

## 3.0 Existing Environment

The following description includes the site specific environmental information identified within the areas of the proposed WWTP area. The information has been gathered through a desktop review and field investigation surveys and includes the following sections:

- Atmospheric Environment;
- Geology;
- Hydrogeology and Hydrology;
- Aquatic Environment (Wetlands and Watercourses);
- Terrestrial Environment;
- Species at Risk and of Conservation Concern (including habitat);
- Archaeological and Heritage Resources; and,
- Socio-Economic and Land use.

### 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 WWTP study area. Information sources included digital mapping and online databases through provincial and federal government resources along with discussions with government representatives.

Prior to conducting field investigation studies, various federal and provincial databases were consulted to identify potential occurrences of rare and endangered flora and fauna, and unique or sensitive habitats that have been known to occur within a 1 km radius of the project boundaries and identified as the “study area”. The following lists were reviewed to define species and habitats of concern:

- Species listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC);
- Species listed under the Species at Risk Act (SARA);
- Species listed under the New Brunswick Species at Risk Act (NBSARA);
- Species ranked or identified by New Brunswick Department of Natural Resources (NBDNR) species at risk biologist; and,
- Species listed by the Atlantic Canada Conservation Data Center (ACCDC) as extremely rare (S1), rare (S2) and uncommon (S3). Refer to **Appendix C** for the complete report.

Other available background information from the following websites and databases were 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.

Watercourses and wetland habitats were identified using the NBDNR watercourse mapping, the GeoNB wetland mapping database as well as high resolution aerial photography mapping.

DND also maintains an inventory of a variety of geospatial data layers consisting of a variety of beneficial datasets such as:

- Infrastructure inventory (road network, buildings, culvert crossings, underground services, utilities, etc.);
- Watercourse and wetland inventories;
- Depth to water table (DTW) from Light Detection and Ranging (LIDAR) imaging;
- Sensitive habitats and critical habitat models for Species at Risk;
- Forest and non-forest datasets; and,
- High resolution imagery (from 25 cm resolution to 8.5 cm).

These data sets were also reviewed during the desktop assessments and prior to conducting biophysical field surveys.

### 3.1.2 Biophysical Field Surveys

Site Investigations were carried out between June and September 2014. The site investigations consisted of topographical and environmental aspect surveys that focused on identifying the existing environment and identifying potential environmental constraints, including watercourses, wetlands and sensitive habitats potentially affected by the project.

Characterization of the existing conditions included:

- Watercourses/Wetlands within 30 m of the project footprint;
- Forest habitat and vegetation assessment;
- Migratory birds;
- Wildlife and wildlife habitat;
- Species at Risk and of Conservation Concern; and,

- Land use.

Watercourses and wetland habitats to be field verified were initially identified using the DND DTW mapping, derived LIDAR surveys and the DNR wetland mapping database, as well as high resolution aerial photography mapping found within the project footprint. The aquatic study area covered by an area surrounding 30 m on either side of the project footprint and is defined in terms of extent of potential effects, extending up to 50 m downstream of the proposed project footprint.

In addition to the use of the DTW mapping, wetland habitat was field verified using hydrophytic vegetation as the key indicator of wetland habitat and in some cases the presence of water was used as a secondary indicator. Hydric soils information was not analyzed as part of these field identification surveys.

## 3.2 Atmospheric Environment

Various data resources were consulted to conduct the desktop assessment for the atmospheric environment and are discussed further throughout this section. Field investigations were not conducted as part of this assessment. For the purpose of this EIA, the atmospheric environment is characterized by the following:

- Air quality – the chemical and physical properties of the air in the atmosphere that includes particulate contaminants;
- Climate – the composite or prevailing weather conditions in an area averaged over several years. Generally includes the temperature, precipitation, winds and air pressure; and,
- Sound levels (Noise quality) – any pressure variation (in air, water or other medium) that can be detected by the human ear. Noise is characterized as any unwanted sound.

The NBDELG and industry maintain and operate a number of ambient air monitoring stations within the province to measure ground-level concentrations of a variety of air contaminants.

The ambient air quality monitoring station that is in closest proximity to the project is located at the Fredericton Airport, approximately 6 km west of the project. An ozone monitoring station is located in Fredericton, approximately 20 km west of the project. Data from these locations were used to develop an understanding of the ambient air quality in the area.

### 3.2.1 Climate

The Canadian Climate Normals recorded from the Oromocto climate station (Environment Canada, 2013a) located approximately 2 km to the south of the proposed WWTP at 45°50'N

and 66°28'W indicates an annual daily mean temperature of 5.4°C, with extremes ranging from -37.8°C to 37.2°C. A summary of the average temperature by month from the Oromocto climate station is presented in **Table 3-1**.

**TABLE 3-1: AVERAGE DAILY TEMPERATURES FREDERICTON AIRPORT CLIMATE STATION  
(ENVIRONMENT CANADA, 2015)**

Month	Average Daily Temperature (°C)
January	-9.4
February	-7.9
March	-2.4
April	4.5
May	11.1
June	16.2
July	19.3
August	18.4
September	13.6
October	7.5
November	1.5
December	-5.7
Year	5.6

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 19.3°C. The coolest period annually was typically between December and February with coldest month being January at an average daily temperature of -9.4°C.

The monthly averages for rainfall, snow and total precipitation are presented in **Table 3-2** below. The historical precipitation data from the Fredericton Airport Station recorded an average of 1078 mm of precipitation per year with 859 mm falling as rain and 252 cm as snowfall. The extreme daily rainfall occurred on August 5, 1989 when 148.6 mm of rain fell. The extreme daily snowfall occurred on December 4, 1967 when 78.0 cm of snow fell.

**TABLE 3-2: AVERAGE PRECIPITATION FREDERICTON AIRPORT CLIMATE STATION  
(ENVIRONMENT CANADA, 2015)**

Month	Rainfall (mm)	Snowfall (cm)	Total Precipitation (mm)
January	38.0	69.9	95.3
February	31.4	47.5	73.1
March	46.7	49.4	93.2
April	68.3	18.6	85.9
May	94.5	1.4	96.2
June	82.4	0.0	82.4
July	88.3	0.0	88.3
August	85.6	0.0	85.6
September	87.5	0.0	87.5
October	88.2	0.8	89.1
November	92.9	14.3	106.3
December	55.3	50.5	94.9
Year	859.1	252.3	1077.7

Wind direction and speed data from the Fredericton Airport climate station are presented in **Table 3-3**. According to the Climate Normals, the average annual wind speed at the Fredericton Airport is 12.0 km/h from the west. The maximum wind speed generally occurs in April with an average speed of 14.2 km/h from the northwest. The minimum wind speed generally occurs in August with an average speed of 9.6 km/h from the south. The maximum hourly wind speed noted in the climate normal data from the Fredericton Airport climate station was 80 km/h, which was recorded on February 3, 1970. The maximum gust speed of 132 km/h was recorded on June 30, 1971. Generally the average monthly wind speeds tend to be high between March and May and lower between July and September. The prevailing winds are generally from the south in the summer and the west in the winter.

**TABLE 3-3: AVERAGE WIND DATA FOR FREDERICTON AIRPORT CLIMATE STATION  
(ENVIRONMENT CANADA, 2015)**

Month	Wind Speed (km/h)	Most Frequent Direction
January	12.2	W
February	12.7	NW
March	13.9	NW
April	14.2	NW
May	13.1	S
June	11.5	S
July	10.3	S
August	9.6	S
September	10.5	SW
October	11.6	SW
November	12.1	W
December	12.4	W
Year	12.0	W

### 3.2.2 Ambient Air Quality

The New Brunswick Department of Environment and Local Government (NBDELG) and industry maintains and operates a number of ambient air monitoring stations within the province to measure ground-level concentrations of a variety of air contaminants. The closest monitoring station in relation to the project is located on Aberdeen Street in Fredericton, approximately 18 km to the west of the Project. The Fredericton monitoring station reports on carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), fine particulate matter (PM<sub>2.5</sub>), and ground level ozone (O<sub>3</sub>).

#### 3.2.2.1 Carbon Monoxide (CO)

Monitoring results for CO for the Fredericton station from 2009 to 2011 showed no exceedances of the 1-hour or 8-hour New Brunswick Air Quality Objectives (Clean Air Act, 1997) of 30 ppm and 13 ppm for CO (NBDELG, 2013; NBDELG, 2012; NBDELG, 2011). The maximum one hour values ranged from 0 to less than 3 ppm in 2011 (NBDELG, 2013).

#### 3.2.2.2 Nitrogen Dioxide (NO<sub>2</sub>)

Monitoring results for NO<sub>2</sub> for the Fredericton station from 2009 to 2011 showed no exceedances of the New Brunswick Air Quality Objectives (Clean Air Act, 1997) of 210 ppb for 1-hour, 105 ppb for 24-hour, and 120 µg/m<sup>3</sup> for 1-year averaging periods (NBDELG, 2013; NBDELG, 2012; NBDELG, 2011). The maximum one hour values ranged from 0 to 50 ppb in 2011 (NBDELG, 2013).

### 3.2.2.3 Fine Particulate Matter (PM<sub>2.5</sub>)

Particles less than 2.5 micrometers in diameter (PM<sub>2.5</sub>) are referred to as "fine" particles and are believed to pose the greatest health risks. Because of their small size (approximately 1/30th the average width of a human hair), fine particles can lodge deeply into the lungs (USEPA, 2012). Monitoring results for PM<sub>2.5</sub> for the Fredericton station in 2011 (most recent available data) showed no hourly values exceeding the Canada-wide Standard (CCME, 2000) of 30 µg/m<sup>3</sup>. Further, there have been no reported exceedances of the Canada-wide Standard since coming into effect in 2010 (NBDELG, 2013). A summary of the annual concentrations from 2007-2011 are presented in **Table 3-4**.

**TABLE 3-4: ANNUAL AVERAGE PM<sub>2.5</sub> CONCENTRATION EMISSIONS RECORDED AT THE FREDERICTON STATION**

Year	Annual Average PM <sub>2.5</sub> Concentration (ug/m <sup>3</sup> )	98th Percentile Value (CWS) (ug/m <sup>3</sup> )
2011	Not available	16
2010	4.0	15.0
2009	3.8	15.6
2008	4.0	14.8
2007	3.8	16.8

### 3.2.2.4 Ground Level Ozone (O<sub>3</sub>)

Monitoring results for ground level O<sub>3</sub> for the Fredericton station in 2011 (NBDELG, 2013) showed no exceedances of the Canada Wide Standard (CCME, 2000) of 65 ppb for an 8-hour averaging time. Further, there have been no reported exceedances of the Canada-wide Standard since coming into effect in 2010 (NBDELG, 2013). In 2011, the maximum 1-hour values ranged from 2 ppb to 60 ppb, which are below the 1-hour O<sub>3</sub> level of 82 ppb (NBDELG, 2013) in other jurisdictions.

### 3.2.3 Emissions

The air contaminant releases from sources throughout New Brunswick can serve as a benchmark for the existing environment conditions. Emissions data is available for criteria air contaminants (CACs) which include:

- Particulate Matter:
  - Total Particulate Matter (TPM);
  - Particles less than 10 µmin diameter (PM10); and,
  - Particles less than 2.5 µmin diameter (PM2.5).

- Combustion Gases:
  - Sulfur Dioxide (SO<sub>2</sub>);
  - Nitrogen Oxides (NO<sub>x</sub>); and,
  - Carbon Monoxide (CO).
- Volatile Organic Compounds (VOCs).

A summary of the CAC emissions in New Brunswick between 2009 and 2012 (the most recent available data) from Environment Canada is presented in **Table 3-5** below.

**TABLE 3-5: ESTIMATED CAD EMISSIONS FROM NEW BRUNSWICK**

Contaminant	2012 Emissions (Tonnes) <sup>1</sup>	2011 Emissions (Tonnes) <sup>2</sup>	2010 Emissions (Tonnes) <sup>3</sup>	2009 Emissions (Tonnes) <sup>4</sup>
Total Particulate Matter (TPM)	483,044	384,254	383,686	379,621
Particulate Matter less than 10 microns (PM <sub>10</sub> )	132,085	101,849	101,864	100,786
Particulate Matter less than 2.5 microns (PM <sub>2.5</sub> )	31,714	24,791	24,790	24,742
Sulphur Oxides (SO <sub>x</sub> )	34,291	28,057	33,263	54,003
Nitrogen Oxides (NO <sub>x</sub> )	38,198	40,540	43,221	48,781
Carbon Monoxide (CO)	212,969	220,609	235,707	231,485
Volatile Organic Compounds (VOCs)	274,702	276,689	278,628	279,253

<sup>1</sup> Environment Canada 2012 Air Pollutants Emissions for New Brunswick (Environment Canada, 2014b)

<sup>2</sup> Environment Canada 2011 Air Pollutant Emissions for New Brunswick (Environment Canada, 2013b)

<sup>3</sup> Environment Canada 2010 Air Pollutant Emissions for New Brunswick (Environment Canada, 2012b)

<sup>4</sup> Environment Canada 2009 Air Pollutant Emissions for New Brunswick (Environment Canada, 2011a)

The Base reports to the National Pollutant release Inventory (NPRI). There are five additional major sources of emissions located within 25 km of the Project site including:

- Fredericton International Airport – airport operations located approximately 6 km to the northwest of the project;
- University of New Brunswick, Department of Facilities Management – university campus including central heating plant operations located approximately 18 km northwest of the project;
- City of Fredericton, Barker Street Treatment Facility – municipal sewer treatment plant located approximately 17 km northwest of the project;



- Marwood Ltd. - Wood product manufacturers located approximately 20 km to the southwest of the project; and,
- Springhill Construction Limited, Springhill Quarry – quarry activities located approximately 25 km northwest of the project.

### 3.2.4 Greenhouse Gas (GHG) Emissions

The Province of NB has no standards or guidelines for regulating the emissions of GHGs. In 2012, the national reported emissions of GHGs for Canada were 699 Mega-tonnes (Mt) of carbon dioxide equivalent (CO<sub>2</sub>e) (Environment Canada, 2014c) which is similar to the 2011 emissions (Environment Canada, 2014c). In New Brunswick the annual emissions for 2012 were approximately 16.4 Mt of CO<sub>2</sub>e per year representing 2.3 % of the national emissions (Environment Canada, 2014e).

GHG reporting is mandated by Environment Canada from sources that release 0.05 MT or more of CO<sub>2</sub>e per year. In 2012, 13 NB facilities reported emissions to Environment Canada for a total of 6.4 Mt of CO<sub>2</sub>e. The closest of these facilities to the Project is AV Nackawic, located approximately 60 km to the northwest, which produced 0.121 Mt of CO<sub>2</sub>e in 2012 and 0.116 Mt of CO<sub>2</sub>e in 2011 (Environment Canada, 2013c).

### 3.2.5 Ambient Sound Quality

Existing sound quality conditions in the vicinity of the project were not measured for this assessment. There are commercial land uses, such as warehousing and the Base operations, within 150 m of the project site and residential areas within 1km. The Fredericton International Airport is less than 6km from the Project site. 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 mixed development area at city outskirts. Based on data collected by the US EPA (1971) of typical background community noise, existing sound pressure levels in the area are likely in the (L<sub>10</sub> to L<sub>90</sub>) range of 39 to 52 dBA(A) as a 24-hour arithmetic average.

## 3.3 Terrestrial Environment

This section of the report considers the terrestrial environmental setting for the WWTP project. For the purposes of this EIA, 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, discussions with resource managers, and field reconnaissance conducted in summer/fall 2014.

### 3.3.1 Site Topography and Physiography

The proposed WWTP footprint area is located within the Grand Lake Lowlands Ecoregion, specifically the Aukpake Ecodistrict encompasses much of the low-lying valley of the Oromocto

River and the Saint John River. It is located east and west of the Oromocto River and north and south of the Saint John River. The Aukpake Ecodistrict is a low-lying, gently rolling area with ridges and valleys that encompass the Saint John River basin and is known to be highly disturbed by intensive settlement, logging activities, and military training (DNR, 2007).

### 3.3.2 Geology

#### 3.3.2.1 Description of Surficial 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 WWTP is Late Wisconsinan aged and comprised of loamy lodgement till and minor ablation till deposited as a discontinuous veneer over bedrock. The deposits are generally 0.5 to 3 m in thickness and include silt sand, gravel, and rubble.

#### 3.3.2.2 Description of Regional Bedrock Geology

Based on the Department of Natural Resources Geological Map, Bedrock Geology of the Grand Lake Area (NTS 21 G/16), Sunbury and Queens Counties, New Brunswick (Plate 2005-39) (St. Peter, 2005), the regional bedrock geology in the study area is identified as the Minto Formation of the Pictou Group deposited during the Late Carboniferous period. The Minto formation in the Fredericton/Oromocto area is characterized by grey to red, fine to medium grained sandstone; grey, green and red mudstone; minor grey and red granule to cobble conglomerate; and, coal.

Given the local geology in the subject area, acid rock drainage (ARD) producing minerals (iron sulphides) are not expected. Bedrock in the area is typically covered by glacial till and iron sulphide oxidation would be unlikely.

### 3.3.3 Hydrogeology and Hydrology

The proposed development is not in a watershed protected area as outlined in the New Brunswick Watershed Protection Program and is not located within a wellfield protected area under the New Brunswick Wellfield Protection Program. The Town residents are supplied with potable water via the nearby water treatment plant located along the Saint John River.

Approximately 300 meters east of the proposed WWTP location, the Base stores road salt in two salt domes. In 2006, GEMTEC Limited reported to DCC on groundwater quality in the salt dome area. GEMTEC identified areas of potentially salt-impacted groundwater extending to the north and northwest from both salt domes. The proposed location of the new WWTP is cross-gradient to the inferred salt contamination. The proposed new sanitary line would be considered down-gradient; it is unlikely that salt impacted groundwater extends to the area that would be excavated for the proposed new sanitary line due to the distance (approximately

180 meters). Additional testing conducted in 2014 confirmed that there is no evidence of sodium chloride from the former salt dome. Operation of the new salt dome includes improved management practices with respect to salt handling.

### 3.3.4 Environmentally Sensitive Areas

The proposed project is located within the “Lower Saint John River (Sheffield/Jemseg) IBA which extends 25 km along the St. John River, from 5 km northeast of the Town to 25 km east. The site includes the Portobello National Wildlife Area, Gilbert Island, French Lake, Big Timber Lake, Grand Lake Meadows, and the southern edge of Grand Lake. The area is under tidal influence (tidal influence extends upstream to Mactaquac dam (located over 25 km from the project area); extensive spring flooding has resulted in the creation of a unique hardwood and flora complex creating the single largest wetland complex in Atlantic Canada (CIBA, 2014). The area provides important breeding habitat for a number of migratory birds including raptors, waterfowl, shorebirds and passerines the site. **Refer to Figure 3-1.**

There are no other identified environmentally sensitive areas or protected natural areas located within the project area (i.e. within the 1 km area surrounding the proposed WWTP). Refer to **Appendix C** for the ACCDC report.

#### Deer Wintering Areas

Although the white tailed deer (WTD) (*Odocoileus virginianus*) is not listed as a species of conservation concern or listed on COSEWIC or SARA, it remains an important game species for New Brunswick. WTD in New Brunswick are a non-migratory species that require adequate shelter and browse to survive the rigors of deep snow and cold temperatures during the winter months. Areas where WTD congregate are commonly known as “wintering areas” or “deer yards”.

According to the database maintained by NBDNR, there are no DWAs within the project area. DND also maintains a database of DWAs within the base boundaries. There are currently three (3) existing managed DWAs identified within the Base: two are located on the southwestern area of the Base consisting of 138 ha and 263 ha of habitat and one larger DWA (378 ha) is located in the southwest corner of the Base near George Lake. In addition to these managed areas, DND also maintains a DWA habitat model which is capable of predicting potential suitable DWA habitat within the Base. These databases were reviewed and it was identified that there is no potential suitable habitat for DWAs within the project footprint and none located within 1 km of the proposed project.

### 3.3.5 Vegetation (Flora) Assessments

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#### 3.3.5.1 Vegetation (Flora) Surveys











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Vegetation assessments were conducted in the project boundaries on August 4, 2014. The study area consisted of the adjacent habitat and effluent connector line corridor comprising of mixed woods and forest wetland.

A total of 89 plant species were noted within the project boundaries. A total of 81 (91%) are native and 8 (9%) are species considered by ACCDC to be non-native or exotic (SE). Refer to **Appendix D** for the complete list of all plant species within the study area. The focus of the surveys was to determine the presence of rare vascular plants as identified by the ACCDC in **Table 3-6** or any other species that are considered to be of a significant status, federally listed and/or regionally species with conservation concern. Vegetation surveys included recording tree, shrub and herbaceous species within the subject property, along the NB Trail and within the riparian habitats. The focus of the vegetation assessment was on species at risk or of conservation concern, based on existing data, habitat suitability and targeted field surveys on habitat potential for priority species. All species identified during the field investigations were species considered to be common and widespread (S4 to S5) within this region of the province. There were no species of conservation concern identified during the field investigation surveys. Refer to **Appendix D**.

TOWN OF OROMOCTO  
Wastewater Treatment Plant  
Environmental Impact Assessment

**Species of Conservation Concern**  
Figure 3-1

-  PROPOSED FACILITY
  -  PROPOSED BOUNDARY
  -  FIELD DELINEATED WETLAND
  -  MAPPED WETLAND
  -  PROVINCIALLY SIGNIFICANT WETLAND
  -  BASE BOUNDARY
  -  WATERCOURSE
  -  ACCDC DATABASE OBSERVATION\*
  -  FIELD OBSERVATION
  -  DND BIRD SAR POTENTIAL HABITAT MODEL
- POTENTIAL HABITAT FOR
- CANADA WARBLER
  - CHIMNEY SWIFT
  - SEDGE WREN
  - WHIP-POOR-WILL

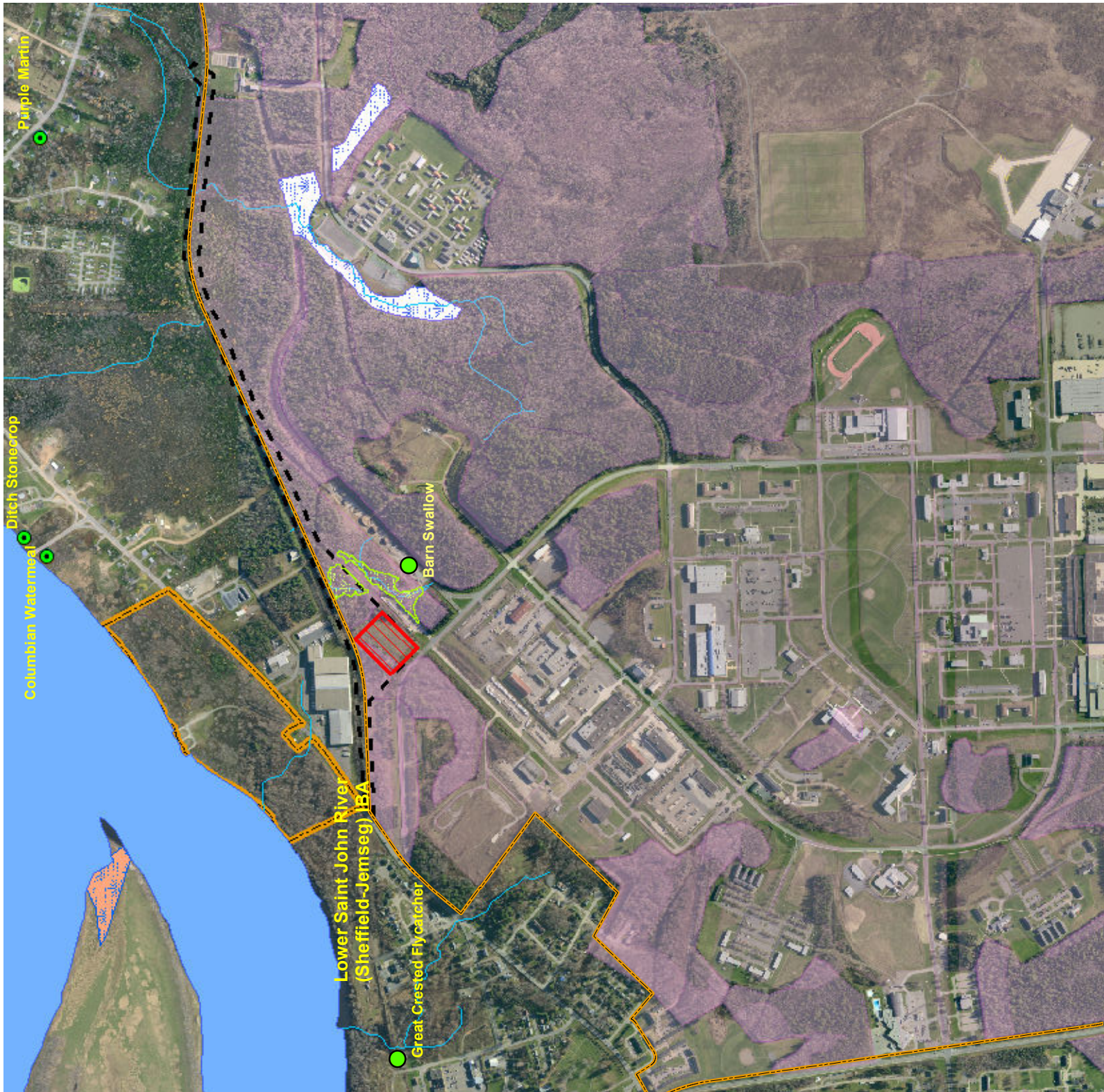
\*SIGHTING IDENTIFIED WITHIN 100M OF THE AREA (ACCDC, 2014)



MAP CREDITS: ESRI, INRCAN, GEBCOBASE.  
MAP CREATED BY: SCM  
MAP CHECKED BY: RWD  
MAP PROJECTION: NAD 1983 UTM Zone 18N



PROJECT: 148895  
STATUS: DRAFT  
DATE: 3/18/2016



## 3.3.5.2

**Vegetation (Flora) Species at Risk and of Conservation Concern**

A review of ACCDC data determined that three (3) species had the potential to occur within a 1 km radius of the project footprint as summarized in **Table 3-6** and shown on **Figure 3-1**. Refer to **Appendix C** for the complete ACCDC report. There were no flora species at risk or of conservation concern identified within the project footprint area during the field studies as indicated in Section 3.3.5.1. The plant species identified by the ACCDC in the study area consisted of: Ditch Stonecrop (*Penthorum sedoides*) and Bog Willow (*Salix pedicellaris*) which were both ranked as S3 (uncommon) and Columbian Watermeal (*Wolffia columbiana*) which is ranked as S1 (extremely rare). None of these species are listed by COSEWIC or the NBSARA.

**TABLE 3-6: SUMMARY OF FLORA OF CONSERVATION CONCERN 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 <sup>1</sup>
Ditch Stonecrop	<i>Penthorum sedoides</i>	S3	N/A	N/A	Aquatic - (Fresh water); found on muddy or gravelly shores
Columbian Watermeal	<i>Wolffia columbiana</i>	S1	N/A	N/A	Wetlands - Gravelly strands, alluvial meadows along major rivers (i.e. Saint John River)
Bog Willow	<i>Salix pedicellaris</i>	S3	N/A	N/A	Forest – In bogs, fens and wet, acid, shrubby meadow

1. Habitat information obtained from the NBDNR flora Vascular Plant Distribution list (2002) and Flora of New Brunswick (Hinds, 2000)

Based on the habitat identified during the field investigation studies, there was no habitat available to support these species identified by the ACCDC. As noted in Section 3.3.5.1, all species identified during the field investigations were species considered to be common and widespread (S4 to S5) within this region of the province.

## 3.3.6

**Forest Cover**

The proposed WWTP footprint area is located within the Grand Lake Lowlands Ecoregion, specifically the Aukpake Ecodistrict where the forest habitat is primarily dominated by red maple (*Acer rubrum*), white birch (*Betula papyrifera*), grey birch (*Betula populifolia*) and trembling aspen (*Populus tremuloides*) with valley forest areas comprised of red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), and hemlock (*Tsuga canadensis*) with red maple (*Acer rubrum*) (NBDNR, 2007).

Dominant forest compositions within the proposed WWTP project boundaries have been mapped using the 2009 DNR forest inventory layers. According to this database, the forest habitat in the area of the proposed WWTP should consist of a regenerated stand of birch and poplar as well as mature conifer stands dominated by balsam fir, black spruce and white pine in the area of the proposed effluent connector line. Refer to **Figure 3-2**. It was confirmed during the field investigation surveys that the WWTP building footprint area consisted of no forest habitat and had been cleared landscaped (lawn) with small areas of weeds, grasses and small shrubs. The effluent connector line footprint was verified to be similar to that identified on the DNR forest inventory layer.

TOWN OF OROMOCTO  
WASTEWATER TREATMENT PLANT  
ENVIRONMENTAL IMPACT ASSESSMENT

**Forest Habitat and Bird Survey Locations**  
Figure 3-2

PROPOSED FACILITY

PROPOSED BOUNDARY

BASE BOUNDARY

POINT COUNT LOCATIONS

FOREST AGE

YOUNG-IMMATURE

MATURE

DOMINANT FOREST SPECIES COMPOSITION

\*BS, BF\*\* DOMINANT SPECIES (FIRST, SECOND)

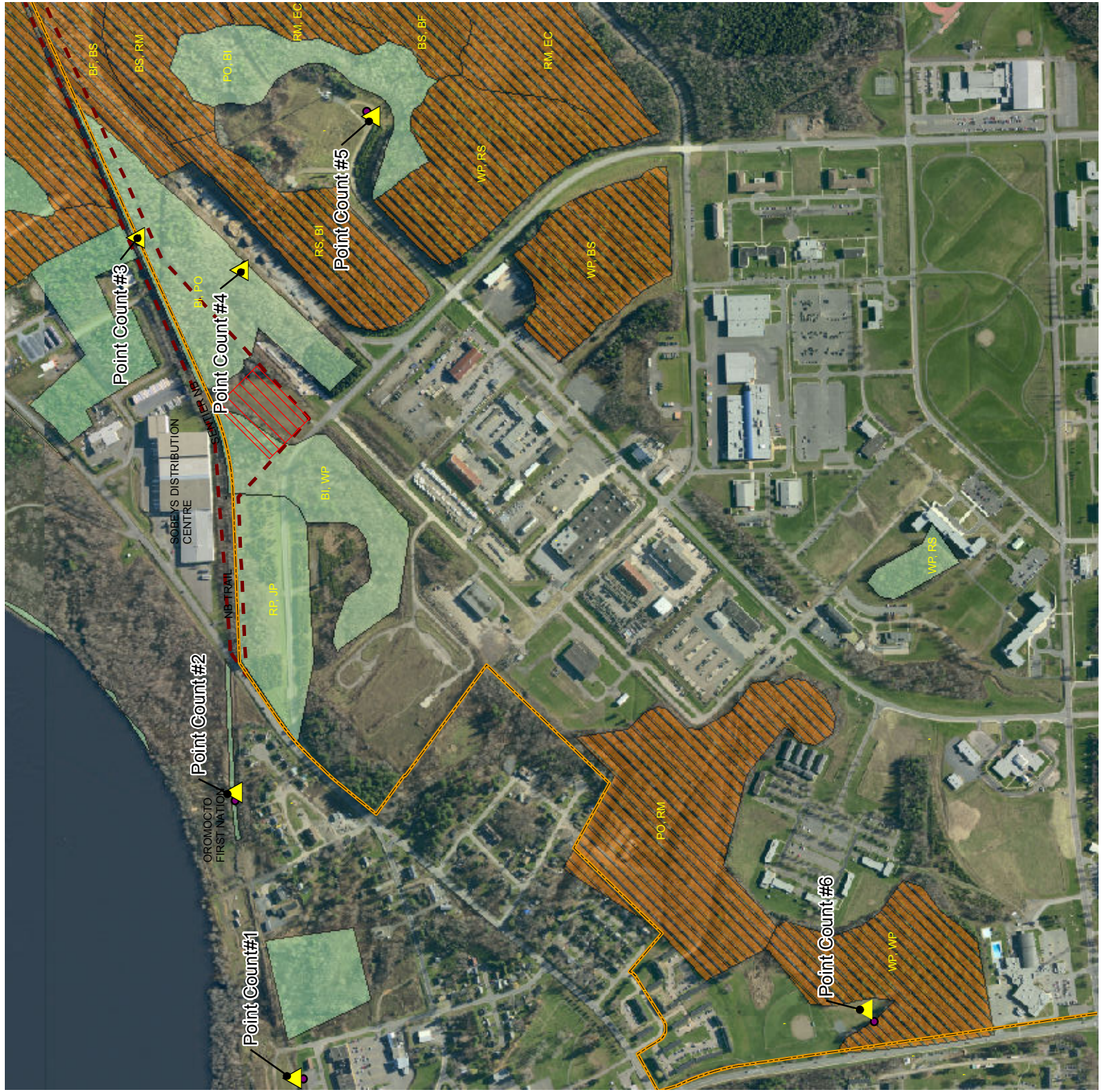
- BF Balsam Fir
- BS Black Spruce
- BI White Birch
- EC Eastern White Cedar
- IH Intolerant Hardwood
- JP Jack Pine
- PO Poplar
- RM Red Maple
- RS Red Pine
- SS Red Spruce
- TH Tolerant Hardwood
- TL Eastern Larch
- WP White Pine



MAP CREDITS: ESRI, INRCAN, GEOBASE.  
MAP CREATED BY: RMD  
MAP CHECKED BY: GD  
MAP PROJECTION: NAD 1983 UTM Zone 18N



PROJECT: 148895  
STATUS: DRAFT  
DATE: 3/18/2016





### 3.3.7 Wildlife (Fauna) and Wildlife Habitat

Given the limited availability of forest habitat and the level of development in the area there is limited potential for diverse wildlife habitat. The area provides habitat that appears to be suitable for small mammals, including red fox (*Vulpes vulpes*), skunk (*Mephitis mephitis*), and raccoon (*Procyon lotor*) as well as other smaller mammals such as meadow voles (*Microtus pennsylvanicus*), squirrels (*Sciurus vulgaris*) and chipmunk (*Tamias striatus*). The habitat in this area may also provide occasional migration route for other larger species such as white tailed deer (*Odocoileus virginianus*) and coyote (*Canis latrans*). The objective of the field studies was to characterize the terrestrial ecology of the area in order to assess the potential environmental effects of the proposed project on potential wildlife and wildlife habitat in the area. Direct observations of animal signs (actual sightings as well as auditory detections, tracks, scat, and dens/nests) were documented. General wildlife habitat conditions were also observed to indicate the type of wildlife that the study area has the potential to support and that is typical of the geographic area. The habitat in the area would not provide unique or limited habitat for any of these species.

#### 3.3.7.1 Wildlife (Fauna) at Risk and of Conservation Concern

The ACCDC database indicates that there are two (2) wildlife species of conservation concern (excluding birds) historically observed within a 1 km area surrounding the proposed project footprint and include two (2) herpetile species, Wood Turtle (*Glyptemus insculpta*), listed as Threatened under the SARA and NBSAR and Snapping Turtle (*Chelyda serpentine*), listed as Special Concern under Schedule 1 of SARA and the NBSARA. Refer to **Table 3-7** for the ACCDC detailed data (ACCDC, 2014).

**TABLE 3-7: SUMMARY OF WILDLIFE (EXCLUDING BIRDS) OF CONSERVATION CONCERN 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 <sup>1</sup>
Wood Turtle	<i>Glyptemys insculpta</i>	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.
Snapping Turtle	<i>Chelydra serpentina</i>	S1	Special Concern	Special Concern	Shallow water in almost every kind of freshwater habitat, the preferred habitat of the species is characterized by slow-moving water with a soft mud bottom and dense aquatic vegetation. Established populations are most often located in ponds, sloughs, shallow bays or river edges, and slow streams, or areas combining several of these wetland habitats.

1. Habitat information obtained from the Environment Canada, Species at Risk Registry [http://www.sararegistry.gc.ca/sar/index/default\\_e.cfm](http://www.sararegistry.gc.ca/sar/index/default_e.cfm)

According to Stewart Lusk, SAR biologist with the NBDNR, there are no other records of species of conservation concern identified in the area. DND does not currently have any wildlife SAR models, however, Deanna McCullum, DND biologist, identified that there were no known wildlife species at risk or of conservation concern to occur in the area of the project. Wood turtle have been known to occur at various locations at the Base, however, there are currently no records in this area.

During the 2014 field investigations, it was identified that the habitat in the area would be marginal for foraging wood turtle and not suitable for nesting. The gravel areas along the section of the NB trail in the area of the proposed effluent line did not present suitable nesting habitat as there was limited gravel present and exhibited varying degrees of disturbance and compaction through recreational vehicle (ATV, snowmobile) use. It was identified that there was no evidence of potential suitable habitat for snapping turtle in the area.

There are no other unique or special wildlife habitat areas identified in the existing data or in the 2014 site surveys within the project boundary as noted on **Figures 3-1**. There were no other wildlife species of conservation concern identified as potentially occurring within the assessment area.

### 3.3.8 Birds and Bird Habitat

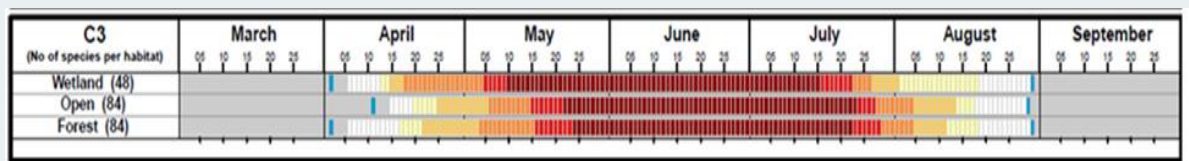
#### 3.3.8.1 Background Data Review

##### Important Bird Areas (IBA)

As outlined in Section 3.3.4, IBA Database identifies the proposed WWTP is within the Lower Saint John River Sheffield/Jemseg) IBA (NB010). This IBA extends 25 km along the Saint John River, from 5 km northeast of the town to 25 km east. The site includes the Portobello National Wildlife Area, Gilbert Island, French Lake, Big Timber Lake, Grand Lake Meadows, and the southern edge of Grand Lake. There are 248 migratory bird species known to migrate, roost, breed and nest in this IBA year round including waterfowl, shorebirds, upland birds, passerine, woodpeckers, raptors and owls.

##### Environment Canada

Based on Environment Canada's calendar for specific "nesting zones" across Canada, the proposed project area is located within "Nesting Zone 3" which identifies the April 1 to August 31 period as a sensitive nesting period for the area (see the table below).



Environment Canada Nesting Calendar ([https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#\\_05](https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#_05))

##### 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 "Maugerville" square (19FL98) with the closest roadside point count (PC) to the proposed WWTP occur at PC# 15 and PC#26. During the atlas period 2006-2010, a total of 92 species of birds were recorded within this

square. Of these species, 45 were confirmed as breeding (including two (2) species of conservation concern: Bald Eagle, Endangered under the NB SARA and Barn Swallow, Threatened under Schedule 1 of SARA), six (6) were probable breeders, and 31 were possible breeders.

#### Atlantic Canada Conservation Data Center (ACCDC)

The ACCDC database indicates that one (1) bird species record, the Purple Martin (*Progne subis*), of conservation concern with a ranking of S1S2B (extremely rare to rare breeding populations) has the potential to occur within 1 km area of the proposed WWTP. This species is not listed by COSEWIC/SARA or NBSARA. Refer to Section 3.3.8.3 for a summary of these results.

#### DND Bird Species at Risk (SAR) Model

DND currently has a bird SAR model which models habitat for various birds of conservation concern. The overall map is based on habitat available through the 1994 forestry inventory dataset. According to this database there is potential suitable habitat for four species of conservation concern. Refer to Section 3.3.8.3 for a summary of these results.

### 3.3.8.2

#### **Breeding Bird Assessments**

To establish the level of breeding evidence for bird species within the study area, breeding bird surveys were conducted on June 11<sup>th</sup> and 16<sup>th</sup>, 2014. Point count surveys were conducted as well as area searches by habitat types, which increase the potential to identify a greater number of species and higher levels of breeding evidence. Area searches were conducted between 0630h and 1000h on June 11<sup>th</sup> and between 1900h and 2100h on June 16<sup>th</sup> during the breeding bird season. Point counts stations were chosen at various locations within a 2 km radius of the proposed WWTP and as shown on **Figure 3-2**. A total of 6 point counts (PC1- PC6) of 5 minutes each using the Canadian Bird Studies Point Count protocol as well as a 3 minute playback recording. Refer to **Appendix E** for the report provided by the project bird specialist (Jim Wilson). Representative habitats were chosen such as mature/immature hardwood, riparian habitat, mixed mature forest, wet habitat and forest edge habitat (forest adjacent open field). All species seen or heard, along with the highest level of breeding evidence, were documented. Survey stations were established with a minimum distance of 300 m between points to maximize coverage of the area. All species noted during both point count surveys were identified as being common and widespread (S4 to S5) in New Brunswick with the exception of two species: Barn Swallow (Threatened, Schedule 1 of SARA) and Great-crested Flycatcher identified as S3B (uncommon with the ACCDC and “Sensitive” on the NBDNR General Status Ranking. These species are discussed further in Section 3.7.3.3.

The habitats provided in **Table 3-8** are based on the observations of the bird survey team and may differ from the habitat information available from NBDNR forest inventory, as illustrated

in **Figure 3-2**. The NBDNR data is derived from interpretation of remote sensing data from 2002, while the information contained in **Table 3-8** is recorded directly on location and is considered to be more accurate.

**TABLE 3-8: BIRD POINT COUNT HABITAT SUMMARY, JUNE 2014**

Point Count (PC) ID	Date	UTM Coordinates (Zone 19)	Identified Habitat
PC#1	06/11/14 & 06/16/14	696531 5080952	Riparian and mature hardwood forest near the Saint John River and a tributary to Saint John River
PC#2	06/11/14 & 06/16/14	696986 5081029	Mature and immature hardwood forest bordering the walking trail
PC#3	06/11/14 & 06/16/14	698030 5081237	Mixed mature forest habitat along the walking trail
PC#4	06/11/14 & 06/16/14	697939 5081033	Wet habitat with mature hardwood stands
PC#5	06/11/14 & 06/16/14	698280 5080760	Forest edge habitat, open field bordering a mixed mature forest
PC#6	06/11/14 & 06/16/14	696539 5079794	Forest edge habitat, open field bordering a mixed mature forest

A total of 100 species were observed during the early morning hours and 79 species were observed during the evening/dusk surveys on June 11<sup>th</sup> and 16<sup>th</sup>, 2014. Of these species, 39 different species were observed and recorded. The most common species observed were the Red-eyed Vireo (16 individuals), Veery (13 individuals), American Redstart (13 individuals) and Black-capped Chickadee (11 individuals). All of these species are considered common and widespread within New Brunswick.

### 3.3.8.3

#### Bird Species at Risk and of Conservation Concern

During the 2014 bird point counts, Barn Swallow (*Hirundo rustica*), listed as Threatened on Schedule 1 of SARA was noted at PC#4 which is located approximately 200 m southeast from the project footprint. This species was noted flying over the area and detected by sound and appeared to be foraging the area. It was determined that this species was not likely nesting in the area as there were no indications of this species upon the second survey (June 16<sup>th</sup>) which was conducted a week later.

Although the Great-crested Flycatcher (*Myiarchus crinitus*) noted during the point count surveys is not identified as a Species at Risk under COSEWIC, SARA or NBSARA, it is identified as an “S3B - Uncommon” and “Sensitive” species through the ACCDC ranking and the NB General Status Ranking, respectively. Only one (1) species was noted in one location around PC#1 which is located approximately 1 km northwest of the project footprint along the Saint John River floodplain. This species was not identified in the area during the second site visit on June 16<sup>th</sup>. According to Stewart Lusk, SAR biologist with the NBDNR, there are no other records of species of conservation concern identified in the area.

DND currently has a bird SAR model which models habitat for various birds of conservation concern. According to this database there is potential suitable habitat in the study area for four

(4) species of conservation concern: Canada Warbler, Chimney Swift, Whip-poor Will and Sedge Wren as presented on **Figure 3-1** and in **Table 3-9**.

**TABLE 3-9: SUMMARY OF BIRDS IDENTIFIED WITHIN 1 KM OF THE STUDY AREA BY THE ACCDC AND THE DND BIRD SAR MODEL, 2014**

Common Name	Scientific Name	Database	ACCDC Status	COSEWIC/ SARA Status	NBSARA Status
Canada Warbler	<i>Cardellina canadensis</i>	DND Model	S3S4B	Threatened (Schedule 1 of SARA)	Threatened
Chimney Swift	<i>Cistothorus platensis</i>	DND Model	S2S3B	Threatened (Schedule 1 of SARA)	Threatened
Whip-poor Will	<i>Antrostomus vociferous</i>	DND Model	S2B	Threatened (Schedule 1 of SARA)	Threatened
Sedge Wren	<i>Cistothorus platensis</i>	DND Model	S1B	Not at Risk	N/A
Purple Martin	<i>Progne subis</i>	ACCDC	S1S2B	N/A	N/A

Based on the ACCDC data and the DND Bird SAR Model (as described in Section 3.3.8.1), there is the potential for one (1) species of conservation concern and four (4) Species at Risk within the study area (within 1 km).

None of these species were identified during the 2014 bird point counts conducted by Jim Wilson.

There are no other unique or special bird habitat areas identified during the 2014 site surveys within the study area and more specifically within the boundaries of the proposed project.

Based on the bird and bird habitat field studies, the habitat available for these species in the area was not identified as unique and would be present in other areas within the assessment area. The majority of the birds listed, were commonly found in New Brunswick.

### 3.4 Aquatic Environment

Any project proposed within 30 m 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. In addition to those wetlands identified as regulated on the GeoNB mapping, DND has a Wetland Management Plan (WMP) which provides guidance to ensure that all activities conform to the objectives of Federal and Provincial Acts, policies and regulations regarding wetlands. No net loss, in habitat or function is the defined objective of wetland management for wetlands on DND property (DND, 2006).

## 3.4.1

**Wetlands**

According to the GeoNB wetland mapping database, there are no regulated wetlands within 30m of the proposed WWTP footprint, as illustrated on **Figure 3-3**. According to the NBDNR DTW mapping, it was identified that a potential wetland feature may exist, in the area. A low lying wet feature was confirmed during the field investigation survey and located approximately 75 m easterly of the proposed WWTP footprint and south of the effluent connector line.

Wetlands within the Province of New Brunswick are addressed by the New Brunswick Conservation Policy (NBDNR, 2004) where the primary objective is to prevent a “no net loss” of wetland function for regulated wetlands and prevent the loss of provincially significant wetlands.

Because this proposed project is currently on DND lands, DND is required to follow their internal Wetland Management Plan (WMP) in which it provides guidance to ensure that all activities conform to the objectives of Federal and Provincial Acts, policies and regulations regarding wetlands. No net loss, in habitat or function is the defined objective of wetland management for wetlands on DND property. The WMP states that all users will have guidelines to minimize risks (DND, 2006).

The goal of the wetland investigation was to identify the wetland and to evaluate its wetland functional value. Key indicator factors considered during the assessment included:

- Adjacent impacting land use and anthropogenic activities;
- Vegetative abundance, health and diversity (including rare species identified in the EIA documents and invasive species);
- Hydrological conditions;
- Wildlife and fish habitat sustainability; and,
- Overall health and function of the wetland.

Field observations conducted in 2014 indicated that this wet feature consisted of watercourse drainage and surface water runoff. The wetland has been created due to man-made berms restricting the water in two respective low lying areas connected by culvert crossings: 1) between the salt dome access road and the culvert depot access road and 2) between the culvert depot access road and the NB trail. Refer to **Figure 3-3**.

The wetland was delineated using GPS points and standard wetland delineation and functional assessment protocols were followed based on Environment Canada’s: Wetland Ecological Functions Assessment: An Overview of Approaches (2008). The wetland was identified as a small, regenerated forested wetland with other disturbance impacts (roads and culvert). It was

broken up by two berms (access road and the NB Trail) thus creating two separate wetlands: Wetland 1a (WL1a) and Wetland 1b (WL1b). Refer to **Figure 3-3**.

WL1a was identified as having standing water from 0-15 cm depth with two inlets (WC1 and WC2) and drains in from the southeast and south. The outlet drains through one culvert which connects with WL1b, located south and adjacent to the NB trail system. Both wetlands (WL1a and WL1b) would be considered the same wetland due to these watercourse connections. Both wetlands were dominated by red maple, balsam fir, speckled alder, sedges, grasses, rushes and ferns. There were no species at risk or of conservation concern identified. All species identified in these wetlands would be considered widespread and common to New Brunswick. Refer to **Appendix D** for a summary of the flora species identified in the wetlands.

High moisture levels in this wetland have been promoted by gentle topography and restricted drainage. Water levels appear to have also been enhanced by flow restrictions associated with adjacent roads and trail.

These wetlands are in varying stages of succession; WL1a would be considered a regenerated forest habitat and WL1b was in a stage of young to mature growth. In addition, the northern boundary of WL1a shows evidence of in-filling stemming from road surface construction activities around the salt domes.

These forested wetlands do not perform any major functions within the watershed due to their small size. However, since wood turtle are known to occur on the Base, there is a minor potential for foraging habitat for this species. There was no identified sensitive nesting habitat for this species. The wetland's highest function would be surface water retention in relation to snowmelt and small mammal habitat since the wetland is connected to two small drainage channels and would provide stream flow maintenance. Functional analysis of the wetland is summarized in **Table 3-10**.



TABLE 3-10: SUMMARY OF WETLAND FUNCTION

Wetland ID	Wetland Type	Connected to Watercourse	Functional Assessment Summary					
			Base Stream Flow Maintenance (Hydrology)	Water Quality Protection	Habitat for Wildlife	Species at Risk or of Conservation Concern	Spring/Snowmelt Storage Attenuation	Anthropogenic Influences
WL1a	FW/ FM Complex	WC1/WC 2	M	L	M	L – foraging wood turtle	M	H
WL1b	FW	WC1/WC 2	M	L	M	L- foraging wood turtle	M	H

FW=Forest Wetland, FM=Freshwater Marsh, n/a= not applicable, L=Low, M=Moderate, H=High

WL1 (WL1a and WL1b) has been generally ranked as “Low to Moderate” with high anthropogenic (man-made) influences.

### 3.4.2 Watercourses

Based on a review of NBDNR 1:10000 mapping and field studies conducted in 2014, there were five (5) watercourses (WC#) noted within the proposed project boundary which are summarized in **Table 3-11**. These watercourses may also interact with the construction of a new access road off of Lutes Street. These surface water drainages are connected with an unmapped wetland (WL1a and WL1b) and flow to the northeast towards the McMonagles Brook, drainage of the Saint John River as shown on **Figure 3-3**. The watercourses and wetlands create one large complex system of wet habitat. WC1 and WC2 provide the inlet water to the wetland and WC3 is the outlet drainage of the wetland which drains along the NB walking trail and to McMonagles Brook. Refer to **Table 3-11** for a summary of the watercourses identified within the project footprint.

TABLE 3-11: WATERCOURSES WITHIN THE PROJECT AREA

Watercourse ID	Project Component	Fish Bearing (Y/N) <sup>1</sup>	Connected to Wetland?	Habitat Description			
				Substrate	Watercourse Width (m)	Depth (m)	% Cover
WC1	Access Road	N	WL1 - inlet	organics, rubble, sand, silt	0.3	0.10	40
WC2	Access Road/ Effluent Line Installation	N	WL1 - inlet	rubble, gravel, sand and silt	0.4	0.15	60
WC3	Facility (within 30 m)	N	n/a	rubble, gravel, sand and silt	0.3	0.15	60
WC4 – Drainage to McMonagles Bk	Effluent Line Installation	N	WL1 – outlet (south of walking trail)	Rubble, organics, sand, silt	0.5	0.20	50
WC5- Bear Trap Brook	Effluent Line Connection/ Operation	Y	Streets Creek Marsh	Sand, silt, rock, rubble, gravel	2-4	0.2-0.5	30

The activity proposed for Bear Trap Brook consists of horizontal directional drilling (HDD) outside of 30 m from the watercourse, therefore, additional investigations on fish and fish habitat were not conducted for this watercourse.









## 3.4.2.1

**Unnamed Watercourse (WC1) – Field Identified**

This drainage channel consisted of a channel width of ~30 cm and substrates dominated by organics, rubble, sand, silt rubble and overgrown by grass. Two drainage culverts were associated with this watercourse. This channel drains surface water from the south and connects with WC2 and WL1 and consequently drains to along the NB walking trail towards McMonagles Brook to the northeast. This drainage channel would not be considered fish habitat. Refer to **Appendix F** for site photographs.

TOWN OF OROMOCTO  
WASTEWATER TREATMENT PLANT  
ENVIRONMENTAL IMPACT ASSESSMENT

**Aquatic Habitat**  
Figure 3-3

-  PROPOSED FACILITY
-  PROPOSED BOUNDARY
-  FIELD DELINEATED WETLAND
-  MAPPED WETLAND
-  BASE BOUNDARY
-  WATERCOURSE
-  WATERCOURSE (Field Identified)
-  WATERCOURSE CROSSING



MAP CREDITS: ESRI, INRCAN, GEOBASE.  
MAP CREATED BY: SCM  
MAP CHECKED BY: RMD  
MAP PROJECTION: NAD 1983 UTM Zone 18N



PROJECT: 148895  
STATUS: DRAFT  
DATE: 3/18/2016



#### 3.4.2.2 Unnamed Watercourse (WC2) – Field Identified

This drainage channel consisted of a channel width of ~40 cm and substrates dominated by rock, rubble, sand, silt and organics. Two drainage culverts were associated with this watercourse. This channel drains surface water from the south/southeast and connects with WC2 and WL1 and consequently drains along the NB walking trail towards McMonagles Brook to the northeast. This drainage channel would not be considered fish habitat. Refer to **Appendix F** for site photographs.

#### 3.4.2.3 Unnamed Watercourse (WC3)

This drainage channel consisted of a channel width of ~30 cm and substrates dominated by rubble, sand, silt and organics. This channel drains surface water from the southwest and consequently drains to along the NB walking trail in a drainage ditch around the Sobeys Distribution Center, disappears underground up to Route 102 then drains under Route 102 towards the Saint John River to the northwest. This drainage channel would not be considered fish habitat.

#### 3.4.2.4 McMonagles Brook (WC4)

This drainage channel consisted of a channel width of 0.5 m and substrates dominated by rubble, sand, silt and organics. This channel drains from the south to the north towards the Saint John River. The field identified portion of this watercourse would not be considered fish habitat and was intermittent at the time of the survey.

#### 3.4.2.5 Bear Trap Brook (WC5)

This watercourse consists of a channel width of 3-4 m and substrates dominated by rubble, sand, silt and organics. This channel drains surface water from the southwest and consequently drains to along the NB walking trail in a drainage ditch around the Sobeys Distribution Center, disappears underground up to Route 102 then drains under Route 102 towards the Saint John River to the northwest. This drainage channel would be considered fish habitat. Because the project activities proposed in this area consists of horizontal directionally drilling under the brook, fish presence survey were not deemed necessary.

### 3.5 Archaeological and Cultural Environment

#### 3.5.1 Cultural Heritage Resources

There are no cultural heritage resources located immediately within the project site; but the following section describes resources that are located within the Town.

A replica of Fort Hughes, an American Revolutionary War Blockhouse is located in Sir Hazen Douglas Park near its original location. The original fort was built in 1780 and remained in use

until the end of the revolutionary war. The heritage is reflected in the Town crest, which features two soldiers from the era (New Brunswick, 2014).

The Oromocto Cenotaph is a granite obelisk war memorial located on a grassy area along MacDonald Avenue. The Cenotaph is designated as a local historic place for its importance of highlighting the military history of the Town. Its design is typical of war monuments throughout Canada. It was erected by citizens of the Town in 1963 and memorializes fallen soldiers of World War I, II, the Korean War and various Canadian peacekeeping missions (New Brunswick, 2014).

St. John's Anglican Church is a block church featuring elements of gothic revival architecture that was built in 1920. It is designated as a local historic place due to its prominence as a longstanding place of worship in the area (New Brunswick, 2014).

The George Brown house, located at 325 MacDonald Road in the Town is a three storey wood-frame gothic house. Considered to be the region's finest example of Carpenter Gothic residences, it is designated as a local historic place for its architectural features and association with the Town's early settlers (New Brunswick, 2014).

Building H12 at the Base, also known as the Drill hall, is a basic two storey structure with a pitched roof. It is located on an open field site, in the central training area of CFB Gagetown. It is a recognized federal heritage building due to its historical associations, architecture, and central prominence to the CFB Gagetown community (New Brunswick, 2014).

### 3.5.2 Archaeological and Cultural Features

Cultural Resource Management (CRM) Group Limited was retained to conduct archaeological investigations associated with the proposed project. A preliminary archaeological investigation was conducted on May 29-30, 2014, according to the terms of Archaeological Research Field Permit 2014NB2, issued by the New Brunswick Archaeological Services Branch of the Department of Tourism Heritage and Culture. A second investigation was conducted on November 4-5, 2014.

#### **Preliminary Investigations (Phase 1)**

The preliminary investigation report as provided in **Appendix G** describes the methodology employed to conduct the background and preliminary field investigations (excluding sub-surface testing) for potential archaeological and cultural resources within the project area footprint.

The background research and field reconnaissance of the WWTP study area identified two areas that exhibit elevated potential for encountering either Native (both Pre contact and historic) or Euro-Canadian archaeological resources at two locations.

1. Located along the east and west bank of Bear Trap Brook, for a distance of 80 m from the water's edge.
2. Located east bank of an unnamed watercourse located south of Waasis Road in Section Four, for a distance of 80 m from the water's edge.

### **Shovel Testing Investigations (Phase 2)**

Based on the recommendations outlined in the Phase 1 Report, it was determined that an archaeological shovel testing of high potential areas identified within the study area of the proposed WWTP should be investigated further. These investigations were conducted on November 4-5, 2014, according to the terms of Archaeological Research Field Permit 2014NB104, issued to CRM through New Brunswick Archaeological Services Branch of the Department of Tourism Heritage and Culture. The complete report is provided in **Appendix G**. This report describes the low level evaluation and shovel testing of locations of elevated archaeological potential, presents the results of these efforts and offers cultural resource management recommendations.

The 2014 archaeological field evaluation and shovel testing of the proposed WWTP study areas consisted of a low-level evaluation of locations of elevated archaeological potential, as well as limited subsurface testing, in the form of archaeological shovel testing, at two locations that were identified as exhibiting elevated potential for encountering either Native (both Pre contact and historic) or Euro-Canadian archaeological resources during preliminary field investigations conducted in the spring of 2014.

1. The effluent pipe installation sections on both banks of Bear Trap Brook potentially impacted by the outfall line of the proposed WWTP site.

A low-level archaeological assessment was undertaken at this location on November 5, 2014 under clear conditions. Predictive modeling of the study area indicated a zone of elevated archaeological potential, totaling 160 m in width, extending back 80 m from the east and west banks of Bear Trap Brook. The first 50 m on either side of the brook are considered high potential, while the following 30 m on each side are ascribed moderate potential. Aside from the modern infrastructure of a railway bed, the topography surrounding Bear Trap Brook is level or gently sloping and relatively flat within the zone of elevated archaeological potential for the full length of the study area. Refer **Appendix G**.

A review of the study area, which includes a 30 m wide corridor across the 160 m zone of elevated potential, included an examination of the surficial geology, local topography and cultural features. The study area included the former railway bed, now converted to a walking trail and a parallel corridor, approximately 10 m south of the railway, for a buried transcontinental telegraph cable. In order to avoid disturbing these features, including potential archaeological resources, horizontal directional drilling will be employed during construction. The effluent line connection will be installed beneath Bear Trap Brook and any associated archaeological deposits. The drilling entry and exit points will be made outside the zone of elevated potential, therefore no subsurface testing was conducted at this location.

2. The east bank of an unnamed (Indian Brook) watercourse southeast of the intersection of Waasis Road, however, revision of the WWTP study area at the time of the field investigations, placed this area outside of the study area and thus eliminating it from further archaeological investigation. This had been identified as a location of elevated archaeological potential during the field reconnaissance conducted in the spring of 2014, but due to a revision of the WWTP study area, the location now falls outside the area of consideration for further archaeological investigation. Therefore, no subsurface testing was conducted.

It was determined at the time of these investigations, In order to avoid various modern features, as well as any potential buried archaeological deposits, horizontal directional drilling will be used during construction. Refer to **Appendix G** for the complete Phase 1 and Phase 2 Archaeological Reports provided by CRM Group Limited.

### 3.6 Socio-Economic Environment

Oromocto was developed in the 1950s as a planned community to provide housing and essential services to the new Base that was set to open as the largest military training facility in the Commonwealth, at the time (Town of Oromocto, 2015). The Town was designed by McGill professor and prominent community designer Harold Spence-Sales (Town of Oromocto, 2015). He designed the Town to feature the suburban ideals of the day, with a small commercial strip serving the residential neighbourhoods, primarily made up of single family lots. The Town is characterized by its idyllic parkland charm, with mature tree-filled neighbourhoods centered around a system of schools and parks. All neighbourhoods and schools are connected via a network of active transportation trails. The following information regarding population and employment is based on the most recent census, as reported to Statistics Canada from the 2011 Census (Statistics Canada, 2012) and 2006 Community Profiles (Statistics Canada, 2007).

### 3.6.1 Population and Labour Force

The Town is a large town located 22 km away from Fredericton, the provincial capital. The Town has a population of 8,932 as of 2011 (Statistics Canada, 2012). The population of the Town increased 6.1% from 2006 to 2011. The population of the town fluctuates depending on demand and flow, and seasonal training at Canada Forces Base Gagetown. Additional population trends for the Town and the Oromocto First Nation Reserve subregion can be found in **Table 3-12**. Furthermore, the Town is a commercial and employment centre for 25,000 people who live within a 9 km radius, in the areas communities of Rusagonis, Waasis, Maugerville, Burton, and Geary. With a land area of 33.27 km<sup>2</sup>, the population density of the Town is 399.2 persons per km<sup>2</sup> in 2011, whereas the population density of New Brunswick was 10.5 people per km<sup>2</sup> (Statistics Canada, 2012). In 2011, there were 3,459 private dwellings in the Town.

**TABLE 3-12: POPULATION STATISTICS FOR THE TOWN OF OROMOCTO AND NEARBY OROMOCTO FIRST NATION RESERVE SUBREGION (STATISTICS CANADA, 2012)**

Year	Town of Oromocto Population	Oromocto IR26 Population	Total population	% Annual Increase	% Increase
2011	8,932	286	9,218	1.20%	6.1%
2006	8,402	284	8,686	-0.91%	-4.5%
2001	8,843	249	9,092	-0.77%	-3.8%
1996	9,194	256	9,450	-0.14%	-0.7%
1991	9,325	190	9,515	-0.57	-2.8%
1986	9,655	135	9,790	1.31%	6.7%
1981	9,064	110	9,174	-4.30%	-19.7%

The aboriginal population in the Town represented 2.5% of the total population, which is on par with the provincial representation (2.4%) (Statistics Canada, 2007). Visible minorities in the Town represented 1.9% of the total population, with Black and Southeast Asian representing the majority (Statistics Canada, 2007).

The Town's population achieved higher educational attainment compared to the province as a whole. In 2006, 79.9% of the Town's population 15 years and over had certificates, diplomas or degrees, compared to 70.6% for New Brunswick (Statistics Canada, 2007).

In 2005, the median income of persons 15 years and over was \$34,145, which is higher than the provincial average of \$22,000 (Statistics Canada, 2007). Males earned on average \$50,860 and females earned \$16,374 compared to the provincial averages of \$28,019 and \$17,586, respectively (Statistics Canada, 2007).

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### 3.6.2 Local Economy

In 2006, the last year of the mandatory Canadian long form census, the highest percentage of people in the Town and the Province of New Brunswick were employed in sales and service occupations (52.6% and 26%, respectively). This high proportion is not surprising given the large employment opportunities at CFB Gagetown. CFB Gagetown employs 4,500 military personnel and 1,500 civilians, making it the largest public sector employer, after the province itself, in New Brunswick. CFB Gagetown reportedly contributes 220 million dollars to the local economy annually (Government of Canada, 2014). In Oromocto, the second and third highest proportions of occupations were related to business, finance, and administration (12.9%) and management occupations (10.3%). In New Brunswick, the second and third highest proportions of occupations were related to business, finance and administration (17.9%) and trades, transportation and equipment operators (17.2%). It is worth noting that Oromocto had a small proportion of the population working in occupations unique to processing, manufacturing and utilities (0.06%) compared to the New Brunswick proportion (5%) (Statistics Canada, 2007). The average employment rate in the Town is 73.5% and unemployment rate hovers around 4.2% (Statistics Canada, 2007). Refer to **Table 3-13** for a summary of the Town's employment characteristics. More recent reported employment figures for the region indicate an employment rate of 59% and unemployment rate of 8.8% for the Greater Fredericton-Oromocto region (Statistics Canada, 2015).

**TABLE 3-13: EMPLOYMENT STATISTICS FOR THE TOWN OF OROMOCTO (STATISTICS CANADA, 2006)**

	<b>Town of Oromocto</b>
Population (2006)	8,402 (-5.0%)
Population (2001)	8,843
Employment Rate	73.5%
Unemployment Rate	4.2%
Largest occupation group	<ol style="list-style-type: none"> <li>1. Sales and service occupations (~50% of labour force)</li> <li>2. Business, finance and administration occupations (~13% of labour force)</li> <li>3. Management occupations (~10% of labour force)</li> </ol>
Largest industry group	<ol style="list-style-type: none"> <li>1. Other services (~65% of labour force)</li> <li>2. Business services (~10% of labour force)</li> <li>3. Retail trade (~8.5% of labour force)</li> </ol>

### 3.6.3 Existing and Historic Land Use

The existing land use in the vicinity of the proposed project is depicted on **Figure 3-4** and presented in detail in the following section.

#### 3.6.3.1 Military

Canada Forces Base Gagetown is the largest military facility in Eastern Canada. The Base features a 1,200 km<sup>2</sup> training area with 1,500 km of roads, 900 km of tracks, and 740 buildings. The main garrison is located within the Town and has a large impact on the community, with facilities such as a gymnasium, bowling alley, arena, outdoor pool and tennis courts, in addition to offices and training-related facilities (Government of Canada, 2014). The proposed WWTP is currently located on military land on Ganong Street, adjacent to the entrance; however, once operational, the land will be turned over to the Town and appropriate zoning will be designated by the Town.

#### 3.6.3.2 Industrial

The Sobeys Distribution centre is an industrial land use immediately adjacent to the proposed WWTP on Waasis Road (Route 102). The Sobeys' property is zoned light industrial and transportation to support its use as a regional distribution centre via transport trucks. The Centre is a major employer in the Town, employing 150 individuals (Town of Oromocto, 2013). The next nearest industry are smaller, light industrial operations located in the Restigouche Road Industrial Park, 3.2 km away. There are future plans to develop the area along Black Watch Ave, in the Oromocto West neighbourhood (West of the TransCanada Highway) into an industrial park to support industry development in the Town.

**3.6.3.3 Commercial**

There are no commercial uses immediately adjacent to the proposed site; however, Oromocto First Nation operates a convenience store and gas bar nearby. In addition, Oromocto Mall, the commercial core of the Town is located under a kilometer from the proposed site. The Mall's major tenants include Atlantic Superstore, Shopper's Drug Mart and Dollarama. There are additional commercial uses further away along Restigouche Road and the new Gateway development, which is undergoing steady expansion and is zoned for highway commercial.

**3.6.3.4 Residential**

The Town has a population density of 399 people per km<sup>2</sup>. The project is not currently zoned for residential use and it is not anticipated that residential use will be permitted on the site once ownership is transferred to the Town. The nearest residences are located nearby at Oromocto First Nation.

**3.6.3.5 Cultural/Institutional**

Cultural and institutional uses include hospitals, schools, places of worship and post-secondary education facilities. The Town is a secondary cultural and institutional centre for the region, after the City of Fredericton.

There are no places of worship in the immediate area, but there are six places of worship within the Town. There are no schools within the area, but there are five elementary schools, two middle schools and one high school in the Town. Post-secondary facilities are offered in Fredericton. Additionally, the Base serves as a large institutional facility within the Town.

**3.6.3.6 Recreational and Tourism**

The Town services a regional population of 25,000, which provides a sufficient population base for ample recreational facilities. The largest recreational facility in the area is the base gymnasium at CFB Gagetown. Additionally, there are facilities for theatre, boating, fishing, golf, tennis, swimming (indoor and outdoor), cross-country skiing, skating, hockey, curling, a library, climbing, biathlon, bowling, playgrounds, picnic areas and parks and trails (Town of Oromocto, 2013).

Sir Hazen Douglas Park and Deer Park provide recreational and tourism opportunities along the St John River and Oromocto River watersheds. There is a marina that operates adjacent to Sir Hazen Douglas Park (Town of Oromocto, 2013). In addition, CFB Gagetown Military Museum is located on the Base's main garrison and provides further tourism opportunities within the Town (Government of Canada, 2014).

Within the project site, the New Brunswick trail transects the proposed project property. The New Brunswick trail is part of the TransCanada Trail and is intended for non-motorized use;

however, the New Brunswick Federation of Snowmobile Clubs lease and maintain the trail for seasonal, motorized use from October of April, annually (Department of Natural Resources, 2006).

### 3.6.4 Transportation and Transportation Infrastructure

#### 3.6.4.1 Highway

The Trans-Canada Highway (New Brunswick Highway 2) is located approximately 3.5 km from the project site. There is an interchange with the highway near gateway Business Park on Miramichi Road that provides highway access. New Brunswick Route 102 is a secondary highway that runs adjacent to the project site. The two-lane corridor was the original road connecting Saint John and Fredericton.

#### 3.6.4.2 Rail

The nearest rail facilities are located in Saint John and Moncton (Town of Oromocto, 2013). The original rail line through the Town was decommissioned and converted to a multi-use trail that runs through the project site.

#### 3.6.4.3 Air

The nearest airport to the project site is the Fredericton Airport, serving domestic and international commercial passenger and cargo flights, approximately 5 km from the Town.

#### 3.6.4.4 Seaport











The proposed project is located 91 km from the region's largest port, Port Saint John.

### 3.6.5 Aboriginal Communities

The proposed project boundary is immediately adjacent to Oromocto First Nation, a Maliseet community of 654 persons (304 on-reserve) (Aboriginal Affairs and Northern Development Canada (AANDC), 2014). Oromocto First Nation is located within Oromocto town limits and has 19.8 hectares of land (AANDC, 2014). Refer to **Figure 3-4**. Established in 1895, it is governed by an elected council, Chief and five councilors serving a two-year term. The current council governs until September 13, 2015 (Oromocto First Nation, 2015). The First Nation provides 95 dwellings to 95 households, in developments north and south of Waasis Road, west of the project site (AANDC, 2014).

TOWN OF OROMOCTO  
WASTEWATER TREATMENT PLANT  
ENVIRONMENTAL IMPACT ASSESSMENT

Land Use  
Figure 3-4

PRIMARY LAND USE	
	AGRICULTURAL
	DEPARTMENT OF NATIONAL DEFENSE
	INDUSTRIAL
	INFRASTRUCTURE
	RECREATION
	SETTLEMENT
	OROMOCTO FIRST NATION
	BASE BOUNDARY
	PROPOSED FACILITY
	PROPOSED BOUNDARY



MAP CREDITS: ESRI, INRSCAN, GEOBASE.  
MAP CREATED BY: SCM  
MAP CHECKED BY: RWD  
MAP PROJECTION: NAD 1983 UTM Zone 18N

