3.0 SUMMARY OF ENVIRONMENTAL SETTING

The Project originates within the western boundaries of the Town of Woodstock, in Carleton County, New Brunswick, and then travels west for approximately 15.7 km along the northern edge of an existing RoW for Route 95 to a new substation near the NB-Maine border. The setting is consistent with this region of the Saint John River valley with a mosaic of farmlands, wetlands, forest stands, and residential clusters connected through tertiary routes and dirt roads that wind amidst rolling hills.

Historically, Aboriginal activity in the area occurred where the mouth of the Meduxnekeag River meets the Saint John River at their confluence (now the town of Woodstock), and may have included some agricultural activity on nearby islands (Clarke 1970). Within the Project Development Area (PDA) Aboriginal activity may have included the use of the watersheds for navigation, fishing and hunting (Peabody and Mitchell 2005).

Modern settlement of the area began around the time of establishment of Woodstock by Loyalist settlers in the mid 1780s (Rayburn 1975). The arrival of the Loyalists brought substantial alterations to the landscape through forestry and agriculture, and the associated road and building infrastructure.

The region continued to develop through the twentieth century, with the addition of rail, road and telecommunications infrastructure, and the expansion of commercial agricultural operations. The most substantive changes in recent history include the establishment of the Trans-Canada Highway and the creation of the Mactaquac headpond in the late 1960s. Today, the area continues to be influenced largely by agriculture (especially potatoes) and related ancillary services, although more recently, agricultural and forested lands have been lost to residential subdivision development (Peabody and Mitchell 2005).

3.1 PHYSICAL SETTING

3.1.1 Physiography and Geography

New Brunswick is divided into six physiographic (geomorphologic) districts defined largely by the underlying bedrock geology. The Project lies within the Chaleur Uplands geomorphologic district, in the Williamstown Plateau (Rampton *et al.* 1984), and is characterized by underlying granite and bedrock formations of mostly Cambro-Ordovician, Silurian, and Carboniferous origin. The composition of these bedrock formations is mainly of grey-green or red slate, greywacke, limestone, and conglomerate with minor inclusions of gabbro, diorite, and diabase of Devonian origin (Fahmy *et al.* 2001).

3.1.2 Topography and Drainage

The Project is located within the Meductic Ecodistrict of the Valley Lowlands Ecoregion (NBDNR 2007). The Meductic Ecodistrict is a gently rolling lowland area located in the mid regions of the Saint John River valley, with reliefs seldom exceeding 100 m. The area is generally well-drained, with the entirety of the Project occurring within the upper reaches of the Meduxnekeag River watershed, which drains in an easterly direction into the Saint John River.

3.1.3 Surficial Geography

The surficial geography in the general vicinity of the Project is composed mainly of Late Wisconsinan glaciofluvial, morainal, and alluvial deposits (Fahmy and Rees 1989) of predominantly calcareous (argillaceous, limestones, sandstones, siltstones and slates) and non-calcareous (metasandstones, metawackes, and metaconglomerates) sediments (Colpitts *et al.* 1995).

The till overlying the metasedimentary rocks is of a coarser texture with rounded to angular rock fragments; whereas, the till overlying the slate and shale components is of a finer texture with flat rock fragments (Fahmy and Rees 1989). This can include morainal sediments consisting of loamy lodgment till and minor ablation till; glaciofluvial sediments including ice-contact deposits, eskers, kames, kame and kettle complexes, sand, gravel, silt and till; and alluvial sediments including terraces, and floodplains consisting of sand, silt, clay and, gravel deposits (Rampton 1984).

3.2 BIOPHYSICAL SETTING

3.2.1 Atmospheric Environment

The Province of New Brunswick has established an air quality monitoring network. The air quality monitoring station closest to the Project is in Canterbury, New Brunswick, approximately 34 km southeast of the PDA. According to New Brunswick's Air Quality Monitoring Results from 2010 through 2014, the province reported no exceedances of annual air quality metrics with respect to ozone or fine particulate matter at the Canterbury air quality monitoring station (NBDELG 2012b, 2013, 2015, and 2016).

The nearest Environment and Climate Change Canada (ECCC) weather station relative to the Project area is in Woodstock, NB, and has historical climate data from 1981 to 2010. According to this data, the month typically reporting the lowest temperatures is January, with a daily average temperature of -11.5°C. The month typically reporting the highest temperatures is July, with a daily average temperature of 19.0°C. The average annual precipitation in Woodstock is 1,130.6 mm. The most rainfall typically occurs in August (100.6 mm on average), and the most snowfall typically occurs in January (76.6 mm on average) (Government of Canada 2016).

The location of the PDA is rural, and adjacent to a highway (Route 95) connecting Canada to the U.S. The Houlton International Airport is also within 5 km of the western end of the PDA. It is expected that the existing sound pressure levels (noise) in the area will be slightly above those typical of rural ambient levels.

More details on the Atmospheric Environment are provided in Section 4.3.1.

3.2.2 Fish and Fish Habitat

The proposed transmission line will span a number of watercourses in the Meduxnekeag River watershed, which drains into the Saint John River near Woodstock, New Brunswick (Figure 2.1). All watercourses spanned by the transmission line are first or second order (e.g., relatively small) and typically contain habitat that is preferred by small fish species such as cyprinids, brook trout (*Salvelinus fontinalis*) and slimy sculpin (*Cottus cognatus*), as well as juveniles of larger fish species.

Fifty-three species have been identified in the Saint John River watershed (Kidd et al. 2011), and of these species, 27 have been confirmed to be present in the Meduxnekeag River and its tributaries (Peabody and Mitchel 2005, NBDNR 2016); some of these tributaries will be crossed by the Project.

Several species of commercial, recreational, or Aboriginal (CRA) species are found within the Meduxnekeag River system including Atlantic salmon (*Salmo salar*), brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), smallmouth bass (*Micropterus dolomieu*), and chain pickerel (*Esox niger*). Non-sport fish are also found in the system including burbot (*Lota lota*), American eel (*Anguilla rostrata*), smelt (*Osmerus mordax*), gaspereau (*Alosa spp.*), white perch (*Morone americana*), yellow perch (*Perca flavescens*), and pumpkinseed sunfish (*Lepomis gibbosus*) (Peabody and Mitchel 2005, NBDNR 2016). Various non-CRA fish are also present in the watershed that may or may not support CRA fisheries including brown bullhead (*Ameiurus nebulosus*), creek and lake chub (*Semotilus atromaculatus*, *Couesius plumbeus),* dace spp., shiner spp., banded killifish (*Fundulus diaphanous*), and slimy sculpin (*Cottus cognatus*).

Atlantic salmon (outer Bay of Fundy population) and American eel are listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as *endangered* and *threatened* (respectively), but are not afforded protection under the *Species at Risk Act* (*SARA*) or the New Brunswick *Species at Risk Act* (NB *SARA*). Atlantic salmon adults, smolt, parr, and fry are unlikely to be present in first and second order watercourses as they are typically inaccessible to adults and do not have sufficient water depth and velocities for developing young (Stanley and Trail 1995, Maki-Petays et al. 2002).

3.2.3 Water Resources

The lone watershed in the PDA (i.e., the Meduxnekeag River watershed) drains a rural, mixed-use landscape comprised largely of agricultural lands, with patches of forested lands interspersed throughout. The Meduxnekeag River watershed is crossed in numerous locations by paved and unpaved roads which interconnect small clusters of residential and commercial agricultural development. There are no protected wellfields within the general vicinity of the Project, nor do any residential or commercial entities acquire potable water from the RoW (see Section 4.3.2).

3.2.4 Terrestrial Environment

The Project is located within the Meductic Ecodistrict of the Valley Lowlands Ecoregion, which is the largest of New Brunswick's seven ecoregions (NBDNR 2007). The Valley Lowlands Ecoregion extends from Edmundston in the north to St. Andrews in Passamaquoddy Bay to the south, and includes most of the Saint John River Valley, with the exception of a section surrounding Fredericton and Grand Lake. This ecoregion also includes the Tobique River valley, the Kennebecasis River valley, and a stretch of land in central New Brunswick that forms a transition between the Central Uplands and Eastern Lowlands Ecoregions. Its large area and geographic span contributes to the Valley Lowlands Ecoregion supporting the highest diversity of all New Brunswick ecoregions. Further information is provided below.

3.2.4.1 Vegetation

The Valley Lowlands Ecoregion, and specifically the Meductic Ecodistrict, has a relatively warm climate, and contains many plant species that are considered southern in their distribution (NBDNR 2007). The Meductic Ecodistrict is approximately 65% forested, but is also highly fragmented; forest stands are often relatively small in a matrix of agriculture, roads, urban and rural communities, and wetlands. Forest composition within the ecodistrict is diverse, and can include sugar maple (*Acer saccharum*), balsam fir (*Abies balsamea*), red spruce (*Picea rubens*), eastern white cedar (*Thuja occidentalis*), beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), and aspen (*Populus* spp.).

3.2.4.2 Wetlands

Historical settlement and development in this part of New Brunswick has reduced the amount of wetland to approximately 2.8% of the total area within the Meductic Ecodistrict, below the provincial average (NBDNR 2007). Wetlands are typically located at the edges of agricultural land or residential areas. Despite historical loss in the ecodistrict, wetlands here typically support high plant diversity, and larger wetlands are often complexes of treed swamp, open water, and marsh wetlands. Peatlands are uncommon in the Meductic Ecodistrict (NBDNR 2007).

3.2.4.3 Wildlife

New Brunswick is host to 531 vertebrate animal species (excluding fish and marine mammals), including 449 birds, 59 terrestrial mammals, 16 amphibians and 7 terrestrial reptiles (NBDNR 2010).

Some mammal species that require large home ranges are likely less common in this area of the province, due to the highly-fragmented nature of natural habitats. However, the diversity in land use types and successional stages of wildlife habitat likely supports and provides resources for many wildlife species.

3.3 SOCIOECONOMIC SETTING

The Project is located in Carleton County along the western boundary of the province of New Brunswick, between the Town of Woodstock and the NB-Maine border. This location is a part of the Western Valley Regional Service Commission, or Regional Service Commission (RSC) 12, and the Northwest Economic Region of New Brunswick. The town of Woodstock is the largest centre within the LAA and serves as an economic hub for its own population of 5,100 as well as the more than 26,000 people living in surrounding communities (Town of Woodstock 2010).

3.3.1 Economic Activity and Economic Drivers

The industry and labour market in the Northwest Economic Region of the province is dominated by the goods-producing sector, trades, and transportation, equipment operators and warehousing industries (GNB 2013). Small businesses are driving the economy, with less than 4% of employers in this region employing more than 50 staff (GNB 2013). The New Brunswick Community College (NBCC) also operates a campus in downtown Woodstock.

3.3.2 Land Use

The majority of the PDA (73.6%) consists of public property within the RoW of New Brunswick Route 95, as nearly 50% forest, primarily young-immature softwood, mature-overmature mixedwood, and young-immature mixedwood; 12.6% wetland, described below; 6.6% industrial; and less than 1% agricultural. According to the Service New Brunswick database (2017), there are 45 private residences and five businesses within 500 metres of the PDA. The nearest private residence and business to the PDA are in Richmond Settlement.

3.3.3 Transportation and Transportation Infrastructure

The PDA is located within the New Brunswick Department of Transportation and Infrastructure's (NBDTI) District 5, meaning that NBDTI employees in this district are responsible for the maintenance and operation of provincial highways in the area (NBDTI 2017), with the exception of the main arterial highways which are the responsibility of New Brunswick Highway Corporation (NBHC) . Four collector and arterial highways exist in the Local Assessment Area (LAA) (Chapter

4.0); New Brunswick Route 103 begins southeast of the PDA and connects with New Brunswick Route 555 which runs parallel to the PDA until its termination approximately 3 km from the NB-Maine States border. New Brunswick Route 540 runs through the PDA from its intersection with Route 550 in the north to its connection with New Brunswick Route 122 in the south. New Brunswick Route 95 runs along the majority of the PDA and serves as a connector road from United States Interstate Highway 95 to a portion of the TransCanada Highway, known provincially as Route 2. Route 2, a twinned highway, runs north to south through the eastern portion of the PDA. The highway serves as a major thoroughfare for New Brunswick, running from New Brunswick's border with the province of Québec to Nova Scotia. There are no active rail lines in the area, but a variety of other municipal and rural roads interconnect the residents and communities in the LAA.

3.3.4 Heritage Resources

A review of the Archaeological Services' Sites Database revealed that there are no registered archaeological sites in the immediately vicinity of the Project. However, it should be noted that a large Indigenous village was historically located at the mouth of the Meduxnekeag River and that archaeological sites have also been documented along the shores of the Meduxnekeag River (Ganong 1899; MacIntosh n.d.a, n.d.b).