGURE 1

DILLON CONSULTING

MAP/DRAWING INFORMATION
National Topographic System Mapsheet 21G/08 .

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PROJECT: 17 5184 STATUS: FINAL DATE: 05/16/17

PHOTO DEPICTING EXISTING SITE CONDITIONS

SAINT JOHN RIVER

00024372
RESIDENTIAL

EX FACILITY TO BE REMOVED

EX SMH

EX SMH

00024364
CITY OF SAINT JOHN

NEW OUTFALL

BURIED TANKS

BURIED TANKS

EX SMH

EX SMH

EX SMH

00416727
RESIDENTIAL

NEW RETAINING WALL

NEW BUILDING

BAY CRESCENT DRIVE

00028233
RESIDENTIAL

00028225
RESIDENTIAL

00025536
RESIDENTIAL

00025510
RESIDENTIAL

00019141
RESIDENTIAL

NOTES:
1. NO WETLAND HAS BEEN IDENTIFIED WITHIN 30m OF THE SUBJECT SITE.
2. TOPOGRAPHY SLOPES TO THE TOP OF THE RIVER BANK WHICH THEN STEEPLY SLOPES TO THE RIVER.
3. THE PROPERTY IS ZONED FOR UTILITY SERVICE.

CITY OF SAINT JOHN

ENVIRONMENTAL IMPACT ASSESSMENT
139 BAY CRESCENT DRIVE
MORNA HEIGHTS
WASTEWATER TREATMENT FACILITY UPGRADES
MORNA HEIGHTS SUBDIVISION

SITE PLAN

FIGURE 2

CITY OF SAINT JOHN

SUBJECT PROPERTY LINE
PROPERTY LINE
EXISTING SANITARY SEWER
EXISTING SANITARY MANHOLE
EXISTING STRUCTURE A/G
EXISTING STRUCTURE U/G
TREE
WATER
SUBMERGED DISCHARGE PIPE

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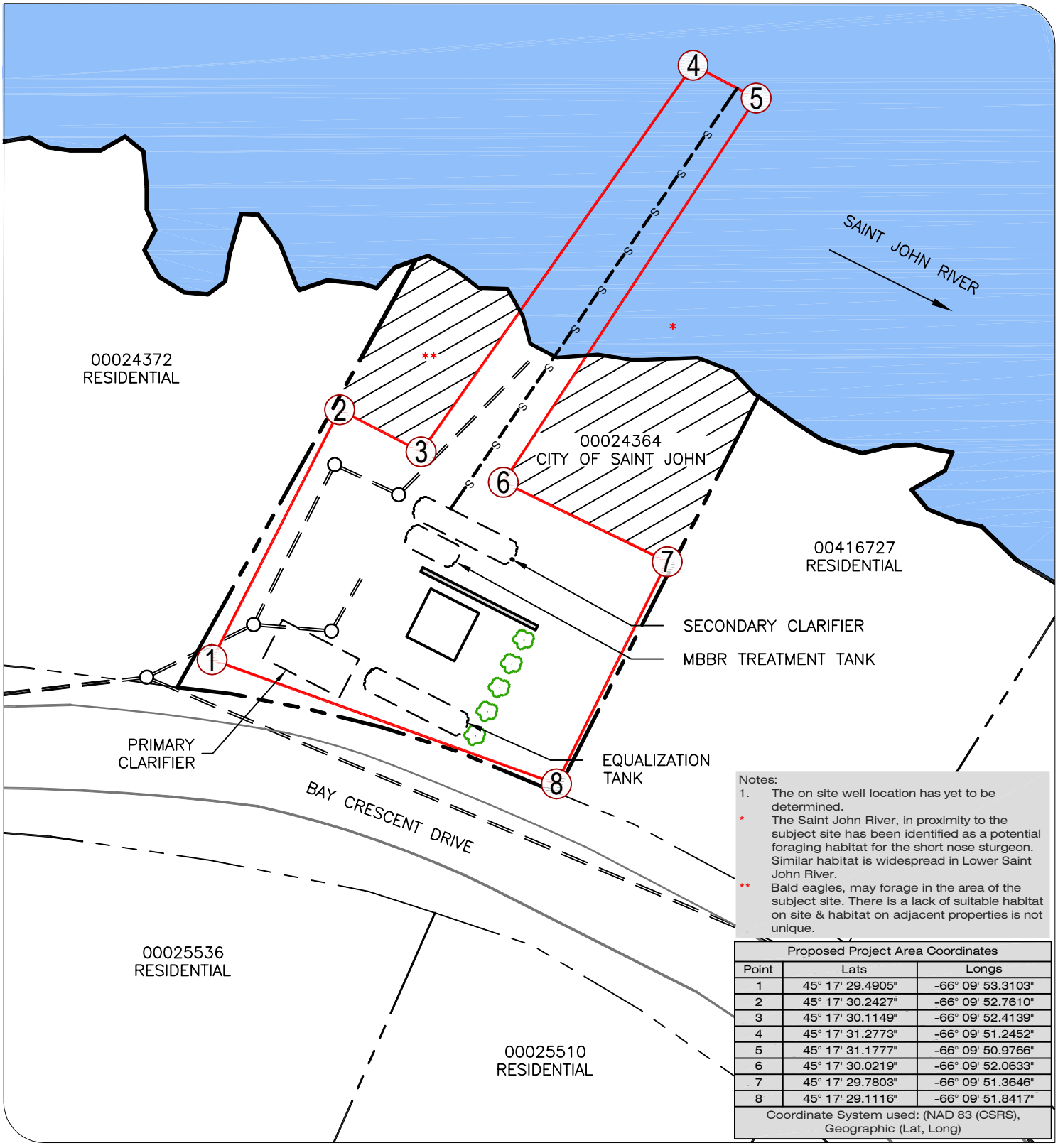

Notes:

1. The on site well location has yet to be determined.

* The Saint John River, in proximity to the subject site has been identified as a potential foraging habitat for the short nose sturgeon. Similar habitat is widespread in Lower Saint John River.

** Bald eagles, may forage in the area of the subject site. There is a lack of suitable habitat on site & habitat on adjacent properties is not unique.

Proposed Project Area Coordinates		
Point	Lats	Longs
1	45° 17' 29.4905"	-66° 09' 53.3103"
2	45° 17' 30.2427"	-66° 09' 52.7610"
3	45° 17' 30.1149"	-66° 09' 52.4139"
4	45° 17' 31.2773"	-66° 09' 51.2452"
5	45° 17' 31.1777"	-66° 09' 50.9766"
6	45° 17' 30.0219"	-66° 09' 52.0633"
7	45° 17' 29.7803"	-66° 09' 51.3646"
8	45° 17' 29.1116"	-66° 09' 51.8417"
Coordinate System used: (NAD 83 (CSRS), Geographic (Lat, Long)		

CITY OF SAINT JOHN
ENVIRONMENTAL IMPACT ASSESSMENT
139 BAY CRESCENT DRIVE
MORNA HEIGHTS
WASTEWATER TREATMENT FACILITY
UPGRADES
MORNA HEIGHTS SUBDIVISION

INFRASTRUCTURE LOCATION MAP
FIGURE 3

PROPOSED PROJECT AREA

CONSTRUCTION BUFFER TO SAINT JOHN RIVER

DILLON CONSULTING

MAP/DRAWING INFORMATION
Property boundaries are based on Service New Brunswick records and may not be exact. This is not a legal survey.

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PROJECT: 17 5184 STATUS: FINAL DATE: 05/16/17

Underground Tanks

The MBBR system will include four tanks as part of the treatment process;

- Primary clarifier tank to reduce gross solids, fats, oils and greases (FOG). Based on conceptual design the tank will be located south of the current WWTF building. This tank will be periodically pumped to remove solid waste material. The waste will be transported to larger WWTF owned by the City;
- Equalization tank, proposed to be located south of the proposed WWTF building, to accommodate variances between average day and peak flows;
- MBBR treatment process tank, which will contain the treatment process, is proposed to be located north of the new WWTF building; and,
- Secondary clarifier which based on the conceptual design will be located North of the MBBR tank.

The approximate locations of the proposed site infrastructure are presented on **Figure 3**.

Submerged Outfall

Treated effluent will be conveyed from the UV disinfection to the Saint John River via a buried HDPE pipe. The pipe will be trenched via excavator, or rock hammer, approximately 20m into the riverbed of the Saint John River from which point it will be floated into place. The pipe will then be sunk over approximately 12 hours using industry standard techniques.

The new WWTF is being designed to meet the effluent discharge objectives recommended in the 2017 Environmental Risk Assessment report by Natech. The proposed effluent discharge objectives for $CBOD_5$ and TSS remain the same as required in the Approval to Operate for the City while several new objectives are proposed as indicated in **Table 2-1**.

Table 2-1: Effluent Discharge Objectives

Parameter	Current Discharge Requirements	Proposed Discharge Requirements
$CBOD_5$	25 mg/L	<25 mg/L
TSS	25 mg/L	<25 mg/L
NH_3N Unionized	-	<1.25 mg/L
NH_3N Total	-	<27 mg/L
TKN	-	<14 mg/L*
TP	-	<2.1 mg/L*
PH	-	4.7-11.0
E.Coli	-	<200 mg/L

** denotes theoretical Effluent Discharge Objective*

Collection System Collection

The new WWTF will be connected to the existing wastewater collection system at the onsite sanitary connection point. The collection pipe will be laid in an excavated trench and buried.

Groundwater Well

It is estimated that the MBBR WWTF will require an average of less than $1m^3$/day to aid the maintenance of the treatment equipment. The well will be installed by a licenced well driller and will be cased into bedrock.

It is anticipated that drawdowns of the local groundwater table associated with water usage from the WWTF operations may be deemed negligible when compared to aquifer recharge from the constant head boundary represented by the nearby Saint John River. However, appropriate setbacks from adjacent residential properties will be applied as outline in the 2016 Saint John Community Plan.

Site Access

The new facility will make use of the existing parking and access area, off Bay Crescent Drive, along the south boundary of the subject property. A retaining wall utilizing precast concrete blocks will be constructed north of the proposed WWTF building to facilitate development. Backfill material will be required, and it will be obtained from an offsite source.

Existing WWTF Removal

The existing WWTF will continue to operate throughout the construction of the new facility. Once the new facility has been commissioned, the existing system will be decommissioned and salvageable equipment and materials will be removed from the building. The existing WWTF building will be demolished using an excavator and bulldozer. Demolition debris will be removed via dump truck and disposed of at an NBDELG approved facility.

2.5 Schedule

The replacement of the existing WWTF will be completed by March 31, 2018 and will be divided into several phases. A description and anticipated timeline for each project phase is presented in the table below (**Table 2-2**).

Table 2-2: Project Schedule

Phase	Timeline
Phase I - Project Planning and Preparation System Design Regulatory Approvals Site Preparation (grubbing)	Ongoing – July 15, 2016
Phase II – Construction and Commissioning Construction of the new WWTF Installation of the submerged discharge line Connection to the current WWTF collection system Commissioning of the new WWTF Decommissioning of the current WWTF Landscaping	July 15, 2017 – March 31, 2018 (some landscaping in spring 2018)
Phase III – Operation and Maintenance Operation of the new WWTF	March 31, 2018 - onward

A proposed date for the first physical construction-related activity on site has yet to be determined and is dependent on the Ministers decision on this registration. The estimated hours of construction will be 7am to 5pm. Longer hours may be required to meet the project schedule but will not go beyond the hours of 7am to 9pm in accordance with the City of Saint John's bylaws. The schedule presented in **Table 2-2** assumes construction starting no later than July 15, 2017.

2.5.1 Phase I – Project Planning and Preparation

The first phase of the project involves desktop design, project planning, environmental studies, regulatory permitting and approvals, and preparation of the proposed project site for construction. Preliminary environmental site visits were completed in spring 2017. Site preparation work includes grubbing, grading, fencing, site protection measures and testing.

The proposed site has been previously cleared and additional vegetation clearing is not anticipated. If any additional shrub, grass or tree clearing activities are required they will adhere to applicable regulatory requirements and will only be done on an as required basis.

Grubbing and grading activities will be required prior to commencing Phase II. Prior to grubbing activities sedimentation/siltation fencing will be installed along the top of the slope to the Saint John River (northern property boundary). Grubbing will involve the removal of organic material and unsuitable soil including stumps, roots, felled timber, embedded logs, and root mat from the proposed construction area. Where possible, vegetation will be left in place.

Grading or rock breaking may be required to prepare and level the site in some areas. Based on the thin patchy soil coverage at the subject site it is assumed that if fill material is required it will be either excavated bedrock or imported fill material. Once the site has been cleared and graded, if needed, the area will be stabilized with gravel to a required thickness capable of supporting heavy equipment traffic.

The existing gravel access and parking area on the property may be topped with pit run gravel or crushed rock, crowned, and compacted to minimize erosion. Sedimentation structures including hay bales and silt fencing will be installed around the site, including access and parking areas on an as needed basis to control run-off.

2.5.2 Phase II – Construction and Commissioning

Phase II of the project will include the construction and commissioning of the new WWTF, decommissioning of the existing WWTF and landscaping. Construction of the new facility is anticipated to occur from July 2017 until early 2018 during standard working hours, while decommissioning and landscaping activities are anticipated to occur in February and March of 2018. It is recognized that some landscaping (seeding and planting) will be required to be completed in spring of 2018.

New WWTF

The new WWTF will be constructed adjacent the existing facility to allow continuity of wastewater treatment during the construction period (**Figure 2**). Although detailed design has yet to be completed, the new facility is anticipated to include:

- New WWTF Building - the new WWTF building is anticipated to be an industrial building with an approximate foot print of 36m^2 and façade that will resemble the local community. The building will have a reinforced concrete slab foundation with masonry block or pre-engineered steel construction and soundproofing. Mechanical and electrical systems will be detailed in the final design. Single phase power will be supplied to the site by overhead lines currently in place along Bay Crescent Drive.
- Four Underground Tanks – the installation of four underground tanks (primary clarifier tank, equalization tank, MBBR tank and secondary clarifier tank to contain the treatment process. Tank construction and installation details will be included in the final design.
- Retaining Wall - a retaining wall will be installed north of the proposed building to facilitate site development.
- Submerged outfall - a new submerged outfall will be installed in the Saint John River. The HDPE pipe will be installed in an excavated trench that will extend across the site and into the river. It is expected that the pipe will be floated into place during installation and then sunk to the river bottom prior to plant commissioning.
- Connection to the existing system – the proposed system is being designed such that minimal trenching and piping will be required to connect the new facility to the existing system. It is anticipated that PVC pipe will be buried in an excavated trench to the existing connection point.

- Groundwater Well – a non-potable groundwater well will be installed by a licenced well driller and will be cased into bedrock. Connection lines will be run in an excavated trench from the well to the new WWTF building. The trench will be buried using appropriate fill material.

Heavy equipment expected to be onsite during construction activities includes; excavator(s), backhoe, bulldozer, roller compactor, dump trucks, concrete trucks, well drilling rig and/or crane.

During construction, access to the site will be from Bay Crescent Drive. Equipment and heavy machinery will be offloaded onsite adjacent to Bay Crescent Drive. However should the offloading be required to occur in the roadway appropriate signage and flagging will be in place. Detours are not expected and impacts on traffic are expected to be minimal and temporary.

Construction activities may generate waste. Solid waste and recyclable materials generated will be collected in a centralized location and will be regularly disposed offsite at appropriate facilities. Construction will also introduce construction noise during working hours to the surrounding area, which is primarily residential in nature.

2.5.2.1 Existing WWTF Decommissioning and Removal

The existing plant is located within a fenced area approximately halfway between the Bay Crescent Drive and the Saint John River, on a moderate slope towards the river. There is currently no potable water used on site.

The facility consists of buried connection lines to the current waste water collection system; a buried concrete primary settling tank; the existing WWTF building (wood frame construction with concrete foundation) housing a trickling filter with small stone media and a secondary clarifier; and, a concrete outfall pipe. All facility components will be decommissioned and removed. If fill material is required it will be either excavated bedrock or soil from onsite excavations or imported.

Heavy equipment required to decommission and remove the existing facility is expected to be limited to an excavator, bulldozer and dump trucks. The equipment will loaded/offloaded onsite adjacent to Bay Crescent Drive.

2.6 Phase III - Operation and Maintenance

The proposed WWTF is being designed to be able to service an average flow of 60m^3 per day with peak flows of up to 350m^3 per day. The estimated lifespan of the new WWTF is 50 years.

Routine maintenance and process monitoring will be completed on a daily to weekly basis, based on communications from the SCADA system, to ensure that the facility is meeting the service demand and requirements outlined in the approval to operate. Routine process specific maintenance may also be required depending on the final design. Based on the maintenance requirements, it is estimated that an employee will be onsite once a week for up to an hour. Additional municipal staff involved in the utility operation may be onsite periodically.

Water will be supplied to the facility by the onsite well to aid in the treatment process. If necessary, flocculent may be used in the treatment process. The quantity of flocculants is not known at this time. Other disinfectants and chemicals are not anticipated to be required for the treatment process.

Waste products of the facility are anticipated to be minimal and be limited to include small amounts of solid waste (recyclables and garbage) on an infrequent basis. Waste products of the process also include waste sludge which will be transported offsite for disposal as needed.

The WWTF is being designed to upgrade the treatment process to modern standards and onsite effects should be reduced or remain similar to the current system (i.e. air and noise emissions are expected to be reduced following the commissioning of the new WWTF).

The new WWTF will obtain power from the existing single phase hydro transmission infrastructure nearby. The facility is being designed to utilize equipment that is powered by a single phase 240 VAC.

2.7 Future Modifications or Extensions

The WWTF is being designed to meet the foreseeable needs of the Morna Heights residential area and school. Future modifications or extensions to the new WWTF are outside the scope of this assessment.

2.8 Accidents and Unplanned Events

An assessment of potential environmental impacts associated with accidents, malfunctions and unplanned events during the construction, operations and maintenance of the new WWTF have been included as part of this EIA. Potential impacts include reference to both the socio-economic and bio-physical effects which could result from the project.

2.9 Project-Related Documents

The following reports have been included in Appendix A;

City of Saint John Property Zoning Inquiry Letter. Katelyn Davis. March 27, 2017.

NATECH Environmental Services Inc. 2017. Environmental Risk Assessment – Morna Heights Wastewater Treatment Plant – Interim Report. For the City of Saint John. Hanwell, NB.

New Brunswick Department of Environment and Local Government, 2014. Approval to Operate (S-2691) Wastewater Works – Morna Heights Trickling Filter.

New Brunswick Department of Environment and Local Government Clean Water and Wastewater Fund Agreement. January 2017.

3.0 Description of Existing Environment

The proposed project location is a 1300 m^2 lot within a residential subdivision area. The existing WWTF building is generally centred on the property and enclosed by chain link fencing. A small gravel driveway and parking area is located between the building and Bay Crescent Drive. The property slopes steeply to the north and northeast, where it meets the Saint John River. Site drainage and treated effluent discharged from the WWTF follows the general site topography. The perimeter of the property, with the exception of the boundary along Bay Crescent Drive, is generally lined with coniferous trees and shrubs providing a buffer for neighbouring residences and the Saint John River. The shoreline along the property consists predominantly of exposed bedrock, cedar shrubs and minor amounts of riparian grasses. Photographs of the subject site taken during site visits are presented in Appendix B.

A description of the existing environment in the area of the proposed project is presented in the following sections. The information has been gathered through a desktop review and field investigation.

3.1 Methodology

3.1.1 Desktop Review

The desktop review consisted of an analysis of the biophysical and socio-economic setting based on background information available within the proposed WWTF project footprint. Information sources included digital mapping and online databases through provincial and federal government resources along with discussions with government representatives.

Prior to conducting field investigations, the Atlantic Conservation Data Centre (ACCDC) and New Brunswick Department of Natural Resources (NBDNR) were consulted to identify potential for occurrences of rare and endangered flora and fauna, and unique or sensitive habitats that have been known to occur within a 1km radius of the study area. The following lists were reviewed for species and habitats of concern:

- Listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC);
- Listed under the Species at Risk Act (SARA);
- Listed under the New Brunswick Species at Risk Act (NBSARA);
- Ranked by New Brunswick Department of Natural Resources (NBDNR); and,
- Listed by the Atlantic Canada Conservation Data Center (ACCDC) as extremely rare (S1), rare (S2) and uncommon (S3).

Available background information from the following websites and databases was also reviewed:

- Nature NB;
- Important Bird Areas (IBA), the Ramsar Convention on Wetlands and Federally recognized Migratory Bird Sanctuaries;

- Provincially identified deer wintering areas;
- Protected Wellfields and Watersheds; and,
- Protected Natural Areas.

Existing ambient air quality was evaluated through the closest NBDELG ambient air monitoring stations to the proposed project that are located in Hillcrest and Prince William Street (Customs Building) in Saint John, approximately 20 km southeast of the project location. Although the Prince William Street station is closer to the subject site, it is located in a commercial and industrial area of the city. Therefore the Hillcrest station, located in a rural or residential area, is expected to be more representative of the subject site however it does not provide reporting on all parameters. The Prince William Street monitoring station reports on carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2), and ground level ozone (O_3). The Hillcrest location reports on fine particulate matter ($PM_{2.5}$), nitrogen oxides (NOx), ground level ozone (O_3), sulfur dioxide (SO_2), and total reduced sulfur (TRS). NB Power also monitors SO_2 concentrations in Grand Bay, to the north of the project location. The most recent available monitoring results from NBDELG are for monitoring years 2012 and 2013.

3.1.2 Biophysical Site Investigations

Preliminary site investigations were carried out in March and May 2017. The site investigations consisted of a topographical and environmental aspect survey that focused on identifying the existing environment and potential environmental constraints. During the site visits, general wildlife habitat conditions, and evidence of wildlife, were observed to identify the type of wildlife and habitat that may be present in the study area (i.e. within 1km of the subject site).

3.2 Results

3.2.1 Atmospheric Environment

The subject site is located within a residential neighbourhood. A community school is located approximately 275 m from the site. Commercial or industrial properties have not been identified within 500 m of the subject site.

For the purpose of this environmental assessment, the atmospheric environment is characterized by; air quality, emissions, climate, and ambient noise quality.

3.2.1.1 Ambient Air Quality

Monitoring results for CO, NO_2, $PM_{2.5}$ and O_3 for the Saint John area in 2012 and 2013 did not exceed applicable guildelines.

The existing WWTF has operated on the subject site since 1972 and odours typical to normal operations of a very small WWTF have been discharged at the property since that time. Modernization of the system will improve on odours and treated effluent will be submerged when discharged.

3.2.1.2 Climate

Data obtained from the Canadian Climate Normals - Saint John climate station (Government of Canada, 2017) was selected as the most appropriate as it was located closest to the subject site (approximately 20 km to the east of the proposed project location at 45°19'N and 65°53'W). Data indicates an annual daily mean temperature of 5.2°C, with extremes ranging from -36.7°C to 34.4°C. The warmest period of the year was typically from June to August, with July typically being the warmest month with an average daily temperature of 17.1°C. The coolest period annually was typically between December and February with coldest month being January at an average daily temperature of -7.9°C.

The historical precipitation data from the Saint John climate station recorded an average of 1295.5 mm of precipitation per year with 1076 mm falling as rain and 239.6 cm as snowfall. On average precipitation occurred approximately 158 days per year with November being the wettest month and August being the driest. The extreme daily rainfall occurred on November 13, 1975 when 154.4 mm of rain fell. The extreme daily snowfall occurred on December 12, 1960 when 58.2 cm of snow fell.

According to the Climate Normals, the average annual wind speed at the climate station is 15.2 km/h from the southwest. The maximum wind speed generally occurs in March with an average speed of 17.5 km/h from the north. The minimum wind speed generally occurs in August with an average speed of 11.3 km/h from the south. Generally, the average monthly wind speeds tend to be high between October and May and lower between June and September. The prevailing winds are generally from the south in the summer and the northwest in the winter.

3.2.1.3 Ambient Noise Quality

Existing sound quality conditions in the vicinity of the project location were not measured for this assessment. Land uses within 250 m of the project location are limited to residential, other than the existing WWTF. An elementary school is located approximately 275 m to the southwest. Given the setting of the project, existing sound pressure levels in vicinity of the project are expected to be typical of sound pressure levels in a suburban residential area.

3.2.2 Terrestrial Environment

The subject site is located in a mature residential neighbourhood and has operated as a small municipal service site. Due to recent clearing activities minimal vegetation remains onsite. The adjacent property is occupied by young to mature softwood (cedar dominant) and little to no understory dominated by mosses. The surrounding residential properties are generally occupied by landscaped lawns.

For the purposes of this environmental assessment, the description of the terrestrial environment considers the site topography, geology, and flora and fauna (including species at risk) habitat/populations. The description has been prepared from available information and field reconnaissance conducted in spring 2017.

3.2.2.1 Site Topography and Physiography

The southern half of the subject property gradually slopes towards the Saint John River. Immediately to the north of the existing WWTF, the topography changes to a steep decline with exposed bedrock outcrops that form the edge of the river are sparsely vegetated.

Approximately 7 m of the eastern edge of the property (**Figure 2**) has been encroached upon by the neighbouring landowner. Gravel fill has been placed in this area to form a recreational vehicle parking area. The slope edge of this area has been reinforced by waste construction materials (concrete slabs, bricks, asphalt, etc.).

Along the western property boundary, and immediately to the west of the existing facility, the property slopes steeply towards the neighbouring residence.

The proposed project area is located within the Fundy Coast Ecoregion (Ecoregion 4), specifically within the Fundy Coastal Ecodistrict which encompasses the extent of the low-lying areas along the Bay of Fundy and the southernmost extent of the Saint John River watershed. The area ranges from seaside salt marshes and estuaries to the gently rolling hills and valleys of inland areas.

3.2.2.2 Geology

Based on the Generalized Surficial Geology Map of New Brunswick (Rampton et al.1984, 2002 Ed.), the surficial geology in the vicinity of the proposed location of the new WWTF is Late Wisconsian aged glaciofluvial sediments and is comprised of ablation morraines and loamy ablation till deposited as a discontinuous veneer over bedrock. The deposits are generally 0.5 to 3 meters in thickness and include silt, sand, gravel, and rubble. Based on field observations made during the site visit, surficial geology consists of sand and gravel with minor silt in thin (less than 0.3m) discontinuous layers. Soil in the area of the proposed project has been previously disturbed and may not be representative of undisturbed soil horizons.

Based on the New Brunswick Department of Natural Resources bedrock geological map of New Brunswick (revised version of map plate NR-1; 2008), the regional bedrock geology in the project area is identified as the Belmont Tonalite Formation of the Golden Grove Plutonic Suite deposited from the Neoproterozoic to Cambrian period. The Belmont Tonalite formation is characterized by light to dark grey, medium-grained tonalite gradational from granodiorite to quartzdiorite.

3.2.2.3 Hydrology and Hydrogeology

The subject site is boarded to the north by the Saint John River and is encompassed within the Saint John River watershed. Despite being located immediately adjacent to the river, the proposed project area is elevated and not located within floodplains. High embankments located along the north of the land parcel separate the site from the Saint John River.

Surface water flow is expected to be controlled by topography and be directed north from Bay Cresent Drive, across the subject site toward the Saint John River. No watercourses or wetlands have been

identified on the subject site. The proposed project area is not located within a watershed protected area as outlined in the New Brunswick Watershed Protection Program.

Groundwater in the area of the subject site is expected to flow north to northeast toward the Saint John River. Potable water is supplied to the adjacent residences by private wells. The proposed project area is not located in a wellfield protected area under the New Brunswick Wellfield Protection Program.

3.2.2.4 Environmentally Sensitive Areas

No environmentally sensitive areas or protected natural areas have been identified within 1 km of the proposed project area. However, the Saint John River and estuary within the project footprint is classified as an unmanaged Environmentally Significant Area (ESA). The ESA extends from the Saint John River mouth to the tidehead, an area with partial mixing of inflowing salt water and outflowing fresh or brackish water. The proposed project location would not provide unique or limited habitat within the ESA.

3.2.2.5 Forest Cover and Vegetation (Flora)

Coniferous forests in the Fundy Coastal Ecodistrict are dominated by red spruce, balsam spruce, black spruce, white spruce and tamarack. Cedar is also a predominant species on the limestone-derived soils around Saint John. In the Saint John area, the most common hardwoods are white birch, mountain ash, red maple, and yellow birch.

Forest cover has largely been removed on the property, with the exception of the riparian area along the river and property boundaries, allowing for a buffer between the facility and neighbouring residences. The forest habitat within the community is primarily fragmented due to residential development. Trees on the adjacent properties are representative of the common species observed throughout the ecodistrict. The riparian area is dominated by mature cedar, and the east and west property edges are occupied by mature red and balsam spruce and white birch.

The subject property and river embankment consists mainly of bedrock outcropping which provides little opportunity for plant growth. Based on the observations made during the site visits, the dominant vegetation onsite consists of moss covered rocks, grass and weeds.

A review of the ACCDC data did not identify vegetation (flora) species of conservation within a 1 km radius of the project footprint (see Appendix C). Based on the habitat identified during the site visit, there is limited potential habitat to support any vegetation of conservation concern. Species identified during the field investigations were species considered to be common and widespread (S4 to S5) within this region of the province.

It was observed during the site visits that the proposed project will occur in an area of previously disturbed vegetation.

3.2.2.6 Wildlife (Fauna) and Wildlife Habitat

The subject property currently has no forest cover and limited vegetation, while the area surrounding the subject site includes mainly landscaped residences with some tree coverage allowing for limited habitat for wildlife.

During the 2017 site visits, no animal signs (actual sightings as well as auditory detections, tracks, scat, and dens/nests) were observed.

Based on field observations, the study area does provide suitable habitat for small mammals and urbanized wildlife such as; skunk (*Mephitis mephitis*), raccoon (*Procyon lotor)* meadow voles (*Microtus pennsylvanicus*), squirrels (*Sciurus vulgaris*) and chipmunk (*Tamias striatus*). Mammals may use the property for foraging and/or migration, but are unlikely to inhabit the proposed project area for significant duration due to the limited availability of suitable habitat. More suitable habitat exists in nearby areas, specifically to the south of Westfield Road in large areas of continuous forest (approximately 600 m to the south) and mammals are expected to gather there.

The Saint John River in the area of the proposed project provides potential suitable habitat for species such as river otter (*Lontra canadensis*), American mink (*Neovison vison*), and muskrat (*Ondatra zibethicus*).

It is unlikely that the site would provide foraging opportunities or a migration route for other larger species such as white tailed deer (*Odocoileus virginianus*) and coyote (*Canis latrans*).

The proposed project location would not provide unique or limited habitat for any of these species.

3.2.2.7 Wildlife (Fauna) of Conservation Concern

A review of the ACCDC database indicated that no wildlife species of conservation concern (excluding birds, and “location sensitive” species) had historically been observed within a 1 km area surrounding the proposed project area. However, the New Brunswick Department of Energy and Resource Development (DERD) and the ACCDC consider a number of species as “location sensitive”. Concern about exploitation of location-sensitive species precludes inclusion of precise geographical coordinates in ACCDC reports. The ACCDC database indicated that there were three wildlife species or habitats of conservation concern known to occur within 5 km of the proposed project area which have been outlined in **Table 3-1**.

Table 3-1: Summary of Wildlife (Excluding Birds) of Conservation Concern and/or Location Sensitive Species Identified by the ACCDC Within a 1 KM Radius of the Project Footprint

Common Name	Scientific Name	ACCDC Status	COSEWIC/ SARA Status	NBSARA Status	Typical Habitat	Habitat Suitability within Project Footprint
Eastern Painted Turtle	*Chrysemys picta picta*	S3	-	-	Common inhabitants of permanent ponds, shallow pools and coves of large lakes, beaver ponds and agricultural ponds. May occur in slow moving sections of river habitat.	No suitable habitat for overwintering or nesting for turtle species and low quality habitat for turtle migration and foraging. The shoreline along the subject property also does not provide preferred habitat for turtle species (i.e. absence of basking logs, cover, soft substrates, shallow pools, etc.).
Wood Turtle	*Glyptemys insculpta*	S3	Threatened	Threatened	Requires rivers and streams with sandy or gravely-sandy bottoms and prefers clear meandering watercourses with a moderate current. The Wood Turtle's natural nesting sites are found on sand or gravel-sand beaches and banks. Other habitats used less frequently by the Wood Turtle include bogs, marshy pastures, beaver ponds, shrubby cover, meadows, coniferous forests, mixed forests, hay, and agricultural fields and pastures.	
Bat Hibernaculum	*N/A*	S3	Endangered[1]	Endangered[1]	Bats favour larger hibernacula where large groups may roost together, including natural caves, mines, cellars, and other kinds of underground sites and man-made structures.	Potential for bat hibernacula at the property, and potential habitat was not observed on adjacent properties. Trees along the shoreline of the subject and neighbouring properties do not provide suitable habitat for bat roosting.

1. Myotis lucifugus (Little Brown Myotis), Myotis septentrionalis (Long-eared Myotis), and Perimyotis subflavus (Tri-colored Bat or Eastern Pipistrelle) are all Endangered under the *Federal Species at Risk Act* and the *NB Species at Risk Act*.

No other unique or special wildlife habitat areas were identified within the boundaries of the proposed project in the existing data or during the 2017 site visits. There were no other wildlife species of conservation concern and/or location sensitive species identified as potentially occurring within the assessment area.

The proposed project location would not provide unique or limited habitat for any of these species.

3.2.2.8 Birds and Bird Habitat

Important Bird Areas (IBA)

The proposed project area is not within an Important Bird Area (IBA). The nearest IBA is the Saint's Rest Marsh & Beach (NB022), located approximately 12 km south of the proposed project area.

Maritime Breeding Bird Atlas

The Maritime Breeding Bird Atlas (MBBA) database provides information on the presence of breeding bird species counts conducted between 2006-2010. It was determined through the on-line search tool that the proposed project lies within the "Saint John West" Atlas square (19GL21) with the closest roadside point count (PC) to the project location occurring at PC# 31. During the atlas period 2006-2010, a total of 101 species of birds were recorded within this square. Of these species, 74 were confirmed as breeding (including one species of conservation concern: Bald Eagle (*Haliaeetus leucocephalus*), Endangered under the NB SARA), 11 were probable breeders, and 16 were possible breeders.

Atlantic Canada Conservation Data Center (ACCDC)

The ACCDC database indicates that no bird species of conservation concern have the potential to occur within 1 km area of the proposed project area. The DERD and ACCDC considers Bald Eagle as "location sensitive", thus removing inclusion of precise coordinates in ACCDC reports. The ACCDC database indicated that Bald Eagles are known to occur within 5 km of the project footprint. Refer to Appendix C for the full ACCDC report

Table 3-2: Summary of Bird Species of Conservation Concern Identified by ACCDC Database Within 1 km of the Project Location

Common Name	Scientific Name	ACCDC Status	COSEWIC/ SARA Status	NBSARA Status	Typical Habitat	Habitat Suitability within Project Footprint
Bald Eagle	*Haliaeetus leucocephalus*	S4	-	Endangered	Found throughout New Brunswick, but more common in the southwestern portion of the province where there is more open water. Nests are typically built near open water where there is an abundance of fish. Nests will often be built on very large white pines. Coastal islands also provide suitable habitat for nesting.	No nesting or roosting due to absence of tall, mature pine or hardwood trees suitable for nesting or roosting. Additionally no observed suitable nesting/roosting at the adjacent shoreline properties east and west of the subject property (up to 200 m distance from boundary). Foraging would occur in the Saint John River in the vicinity of the project.

The proposed project location would not provide unique or limited habitat for this species.

3.2.3 Aquatic Environment

The proposed project area is situated within the Lower Saint John River basin. For the purposes of this environmental assessment, the description of the aquatic environment considers wetlands and watercourses located on, or adjacent to, the proposed project area. The description has been prepared from available information and field reconnaissance conducted in spring 2017.

It is recognized that any project proposed within 30m of a watercourse or wetland that is identified on the GeoNB map must apply for a permit under the Wetland and Watercourse Alteration Regulation (WAWA) under the Clean Water Act.

3.2.3.1 Wetlands

According to the GeoNB wetland mapping database, there are no regulated wetlands or provincially significant wetlands within 30m of the proposed project area. No unmapped wetlands were identified within 30m of the proposed project area during the site visits.

3.2.3.2 Watercourses

Based on a review of GeoNB watercourse (1:10,000) mapping and observations made during site visits conducted in 2017, watercourses within 30m of the proposed project area are limited to the Saint John River. The Saint John River is the longest river in northeastern North America and has a basin area of over 55,000 km2 (CRI, 2012). A description of the river's characteristics is presented in **Table 3-3**.

Table 3-3: Watercourses within the Project Area

Watercourse	Project Component	Fish Bearing (Y/N)	Habitat Description				
			Substrate	Watercourse Width (m)	Dominant Habitat	Depth (m)	% Cover
Saint John River	New Outfall (effluent)	Y	Boulders, cobble, gravel, sand	2,200	Run	5 m	0

The Saint John River is located approximately 15 m from the existing WWTF building, and 20 m from the new proposed WWTF building. The proposed effluent outfall location extends approximately 20 m into the Saint John River. With the exception of the installation of the new effluent discharge piping, project components are not expected to interact with the watercourse.

The proposed WWTF is being designed to meet, or be below, the current treated effluent discharge objectives, in addition to several other parameters.

Fish Presence

A review of the information provided in the CRI, 2012 report identified 41 fish species based on historic and recent finding that may frequent the lower reach of the Saint John River including: Salmoniformes, Anguilliformes, Perciformes, Cypriniformes, and Acipenseriformes.

Fish Species of Conservation Concern

The ACCDC database indicates that there is one fish species of conservation concern historically observed within a 1 km area of the proposed project footprint. The Shortnose Sturgeon (*Acipenser brevirostrum*) is a species of Special Concern under SARA and NBSAR, as summarized in **Table 3-4**.

Table 3-4: Summary of Fish Species of Conservation Concern Identified by ACCDC Database Within 1 km of the Project Location

Common Name	Scientific Name	ACCDC Status	COSEWIC/ SARA Status	NBSARA Status	Typical Habitat	Habitat Suitability within Project Footprint
Shortnose Sturgeon	*Acipenser brevirostrum*	S3	Special Concern	Special Concern	The Shortnose Sturgeon an anadromous fish inhabiting nearshore marine, estuarine and riverine habitats of large river systems. It is known to occur and spawn in the Saint John River, the only river system it inhabits in Canada. It spawns in fast flowing water over a boulder and gravel bottom. They generally over winter in the lower reaches of the Saint John River and in the spring migrate upstream as far as the Mactaquac Dam to spawn.	No spawning habitat within the area of the effluent pipe installation or the shoreline of the subject site. Possible foraging habitat adjacent the project location.

The proposed project location would not provide unique or limited habitat for this species.

3.2.4 Archaeological and Cultural Environment

There are no known cultural heritage or archaeological resources located within the proposed project area or on adjacent properties.

Due to the thin discontinuous layer of surficial soil, the proposed project area has limited potential to preserve cultural heritage resources either Native (both pre-contact and historic) or Euro-Canadian resources. In addition, the proposed project area was cleared and grubbed during the construction of the existing WWTF, and it is expected cultural resources (if any) were likely found or destroyed at that time.

3.2.5 Socio-Economic Environment

3.2.5.1 Population and Local Economy

Based on the 2011 census the population of Saint John metropolitan area was 127,761, showing an increase of approximately 4.4% from 2006 (Statistics Canada, 2016). The core of the City serves as the commercial, industrial and employment centre for the region.

The Morna Heights community consists of 51 residences and is located approximately 15 km northwest of the City core. Residents predominantly commute for employment purposes and government services. The community surrounding Morna Heights is located along the southern shore of the Saint John River and includes an elementary school, several churches and a marina. The community was predominantly developed through the 1960's to 1980's.

Land Use

The subject property is currently zoned for utility services has been owned by the City of Saint John and operated as a WWTP since 1972. Prior to 1972 the property was undeveloped and forested. The surrounding properties are occupied by privately owned residences located immediately adjacent (within 50 m) the project property on both sides, and directly across Bay Crescent Drive.

There are no commercial land uses immediately adjacent to the proposed site. The nearest commercial establishments are at the Saint John Marina, located approximately 1.5 km south of the site. There are no industrial uses immediately adjacent to the proposed project site.

The nearest large military facility to the project site is Canada Forces Base Gagetown, which is the largest military facility in Eastern Canada. The Base is located approximately 75 km north of the project location and features a 1,200 km^2 training area with 1,500 km of roads, 900 km of tracks, and 740 buildings. A number of smaller reserve units of the Canadian Forces are located in Saint John.

Recreational and Tourism

The City of Saint John services a regional population of over 150,000, which provides a sufficient population base for ample recreational facilities. Natural features in the area, including the Bay of Fundy and many lakes and waterways, provide many areas of interest to tourists as well.

Adjacent to the proposed project area, the Saint John River is an important recreational area for local users and tourists. Particularly during the ice-free season, the river is widely used for recreational fishing, sailing, swimming, and other water-based transportation and recreational activity.

3.2.5.2 Transportation and Transportation Infrastructure

Westfield Road connects Morna Heights, and the majority of the communities along the Saint John River, to the City Core and is located approximately 400 m west of the project site. The nearest major highway to the subject site is the New Brunswick Highway 7 (connecting Saint John and Fredericton, NB) which is located approximately 3.8 km west of the project site and is accessed by Westfield Road.

The proposed project is located 10 km northwest (upstream) of the region's largest port, the Port Saint John. The nearest airport to the project site is the Saint John Airport (YSJ), serving domestic and international commercial passenger and cargo flights, is located approximately 21 km to the east. The nearest rail facility is the CN track corridor located approximately 650 m to the southwest of the project location.

The proposed project is not anticipated to significantly influence transportation or transportation infrastructure.

3.2.5.3 Utilities

The Morna Heights area, including the proposed project area, is supplied single phase power by Saint John Energy. There are no generating facilities within the proposed project area.

The Morna Heights residential properties are supplied potable water by individually drilled wells. The existing central wastewater treatment facility on the subject property currently provides sanitary services to the local residents.

Bell Aliant and Rogers have lines and communication towers within the region and provide communication services to the Morna Heights area.

3.2.5.4 Aboriginal Communities

The nearest First Nation community to the proposed project area is the Oromocto First Nation, a Maliseet community of 654 persons (304 on-reserve) (AANDC, 2014). Oromocto First Nation is located within Oromocto town limits and occupies approximately 20 hectares of land located 75 km north of the project site. Established in 1895, it currently governed by an elected council, Chief and five councillors serving a two-year term. The current council governs until Fall 2017 (Oromocto First Nation, 2017).

The Tobique First Nation owns two small islands, known as 'The Brothers" located approximately 4.5 km north east of the subject site. The islands are uninhabited and have been since at least 2011.

4.0 Assessment of Environmental Impacts

There is potential for the local environment in the area of the subject site to be impacted by the project. An assessment of potential impacts during each phase of the project, as well as potential accidental events/malfunctions, has been undertaken below.

4.1 Methodology

Environmental features deemed to have specific value to the ecosystem, heritage and culture or are afforded protection by legislation are identified as Valued Ecosystem Components (VEC) or Valued Socio-economic Components (VSC's). The following environmental features have been identified as a VEC/VSC in relation to the proposed project:

- Atmospheric Environment;
- Aquatic Environment;
- Terrestrial Environment;
- Species at Risk;
- Archaeological and Cultural Resources; and,
- Socio-Economic Environment.

The impact assessment involves identifying the potential for the project to interact with the VEC/VSCs.

Because each phase of the project involves different activities, and potentially different interactions with the VEC/VSCs, the impact assessment was completed in consideration of each of the project phases identified in Section 2.5 (Project Planning and Preparation; Construction; and Operation and Maintenance) as well as unplanned events and accidents.

The initial screening to identify if interactions between the project and the environmental component are anticipated is presented in **Table 4-1**.

Table 4-1: Anticipated Project Interaction with VECs/VSCs

Environmental Components		Project Components			
		Planning and Preparation	Construction Phase	Operations and Maintenance	Unplanned Events and Accidents
Atmospheric	*Ambient Air Quality*		✓	✓	✓
	Climate				
	Ambient Noise Quality		✓		
Terrestrial	*Vegetation (Flora)*				
	Wildlife (Fauna)		✓		✓
	Migratory Birds		✓		✓
	Designated Habitat and other Protected Areas				
Species at Risk	*Flora/Fauna and Associated Habitat*		✓		
Aquatic	*Groundwater*		✓	✓	✓
	Surface Water		✓		✓
	Wetlands				
Cultural and Heritage Resources	Archaeological / Cultural Heritage Resources				✓
Socio-Economic	First Nations / Aboriginal Interests				✓
	Health and Safety				✓
	Labour and Economy				
	Land Use				✓

5.0 Environmental Effects Assessment and Mitigation

An analysis of the potential environmental effects for each of the interactions identified in Section 4.1 is undertaken in the following sections. For each of these interactions the potential impact and boundaries are identified, the effect prior to mitigation is evaluated, mitigation is proposed, and significance and residual effects were predicted. The predicted residual effect assumes that each of the recommended mitigation measures has been implemented.

5.1 Methodology

5.1.1 Potential Impact from Interaction

Potential interactions between the project phases and VEC/VSCs were considered. If the interaction was expected to result in a net negative impact to the VEC/VSC it was carried forward for mitigation and a residual effect was predicted.

Impacts that were not expected to pose a net change to the project area (i.e. noise levels for the new WWTF and effluent discharge are expected to be similar to the existing WWTF) were not considered carried forward for further consideration.

5.1.2 Impact Effects Boundaries

The spatial and ecological boundaries for the environmental impact assessment encompass the physical or geographical limit for which impacts related to a proposed project will be considered and assessed. The spatial boundary for the assessment of the potential environmental effects of the project on the following VECs are presented in **Table 5-1**.

Table 5-1: Spatial Boundaries for Potential Environmental Effects

Environmental Components		Spatial Boundary (km)
Atmospheric	*Ambient Air Quality*	0.25
	Climate	1
	Ambient Noise Quality	0.01
Terrestrial	*Vegetation (Flora)*	0.5
	Wildlife (Fauna)	1
	Migratory Birds	1
	Designated Habitat and other Protected Areas	1
Species at Risk	*Flora/Fauna and Associated Habitat*	1
Aquatic	*Groundwater*	0.03
	Surface Water	0.03
	Wetlands	0.03
Cultural and Heritage Resources	Archaeological / Cultural Heritage Resources	0.5
Socio-Economic	First Nations / Aboriginal Interests	0.5
	Health and Safety	5
	Labour and Economy	50
	Land Use	n/a

5.1.3 Mitigation

Mitigation is identified for each interaction and/or effect in an attempt to reduce the severity, magnitude or duration of the interaction. Best management practices (based on industry guidelines and regulatory guidance documents) have been identified as appropriate mitigative measures. In addition, several acts, codes, regulations and guidelines may require appropriate actions be conducted as mitigative measures prior to or during the interaction. The following Acts, codes, regulations and guidelines have been consulted in the development of the mitigative measures;

- Environment Canada's Migratory Birds Convention Act,1994 (MBCA);
- The Migratory Birds Regulations (MBR);
- The Fisheries Act;
- Watercourse and Wetland Alteration Regulation;

- the Clean Air Act (New Brunswick);
- New Brunswick Health and Safety Act;
- Fire Code of Canada; and ,
- the Atlantic Risk Based Corrective Action Guideline for the Management of Contaminated Sites.

5.1.4 Significance and Residual Effect

The significance of the resultant effect of the interaction after mitigative measures were applied was evaluated using the following questions as a guide:

1. What is the magnitude of the effect?
2. What is the geographic extent of the effect?
3. What is the duration (short or long term) and frequency of the effect?
4. How does the net effect compare to the existing environment? Does it represent a substantive or order of magnitude negative change in baseline conditions?
5. Is there a substantive public, government or agency concern?
6. What is the ecological and/or social context for the effect?
7. Is the effect reversible?

The significance of effects are ranked on the following scale (**Table 5-2**);

Table 5-2: Significance of Environmental Effects

Significance of Effects	Definition
Negligible	Impacts contained to the immediate area (<5m) and are short term (days to weeks)
Low	Impacts contained to the project area and/or are short term in duration (<1 year)
Moderate	Impacts may extend to the area surrounding the project and/or are moderate term in durration (1-5 years)
High	Impacts extend to the area surrounding the project and/or are moderate term in durration (>5 years)

The residual effect of the interaction after mitigative measures were applied was then predicted.

5.2 Results

The results of the environmental effects evaluation, including post mitigation, are presented on **Table 5-3**.

Table 5-3 - Environmental Effects Evaluation Results

Project Phase	Potential Impact	Mitigation	Significance of Effects	Residual
Atmospheric Environment - Ambient Air Quality, Ambient Noise Quality				
Construction	• Fugitive dust emissions; • Generation of particulate matter from construction activities • Emissions of NOX, CO, VOCs and SO_2 from construction equipment; and • Elevated noise levels at adjacent and nearby receptors from construction equipment and activities.	• As part of the Environmental Management Plan (EMP), a noise reduction plan will be established and communicated to the contractors prior to construction • During construction nearby residents will be notified of the schedule for construction activities and the likely duration • Contractors are to ensure that equipment and tools are well maintained • Vehicles and equipment will be properly muffled and maintained according to emission and noise suppression standards • All construction equipment will be turned off when not in active use to minimize excess idling • A plan for handling soil and construction materials for the site will be developed (i.e. excavated soil and rock will be stockpiled away from the Saint John River in predefined areas or removed from site to a predetermined location) with an intent to minimize soil stockpiled, and duration soil is stockpiled, at the site • Monitoring of weather (wind conditions) and stabilization of stockpiles, bare slopes to minimize increase in fine particulate matter • Water will be used to reduce dust, where necessary • Exposed soils will be stabilized as soon as practical • Complaints related to noise from the construction will be addressed by the contractor.	Low	None
Operational	• Elevated noise levels at adjacent residences from onsite equipment.	• The WWTF building will be constructed such that the soundproofing measures are included • Blowers and fans will be pointed away from residential properties • Sound levels and odors will be similar or improved than the current operations of the existing WWTF • Operation requirements will be completed in accordance with the DELG Approval to Operate Certificate issued under the NB Clean Air Act	Low	None
Unplanned Events and Accidents	• Fire may result in decreased air quality for the subject site and surrounding area.	• Rubbish and waste materials will be kept at minimum quantities and burning of this material will be prohibited • Waste materials will be collected on a regular basis and disposed of at an appropriate facility • Oily rags will be stored in approved receptacles and disposed of at approved waste facilities	Low	None
Terrestrial Environment - Wildlife and Wildlife Habitat, Migratory Birds				
Construction	• Alteration of, disruption to, or removal of, foraging areas for wildlife; • Disturbance of adjacent nesting/breeding habitats from construction noise; • Visual impacts from the presence of humans in the area as well as vehicles and construction equipment may cause disruption of sensitive wildlife activity such as breeding and/or feeding; and • Heavy equipment use during the construction activities may cause direct injury or death of wildlife through collisions or destruction of dens and food sources.	• Vegetation will be retained where possible to provide wildlife habitat • Construction crews and machinery are to use designated roadways and access-points to limit disturbance off the project footprint and minimize the interactions with wildlife and wildlife habitat • To minimize wildlife encounters, site and working areas shall be kept clean of food scraps and garbage and will be removed from the site daily • In the case of wildlife encounters the following shall be implemented: - No attempt will be made by any worker at the project site to chase, catch, divert, follow or otherwise harass wildlife by vehicle or on foot - Equipment and vehicles will yield the right-of-way to wildlife - Any wildlife sightings or encounters shall be reported to the site supervisor - If the nest of any bird is encountered during construction and operation activities, work around the nest shall cease until a biologist representative of the City assesses the situation and appropriate mitigations are applied • All workers will adhere to the Environment and Climate Change Canada (ECCC) *Migratory Birds Convention Act,* 1994 (MBCA) and the Migratory Birds Regulations (MBR) • Tree clearing shall not be undertaken • Grubbing will be initiated as early as possible, and must be completed in 30 days of initiation • No one shall disturb, move or destroy migratory bird nests. If a nest or young birds are encountered, the contractor shall cease work in the immediate area of the nest and contact the City and/or biologist representative. In consultation with ECCC a suitable buffer will be flagged around identified active nests and work in the area may be delayed until after the birds have fledged • To minimize disruptions with bird/bat activity at night, the project construction activities will be limited to daylight hours.	Low	None

Project Phase	Potential Impact	Mitigation	Significance of Effects	Residual
Unplanned Events and Accidents	• Chemical and fuel spills have the potential to kill vegetation, resulting in a loss of habitat or food sources; and, • Fires may result in a loss of vegetation in adjacent areas which has the potential to impact wildlife food sources.	• A spill response plan will be completed and detailed in the EMP and the contractor will be required to provide spill response training to construction personnel • Prior to commencing construction the contractor will be required to ensure that spill response equipment is readily available onsite • Any spills or leaks that occur will be reported to the appropriate regulatory bodies (1-800-565-1633), if applicable, as soon as possible • Remedial action, or engineered controls, for any spills or leaks that occur will be completed • Refueling, oiling, and maintenance of equipment will be completed in specifically designated areas to minimize the potential for terrestrial impacts • Servicing of equipment fluids will be completed offsite by a licensed mechanic; however if required to be completed onsite the work will be completed over an impervious surface • Rubbish and waste materials will be kept at minimum quantities and burning of this material will be prohibited • Waste materials will be collected on a regular basis and disposed of at an appropriate waste facility • Oily rags will be stored in approved receptacles and disposed of at approved waste facilities • Construction equipment and vehicles will be stored away from the Saint John River to minimize potential for accidents or vandalism, petroleum hydrocarbons will not reach the watercourse	Low	None
Species at Risk				
Construction	• Alteration of, disruption to, or removal of species of at risk and their habitat (i.e., areas where construction components have the potential to impact Shortnose Sturgeon or Bald Eagle habitat); • The presence of humans, as well as vehicles and construction equipment, in the project area may cause disruption to Wood Turtle migration and/or movement; • Reduction in quantity and quality of habitat within and in proximity to the project footprint; and, • Installation of the effluent discharge pipe may temporarily interfere with suitable foraging habitat for Shortnose Sturgeon and Bald Eagles.	Refer to the Terrestrial and Aquatic Environment Mitigation in addition to the following mitigation measures: • Construction crews and machinery are to use designated roadways and access-points to limit the potential interactions with species at risk and potential species at risk habitat • Contractors will be notified of potential environmental constraints (i.e. potential habitat areas) in the project area prior to the commencement of work • If a SAR is encountered, the Contractor will immediately stop work and notify the City, ECCC and/or Canadian Wildlife Service for guidance on any further mitigation or handling measures • SAR are protected under the provincial and federal SARA • Installation of new effluent discharge pipe in the Saint John River will be completed over a short duration to limit the potential disturbance to SAR in the area SAR habitat disturbance.	Low	None
Aquatic Environment - Groundwater, Surface Water				
Construction	• A change in local surface water quality in an aquatic receptor (Saint John River) due to deleterious substances discharging downgradient of the project footprint.	• Ground disturbance shall be minimized to reduce the potential for erosion and sedimentation to the aquatic environment • Natural vegetation (especially adjacent to the wetland) will be preserved as much as possible • Stock piled materials will be kept as far as feasible away from the Saint John River • If practical, work will be scheduled so as to avoid outdoor work during periods of significant precipitation, defined as rainfall in excess of 25 mm in 12 hours, or an intensity of greater than 5 mm/hour for 2 or more hours. This shall be considered a minimum; conditions may require more stringent criteria to adequately control erosion and sedimentation • Prior to heavy rainfall events sediment control measures will be checked to ensure they are continuing to operate properly • Proper sediment control measures will be installed • Additional mitigative measures as outlined in the Watercourses and Wetland Alteration Permit will be followed	Low	None
Operational	• Possibility for drawdown of the groundwater table associated with use of the new well.	• The proposed WWTF will source groundwater for its operations from only the onsite well • The onsite well will not provide potable water to any residential, industrial, or communal water supply • Water volume requirements for the WWTF operations will remain less than 25 cubic meters per day • The onsite well will adhere to applicable NBDELG Water Well Regulations	Low	None

Project Phase	Potential Impact	Mitigation	Significance of Effects	Residual
Unplanned Events and Accidents	• Chemical and fuel spills have the potential to impact groundwater or migration to the Saint John River; and, • Erosion and sediment control measures failure.	• A spill response plan will be completed and detailed in the environmental protection plan and the contractor will be required to provide spill response training to construction personnel • Prior to commencing construction the contractor will be required to ensure that spill response equipment is readily available onsite and each piece of machinery is equipped with a spill response kit • Any spills or leaks that occur will be reported to the appropriate regulatory bodies, if applicable, as soon as possible • Remedial action, or engineered controls, for any spills or leaks that occur will be completed • Refueling, oiling, and maintenance of equipment will be completed in specifically designated areas to minimize the potential for terrestrial impacts • Servicing of equipment fluids will be completed offsite by a licensed mechanic; however if required to be completed onsite the work will be completed over an impervious surface • Oily rags will be stored in approved receptacles and disposed of at approved waste facilities • Construction equipment and vehicles will be stored away from the Saint John River to ensure that in the event of an accident or vandalism, petroleum hydrocarbons will not reach the watercourse • The performance of erosion and sediment control measures will be inspected daily and prior to storm events. Issues or concerns will be addressed proactively	Low	None
Cultural and Heritage Resources				
Unplanned Events and Accidents	• Potential discovery and destruction or alteration of all or part of an archaeological resource; and, • Potential discovery of human remains.	• Construction crews and machinery are to use the designated roadways and access points to limit disturbance off the project footprint • Construction crews will be made aware of the potential for archaeological resources within the construction area • The contractor will be educated on the proper mitigative activities if an archaeological resource or human remains is unearthed • Should an archaeological resource be unearthed, work in the area will cease immediately and Archaeological Services New Brunswick (ASNB) will be contacted at (506) 453-3014 for further mitigation. Until a qualified archaeologist arrives at the scene, no one shall disturb, move or rebury any uncovered artifact. Construction at the proposed project area will only resume when authorized by ASNB and once mitigative measures have been completed • Should human remains be unearthed, work in the area will cease and the Saint John Police will be notified immediately. No one will disturb, move or rebury any uncovered human remains. If it is a suspected First Nations burial site, the Oromocto First Nation will be contacted	Low	None
Socio-Economic - First Nation / Aboriginal Interests, Health and Safety, Land Use				
Unplanned Events and Accidents	• During construction accidents connected to construction activities may pose a physical hazard to the contract workers or the public residing or working in close proximity to the construction activities; and, • Fire may result in damage to adjacent residential properties.	• Rubbish and waste materials will be kept at minimum quantities and burning of this material will be prohibited • Waste materials will be collected on a regular basis and disposed of at an appropriate facility • Oily rags will be stored in approved receptacles and disposed of at approved waste facilities • Contractors will be required to comply with requirements of the New Brunswick Department of Transportation and Infrastructure's (NBDTI) Work Area Traffic Control Manual (WATCM) as well as all applicable Acts, Regulations and By Laws in force for regulation of traffic or use of roadways • The contractor will be required to post appropriate signage prior to entering the construction areas and to facilitate passage of traffic around restricted construction area (use of flaggers on Bay Crescent Drive, as necessary) • Workers and operators of heavy equipment will be properly trained in order to help avoid hazardous situations • A site specific / project specific health and safety plan will be developed for all stages of construction of the Project • Tender documents for the construction of the Project will include a clause that the contractor will adhere to the H&S standard, procedures, policies, safe work practices, etc, as outlined in the NB H&S Act • An emergency response plan and procedures will be developed to ensure an injured person will receive aid as quickly and safely as possible • During construction nearby residents will be notified of the schedule for construction activities and the likely duration	Low	None

6.0 Public Involvement

INTRODUCTION

In accordance with the New Brunswick EIA Regulation (87-83), public notification of the proposed project is required. Evidence of notification presented in Appendix D. Consultation has primarily focused on those individuals residing in the Morna Heights Subdivision, as well as provincial regulatory authorities providing guidance on the regulatory requirements. The following individuals have been consulted:

Consultation with Other Departments

Provincial Departments that have been contacted through email communication and/or telephone:

1. Christie Ward – Project Manager, NBDELG Environmental Assessment Section.
2. Pierre Doucet - Project Manager, NBDELG Environmental Assessment Section.
3. Sheryl Johnstone –Engineer, NBDELG Industrial Processes Section.
4. Kim Allen – Director, Engagement and Consultation, Aboriginal Affairs Secretariat.

COMMUNICATIONS OBJECTIVES

The following objectives have been established by the City of Saint John to ensure effective communications with the stakeholders and public:

1. Keep the public informed about the proposed project through timely and meaningful information release(s) in both official languages.
2. Consult with affected stakeholders in a timely manner in an effort to mitigate impacts.
3. Provide the public and interested stakeholder groups with opportunities to be involved and learn more about the proposed project.

DIRECT WRITTEN COMMUNICATIONS TO AREA RESIDENTS

Residents of Morna Heights subdivision were made aware of the proposed project, and its location, through direct written communications on March 17, 2017. Each resident along Bay Cresent Drive, Cardinal Lane and Chalmers Drive was provided with an invitation to an open house on March 22, 2017 and a project information sheet detailing the following information:

- Brief description of the proposed project;
- Description of the location for the proposed project;
- Map showing the location of the proposed project;
- Status of the Provincial Regulatory Approval process;
- Statement indicating that members of the general public can ask questions and/or raise concerns with the Proponent regarding any and all environmental impacts; and,

- Date that the public comment period expires.

The project information sheet is attached in Appendix D.

An open house style information session was held at the Saint John Marina on March 22, 2017 from 2:00 to 4:00 p.m. and again from 6:00 to 8:00 pm. An advertisement inviting stakeholders to the session was published in the Telegraph Journal on March 17, 2017 (Appendix D). The open house was attended by 6 residents and the sign-in sheet is attached in Appendix D. Questions were primarily related to construction schedule, traffic impacts during construction, changes in taxation rates, wastewater backflow, improvements to the treatment process and potential environmental impacts. Requests for modifications or concerns with the proposed project were not raised by the local residents during the information session. A summary of the questions and comments received and our responses are presented in **Table 6-1**.

Table 6-1: Environmental Effects Evaluation Results

Questions and Comments from the Public	Response to Questions and Comments
Several residents posed questions regarding the duration and timing of work that would be completed in the Bay Crescent Drive roadway. These comments seemed to be primarily related to impacts on traffic flow in the area.	Initial information on the duration and timing of work was verbally provided to residents at the information session. An overview of the schedule was also provided on the information sheet available at the information session.
Residents inquired if upgrades to service laterals on their properties would be required.	Modifications to service laterals on private properties will not be required.
Several residents asked how the project was being funded and if local taxation rates would be increased as a result of the project.	Residents were informed that the project is partially funded by the Clean Water Wastewater Fund Program. Taxation rates are dictated by City by-laws and will not be impacted by this project.
Several residents inquired if wastewater treatment services would be disrupted or if wastewater flow back into residences is a possibility.	Residents were informed that the project is being constructed so that wastewater treatment services will not be disrupted. Protective measures are in place on the current system, and will remain in place for the new system, to prevent flow back.
Questions relating to environmental impacts; extent of odour and discharge into the Saint John River were posed by two local residents	Odours at the facility are related to waste removal through pumping. Residents were informed that the new facility is anticipated to remain on a similar waste disposal schedule as the existing facility. Residents were informed that the project is undergoing an Environmental Impact Assessment and that the report, including assessment of the discharge receiving habitat, will be made available to the public.
Several general questions regarding the proposed treatment process and frequency of storage tank pumping were posed	Information on the current and proposed treatment processes was verbally provided at the information session. Residents were also informed that a project description will be included in the Environmental Impact Assessment and will be made available to the public.
One resident inquired about the final viewscape of the project and the amount of landscaping that would be required	Renderings of the project were on display at the information session. Residents were also informed of the level of landscaping anticipated to be completed at the culmination of the project.

Written comments from the public were not received by the public consultation closing date, nor have any questions or comments been received since.

FIRST NATIONS COMMUNITIES

The Oromocto First Nation, located approximately 75 km north of the proposed project area is the closest First Nation community to the subject site. The Tobique First Nation owns two small islands, known as 'The Brothers" located approximately 4.5 km north east of the subject site.

The Aboriginal Affairs Secretariat (AAS) was contacted in writing on March 23, 2017 with inquiries as to the duty to consult with relation to this project. On April 18, 2017 the City was advised that the conclusion of the initial assessment of the project was complete and that AAS concluded that there would be no obligation regarding the Crown's Duty to Consult as there is no apparent adverse impact to Aboriginal or Treaty Rights as a result of the project. Documentation of the initial assessment from AAS is presented in Appendix D.

REGISTRATION DOCUMENT AVAILABILITY

The City of Saint John will provide a copy of the Registration document to the NBDELG Sustainable Development, Planning and Impact Evaluation Branch and the regional Saint John NBDELG office. Requests for copies from the public, stakeholders and First Nation communities will be honoured by providing a copy of the Registration document directly. Subsequent submissions in response to issues raised by the Technical Review Committee will be made available upon request.

7.0 Permits and Approvals

The following permits and approvals will be obtained once the Certificate of Determination is received and prior to proceeding with the physical components of the project:

Table 7-1: List of Permits and Approvals

Permit or Approval	Authority Responsible
Watercourse and Wetland Alteration Permit	NBDELG (Watercourse and Wetland Alteration Regulation - Clean Water Act)
Approval to Construct	NBDELG (Water Quality Regulation - Clean Environment Act)
Approval to Operate	NBDELG (Water Quality Regulation - Clean Environment Act)
Building Permit	City of Saint John (Community Plan)
Crown Land – Licence of Occupation	New Brunswick Department of Energy and Resource Development (Crown Land and Forests Act)

According to the Navigable Protection Act (NPA), navigable water includes a canal and any other body of water created or altered as a result of the construction of any work and are those waterways where the public has a right to navigate the water as a highway. Only navigable waters included on the List of Scheduled Waters under the NPA are those navigable waters for which regulatory approval is required for works that risk a substantial interference with navigation.

According to the NPA list of scheduled waters, the Saint John River is considered to be a “designated” navigable water, however the proposed effluent pipe installation is considered a designated work in the “Minor Works Order”. Designated works are works that may proceed without Notice under the NPA, as long as they comply with the requirements of the Minor Works

Based on the above requirements of the Minor Works Order, it has been determined that the proposed project complies with the Minor Works Order and a notice to the Minister is not required for the proposed outfall pipe installation.

8.0 Funding

The proposed project is being funded under the Clean Water and Wastewater Fund through a partnership between the municipality, the Province of New Brunswick and the Government of Canada. Contact information for the departments involved in the partnership are presented below:

Government of Canada
Infrastructure Canada
180 Kent Street, Suite 1100
Ottawa, Ontario K1P 0B6

Province of New Brunswick
Department of Environment and Local Government
20 McGloin Street
Fredericton, NB E3A 5T8

City of Saint John
P.O. Box 1971
15 Market Square
Saint John, NB E2L 4L1

The Funding Contribution Agreement (Reference No. 6990-1072; Appendix A) requires that the project be completed prior to March 31, 2018.

9.0 Summary

This EIA registration has been prepared for the planning, construction and operation of a new wastewater treatment facility and the decommissioning of the existing wastewater treatment facility in Morna Heights subdivision in the City of Saint John. The proposed project will allow the City to modernize the treatment processes, improve the treated effluent quality, and reduce impacts on the local environment.

The information provided in this document is based on the current available design/planning information and existing environment information obtained in 2017.

The applicable environmental components and potential project effects were assessed and presented with meaningful mitigation measures to minimize, and in some cases eliminate, the potential effects. Based on these interactions, it can be concluded that, with the proper mitigation and standard operating procedures as outlined in this document, the residual effects of the project would be considered not significant for project components. The project would be considered to provide a net positive effect.

10.0 Closure

This report was prepared by Dillon on behalf of the City of Saint John. Dillon has used the degree of care and skill ordinarily exercised under similar circumstances at the time the work was performed by reputable members of the environmental consulting profession practicing in Canada. Dillon assumes no responsibility for conditions which were beyond its scope of work. There is no warranty expressed or implied by Dillon.

The material in the report reflects Dillon's best judgment in light of the information available to Dillon at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Yours truly,

DILLON CONSULTING LIMITED

Jeff Trail
City Manager
City of Saint John

Kristin Banks, P.Eng.
EIA Lead for Project
Dillon Consulting

DILLON CONSULTING

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