Eigg Mountain Wind Project

Environmental Assessment

Prepared for: Eigg Mountain Wind Inc.

CBCL

February 11, 2026

Executive Summary

Eigg Mountain Wind Inc. (the Proponent), a wholly owned subsidiary of Renewable Energy Systems Canada Inc. (RES), is proposing the construction and operation of the Eigg Mountain Wind Project (the Project). The Project is situated on the ancestral and unceded territory of the Mi'kmaq people, in the Municipality of the County of Antigonish, to the northwest of the town of Antigonish.

The Project is a proposed onshore wind farm consisting of 22 wind turbines that will include associated infrastructure such as a substation, an operation and maintenance building, a transmission line to the Nova Scotia Power Incorporated (NSPI) interconnection point, power collection systems, access roads, and temporary laydown areas. The Project turbines will have a nameplate capacity of 7.0 megawatts (MW) each for a combined total installed capacity of 154 MW. The implementation of this Project will supply renewable energy for the province's Green Choice Program, which is designed to offer some of the Province's largest energy consumers with up to 100% renewable energy.

The Project is a Class I undertaking per Schedule A of the Nova Scotia Environmental Assessment (EA) Regulations under the provisions of the *Environment Act*, requiring registration with the Nova Scotia Department of Environment and Climate Change (NSECC). This EA registration document has been prepared by CBCL Limited (CBCL) according to guidance outlined in the province's document, *A Proponent's Guide to Environmental Assessment*, as well as the *Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia*.

The Proponent and consultants carried out consultation and engagement as part of the Project planning process. Key rightsholders and stakeholders involved in these discussions included the Mi'kmaq of Nova Scotia, regulatory agencies, municipal leadership, local and provincial organizations, and the public. The purpose of these engagement activities was to provide information, gather input, and understand concerns. In response to comments raised during the consultation and engagement, the Proponent has made the following key revisions to the design and layout of the Project:

- Revised layout to avoid sensitive ecological areas and minimize impact to local property owners and built infrastructure, and limit the number of roads
- Revised access road and turbine layout to mitigate potential adverse impacts on Mainland Moose

- Removed turbines from old growth forest and tracts of mature intact forest

The Project will use approximately 17.4 km of existing roads and need approximately 18.3 km of new access roads. A total of 10 permanent or intermittent watercourses may intersect with these access roads, with many requiring upgrades to culverts.

Most of the Project is situated on private lands that have experienced historical and ongoing disturbance from forestry, recreation, and quarrying activities. The detailed design of the Project and precise placement (micrositing) of turbines has aimed to locate Project infrastructure in previously disturbed areas, whenever possible.

The potential impact of the Project on the following Valuable Environmental Components (VECs) has been assessed:

- Climate and Weather
- Air Quality
- Ambient Light
- Acoustic Environment
- Topography and Landform
- Bedrock and Soils
- Subsidence and Sinkholes
- Groundwater
- Hydrology/Watersheds
- Fish and Fish Habitat
- Water Quality
- Flora
- Wetlands
- Terrestrial Wildlife
- Bats
- Birds
- Population and Economy
- Land Use and Value
- Visual Landscape
- Utilities
- Communication and Radar Systems
- Transportation
- Recreation and Tourism
- Human Health
- Indigenous Cultural Resources
- Archaeological Resources

To support the assessment of these VECs, baseline field and technical studies were completed in accordance with provincial guidance documents and applicable regulatory standards. These studies included multi-season field programs (e.g., wildlife, birds, bats, wetlands, watercourses, and vegetation), technical modelling (e.g., noise, shadow flicker, and habitat), and desktop analyses. The results of these studies informed the iterative design and siting of turbines and associated infrastructure to avoid or minimize potential environmental effects.

The Proponent has incorporated environmental management approaches and strategies into Project planning and execution so that the Project complies with regulatory requirements and reduces or avoids potential adverse environmental effects. A Project-specific Environmental Protection Plan (EPP) will be developed before commencement of construction, and will incorporate the EA Conditions of Approval. The EPP will include information on the following:

- Erosion and Sediment Control
- Blasting Management
- Fire Prevention and Control
- Surface Water Management
- Waste Management
- Dust Control
- Wildlife Management
- Vegetation Management
- Soil and Stockpile Management
- Hazardous Substances Management and Spill Prevention
- Decommissioning and Site Reclamation
- Environmental Emergency Response and Contingencies

In addition to providing renewable energy to produce carbon-free fuel, the Project will provide the following benefits:

- Job creation and training opportunities
- Long-term employment opportunities
- Contributions to community groups
- An Annual Community Fund
- Stimulus to local businesses
- Tax revenues

Through Project planning and design, and applying effective mitigation and monitoring, the Project will not result in significant adverse residual effects to the environment. Furthermore, the Project will have a positive residual effect associated with minimizing the regional carbon footprint and contributing economic benefits for the Municipality of the County of Antigonish.

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List of Acronyms

Acronym	Defined
°C	degrees Celsius
AC CDC	Atlantic Canada Conservation Data Centre
ACSR	Aluminum conductor steel reinforced
AOD	Area of disturbance
AQMS	Air Quality Management System
ARD	Acid rock drainage
ARIA	Archaeological resource impact assessment
ARU	Autonomous recording unit
ATV	All-terrain vehicle
ATVANS	All-terrain Vehicle Association of Nova Scotia
CAAQS	Canadian Ambient Air Quality Standards
CanREA	Canadian Renewable Energy Association
CanWEA	Canadian Wind Energy Association
CBCL	CBCL Limited
CCME	Canadian Council of Ministers of the Environment
cm	Centimetre
CMM	Confederacy of Mainland Mi'kmaq
CO_2	Carbon dioxide
CO2e	Carbon dioxide equivalent
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWS	Canadian Wildlife Service
dBA	A-weighted decibel
dBC	C-weighted decibel
DFO	Fisheries and Oceans Canada
DND	Department of National Defence
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
EMF	Electromagnetic field
EMI	Electromagnetic interference
EPP	Environmental protection plan
EQS	Environmental Quality Standards
ESC	Erosion and sediment control
GHG	Greenhouse gas
GIS	Geographic information system
ha	Hectare
Hz	Hertz
IAAC	Impact Assessment Agency of Canada
IBA	Important Bird Area

Acronym	Defined
IPCC	Intergovernmental Panel on Climate Change
km	Kilometre
km^2	Square kilometre
km/h	Kilometres per hour
KMK	Kwilmu'kw Maw-klusuaqn
kV	Kilovolt
L	Litres
LAA	Local assessment area
LiDAR	Light Detection and Ranging
m	Metre
m^2	Square metre
m^3	Cubic metre
m/s	Metres per second
MAC	Maximum acceptable concentration
magl	Metres above ground level
masl	Metres above sea level
MBBA	Maritimes Breeding Bird Atlas
mbgs	Metres below ground surface
MCANS	Moose Conservation Association of Nova Scotia
MEKS	Mi'kmaq Ecological Knowledge Study
MET Tower	Meteorological tower
mg/L	Milligrams per litre
mm	Millimetres
MOU	Memorandum of Understanding
MW	Megawatt
na	Not applicable
NO_2	Nitrogen dioxide
NRCan	Natural Resources Canada
NSCCTH	Nova Scotia Department of Communities, Culture, Tourism and Heritage
NSDLF	Nova Scotia Department of Lands and Forestry
NSDNR	Nova Scotia Department of Natural Resources
NSDPW	Nova Scotia Department of Public Works
NSECC	Nova Scotia Department of Environment and Climate Change
NSESA	Nova Scotia *Endangered Species Act*
NSPI	Nova Scotia Power Incorporated
NWA	National Wildlife Area
OLA	Office of L'Nu Affairs
PDA	Potential development area
PGI	Pellet group inventory
PID	Property identification number

Acronym	Defined
$PM_{2.5}$	Particulate matter having a size of 2.5 micrometres or less
PM_{10}	Particulate matter having a size of 10 micrometres or less
POL	Petroleum, oils, and lubricants
ppb	Parts per billion
PPE	Personal protective equipment
ppt	Parts per thousand
RAA	Regional assessment area
RABC	Radio Advisory Board of Canada
RCMP	Royal Canadian Mounted Police
RES	Renewable Energy Systems Canada
RoW	Right-of-way
RSZ	Rotor-swept zone
SDS	Safety Data Sheet
SANS	Snowmobilers Association of Nova Scotia
SAR	Species at risk
SARA	*Species at Risk Act*
SNA	Status rank not applicable
SO_2	Sulphur dioxide
SoCC	Species of conservation concern
StatCan	Statistics Canada
T	Tonne
TDS	Total dissolved solids
US	United States
USACE	United States Army Corp of Engineers
USDA	United States Department of Agriculture
UTM	Universal Transverse Mercator
VEC	Valued environmental component
VES	Visual Encounter Surveys
W/m^2	Watts per square metre
WESP-AC	Wetland Ecosystem Services Protocol for Atlantic Canada
WHMIS	Workplace Hazardous Materials Information System
WHO	World Health Organization
WNS	White-nose syndrome
WSS	Wetlands of special significance
$\mu g/m^3$	Micrograms per cubic metre

1 Introduction

Eigg Mountain Wind Inc. (the Proponent), a wholly owned subsidiary of Renewable Energy Systems Canada Inc. (RES), is proposing to develop the Eigg Mountain Wind Project (the Project), a 154-megawatt (MW) wind power project in the Municipality of the County of Antigonish, Nova Scotia. The Proponent, successfully bid the proposed Project into Nova Scotia's Green Choice Program. The Green Choice Program is a Nova Scotia initiative that allows large-scale electricity customers, such as public institutions and businesses, to access renewable energy (Government of Nova Scotia, 2025).

The Project will have an installed capacity of 154 MW and will consist of 22 turbines (Figure 1.1, Appendix A). Each turbine will have a generation capacity of 7.0 MW, with a hub height of 118 metres (m) and a rotor diameter of 163 m. The Project will also include the following components:

- A network of upgraded and new access roads
- Aboveground and underground medium-voltage electrical collector lines
- An electrical substation
- An operation and maintenance building
- A transmission line for interconnection to the NSPI grid in James River

Temporary laydown areas will be necessary during construction. Additionally, the Project is expected to include one or two long-term meteorological (MET) towers to assess and monitor the wind resource.

The Project is considered a Class I undertaking per Schedule A of the Nova Scotia Environmental Assessment (EA) Regulations under the provisions of the provincial *Environment Act*. On behalf of the Proponent, CBCL Limited (CBCL) has prepared this document, with contributions from other firms and consultants that carried out specialized studies, to serve as the EA Registration Document for submission to the Nova Scotia Department of Environment and Climate Change (NSECC).

1.1 Project Title and Proponent

Project Name:	Eigg Mountain Wind Project
Project Location:	Municipality of the County of Antigonish
Proponent:	Eigg Mountain Wind Inc.
Principal Proponent Contacts:	**Eigg Mountain Wind Inc.** c/o Renewable Energy Systems Canada Inc. 5605 avenue de Gaspé Montreal, QC H2T 2A4 EiggMountain.Wind@res-group.com Peter Clibbon Senior Vice President, Development Canada Phone: 1 (438) 266-1899 Email: peter.clibbon@res-group.com Keith Martin Development Manager Phone: (514) 386-3083 Email: keith.martin@res-group.com
Proponent Website	https://www.eiggmountainwind.com/
Principal Consultant Contact:	CBCL Limited 1505 Barrington Street, Suite 901 Halifax, NS B3J 2R7 Phone: (902) 421-7241

The Proponent's parent company, RES, is the world's largest independent renewable energy company, working across 24 countries and active in wind, solar, energy storage, transmission, and distribution. In Canada, RES has more than 20 years of experience, including development in Nova Scotia and across the country.

An industry innovator for over 40 years, RES Group has delivered more than 28 GW of renewable energy projects across the globe and plans to bring more than 26 GW of new capacity online in the next five years. RES is the power behind a clean energy future where everyone has access to affordable zero carbon energy bringing together global experience, passion, and the innovation of its 4,500 people to transform the way energy is generated, stored, and supplied.

1.2 Purpose of the Project

Electricity demand in Atlantic Canada is expected to significantly increase in the coming years (Natural Resources Canada, 2022). Coal-fired power generation remains an important source of electricity in the region, but the Atlantic Provinces are committed to reducing reliance on fossil fuels and expanding renewable energy (Natural Resources Canada, 2022a). As the region is shifting to a low-carbon future, the Government of Nova Scotia has committed to phasing out the use of coal and to powering 80 percent of the provincial grid with renewable energy by 2030 (Nova Scotia Department of Natural Resources and Renewables (NSDNR), 2023) eventually leading to a net-zero emissions future by 2050 as stated in the *Environmental Goals and Climate Change Reduction Act* (2021). To fulfill these commitments, the provincial government has proposed to increase onshore wind power generation from 20 percent to 50 percent or greater, as wind energy is considered the lowest cost electricity resource in the province (NSDNR, 2023). The provincial government has also stated that it will procure 372 MW of new wind power, which will result in 70 percent of electricity being generated from renewable sources by 2026 (NS Environment and Climate Change (NSECC), 2022).

To support these 2030 goals, the Government of Nova Scotia has created the Green Choice Program, which will allow 11 of the province's largest energy consumers to procure up to 100 percent of their electricity from local renewable energy sources. These 11 consumers include governments, hospitals, schools, universities, and large scale industrial and commercial businesses. To provide this renewable energy to the grid, the province selected six wind farms through a competitive, independent procurement process. The Project was one of the wind farms selected as part of the Green Choice Program and will thereby contribute to the province's green energy targets and reduction of greenhouse gas (GHG) emissions (Government of Nova Scotia, 2025).

Regionally, the Project will contribute to the Government of Nova Scotia's goal to reduce GHG emissions by 2030 as per the *Environmental Goals and Climate Change Reduction Act* and concurrent revisions to the Renewable Electricity Regulations under the Nova Scotia *Electricity Act* in 2021 (NSECC, 2022). To conform with these two Acts, Nova Scotia Power Incorporated (NSPI) will procure 80 percent of its energy supply from renewable sources and acquire a minimum of 1,100 GW-hours from independent power producers by 2030—the strictest target of those set by Canadian provinces.

The Project will support the Municipality of the County of Antigonish in achieving its target for a 35 percent reduction in GHG emissions by buildings in the county by 2031, as outlined in the *2021 Energy Management Plan* (Efficiency Nova Scotia, 2021). The plan includes a goal of investing in and supporting renewable and non-emitting sources of energy, such as the Project. The Project will also provide economic and social benefits such as municipal tax revenues, local jobs, and a stimulus to local businesses, outlined in Chapter 3 (Consultation and Engagement) and Chapter 13 (Socio-Economic Environment) of this EA Registration Document.

1.3 Project Location and Setting

The Project takes place on Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq people. The nearest Mi'kmaq communities to the Project are Pictou Landing First Nation, approximately 40 kilometres (km) west of the Project, and Paqtnkek Mi'kmaw Nation, approximately 33 km southeast of the Project.

The Project is located approximately 11 km northwest of the town of Antigonish, Nova Scotia, in a primarily rural area of the Municipality of the County of Antigonish (Figure 1.1, Appendix A), with a central coordinate of 45.701936N, 62.131292W. The wind farm site was chosen on the basis of a detailed feasibility analysis that considered factors such as wind potential, land availability, local support for wind, and proximity to the provincial transmission network. All turbines are located on private lands, per the Green Choice Program requirements. An initial constraints analysis was completed prior to development of the Project layout (see Section 2.1 for details on the Potential Development Area or PDA) which further confirmed the feasibility of the Project. The Project turbines are located on several properties under an option to lease (Table 1.1;4 Figure 1.2, Appendix A); Crown land leases and easements will also be required to build other parts of the Project, such as portions of the transmission line and small segments of access roads.

Table 1.1 Property Ownership of Proposed Project Turbine Locations

Property Identification (PID) Number	Ownership
01200419	Private
01200435	Private
01200906	Private
01200922	Private
01200930*	Private
01203504	Private
01208495	Private
01265651	Private
01302298	Private
01303569	Private
01303775	Private
01303783	Private
01303809	Private
10011930	Private
10101251	Private
10108256	Private
10112563	Private
10119261	Private
10121259*	Private
10121267*	Private

*Alternate turbine locations PIDs

The Project is in the Nova Scotia Highlands ecoregion, composed of low-lying plateaus and lower-level highlands between Chignecto Bay and Cape Breton Island (Ecological Stratification Working Group, 1995). The Project is in the Pictou Antigonish Highlands ecodistrict—an elevated triangle separating the Northumberland Lowlands ecodistrict of Pictou County from the St. Georges Bay ecodistrict lowlands of Antigonish County that rises to a maximum elevation of 300 m at Eigg Mountain (Nova Scotia Department of Lands and Forestry, 2019). According to 2020 Light Detection and Ranging (LiDAR) data available from the province, elevations within the Project Area range from approximately 30 to 320 metres above sea level (masl). This high elevation exerts a strong influence on the climate of the uplands with colder winters, late, cool springs, and low annual temperatures overall compared to nearby lowlands (Province of Nova Scotia, 2020).

The higher elevation in the region is associated with greater wind speeds, which makes it a good candidate area for wind power generation. According to the Canadian Wind Atlas, annual mean wind speed at 80 m elevation near the centre of the turbine layout is 8.11 metres per second (m/s), having a wind energy of 450.6 Watts per square metre (W/m^2) (Environment and Climate Change Canada (ECCC), 2016).

The Pictou Antigonish Highlands Ecodistrict is a structurally complex highland area underlain by Precambrian to Silurian volcanic and sedimentary rocks, with Carboniferous basins present locally. Its rugged topography reflects extensive faulting and folding, and the region hosts several resource-relevant materials, including bedrock suitable for aggregate, diatomaceous earth, and hydrocarbon-bearing formations. The district is also notable for the internationally significant Silurian fossil exposures at Arisaig (Ami, 1892). As is characteristic of upland ecodistricts, wetlands and lakes are relatively small and few; however, the ecodistrict contains headwaters of several rivers. Most of the region has well-drained soils, and its tolerant hardwood hills support Sugar Maple (*Acer saccharum*), Yellow Birch (*Betula alleghaniensis*), American Beech (*Fagus grandifolia*), and Red and Black Spruce (*Picea rubens*, *P. mariana*). Hummocks are also found on the plateau-like top of this ecodistrict. In this ecodistrict, there are also tolerant mixedwood hills, tolerant mixedwood slopes, and floodplains.

The Project is situated near the Eigg Mountain-James River Wilderness Area which encompasses over 7,600 hectares (ha) of upland forests and includes most of the James River Watershed Protected Water Area that supplies drinking water for the Town of Antigonish (Figure 1.3, Appendix A). Major forest roads provide access to the Project area and the wilderness area, which is used for recreational activities such as hiking, backcountry skiing, mountain biking, bird watching, hunting, and trapping. Several designated off-highway vehicle routes managed by Snowmobilers Association of Nova Scotia (SANS) and All-terrain Vehicle Association of Nova Scotia (ATVANS) travel though the lands in and adjacent to the Project and the Eigg Mountain-James River Wilderness Area (SANS, 2025).

1.4 Regulatory Framework

Wind projects that produce 2 MW or more are considered Class I undertakings per Schedule A of the Nova Scotia EA Regulations under the provisions of the *Environment Act*, requiring Registration with NSECC to initiate the EA process. This EA Registration Document was prepared by CBCL in accordance with the *A Proponent's Guide to Environmental Assessment* (NSECC, 2025), *Nova Scotia Class I Environmental Assessment Checklist* (NSECC, 2025), and the *Environmental Assessment Supplemental Checklist: Wind Energy Projects* (NSECC, 2025).

The Project does not require a federal impact assessment, as it will not be located on federal lands and is not classified as a designated project per the Physical Activities Regulations under the *Impact Assessment Act*.

Table 1.2 presents a summary of the federal, provincial, and municipal regulatory permits, approvals, or notifications that may be applicable to the Project, along with the status of requirements (as of the date of this report).

Table 1.2 Summary of Regulatory Permits, Approvals and Notifications

Permit/Approval/ Notification	Regulatory Authority	Application/Permit Status
Federal		
Request for Review of Project Near Water	Fisheries and Oceans Canada (DFO) Fish and Fish Habitat Protection Program	A Request for Review will be submitted to DFO after the detailed design phase, and before construction in watercourses or where activities have the potential to impact fish and fish habitat, for determination of the requirement for a *Fisheries Act* Authorization.
Canadian Navigable Waters Act Notification of a Work	Transport Canada	Required for minor works, such as watercourse crossings or aerial power transmission lines, or works in a non-scheduled waterway. Will be submitted prior to construction, if required.
Operations Interference Clearance	Department of National Defence (DND)	Required for confirmation that turbines will not cause electromagnetic interference (EMI) in communications used by DND or DND operations. DND has confirmed no objections to the Project[†].
Weather Radar Interference Approval	ECCC Meteorological Service of Canada	Required for confirmation that turbines will not cause interference to weather radars. ECCC has confirmed no objection to the Project.
Aeronautical Assessment Obstacle Evaluation	Transport Canada	Required for marking and lighting of obstacles (e.g., turbines). To be completed prior to construction.

Permit/Approval/ Notification	Regulatory Authority	Application/Permit Status
Land Use Approval	NAV Canada	Required for confirmation that turbines will not cause EMI or interference to aviation. Land use #23-3299 was provided by NAV Canada and NAV Canada has confirmed no objection to the Project.
Notification of Project	Royal Canadian Mounted Police (RCMP)	RCMP has confirmed that the turbines are not expected to interfere with their operations, but to follow-up with Bell Mobility Inc. Bell Mobility Inc. has confirmed that no interference is expected.
Provincial		
Crown Land Applications	Nova Scotia Department of Natural Resources (NSDNR) and NSECC	Application for Project components that overlap Crown lands (managed by NSDNR or NSECC) to be submitted concurrently with EA process.
Water Approval for Watercourse Alteration	NSECC	Application for watercourse alteration to be submitted following EA Approval.
Wetland Alteration Approval	NSECC	Application for wetland alteration to be submitted following EA Approval.
Water Approval	NSECC	Required if there is a need to draw surface water or groundwater for use during construction and/or operation that exceeds 23,000 litres per day.
Special Move Permit	Nova Scotia Department of Public Works (NSDPW)	Application to be submitted prior to mobilization of oversize vehicles on public roads.
Work within Highway Right of Way Permits	NSDPW	Application to be submitted in advance of planned work within a highway right-of-way (RoW). Expected for collector line crossings, transmission line crossings, and road upgrades.
Endangered Species Permit	NSDNR	Will be required if species at risk (SAR) listed under the Nova Scotia *Endangered Species Act* (NSESA) will be directly impacted. The Project is not expected to require a permit under the NSESA.
Municipal		
By-law Amendment – Land Use By-law (2024, amended 2025)	Municipality of the County of Antigonish	An amendment to the County Land Use By-law will be required to create a Wind Resource Overlay zone for areas where turbines are proposed.

Permit/Approval/ Notification	Regulatory Authority	Application/Permit Status
Wind Development Permit - Land Use By-law (2009, amended 2022)	Municipality of the County of Antigonish	A Wind Development Permit must be applied for through the Development Officer with the County of Antigonish.
Building Permit Under the NS *Municipal Government Act*	Municipality of the County of Antigonish	For buildings greater than 20 m^2, including turbine foundations.

† Non-objection assessments from DND, ECCC, NAV Canada, and RCMP were based on a prior turbine layout. However, given only slight changes were made to turbine positions, no changes to these assessments are expected.

1.5 Funding

There are no sources of public funding for the proposed undertaking.

2 Project Description

The Project is located north of the Eigg-Mountain James River Wilderness Area within the Municipality of the County of Antigonish. The Project comprises 22 7 MW turbines for a total installed capacity of 154 MW, a network of upgraded and new access roads, above-ground and below-ground medium-voltage electrical collector lines, an electrical substation, an operation and maintenance building, and a transmission line for interconnection to the NSPI grid in James River. Figure 1.1 illustrates a Project layout of 24 turbines; however, two of these are alternate locations to allow for flexibility during detailed design (Appendix A).

Per the Green Choice Program, all turbines are located on private land. Supporting infrastructure is located primarily on private land, with a small portion on Crown lands.

Temporary laydown areas will be necessary during construction. Additionally, one or two long-term MET towers to assess and monitor the wind resource during operations will be included in the Project. Each turbine will have a generating capacity of 7 MW, with a hub height of 118 m and a rotor diameter of 163 m.

This Project was selected through Nova Scotia's Green Choice Program, a competitive procurement initiative that enables large electricity consumers (e.g., hospitals and public institutions) to purchase renewable energy. The program supports provincial renewable energy targets and reduces GHG emissions (Government of Nova Scotia, 2025).

2.1 Potential Development Area and Area of Disturbance

The Potential Development Area (PDA) for the Project is 3,275 ha. The PDA is a buffered area encompassing all infrastructure required for the Project. This includes the access road network, turbine pads, power infrastructure (i.e., transmission line, collector lines, substation, and operation and maintenance building), and construction laydown areas. The PDA includes two proposed transmission corridors; however, only one will be constructed. The PDA represents a general area within which the Area of Disturbance (AOD) will be located and the area targeted for assessment to allow for flexibility in the final design. Local public roadways used as access roads to connect the Project are also included within the PDA. The PDA includes two alternative turbine locations as a contingency measure, in case one of the intended turbine locations is deemed to be unsuitable for environmental or structural reasons.

The AOD is 312 ha and represents the portion of the PDA expected to be physically altered for construction and operation of the Project. It includes both the permanent Project footprint (e.g., access roads, turbine pads, and power infrastructure) and temporary disturbance areas necessary for construction, such as vegetation clearing and laydown areas to accommodate equipment delivery and assembly. The AOD was developed and refined using baseline environmental data collected during the 2024–2025 field programs, including wetlands, watercourses, and other sensitive environmental features (e.g., old growth forest). This data informed an iterative design process, and as a result, the AOD was adjusted to avoid or minimize interactions with sensitive habitats and key environmental features to the extent possible. The mapping provided in this Registration shows the current AOD for the Project; however, minor changes may occur during final design stages.

As part of Project design, multiple transmission line routing options were explored and evaluated, with iterative refinement informed by environmental constraints, land ownership considerations, and public engagement. As illustrated on Figure 2.1, three primary routing options were explored in more detail (Appendix A). The westernmost option was removed from consideration due to several constraints, including proximity to the Eigg Mountain–James River Wilderness Area and feedback received during landowner engagement. Two routing options are currently under consideration. The northern portion of the transmission line corridor has been defined, and the PDA has been narrowed around the proposed AOD in this portion. The southern portion of the corridor remains under refinement. The PDA around the southern portion of the proposed routes is wider to allow for flexibility (Figure 2.1, Appendix A). While the PDA and AOD include both proposed transmission corridors, only one alignment will be constructed. Final route selection will be determined based on land acquisition, constructability, and environmental and social considerations.

2.2 Siting Considerations

The Project is located predominantly on privately owned lands that have been subject to historical and ongoing disturbance from forestry practices and recreational use. Prior to establishing the PDA, an environmental constraints analysis was completed. This analysis involved the identification and spatial mapping of sensitive receptors, environmental features, and local and regional infrastructure. Applicable setback distances were then applied to these features based on relevant legislation, best management practices, and guidance obtained through consultation with government regulators.

2.2.1 Turbines

The turbine layout as proposed in this Registration considers multiple factors, with the objective of maximizing wind energy production while minimizing environmental and social impacts. The design approach prioritized first avoiding and, where avoidance was not reasonably practicable, minimizing potential adverse environmental effects. Layout development also considered the following siting principles:

- Maximizing exposure to areas with high wind resource potential
- Preferential use of previously disturbed areas and existing access networks
- Complying with noise and shadow flicker requirements
- Avoidance of managed and biologically significant areas Reducing interference with radar systems, aviation assets, and communications infrastructure
- Adhering to prescribed regulatory setbacks (see Table 2.1)

Subsequent refinements to the turbine layout were made following completion of field programs, results of technical modelling, and information received through engagement with the Mi'kmaq of Nova Scotia and the public. Turbines, including turbine laydown areas, have been sited to avoid wetlands, watercourse, old-growth forest, and areas of high archaeological potential. The AOD of three turbine pads slightly overlap wetlands.

A summary of the turbine setback distances applied to the PDA layout and relevant references are provided in Table 2.1 and illustrated in Figure 2.2.

Table 2.1 Turbine Setback Distances

Feature	Setback Distance	Reference
Protected Areas, Provincial Parks, and Park Reserves	Avoidance, except for small, temporary areas	NSECC
Watercourses, Wetlands, and Wetlands of Special Significance	≥ 30 m measured from the area of disturbance (where possible) unless otherwise authorized in writing by the province	NSECC
Watercourses	30 metres plus the blade length (111.5 m)	Plan Antigonish Land Use Bylaw: Wind Turbine Setback Amendments
Old Growth Forests	Avoid	An Old-Growth Forest Policy for Nova Scotia
Areas of High Archaeological Potential	Avoid	*Special Places Protection Act*

Feature	Setback Distance	Reference
Residences (Civic Addresses)	No more than four times the wind turbine height, unless a greater distance is required to prevent sound levels from exceeding 40 decibels. There is no setback requirement from residences located on the same lot	Minimum Planning Requirements Regulations, made under subsection 214(4) of the *Municipal Government Act* Plan Antigonish Land Use Bylaw: Wind Turbine Setback Amendments
New Residences	There are no turbine setbacks for new residences that are constructed after the construction of a wind development	Plan Antigonish Land Use Bylaw: Wind Turbine Setback Amendments
External Property Boundaries	10 m plus 1x the height of the rotor (173 m)	Plan Antigonish Land Use Bylaw: Wind Turbine Setback Amendments
Public Highways	The minimum setback from public highways shall be 60 metres, or two times the height of the turbine, whichever is greater	Plan Antigonish Land Use Bylaw: Wind Turbine Setback Amendments
Noise	Distance required so that turbine operational noise levels do not exceed 40 dBA from permanent and seasonal receptors	NSECC
Shadow Flicker	Distance required so that shadow flicker will not exceed 30 minutes per day or 30 hours per year at any permanent or seasonal receptor within 2 km of the Project	NSECC
Distance Between Turbines	Minimum separation distance between turbines is equal to the height of the tallest turbine (200 m).	NSECC
Point-to-Point Microwave Link	3 x First Fresnel Zone	Radio Advisory Board of Canada (RABC) & Canadian Wind Energy Association (CanWEA) Guidelines (2025)
FM Radio Station	2,000 m consultation zone; 1,000 m setback (best practice)	RABC & CanWEA Guidelines (2025)

2.2.2 Other Infrastructure

A setback strategy was also applied to the other infrastructure of the Project, to minimize impact to the extent possible on environmental, heritage, and built features. This included minimizing encroachment of new access roads and the transmission line on wetlands and watercourses, and avoidance of old growth forest. It also included positioning the proposed transmission line at safe distances from residences and building the substation in an area that avoids sensitive features.

2.3 Project Schedule

Project construction is planned to begin in late fall of 2026, starting with necessary site clearing. Construction will resume in spring of 2027 and be completed over a period of approximately 20 months as outlined in Table 2.2.

Table 2.2 Project Construction Schedule

Construction Activity	Estimated Timeline
Site Clearing	November 2026 to January 2027
Site Preparation and Access Roads	May to November 2027
Foundation Installation	June 2027 to February 2028
Collector System and Substation Installation	May 2027 to September 2028
Turbine Delivery and Assembly	May to December 2028
Testing and Commissioning	August to December 2028

The commercial operation date (COD) is planned for December 2028. The Project will operate from COD through to decommissioning. While the Power Purchase Agreement with NSPI has a term of 25 years, the expected lifespan for the Project is up to 35 years if an additional offtake agreement is secured.

2.4 Project Components

2.4.1 Turbines

The Project will consist of 22 Nordex N163 wind turbines. The turbine model under consideration has an individual generating capacity of 7 MW and stands at 118 m in hub height—a total height of 199.5 m including an 81.5-m blade length. Each turbine will consist of a tower secured to a concrete foundation at the base, nacelle generator, and three blades. The rotors will have a maximum diameter of 163 m (a maximum rotor-swept zone of 20,867 square metres (m^2)). The blade to ground clearance is approximately 36.5 m. Each turbine has three independent pitch control systems with emergency power supply, rotor brake, and a rotor lock controlled remotely. The footprint for each turbine foundation will cover an area of 0.12 ha. There will be a crane pad at the base of each turbine and surrounding the base of each turbine will be a gravel ring.

2.4.2 Access Roads

The Project will require approximately 31.8 km of access roads, 18.9 km (60 percent) of which are existing gravel roads. An additional 6.5 km of Pleasant Valley Road will be used. Most existing roads will require upgrades. New gravel road sections will be necessary where turbines branch from the existing roads, resulting in approximately 12.9 km (40 percent) of new road construction.

Access road design will conform to applicable engineering standards, turbine transportation requirements, and industry best practices. These roads will facilitate mobilization of equipment, turbine components, and personnel to and from the PDA during all phases of the Project. Accordingly, road design must provide sufficient bearing capacity and appropriate turning radii to accommodate heavy-haul vehicles, cranes, and other construction equipment. Upgrades will be implemented where existing road conditions do not meet these specifications.

Requirements for ditching, culvert installation, and bridge construction or rehabilitation will be finalized during detailed design to align with industry standards and regulatory requirements.

2.4.3 Ancillary Infrastructure

2.4.3.1 Collector System

A 34.5 kilovolt (kV) overhead turbine collector circuit (medium voltage electrical cabling) will relay power generated from each turbine to the base of wood or steel monopoles that will support the overhead collector lines. Underground collector lines will extend approximately 100 m from the turbine to the overhead collector lines. The overhead collector line system comprises four circuits and will generally run parallel to the access road rights-of-way (RoWs) within the PDA and will converge at the substation. Routing is expected to be optimized as part of detailed design.

2.4.3.2 Substation, Operation and Maintenance Building, and Transmission Line

The substation, situated northeast in the PDA (Figure 2.3, Appendix A), is necessary to convert voltage received from the turbine collector system before the power connects to the NSPI grid system as per the NSPI Interconnection Procedure and Transmission System Interconnection Requirements. The substation will have a maximum footprint of 0.67 ha, with the actual size likely being smaller.

The operation and maintenance building will be in the southeast portion of the turbine layout area along Connors Mountain Road and will have a footprint of up to 0.5 ha.

A new aboveground transmission line, approximately 21 km in length, will be routed from the substation to the NSPI 230 kV power line in the corridor south of Highway 104 around James River (Figure 2.1, Appendix A). As noted in Section 2.1, the southern portion of the transmission line corridor is being refined, and two possible routes are presented; however, only one line will be constructed. The transmission line design will be determined during detailed design but will likely consist of wood-pole H-frame structures, as per NSPI standard. The point of interconnection (POI), defined as the location where the Project transmission line will connect to NSPI's existing transmission system, will include a switching station which will require up to 1 ha of land.

2.4.3.3 Fencing

For public safety, perimeter 2x2-inch chain link fence (approximately 1.8 m in height), with three strands of barbed wire on top, will be installed around the substation, the switching station, and operation and maintenance building to restrict access by unauthorized people. No other restrictive fencing is planned for Project infrastructure.

2.4.3.4 MET Towers and Remote Sensing

A LiDAR remote sensing device was installed in December 2023 in a central area within the PDA and a MET tower was erected next to the LiDAR in July 2024. The LiDAR was moved to the western area of the site in October 2025. The MET tower and LiDAR monitor atmospheric conditions relevant to the Project (wind speed and direction, atmospheric pressure, relative humidity, and temperature) and will be removed before COD. One or two MET towers will be installed as part of the Project to assess and monitor the wind resource over the long term.

2.4.4 Temporary Laydown Areas

A designated temporary working (i.e., laydown) area of approximately 1.3 ha is located at the base of each turbine, where the turbine components (the hub, nacelle, generator, and blades) will be stored just prior to assembly (Figure 2.4, Appendix A). A 30 m buffer will be created around each cleared turbine laydown area and is included in the AOD for flexibility during construction.

An additional temporary laydown area, covering an area of approximately 3.3 ha, is proposed within the PDA to store other onsite equipment and components of infrastructure during construction. There are six additional alternative temporary laydown areas within the PDA, with areas varying from approximately 2.1 to 3.4 ha that are not expected to be used but are included within the AOD and PDA to ensure flexibility during detailed design.

2.5 Construction

The construction phase of the Project will take place over approximately two years, from fall 2026 to winter 2028. Construction will involve site preparation, access road construction and modifications, materials and equipment delivery and storage, installation of infrastructure, and restoration of the temporary areas needed to facilitate construction within the PDA. Testing and commissioning of the Project will mark the end of the construction phase.

Approximately 200 to 250 workers will be employed during the construction phase. Accommodations for traveling workers will be facilitated through established commercial lodging facilities in the region, specifically in Antigonish, Nova Scotia, and surrounding areas. Construction is to occur predominantly during daytime hours, seven days per week.

2.5.1 Site Preparation

Site preparation activities will include clearing, grubbing, excavation, grading, compaction, and ditching, supported by appropriate erosion and sediment control (ESC) measures. Grubbing will be completed using a root rake or equivalent equipment capable of removing root material while retaining topsoil for salvage. Topsoil will be stored away from watercourses and other aquatic features for later use in restoring temporary workspaces and laydown areas. Grading and leveling within the PDA will be carried out using heavy equipment (e.g., graders, dozers, scrapers).

Site preparation will be restricted to the minimum practicable footprint to limit environmental effects while providing adequate space for construction activities. ESC measures and other mitigations will be implemented, and soil conservation practices will be applied consistent with regulatory requirements, engineering standards, and industry best practices.

The AOD is approximately 312 ha, which includes both transmission line RoWs, turbine pads (including two alternate locations), new and existing access roads, ancillary infrastructure, and temporary laydown areas. Clearing will be limited to the AOD; however, portions of the AOD area non-vegetated areas (e.g., existing road footprints). Turbine pads may require up to approximately 2 to 3 ha of cleared area per unit; however, siting within previously disturbed locations was prioritized to reduce vegetation removal.

Earthworks will also be necessary to support access road development, including construction of ditches, drainage features, and turbine pad foundations. Excavated material generated during construction will be stockpiled onsite for reuse where feasible or disposed of in accordance with regulatory requirements and best practices.

2.5.2 Access Road Construction and Modification

New and upgraded road surfaces will be constructed using clean granular fill sourced from local quarries or borrow pits. Materials will be stored temporarily until necessary for placement. Excess fill and excavated material generated during construction will be stockpiled for reuse where feasible, or disposed of in accordance with applicable regulations, road construction standards, and best practices.

While the access road AOD on private lands may be up to 30 m in width during construction, the final, permanent RoW, inclusive of ditches, existing road segments, and turbine access spurs, will have a maximum width of 20 m or less, including space for overhead collector lines where applicable. Nordex turbine transport requirements specify that road grades must generally remain below 10 percent. Blasting may be necessary to remove shallow bedrock and achieve required grades and turning radii. The final constructed road surface is expected to be approximately 6 to 7 m in width depending on load rating.

Roadside ditches will be constructed and stabilized using ESC measures appropriate to local drainage patterns and erosion risk. Culverts and/or bridges will be installed at new watercourse crossings. For existing access roads within the PDA, culvert replacement will be undertaken where current structures do not meet design standards or are in poor condition. The final number and locations of culvert replacements will be confirmed during detailed design.

2.5.3 Material and Equipment Delivery and Storage

Construction equipment will be mobilized to the PDA from local contractors and will include graders, bulldozers, excavators, telehandlers, cranes, rock trucks, and dump trucks, as well as light-duty trucks.

2.5.3.1 Transportation

Turbine components will be transported to the province via ship to the Strait of Canso Superport in Mulgrave, NS. They will be transported approximately 68 km to the PDA via Highway 344, TransCanada Highway 104, Clydesdale Road, and Pleasant Valley Road. Turbine components will then be mobilized to the turbine pads prior to assembly.

Traffic management measures will be implemented on local and provincial roadways, as well as on recreational trails intersecting the PDA. These measures will include communication protocols for sharing proposed transportation schedules and haul routes with local communities and recreational off-road user groups through their representative organizations.

A Special Move Permit will be obtained from NSDPW for the movement of vehicles or equipment exceeding legal weight or dimensional limits on provincial roads.

2.5.3.2 Temporary Lay-down Areas

A turbine lay-down area will be established around each turbine location to accommodate crane operations, equipment positioning, and turbine component staging during assembly. These lay-down areas fall within the AOD (Figure 2.4).

The footprint of the Project laydown area is approximately 3.3 ha. Six additional temporary laydown areas were defined within the PDA to be used as alternate areas for flexibility during construction. Each laydown area will include segregated sections for storage of fuel, aggregate, and construction materials. Storage locations will be sited a minimum of 30 m from wetlands and watercourses. Appropriate ESC measures will be implemented for aggregate stockpile and appropriate spill containment measures will be in place for fuel storage.

Laydown area configurations will prioritize safe equipment maneuvering and material staging. Demarcation, signage, and designated access routes will be established, together with environmental protection measures, to ensure compliance with applicable regulations and industry best practices.

2.5.4 Infrastructure Installation

This section describes the construction activities related to the installation of Project infrastructure, including the turbines, power lines, electrical substation, operation and maintenance building, lighting, and security fencing.

2.5.4.1 Turbines

The turbine components described in Section 2.4 will be installed sequentially.

Foundations

The foundation material will consist of structural concrete, as well as steel for rebar, anchor bolts, and spreader plates. The turbine foundation design will be finalised once the geotechnical investigation has been completed, but it is expected that turbines will be stabilized via a reinforced concrete gravity base foundation. The foundations are expected to be a mix of buoyant and partially buoyant foundations, based on measured groundwater elevation relative to existing grade. The buoyant foundations will be 28 m in diameter and consist of approximately 940 cubic metres (m^3) of concrete per foundation. The partially buoyant foundations will be 25 m in diameter and consist of approximately 780 m^3 of concrete per foundation. The majority of each foundation will be below grade surface, with the exception of the 6.5 m diameter pedestal that will extend 1.1 m above grade. Excavation for the foundation is expected to be approximately 3.5 m below grade; however, at locations where bedrock is shallow and highly intact, excavation from localized rock blasting may be required up to 7 m below grade. Concrete will be sourced from a local subcontractor, who will likely provide a mobile batch plant on site and deliver concrete by truck to the mobile plant. Rebar will likely be locally sourced.

Excavation may occur via drilling, or localized blasting if bedrock is present and determined not to be a suitable base. If required, blasting activities will be completed by a qualified blasting contractor and will follow the Nova Scotia Blasting Safety Regulations under the *Occupational Health and Safety Act*. Following excavation, the reinforcement bar supports will be laid and the concrete poured. After the concrete has finished curing, the foundation excavation, apart from the concrete pedestal, will be backfilled to ground level.

Assembly

The turbine assembly will consist of installing the tower sections, nacelle, hub, and three-blade rotors in sequence. A main crane and tailing crane will be mobilized to each working area and stabilized on a 35 m by 20 m pad during construction. The turbines will be erected in pieces, starting with towers being hoisted vertically from the designated laydown areas by the cranes and secured in the turbine foundation. Once secured, the nacelle, drive train, hub, and turbine blades will be independently lifted and installed via crane.

2.5.4.2 Power Lines and Substation

Collector Lines

Four 34.5-kV turbine collector circuits (medium voltage electrical cabling) will be installed above ground to relay power from each turbine to the substation. Each circuit will be underground near the turbine and then strung overhead on wooden poles leading to the substation. The power poles will be built per industry and NSPI standards and installed as per standard procedures. The spacing of the poles will be determined during detailed design.

Transmission Line, Substation, and Switching Station

The four collector circuits will converge at the Project substation (Figure 2.1, Appendix A), where the voltage will be stepped up to 230 kV for interconnection with the NSPI transmission grid. The substation will be constructed as a permanent facility supported on piers and footings. A larger foundation will be constructed for the main power transformer. The substation will include electrical equipment such as transformers, breakers, and protection and control systems. A switching station will be constructed, similar to the substation, for the point of interconnection with the NSPI grid. Security fencing and controlled access will be installed around the substation and the switching station for safety and security purposes.

The transmission line will extend approximately 21 km from the Project substation to the NSPI POI. The transmission line will be constructed within a cleared RoW expected to be 38 m wide. Construction activities will include vegetation clearing, installation of structures (e.g., poles or towers), conductor stringing, and site restoration. Access to the transmission line corridor will utilize existing roads where feasible, with temporary access constructed as required.

2.5.4.3 Operations and Maintenance Building

The Project will include the installation of an operations and maintenance building to support the operation and maintenance of the wind facility during the operational phase. The building will be located within the PDA and accessed via the Project access road network. Construction of the operations and maintenance building will include site preparation activities such as vegetation clearing and grading, followed by foundation installation and building construction. The structure is expected to be a pre-engineered or conventional building and will be used to store equipment, tools, spare parts, and materials, and may include office space for Project personnel. Ancillary infrastructure may include laydown areas, parking, exterior lighting, and utility servicing.

2.5.4.4 Security

Security fencing around the substation and operation and maintenance building will consist of a perimeter chain-link barrier. Installation will begin with excavation of post holes at regular intervals and placement of steel posts approximately 2 m in height, which will be backfilled with concrete to ensure structural stability. Once the posts are set, top rails and tension bands will be installed and secured to the terminal posts. Chain-link mesh will then be attached to the line posts, gates will be installed, and the fencing fabric will be tensioned and trimmed to achieve the required specifications.

2.5.5 Restoration of Temporary Areas

Where practicable, topsoil will be conserved during grubbing activities for reinstatement once temporary laydown areas are decommissioned. Temporary construction areas will undergo decompaction and scarification to support restoration of natural site conditions. Areas of exposed soil will be stabilized and allowed to revegetate naturally.

2.5.6 Testing and Commissioning

The final stage of the construction phase will involve commissioning activities to verify operational performance and undertake any necessary physical adjustments to Project components. Electrical interconnection and power export will be implemented in accordance with the NSPI *Transmission System Interconnection Requirements* (NSPI, 2025). Commercial operation will begin once all required approvals and authorizations are secured, enabling electricity delivery to the provincial grid via the existing 230 kV transmission line.

2.6 Operation and Maintenance

The Project is scheduled to be commissioned in December 2028, and operation and maintenance will occur for up to 35 years, during which the facility will be contributing renewable power to the NSPI electrical grid. The facility will require oversight, maintenance, and repairs as needed for the turbines, roads, power lines, and substation as well as the management of vegetation and the safety and security of the site.

2.6.1 Turbine Operation and Maintenance

The wind turbines will operate automatically. A computerized system, or programmable logic control, will continuously monitor the operating parameters. When there is no wind, the wind turbines will remain idle until the cut-in speed is reached. At the cut-in speed, or minimum required wind speed of 3 m/s, the blades will begin rotating and electrical energy will be produced. When the wind turbines reach a cut-out speed of 26 m/s, which is the maximum wind speed the turbine is designed to operate at, safety measures will be initiated. The turbine's control system will automatically shut the turbine down, ceasing the rotation of rotor blades to prevent damage from high winds. Periodic shutdowns will occur during maintenance or during extreme weather or icy conditions when the risk of ice formation is high.

Turbine lighting will meet Transport Canada requirements for aviation.

Maintenance will be conducted in accordance with manufacturer specifications, industry best practices, and internal procedures and standards. Preventative and predictive maintenance activities will be carried out to avoid component failure and ensure proper system performance. Typical maintenance activities include the following:

- Inspection and condition assessment of mechanical and electrical components
- Application of lubricants and coolants to moving assemblies
- Examination and tightening of bolts and fasteners
- Repair or replacement of damaged or malfunctioning components
- Maintenance and troubleshooting of electrical systems
- Cleaning and upkeep of turbine blades to remove accumulated debris
- Software updates and control system upgrades
- Implementation of health and safety inspections
- Diagnostics and calibration of monitoring systems

There will be approximately four to 12 personnel performing operation and maintenance employed on both a part-time and full-time basis when necessary. Key roles of onsite personnel include a site manager, high voltage and wind turbine technicians, road maintenance workers, vegetation management service providers, snow removal providers, administrative support, and inventory/materials management.

2.6.2 Road Maintenance

Onsite staff will notify the facility management when maintenance is necessary. Onsite roads will require typical repairs to ditches, culverts, shoulders, and signage. Occasional clearing of brush may be necessary to maintain clearance and onsite litter will be collected for disposal. Washout and pothole repairs will be necessary during the lifetime of the Project. Gravel roads may need occasional resurfacing and grading as well as vegetation clearance at the shoulders (e.g., brush cutting). The Proponent has engaged with the local snowmobile club and provincial snowmobile association to align on possible strategies for winter snow management on site roads that overlap with the club trail systems. Possible winter maintenance strategies include the use of tracked vehicles to reduce snow removal, positioning of roads adjacent to trails to facilitate pushing snow from the road onto the trails, and snow removal where necessary. The application of salt may be used as a last resort in areas where de-icing is required and alternative strategies are not possible.

2.6.3 Power Lines, Substation, Switching Station, and Operation and Maintenance Building

Maintenance of power lines, substation, switching station, and the operation and maintenance building may include repair and/or replacement of components such as utility poles, transformers, cables, connections and splices, switchgears, and circuit breakers, computer systems, and office equipment. The housing infrastructure of the substation enclosure and operation and maintenance building may also need repairs, such as roofing replacement, over the course of the Project operation.

2.6.4 Vegetation Management

Onsite vegetation management within the AOD will involve the systematic maintenance and control of plant growth in the areas directly surrounding the turbines, substation, and transmission lines. Vegetation control will be necessary to maintain the safety and environmental features of the facility grounds and will include trimming and removal of vegetation to prevent contact that could damage or disrupt equipment. The *Nova Scotia Industrial Vegetation Management Manual* outlines procedures for industrial vegetation managers (Nova Scotia Department of Environment and Labour, 1999). Management practices will be further developed as described in Section 2.9 of the manual.

2.6.5 Safety and Security

The selected turbines are equipped with advanced safety features and technology to maintain operation while safeguarding both people and systems. Safety-related parameters in the system control are continuously monitored. Data from the safety sensors are transmitted to the safety controller for evaluation. If specific parameters are exceeded, the system is stopped using actuators and placed in a secure state.

Different brake programs are activated based on the specific cause for cut-out (i.e., enabling of automatic shut down of the wind turbine). In instances of external factors like high wind speeds, icing events, or temperatures below the operational range, the wind turbine is softly slowed through adjustments to the rotor blades. Additional safety protocols are employed to safely halt operations for maintenance purposes.

During maintenance activities that pose safety risks to the public, clear signage will be erected to notify the public about the maintenance activities and potential hazards. A Traffic Management Plan will be developed to avoid potential risks to public safety on access roads and neighbouring areas.

Onsite personnel will regularly monitor the condition of the fence. Fencing will require routine maintenance to preserve the security of the substation.

2.7 Waste and Emissions

This section summarizes the primary sources of waste and emissions from the Project, with emphasis on the assessment and quantification of GHG emissions over the Project lifecycle. In addition to identifying Project-generated emissions, the assessment considers the Project contribution to provincial GHG reduction and avoided emissions, meaning those displaced or reduced because of renewable electricity generation. Beyond GHGs, the Project will generate noise, light, fugitive dust/particulates, and solid waste, primarily during construction. The focus of this section is the characterization and quantification of GHG emissions associated with construction, operation and maintenance, and decommissioning.

Monitoring of emissions and air quality at the Project site will reference the Nova Scotia Department of Public Works (NSDPW) generic Environmental Protection Plan (EPP) (NSDPW, 2007). The construction contractor will be responsible for maintaining equipment in proper operating condition. Measures such as non-idling practices and reduced speed limits may be implemented across Project phases to reduce impacts on local air quality, soil and water quality, and GHG emissions. The NSDPW EPP also provides guidance for waste management and the handling, storage, and control of petroleum, oils, and lubricants (POL).

2.7.1 Waste Management

Hazardous waste generated during the Project, including used POL, oil filters, solvents, and batteries, will be segregated, stored, transported, and disposed of in accordance with applicable regulatory requirements and sent to an approved hazardous waste recycling or disposal facility. Non-hazardous waste will be managed using similar procedures, with disposal occurring at approved non-hazardous recycling or disposal facilities.

Construction-related wastes such as concrete debris, metal scraps, and other inert materials will be stored, handled, and recycled or disposed of in compliance with municipal by-laws and provincial regulations. Excess soil or excavated material unsuitable for reuse, cleared vegetation, and unused aggregates will be stockpiled in designated laydown areas and transported offsite for disposal in accordance with regulatory requirements once construction activities are complete.

2.7.2 Non-GHG Emissions

During the construction and decommissioning phases, primary sources of noise emissions include heavy equipment such as excavators, bulldozers, cranes, blasting equipment, and material-hauling trucks. All construction activities contribute to baseline noise levels, while only specific decommissioning tasks generate noise. Dust emissions may result from site preparation, soil handling, and vehicular movement, and are typically elevated under dry weather conditions. Although construction and decommissioning activities are expected to occur predominantly during daytime hours, nighttime work may occasionally be necessary. Artificial lighting associated with nighttime operations, including worksite illumination, vehicle headlights, and temporary construction lighting, will contribute to light emissions. Activities such as grading, excavation, and earth moving may also disturb soils and increase runoff and sedimentation potential. Appropriate stormwater management, ESC measures, and spill prevention and response protocols will be implemented. The effects of soil disturbance and accidental releases on the aquatic environment in the PDA are assessed in Section 7 – Aquatic Environment, as well as Section 17 – Accidents and Malfunctions. Additional mitigation measures will be applied as needed to minimize noise, dust, light emissions, and stormwater impacts within and beyond the PDA. The impacts of noise, light, and dust emissions to the atmospheric environment are assessed in Section 5 – Atmospheric Environment.

During the operation and maintenance phase, the primary source of noise will be wind turbine operation, including blade movement, generator activity, and mechanical components such as the gearbox. Maintenance-related noise sources will be similar in type to those present during construction, but of lower magnitude and frequency. Dust emissions are expected to be minimal during operation, though vehicle traffic along access roads may generate localized dust during inspection and maintenance activities. Artificial lighting may be required for specific maintenance tasks. As with construction and decommissioning, appropriate mitigation measures will be implemented to limit dust, light emissions, and stormwater impacts during operation and maintenance.

2.7.3 GHG Emissions

This section was prepared in accordance with ISO 14064-1: 2018, Greenhouse gases*, Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*. This section focuses on the characterization and quantification of greenhouse gas emissions during all project phases (construction, operation and maintenance, and decommissioning).

2.7.3.1 Construction Phase

The construction phase will comprise the largest source of emissions out of all three project phases due to manufacturing and transportation of the turbines and concrete used to develop the foundations as well as the manufacturing and transport of the materials needed to develop the electrical collection and transmission infrastructure as well as the substation.

Site Development

The process of developing new roads, improving existing roads, clearing new transmission corridors, turbine sites, and preparing laydown areas will necessitate the clearing of vegetation and overburden, leading to the generation of GHG emissions. The construction of new and upgraded roads as well as the clearing needed for each turbine site will require the removal of existing vegetation as well as some temporary or permanent removal of the organic-rich natural overburden in most of the Project area. A review of forestry layers in the provincial GIS database of the Project site, as well as the Global Forest Watch database, lead to the following estimates of the current vegetation cover at each proposed turbine site:

- Mature forest – 10 sites
- Young forest – 6 sites
- Non forested meadow/shrub – 6 sites

Across the entire AOD, the database yielded the following estimate of vegetation cover:

- Mature forest – 46 percent
- Young forest – 26 percent
- Non forested meadow/shrub – 28 percent

Carbon sequestration potential for each vegetation type is estimated as follows:

- Mature forest – 2.0 tonnes/hectare/year (t/ha/yr) (NB Forest Carbon Inventory, 2023)
- Young forest – 0.8 t/ha/yr (NB Forest Carbon Inventory, 2023)
- Non forested meadow/shrub – 0.1 t/ha/yr (USFS, undated)

It is estimated that 31.8 km of access roads will be required to reach the 22 turbine sites and provide access points to the provincial road network. The required road network in the AOD will comprise 18.9 km of upgraded existing roads and 12.9 km of new roads.

Total loss of sequestration potential due to land clearing within the AOD to accommodate the Project is presented in Table 2.3.

Table 2.3 Sequestration Loss Attributed to the AOD

Current Vegetation	Area (ha)	Sequestration Intensity (t/ha/yr)	Total Sequestration (t/yr)
Mature Forest	125.0	2.0	250.0
Young Forest	67.8	0.8	54.2
Non-Forested Vegetated	64.3	0.1	6.4

The organic soil layer in the PDA is assumed to contain a large amount of embodied organic carbon, given the predominant type of forest cover. Excavation of this layer to allow for the installation of turbine bases, laydown areas, and crane pads could allow for a large portion of embodied carbon to be released into the atmosphere if this material is not reinstated and revegetated before it dries out. It is expected that all excavated soils at each turbine site will be reinstated and revegetated at a suitable site nearby to prevent soil carbon loss.

Emissions are expected to be temporary and short term for the construction of roads and laydown areas and therefore have not been quantified as they contribute minimally to the Project emissions.

Concrete Foundation

A turbine base for a Nordex model N163 turbine could require as much as 888 m^3 of concrete and 172.5 tonnes of steel rebar. Assuming 22 turbine bases, this will require 19,543 m^3 of concrete and 3,795 tonnes of steel rebar. Assuming concrete is produced at an existing plant in the Town of Antigonish, the transportation distances to each turbine site can be reduced. Each ready-mix concrete truck can haul 7 m^3 (16.8 tonnes) which results in a total of 2,792 truckloads. At an average round trip distance of 46 km the total haul distance will be 128,432 km. At an average diesel fuel consumption of 0.05 L/T km fully loaded and 0.41 L/km unloaded, the transport of concrete will consume approximately 48,033 litres of diesel fuel. Steel rebar for each base is expected to be supplied from a location in Dartmouth, NS, which is approximately 230 km from each turbine location. At an average load of 21.25 tonnes, it will require 20 truckloads of steel rebar per turbine base. At an average round trip distance of 460 km the total haul distance will be 10,120 km. Fuel consumption for this portion of the Project will be approximately 109,600 litres of diesel fuel. Total embodied and transportation carbon emissions associated with the turbine bases are calculated and shown in Appendix B.

Turbines

The proposed turbines are the Nordex N163 with a maximum generating capacity of 7 MW each. A breakdown of the GHG emissions associated with the manufacture and shipment of the turbines is shown in Appendix B. The turbines will be manufactured in southeast China (nacelles and blades) and Malaysia (tower sections) and transported by truck to dockside and then by ship to the Straight of Canso, and then by truck to the Project site. Each turbine will have a weight of approximately 668 tonnes that is composed primarily of steel (eighty-nine percent) with the remainder being mostly the fiberglass blades and electronics. The total embodied carbon associated with the manufacture of each turbine is estimated to be 1,650 tonnes. Transport from Quanzhou, China, and Kuantan, Malaysia, is expected to require one ship per turbine, while land transport will require 19 truckloads per turbine at an average load of 50 to 60 tonnes. The total carbon emissions associated with the transport of each turbine from the manufacturer to the Project site is estimated to be 4,929 tonnes.

Electrical Infrastructure

The windfarm will require a considerable amount of electrical infrastructure to permit interconnection with the NSPI power grid. Each of the 22 turbines will generate electricity that will be transformed to 34.5 kV at each site. Collector lines composed of three aluminum conductor steel reinforced (ACSR) overhead cables will connect the turbine locations to the Project substation. It is estimated that four circuits will be required with each circuit connected to five or six turbines. The substation will include one transformer to increase the voltage to 230 kV. The substation will also include additional high and low voltage equipment as well as an operations and maintenance building and perimeter fence. The outlet from the substation will travel via a 230 kV transmission line to intersect with an existing NSPI 230-kV transmission line approximately 20 km away. The interconnection point will include a switching station.

The transmission line will include three ACSR cables supported on wood H frames. Freestanding steel lattice towers may be needed in limited areas with longer spans. Two overhead ACSR shield wires will be included to provide lightning protection and for communication and signalling purposes.

Calculations for the emissions associated with the fabrication and transport of the electrical infrastructure to the Project site are included in Appendix B. When calculating the transportation distances, all components except for concrete and wood are expected to be shipped from Dartmouth, which is approximately 230 km from the Project site. Concrete is expected to be transported from a ready-mix plant in the Antigonish area. Wood poles are expected to be shipped from Truro. Metals used in this infrastructure includes copper (transformers), aluminum (conductor cabling and busbars) and steel. Each transformer will also include mineral oil as a cooling medium. Concrete pads with steel reinforcement are included for all transformers and other major substation equipment, the operations and maintenance building slab, and foundations for each transmission tower. Total carbon emissions associated with the fabrication and transport of the electrical infrastructure is estimated to be 7,101 tonnes.

2.7.4 Operations and Maintenance Phase

During the operation and maintenance phase, any generation of electricity that offsets higher carbon producing sources of electricity will lead to a reduction in the emission intensity of the electricity grid in Nova Scotia, as the electricity produced will be entirely emissions-free, in contrast to other energy sources like coal, natural gas, and oil that are typically associated with emissions during electricity generation. This phase contributes to GHG emissions mitigation, aiming to combat climate change by reducing the concentration of GHGs in the Earth's atmosphere.

Maintenance activities, such as the servicing and replacement of turbine components, vegetation management, and road, power line and substation maintenance, will be the only contributor of GHG emissions. Nordex N163 maintenance manuals suggest that each turbine will require 144 kg of replacement lubricating oil and 40 kg of replacement coolant per year based on a 25-year turbine life. Replacement parts will average 328 kg per turbine per year and are expected to be primarily steel. All replacement parts are expected to be supplied from the Nordex North American distribution centre in West Branch, Iowa. The distance from West Branch, Iowa to the Project site is approximately 2,960 km and it is estimated that one truck per year of spare parts will be sent to the Project site. Lubricants and coolants for each turbine as well as mineral oil for transformers can be sourced through local suppliers in Nova Scotia. Annual emissions associated with the supply and transport of spare parts is 17 tonnes carbon dioxide equivalent (CO_2e). Energy consumption for the operations and maintenance building and other project infrastructure will be supplied from the windfarm output and will have no carbon emissions.

2.7.5 Decommissioning Phase

The sources of emissions during the decommissioning phase are expected to be similar to those during the construction phase but are expected to contribute less emissions. Most of the metal components associated with the Project can be recycled using currently available technology. Fiberglass is currently not easily recycled but advances in recycling technology for this material are ongoing and it is expected that fiberglass recycling will be commonly available prior to the decommissioning phase of this project. Most emissions associated with the decommissioning effort will be linked to the emissions from equipment used to disassemble and haul away the Project components and to restore each site. Decommissioning of this project is likely not to occur until the 2060s by which time most construction and heavy transport equipment will be zero emitting.

2.7.6 GHG Emission Summary

A summary of the calculated total GHG emissions from the construction, transport, and operation of the windfarm as a producer of electricity for supply to the Nova Scotia grid is presented below.

Total Emissions from fabrication and transport – 72,549.8 t CO_2e
Loss of CO_2e sequestration due to land clearing – 310.6 t per year
Emissions due to operations and maintenance – 17.0 t per year

Electricity production in Nova Scotia at present produces an average of 14,800 tonnes of CO_2e per day (NSPI Integrated Resource Plan, 2021). Assuming a zero contribution to GHG mitigation in Nova Scotia, the total emissions associated with the fabrication, transport, construction, operation, and maintenance of the Project for 35 years will be equivalent to approximately five days of electricity generation in Nova Scotia at present. If the full output from the Project was used to offset current electricity production in Nova Scotia, the total life cycle emissions of the Project would be offset in the same 15 days.

2.8 Environmental Management and Monitoring

The Proponent is integrating environmental management approaches and strategies into Project planning and execution to comply with regulatory requirements and to avoid or minimize potential adverse environmental effects. These approaches inform the design and siting of Project components, the avoidance and mitigation of potential effects, and the development of a Project-specific EPP.

A Project-specific EPP will be prepared prior to construction and will incorporate the conditions of the Project EA Approval. Once finalized, the EPP will be made publicly available to the Community Liaison Committee. The EPP will outline known or potential environmental issues to be addressed during construction and operation and maintenance, as well as mitigation measures to be implemented based on site-specific conditions. The EPP will be reviewed by contractors and site personnel prior to initiation of construction activities and will describe the following:

- Personnel roles and responsibilities
- Environmental training and orientation requirements
- Document control procedures
- Regulatory requirements and commitments
- Scheduling and sequencing of activities
- Procedures for working in or near watercourses and wetlands
- Noise, light, and traffic management
- Wildlife management practices
- Protocols for heritage and archaeological resource encounters
- Environmental protection and control measures
- Environmental monitoring and reporting requirements
- Complaints resolution

2.9 Decommissioning

While the Power Purchase Agreement with NSPI has a term of 25 years, the expected lifespan for the Project is up to 35 years if an additional offtake agreement can be secured.

As part of the development permit application for the Municipality of the County of Antigonish, a Decommissioning and Site Reclamation Plan will be submitted for review and approval. Two years prior to Project decommissioning, a Decommissioning and Site Reclamation Plan will be submitted to NSECC for review and approval. If an individual turbine becomes inoperative for a period of two years during the operation and maintenance phase, NSECC will be notified of the Proponent's plan to either recommission or remove the unit.

Decommissioning activities will be similar to construction activities but will focus on the removal of infrastructure to a depth of approximately 1 metre below ground surface (mbgs), including foundations, underground collector lines, and overhead distribution poles. Current industry estimates indicate that approximately 85 to 90 percent of a wind turbine's total mass can be reused or recycled (Canadian Renewable Energy Association, 2021). Major components, including the steel tower, gears, and generator assembly, can be recycled or sold as scrap metal, and the concrete foundation can be recycled.

At the time of this EA, recycling options for turbine blades remain limited due to the predominance of fiberglass composites. However, industry advancements are rapidly expanding available pathways. Recent initiatives demonstrate viable solutions such as material recovery through shredding (Beauson et al., 2016) and repurposing fiberglass in cement manufacturing (Paulsen and Enevoldsen, 2021). For example, Carbon Rivers has developed a process that recovers 99.9 percent pure glass fiber from decommissioned turbine blades, enabling mechanical reuse in new composite products rather than disposal (U.S. Department of Energy, 2023). The European wind sector is also committing to "no-blade-to-landfill" solutions, with manufacturers and researchers working to commercialize fully recyclable blade designs and large-scale recycling programs (WindEurope, 2025). Over the next 35 years, continued innovation is expected to enhance recovery, recycling, and reuse options.

If turbine components cannot be recycled or resold at the time of decommissioning, they will be managed by a qualified contractor and disposed of in accordance with applicable legislation and regulations. Landowners will determine whether access roads are retained or removed as part of site restoration. Restoration will begin following infrastructure removal and will include topsoil replacement and natural revegetation.

Decommissioning will proceed in the following sequence.

- Disconnect the Project from the NSPI transmission system and decommission and remove the substation.
- Re-establish temporary laydown areas to support heavy vehicles, topsoil storage, and equipment at each turbine location.
- Dismantle and remove turbine blades, hubs, nacelles, and tower segments.
- Remove underground electrical infrastructure to approximately 1 mbgs. Remove overhead poles where feasible.
- Remove overhead electrical lines, including the transmission line, unless otherwise requested by NSPI.
- Remove or retain access roads based on landowner agreements. Where roads are removed, affected lands will be restored to pre-construction land use, to the extent practicable and at the discretion of landowners.
- Remove the meteorological (MET) towers unless otherwise requested by the Municipality of the County of Antigonish, landowner, or other stakeholders.

Following removal of infrastructure to 1 mbgs, temporary staging areas and associated decommissioning facilities will be restored using stockpiled topsoil or clean imported fill. The site will be graded, contoured, and restored to appropriate elevations and slopes, followed by natural revegetation.

3 Consultation and Engagement

The Proponent and consultants conducted consultation and engagement as part of the Project planning process. Key rightsholders and collaborators involved in these discussions included the Mi'kmaq of Nova Scotia, regulatory agencies, municipal leadership, and the public. These interactions were aimed at providing information, gathering input, addressing concerns, and adhering to regulatory requirements.

The Proponent acknowledges the importance of conducting engagement processes early and continuously throughout the Project life, in good faith and with transparency and fairness to help establish the foundations of strong, lasting relationships.

3.1 Engagement with the Mi'kmaq of Nova Scotia

The Proponent is deeply committed to meaningful and respectful engagement with First Nations. Guided by the Proponent's parent company RES's Reconciliation Action Plan (2025-2029), the approach emphasizes early and genuine collaboration, recognizing First Nations as essential partners whose stewardship, knowledge, and perspectives significantly enhance Project outcomes. The Proponent actively incorporated principles from the United Nations Declaration on the Rights of Indigenous Peoples, the Truth and Reconciliation Commission of Canada's Calls to Action, and the Calls for Justice from the National Inquiry into Missing and Murdered Indigenous Women and Girls into engagement with Mi'kmaw communities.

The Proponent is guided by the following principles of engagement:

- Listening first – enter engagement processes early and in good faith
- Transparency – sharing clear, timely updates and communication at all stages
- Respect - incorporate Indigenous knowledge into project plans and collaborate on project design and mitigation measures
- Relationships – prioritize relationship building, collaboration, and inclusivity
- Fairness – ensuring accountability and a commitment that projects include tangible economic, employment, and capacity-building benefits

As stated in Section 1.3, the Project is set on Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. The Mi'kmaw communities located closest to the Project are Pictou Landing First Nation approximately 40 km west of the Project and Paqtnkek Mi'kmaw Nation approximately 33 km southeast of the Project. The Proponent is committed to meaningful engagement and collaboration with the Mi'kmaq of Nova Scotia. Regular updates and opportunities for feedback have been and will continue to be provided to the Mi'kmaq during all phases of the Project. The Proponent will work closely with the Mi'kmaw communities to ensure steps are taken to minimize project impacts on the Mi'kmaq, while pursuing economic opportunities and environmental benefits.

Below is a summary of the Proponent's engagement with Mi'kmaw communities:

- In March 2024, information letters were sent to Paqtnkek, Sipekne'katik, Pictou Landing, Millbrook, and Membertou First Nations to introduce the proposed Project under the Nova Scotia Green Choice Program. The letters outlined the Project location, timeline, and capacity, and invited recipients to ask questions or request additional information. Kwilmu'kw Maw-klusuaqn Negotiation Organization (KMK) was included in this correspondence. The letter was followed by a phone call to confirm the correspondence was received.
- In March 2024, Proponent's staff held a meeting with KMK staff to review the proposed project and engagement efforts. This opportunity provided insight into the planning of future engagement and sought input from KMK on how they wanted to be engaged.
- In April 2024, a virtual meeting with Consultation Advisors from the Office of L'Nu Affairs was held to provide a project update and introductions, review the Proponent's Guide, and answer any questions about proper engagement with First Nations communities.
- In May 2024, the Proponent held a virtual meeting with Pictou Landing First Nation's Senior Administrative Officer, Corporate Financial Officer, and Director of Lands and Economic Development to review project details.
- In June 2024, Paqtn'kek and Pictou Landing First Nations each separately signed Memorandums of Understanding (MOUs) with the Proponent. These MOUs provided commitments for economic opportunities, including the option for equity ownership in the project. From the period between June 2024 and February 2025 there was ongoing engagement between Paqtn'kek and Pictou Landing First Nations about the project and discussions related to the economic opportunities were advanced.
- In February 2025, the Proponent advised Paqtnkek and Pictou Landing First Nations that they had been successful in their Green Choice Program bid.
- In March 2025, the Proponent met with the CEO and staff of Bayside Development Corporation to provide project updates, including updated timelines.
- In May 2025, the Proponent visited with staff at Paqtnkek's Bayside Development Corporation offices to meet with staff to discuss the project and how to advance some of the benefits of the MOU.
- In November 2025, a follow-up meeting with Consultation Advisors from the Office of L'Nu Affairs was held virtually. The meeting provided an opportunity for the Proponent

to update the department on the Project and engagements activities. The feedback was positive.

- In early December 2025, the Proponent held a virtual call with representatives from KMK's Energy & Mines and Benefits divisions. This provided an opportunity to update KMK on the EA process and review any concerns they may have. It was also an opportunity for the Proponent to seek input from KMK on how they wish to be involved in the EA process and as the project progresses.
- In December 2025, the Proponent shared the Mi'kmaq Ecological Knowledge Study (MEKS) with KMK. The MEKS was conducted by Confederacy of Mainland Mi'kmaq (CMM) to evaluate the historic and current Mi'kmaq land and resource use within the PDA. The MEKS facilitated dialogue between Mi'kmaw communities and Project collaborators. It involved active engagement with the Mi'kmaw communities, including discussions and interviews with Indigenous Knowledge Holders. Additionally, methods involved historical research and site visits to document traditional ecological knowledge (CMM, 2025). The MEKS is a crucial component for integrating Indigenous perspectives, values, and concerns related to the environment into the Project. The Proponent commits to sharing the MEKS with NSECC for circulation to the Mi'kmaq of Nova Scotia.
- On January 12, 2026, the Proponent met with KMK Energy & Mines Advisor and Benefits Officer as a follow up meeting to further explore how to keep KMK engaged in the project.

A record of further communication and engagement is provided in Appendix C, which summarizes engagement activities to date with five Mi'kmaw communities in Nova Scotia and Mi'kmaw community organizations. This record is organized by date and the nature of contact.

The Proponent is committed to sustainable development that balances economic viability with social and environmental considerations. A key part of this approach is engaging openly and respectfully with First Nations communities to support long term economic participation.

The Proponent is focused on ensuring that First Nations communities and businesses have meaningful access to economic opportunities associated with renewable energy projects. This includes supporting local procurement, contracting, and employment where possible. KMK has provided an Indigenous business directory, which will be used to help identify and connect with Indigenous businesses.

3.1.1 Summary of Questions and Concerns Identified During Engagement

Meetings were held with Mi'kmaw communities and organizations and, through engagement, had the opportunity to ask questions and raise concerns. The Mi'kmaw communities of Paqtnkek and Pictou Landing First Nations, as well as KMK, have indicated they will be reviewing the MEKS and remain engaged during the EA process.

While engagement has been ongoing, the Proponent has not been made aware of any concerns related to the Project.

3.2 Regulator Consultation

An essential aspect of Project planning was consultation with regulatory agencies, including federal, provincial, and municipal levels. This consultation aimed to introduce the Project, the Proponent, and to solicit collaborative feedback on the Proponent's approach to the EA in accordance with regulatory requirements and established protocols. Several key regulatory consultations are described below, and a summary of regulatory consultations completed for the Project is provided in Table 3.1.

3.2.1 Consultation on Environmental Assessment Process

Before conducting spring and summer field programs, a meeting occurred on February 27, 2025, with several provincial government regulators, including a Species at Risk Biologist with DNR, an EA officer with ECC, a Manager of Ecosystems and Habitat with DNR, and a Business Relationship Manager with ECC. Prior to this meeting, a consultation package was provided, outlining proposed field methodologies and associated maps. During the meeting, the methodologies and maps were presented, and input was received from the provincial regulators and the biologist. Based on comments and input, field methodologies were refined prior to field work initiation.

Additionally, to inform spring and summer field programs, the Wildlife EA branch was contacted on January 15, 2025, to request information on data-sensitive species and critical/core habitat that may overlap with the PDA and within a 5 km radius.

On January 23, 2025, CBCL contacted the provincial Old-Growth Forest Coordinator (Peter Bush) to obtain updated Old-Growth Potential Index layer and review field procedures for compliance with the Old-Growth Forest Policy. The field plan was developed with guidance from the Old-Growth Forest Coordinator and assessed with the Old Forest Scoring data as advised. On June 2, 2025, CBCL biologists participated in an in-person refresher training session on old-growth forest scoring procedures with Peter Bush and provincial forest technician Eugene Quigley in the Project area. Resources and guidance documents for old growth scoring were provided and used in data collection and analysis as applicable. On November 20, 2025, clarification was requested and received on continued use of existing infrastructure (roads) adjacent to Old-Growth Forestry Policy polygon for a specific PID within the PDA.

Environment and Climate Change Canada (ECCC) was provided with a Project package with information on the proposed Project, pre-construction survey methodologies, and survey maps on February 14, 2025. Feedback on the consultation package was requested. An EA Analyst with the Environmental Stewardship Branch of ECCC provided updated guidance documents for consideration and comments on the proposed field programs. Comments were incorporated as applicable. On May 27, 2025, location sensitive critical habitat data interacting with a 5 km buffer of the Project area was requested—excluding the transmission line corridor, which had not yet been determined. ECCC Canadian Wildlife Service (CWS) confirmed on June 10, 2025, that there was no Wood Turtle Critical Habitat within 5 km of the provided Project area. In November 2025, an update to the location sensitive critical habitat request was made to ECCC due to changes in the Project layout including potential transmission line routes.

3.2.2 Aviation, Radar, and Communications Consultation

The Proponent conducted consultation with recommended agencies per the RABC & CanWEA Guidelines (2025), with an aim to notify these agencies of the Project and request feedback. Per the guidelines, the following agencies were sent a notification providing turbine dimensions and coordinates to assess potential impact to their operations:

- NAV CANADA
- Department of National Defence (DND)
- Meteorological Service of Canada
- Royal Canadian Mounted Police (RCMP)
- Canadian Coast Guard (CCG)
- Innovation, Science and Economic Development Canada (ISED)

The following stakeholders were also sent a notification regarding the turbine dimensions and coordinates on March 19, 2024. Those engaged in this process include:

- Antigonish County Volunteer Fire Department
- Antigonish Town Fire Department
- Barneys River Fire Department
- Four Valleys Fire Department
- Merigomish District Fire Department
- Bell Aliant
- Seaside Communications
- Eastlink Inc.
- NCS Managed Services Inc.
- Rogers Communication
- CJFX 98.9 FM

Eastlink Inc. and NCS Managed Services Inc. acknowledged receipt and responses from others are outlined in Table 3.1. As indicated, all agencies provided a non-objection letter for the Project, while ISED has indicated the presence of radiocommunication towers near the site (as the towers are privately-owned, they are discussed in Section 3.3. Local Stakeholder Engagement). While these non-objection letters are based on a previous turbine layout, the currently proposed layout has only slightly changed and thus the non-objection determinations from these agencies are not expected to change. For completeness, the Proponent will be submitting a final notification to all these agencies and request a final response prior to the construction phase.

3.2.3 Municipal and Regional Planning Consultation

Since Project inception, the Proponent has engaged with the Municipality of the County of Antigonish and the Eastern District Planning Commission (EDPC), the latter being responsible for applying the County's Land-Use by-law and supporting general siting issues.

Several meetings have occurred, in-person and online, and several email exchanges have also occurred when clarifications were needed on the by-law, or specific questions were asked to the EDPC or the County.

The County and the EDPC have been very supportive of the Project and have collaborated with the Proponent to ensure the Project can advance with its zoning and permitting process. The table below provides a summary of engagement activities with local government, and more detail is provided in the engagement log in Appendix C.

Table 3.1 Summary of Regulatory Consultation

Regulatory Agency	Branch/ Representatives	Dates, Nature of Contact, Feedback
Federal Government		
ECCC	Meteorological Service of Canada	March 19, 2024 – EMI notification letter sent. Receipt of Letter of Non-Objection April 2024.
NAV CANADA	service@navcanada.ca	March 19, 2024 – EMI notification letter sent. Receipt of Letter of Non-Objection April 2024.
Canadian Coast Guard	Vessel Traffic Systems Radar	March 19, 2024 – EMI notification letter sent. Receipt of Letter of Non-Objection March 2024.
DND	Military Air Defence and Air Traffic Control Radars Military Radio Communication Users	March 19, 2024 – EMI notification letter sent. Receipt of Letter of Non-Objection April 2024.
Innovation, Science, and Economic Development Canada	Nova Scotia District Office	March 19, 2024 – EMI notification letter sent. Response received May 2024 stating that at least one turbine is within 1 km of a site with broadcast and other radiocommunication services; further consultation may be required.

Regulatory Agency	Branch/ Representatives	Dates, Nature of Contact, Feedback
RCMP	Wind Farm Coordinator	March 19, 2024 – EMI notification letter sent. March 2024 RCMP response stating they currently have no 'owned' radio towers; however, the surrounding area is receiving radio coverage from TMR2 operated as a leased system through Bell Canada. Recommend coordination with Bell acting on behalf of the RCMP. Bell provided Letter of Non-Objection July 2024.
ECCC	Environmental Stewardship Branch Suzanne Wade Environmental Assessment Analyst	February 14, 2025 - email from CBCL to ECCC requesting input on proposed field survey methodologies. ECCC responded on April 3, 2025, and provided comments and feedback on the field methodologies. Feedback was integrated into the proposed methodologies as applicable.
ECCC	Canadian Wildlife Services Lee Godfrey Priority Species Critical Habitat Specialist Michael Hingston Head, Environmental Assessment, Environmental Protection Operations Directorate - Atlantic Marley Aikens Coordinator, Environmental Assessment	May 27, 2025 - Request for location sensitive critical habitat data interacting with a 5 km buffer of the Project area (without transmission line). June 10, 2025 – CWS indicated no concern for Wood Turtle Critical Habitat within a 5 km buffer of the Project area and a data sharing agreement and transfer of data is not required. November 11, 2025 – Request for an update of location sensitive critical habitat data within 5 km of an updated project layout. November 26, 2025 – CBCL clarified the layout changes that had occurred since the last information request.

Regulatory Agency	Branch/ Representatives	Dates, Nature of Contact, Feedback
Provincial Government		
NSDNR NSECC	Mark McGarrigle, Species at Risk Biologist, NSDNR Tara Crewe, Manager of Ecosystems and Habitat, NSDNR Lynda Weatherby, Business Relationship Manager, NSECC Jeremy Higgins, EA Officer, NSECC	February 14, 2025 – Email to provide a consultation package with information on the proposed Project, field methodologies, and supporting field survey maps. Requested a meeting to present the Project and pre-construction field survey methodologies. Meeting date was set for February 27, 2025. February 27, 2025 – Meeting with NSDNR and NSECC to introduce the Project and discuss planned field programs to support the EA. March 18, 2025 – Meeting minutes sent to NSDNR and NSECC for review and comment.
NSDNR	Tara Crewe, Manager of Ecosystems and Habitat Donna Hurlburt, Manager of Biodiversity Mark McGarrigle, Species at Risk Biologist	Between January and June 2025, the provincial data on location-sensitive species, core habitat within 5 km of the Project, and updated old-growth forest datasets was requested. NSDNR confirmed the presence of Core Habitat for Mainland Moose and other location-sensitive species in the vicinity of the Project. The requested data was provided on June 24, 2025, and used to inform field programs and the environmental assessment.
NSDNR	Peter Bush, Provincial Landscape Forester & Old-Growth Forest Coordinator Donald (Sandy) Sutherland, Regional Crown Forester	Consultation has been on-going since January 2025, with the following key outcomes to date: January to February 2025 – on-going communication between CBCL and Peter Bush regarding information updates to the Old-Growth Policy and Old-Growth Potential Index, and data-sharing agreements, and offer of a spring in-person field refresher for CBCL biologists by Peter. May 2025 – communication between CBCL and Peter to arrange in-person field refresher and discuss methodologies. In-field refresher was scheduled for June 2, 2025 October to November 2025 – Due to layout changes, CBCL confirmed with Peter that no updates were required for the Old-Growth Potential Index layer that was sent to CBCL in February. Peter confirmed

Regulatory Agency	Branch/ Representatives	Dates, Nature of Contact, Feedback
		widening existing roads is permitted under the Old-Growth Policy. January 26, 2026 – Meeting with NSDNR to discuss the proposed transmission corridor options for the Project. January 29, 2026 – A summary of the meeting was provided to NSDNR as well as updated Shapefiles for NSDNR's further review.
Municipal Government		
Municipality of the County of Antigonish	Members of Council, Warden, Senior Administrative Officer, Municipal staff.	The Proponent has engaged with the Municipality on multiple occasions, providing Project updates to Council and staff, and discussing items such as the Community Benefits Agreement. In March 2024, the Municipality provided a letter of support for the Project. In May 2025, the Proponent met with Council in-person to provide a Project update and address any questions from Council and the public. The Proponent has established consistent and open lines of communication with the Council and Municipality throughout the development process.
Eastern District Planning Commission (EDPC)	Director of Planning	The Proponent has engaged with the EDPC on multiple occasions, providing Project updates, discussing the Land-Use by-law, zoning, and discussing Project siting. The EDPC has provided valuable insight for the development phase and has been supportive of the Project.
Town of Antigonish	Mayor, Councillors, Senior Administrative Office	The Proponent has established and maintained an open dialogue with the town. In May 2024, the Proponent met with the Mayor and town staff to review the project and discuss Wrights River Watershed. These concerns were shared with environmental consultants. Councillors and staff have been actively attending community open houses and information sessions.

3.3 Public Engagement

Meaningful public engagement, involving local and provincial organizations, businesses, and members of the public at large, helps build transparency and inclusivity while integrating a broad array of perspectives into a project. For the Project, several methods of public engagement have been used to share information on the Project with the public and to allow the public to ask questions, make comments, and share local knowledge to help inform the Project. These methods include the organization of community engagement sessions, meeting with special interest groups and members of the public, distributing mailed informational pamphlets, posting Project updates in community areas, as well as using digital platforms to share and receive information, such as newsletters, websites, and mailing lists.

The Proponent also established a Community Liaison Committee (CLC), which has met regularly since March 2024. The CLC is composed of 13 members, and have thus far met on the following dates:

- March 19, 2024
- April 23, 2024
- May 21, 2024
- February 25, 2025
- October 22, 2025
- February 10, 2026

The CLC is an opportunity for the Proponent to provide Project updates, and for the community members of the CLC to discuss various issues. The CLC had discussions on local community benefits, including the drafting of a Community Benefits Agreement with the Municipality, Project impacts, and land use.

A Project website (https://www.eiggmountainwind.com) was created under public domain to begin the process of public engagement. The website, still active at the time of EA registration, includes information about the Project such as news and updates, a timeline, information on community benefits, and contact information. The Proponent will maintain this Project website to be updated through the Project lifespan.

A Project-specific email address (EiggMountain.Wind@res-group.com) was created in February 2024 to allow the community to submit questions, comments and concerns directly to the Proponent. This email inbox is actively monitored by the Proponent, and has been shared across various channels, including social media platforms and being actively featured on the Project website, and pamphlets. This email address will remain active throughout the Project lifespan and will enable community members to engage with the Proponent over this duration.

3.3.1 Community Engagement Sessions

Early-stage development activities included two open house sessions with the community, aimed at providing early-stage information on the proposed Project and receiving early feedback. These sessions were held on December 2023 and May 2024.

As the Project entered into late-stage development, as well as into a Power Purchase Agreement with NSPI, two rounds of open house community engagement sessions were held to provide more Project-specific information and study results: one round in late April 2025, and a second occurring in late November 2025.

The open house community engagement sessions were designed to accommodate drop-in visits from community members and provide flexibility for attendees.

The participation and cooperation of private landowners is critical to the development of the Project. In February 2025, the Proponent hosted a dinner at the Arisaig Community Centre for participating landowners to show appreciation for their commitment to the Project. The event also included a presentation on the progress of the Project.

The Proponent believes that projects are more successful when economic benefits are distributed in the community and support local businesses. The Proponent is an active member of the Antigonish Chamber of Commerce. In June 2025, the Proponent attended the Annual Chamber President's Dinner, which included invited faculty from the Nova Scotia Community College Strait Area Campus.

Notices of the April 2025 and November 2025 engagement sessions were widely publicized through social media, local radio, Municipality newsletters, email lists, and poster boards at community gathering spots. The use of multiple communication channels was intended to allow the public to stay informed on updates and enhance attendance.

The primary objectives of these open houses were to introduce the Project and the Project team, share high-level information about the Project, and gather local feedback to inform Project design. This included conveying the key purpose of the Project; outlining the Project scope, tentative timeline, and location; and giving attendees a broad understanding of its potential impacts and benefits to the community. The open houses also provided a platform for the public to raise questions, comments, and concerns related to the Project through face-to-face conversations with the Proponent and Project team and through written feedback forms, which were provided at each meeting. Sign-in sheets were available at the entrance of the conference room, where attendees could provide their contact information and opt to be included on the Project mailing list to receive Project updates, including notifications for open house events. The feedback received during these sessions was collected and documented for further consideration in the Project planning and design, as well as in the EA Registration Document.

In both the April 2025 and November 2025 open houses, the Project team set up poster panels displayed on easels around the conference rooms of each event location. These boards featured visual representations and detailed information about various aspects of the Project, including a general location and layout, environmental considerations, and potential community enhancements. Poster panels are provided in Appendix C.

The open houses were also an opportunity to provides details on direct and indirect benefits resulting from the proposed Project to local landowners and the local community as a whole. Key benefits underlined during the sessions were the following:

- Partner-Landowner royalties for the duration of the wind project, for lands with wind farm infrastructure and transmission line infrastructure
- Municipal tax of over $1.3 M a year for the duration of the operations phase
- Annual allocation to fund community-based projects and initiatives
- Annual fund allocated to the H.M MacDonald School in Maryvale to fund programs and projects
- Five training bursaries for residents of the Municipality to enter in training or education programs that are related to construction or operation of wind energy projects
- Commitments to maximise hiring of local contractors and local workers
- Indirect economic benefits for local services, housing, accommodations, etc.

The dates, times, locations, and number of attendees at each community engagement session are summarized in Table 3.2. The materials presented at the community engagement sessions are included in Appendix C.

Table 3.2 Community Engagement Session Attendance Information

Date/ Time	Engagement Session	Location	Public Attendance Numbers
December 13, 2023	Information Session	Arisaig Parish Community Centre, 5548 NS-245, Arisaig, NS, B2G 2L1	40
May 26, 2024	Open House	Arisaig Parish Community Centre, 5548 NS-245, Arisaig, NS, B2G 2L1	45
April 29, 2025 11am to 2pm	Open House	4 Valleys Fire Hall 3331 NS-245, Maryvale, NS B2G 2L1	45
April 30, 2025 4 to 8pm	Open House	Arisaig Parish Community Centre, 5548 NS-245, Arisaig, NS, B2G 2L1	60
November 25, 2025 4 to 8pm	Open House	Arisaig Parish Community Centre, 5548 NS-245, Arisaig, NS, B2G 2L1	35

3.3.2 Special Interest Group Engagement

Emails were sent by the Proponent to special interest groups starting in December 2023, inviting them to an information session on the proposed project. The Proponent held subsequent face-to-face meetings with special interest groups to gather their initial impressions of the project as well as feedback. The list included the following, while several others were notified and are listed in the engagement log in Appendix C:

- Antigonish Sno-Dogs

- Snowmobilers Association of Nova Scotia (SANS)
- NSPI
- Seniors for Climate Change
- Friends of Eigg Mountain
- Eigg Mountain Trails Association (member of ATV Association of NS, or ATVANS)

Moose Conservation Association of Nova Scotia (MCANS)

The Proponent, along with CBCL, met with MCANS on November 18, 2025 and exchanged email information during the course of the engagement period. MCANS raised concerns with respect to the loss of Mainland Moose habitat as a result of the Project, namely in proximity to a wetland located in the center of the Project Area. MCANS also requested to be informed of when the EA registration document would be available for review.

The Proponent and CBCL provided environmental information on the site as well as outlined the key commitments to siting, such as avoiding watercourses and wetlands to the extent possible, minimizing the AOD for roads and turbine positions, and committing to avoid old growth forests. One turbine of concern for MCANS was an alternate turbine, i.e., a turbine that is not planned to be part of the 22-turbine Project unless major circumstances would remove one of the 22 main turbines. See Chapter 10 - Terrestrial Fauna for more detailed information on the potential for impact to Mainland Moose habitat.

Antigonish Sno-Dogs and Snowmobilers Association of Nova Scotia (SANS)

The Proponent has met with the Antigonish Sno-Dogs and SANS on several occasions, as some snowmobile trails are found on unmaintained K-Class roads in the vicinity of the Project, as well as on private lands where some turbines are proposed. Concerns were raised by the Sno-Dogs, which have mentioned the potential impact to their trails and safety. Following several exchanges, in January 2026 the Proponent offered several commitments to the Sno-Dogs to address their concerns, which are the following:

- Commitment to limit disturbance to the trail system during operations, by limiting plowing of K-Class roads, any other joint-use roads, and using tracked vehicles to access turbines during the winter period
- Commitment to use the Advanced Anti-Icing System (AAIS) package on all turbines, to effectively and significantly reduce formation of ice on the blades
- Commitment to provide educational and awareness materials for snowmobilers, and signage near trails on potential hazards due to ice-shedding or ice-throw from turbines
- Commitment to implement turbine stoppage protocols during detected rotor-icing periods, and securing the perimeter to ensure safety for local users

Consultation with SANS has indicated they would be supportive of the Project and appreciated the Proponent’s commitment to implement and support safety measures, and to provide education and awareness materials.

Eigg Mountain Trails Association (ATVANS)

The Proponent met with the Eigg Mountain Trails Association, member of ATVANS, September 23, 2025. ATVANS raised concerns with respect to the disturbance of, and access to, ATV trails during the construction period. The Proponent provided information on construction activities and potential disturbance to trails. ATVANS has stated their support to the Project and had no further issues for the Proponent. The Proponent is committed to keeping open lines of communication with the group and share project timelines and details as soon as they become available.

NSPI and Atlantic Broadcasters Ltd. (Communication Towers)

As indicated previously and on the constraints mapping, two communication towers are in the vicinity of the Project. The tower owned by NSPI has a point-to-point microwave link which communicates with another NSPI tower south of the site, while the tower owned by Atlantic Broadcasters Ltd. is used for an FM radio station.

A buffer zone was applied to the microwave link as per the RABC & CanWEA Guidelines (2025), and the Proponent repositioned two turbines to avoid the link as an additional precautionary measure. The Proponent also modified the turbine layout to be as far as possible from the FM radio station while complying with Land-Use bylaw provisions. As a result, the closest turbine is now 1.8 km away from the station. Given that this distance is slightly less than the 2 km consultation zone recommended by the RABC &CanWEA Guidelines (2025), the Proponent notified Atlantic Broadcasters Ltd. on several occasions and requested their feedback. The Proponent also commissioned a study by YRH, an engineering consulting firm specializing in telecommunications, which indicated that interference to the FM radio antenna is not expected at this distance. The study results were provided to the owner of the tower. Although several communication attempts were made, the tower owner has not responded to the request for feedback. Given the study results and the significant distance from the tower, the Proponent does not foresee any impact to the functioning of the tower.

Seniors for Climate Change

The Proponent first met with this organization June 4, 2025, and continued to meet with members from this group, including participating in an event September 21, 2025, to raise awareness of the effects of climate change. The Proponent provided information on the Project and its primary activities and answered general questions from the group. Seniors for Climate Change has stated their support to the Project and had no further issues for the Proponent.

Friends of Eigg Mountain

The Proponent met with this organization in April 2025 to review a map of historical sites in the Eigg Mountain area, and to receive an oral history account from a local historian. A follow-up meeting was organized with several members of the group in June 2025. This was an opportunity for the Proponent to provide updates on the Project and timelines, as well as to review the groups plan to implement site markers at historical sites. Friends of Eigg

Mountain has stated their support for the Project and had no further issues for the Proponent.

For a complete list of special interest groups engaged, and records of dates, contact information, and nature of contact that took place prior to registering the EA Registration Document, refer to Appendix C. Engagement with these groups is ongoing.

3.3.3 Summary of Concerns Identified During Engagement

Questions, concerns, and issues were received from the public via email, in-person engagement sessions, public stakeholder meetings, and phone conversations. The main concerns brought forward from the public through these channels of communication are summarized in Table 3.3, along with the Proponent responses and proposed resolutions. Table 3.3 also refers to specific sections of the EA that address these concerns. Per feedback received during the public engagement sessions and various other engagement activities with stakeholders, that the general sentiment around the Project is positive and the community is supportive. The Proponent is committed to on-going engagement and addressing any further issues as they arise.

Table 3.3 Summary of Key Questions and Concerns from Public Engagement

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
Mainland Moose – MCANS, Nature Nova Scotia, members of the public	Concerns regarding Project related impacts to Mainland Moose, habitat connectivity, and other wildlife.	CBCL completed biological field surveys to collect data on the baseline conditions of the PDA, including surveys to target Mainland Moose: pellet group inventory (PGI) transects, winter tracking, and use of camera traps. Habitat suitability modelling was also conducted to identify potential suitable habitat that supports life cycle requirements for Mainland Moose. CBCL also welcomed observations from the public. CBCL observed signs of moose activity in the PDA. The Proponent has modified the road and turbine layout where possible to avoid or reduce potential for adverse effects on terrestrial wildlife and their habitat, including Mainland Moose. For example, the Proponent will be mainly using existing roads through the PDA to reduce the effects of habitat fragmentation. Turbines have also been removed from wetland areas, areas where the presence of high wildlife activity was observed, and intact forest habitats, where possible. Old growth forests in the PDA have been avoided. Additionally, through public engagement, the Proponent designated two turbine locations (A3 and A24) as alternates in response to public concerns related to Mainland Moose. These locations may ultimately not be constructed (Figure 1.1; Appendix A).	Chapter 10, Figure 2.2 and 2.3 (Appendix A)
Mainland Moose - MCANS	Questions from the Moose Conservation Association of Nova Scotia (MCANS) on whether Mainland Moose will be	The Mainland Moose pre- and post-construction monitoring will not use radio collaring to track moose. The use of radio collars on terrestrial wildlife has provided many revolutionary advancements in understanding wildlife behaviour and movement. However, capturing and subduing large mammals to attach collars can be stressful, and at times, even lethal (Montgomery et al.,	Chapter 10

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
	monitored using radio collars.	2023). The use of radio collars on wildlife can also lead to skin irritations and sensitivities. Collar injuries are common in tagged animals (Manville et al., 2024). Non-invasive alternatives to radio collaring can be equally as informative on a species, such as the use of camera traps, PGI surveys, and winter surveys (Manville et al., 2024). These are the methods that were employed to collect data on Mainland Moose and will also be part of post-construction monitoring. These surveys resulted in an informed assessment of the potential environmental effects facing the moose population and have guided mitigation measures.	
Impacts to Wright's River - Town of Antigonish	Concerns expressed about the Project contributing to ice jams and subsequent flooding on the Wright's River in Antigonish.	The Project is not expected to contribute to ice jams and flooding on the Wright's River in Antigonish, based on the 1995 Wright's River Ice Study (C.J. MacLellan & Associates Inc., 1995). The Wright's River was modelled by CBCL in 2022 (South/ West River Flood Mapping). Several locations were modeled for ice jamming near the Town of Antigonish, and no locations of concern were identified near the PDA.	Chapter 17
Use of Crown Land	Questions about using Crown land that has previously been disturbed from industrial forestry activity, as opposed to using undisturbed private lands, to minimize effects on wildlife, etc.	The Project is being developed under the Green Choice Program, which requires wind turbines to be placed exclusively on private lands. The Proponent has made significant effort to minimize impact to private land, namely by minimizing the AOD. Other infrastructure of the Project, such as roads and the transmission line, will be located on Crown land, and in some cases on previously disturbed areas. All confirmed old growth forest stands were avoided.	Sections 1.3 and 2.2, Figure 2.3 (Appendix A)

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
Site Accessibility – Eigg Mountain Trail Association	Questions about site access during construction and operation were raised. Many members of the public and local communities want to continue to access the site for recreational purposes.	For safety reasons, access to certain areas of the Project may be partially restricted during construction. In the long-term, the substation and the operation and maintenance building will be fenced for safety; however, access to the remaining AOD will not be restricted during operation.	Sections 2.4 and 2.6.5.
Impacts to the snowmobile trail system – Antigonish Sno-Dogs	Safety issues associated with potential ice-shedding or ice-throw near turbines, and disturbance to trails on K-Class roads and other local roads	Following several discussions and meetings between the Sno-Dogs and the Proponent in 2025, the Proponent provided a letter of commitments in January 2026 to the association to minimize, as much as possible, any perceived impact to the trail system. The following commitments were made: - Install signage on trails near turbines - Use safety protocols enabling stoppage of turbines upon detection of rotor-icing, and securing the perimeter - Install anti-icing systems (heating) on all turbines, significantly reducing potential for ice formation on blades - Collaborate with the provincial association to produce educational and awareness material related to safety and icing - Commitment to not plow existing trails, and/or use tracked vehicles to access turbines in the winter during operations The letter also summarized information on ice-shedding and ice-throw, noting that the measures to be applied above will significantly reduce rotor-icing and, combined with the limited number of days with icing	Section 17

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
		conditions, virtually eliminate any safety hazard related to ice. It should also be noted that no injury or death has been reported, globally, a result of ice-shedding or ice-throw. More information is provided in Section 13 - Socio-economic Environment and Section 18 - Accidents and Malfunctions, with respect to icing.	
Disturbance during construction - ATVANS	Questions related to limited trail access during construction phase	The Eigg Mountain Trail Association executive inquired about the construction schedule and the potential impact on trail access. The Proponent committed to making this information available to the local association once the Project schedule was finalized.	Section 3
Noise from wind turbines – open house attendees	Questions on level of noise produced from wind turbines	The open house sessions provided detailed information on noise generated by turbines, and noise iso-contour mapping. Generally speaking, noise from operating turbines can be heard from a short distance, but is usually imperceptible a few hundred metres away. Ambient noise generated from the wind itself often masks turbine noise.	Section 5.2.4; Appendix D
Visibility of turbines from nearby residences – local community	Questions on visibility of turbines from inhabited areas	Community members from Pleasant Valley and Arisaig inquired into the visual impact of turbines. These were addressed through the development of visual simulation photos developed for the April and November open houses. These photos were also posted on the Project website.	Section 13; Appendix J
Dust and public road impact during construction - landowners	Landowner questions about the route to be used during construction, and impacts on unpaved public roads	The Proponent shared the preliminary routing plans and timelines, with a commitment to provide an update once the routing was confirmed. The Proponent also provided information related to the obligation and responsibilities encompassed in road-use permits with the province and dust mitigation practices, which would be used during construction.	Section 2

Subject	Questions and Concerns	General Responses/ Solutions	EA Registration Document Reference
Turbine Lifecycle and recycling - open house attendees	Community members from members of the Seniors for Climate Change group poised questions to the Proponent about the plans for the disposal and recycling of used turbine components.	The Proponent provided information on some developments in the technology for recycling of blades and steel towers. The expectation is that great strides will be made over the next 30 years. The Proponent agreed to continuing conversations about ideas to reduce impacts in the post-Project phase.	Section 2.9

4 Assessment Methods and Initial Screening

4.1 Approach

The methods applied to complete the environmental effects analysis for the Project were developed by CBCL in accordance with NSECC's (2025a) A Proponent's Guide to Environmental Assessment, NSECC's (2025b) Nova Scotia Class I Environmental Assessment Checklist, and NSECC's (2025c) Environmental Assessment Supplemental Checklist: Wind Energy Projects.

CBCL's assessment methodology follows a systematic and defensible approach consistent with provincial EA requirements. The approach involves the following key steps:

- Establish the scope of the EA
  - Describe Project (i.e., Undertaking) components and associated activities
  - Identify issues and potential interactions between Project activities and the environment
  - Select Valued Environmental Components (VECs) based on regulatory requirements, guidance, input from stakeholders and Indigenous communities, and known environmental sensitivities
  - Define appropriate spatial and temporal boundaries for each VEC
- Describe the environment as it exists
  - Collect and compile baseline information using desktop review, regulatory data sources, field surveys, professional expertise, and Indigenous and stakeholder input
  - Characterize current environmental conditions within the defined boundaries
- Evaluate environmental effects
  - Identify potential Project–environment interactions by assessing pathways of effects for each Project component and activity
  - Identify mitigation measures to avoid, reduce, or otherwise manage potential adverse effects
  - Characterize residual environmental effects after mitigation has been applied
  - Determine the significance of residual adverse effects using established criteria (e.g., magnitude, duration, geographic extent, reversibility, and likelihood)

The following sections describe the specific approach used to scope and evaluate environmental effects for this Project. Detailed methods for data collection and VEC-specific analysis are provided in each corresponding VEC chapter.

4.2 Scoping

Establishing the scope of the environmental effects analysis defines the extent of the Project to be assessed and the issues raised by regulators, Indigenous communities, and stakeholders. The primary objective of scoping is to identify VECs that are both important and potentially affected by Project activities. For this Project, the scope encompasses all Project components and activities outlined in Chapter 2: Project Description.

4.2.1 Identifying Issues and Selecting VECs

VECs are biophysical, socio-economic, or cultural components that may be affected by the Project and are important to regulators, Indigenous communities, stakeholders, or the public. For this Project, VECs were selected based on the scope and location of the undertaking and consideration of the following:

- Characteristics of the Project and expected construction and operation methods
- Consultation with regulatory authorities
- Applicable guidance, including *A Proponent's Guide to Environmental Assessment* (NSECC, 2025a), the *Nova Scotia Class I Environmental Assessment Checklist* (NSECC, 2025b), and the *Environmental Assessment Supplemental Checklist: Wind Energy Projects* (NSECC, 2025c)
- Community and stakeholder interests and concerns
- Indigenous rights, resource use, and knowledge of the environment
- Nature and extent of potential Project interactions and impacts
- Professional judgement and experience from similar wind projects

4.2.2 Establishing Spatial and Temporal Boundaries

Spatial and temporal boundaries define the geographic areas and time periods within which the Project may interact with a VEC. Environmental effects, including direct and indirect interactions, are assessed within these boundaries. Because Project interactions differ by VEC, boundaries are defined individually for each VEC in this EA considering the following:

- The geographic range and natural variability of the VEC
- The Project zone of influence
- The timing and duration of Project phases
- Seasonal presence or use of the area by the VEC
- The time required for recovery from potential effects
- Administrative or regulatory boundaries
- The availability and quality of existing data

4.2.2.1 Spatial Boundaries

Four spatial boundary terms are used consistently in this EA. Their specific extent varies by VEC to reflect ecological characteristics, potential pathways of effects, and regulatory context.

Area of Disturbance (AOD): The AOD represents the area that will be used to build and operate the Project. It consists of the permanent footprint of the Project, including project infrastructure (e.g., turbine pads, access roads, collector system), as well as temporary construction areas and the associated RoW that will continue to be used for operational activities.

Potential Development Area (PDA): The PDA represents the boundaries within which the AOD may occur. The overall footprint of the Project will be substantially smaller than the extent of the PDA.

Local Assessment Area (LAA): The LAA represents the area where measurable environmental changes may occur during any phase of the Project (construction, operation, maintenance, or decommissioning), including effects from normal activities or potential accidents or malfunctions. The size of the LAA varies by VEC (e.g., the local area for aquatic assessment differs from that for atmospheric effects).

Regional Assessment Area (RAA): The RAA represents the broader area where Project-related effects may overlap with those of other existing or reasonably foreseeable projects, potentially resulting in cumulative effects. The size of the RAA is also VEC-specific. For example, the RAA for aquatic effects includes secondary watersheds overlapped by the PDA, whereas the RAA for wetlands extends 1 km beyond the AOD.

For the visual landscape, shadow flicker, and acoustic environment, modelling was used to determine the Project zone of influence.

4.2.2.2 Temporal Boundaries

Temporal boundaries for this EA encompass all phases of the Project: construction, operation and maintenance, and decommissioning. Where a VEC assessment does not apply to all phases, the relevant temporal scope and rationale are provided.

4.3 Describing the Existing Environment

Baseline conditions within the Project assessment areas are described in Chapters 5 to 14. These chapters characterize the physical, biological, socio-economic, and cultural environments to provide context for assessing potential effects within the PDA and surrounding areas. Baseline descriptions are based on field surveys, modelling, background information, and literature review, and are supported by technical reports and relevant published sources.

4.4 Evaluating Environmental Effects

4.4.1 Identifying Project–Environment Interactions and Pathways of Effects

Potential interactions between the Project and each VEC are identified using a matrix-based process that systematically evaluates which Project components and activities may influence environmental conditions. Interactions are characterized as positive, adverse, or neutral, recognizing the following:

- Some activities may result in both beneficial and adverse effects
- Some may not directly affect a VEC but may create indirect pathways that influence other VECs

Where potential adverse interactions are identified, a detailed assessment is completed. Effects are evaluated qualitatively and, when feasible, quantitatively, using existing data, analytical tools, professional judgement, and applicable regulatory guidance. If an activity is determined not to result in a likely interaction with a VEC, no further analysis is conducted.

4.4.2 Identifying Mitigation Strategies

The pathways of effects used to identify potential environmental interactions also inform the selection of mitigation strategies to avoid or reduce adverse effects on VECs. Mitigation measures are applied when they are technically and economically feasible and are expected to be effective. Established best practices are used where applicable. When adverse effects cannot be fully avoided or reduced, additional measures may be considered, such as habitat offsetting, species relocation, activity timing restrictions, or monitoring.

For each interaction where mitigation is applied, the effectiveness of the measure is evaluated to determine whether residual effects remain. Residual effects refer to the effects on VECs that persist after mitigation is implemented.

4.4.3 Characterizing Residual Environmental Effects

Residual adverse environmental effects are characterized using standard criteria: magnitude, geographic extent, timing, duration, frequency, and reversibility. These criteria describe the nature of the effect that remains after mitigation and provide the basis for determining the significance of the effect.

Magnitude—the amount of change to a VEC relative to baseline conditions

- Minor—the effect is at, or only slightly above, baseline conditions
- Moderate—the effect exceeds baseline conditions but does not exceed established regulatory criteria or published guidelines
- Large—the effect exceeds established regulatory criteria or published guidelines

Geographic Extent—the spatial area within which an effect of a defined magnitude will occur

- Immediate—the effect is limited to the AOD
- Local—the effect extends beyond the AOD but remains within the LAA as defined for each VEC
- Regional—the effect will occur on a regional scale, extending beyond the LAA into the RAA as defined for each VEC

Timing—when the effect occurs relative to the sensitive time period for the VEC

- Low—the effect occurs during low or non-sensitive time periods for the VEC
- Moderate—the effect occurs during moderately sensitive time periods for the VEC
- High—the effect occurs during highly sensitive time periods for the VEC

Duration—the period of time the effect persists (i.e., until the VEC returns to baseline conditions)

- Short-term—the effect occurs only during construction or for 0 to 2 years during operation
- Medium-term—the effect occurs through the construction phase and into the operation phase or for 2 to 10 years during operation
- Long-term—the effect persists for more than 10 years

Frequency—how often the effect occurs during the Project or a specific Project phase

- Once—the conditions or activities causing the effect occur once
- Intermittent—the conditions or activities causing the effect occur periodically
- Continuous—the conditions or activities causing the effect persist continuously throughout the Project phases

Reversibility—whether a VEC will recover from an effect and return to baseline conditions

- Reversible—the effect is feasibly reversible
- Irreversible—the effect is permanent

4.4.4 Determining Significance

The significance of residual adverse environmental effects is determined by comparing their characterized attributes to established benchmarks, where available. Applicable regulatory standards, guidelines, targets, or objectives are used when appropriate. Where explicit benchmarks are not available, reasoned argument and professional judgment are applied, supported by recognized scientific information and the residual effects characterization.

4.5 Initial Screening and VEC Selection

The Project construction, operation and maintenance, and decommissioning activities were screened against the VECs to identify potential Project-VEC interactions. VECs requiring further assessment were selected based on this screening process. The potential interactions are summarized in Table 4.1, and VEC-specific assessment and evaluation are provided in the chapters that follow.

The purpose of the Project is to generate renewable electricity that supports Nova Scotia's legislated climate goals, including phasing out coal, achieving 80 percent renewable energy by 2030, and reducing provincial GHG emissions. Selected under the provincial Green Choice Program, the Project will supply clean power to large public and institutional energy consumers, while also supporting local economic development and community climate goals. Based on operational activities, there are VECs that are expected to be positively affected that do not require in-depth assessment for mitigation measures:

- Climate
- Economy

Based on the environmental setting and Project activities, pathways to possible adverse effects have been identified for some components of the environment. The assessment is focused on those VECs on which the Project may have adverse effects:

- Air Quality
- Ambient Light
- Acoustic Environment
- Topography and Landform
- Bedrock and Soils
- Groundwater
- Aquatic Environment
- Flora
- Wetlands
- Terrestrial Wildlife
- Bats
- Birds
- Land Use and Value
- Visual Landscape
- Communication and Radar Systems
- Transportation
- Recreation and Tourism
- Human Health
- Archaeological Resources
- Indigenous Cultural Resources

Table 4.1 Potential Project-Environment Interactions and VEC Selection

Project Activities	Environmental Components																						
	Atmospheric Environment				Geophysical Environment			Biophysical Environment						Socio-Economic Environment								Heritage and Cultural Resources	
	Climate and Weather	Ambient Light	Air Quality	Acoustic Environment	Topography and Landform	Bedrock and Soils	Groundwater	Aquatic Environment	Flora	Wetlands	Terrestrial Wildlife	Bats	Birds	Population and Economy	Land Use and Value	Visual Landscape	Electricity and Other Utilities	Communication and Radar Systems	Transportation	Recreation and Tourism	Human Health	Archaeological Resources	Indigenous Cultural Resources
Construction																							
Site Preparation	-	-	X	X	-	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	X	X	X
Access Road Construction and Modification	-	-	X	X	-	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	X	X	-
Material and Equipment Delivery and Storage	-	-	X	X	-	-	-	-	X	X	X	X	X	X	-	-	-	-	X	X	X	-	-
Infrastructure Installation	-	X	X	X	-	-	-	X	-	X	X	X	X	X	-	X	-	-	-	X	-	-	-
Restoration of Temporary Areas	-	-	X	X	-	-	-	X	-	-	X	X	X	X	-	-	-	-	-	X	X	-	-
Testing and Commissioning	-	X		X	-	-	-		-	-	X	X	X	X	-	-	-	-	-	-	-	-	-
Operation and Maintenance																							
Turbine Operation and Maintenance	X*	X	-	X	-	-	-	-	-	-	X	X	X	X	X	X	X	X	-	X	X	-	-
Road Maintenance	-	-	X	X	-	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	X	X	-
Power Line and Substation Maintenance	-	-	-	X	-	-	-	X	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-
Vegetation Management	-	-	X	X	-	-	X	X	X	X	X	X	X	X	-	-	-	-	-	-	X		X
Safety and Security	-	X	-	X	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
Decommissioning																							
Removal of Infrastructure and Site Restoration	-	X	X	X	-	X	X	X	X	-	X	X	X	X	-	-	-	-	X	X	X	X	X

X = Potential interaction
- = No meaningful interaction
*= Interaction with positive effect that does not require in-depth assessment for mitigation measures

5 Atmospheric Environment

5.1 Overview

The atmospheric environment comprises weather and climate, air quality, ambient light, and acoustic conditions.

Biophysical and socio-economic conditions are closely tied to components of the existing atmospheric environment, effects to which could thereby effect changes to other VECs. Weather conditions such as precipitation and temperature shape features of habitat such as the aquatic environment, wetlands, and vegetation. Skyglow and surrounding noise levels are aspects of habitat and behaviour for terrestrial wildlife, bats, birds, and the human environment. Air quality is a cumulative measure of pollutants in the air from emissions and particulate matter that can settle to our earth and waters, influence climate, and affect health for all forms of life. Interactions of the Project with the atmospheric environment are therefore considered for many VEC assessments that follow in this document.

The Project may interact with the atmospheric environment via several pathways during construction, operation and maintenance, and decommissioning. The overall purpose of the Project is to generate energy that does not produce carbon emissions and will offset the use of fossil fuels and generating carbon emissions savings. The replacement of power plants that use conventional fossil fuels with wind energy projects ultimately results in lower emissions of fine particles that pose risks to human health (Bošnjaković et al., 2024).

Effects, mitigation measures, and residual impacts to atmospheric environment as a result of the Project are outlined in this chapter. Mitigation measures to minimize adverse effects will be further developed in a Project-specific EPP prior to construction.

5.1.1 Regulatory Context

Assessment of the atmospheric environment considers provincial and federal regulations, policy, and guidelines:

- Nova Scotia *Environment Act*
- Nova Scotia Air Quality Regulations
- Canadian Ambient Air Quality Standards (CAAQS)
- *Environmental Assessment Supplemental Checklist: Wind Energy Projects* (NSECC, 2025)

- Minimum Planning Requirements Regulations (NS Reg. 51/2025)
- *Guidelines for Environmental Noise Measurement and Assessment* (NSECC, 2023)
- *Health Canada Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise* (Health Canada, 2016)

5.1.2 Boundaries

The AOD represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. The PDA represents the boundaries within which the AOD may occur. The LAA and RAA boundaries are defined as follows for each subcomponent of the atmospheric environment VEC.

Air Quality: According to the United States (US) Environmental Protection Agency (2014), influences on air quality are generally limited to a range of 150 to 180 m downwind from the vicinity of heavily travelled roadways or along corridors with significant trucking traffic or rail activities. A conservative boundary of 500 m surrounding the PDA has therefore been selected as the LAA for air quality. The Project is expected to affect air quality in the LAA for the lifetime of the Project, predominantly during activities that involve earthworks. The RAA is within the limits of Nova Scotia's northern air zone assessed in the AQMS by ECCC through monitoring at Pictou.

Ambient Light: Effects from anthropogenic light depend on properties of the light source and height as well as atmospheric conditions. An LAA of 1 km around the PDA has been selected for effects to light levels to the surrounding receptors; the RAA is limited to 5 km to consider turbine lighting that meets Standard 621 of the Canadian Aviation Regulations.

Acoustic Environment: An LAA of 2 km from turbines and the transmission line RoW has been selected as per the *Environmental Assessment Supplemental Checklist: Wind Energy Projects* (NSECC, 2025) as well as Health Canada guidance (Health Canada, 2016). An RAA of 2 km combining both the Project LAA and those of the adjacent Glen Dhu Wind Project was completed. It is expected that sound levels in the LAA will be affected for the lifetime of the Project.

5.1.3 Assessment Methodology

The description of the existing environment is based primarily on data collected by regional air quality and meteorological monitoring stations as well as online scientific reports:

- ECCC Canadian Climate Normals
- Nova Scotia Ambient Air Quality Data Reports
- Nova Scotia Ecological Landscape Analysis

A noise assessment was completed for the Project by Nortek Resource Solutions Inc. (Nortek) and is presented in Appendix D. Nortek (2026) established a study area for the noise assessment as a 2 km buffer around the AOD.

Potential noise receptors were selected using publicly available satellite imagery and a field reconnaissance survey that identified whether the receptors were habitable was conducted. All non habitable receptors (including garages and sheds) were not included in modelling. Receptors for which the owners have agreements with the Project developer were considered participating receptors and were excluded from modelling. A total of 31 receptors were included in noise modelling. Nortek (2026) applied a baseline acoustic value recommended by Health Canada (2017), where 35 dBA is considered the average baseline acoustic level in quiet, rural areas during the night.

Computer modelling was conducted to predict noise levels from operation of the Project and the cumulative effect of the operation of the Project combined with nearby Glen Dhu and Maryvale wind developments. Details on the computer noise model inputs are provided in Nortek (2026) and consisted of source emissions from Project turbines, substation transformers, and environmental conditions known to influence noise propagation (ground cover, temperature, humidity, wind conditions).

5.2 Existing Environment

5.2.1 Climate and Weather

The Project is located within the Nova Scotia Highlands ecoregion, which is composed of both low-lying plateaus and lower-level highlands ranging in elevation from 120 to 300 m from Chignecto Bay to Cape Breton Island (Ecological Stratification Working Group, 1995). The ecoregion is characterized by warm, rainy summers and mild to cold, snowy winters. The Project lies within the Pictou Antigonish Highlands ecodistrict—an elevated triangle separating the Northumberland Lowlands ecodistrict of Pictou County from the St. Georges Bay ecodistrict lowlands of Antigonish County that rises to a maximum elevation of 300 m at Eigg Mountain (Nova Scotia Department of Lands and Forestry, 2019).

The nearest weather station to the PDA that records Canadian Climate Normal data is the Collegeville Weather Station, approximately 22 km south of the nearest turbine (ECCC, 2025). The station collects data from heights of 69 and 76.2 m, which are lower than that of the turbine locations where the elevations range from approximately 260 to 310 m. Climate Normals, based on the most recently available collection of meteorological data from 1991 to 2020, indicate that the average annual temperature at Collegeville was 6.3°C. Daily minimum temperature is lowest in the month of February, at -10.6°C, and highest in the month of July at 24.5°C. The extreme temperatures for that 30-year period were recorded as 36.0°C (July 2012) and –33.0°C (January 1993). The average annual precipitation at that location was 1,122.0 millimetres (mm), with a daily extreme in the form of rainfall being 77.5 mm in June 1994. The lowest historical daily temperature recorded at this station over the entire period of record (1917 to present) was -37.2°C on February 9, 1934, and the highest was 38.3°C on August 19, 1935.

According to the Canadian Wind Atlas, annual mean wind speed at 80 m elevation near the centre of the turbine layout is 8.11 m/s, having a wind energy of 450.6 W/m^2 (ECCC, 2016).

5.2.2 Air Quality

Nova Scotia shares air quality monitoring data with the federal government to inform the Air Quality Management System (AQMS) across Canada. The Canadian Council of Ministers of the Environment (CCME) assesses provincial values against the CAAQS (CCME, 2024) for fine particulate matter ($PM_{2.5}$), ground-level ozone, sulphur dioxide (SO_2), and nitrogen dioxide (NO_2). The CAAQS are meant to work progressively toward improving the air quality of Canada and are reviewed every five years. The evolving CAAQS for 2020 to 2030 are presented in Table 5.1.

Table 5.1 Canadian Ambient Air Quality Standards

Pollutant	Averaging Time	Standards (concentration)		
		2020	2025	2030
$PM_{2.5}$	24-hour (calendar day)	27 µg/m^3	-	23 µg/m^3
$PM_{2.5}$	Annual (calendar year)	8.8 µg/m^3	-	8.0 µg/m^3
Ground level Ozone	8-hour	62 ppb	60 ppb	Under review
SO_2	1-hour	70 ppb	65 ppb	Under review
	Annual	5.0 ppb	4.0 ppb	Under review
NO_2	1-hour	60 ppb	42 ppb	Under review
	Annual	17.0 ppb	12.0 ppb	Under review

$PM_{2.5}$: Particulate matter having a size of 2.5 micrometres (µm) or less
ppb: parts per billion
µg/m^3: micrograms per cubic metre

Nova Scotia is divided into four air zones; the Project is located in the northern air zone, where ambient air is monitored by the province at Pictou. The northern air zone contains a population of 0.2 million people, extending across the entirety of the northern shore of mainland Nova Scotia and to a southern extent that includes the communities of Sherbrooke and Truro (Health Canada, 2023).

Based on the 2022 data (which is the most current at the time of document preparation) the CAAQS were met in all four air zones in Nova Scotia (NSECC, 2024). With a goal to prevent deterioration of ambient air quality, two parameters in the northern air zone have been categorized as "yellow" under the CCME's Air Zone Management System, reflecting an aim to further reduce ground-level ozone and $PM_{2.5}$ annual concentrations. Although ground-level ozone values have risen from 46 to 51 ppb since 2017, the 2022 value is still below the 2025 target standard of 60 ppb. The $PM_{2.5}$ annual levels in the northern zone have decreased from 5.7 to 4.8 µg/m^3 since 2017, below the 2020 target of 8.8 µg/m^3.

5.2.3 Ambient Light

The LAA is predominantly within a mountainous treed area with some exposure to artificial light sources. Recreational vehicles use headlights to travel the roads and trails at night through the year and one recreational shelter building near Vincents Lake has an outdoor light. There are two cellular transmission towers present in and adjacent to the PDA, whose lights are visible from some vantagepoints on Route 245 and Connors Mountain Road.

In the PDA, LAA, and RAA, ambient light along Route 245, and the smaller roads that access it, is typical of rural areas. Beyond Antigonish Town limits, there are no streetlights present along Route 245, nor the smaller roads such as Pleasant Valley Road or Connors Mountain Road, although headlights from rural traffic can frequently be observed. In the LAA and RAA, lighting on the turbines at Glen Dhu wind farm west of the Project are visible from some vantagepoints on Route 245 and Connors Mountain Road within the LAA and PDA, as are the cellular towers. During summer months, full foliage in the mountainous terrain limits the ambient light in the area.

The southern portion of the PDA, which includes three options for the proposed transmission line corridor, extends from predominantly forested area over land cleared for agricultural, residential, and industrial use and over Highway 104 (TransCanada Highway). In this section of the PDA, sources of ambient light include roadside lighting, headlights from vehicle traffic, and lighting at agricultural, residential, and industrial properties.

5.2.4 Acoustic Environment

The area within the LAA is considered to match the Health Canada description of being a quiet rural area where natural noise sources tend to dominate, having baseline sound levels of 35 dBA during nighttime periods (Health Canada, 2016). During daytime hours, natural sounds such as songbirds, well as intermittent anthropogenic noise from industrial and recreational activities, are typical of the acoustic environment within the LAA.

Industrial forestry operations occur in the PDA and LAA, and large vehicles associated with forestry frequently use the roads in the AOD. In addition, there are active quarries in the proposed transmission line LAA that currently produce noise, as well as road traffic on Trunk 4 and Highway 104. Existing quarries in the LAA and RAA are further described as part of the existing land use in the socio-economic environment (Chapter 13). Snowmobiles and ATVs regularly use trails and roads in the AOD that extend through the PDA, and beyond to the LAA and RAA.

5.3 Effects Assessment

5.3.1 Potential Effects and Mitigation

Direct and indirect effects of the Project on components of the atmospheric environment could occur through several interconnected pathways. During construction, operation and maintenance, and decommissioning, vehicular emissions, fugitive dust, and noise are expected to be produced—which will affect air quality. Ground lighting of the Project and aerial lighting on turbines will contribute to ambient light in the AOD and LAA. There will also be effects on the acoustic environment during all phases of the Project when people and vehicles are on site and turbines are in operation.

Project activities can affect the atmospheric environment as indicated in Table 5.2; identification of these potential effects does not consider the implementation of mitigation measures described herein.

Table 5.2 Potential Environmental Effects of the Project on the Atmospheric Environment

Project Activity	Potential Environmental Effects		
	Change in Air Quality	Change in Ambient Light	Change in Acoustic Environment
Construction			
Site Preparation	X	-	X
Access Roads Construction and Modifications	X	-	X
Material and Equipment Delivery and Storage	X	-	X
Infrastructure Installation	X	X	X
Restoration of Temporary Areas	X	-	X
Testing and Commissioning	-	X	X
Operation and Maintenance			
Turbine Operation and Maintenance	-	X	X
Road Maintenance	X	-	X
Power Line and Substation Maintenance	-	-	X
Vegetation Management	X	-	X
Safety and Security	-	X	X
Decommissioning			
Removal of Infrastructure and Site Restoration	X	X	X

X = Potential Interaction
- = No Interaction

5.3.1.1 Air Quality

Air quality in the LAA will be affected, primarily by dust emissions during construction activities for clearing, road construction and maintenance, and equipment delivery traffic. Potential Project effects on air quality can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on air quality will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Onsite workers will visually monitor the construction site and report dust concerns to the site inspector.
- Dust control measures (e.g., application of water) will be used during periods of significant dust generation.
- Use of petroleum product for dust control will be prohibited.
- Good housekeeping practices will be employed to prevent dust from leaving the AOD.
- Disturbed areas where soil is exposed will be reestablished as soon as the season permits and in accordance with contract specifications.
- Idling of heavy machinery and vehicles will be minimized as practicable.
- Heavy machinery and vehicles will be regularly checked and maintained for optimal operational emission levels.
- Speed limits will be enforced.
- Drop heights will be minimized when unloading trucks.
- Construction activities during high winds will be avoided whenever possible.
- No burning of cleared or grubbed materials will be permitted on site; surplus clearing and grubbing materials will be hauled off site for disposal.
- A Complaint Resolution Plan will be developed prior to construction.

5.3.1.2 Ambient Light

Activities associated with lighting of the AOD will occur through the life of the Project.. Construction will be conducted seven days per week. During operation and maintenance, turbine towers will require lighting for the safe navigation of aircraft during Project operation. Some site lighting, such as that for the substation and operation and maintenance building, will also be needed for the duration of the operation and maintenance phase. Lighting will be limited to safety and security needs during construction and operation. During construction and maintenance, if lighting on site is needed, spill-over light will be minimized and be side-shielded and directed downward, where possible. Construction activities will be limited to the daylight hours, when possible. Some nighttime construction activities are expected, and lighting will be used for human safety. Turbine and transmission line lighting levels will be minimized, while meeting Transport Canada's requirements for aeronautical safety. With these mitigations, change to ambient light levels is expected to be low for the lifespan of the Project.

Potential Project effects on ambient light conditions can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on ambient light will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Nighttime construction activities will be minimized.
- Onsite lighting will be installed to the minimum required for safety.
- Where onsite lighting is installed near the perimeter of the LAA, open areas will be avoided where possible.
- The fewest number of site-illuminating lights possible will be used in the PDA. Minimize lighting to the extent possible, while maintaining Transport Canada requirements.
- Site lighting will be shielded downward to minimize light pollution to the surrounding environment and adjacent habitat, without compromising safety.
- Movement detection lighting will be used on office structures, doors to turbines, gates, etc., which will turn off when not in use.
- A Complaint Resolution Plan will be developed prior to construction.

5.3.1.3 Acoustic Environment

The primary noise sources associated with construction will include trucks and other vehicles used to transport workers and materials to the PDA, backhoes and graders, cranes, and smaller equipment such as welding units. Blasting is expected as part of access road construction or upgrades, as well as turbine foundations. During operation and maintenance, the primary noise emissions are expected to occur through operation of the turbines. The modelling results (Appendix D) predict sound levels ranging from 36 dBA to 38 dBA, except for a unique receptor located in a wilderness area, which predicted a sound level of 40 dBA. which is the threshold of acceptable noise.

In combination with natural and non-industrial anthropogenic sources, Nortek (2026) determined that the Project operation will comply with permissible sound levels outlined in the provincial noise guidelines in both the LAA and RAA (Appendix D).

Potential Project effects on acoustic environment can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on acoustic environment will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Nearby residents will be notified about scheduled noisy activities (e.g., blasting) to reduce disruption.
- A Blasting Management Plan will be developed.
- Blasting will be conducted by a certified blaster.
- Blasting patterns and procedures that minimize shock or instantaneous peak noise levels will be used, where possible.
- Blasting activities will be limited to that which is necessary.
- Blasting will not occur near fuel storage facilities.
- Construction will occur during daytime hours and will be restricted at night, when possible.
- Work areas and travel paths will be designed to reduce the amount of time that equipment must operate in reverse to reduce the use of back-up alarms.

- Noise-reducing technologies will be used to minimize construction noise.
- Construction equipment and vehicles will be kept in good working order and loud machinery will be muffled when possible.
- A Complaint Resolution Plan will be developed prior to construction.

5.3.2 Residual Effects

Effects on the atmospheric environment are expected to be moderate. With the exception of particulate matter, activities will not increase air quality parameters in the LAA to levels above CAAQS. Effects to air quality will be temporary, occurring predominantly during construction, but will occur intermittently during operation and maintenance activities and temporarily during decommissioning. Lighting of the footprint will be the minimum required for safety of the operations crew, and wooded areas will absorb most ground light diffusion in the LAA. Aerial light diffusion will be minimized while meeting the minimum standards in the Canadian Aviation Regulations for turbine lighting (i.e., Standard 621, Section 12.2 and Figure 5.3, Appendix A) (Transport Canada, 2025). The noise assessment predicts that effects will be minor. Project construction and operation is not expected to result in unacceptable noise effects in the LAA or the RAA. With planning and management of construction activities, the adverse effects on atmospheric environment are not expected to be significant. Overall, the Project contribution to installed renewable energy in Nova Scotia will have positive environmental effects for the air quality of the RAA; effects to ambient lighting and the acoustic environment will be reversed upon decommissioning of the Project.

5.4 Monitoring

Aside from general observations and mitigation during work activities, monitoring is not proposed. A Complaint Resolution Plan will be developed prior to Project commencement. The plan will include noise monitoring methods should an operational noise related complaint require investigation by the Proponent.

6 Geophysical Environment

6.1 Overview

The geophysical environment comprises the topography (both natural and artificial) and subsurface resources, such as soil, sediment, bedrock, and groundwater. Surficial geology and topography shape the bioterrain of the ecological environment and are therefore closely related to other VECs assessed in this EA. Changes in topography can affect surface water flow, effecting change on the aquatic environment, wetlands, and groundwater recharge. Soil and bedrock matrices influence dust formation and erosion. Changes in groundwater can affect the surrounding ecosystems (aquatic and terrestrial) and socio-economic environment, namely human health.

That the Project may interact with the geophysical environment via several pathways during construction, operation and maintenance, and decommissioning. Site works in the PDA will involve the reshaping of the surface during construction that will affect the site's topography and run-off. Existing roads will be used to the extent possible, but excavation and blasting may be used where needed to achieve road grades suitable for construction and transportation of components, and/or preparation of turbine foundations. During decommissioning, while surface infrastructure will be removed (with the exception of access roads where landowners opt for retainment), the PDA will be restored to an approximate depth of 1 mbgs below which remaining structural components will remain in place.

Effects, mitigation measures, and residual impacts to the geophysical environment have been outlined in this chapter and will be further developed in a Project-specific EPP prior to construction to minimize adverse effects.

6.1.1 Regulatory Context

Assessment of the geophysical environment considers characteristics of the existing environment and measures effects using provincial and federal legislation and guidelines:

- Nova Scotia *Environment Act*
- Nova Scotia *Water Resources Protection Act*
- James River Watershed Protected Water Area Regulations (NSECC, 2006)
- Sulfide Bearing Material Disposal Regulations NS. Reg. 57/1995
- Health Canada Guidelines for Canadian Drinking Water Quality (2022)

- The CCME Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME, 2007)

6.1.2 Boundaries

The AOD represents the Project footprint and the maximum limit of potential direct physical disturbance within the PDA. The PDA represents the boundaries within which the AOD may occur. The LAA and RAA boundaries are defined as follows for each subcomponent of the geophysical environment VEC.

Bedrock and Soils (Quantity and Quality): Physical changes in bedrock and soil characteristics will be limited to the AOD for the lifetime of the Project; some infrastructure will remain after decommissioning.

Groundwater (Quantity and Quality): An LAA of 1 km outside the PDA boundary has been established (Figure 6.1, Appendix A).

6.1.3 Assessment Methodology

The description of the existing environment is based primarily on available online data sources:

- Ecological Land Classification for Nova Scotia
- Nova Scotia Geoscience Maps, Reports, and Data
- Nova Scotia Water Resource Reports and Maps
- Nova Scotia Well Logs Database
- Nova Scotia Groundwater Atlas
- Eigg Mountain Wind Project Geotechnical Investigation Report (WSP, 2025)

Information from well records from the Nova Scotia Well Logs Database within 1 km of the AOD are summarized in Table 6.1. There are 81 wells on the Nova Scotia Groundwater Database (NSECC, 2023) within the LAA. The total number of wells is likely closer to the number of civic addresses (234, assuming one well per address); however, the provincial database is not a complete record of the wells drilled in the province.

6.2 Existing Environment

6.2.1 Topography and Seismicity

Nova Scotia is part of the Appalachian region. The Project lies primarily within Ecodistrict 330: Pictou Antigonish Highlands Ecoregion. The Hollow Fault and Browns Mountain Fault extend in a northeast-southwest direction across the Ecodistrict, overlapping the PDA, with several smaller faults extending perpendicular to both (DNR, 1974). The Hollow fault is known as a strike-slip fault, where the topography was created through rock strata displacing horizontally, parallel to the fault line. In contrast, the Browns Mountain fault is a Normal Fault, where bedrock displacement is primarily vertical, resulting in a raised and lowered regions of the bedrock following displacement. The region is not located near the edges of tectonic plates and is outside of any seismic zones and is therefore considered low risk for major earthquakes (Natural Resources Canada (NRCan), 2019). A review of seismic data was completed by WSP (2025) as part of geotechnical reporting, and indicated that seismic hazards in the site area are very low, with significant events being very rare.

Within the PDA, elevations range from approximately 30 to 320 masl. Roadways are limited primarily to single lane roads as well as dirt and gravel roads through the highlands. Where the PDA crosses Highway 104, there are several homes as well as some farmed lots. Streams and rivers intersect the PDA at several locations. There are two quarries north of Highway 104 within the PDA boundary, each of which are of limited size (approximately 40,000 m^2 or less).

6.2.2 Bedrock and Soils

The ecodistrict's bedrock geology comprises sedimentary, igneous, and metamorphic rock deposited between the Ordovician and Carboniferous periods, and late Pre-Cambrian sedimentary rocks (NSDNR, 2006). The interlayered sedimentary and volcanic rock has been folded, faulted, and intruded by several plutonic assemblages (DNR, 1974). Granite, gabbro, diorite, siltstone, wacke, and conglomerate are typical.

Interactive mapping provided by the province is based on that originally produced by J.D. Keppie, 2000 (NSDNR, 2006). Most of the PDA is underlain by the Georgeville Group, comprising primarily sedimentary rock, with limited areas of intruded igneous rock and metamorphosed features. Several formations within the Georgeville Group overlap the PDA. The James River Formation consists of deep-water sediments including conglomerate, mudstone, wacke, and minor basalt. The Maple Ridge Formation consists of deep-water mudstone, siltstone, and turbiditic wacke (Murphy, J.B., Keppie, J.D., 1987). Southern sections of the PDA are underlain by Horton and Windsor group rocks, primarily mudstone, sandstone, and gypsum with some evaporites including halite and anhydrite.

A variety of glacial sediments deposited during the last glaciation intersect the PDA. Stony till derived from local bedrock is deposited across much of the northern sections, in addition to colluvial deposits formed by glacial meltwater channels along streams and rivers. Bedrock is exposed to the south of the highlands, and further south still in the PDA is a larger section of glaciofluvial deposits of stratified and graded sand and gravel.

Soils in the PDA consist mostly of Cobequid soils—a stony, dark brown, gravelly loam underlain by a dark brown gravelly loam (Boreas, 2022). These soils are described as well drained, loose, and non-plastic.

Geotechnical borehole drilling work completed by WSP (2025) indicated subsurface conditions encountered at borehole locations were generally consistent with mapping, revealing glacial till overlying sedimentary bedrock. Bedrock depths were generally shallow, ranging between 0.6 mbgs and 8.3 mbgs. Groundwater levels recorded in each borehole at least 24 hours after drilling was completed were also shallow, varying between 0.3 and 6.5 mbgs.

6.2.3 Subsidence and Sinkholes

The PDA lies primarily in areas of low-risk karst but has an area to the south that overlaps high karst risk (NSDNR, 2019). High-risk areas can be associated with subsidence and sinkholes where soluble evaporite or carbonate rocks can dissolve (NSDNR, 2021). Sinkholes have appeared in areas characterized as high-risk west of Antigonish, which overlays bedrock from the Windsor Group (Bridgeville and Gays River Formations). Evaporite bedrock from the Windsor group has been demonstrated to show a high karst risk and the development of sinkholes. Voids detected in boreholes during geotechnical investigation near Route 321, approximately 140 km west of the LAA (similarly in Windsor formation), suggest a potential risk to critical infrastructure such as portions of Highway 104 (GHD, 2019). There are three sinkholes mapped within the PDA along the railroad that runs south of Brierly Brook Road, and two further west just outside the PDA. All the turbine pads will be built in areas of low-risk karst; however, limited sections of the proposed transmission lines are in areas of high-risk karst, and existing access roads intersect areas of medium-risk karst (Figure 6.3, Appendix A).

6.2.4 Groundwater

Groundwater flow is influenced by the primary porosity (pore spaces) and secondary porosity (fracture occurrence) in the bedrock. Sedimentary rock is typically highly fractured, and groundwater flows through pore spaces in the rock and along bedding planes and fracture zones. Igneous and metamorphic rock relies on faults and fractures to transmit water. Groundwater flow through clastic sedimentary rock in the Antigonish highlands (Georgeville Group) most likely occurs primarily along fractures, faults, and contacts between geologic units. Groundwater flow through evaporites in the lowlands to the south (Windsor group, Horton group) is likely focused along fractures augmented by dissolution of rock, and yield from wells drilled here may benefit from the hydraulic head buildup in the highlands to the north. There are several geologic contacts in the region, associated with both strike–slip and thrust faults, which likely provide preferential groundwater flow pathways. Locally, groundwater flow is likely focused along minor faults and fractures within and between formations. Glaciofluvial deposits to the south of the PDA may support shallow groundwater flow systems; however, borehole data from these deposits are limited.

6.2.4.1 Watersheds and Groundwater Flow Divides

The PDA is divided north-south by a watershed boundary that directs flow north to streams and brooks that discharge to the Northumberland Straight, and south into the Rights River watershed and West River watershed, which drain east into Antigonish Harbour (NSE, 2011). Groundwater flow patterns are likely influenced by the variety of geologic formations and rock types present within the assessment area.

Groundwater–surface water interactions are influenced by a variety of factors such as permeability of surficial sediments and bedrock, precipitation that contributes to groundwater recharge, and the presence of wetlands, lakes, and rivers which are influenced by topographic relief. The dramatic topographic relief across the RAA, and the presence of this surficial hydrology, result in complex groundwater–surface water interactions. Lakes, ponds, and rivers could serve as areas of focused groundwater recharge, especially where surficial sediments are thin and bedrock porosity is high. Groundwater springs are likely present toward the bottom of steeper hills and cliffs as groundwater flows from regions of high to low pressure, often reflecting surface topography.

6.2.4.2 Protected Wellfields and Municipal Water Supplies

The two nearest public water supplies are the Antigonish Water Utility, which draws water from Rights River, and the Community of St. Joseph, which draws water from one municipal groundwater well.

The Town of Antigonish draws water from Rights River, which originates from several streams in an upland area west of the PDA. The source water area is designated as a Protected Water Area under Section 106 of the *Environment Act*. The PDA is approximately 200 m east of the boundary of the Protected Water Area and does not overlap any portion of the source water area of Rights River upstream of the dam.

The community of St. Joseph has a single drilled well that appears to supply a small number of homes along Ohio East Road west of HWY 7. The well is more than 2 km south of the southern tip of the PDA. The well is drilled into bedrock to a depth of 55 m and has 31 m of casing. Airlift yield following drilling indicated that the well is capable of producing approximately 118 m^3/day.

6.2.4.3 Potable Water Wells

A search of the Nova Scotia Well Logs Database (NSECC, 2023), identified 125 wells within 1 km of the AOD, as illustrated in Figure 6.1, Appendix A. There are 168 civic addresses within 1 km of the AOD, which is likely a closer reflection of the total number of wells as there is no centralized water supply within the AOD. The wells are primarily used for domestic, single-family dwellings. Information regarding depth to bedrock, total well depth, casing depth, static water level, and estimated yield (m^3/day) for these wells is summarized in Table 6.1.

Table 6.1 Summary Table for Wells Within 1 km of the AOD

	Bedrock Depth (m)	Well Depth (m)	Casing Depth (m)	Static Water Level (m)	Estimated Yield (m^3/day)
Minimum	0.6	3.2	0.6	0	0
1st Quartile[1]	5.0	24.4	9.8	4.7	13

	Bedrock Depth (m)	Well Depth (m)	Casing Depth (m)	Static Water Level (m)	Estimated Yield (m^3/day)
Median	9.1	42.6	16.0	7.5	33
Mean	10.3	43.5	16.3	7.9	108
3rd Quartile[2]	13.7	60.9	19.6	9.1	65
Maximum	28.0	93.5	48.7	68.5	981
Number of Record Entries	115	92.0	115	83	125

[1] 1st Quartile – The value below which 25% of the data points are found when arranged in ascending order
[2] 3rd Quartile – The value below which 75% of the data points are found when arranged in ascending order

Records indicate that well depths are relatively shallow (median value of 42.6 m) and provide low to moderate yields (median value of 33 m^3/day), which is enough water for most domestic uses. Pumping test data provided on the provincial database in the vicinity of the LAA is sparse. Two pumping tests conducted in carbonate/evaporite rock of the Windsor formation indicate long-term yields on the order of 100 m^3/day. One test conducted in the metamorphic rock from the Georgeville Group showed lower yields, on the order of 10 m^3/day. There are no records of pumping tests completed in the sedimentary rock that underlies much of the PDA.

A provincial observation well in North Grant (number 054), located approximately 3 km east of the PDA, has water levels recorded periodically since 1987 (NSECC, 2023). The well is 45.7 m deep and drilled into sedimentary bedrock (shale/slate) of the Horton Group. Water level data between 1987 and 1997 varied seasonally between 19.3 and 20.5 masl, with a gap in the data between 1995 and 2007. Between 2007 and 2024, seasonal water levels were consistent, with high water levels reaching 20 masl in the spring and low water levels of 19 masl in the late summer. The monitoring data indicate that seasonal water level changes are relatively minor and are not expected to affect any assessments or effects associated with the Project.

Wells in the LAA are primarily nearest to planned roadways, not wind turbine pads. The two closest mapped wells to wind turbines on the NSGWDB are 350 m and 930 m away. Wells appear to be associated with homes west of Highway 245 (Clydesdale, Pleasant Valley), and to the north and south of Highway 104 (Brierly Brook, Addington Forks); each home is likely serviced by either a dug or drilled well (Figure 6.2, Appendix A). Drilled wells in these areas likely draw water from shallow and intermediate flow systems that originate in higher elevation areas. Other features in the area that are likely to be supported by local and intermediate flow systems are Rights River, South Rights River, Brierly Brook, as well as numerous local streams and wetlands. Domestic water supply appears to be the only water use in the LAA. There is a record of a commercial well in the LAA drilled for Shell Canada in 1992; however, it does not appear to be associated with any business in the area. Some of the domestic wells may be used for agricultural water for properties to the south of the LAA.

6.2.4.4 Groundwater Quality

Groundwater quality in general varies depending on the mineral composition of the aquifer. Groundwater from igneous and metamorphic rock in Nova Scotia tends to exhibit higher concentrations of dissolved metals such as iron and manganese. Risk maps of the province (Nova Scotia Department of Mines) show some instances of elevated manganese in regional well water, and the area is broadly characterised as medium risk for elevated manganese (Kennedy, 2021).

In Nova Scotia, arsenic in groundwater is derived from bedrock-hosting sulphide minerals (primarily pyrite/pyrrhotite-bearing slate and granite). The PDA is underlain by rock primarily associated with a low risk of arsenic occurrence in groundwater. There are some limited regions of medium risk bedrock surrounding highway 104 that the PDA crosses, associated with the Horton Gorup and the Windsor Group (Kennedy and Drage, 2017) (Figure 6.4, Appendix A).

Uranium has been identified in elevated concentrations across many groundwater wells in Nova Scotia. The bedrock deposits underlying the PDA are labelled as low risk for uranium in groundwater (Kennedy and Drage, 2020). Radon is a naturally occurring product of the breakdown of uranium. Radon is not considered a risk for drinking water (NSECC, n.d.); however, the PDA is underlain by areas of low to medium risk potential for radon in indoor air (Figure 6.5, Appendix A). Water quality is assessed using Health Canada's Guidelines for Canadian Drinking Water Quality (Health Canada, 2022), which have been adopted by NSECC (NSECC, 2024a). Arsenic, uranium, and radon are further discussed in Chapter 13 (Socio-Economic Environment) in relation to human health.

6.3 Effects Assessment

6.3.1 Potential Effects and Mitigation

Direct and indirect effects of the Project on the geophysical environment could occur through several interconnected pathways. During construction, there will be blasting in some locations and fill brought to the AOD for developing access roads and turbine pads, which could affect ground stability and possibly future land use. Infrastructure at a depth greater than 1 mbgs, such as turbine foundations, will remain after decommissioning and landowners will have the option to retain access roads. Project activities can affect the geophysical environment as indicated in Table 6.2; these potential effects do not consider the implementation of mitigation measures described herein.

Table 6.2 Potential Environmental Effects of the Project on the Geophysical Environment

Project Activity	Potential Environmental Effects			
	Bedrock and Soils		Groundwater	
	Change in Quantity	Change in Quality	Change in Quantity	Change in Quality
Construction				
Site Preparation	X	X	-	X
Access Roads Construction and Modifications	X	X	X	X
Material and Equipment Delivery and Storage	-	-	-	-
Infrastructure Installation	X	X	X	X
Restoration of Temporary Areas	-	-	-	-
Testing and Commissioning	-	-	-	-
Operation and Maintenance				
Turbine Operation and Maintenance	-	-	-	-
Road Maintenance	X	-	-	X
Power Line and Substation Maintenance	-	-	-	-
Vegetation Management	-	X	-	X
Safety and Security	-	-	-	-
Decommissioning				
Removal of Infrastructure and Site Restoration	-	X	-	X

X = Potential Interaction
- = No Interaction

There are specific activities that could impact geophysical characteristics.

- Site preparation as well as operation and maintenance that includes vegetation clearing could impact nutrient loading to groundwater and remove or compact native soil. Increases in soil erosion rates could also occur.
- Site preparations involving earthworks and drainage features could alter groundwater recharge pathways and impact groundwater recharge rates.
- Construction and upgrades of access roads will introduce new material and cause soil compaction.
- Construction of turbine foundation footings that involve blasting could disturb established bedrock fracture networks that affect groundwater quantity (i.e., flow paths) and/or groundwater quality (i.e., creation and transmission of turbidity in large fractures, exposure of leachable elements such as arsenic or uranium).

- Temporary dewatering requirements during construction could lower groundwater table elevations in the areas surrounding the foundations.
- Decommissioning of infrastructure would involve heavy machinery and earthworks, which could impact the soil quality.

6.3.1.1 Change in Soil Quantity and Quality

Earthworks activities, such as constructing turbine foundations and new access roads, and/or improving existing access roads, will result in clearing vegetation and exposing soils in the immediate area of the PDA that will affect the characteristics of the site's terrain. Sloping in some areas may affect drainage features and will require ditching and/or installation of berms and culverts. Pathways and effects to surface water resources are described further in Chapter 7 (Aquatic Environment) and Chapter 9 (Wetlands).

Activities associated with earthworks as well as the use of vehicles and heavy equipment will occur during the lifetime of the Project, particularly during construction, and result in changes in ground stability where granular fill is used for building access roads, foundations, and temporary pads for cranes. During decommissioning, landowners may opt to retain access roads, which will continue to be vulnerable to erosion.

Access road materials generally require gravel consisting of stone, sand, and fine particles with a binding characteristic to form a smooth, firm surface that can withstand weight and environmental effects. Appendix F of the Generic EPP used by the NSDPW recommends that Gravel Type II be applied at a thickness of 125 mm, covered by Gravel Type I to a thickness of 75 mm before shaping, compacting, and crowning access roads (NSDPW, 2005). The combination of adding fill to some portions of the PDA while excavating in others will affect soil quantity in those locations.

Below depths of 1 m, portions of foundations may remain after decommissioning. Compacted areas, blasted bedrock, and buried turbine foundations will change the characteristics of the underlying soil and ground stability that could affect land use opportunities after decommissioning.

Potential Project effects on soil quantity can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on soil quantity will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Access to turbine locations will use established roads to the extent practicable.
- Areas of clearing and grubbing will be limited to that needed to construct the Project.
- Where practicable, roots of trees and shrubs will be left intact to prevent soil erosion.
- Disturbed or compacted soils will be restored using topsoil during construction and decommissioning.
- Where possible, surface soil will be reused. Material that cannot be reused on site will be disposed of off-site following applicable regulations and guidelines such as the CCME

Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME, 2007) and parameter-specific updates.
- Drainage features will be installed per the Project-specific EPP and guidance from the generic NSDPW EPP (NSDPW, 2005).
- An ESC Plan will be developed and implemented to mitigate soil erosion during earthworks.

Soil quality in the PDA and LAA is also at risk of being adversely affected. Dust and gravel produced during construction as well as operation and maintenance of roadways and foundations could settle into undisturbed areas of the LAA, impacting soil quality at the surface. Vegetation management including vegetation clearing would also impact soil quality as destroyed vegetation decays at a rapid rate into the soil, producing elevated concentrations of nutrients such as dissolved organic carbon, nitrate, and ammonia.

Potential Project effects on soil quality can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on soil quality will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Topsoil and subsurface excavated material will be stored separately to prevent mixing and will be reused and/or disposed of separately.
- Run-off from stockpiled soil and organic debris will be controlled or minimized using tarps.
- Where possible, surface soil will be reused. Material that cannot be reused on site will be disposed of off site following applicable regulations and guidelines.
- Fill brought to site for access road maintenance will meet CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME, 2007) and parameter-specific updates appropriate for the site's land use.

6.3.1.2 Change in Groundwater Quantity and Quality

Groundwater is recharged from the surface via infiltration through porous rock, unconsolidated sediment, and/or bedrock fractures. Any alteration in these flow pathways resulting from Project activities could impact groundwater recharge volumes.

Construction and decommissioning activities have the potential to impact both groundwater quantity and quality. Blasting for access road construction can cause changes in established bedrock fracture networks, resulting in changes to flow to wells in the LAA. These changes could either partially or fully seal fractures that previously provided water to nearby wells. Alternatively, blasting could open new, or expand, existing fracture networks, thereby providing more, or differently sourced, water to nearby wells. Blasting may be necessary only in selection locations, to be determined during final engineering design, so only a small fraction (perhaps none) of the 56 wells will be within 800 m of a blast, and vibrations will weaken through distance from the blasting point.

General earthworks, including turbine foundation construction and roadwork, could change infiltration rates and thus groundwater recharge across the PDA, as surfaces and permeability are altered. This could have an impact on the volume of water recharging the water-bearing fractures, and thereby water availability for nearby wells. However, planned access road and foundation construction accounts for a small percentage the total surface area of the LAA. Furthermore, surfaces made less permeable during construction, such as roadways, will drain to constructed ditches or undisturbed areas of the LAA, which would in turn contribute to recharge of the aquifer in the same way as pre-construction.

If shallow water tables are encountered during blasting and excavation at foundation locations, temporary dewatering would be needed to allow the curing of the concrete. This has the potential to temporarily impact groundwater table elevations and groundwater flow pathways immediately surrounding the excavation, which could lower water levels in the area surrounding excavations. However, well depths in the LAA are typically much deeper (median of 36.5 m), the shallowest drilled well being 13.7 m, than the depth of the turbine foundations (3 to 7 m). The 2025 draft geotechnical report submitted by Strum stated that was present in all but 1 monitoring when water levels were recorded (Strum, 2025). This could indicate that some dewatering would be needed during foundation construction. Furthermore, while the Nova Scotia Well Logs Database indicates that there are wells within the LAA, the nearest registered well to any turbine foundation is located approximately 350 m north (Figure 6.1, Appendix A), far beyond the extent of any drawdown caused by shallow dewatering.

The apparent well yield data are consistent with expectations for the rock types in the PDA, and suggest that water management requirements would be greatest in areas of evaporite rock, if excavation is required. Propagation of any associated drawdown effects would extend furthest from the PDA in evaporite rock, but the magnitude of drawdown would be expected to be relatively minor. Drawdown in the metamorphic rock would be the most significant, but the distance of propagation in this type of rock tends to be limited due to generally poorly developed and connected fracture networks.

The following key measures to mitigate the potential effects of the Project on groundwater quantity will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

- Where blasting is necessary, it will be undertaken by a qualified professional and explosives will be stored off-site.
- Blasting will be avoided near residential areas where possible. Pre-blasting well water surveys will be completed for those within 800 m of the activity. Bedrock monitoring wells installed during geotechnical investigations will be used to detect changes in water quantity.
- If demonstrable changes in groundwater quantity to a well are detected, an alternative water supply, of equal or better quantity than that impacted, will be provided to the landowner.
- A Complaint Resolution Plan will be developed and implemented.

While wells are not likely to be affected by turbine construction and decommissioning, blasting for access road construction and upgrades could have potential adverse impacts on groundwater quality. Blasting during construction can expose uranium or arsenic-bearing bedrock to groundwater (i.e., new fracture development) or surface water (following excavation), which could introduce these contaminants to the groundwater system and impact nearby wells through increased turbidity. Excavated rock piles exposed to rainfall have the potential to leach contaminants from the rock into surface water, and subsequently into groundwater. Blasting also has the potential to open new fracture networks that connect to contamination sources such as surface water bodies, which could transmit sediment to nearby wells, but the risk is relatively low. Finally, byproducts of blasting such as ammonium nitrate and sediment can enter the groundwater system and affect nearby wells. There are 125 wells within 1 km of the AOD; 63 are within the proposed 800 m pre-blast survey area.

Clearing of vegetation during both the construction and operation and maintenance phases could also deteriorate groundwater quality. Vegetation clearing has the potential to temporarily enhance the nutrient loading (as cleared vegetation decomposes over time) to surface water and groundwater systems, impacting well water quality. Herbicides can leach into the groundwater.

Potential Project effects on groundwater quality can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on groundwater quality will be further detailed in a Project-specific EPP to be implemented prior to construction.

- Refuelling will occur in designated areas at least 30 m from a water feature.
- Where blasting is necessary, it will be undertaken by a qualified professional and explosives will be stored off site.
- Blasting will be avoided near residential areas where possible. Pre-blasting well water surveys will be completed for those within 800 m of the activity. Monitoring wells installed during geotechnical investigations will be used to detect changes in water quality.
- If demonstrable changes in groundwater quality to a well are detected, an alternative water supply, of equal or better quality than that impacted, will be provided to the landowner.
- The Proponent will consult NSECC to determine whether rock samples from areas to be excavated require further analysis for sulphide-bearing materials per the Sulfide Bearing Material Disposal Regulations NS. Reg. 57/1995. The geotechnical investigation that includes sulphide analysis is in progress. Response and mitigation measures to control acid rock exposure will be described in the Project-specific EPP.
- Site-specific measures will be developed to restore and maintain infiltration areas and receiving water bodies in the Project-specific EPP.
- An ESC Plan will be developed and implemented to mitigate soil erosion during earthworks.
- A Complaint Resolution Plan will be developed and implemented.

6.3.2 Residual Effects

6.3.2.1 Change in Soil Quantity

Changes in soil quantity directly within the AOD where road building and foundation construction takes place cannot be avoided. The magnitude of these effects will be moderate, and the geographic extent of the impact immediate. These changes will permanently impact soil quantity (compaction, volume) as soil will be removed and roads and foundations are established. Therefore, the duration is expected to be long-term and the frequency continuous, as the access roads will be in place for the duration of the operation of the wind facility. Furthermore, the portions of the foundation slabs at 1 m and below will remain in place; as such, the impact to these areas is irreversible. The timing is considered to have a low effect on this VEC.

Based on the limited AOD, both in area and depth, the overall residual effects on soil quantity are predicted to be not significant.

6.3.2.2 Change in Soil Quality

Changes in soil quality directly within the AOD where road building and foundation construction take place cannot be avoided. The magnitude of these effects is expected to be minor, and the geographic extent of the impact immediate, limited to the AOD. These changes will temporarily impact soil quality (pouring concrete and gravel, compacting existing soil) as soil will be removed and roads and foundations established. Therefore, the duration is medium-term and the frequency continuous, as the access roads will be in place for the duration of the operation of the wind facility, with some compacted areas being restored following Project construction. The timing is considered to have a low effect on this VEC.

Based on the limited AOD, both in area and depth, the overall residual effects on soil quality are predicted to be not significant.

6.3.2.3 Change in Groundwater Quantity

Changes in groundwater quantity resulting from dewatering, should it be necessary, will result in temporary changes in the groundwater flow system, however the magnitude of this effect is expected to be minor. The geographic extent of this effect is considered local, extending beyond the AOD but not beyond the LAA. Once the foundations are poured, site dewatering will cease, and the groundwater table will be allowed to recharge.

Changes in groundwater quantity resulting from blasting changing fracture occurrence or orientation could result in changes in the groundwater flow system; however, the magnitude of this effect is expected to be minor. The geographic extent of this effect is considered local, extending beyond the AOD but not beyond the LAA. The timing of these impacts could be high, if groundwater flow pathways to wells were sealed off during the summer, when groundwater tables are typically lower. In the event where a water bearing fracture was sealed, this would be irreversible with continuous, long-term impacts on groundwater flow.

Neither of these changes are likely to affect private wells due to their distance from the turbine pads (at least 0.5 km), and their significantly deeper depths; public records indicate a median domestic well has a depth of 36.5 m and a median casing depth of 16.1 m compared to the relatively shallow turbine foundation depth (maximum 7 m). If proven adverse effects related to Project activities occur after mitigation, the Proponent will re-drill the affected well.

Based on the likely limited extent of any potential impacts on groundwater, and the mitigation measures related to blasting (pre-blast surveys), the impact on groundwater quantity is predicted to be not significant.

6.3.2.4 Groundwater Quality

Similar to the effects on groundwater quantity, changes in groundwater quality resulting from blasting changing fracture occurrence or orientation could result in changes in the groundwater flow system and carry particulates; however, the magnitude of this effect is expected to be minor. The geographic extent of this effect is considered local, extending beyond the AOD but not beyond the LAA. Long-term, continuous, and irreversible impacts could result from this effect.

Blasting is unlikely to affect private wells due to their distance from the turbine pads (at least 0.5 km), and their significantly deeper depths; public records indicate a median domestic well has a depth of 36.5 m and a median casing depth of 16.1m compared to the relatively shallow turbine foundation depth (maximum 7 m). Blasting may occur at some sections of access roads but changes in water quality are not expected.

Based on the likely limited extent of any potential impacts on groundwater, and the mitigation measures related to blasting (pre-blast surveys), the impact on groundwater quality is predicted to be not significant.

6.4 Monitoring

Construction monitors will report issues observed during earthworks; operation and maintenance staff will report signs of subsidence and erosion. A pre-blast well water survey to be conducted on domestic water wells located within 800 m of a blast site will be part of the Project-specific EPP and Blasting Management Plan, as required by the Blasting Safety Regulations (Nova Scotia, 2011). A Complaint Resolution Plan will be used to address complaints regarding well water quantity or quality should they arise. There is no continuous groundwater monitoring proposed for this Project.

7 Aquatic Environment

7.1 Overview

The assessment of the Project on the aquatic environment includes the aquatic ecosystem in watercourses and waterbodies that interact with the Project. Waterbodies support essential ecological and socio-economic functions that are connected to flora (Chapter 8: Flora), wetlands (Chapter 9: Wetlands), and wildlife (Chapter 10: Terrestrial Wildlife, Chapter 11: Bats, and Chapter 12: Birds).

This section evaluates the potential impacts of the Project on the aquatic environment, with emphasis on fish and fish habitat, and provides mitigation, and construction and operational management practices to minimize these possible effects. The information collected for the assessment has also been used to provide input into design of the Project. The Project has the potential to affect the aquatic environment both directly (i.e., change in fish habitat during construction due to installation of watercourse crossings, or change in water quality during construction, operation and maintenance, and/or decommission phases from sedimentation), as well as indirectly due to increased use of Project roads and riparian habitat loss, fragmentation, and modification. In addition, aquatic species (i.e., fish) may exhibit short-term or long-term behavioural changes to avoid habitats subject to disturbance or changes in water or habitat quality, depending on the fish species and level of tolerance to disturbance.

The Proponent has modified the road and turbine layout for the Project to avoid or reduce potential for adverse environmental effects on multiple VECs, including the aquatic environment. The James River Watershed Protected Water Area is positioned south and west of the PDA and is largely contained within the Eigg Mountain – James River Wilderness Area. The protected water area was considered during the development of the transmission line layout and is avoided entirely. Project infrastructure does not overlap with the James River Watershed Protected Water Area. Additionally, the road network maximizes use of existing roads and minimizes new clearing as much as practical.

As discussed in the following subsections, the Project avoids impacts to the aquatic environment through detailed design and avoiding instream disruptions to fish habitat during key periods of fish life cycles by planning for work to occur within the least risk window for instream construction (June 1 to September 30). Additionally, the Proponent will mitigate effects and protect the aquatic environment by acquiring required environmental permits for instream works (e.g. watercourse alteration approval), implementation of ESC measures at watercourse crossing sites, working in the dry and conducting fish salvages, and restoring sites to pre-construction conditions, or better, when possible, after watercourse crossings have been completed. DFO will assess the potential for harmful alteration, disruption, or destruction of fish habitat (HADD) during the permitting phase of the Project and may require offsetting to counterbalance losses in fish habitat from the Project.

Potential effects, mitigation measures, and residual impacts to the aquatic environment as a result of the Project are outlined in this Chapter. Mitigation measures will be further developed in a Project-specific EPP prior to construction to minimize adverse effects.

7.1.1 Regulatory Context

Assessment of the aquatic environment considers relevant provincial and federal legislation and guidelines:

- *Fisheries Act*
- SARA
- *Canadian Environmental Protection Act*
- Nova Scotia *Environment Act*
- NSESA

7.1.2 Boundaries

The AOD represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. The PDA represents the boundaries within which the AOD may occur. The LAA and RAA boundaries are defined as follows for the aquatic environment VEC.

- For this assessment, the LAA for the aquatic environment has been set as 100 m upstream and 100 m downstream from the point of interaction of the Project with a watercourse (e.g., crossing location). This is based on the path of the river and not a straight-line distance. The LAA is based on the area where the extent of the effects from Project activities are likely to be detected and is based on the observed local conditions, assessed habitat, and typical size and flows in watercourses within the PDA.
- The RAA for the aquatic environment is set as the boundaries of the secondary watersheds that the PDA overlaps: Knoydart Brook, Rights River, Doctors Brook, Shore Direct, and West River watersheds (Figure 7.1, Appendix A). The determination of the RAA is based on the physical and biological conditions present and the type and location of other past, present, or reasonably foreseeable future projects or activities that have previously, or may be, implemented. The RAA is used to inform the cumulative effects assessment resulting from activities occurring within the RAA (Chapter 15: Consideration of Cumulative Effects).

7.1.3 Assessment Methodology

The assessment of aquatic environment focused on identifying watercourses and waterbodies, and the fish species present or likely to be present, in or near the PDA including any fish SAR[1] or species of conservation concern (SoCC)[2] and their habitat. This was achieved though literature review, habitat analysis, and field surveys. The data collected from this assessment was used to evaluate the impact of the Project on the aquatic environment. The description of the existing environment is based primarily on data collected through the following resources followed by field surveys:

- Provincially mapped watercourses
- Watercourse Database
- AC CDC (2023) Data Report
- DFO Aquatic SAR Database
- Natural History of Nova Scotia (Davis and Browne, 1996)
- NSDNR (2018) Significant Species and Habitat Database

Existing biophysical features in the PDA were mapped using available geospatial data. The aquatic environment assessment focussed on determining the presence of predicted watercourses (i.e., GIS modelled and provincially mapped) and the evaluation of fish habitat in those watercourses in the secondary watersheds that interact with the Project layout in the PDA. A total of 31 watercourses were assessed in the PDA. Watercourse assessments were not completed in the Shore Direct secondary watershed as there were no predicted interactions with watercourses in the PDA. Watercourse assessments for the transmission line will be completed in the West River secondary watershed, pending the selection of the transmission line route.

7.1.3.1 Habitat Assessment

Detailed fish and fish habitat assessments, including fish sampling, habitat biophysical measurements, and water quality sampling, were conducted between July and November 2025. Fish habitat assessments followed the standards and methods provided in the Nova Scotia *Fish Habitat Suitability Assessment: A Field Methods Manual* (NSLC Adopt a Stream, 2018), and those used in the *Reconnaissance (1:20 000) Fish and Fish Habitat Inventory: Standards and Procedures* (Resources Inventory Committee, 2001) and *Reconnaissance (1:20 000) Fish and Fish Habitat Inventory: Site Card Field Guide* (Resources Inventory Standards Committee, 2008). These included the assessment of the following parameters and characteristics at each assessed site:

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[1] SAR are those species that listed under SARA (Schedule 1) or the NSESA.

[2] SoCC are those species that have been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Endangered, Threatened, or Special Concern, but not yet listed under SARA or the NSESA. SoCC also includes those species tracked by the AC CDC and assigned conservation ranks of S1, S2, or S3.

- Channel biophysical features (mean channel width, wetted width, bankfull width, mean channel/bankfull depth, pool depth, mean bank height, percent gradient, barriers to fish movement)
- Geomorphologic features (channel morphology, slope, confinement, pattern, bank features)
- Fish habitat characteristics and quality (channel substrates, instream cover, spawning, migration)
- Velocity (metres per second)
- Riparian features (vegetation stage, vegetation type, crown closure)
- Human disturbance indicators (abandoned channels, erosion, sediment wedges)
- Water quality (dissolved oxygen, pH, temperature, turbidity)
- Watercourse classification (permanent, intermittent, ephemeral)
- Watercourse stage (high, mid, low, dry, frozen)

Fish habitat assessments were conducted at five locations (i.e., transects) on each watercourse to represent the conditions above, at, and below the interaction of the Project with the existing watercourse. The following locations were assessed at each watercourse:

- At the intersection of the Project and watercourse (i.e., the crossing or centreline)
- 50 m upstream
- 100 m upstream
- 50 m downstream
- 100 m downstream

Watercourses assessed during the detailed field assessments were given a classification based on channel width and characteristics. The watercourses were classified as one, or a combination, of the following: no channel, ephemeral, intermittent, small permanent, or large permanent based on the definitions provided in the Table 7.1.

Table 7.1 Description of Watercourse Types

Watercourse Type	Channel Width	Description
Large Permanent	Greater than 5 m	• Defined channels • Defined beds and banks • Year-round flow • Fish bearing (unless barrier present) • Fish habitat
Small Permanent	Less than 5 m	• Defined channel • Defined beds and banks • Year-round flow • Fish bearing (unless barrier present) • Fish habitat

Watercourse Type	Channel Width	Description
Intermittent	Typically less than 2 m	• Defined channels with scour • Defined beds and banks • Seasonal water flows (e.g., spring, fall) • May be seasonally fish-bearing • Potential for fish habitat
Ephemeral	Typically less than 1 m; channel not always defined	• Signs of infrequent flow; minor scour • No defined bed or banks • Result of rain events or snowmelt • Signs of surface flow or flooding • Roadside ditches • Typically not fish-bearing • Typically not fish habitat
No Channel	N/A	• No defined channel or scour • Surface or subsurface drainage • Potential mapping error • Not fish-bearing • Not fish habitat

Watercourses were also assessed based on the potential for fish habitat, using information gathered from both in situ water quality via a handheld multimeter and a rapid evaluation of the presence and quality of spawning, rearing, migration, foraging, and overwintering habitats, based on the following:

- Spawning habitat quality—water flow and depth, presence of groundwater upwelling, and substrate size, embeddedness, and composition (i.e., large and small gravels)
- Rearing habitat quality—based on cover abundance and type, water flow, and habitat connectivity
- Migration—based on connectivity of habitat to upstream and/or downstream areas, water depth, and waterflow
- Foraging—based on substrate size and quality for invertebrate presence, riparian and overhanging vegetation, and observed invertebrates
- Overwintering habitat quality—based on the presence of deep pools (50 centimetres (cm) or greater), adequate water quality, and the potential for year-round flow

Where species presence was unknown or uncertain, salmonid habitat was used as the default benchmark criteria for comparison as salmonid species are less adaptable than other fish species and typically have had more studies completed to understand the limits for their survival. Dominant and subdominant substrates were assessed based on the size classification presented in Bain and Stevenson (1999), Cummins (1962), Hooper and Hubbart (2016), and the Wentworth Scale (Wentworth, 1922) for habitat assessments, as per Table 7.2.

Table 7.2 Substrate sizes and classes

Substrate Type	Size
Fines	< 2 mm
Silt and Clay	< 0.06 mm
Sand	0.06 to 2 mm
Small Gravel (e.g., pebbles)	2 to 16 mm
Large Gravel (e.g., pebbles)	16 to 64 mm
Cobble	64 to 256 mm
Boulder	> 256 mm
Bedrock	Continuous slab (> 2m diameter)

Fish habitat quality was determined through evaluation of existing conditions present in the assessed watercourses and the suitability of those conditions for the life stages of the fish species likely to be present in the watercourse.

Fish habitat quality was assessed at proposed watercourse crossing locations for the watercourses in the PDA. The five main habitat types assessed for presence and quality in each watercourse were rearing, spawning, migration, overwintering, and foraging along with overall habitat quality. Each was assessed and ranked on a scale of None to Good. A ranking of None is equivalent to either no fish habitat being present in the assessed area, or the habitat present would not be suitable for the species expected to use the watercourse. A ranking of Good was used when fish would be expected in the area and could use the habitat for the assessed purpose (e.g., spawning). Rankings were based on the presence of key habitat features or physical parameters (e.g., substrates, cover, flow) and subject to interpretation by the assessor (i.e., environmental professional) based on previously reviewed published literature or guidance.

A conservative approach has been taken to the classification of the watercourses assessed. Watercourses that were identified during the field assessment as intermittent or permanent were treated as possibly fish bearing.

Fish habitat type and quality determined during the field assessments were typically based on the most sensitive species found in the region, which for the Project was salmonids (e.g., Brook Trout). Where habitat characteristics were suitable for multiple species, the rating was based on the species most likely to use the area; where this was unknown, the default was to rate the habitat based on the value for salmonids.

7.1.3.2 Fish Sampling

Active fish sampling was completed using a backpack electrofishing unit in a subset of watercourses in the PDA. Sampling locations were determined based on the habitat assessment and physical characteristics of the watercourses assessed, including watercourse width, depth, and water quality, measured during the habitat assessment program.

7.1.3.3 Water Quality Analysis

A YSI Multimeter, a handheld multiparameter water quality meter, was used to measure water quality in streams with adequate flow and depth (greater than 0.05 m). Field surface water quality parameters were measured using the YSI multimeter at each assessment site:

- Temperature in degrees Celsius (ºC)
- pH
- Conductivity in micro-siemens per cm (mS/cm)
- Total Dissolved Solids (TDS) in milligrams per litre (mg/L)
- Dissolved Oxygen (mg/L) and percent saturation (when available)
- Salinity (parts per thousand (ppt))

Turbidity was qualitatively recorded by visual assessment of water clarity and recorded as clear, low, moderate, or turbid.

Water quality parameters (i.e., temperature, pH, and dissolved oxygen) measured in the field were compared to the water quality guidelines[3] presented in Table 7.3 to provide a likelihood of fish presence.

Table 7.3 Water Quality Limits for the Protection of Aquatic Life and Salmonids

Water Quality Parameter	CCME Water Quality Guideline for the Protection of Aquatic Life (Freshwater) (CCME, 2017)	Brook Trout Tolerance and Optimum Range (Raleigh, 1982)
pH	6.5 to 9.0	Tolerance: 4.0 to 9.5 Optimal: 6.5 to 8.0
Temperature (ºC)	N/A	Tolerance: 0.5 to 22 Optimal: 11.0 to 16.0
Dissolved Oxygen (mg/L)	**Cold water: between 6.5 and 9.5	Tolerance: ≥ 5.0 Optimal: ≥ 7.0

** Depending on the life stage

In situ water quality measurements were collected at the watercourse assessment crossing locations, where sufficient waterflow and depth was present. If insufficient conditions are present at the crossing location, water quality measurements were taken at the next possible point. Data collected represent a snapshot view of the water quality in the watercourse at the time of assessment. The field habitat assessment and water quality program for the Project was completed from July to November 2025. Water quality parameters were measured at 15 watercourse locations.

[3] Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2017) and Brook Trout tolerance and optimal ranges for water quality (Raleigh, 1982)

7.1.3.4 Aquatic Invertebrates

Aquatic invertebrate presence was assessed in watercourses during the fish habitat assessment program. Observations of aquatic invertebrates were made and recorded as part of the habitat assessment conducted at each assessment location. At each assessment location with suitable conditions (i.e., gravel or larger substrates and presence of water), at least four cobble-sized rocks (if present) were selected, flipped over, and observed for the presence of aquatic invertebrates or larvae. Visual observations of invertebrates on the surface or in the watercourse were also recorded as part of the assessment. Presence of aquatic invertebrates was recorded using a density scale of None, Low (up to 25 percent), Moderate (25 to 50 percent), and High (greater than 50 percent); based on the number of locations or rocks with invertebrates observed versus the total number of locations sampled.

7.2 Existing Environment

7.2.1 Hydrology / Watersheds

The PDA is located within the Pictou Antigonish Highlands Ecoregion, and intersects five secondary watersheds:

- Rights River
- Doctors Brook
- Knoydart Brook
- West River
- Shore Direct

All watersheds drain into the Northumberland Strait; the Rights River and West River drain towards Antigonish Harbour to the Northeast, while Doctors Brook, and Knoydart Brook watersheds drain towards the coast on the Northwest through the brooks. The Shore Direct watershed is a coastal watershed that drains directly to the Northumberland Strait. The Rights River and West River are the largest of the intersected watersheds, which encompass a large portion of the PDA. The highest elevation in the PDA is 320 masl (CGVD2013).

The most prominent soil type in the intersected watershed areas is sandy loam, with most of the PDA encompassed by this soil type. The most prominent land cover type in the PDA is temperate or sub-polar broadleaf deciduous forest, with smaller areas of mixed forest, shrubland, grassland, particularly around turbine extents in the upper PDA area, with some cropland in the lower extents of the PDA.

Main watercourses crossing the PDA include James River, Pushies Brook, West River, and Brierly Brook in the lower extents; with South Rights River, Powers Brook, tributaries of Rights River, and Doctors Brook crossing the northern extent of the PDA where the turbines will be placed. There are several smaller, tributaries to these watercourses crossing the PDA, with very few lakes. The largest lake is Vincent Lake, which is less than 6 ha and located in the northern portion of the PDA. Across all secondary watersheds that are intersected by the PDA, there is a small percentage of surface area represented by water (0.6 percent).

7.2.2 Fish and Fish Habitat

The dominant watercourse type identified was ephemeral, with a total of 13 locations of the 31 assessment locations identified as such. These locations consisted of sloped drainage channels connected to culverts, narrow ephemeral tributaries, ditches, and ephemeral wetland drainage channels. These ephemeral locations typically had little to no water present at the time of assessment. Additionally, of the 31 watercourse assessment locations, only one large permanent (greater than 5.0 m in width) watercourse was identified, the fewest of the watercourse types observed. The large permanent watercourse, all four intermittent watercourses, and eight of the 11 small permanent watercourses are in the Rights River secondary watershed. A summary of the watercourse types is presented in Table 7.4.

Table 7.4 Watercourse Types Intersecting the PDA (total counts and percent overall)

Watercourse Type	Count	Percent
Large Permanent	1	3.2
Small Permanent	11	35.5
Intermittent	4	12.9
Ephemeral	13	41.9
No channel	2	6.5

7.2.2.1 Fish Habitat

Substrates are important for fish habitat as they support a range of uses for fish, from spawning, to cover, to foraging areas. Gravel, which is an important feature of spawning habitat, was determined to be the dominant substrate in 50 percent (seven watercourses) of the fish-bearing watercourse channels assessed. Fines were the most common subdominant substrate (i.e., second most common in a watercourse) observed at approximately 29 percent (four watercourses), followed by cobble at 14 percent (two watercourses) and boulder at seven percent (one watercourse). In non-fish-bearing watercourse channels, fines were the dominant substrate in 87.5 percent (seven channels), with 12.5 percent (one channel) being primarily gravel (Table E1 Appendix E).

Instream cover provides areas for rearing and avoiding predation. Cover type and abundance are part of the characteristics used to determine the suitability of available habitat for various life stages of fish. Overall, overhanging vegetation and instream vegetation were the dominant and sub-dominant cover types observed. In fish-bearing watercourses, overhanging vegetation was the most common cover type in 50 percent (seven watercourses) of these channels, followed by instream vegetation at 29 percent (four watercourses) and boulder at 21 percent (three watercourses). Overhanging vegetation was the dominant cover type in all assessed non-fish-bearing channels (Table E2 Appendix E).

In the PDA, out of 20 assessment locations where fish habitat was determined to be present, only three were identified as having good overall fish habitat. Of these three locations, one was a large permanent watercourse, while the other two were small permanent watercourses. These watercourses, located in the southeast area of the northern portion of the PDA containing the turbine layout, are upstream tributaries to Rights River. No Intermittent or ephemeral watercourses assessed were found to have good overall fish habitat. Moderate-good overall fish habitat was observed at three of the assessed watercourse locations, all being small permanent watercourses. Moderate overall fish habitat was observed at two small permanent assessment locations, and one intermittent. Poor to poor-moderate overall fish habitat was observed at 10 of the assessed watercourse locations, with three being small permanent channels, two being intermittent, and five being ephemeral. One ephemeral watercourse assessed for fish habitat was deemed to have no suitable habitat overall. A summary of overall fish habitat quality is provided in Table E3 Appendix E.

Four of the watercourses possessed sections of good to moderate-good spawning habitat, with most watercourses containing poor to moderate quality spawning habitat. Three of these watercourses are the same upstream tributaries to Rights River that possessed an overall habitat quality rating of Good. Nine watercourses (seven in Rights River, one in Knoydart Brook, and one in Doctors Brook secondary watersheds) contained good to moderate-good rearing habitat. Eleven watercourses (nine in Rights River, one in Knoydart Brook, and one in Doctors Brook secondary watersheds) contained good to moderate-good migration habitat. Overwintering habitat rated poorly overall, with poor and none being the dominant ratings. The single large permanent watercourse in the PDA contained moderate to poor-moderate quality overwintering habitat. Foraging habitat quality was the most highly rated parameter during fish habitat quality assessments, with 13 of the watercourses (11 in Rights River, one in Knoydart Brook, and one in Doctors Brook secondary watersheds) containing good or moderate-good foraging habitat.

As part of the fish habitat assessment program, fish passage barriers were identified when encountered. The most common barriers encountered during the assessment program were loss of channel definition, sections of subsurface flow, and debris barriers. Barriers such as debris, log jams, and beaver dams are considered partial or temporary barriers to fish passage. Two beaver dams were observed during fish habitat assessments: one on Doctors Brook, and one on South Rights River. At many of the locations where loss of channelization and subsurface flows were observed, the channel led to a wetland. Waterfalls/cascades and damaged, hanging, or perched culverts were occasionally encountered in the PDA. The locations of the observed permanent and temporary fish barriers are shown in Figure 7.2, Appendix A.

Overall, the results of fish habitat assessments indicate similarity among the watercourses present in the PDA, the majority of which are located in the Rights River secondary watershed.

Fish habitat assessments have yet to be completed along the transmission line routes in the southern portion of the PDA; however, based on the similarity of the data from completed assessments in the rest of the PDA, fish habitat characteristics in watercourses along the transmission route are expected to be similar to those assessed in the northern portion of the PDA. According to provincial watercourse mapping, the primary watercourses in the West River Watershed that intersect with the unassessed portion of the PDA include Brierly Brook and Pushies Brook, along with tributaries of these watercourses (Figure 7.1, Appendix A). Based on GIS spatial data layers, similar forest cover, elevation, and topography are found along the two transmission line routes that run through the West River secondary watershed compared to the northern portion of the PDA. Additionally, based on expected similar habitat characteristics, it is assumed that the same fish species observed in the northern portion of the PDA (i.e., Brook Trout and Brown Trout) are present in watercourses in the southern portion of the PDA, and the presence of Atlantic Salmon is possible. Fish habitat assessments along the transmission line route will be completed once a route is finalized.

7.2.2.2 Aquatic Species

Three sites in the PDA were sampled for fish presence via backpack electrofishing: Powers Brook, Doctors Brook, and an upstream tributary connected to Rights River. All three watercourses were found to contain fish, though fish were successfully captured at just two locations. Sampling occurred twice in each watercourse: upstream and downstream of the crossing. Twenty-eight fish were captured during the electrofishing surveys, with 26 being Brook Trout (*Salvelinus fontinalis*), and two being Brown Trout (*Salmo trutta*). More fish were observed but not successfully captured. All the fish were of immature or young-of-year life stage, except for one mature, female Brook Trout. Total length of individual fish ranged from 35 to 190 mm. Additional details on electrofishing results are in Table E4 Appendix E. Fish were observed at three locations while conducting watercourse and fish habitat assessments.

Other aquatic and semiaquatic species observed during watercourse assessments and electrofishing surveys were recorded. Only one individual was observed: an adult Eastern Newt (*Notophthalmus viridescens*). Reptile and amphibian sightings are reported in Section 10 Terrestrial Wildlife.

7.2.2.3 Species at Risk

No SAR fish have been observed within 15 km of the PDA. SoCC that are known to be present in this range are Brook Trout and the Gaspe-Southern Gulf of St. Lawrence population of Atlantic Salmon (*Salmo salar* pop. 12). Over 1800 Brook Trout were stocked in a lake in the PDA (Vincents Lake) once in 1985. An invertebrate species of concern that is known to occur within 15 km of the PDA, but was not observed during field programs, is the Eastern Pearlshell (*Margaritifera margaritifera*).

The Gaspe-Southern Gulf of St. Lawrence population of Atlantic Salmon has been assessed as Special Concern by COSEWIC and have an AC CDC rank of S1 in Nova Scotia. The spawning range of this population covers 78 known salmon rivers between the Sud-Ouest River in Quebec to rivers in northern Cape Breton, Nova Scotia (ECCC, 2025). As occurs with other populations of Atlantic Salmon, this population is anadromous. They spend much of their life feeding and growing at sea in the North Atlantic and then return to reproduce in their natal freshwater streams. Juveniles spend one to eight years in freshwater before migrating to the ocean, where they remain for one to four years before returning to fresh water for their first spawning season. Although Atlantic Salmon were not observed in the PDA, they are known to be present within 15 km and suitable spawning habitat is present in some of the permanent watercourses, particularly those near Rights River in the southeast portion of the PDA.

Brook Trout (AC CDC rank S3) are a popular sport fish that are found widely around the province in clear, cool, well oxygenated streams. Brook Trout can live in salt or fresh water; however, they may spend their entire life in fresh water and never migrate to the ocean (DFO, 1988). Both sea run and freshwater Brook Trout spawn in fresh water. Brook Trout generally prefer to spawn over gravel substrates in lakes or small protected streams with groundwater or areas of spring upwelling. Spawning occurs in September and October and trout fry emerge from the gravel between February and April. Juvenile trout feed on plankton, progressing to insects, while adults feed primarily on insects but are opportunistic and will feed on a wide variety of prey (Scott & Crossman, 1985). As they mature, Brook Trout will move into deeper waters for protection and foraging opportunities. A stocking program is active in Nova Scotia, where Brook Trout are stocked in up to 200 lakes around the province in the fall. Brook Trout were observed in the PDA and suitable habitat is present in many of the permanent watercourses.

The Eastern Pearlshell is a long-lived, freshwater mussel that has been observed within 15 km of the PDA and has an AC CDC rank of S2 in Nova Scotia. In North America, this species can be found in eight US states along the Eastern Seaboard, and in Atlantic Canada. In Nova Scotia, they are primarily found in northern and central areas of the mainland (Davis, 2007). The typical habitat for Eastern Pearlshell includes small to medium-sized cold-water streams and rivers with sand and gravel substrate. They require well-oxygenated water, as this is a requirement of their salmonid host species. Glochidia, a tiny larval stage of freshwater mussels, temporarily attach to the gill filaments of salmonid species while they grow into their juvenile stage and then detach. This parasitic life stage is not known to have any observable negative effects on the host (Mitchell, 2011). This mussel is considered a sensitive species in Nova Scotia due to the reduction in Atlantic Salmon numbers, as well as the impacts of acid rain. While this species was not observed in the PDA during field programs, suitable habitat is present in many of the permanent watercourses.

7.2.3 Water Quality

The summary of in situ water quality parameters collected during the field program is presented in Table 7.5. During sampling, the maximum temperature recorded in the watercourses was 17.6°C, while the minimum temperature recorded was 4.8°C. The median value for pH measured was 6.68, with the lowest value recorded at 5.98. The average dissolved oxygen measurement was approximately 7.69 mg/L, with the lowest value measured at 4.27 mg/L. The water in 14 of the 15 watercourses where quality parameters were measured was clear or had low turbidity.

Overall, most water quality results fell within the water quality limits stated in Table 7.5. Readings for pH measurements often fell within the optimal range (6.5 to 8), with all falling within the tolerant range (4.0 to 9.5). Dissolved oxygen levels were often optimal (≥ 7.0 mg/L), with two readings falling just below the tolerance level (≥ 5.0 mg/L). All but two temperature readings fell within the optimal temperature range (11 to 16°C), with the remaining two still being within the range of tolerance (0.5 to 22°C).

Table 7.5 Summary Statistics of In Situ Water Quality Measurements

Parameter	Average	Maximum	Minimum	Median
Temperature (°C)	13.95	17.6	4.8	14.1
Dissolved Oxygen (mg/L)	7.69	11.82	4.27	7.97
pH	6.65	7.45	5.98	6.68
Conductivity (mS/cm)	56.07	125.8	29.7	39.5
Salinity (ppt)	0.02	0.06	0.01	0.02

7.3 Effects Assessment

7.3.1 Potential Effects and Mitigation

Direct and indirect effects of the Project on the aquatic environment could occur through interconnected pathways. During construction, activities like earthworks and vegetation clearing may lead to changes in riparian habitat, as well as changes in water quality. Increased road width and density will require additional watercourse crossings which may result in changed to fish habitat and aquatic species movement. Additionally, sensory disturbance from noise during construction (e.g., blasting) has the potential to cause injury or mortality to fish or could impact aquatic organism behaviour.

The Project has the potential to result in adverse effects on the aquatic environment as a result of short-term activities during the construction phase, as well as long-term activities during operation and maintenance. The potential effects include a loss of fish habitat, change in water quality, and mortality or injury of fish. Project construction activities, predominantly earthworks, will result in alteration of fish and riparian habitat and may result in a loss of fish habitat in the AOD. Changes to fish habitat as a result of Project activities are expected to occur within the AOD.

Earth disturbing activities can lead to changes in the local surface water drainage with potential indirect effects on water quantity and quality in watercourses. Project activities can affect the aquatic environment as indicated in Table 7.6; these potential effects do not consider the implementation of mitigation measures described herein.

Table 7.6 Potential Environmental Effects of the Project on the Aquatic Environment

Project Activity	Potential Environmental Effects			
	Change in Fish Habitat		Change in Water Quality	Mortality or Injury of Fish
	Instream Habitat	Riparian Area		
Construction				
Site Preparation	X	X	X	X
Access Roads Construction and Modifications	X	X	X	X
Material and Equipment Delivery and Storage	-	-	-	-
Infrastructure Installation	-	-	X	X
Restoration of Temporary Areas	-	X	X	-
Testing and Commissioning	-	-	-	-
Operation and Maintenance				
Turbine Operation and Maintenance	-	-	-	-
Road Maintenance	-	-	X	X
Power Line and Substation Maintenance	-	X	-	-
Vegetation Management	-	X	-	-
Safety and Security	-	-	-	-
Decommissioning				
Removal of Infrastructure and Site Restoration	-	X	X	-

X = Potential Interaction
- = No Interaction

Potential adverse effects on fish habitat in the aquatic environment have been determined through an evaluation of the DFO (2024) Pathways of Effects diagrams based on the proposed Project activities. These effects are described in this section in terms of the loss of fish habitat, changes to water quality, and mortality or injury to fish. Mitigation measures are applied to avoid or minimize the effects of the activities needed for the Project, where possible. Avoidance is the first step of the hierarchy of measures for the conservation and protection of fish and fish habitat, described in DFO (2025), followed by mitigation, then offsetting.

The primary locations of effects to the aquatic environment from Project activities are at watercourse crossings where culvert or bridge works, during road upgrades or new road construction, will occur. The crossings will also require removal of riparian areas. Effects to the aquatic environment are possible during all stages of the Project but are most likely to occur during the construction phase of the Project when direct interaction with watercourses will occur (i.e., watercourse crossing installation or replacement). Generally, effects are expected to be short-term, occurring regularly during the construction phase, localized to the area immediately in or adjacent to watercourses, and expected to be mostly reversible upon completion of the construction. Mitigation measures are expected to be highly effective at preventing effects to the aquatic environment at most construction locations in the PDA. Details on the potential effects to the aquatic environment and applicable mitigation measures are presented in the following subsections.

7.3.1.1 Change in Fish Habitat

Although the Project layout and implementation methods have been designed to minimize adverse impacts to the aquatic environment, some Project activities will interact with the aquatic environment and potentially cause a change in hydrology and fish habitat, including direct losses of instream and riparian fish habitat. Without mitigation, the Project has the potential to change the base flow in existing watercourses through surface water drainage ditches and grading in the AOD, which can result in changes in pathways of surface water flows which can change the quantity of water available in watercourses. A reduction in water quantity in fish bearing watercourses can cause a loss of usable area and a change in the availability of suitable habitat for important life stages of fish and aquatic organisms. The change in quantity can result in a reduction in quality of the existing water through increased temperature or changes in availability of food and nutrients.

During operation and maintenance, there may be less overall forested land due to clearing activities associated with the Project. This change could reduce stormwater storage on site, leading to increased runoff from precipitation.

Riparian clearing for the Project will be limited to only those areas needed for the upgraded access roads or work areas. Slopes and banks will be stabilized. Additionally, works in watercourses will be completed in the dry, and all instream areas disturbed will be restored to their previous condition, or better. Loss of instream habitat from sedimentation is not expected after the implementation of mitigation measures.

Habitat loss has the potential to occur where watercourses intersect the AOD, specifically where road crossing culverts require replacement or upgrades, or where additional tree clearing is required on turbine pads and along roadways. There are 10 permanent or intermittent watercourses that intersect the AOD, and most of these will require crossing structure installation or upgrades where new roads, or roads requiring upgrades, cross the watercourse.

Watercourses along the proposed transmission line corridor will be avoided to the extent practicable through alignment refinement during detailed design. Transmission poles will be sited outside watercourses and associated riparian buffers, with spans designed to avoid in-channel works and minimize effects on aquatic habitat.

Mitigation measures implemented during the installation of culverts and bridges will include proper culvert and bridge design, including allowing for adequate flow conveyance, embedding culverts, and maintaining fish passage through the installed culverts. Additionally, all culverts installed for the access roads will meet or exceed the minimum Nova Scotia Watercourse Alteration Standard (NSECC, 2015). Although the minimum standard for culverts in Nova Scotia is 450 mm, all culverts installed will be designed to convey the 1 in 100-year event flows. These measures are expected to be effective at preventing changes in base flows in the watercourses where crossing culverts upgrades or installations are needed. Fish habitat will be established in embedded culverts through the placement of appropriately sized substrates to create cover and foraging habitat, while not impeding migration. Instream areas around culvert and bridge work areas will be modified, if necessary, to improve fish habitat through placement of appropriately sized substrates to create cover, foraging, and potentially spawning habitat.

Most potential Project effects on fish habitat can be effectively mitigated through planning and management of construction activities. Any that cannot be effectively mitigated may require offsetting through DFO's *Fisheries Act* authorization process. Harmful fish habitat alteration, disruption, or destruction is not expected to occur with this Project, and therefore offsetting will not likely be necessary. If it were, offsetting for Project effects on fish habitat would be determined during the permitting phase. The following key measures to mitigate the potential effects of the Project on fish habitat and hydrology will be further detailed in an EPP and will be implemented prior to and during construction.

- Work areas that overlap with watercourses below the high-water mark (i.e., in-water work areas) will be avoided, where not directly in the construction area.
- Applicable permits will be obtained prior to the start of any activity that has the potential to impact the aquatic environment. The Project will follow the conditions set out in the acquired permits for works in the aquatic environment.
- The Proponent will develop and implement ESC procedures.
- Installation of new or upgraded culverts will meet provincial standards and DFO design criteria for fish passage where applicable.
- Watercourse crossings will be installed in compliance with the Nova Scotia Guide to Altering Watercourses.
  - All work will occur in the dry
  - In-stream work will occur between June 1 to September 30, unless otherwise approved by NSECC
- Restoration of instream and riparian areas will occur as required.

7.3.1.2 Change in Water Quality

Without mitigation, construction and operation and maintenance activities in or adjacent to the aquatic environment may result in a change to the baseline surface water quality in watercourses and waterbodies in the AOD, which could extend into the LAA. Effects on water quality may occur during construction or during operation of the Project in areas where ground disturbance occurs. Effects on water quality are expected to be short-term in duration and localized to the AOD or immediately downstream of the construction area in flowing watercourses.

Potential Project effects on water quality can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on water quality will be further detailed in a Project-specific EPP and implemented prior to construction.

- ESC Measures
  - Implementation of ESC measures around work areas for the duration of construction, especially upslope of wetlands and/or watercourses. ESC measures will be periodically inspected by the onsite environmental monitor and will be modified as needed.
  - Exposed soils, especially on slopes, will be stabilized as soon as possible following completion of construction.
  - Riparian clearing will be limited to only that necessary for the Project and will be conducted in stages to minimize exposure size and duration for soils.
  - Banks will be graded to a stable slope and revegetated/seeded where possible.
  - Environmental monitoring will occur during in-water works, or where works have the potential to adversely impact the aquatic environment.
- Acid Rock Drainage (ARD) Procedures (if required)
  - Site-specific measures will be developed for managing runoff from bedrock that is newly exposed during excavation and/or blasting.
  - An ARD Management Plan will be developed, if required, to manage and mitigate any potential effects from ARD.

7.3.1.3 Fish Mortality

Project activities during construction, operation and maintenance, and decommissioning of the Project have the potential to cause mortality or injury to aquatic organisms (i.e., freshwater fish). Project activities in watercourses for access road construction can include the placement or upgrades of crossing structures, culverts, as well as the placement of materials (e.g., boulders) that support the infrastructure. These activities can cause mortality or injury of fish/eggs/ova from physical crushing as a result of equipment use in watercourses. Sediment, contamination, and excess nutrients have the potential to cause mortality to fish/eggs/ova through the disruption of physiological functions in the organisms. If used in proximity to fish bearing watercourses or waterbodies, explosives have the potential to cause lethal or sublethal effects to fish. Through the blasting of rock or materials, the activity may cause the ejecta to land in adjacent waters where, if present, fish could be harmed or killed. Additionally, the vibrations and sound pressure from the blast can cause damage to internal organs, including swim bladders, which can affect the ability of a fish to regulate buoyancy in the water column, as well as affecting their ability to detect sound or pressure changes (Blanco & Unniappan, 2022; Wright & Hopky, 1998).

Mitigation measures to prevent or reduce loss of fish habitat and change in water quality will also prevent or reduce fish mortality and injury. Project activities in watercourses will be completed in the dry, in the appropriate timing window, and with a fish salvage and relocation program.

Potential Project effects on fish can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on fish will be further detailed in an EPP and will be implemented prior to and during construction.

- Acquire provincial and federal approvals and permits for in-water works.
- Follow recommendations and requirements of the approvals and permits issued for the Project to prevent fish mortality.
- Follow instream work windows to protect fish. In-water works will be conducted between June 1 and September 30, unless otherwise permitted by regulators.
- Equipment will not be used directly in flowing water.
- Follow DFO's Codes of Practice: Temporary Fords: Crossing.
- Isolate the work site with a coffer dam (or similar) and dewater the site.
- Follow DFO's In-Water Site Isolation Standard.
- Avoid the use of explosives, where possible, in the aquatic environment or within the setback from the aquatic environment as per the guideline criteria for substrates as per Wright & Hopky (1998), or as per a distance as directed by DFO. Any storage of explosives will be a minimum of 30 m away from watercourses unless authorized by applicable regulatory authorities.
- Debris from blasting will not be ejected into any watercourses.

7.3.2 Residual Effects

After mitigation, detailed design, and restoration in accordance with permit conditions, significant residual effects in the aquatic environment are not expected in the LAA. Although habitat losses for instream and riparian areas are expected to occur, residual effects from the Project activities would be minor, short-term, and local in impact, resulting in no permanent or significant impacts. Effects to water quality and mortality or injury of fish can be mitigated to avoid significant residual effects.

7.4 Monitoring

If required, a monitoring plan will be developed prior to the start of construction to meet the conditions of any required regulatory permits for the Project, including NSECC

Watercourse Alteration Approvals and DFO *Fisheries Act* Authorization (not expected to be required) for the Project. The monitoring plan, if required, will identify locations and methods to assess the effectiveness of mitigation measures to protect the aquatic environment during construction of the Project. Monitoring locations will be based on the final project design and the location of impacts to the aquatic environment, including culvert and bridge installations or upgrades. Monitoring targets and goals will be determined during the permitting phase of the Project in coordination with the applicable regulatory agency (e.g., DFO, NSECC).

Monitoring locations will be based on pre-construction conditions and will be monitored through construction and post-construction as required by conditions of permits.

- Experienced environmental monitors will be on site during works in or near the aquatic environment to monitor the effectiveness of implemented mitigation measures and to provide support to the construction team for any environmental issues that arise.
- Environmental monitors will be given authority to stop or modify activities that have the potential to cause, or are causing, an adverse impact to the aquatic environment. The environmental monitor will also have Stop Work authority for the entire work site to mitigate an impact to the aquatic environment due to failing or improperly functioning mitigation measures. Details of the environmental monitor's responsibilities and authority will be defined in a Project-specific EPP.

8 Flora

8.1 Overview

This chapter assesses the potential effects of the Project on terrestrial flora, including vegetation communities and individual vascular and non-vascular plant, lichen, and bryophyte species (including SAR and SoCC). Project activities can affect flora through direct pathways, such as habitat loss associated with pre-construction clearing, and through indirect pathways, including habitat modification, degradation, and the introduction or spread of invasive species. Interactions with vegetation communities are closely linked to other VECs assessed in this EIS, including the aquatic environment (Chapter 7), wetlands (Chapter 9), terrestrial wildlife (Chapter 10), bats (Chapter 11), and birds (Chapter 12).

Iterative refinements to the Project layout, including the use of existing roads, previously harvested areas, and the removal of proposed turbines from old-growth and mature intact forest stands, have reduced the potential for adverse effects on vegetation communities. Strategic site planning has been or will be implemented to minimize habitat disturbance, including maintaining vegetated buffers around wetlands and watercourses and prioritizing disturbed or low-quality habitat for infrastructure placement.

Vegetation will be allowed to regenerate in areas of temporary disturbance to mitigate long-term impacts on flora and vegetation communities.

The potential effects, mitigation measures, and residual impacts on terrestrial flora resulting from the Project are described in the following sections. Mitigation measures will be further refined and consolidated into an EPP prior to construction.

8.1.1 Regulatory Context

Assessment of the terrestrial flora considers relevant provincial and federal legislation and guidelines:

- SARA
- *Canadian Environmental Protection Act*
- NSESA
- Nova Scotia *Wildlife Act*
- Nova Scotia *Biodiversity Act*
- Nova Scotia *Environment Act*

- Nova Scotia *Wilderness Areas Protection Act*
- At-Risk Lichens–Special Management Practices (NSDNR, 2018)
- An Old-Growth Forest Policy for Nova Scotia (NSDNR, 2022)
- Nova Scotia Silvicultural Guide for the Ecological Matrix (McGrath et al., 2021)

8.1.2 Boundaries

The AOD represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. The PDA represents the boundaries within which the AOD may occur. For this assessment, the LAA for flora includes the PDA and a 200 m buffer of the PDA. The RAA for flora incorporates the LAA and all contiguous natural habitat areas.

8.1.3 Assessment Methodology

The assessment of terrestrial flora focused on identifying vegetation communities and individual vascular plant and lichen species present or likely to occur in or near the LAA, with emphasis on SAR or SoCC and their habitats. The assessment approach combined a desktop review, habitat analysis, and targeted field surveys.

Information from the desktop review and habitat modelling was used to predict the potential occurrence of SAR and SoCC and to guide survey design. Field surveys were then conducted to confirm habitat conditions, document existing vegetation communities, and detect SAR or SoCC in the LAA. Data collected through this process were used to evaluate the potential effects of the Project on terrestrial flora and to inform iterative refinements to Project design. The findings supported the avoidance of sensitive habitats during siting and the development of mitigation measures to minimize adverse effects during construction, operation, and maintenance.

The description of the existing environment is based primarily on data collected through the following resources plus field surveys carried out for this Project:

- Nova Scotia Significant Species and Habitats Database (NSDNR, 2025)
- AC CDC Data Report (AC CDC, 2025)
- iNaturalist.ca Observation Database (2025)
- Global Biodiversity Information Facility Occurrence Database (2025)
- Nova Scotia Forestry Inventory (Government of Nova Scotia, 2021)
- Predictive Ecosystem Mapping for Nova Scotia (Government of Nova Scotia, 2024)
- Old-Growth Potential Index V2 (NSDNR, 2025)
- An Old Growth Forest Policy (Government of Nova Scotia, 2025)
- Forest Ecosystem Classification for Nova Scotia (2022): Field Guide (Neily et al., 2023)
- Ecological Land Classification 2015 (Government of Nova Scotia, 2018)
- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Nova Scotia Parks and Protected Areas Map (Government of Nova Scotia, 2025)
- Global Forest Watch Tree Cover Loss 2001-2024 (Global Forest Watch, 2025)
- Nova Scotia Forestry Harvest Plan Map (NSDNR, 2025)

- Nova Scotia Wetlands Inventory (Government of Nova Scotia, 2021)
- Nova Scotia Wet Areas Mapping (Government of Nova Scotia, 2012)
- Nova Scotia Topographic Database (Government of Nova Scotia, 2024)
- Nova Scotia LiDAR Data (Government of Nova Scotia, 2024)
- Surficial geology mapping (Government of Nova Scotia, 2021)
- Species at Risk Public Registry documents for federal SAR
- Species at Risk documents for provincial SAR
- Boreal Felt Lichen predictive habitat layer (NSDNR, 2012)
- Nova Scotia Location-sensitive SAR Database (NSDNR, 2025)
- Nova Scotia SAR Core Habitat Data (NSDNR, 2025)
- Critical Habitat for Species at Risk National Dataset – Canada (ECCC, 2025)
- Natural History of Nova Scotia (Davis and Browne, 1996)
- Nova Scotia Plants (Munro et al., 2014)
- Assessment of Species Diversity in the Atlantic Maritime Ecozone (McAlpine and Smith, 2010)

Landcover within 2 km of the PDA was analyzed through the Nova Scotia Forest Inventory layer (this distance was selected to include the habitats covered by the LAAs for the VECs assessed within this document) (Figure 8.1, Appendix A).

A habitat assessment for terrestrial plant and lichen SAR and SoCC known to occur within a 100-km radius of the PDA was completed using available habitat information and species occurrence data, including federal critical habitat and provincial core habitat datasets. This assessment was used to identify areas in the LAA that may support SAR and SoCC and to guide the development of targeted field surveys for potential species and their habitats. Old-growth Forest assessments in the LAA were guided by the Old-Growth Potential Index layer provided by NSDNR through a data-sharing agreement (NSDNR, 2025). In addition, a habitat suitability model was developed to identify areas with potential to support the federally and provincially Threatened Eastern Waterfan (*Peltigera hydrothyria*), an aquatic lichen whose known distribution suggests it may occur in the LAA. Further details on the habitat model are provided below.

8.1.3.1 Eastern Waterfan Habitat Suitability Mapping

A habitat suitability model was developed to assess the extent and distribution of potential Eastern Waterfan habitat in the LAA. Eastern Waterfan is typically found in cool, clear, partially shaded backwater streams outside of the main water flow (COSEWIC, 2013). Its habitat occurs both underwater and along stream margins, although the species can be exposed during periods of receding water levels (COSEWIC, 2013). High humidity and year-round wetness are key habitat requirements, with partial shade playing an important role in maintaining these conditions, particularly during summer months when the lichen may be exposed (Clayden et al., 2011; COSEWIC, 2013). The species has been shown to occur in mature hardwood and mixedwood forests and is generally absent from exclusively softwood stands (S. Haughian, pers. comm., February 15, 2024).

Spatial parameters representing these habitat attributes were aggregated in the GIS-based model, with sites meeting all criteria classified as suitable habitat. Selection of parameters was informed by expert consultation and COSEWIC habitat descriptions. The following spatial datasets were used to identify and characterize suitable habitat:

- Nova Scotia Forestry Inventory (Government of Nova Scotia, 2021) supplemented by Global Forest Watch Tree Cover Loss 2001-2024 (Global Forest Watch, 2025) and recent aerial imagery to identify recent forestry activities
- Nova Scotia LiDAR Data (Government of Nova Scotia, 2024)
- Hydrological data

A GIS-based stream network was generated using a bare-earth digital elevation model (DEM) derived from provincial LiDAR data. Streams were delineated using the D8 flow-routing algorithm with a 4-ha channel initiation threshold, and stream order was assigned using the Strahler classification system (Tarboton, 1991). Only first-order streams were considered suitable for Eastern Waterfan based on expert guidance (S. Haughian, pers. comm., February 15, 2024).

The following attributes were used to model suitable Eastern Waterfan habitat:

- Forest Type – Any stand classified as hardwood or mixedwood
- Stream Order – Any stream classified as 1st order in the Stream Network Model (S. Haughian, pers. comm., February 15, 2024)
- Forest Cover Change – Any site with tree cover loss from 2001 to 2024 was considered unsuitable habitat for Eastern Waterfan. Loss of tree cover renders streams inhospitable to Eastern Waterfan by increasing stream temperature and siltation, and reducing humidity (ECCC, 2021)

8.1.3.1 Field Surveys

The objective of the field surveys was to assess the presence and distribution of flora across the LAA, focussing on SAR and SoCC and their habitats identified during the desktop assessment and in consultation with NSDNR. Field surveys for vascular plants, lichens, and vegetation communities were conducted between April and November 2025. The survey design targeted areas with the highest potential of hosting SAR and SoCC, including mature forests and wetlands, while also covering representative habitat types present across the LAA. Habitats in the LAA considered to be highest-priority areas for plant and lichen species inventory included wetlands, mature or fertile forest areas, floodplains, and old-growth forests. During surveys, forested areas in the PDA and LAA were identified and classified in the field using the Forest Ecosystems Classification for Nova Scotia (2022) (Neily et al., 2023). Sample locations for Forest Ecosystems Classification were situated in areas considered representative of a particular community.

The Old-Growth Potential Index layer was used to identify forest stands occurring on Crown land with a high likelihood of old-growth conditions (i.e., stands ranked 7 to 11) that intersect the PDA or occur within 100 m of proposed infrastructure. In total 27 stands meeting this criterion were identified and assessed in the field. Field surveys to determine old growth forest stands were completed using NSDNR's Old Forest Assessment (2025) scoring procedures.

Surveys for lichens were conducted by an NSDNR-approved lichenologist (Chris Pepper), which is required on provincial Crown lands under the At-Risk Lichens Special Management Practices. Surveys were conducted in the PDA and LAA in areas with high potential to host SAR lichens and in areas predicted as suitable habitat in the Eastern Waterfan modelling. Additional observations of terrestrial flora were gathered as incidental observations during the biological field programs conducted in the LAA including wetlands and with turtle surveys where habitat was suitable for Eastern Waterfan. These incidental observations were included in the assessment of the existing environment.

Field surveys were also completed as part of the MEKS conducted for the Project (CMM, 2025). The methods for these field surveys included measured transition-transects at Vincent's Lake, and scoping/reconnaissance surveys at four additional sites: Arisaig/Nature Reserve, Doctor's Brook/Marsh, South Rights River (Knoydart), and Maple Ridge Road. Plants identified during the MEKS are incorporated into the assessment of the existing environment.

8.2 Existing Environment

8.2.1 Vegetation Communities

The Project is primarily situated in the Pictou-Antigonish Highlands ecodistrict of the Nova Scotia Highlands ecoregion, with some areas of the proposed access roads and transmission line routes occurring in the St. George's Bay ecodistrict of the Northumberlands/Bras d'Or Ecoregion. The Pictou-Antigonish Highlands ecodistrict is an upland landscape characterized by rugged plateaus, steep ravines, and productive wetlands. This ecodistrict is characterised by elevations of approximately 260 to 310 m, contributing to cooler temperatures, higher precipitation, and shorter growing seasons compared to surrounding lowlands (Neily et al., 2017).

Forests in the Pictou-Antigonish Highlands are dominated by tolerant hardwoods such as Sugar Maple (*Acer saccharum*), Yellow Birch (*Betula alleghaniensis*), American Beech (*Fagus grandifolia*), Red Maple (*Acer rubrum*), and White Ash (*Fraxinus americana*). Mixedwood slopes and ravines support Red Spruce (*Picea rubens*), Eastern Hemlock (*Tsuga canadensis*), and Eastern White Pine (*Pinus strobus*), while imperfectly drained depressions feature Balsam Fir (*Abies balsamea*) and Black Spruce (*Picea mariana*) (Davis and Brown, 1997).

According to the Nova Scotia Provincial Landscape Viewer, the Project area includes the following eco-elements:

- Tolerant Hardwood Hills – Well-drained upland soils supporting hardwood-dominated stands with diverse understory species such as Hobblebush (*Viburnum lantanoides*) and Beaked Hazel (*Corylus cornuta*)
- Tolerant Mixedwood Slopes – Mixedwood forest on steep slopes with seepages and springs
- Red Spruce Hummocks – Rolling hills with imperfect drainage dominated by Red Spruce
- Tolerant Mixedwood Hummocks – Upper-elevation plateaus with mixed hardwood and conifer species

Adjacent to the PDA is the Eigg Mountain–James River Wilderness Area, which protects over 7,600 ha of upland forest and wetlands, providing habitat for species such as mainland moose and goshawk.

The majority of the landcover surrounding the PDA is categorized as forested stands (76 percent) with hardwood, softwood, and mixedwood stands comprising 22, 27, and 27 percent, respectively. Other land cover types include clearcut (6 percent) and wetland (4 percent), with the remaining cover types making up less than 1 percent of the total landcover. The outdated forest inventory layer, however, is not representative of current site conditions. Some of the forested lands in the LAA have been subject to industrial forestry operations within the past 20 years. The Global Forest Watch Tree Cover Loss (2001 to 2024) data indicate that 19 percent of the PDA and 16 percent of the LAA has experienced forest loss in this period, additionally forestry activities were observed in the PDA during the 2025 field surveys.

A total of 24 Forest Ecosystems Classification vegetation types (VTs) were identified in the LAA during the field surveys. These are listed below, in Table 8.1.

Table 8.1 Forest Ecosystem Classification Vegetation Types Observed in the LAA

Forest Group	Vegetation Types (VTs)
Flood Plain Forest	FP7 - White ash / Sensitive fern - Meadow rue
Intolerant Hardwood Forest	IH4 - Trembling aspen / Wild raisin / Bunchberry
	IH6 - White birch - Red maple / Sarsaparilla - Bracken
Mixedwood Forest	MW2 - Red spruce - Red maple - White birch / Goldthread
	MW5 - White spruce - Yellow birch / Bunchberry - Wood fern
	MW6 - White spruce - Red maple (White birch) / Starflower / Schreber's moss
	MW7 - Balsam fir - Red maple / Wood-sorrel - Goldthread
	MW8 - White birch - Balsam fir / Starflower
Old Field	OF1 - White spruce / Aster - Goldenrod / Shaggy moss
Spruce Hemlock	SH1 - Hemlock / Needle carpet

Forest Group	Vegetation Types (VTs)
	SH6 - White spruce - Balsam fir / Broom moss
	SH8 - Balsam fir / Wood fern / Schreber's moss
Tolerant Hardwood	TH1 - Sugar maple / Wood fern - Hay-scented fern
	TH2a - Yellow birch variant
	TH2 - Sugar maple / New York fern - Northern beech fern
	TH3 - Sugar maple - White ash / Christmas fern
	TH4 - Sugar maple - White ash / Silvery spleenwort - Baneberry
	TH7 - Yellow birch - White birch / Evergreen wood fern
	TH8 - Red maple - Yellow birch / Striped maple
	TH8a - White ash variant
	TH9 - Red maple - Sugar maple / Hay-scented fern - Evergreen wood fern
Wet Coniferous	WC1 - Black spruce / Cinnamon fern / Sphagnum
	WC6 - Balsam fir / Cinnamon fern - Three seeded sedge / Sphagnum
	WC8 - Hemlock / Cinnamon fern - Sensitive fern / Sphagnum

Eight forest stands in the LAA are classified as old-growth under the Old-Growth Forest Policy (2022) (Figure 8.2, Appendix A). Of the 27 stands selected for field investigation, 19 were found to have been previously harvested or showed evidence of recent forestry treatments (e.g., thinning). Old growth scoring procedures were completed in the remaining eight stands and found that none of the stands met the criteria for old-growth forest. See Figure 8.2 in Appendix A for the locations of assessed stands and Table 8.2 below for scoring results.

Two additional stands were preliminarily assessed for old-growth characteristics in January 2026 along the proposed transmission line corridor, and consultation has occurred with the provincial Old Growth Forest Coordinator regarding these stands. Due to accessibility constraints, full assessments will be completed as soon as site conditions allow.

Table 8.2 Results of the Old-Growth Field Assessments

Stand ID	Stand Size (ha)	Plot #	Species Cored	DBH (cm)	Age (years)	Old Growth Reference Age (years)	Avg. Stand Age	Old Growth Status
B008-02098	4.9	1	SM	32.4	123	140	109	Not Old-Growth
		2	YB	53.3	90			
		3	SM	39.0	115			
B008-02134	4.3	1	RM	28.9	49	140	71	Not Old-Growth
		2	YB	49.3	98			
		3	RM	31.1	67			
	2.6	1	YB	48.9	112	140	93	

Stand ID	Stand Size (ha)	Plot #	Species Cored	DBH (cm)	Age (years)	Old Growth Reference Age (years)	Avg. Stand Age	Old Growth Status
B008-02174		2	SM	48.1	75			Not Old-Growth
		3	YB	40.0	92			
B008-01498	2.9	1	SM	43.3	65	140	94	Not Old-Growth
		2	YB	49.8	115			
		3	YB	41.6	103			
B008-02785	4.2	1	SM	24.7	52	140	46	Not Old-Growth
		2	YB	18.3	40			
		3	YB	15.1	45			
B008-03544	1.1	1	YB	53.7	100	140	105	Not Old-Growth
		2	SM	50.4	95			
		3	YB	48.0	120			
B008-02839	16.5	1	WA	34.7	43	140	103	Not Old-Growth
		2	YB	36.8	63			
		3	YB	36.0	72			
		4	RM	33.3	115			
		5	YB	41.8	90			
		6	HE	40.4	220			
		7	RM	36.9	105			
		8	HE	48.1	115			
B008-02875	1.5	1	TA	33.3	65	140	83	Not Old-Growth
		2	RM	25.1	100			
		3	YB	29.9	85			

[1]SM = Sugar Maple, YB = Yellow Birch, RM = Red Maple, HE = Eastern Hemlock, TA = Trembling Aspen, WA = White Ash

[2]DBH = Diameter Breast Height

8.2.2 Vascular and Non-vascular Flora

The AC CDC (2025) Data Report includes observations of 394 flora SAR and SoCC that have been recorded within a 100 km radius of the PDA (see Appendix F). Of the 394 species, 260 are vascular plants and 134 are non-vascular species (lichens and bryophytes). The NSDNR Significant Species and Habitat Database does not contain any records of species and/or habitat records relating terrestrial flora within a 100 km radius of the PDA.

8.2.2.1 Vascular Plants

The list of SAR and SoCC vascular plant species from the AC CDC database occurring within 5 km of the PDA, along with other available records, is provided in Table 8.3. Black Ash (*Fraxinus nigra*) is the only SAR known to occur within 5 km of the PDA and is considered a location-sensitive species in Nova Scotia. The Nova Scotia location-sensitive species observations layer includes two Black Ash occurrences approximately 5 km east of northern portion of the PDA closest to the turbine layout with additional Black Ash records present in the southernmost portions of the PDA, near Highway 104 (NSDNR, 2025).

Table 8.3 SAR and SoCC Vascular Plant Species Occurring Within 5 km (AC CDC and other available sources)

Scientific Name	Common Name	NSESA	SARA	COSEWIC	AC CDC
Fraxinus nigra	Black Ash	Threatened	-	Threatened	S1
Cyperus lupulinus ssp. *macilentus*	Hop Flatsedge	-	-	-	S1
Parnassia parviflora	Small-flowered Grass-of-Parnassus	-	-	-	S1S2
Lilium canadense	Canada Lily	-	-	-	S2
Erigeron philadelphicus	Philadelphia Fleabane	-	-	-	S2S3
Caltha palustris	Yellow Marsh Marigold	-	-	-	S2S3
Triosteum aurantiacum	Orange-fruited Tinker's Weed	-	-	-	S3
Persicaria arifolia	Halberd-leaved Tearthumb	-	-	-	S3
Lindernia dubia	Yellow-seeded False Pimpernel	-	-	-	S3
Laportea canadensis	Canada Wood Nettle	-	-	-	S3
Carex eburnea	Bristle-leaved Sedge	-	-	-	S3
Carex lupulina	Hop Sedge	-	-	-	S3
Carex tribuloides	Blunt Broom Sedge	-	-	-	S3
Cypripedium parviflorum	Yellow Lady's-slipper	-	-	-	S3
Platanthera grandiflora	Large Purple Fringed Orchid	-	-	-	S3
Potamogeton praelongus	White-stemmed Pondweed	-	-	-	S3
Persicaria amphibia var. emersa	Long-root Smartweed	-	-	-	S3?
Spiranthes ochroleuca	Yellow Ladies'-tresses	-	-	-	S3?
Erigeron hyssopifolius	Hyssop-leaved Fleabane	-	-	-	S3S4
Bidens beckii	Water Beggarticks	-	-	-	S3S4
Packera paupercula	Balsam Groundsel	-	-	-	S3S4
Fagus grandifolia	American Beech	-	-	-	S3S4
Endotropis alnifolia	Alder-leaved Buckthorn	-	-	-	S3S4
Fragaria vesca ssp. americana	Woodland Strawberry	-	-	-	S3S4
Galium aparine	Common Bedstraw	-	-	-	S3S4
Ulmus americana	White Elm	-	-	-	S3S4
Verbena hastata	Blue Vervain	-	-	-	S3S4
Juncus acuminatus	Sharp-Fruit Rush	-	-	-	S3S4
Alopecurus aequalis	Short-awned Foxtail	-	-	-	S3S4
Botrychium matricariifolium	Daisy-leaved Moonwort	-	-	-	S3S4

A total of 239 species of vascular flora were recorded in the LAA (see Table 8.1 in Appendix G for full list of vascular plants observed and Figure 8.3 in Appendix A for survey locations). No SAR vascular plant species were observed; however, two species of SoCC were documented. American Beech (S-rank: S3S4) and Southern Twayblade (*Neottia bifolia*; S-rank: S3) were both detected during field surveys.

American Beech was common and widespread in the PDA and LAA, occurring primarily in tolerant hardwood forest communities. Most individuals showed signs of poor health associated with invasive Beech Bark Disease (*Cryptococcus fagisuga/Neonectria* spp. complex) and Beech Leaf-mining Weevil (*Orchestes fagi*). A single Southern Twayblade individual was observed in a wetland in the PDA, approximately 30 m from a proposed access road.

Of the 239 species of vascular plants, 55 plants considered non-native in Nova Scotia were recorded (Table 8.1 in Appendix G). Two of the species observed, Woodland Angelica (*Angelica sylvestris*) and Japanese Knotweed (*Reynoutria japonica*), are considered invasive species in Nova Scotia (Nova Scotia Invasive Species Council, 2025). A patch of Woodland Angelica was observed in the PDA along the southern portion of Connors Mountain Road and Japanese Knotweed was reported from a few locations along access roads in the PDA.

8.2.2.2 Non-vascular Plants

The list of SAR and SoCC non-vascular plant species in the AC CDC database occurring within 5 km of the PDA as well as other available records are provided in Table 8.4.

Table 8.4 SAR and SoCC Non-vascular Plant Species Occurring Within 5 km (Source: AC CDC)

Scientific Name	Common Name	NSESA	SARA	COSEWIC	AC CDC
Solorina spongiosa	Fringed Chocolate Chip Lichen	-	-	-	S1S2
Peltigera neckeri	Black-saddle Pelt Lichen	-	-	-	S1S3
Collema leptaleum	Crumpled Bat's Wing Lichen	-	-	-	S2S3
Scytinium tenuissimum	Birdnest Jellyskin Lichen	-	-	-	S2S3
Solorina saccata	Woodland Owl Lichen	-	-	-	S3
Scytinium lichenoides	Tattered Jellyskin Lichen	-	-	-	S3
Nephroma bellum	Naked Kidney Lichen	-	-	-	S3
Enchylium tenax	Soil Tarpaper Lichen	-	-	-	S3S4
Scytinium subtile	Appressed Jellyskin Lichen	-	-	-	S3S4
Evernia prunastri	Valley Oakmoss Lichen	-	-	-	S3S4

During the 2025 field surveys, 36 species of non-vascular flora (all lichens) were identified in the LAA (see Appendix G, Table 8.2). One SAR lichen, Eastern Waterfan, was observed during the surveys targeted on this species using the habitat model. Additionally, four SoCC lichens were identified during the field survey program (see Table 8.5).

Table 8.5 List of SAR and SoCC Non-vascular Plant Species Observed During Field Surveys in 2025

Species	Common Name	NSESA	SARA	COSEWIC	AC CDC
Peltigera hydrothyria	Eastern Waterfan	Threatened	Threatened	Threatened	S1
Peltigera collina	Tree Pelt Lichen	-	-	-	S3
Anaptychia palmulata	Shaggy Fringed Lichen	-	-	-	S3S4
Leptogium acadiense	Acadian Jellyskin Lichen	-	-	-	S3S4
Heterodermia speciosa	Powdered Fringe Lichen	-	-	-	S3S4

The habitat suitability mapping predicted four areas of potentially suitable habitat for Eastern Waterfan in the LAA (Figure 8.3, Appendix A). In one of the areas predicted to contain suitable habitat, several individuals of Eastern Waterfan were observed along a 300 m stretch of a shaded watercourse in the central portion of the LAA on Crown land, over 400 m from the nearest proposed turbine or access road.

8.2.2.3 Mi'kmaq Ecological Knowledge Study

The MEKS site visit at Vincent's Lake documented abundant Yellow Birch, Sugar Maple, and American Beech in the forest interior, while clusters of Grey and White Birch, Mountain Maple, Poplar, and Red Berry Elder were observed along the narrow trail leading to the lake. The area around a small gravel clearing next to the lake (likely used as a boat launch and vehicle turnaround) was characterized by early recolonization of Balsam Fir, Red Maple, and Mountain Ash. Beyond the gravel clearing, the landscape becomes softwood dominant, mainly Black Spruce, Red Spruce, and Balsam Fir (CMM, 2025).

8.3 Effects Assessment

8.3.1 Potential Effects and Mitigation

Several changes were implemented to the Project including final AOD refinement around each turbine location, to minimize potential direct and indirect impacts on terrestrial flora, while accommodating engineering and layout constraints.

Direct and indirect effects on flora may occur through multiple, interconnected pathways. Construction activities like vegetation clearing, soil disturbance, and infilling have the potential to cause direct habitat loss for sensitive flora species and communities. Increased road width and density will contribute to vegetation community fragmentation and edge effects. The rise in Project-related vehicle traffic may facilitate the introduction and spread of invasive flora species, decrease air quality including generating dust that can affect vegetation health. While some flora species are adaptable to a variety of habitat types and environmental conditions, others are more specialized when it comes to habitat preferences and requirements. Species that are naturally more specialized, including SAR and SoCC, may be disproportionately affected by direct or indirect habitat loss.

Project activities can affect terrestrial flora as summarized in Table 8.6; identification of these potential effects does not consider the implementation of mitigation measures described herein.

Table 8.6 Potential Environmental Effects of the Project on Terrestrial Flora

Project Activity	Potential Environmental Effects		
	Habitat Loss and Fragmentation	Loss of Flora SAR/SoCC	Degradation of Flora Habitat
Construction			
Site Preparation	X	X	X
Access Roads Construction and Modifications	X	X	X
Material and Equipment Delivery and Storage	-	-	X
Infrastructure Installation	-	-	-
Restoration of Temporary Areas	-	-	-
Testing and Commissioning	-	-	-
Operation and Maintenance			
Turbine Operation and Maintenance	-	-	-
Road Maintenance	-	-	X
Power Line and Substation Maintenance	-	-	X
Vegetation Management		X	X
Safety and Security	-	-	-
Decommissioning			
Removal of Infrastructure and Site Restoration	-	-	X

X = Potential Interaction
- = No Interaction

8.3.1.1 Habitat Loss and Fragmentation

The Project may result in habitat loss and fragmentation for terrestrial flora species in the LAA.

Direct habitat loss will occur though vegetation clearing associated with road widening, construction of new access roads, turbine pads, temporary laydown areas and other Project infrastructure. In the AOD, construction activities may require clearing of up to 2.2 square kilometres (km^2) of relatively undisturbed habitat (i.e., areas not cleared within the last 20 years). Clearing activities will result in both short- and long-term habitat loss and some areas in the AOD will be permanently affected. Following construction, temporary roads and laydown areas will be decommissioned, and restoration will be undertaken to return these areas to natural habitat.

Indirect habitat loss may also occur. Vegetation clearing and soil disturbance can alter surface and groundwater flow patterns resulting in changes to moisture regimes that support flora species or communities dependent on specific hydrological conditions (Hartsog, 1997). Soil compaction from machinery and vehicle traffic may degrade soil structure and nutrient availability, affecting species composition and diversity. Mitigation measures to avoid soil compaction and disruption of surface and groundwater flow pattens are outlined in Sections 6.3.2 and 7.3.2.

Habitat fragmentation may occur where Project infrastructure disrupts contiguous forest cover. Fragmentation can alter canopy structure and moisture regimes, reducing shade and humidity conditions important for certain terrestrial flora species, particularly lichens (Boudreault, 2008). Fragmented habitats may also affect plant-pollinator interactions as both habitat size and connectivity directly or indirectly influence pollinator abundance and movement (Yian, 2016).

Eastern Waterfan was observed during the 2025 surveys in the LAA but not in the AOD. Habitat of this species is not expected to be affected by the Project, as no clearing is expected to occur within the recommended buffers established by ECCC-CWS (a 50 m riparian buffer on both sides of occupied streams, including tributaries, within a 1 km radius of each occurrence) and by NSDNR (a 200 m buffer around occurrences in accordance with the *At-Risk Lichens–Special Management Practices*; NSDNR, 2018).

Habitat loss and fragmentation resulting from vegetation clearing have been and will continue to be minimized through strategic site planning. This includes refinement of the final AOD at each turbine location. Direct impacts related to habitat loss and fragmentation to flora species and their habitat in the LAA will be minor due to the quality and extent of habitat affected and the application of avoidance and mitigation strategies. The iterative Project design process has prioritized reducing interactions with sensitive terrestrial flora habitat including wetland and mature forests.

In addition to the measures implemented at the design stage, which included prioritizing use of existing roads, minimizing the AOD and avoiding sensitive habitats to the extent possible, potential Project effects related to habitat loss and fragmentation will be mitigated through planning and management of construction activities. The following key measures will be implemented prior to and during construction to mitigate potential effects of the Project on terrestrial flora and associated habitats.

- Existing roads and areas that have been previously altered, such as harvested areas will be prioritized.
- Watercourse crossings, both temporary and permanent, will be constructed in accordance with current applicable guidelines and regulatory requirements, and will be maintained for the duration of the Project.

- Natural vegetation, topsoil, and useable grubbed material will be preserved and reused where feasible to promote reestablishment of native vegetation though existing seed banks.
- Vegetated buffers around wetlands and watercourses will be maintained to support habitat connectivity where possible.
- To minimize the impacts of habitat loss during operation, vegetation will be maintained in cleared areas by removing taller vegetation while preserving low vegetation that does not interfere with Project infrastructure or site access when applicable.
- The Proponent will develop and implement ESC procedures to avoid sedimentation and protect vegetation and habitat.

8.3.1.2 Loss of Flora SAR/SoCC

Field surveys identified seven flora species listed as SAR or SoCC in the LAA. Eastern Waterfan, an aquatic lichen SAR, will not be directly removed through Project clearing activities. Clearing activities can indirectly affect Eastern Waterfan, which are very sensitive to siltation and sedimentation. Appropriate clearing buffers will be developed in consultation with ECCC-CWS and NSDNR to minimise the indirect impacts related to sedimentation, hydrological changes, or shade loss.

Habitat loss from clearing activities has been and will continue to be minimized through strategic site planning, including the final AOD refinement around each turbine location. However, clearing may result in the loss of vascular and non-vascular SoCC flora, including American Beech and terrestrial lichen species.

Potential Project effects related to loss of flora SAR/SoCC can be effectively mitigated through planning and management of construction activities. The following key measures will be implemented prior to and during construction to mitigate potential effects of the Project on terrestrial flora SAR and SoCC.

- Project personnel will be educated on possible SAR and SoCC that may occur in the LAA.
- NSDNR will be consulted if an unexpected flora SAR or SoCC is encountered during construction activities. Mitigation measures based upon consultation will be implemented to reduce the loss of sensitive flora.
- The Proponent will develop and implement surface water management and erosion and sediment control procedures.

8.3.1.3 Habitat Degradation

Terrestrial flora, including rare species, may be affected by habitat degradation resulting from activities. Construction and associated activities can accelerate natural processes or directly degrade habitats though erosion of soils, sedimentation, altered hydrology, reduced air quality, soil compaction, disturbance of plant communities and the introduction and spread of invasive species.

Soil erosion can be exacerbated on unvegetated surfaces exposed to rainfall exceeding infiltration rates, such as roads and cleared areas. Sediment transport from erosion can reduce soil productivity in terrestrial flora habitats (Al-Kaisi, 2000). Erosion sediment deposited into wetlands or watercourses can impair their function, potentially impacting terrestrial flora and aquatic habitats (Gleason and Euliss, 1998). Mitigation measures to reduce effects of soil erosion and siltation include ESC measures such as installing silt fencing and mulching of bare soil and the development and implementation of surface water management procedures.

Fragmentation of habitat in the Project area may create edge habitats, which can affect habitat suitability by altering moisture regimes and microclimatic conditions. Edge habitats are exposed to increased light, dust, and wind (Chen, 1993), causing short-term impacts such as increased susceptibility to windthrow (Esseen, 1994) and disrupting localized moisture and light regimes that may impact sensitive species including lichens (Green and Lange, 1994).

Construction and operational activities may increase the presence and spread of invasive plant species. Non-native species, introduced intentionally or unintentionally by humans, can out-competing native flora, altering species composition and habitat quality (Invasive Species Centre, 2025). Several invasive species were observed in the PDA. Soil disturbance and construction activities, along with unintentional seed movement during operation and maintenance, may facilitate their spread.

Air quality changes, including dust and emissions, can impact terrestrial flora. During the construction phase, road development, blasting, and soil disturbance may increase fugitive dust and particulate matter, affecting photosynthesis as they settle on flora surfaces (Farmer, 1993). Accumulation of dust on the soil surface and organic litter can alter soil properties. Airborne contaminants from vehicle exhaust and construction-related products may also affect the terrestrial flora community. They can enter the natural environment by settling on the ground or being absorbed directly from the air. Lichens and other non-vascular flora are particularly susceptible because they absorb moisture and particles directly from the air (Canters et al., 1991).

Potential Project effects related to habitat degradation can be effectively mitigated through planning and management of construction activities. The following key measures will be implemented during Project activities to mitigate potential degradation of habitats for terrestrial flora.

- The Proponent will develop and implement surface water management and erosion and sediment control procedures. ESC materials such as sediment fencing or mulch will be applied to unvegetated areas to limit sedimentation into adjacent wetlands or watercourses, or other upland habitats. These erosion prevention materials will be maintained for the duration of the Project as needed to ensure the transportation and deposition of sediment is minimized.

- Vehicular traffic and the staging of equipment will occur on designated roads and laydown areas.
- Alternative road de-icing methods may be employed during winter road maintenance to prevent salt impacts on terrestrial flora habitats.
- Invasive species management procedures will be developed and implemented for construction and operation as part of the Vegetation Management Plan.
- Vehicle and equipment emissions will be managed through regular maintenance on machinery avoidance of unnecessary idling, and minimization of haul distances.
- Construction-related fugitive road dust will be controlled through speed limits on access roads, road watering and limiting construction during high wind events.
- Disturbed areas will be revegetated as soon as practical to limit dust and erosion of soils. Temporarily stockpiled materials will be dampened during dry periods.

8.3.2 Residual Effects

While the impacts on vascular and non-vascular terrestrial flora may vary, the primary concerns involve habitat loss, fragmentation, loss of rare species, and degradation of flora habitat, including the introduction and spread of invasive species. Proposed mitigation and monitoring measures are designed to minimize these effects, which are expected to be of minor magnitude and localized. Residual effects are expected to be long-term for habitat loss and rare species, and variable for other impacts.

Some residual effects related to habitat degradation may be intermittent during construction, operation and maintenance, and decommissioning phases, corresponding with periods of onsite activity. If mitigation measures are properly implemented the severity and duration of these effects is expected to be low.

With careful detailed design of Project infrastructure to avoid sensitive habitats, combined with active habitat restoration and enhancement efforts, the effects on terrestrial flora (both rare and common species) are not expected to be significant. Residual effects are expected to be minor, local, seasonally varied, and reversible.

Based on current site conditions, the impact assessment, and the mitigation measures implemented or planned for construction, the overall residual effects on terrestrial flora are predicted to be not significant.

8.4 Monitoring

No monitoring is proposed for this VEC.

9 Wetlands

9.1 Overview

The wetland VEC is composed of all provincially regulated wetlands (greater than 100 m^2 in size) that may interact with the Project. The wetland VEC encompasses each wetland habitat type and function assessed in the PDA, and project impacts to wetland habitat in the AOD.

Wetlands are generally defined as habitats with water at or near the surface, with low water flow and saturated (i.e., hydric) soils, and are host to hydrophytic plants that thrive in wet conditions. Wetlands are routinely categorized by form as marshes, swamps, fens, or bogs. Wetland resources support a variety of essential hydrologic, ecological, and socio-economic functions. Wetlands function in the conservation of biodiversity and maintenance of watershed health, including surface water and groundwater quantity and quality. Wetlands are closely related to other VECs assessed in this EA. Impacts to wetlands can affect surface water, groundwater, and essential habitat for terrestrial and aquatic flora and fauna. The potentially interacting VECs are discussed in their respective chapters and include the geophysical environment (Chapter 6), aquatic environment (Chapter 7), flora (Chapter 8), terrestrial wildlife (Chapter 10), bats (Chapter 11), and birds (Chapter 12).

Environmental baseline survey results informed iterative refinements to the turbine layout, Project roads, and associated infrastructure to avoid or reduce potential adverse effects on multiple VECs, including wetlands. These refinements are reflected in the proposed AOD. For the two transmission line options, field surveys will be conducted and estimated wetland impacts will be refined during the 2026 seasonal window for wetland permitting.

As it was not possible to avoid all wetlands on the site, the Project will have some direct and indirect impacts on wetlands via loss of wetland habitat and function in the AOD, with the potential to affect wetland function in the LAA and RAA during construction, operation and maintenance, and decommissioning. Site works in the AOD will involve clearing of wetland vegetation and disturbance of wetland soil—both having potential impacts to wetland vegetation communities, hydrology, and wetland function. Changes to the Project layout were implemented to avoid wetlands where possible, and mitigation measures will be used to protect adjacent wetland habitat and function. For wetlands that are temporarily altered, restoration will be conducted to a feasible extent. Wetland compensation, determined through consultation with NSECC, will be completed to offset wetland loss that cannot be avoided.

9.1.1 Regulatory Context

The assessment of wetlands considers the relevant federal and provincial legislation, regulations, and policies in place for wetland protection:

- Nova Scotia *Environment Act*
- Nova Scotia Wetland Conservation Policy
- SARA
- NSESA

9.1.2 Boundaries

The AOD represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. The PDA represents the boundaries within which the AOD may occur. The LAA and RAA boundaries are defined as follows for the wetland VEC.

- A wetland LAA of 500 m was chosen to extend beyond the PDA to a representative distance where potential measurable effects on the wetland VEC may occur. Effects on wetland habitat, hydrology, and function may extend downstream of direct disturbance in the PDA, reaching into the LAA. NSECC has defined the wind turbine setback for wetlands to be 30 m from the area of disturbance, which has been considered in the LAA definition. To accommodate variations among wetlands, a conservative buffer has been applied. Parameters, including wetland classification, location, topography, watershed hydrology, soil parent material, vegetation species, and community diversity will influence the extent of the potentially affected area. The LAA has been chosen based on the recognition that potential effects on individual wetlands will vary.
- The wetland RAA is 1 km surrounding the PDA and was chosen to incorporate the total field and desktop delineated wetland area. The RAA is used to assess potential broader effects of the Project from interaction with other activities, predominantly forestry operations. There is evidence of historical logging in the RAA and many active forestry operations that currently intersect with wetlands in the PDA. The RAA informs the assessment of cumulative effects resulting from activities such as current forestry operations.

9.1.3 Assessment Methodology

The assessment of wetlands focused on wetland habitat intersecting with the PDA. Existing wetland conditions were assessed through desktop review, predictive wetland modelling, and field surveys. Predictive wetland modelling informed targeted field surveys for wetland delineation and functional assessment. The data collected from this assessment were used to evaluate the impact of the Project on wetland habitat. This information was used to inform the siting of Project infrastructure and to develop mitigation measures for adverse Project impacts in the AOD.

The description of the existing environment is based primarily on data collected through the following resources plus field surveys carried out for this Project:

- NSDNR wetlands database (NSDLF, 2001)
- NSECC LiDAR Wet areas mapping (which depicts predicted depth to water table)
- NSDNR Forest Inventory
- Provincial topographic data
- Recent aerial imagery (Pictometry)
- Light Detection and Ranging (LiDAR) imagery and elevation data
- Nova Scotia Geomatics Centre high resolution digital orthoimagery

9.1.3.1 LiDAR Predicted Wetland Mapping

CBCL developed predictive wetland modelling for field surveys. The best available topographic and imagery data from the Nova Scotia Elevation Explorer data portal were compiled and reviewed. A 1-m resolution LiDAR digital elevation model was acquired to identify the landforms and drainage conditions of the site that are conducive to wetland formation. Based on the LiDAR digital elevation model, a depth-to-water-table model was generated, consistent with techniques used by White et al. (2012). The result of this modelling was a theoretical water table position, indicative of wetland hydrology, for the LAA. The LiDAR depth to water table model was used along with slope and watercourse mapping to generate contours, which were compared with provincial wetland mapping and wetlands visible from aerial imagery. Predicted wetland polygons for field maps were then generated from this modelling. Predicted wetlands that intersected with the PDA were cross-referenced with high-resolution aerial imagery prior to field surveys to refine predictions and improve accuracy.

9.1.3.2 Wetland Delineation Surveys

CBCL's qualified wetland assessors conducted formal delineations and functional assessments of wetlands identified in the PDA, including proposed turbines, access roads, and temporary laydown areas. Field surveys were conducted between June 12 and November 12, 2025. CBCL did not deviate from the standard delineation protocol save for extending the survey outside of the growing period, which was granted by NSECC, permitting surveys until the end of November (M. Dulmage, pers. comm., September 26, and November 21, 2025).

Due to timing and design iterations for the proposed transmission lines, several provincially mapped wetlands intersecting with the three transmission line options were not field verified and formally assessed in the 2025 seasonal window for wetland delineation. These data gaps are identified in the following sections. Wetlands intersecting with the transmission lines were identified at a desktop level. The provincially mapped wetland area that may be impacted has been included in the effects assessment. These wetlands within the AOD of the selected transmission corridor will be assessed during the 2026 growing season (June 1 to September 30) to support future wetland alteration permitting.

The portions of the wetlands within the PDA (excluding the transmission corridor options) were field delineated, with some exceptions where wetland connectivity needed to be field verified. Wetlands were delineated only if their size was greater than 100 m^2 (i.e., the minimum size for regulated wetlands, according to NSECC regulations). Field data was regularly provided to the Proponent during the wetland surveys to inform modifications to the AOD with the intent of minimizing wetland alterations. Wetlands intersecting the AOD have been included in the wetland results. The wetland area intersecting with the AOD has been calculated to characterize potential direct loss of wetland habitat in the effects assessment.

Individual wetlands were delineated and classified using the US Army Corp of Engineers *Wetlands Delineation Manual* (US Army Corp of Engineers (USACE), 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (USACE, 2012). Wetland boundaries and delineation data were collected using the ArcGIS applications QuickCapture and Survey 123 (at least 3 to 5 m accuracy). Wetland boundaries were walked and mapped. Wetland areas outside of the PDA (within the LAA and RAA) were interpreted upon completion of the field program using a combination of the LiDAR digital elevation model and depth to water table models, as well as aerial photos.

Wetlands were classified using the Canadian Wetland Classification System (National Wetlands Working Group, 1997). Where complexes of multiple wetland types were present, wetland types were named by leading with the dominant class following with the adjoining or subordinate class(es).

Observations on wetland types, water flow path, dominant vegetation communities, fish habitat potential, wetland function, and SAR/SoCC (if present) were recorded. Wetland inflows and outflows were georeferenced where encountered, along with observations of culverts and ditches. Evidence of wetland disturbance was noted when observed. Hydrologic connections to other wetlands, watercourses, and waterbodies were determined.

The wetland delineation procedure identifies the wetland-upland interface and is based on the presence of the following three environmental parameters:

- Hydrophytic vegetation
- Hydric soils
- Wetland hydrology

To determine a wetland, all three parameters must be present. Sampling points were established at representative locations in the subject wetland, and in the adjacent upland habitat. Subsequently, a wetland-upland interface condition was determined and used to delineate the wetland boundary in the PDA.

Hydrophytic Vegetation

Hydrophytic vegetation refers to plant species that have adapted to living in saturated soils (USACE, 1987). The Nova Scotia Wetland Indicator Plant List (NSECC, 2012) was used to determine the associated wetland indicator status for applicable vegetation. Wetland indicator status can be summarized as the probability or likelihood of a species occurring in wetland versus non-wetland habitat. The percent cover and wetland status indicator of plant species at each sampling location was visually assessed and recorded for varying plot sizes according to the vegetation stratum (10 m for trees, 5 m for shrubs, and 2 m for herbs) to determine if hydrophytic vegetation was dominant in each of the sample locations.

Hydric Soils

Hydric soils are formed as a result of prolonged periods of saturation, flooding, or ponding during the growing season, resulting in anaerobic (oxygen-free) conditions (US Department of Agriculture (USDA) Natural Resources Conservation Service, 1994).

Hydric soil indicators were identified as per the *Field Indicators of Hydric Soils in the United States* (USDA, 2017). Hydric soil is summarized in Appendix H, Table 1, using the field indicator codes (i.e., A1 for Histosol, A2 for Histic Epipedon, etc.). Soil samples were collected using a soil auger to an approximate depth of 50 cm or to the point of refusal, then visually assessed to identify conditions in the wetland and upland soils. Soil horizons were profiled by their texture, thickness, and colour using a Munsell Soil Colour Chart (Kollmorgen Instruments Company, 1990), and the presence of hydric soil indicators (where applicable).

Wetland Hydrology

Wetland hydrology is characterized by periodic inundation or soils that are saturated to the surface at some point during the growing season. Wetland hydrology indicators were recorded where observed at determination plots and in the surveyed wetland area. Wetland hydrology is summarized in Appendix H, Table 1, using the field indicators codes (i.e., A1 for surface water, A2 for high water table, etc.).

9.1.3.3 Wetland Functional Assessment

Wetland functional assessments were completed for each wetland using the Non-tidal *Wetland Ecosystem Services Protocol for Atlantic Canada* (WESP-AC V 3.3) (Adamus, 2018), a functional assessment technique required by NSECC as part of wetland alteration applications. Physical parameters such as pH, TDS, and conductivity were measured when surface water was present. The desktop functional assessment component was conducted after the field portion had been completed.

WESP-AC characterizes and ranks 19 individual ecosystem functions and their associated benefits (Table 9.1) based upon input with upwards of 129 ecological characteristics (indicators) into a logic-based model. The WESP-AC calculator incorporates the responses from desktop, field, and stressor questions to determine whether the functions and associated benefits are Low, Moderate, or High in comparison to baseline wetland scores in Nova Scotia.

Table 9.1 WESP-AC Ecosystem Functions and Benefits

Function	Definition	Potential Benefit
Hydrologic Functions		
Surface Water Storage	The effectiveness for storing runoff or delaying the downslope movement of surface water for long or short periods.	Flood control and maintaining ecological systems
Stream Flow and Temperature Support	The effectiveness for contributing to streamflow, and to water cooling, especially during the driest part of a growing season.	Supporting fish and other aquatic life
Water and Climate Protection Functions		
Sediment and Toxicant Retention & Stabilisation	The effectiveness for intercepting and filtering suspended inorganic sediments and toxins, thus allowing their deposition; reducing current velocity; resisting erosion; and stabilizing underlying sediments or soil.	Maintaining quality of receiving waters and protecting shoreline structures from erosion.
Phosphorus Retention	The effectiveness for retaining phosphorus for long periods (>1 growing season).	Maintaining quality of receiving waters
Nitrate Removal & Retention	The effectiveness for retaining particulate nitrate and converting soluble nitrate and ammonium to nitrogen gas while generating little or no nitrous oxide (a potent GHG).	Maintaining quality of receiving waters
Wildfire Resistance	A wetland's capacity to resist ignition by wildfire and/or to resist sustaining it once burning, thus potentially limiting, or delaying wildfire spread to other areas.	Maintaining quality of receiving waters. Protection from wildfires.
Carbon Stock Preservation	The ability of wetland processes to preserve the total biomass of organic carbon as it accumulates over time in a wetland's soil/sediment (an attribute, not a function).	Maintain carbon sequestration.
Carbon Capture	The effectiveness of a wetland both for retaining incoming particulate and dissolved carbon and converting carbon dioxide gas to organic matter (particulate or dissolved) through photosynthesis. The effectiveness to then retain that organic matter on a net annual basis for long periods while emitting little or no methane (a potent GHG).	Increase carbon sequestration and prevent the release of GHG.
Organic Nutrient Export	The effectiveness for producing and subsequently exporting organic nutrients (mainly carbon), either particulate or dissolved. It does not include exports of carbon in gaseous form or as animal matter.	Supporting food chains in receiving waters

Function	Definition	Potential Benefit
Ecological (Habitat) Functions		
Aquatic Primary Productivity	The capacity to support aquatic primary productivity and provide nutrients and energy to higher trophic levels and organisms.	Supporting aquatic food webs and contributing to local biodiversity
Anadromous Fish Habitat	The capacity to support an abundance and diversity of native anadromous fish for functions other than spawning.	Supporting recreational and ecological values
Resident and Other Fish Habitat	The capacity to support an abundance and diversity of native non-anadromous fish.	Supporting recreational and ecological values
Amphibian Habitat	The capacity to support or contribute to an abundance and diversity of native amphibians (e.g., frogs, toads, salamanders) and turtles.	Maintaining regional biodiversity
Waterbird Feeding Habitat	The capacity to support an abundance and diversity of waterbirds that migrate or winter but do not breed in the region.	Supporting hunting and ecological values; and maintaining regional biodiversity
Waterbird Nesting Habitat	The capacity to support an abundance and diversity of waterbirds that nest in the region.	Maintaining regional biodiversity
Raptor & Wetland Songbird Habitat	The capacity to support an abundance and diversity of native raptors and wetland songbirds.	Maintaining regional biodiversity
Keystone Mammal Habitat	The capacity to support keystone mammals in the region.	Maintaining regional biodiversity
Native Plant Habitat	The capacity to support a diversity of native vascular and non-vascular species and functional groups, especially those that are most dependent on wetlands and water.	Maintaining regional biodiversity and food chains
Pollinator Habitat	The capacity to support pollinating insects and birds.	Maintaining regional biodiversity and food chains

9.1.3.4 Wetlands of Special Significance

The Nova Scotia Wetland Conservation Policy (Nova Scotia Environment, 2019) stresses the importance of conserving wetlands and their ecological functions, particularly Wetlands of Special Significance (WSS). According to the policy, WSS are defined as the following:

- Salt marshes
- Wetlands within, or partially within, a designated Ramsar site, provincial wildlife management area, provincial park, nature reserve, wilderness area, or lands owned or legally protected by non-government charitable conservation land trusts
- Intact or restored wetlands that are project sites under the North American Waterfowl Management Plan and secured for conservation through Nova Scotia Eastern Habitat Joint Venture
- Wetlands that support SAR that are designated under the SARA or the NSESA

- Wetlands in designated protected water areas as described in the *Environment Act* (Section 106)

Wetlands identified in the AOD were assessed to determine if they meet the criteria of WSS. Additionally, the WESP-AC indicated whether assessed wetlands are WSS.

There is currently no clear definition for WSS based on the presence of mobile SAR. As suggested by NSECC, a wetland is considered a WSS based on the presence of mobile SAR (e.g., birds and bat species that are provincially listed as Threatened or Endangered) if the subject wetland provides or supports life functions for the SAR (e.g., a SAR bird species observed during the breeding period in their preferred habitat). NSECC confirmed that the determination of a WSS based on the presence of a mobile SAR should be based on current observations during field surveys in support of this EA, rather than historical records (e.g., AC CDC records).

9.2 Existing Environment

9.2.1 Wetland Identification and Area

Wetland identifiers were numbered sequentially as they were delineated. Wetland results are provided in Appendix H and were mapped according to a grid system in Figures 9.A1-A3, 9.B1-B3, and 9.C1-C4 (Appendix A). The provincially mapped wetlands intersecting with the transmission line options are numbered following the sequence of the field delineated wetlands.

A total of 32 wetlands were identified within the entire PDA. The existing conditions for wetlands in the PDA are described for the northern portion, where wetlands were field delineated and assessed to inform the turbine and access road layouts, and the southern portion, where wetlands were identified through desktop information for the two transmission line options.

Northern PDA

Fourteen wetlands within the northern PDA were formally delineated during the field surveys. Ten of these field delineated wetlands intersect with the AOD (Appendix H, Table 1). The number and total area of wetland types delineated in the northern PDA and LAA are outlined in Table 9.2.

Table 9.2 Summary of Field Verified Wetland Types within the Northern PDA

Wetland Type	Total Count in PDA	Total Delineated Area in PDA (ha)	Total Wetland Area in LAA (ha)
Treed Swamp	3	3.2	8.5
Shrub Swamp	7	1.8	6.6
Shrub Fen	1	1.0	5.5

Wetland Type	Total Count in PDA	Total Delineated Area in PDA (ha)	Total Wetland Area in LAA (ha)
Shrub Bog	1	0.1	2.1
Complexes	2	9.0	216.1

Several wetland types (bog, fen, and swamp) were encountered within the PDA. Some wetlands encountered consisted of complexes of multiple wetland types.

Of the 14 wetlands within the northern PDA, 10 are classified as swamps. Most of the swamps within the northern PDA were hydrologically connected with some water features flowing through or out of the wetland, ranging from subsurface flow to defined watercourses. One swamp (WL13) within the northern PDA is known, or likely, to support fish. The hydric soils within the swamps were indicated by organic layers of varying depths ranging from approximately 5 to 20 cm, underlain by a rock or gravel restricting layer.

Within the northern PDA, three wetlands were classified as a fen or a fen-swamp complex. Fens within the northern PDA were predominantly throughflow peatlands with shallow to deep peat (greater than 40 cm in depth). All fens within the northern PDA are known, or likely, to support fish.

Within the northern PDA, one wetland (WL02) was classified as an outflow basin peatland characterized by deep peat (greater than 40 cm in depth). WL02 is known to be fishless.

Transmission Line Options PDA

There are 18 provincially mapped wetlands identified within the transmission line options combined PDA. Provincially mapped wetlands potentially intersect with the transmission line options AODs: seven in Option A and five in Option B Desktop identified wetlands within the transmission line options PDA and AOD are outlined in Table 9.3. Option C is not presented as this option is no longer under consideration (Figure 2.1, Appendix A).

Table 9.3 Summary of Provincially Mapped Wetland Types within the Transmission Line Options PDA & AOD

Wetland Type	Total Count in Option A AOD	Total Count in Option B AOD	Total Wetland Area in PDA (ha)
Unclassified Open Wetland	1	1	0.5
Treed Swamp	2	1	23.7
Shrub Swamp	2	1	22.0
Marsh	1	1	17.4

9.2.2 Wetland Functional Assessment

WESP-AC scores were calculated for 14 wetlands within the PDA and detailed results are provided in Appendix H, Tables 2 and 3. Lower, moderate, and higher scores are colour-coded (green, yellow, and red, respectively) to illustrate the normalized scores used to determine each function rating, which are summarized in Appendix H, Table 2. Function scores for wetlands within the PDA are provided in Appendix H, Table 2, and summarized by percentage of Project wetlands for each wetland function in Table 9.4. Project wetlands performed lower to moderate for hydrologic, water and climate protection functions, and ecological functions; 57 percent scored higher for keystone mammal habitat and 93 percent scored higher for pollinator habitat.

Table 9.4 Summary of PDA Wetland Function Performance

Summary of Function Scores (Percentage of Project Wetlands)		
Lower	**Moderate**	**Higher**
• Wildfire Resistance (93%) • Carbon Capture (57%) • Aquatic Primary Productivity (79%) • Anadromous Fish Habitat (93%) • Resident Fish Habitat (64%) • Amphibian Habitat (50%) • Waterbird Feeding Habitat (71%) • Waterbird Nesting Habitat (79%)	• Surface Water Storage (57%) • Stream Flow & Temperature Support (57%) • Sediment & Toxicant Retention & Stabilization (57%) • Phosphorus Retention (57%) • Nitrate Removal & Retention (64%) • Carbon Stock Preservation (79%) • Organic Nutrient Export (43%) • Amphibian Habitat (50%) • Raptor & Wetland Songbird Habitat (100%) • Native Plant Habitat (50%)	• Pollinator Habitat (93%) • Keystone Mammal Habitat (57%)

9.2.3 Wetlands of Special Significance

Five wetlands in the PDA were determined to be WSS because they occur within the protected Eigg Mountain-James River Wilderness Area: WL01, WL02, WL04, WL05, and WL06.

No wetlands in the AOD were determined to be WSS based on the results of the WESP-AC assessment. No flora SAR designated under the SARA or the NSESA were observed in Project wetlands. One wetland (WL07) could be designated as a WSS based on CBCL field collected SAR data (Table 9.5), but it is unlikely the SAR utilized the habitat to support a life function. Final determination of WSS designation of WL07 will be made by NSECC. Table 9.5 outlines the presence of mobile avian SAR found in Project wetlands. All of these, except for WL07 are already designated as WSS based on their presence within the protected Eigg Mountain-James River Wilderness Area.

The MEKS indicates that wetlands and wetland headwaters in the Eigg Mountain area are known to support SAR like the Brook Floater Mussel, and American Eel and Atlantic Salmon habitat. There are currently no confirmed records of the Brook Floater Mussel in the watersheds overlapping the PDA. A search of the DFO's Aquatic Species at Risk map indicates there are no records of Atlantic Salmon or American Eel in the vicinity of the Eigg Mountain PDA or in the intersecting watersheds.

Table 9.5 Presence of SAR in PDA Wetlands

Wetland ID	Type	SAR Presence	WSS Rationale
WL01	Treed Swamp-Fen Complex	Olive-sided Flycatcher (*Contopus cooperi*)	Endangered, listed under NSESA Threatened, listed under SARA Three individuals observed (June 12 and 13, and July 3, 2025) during the breeding period in Spruce dominated habitat (i.e., suitable nesting habitat for the species). Breeding evidence: Probable
		Evening Grosbeak (*Hesperiphona vespertina*)	Vulnerable, listed under NSESA Special Concern, listed under SARA Three individuals observed (June 13 and 14, 2025) during the breeding period in coniferous and mixed forest habitat (i.e., suitable nesting habitat for the species). Breeding evidence: Probable
WL04	Treed Swamp	Evening Grosbeak	One individual observed (May 14, 2025) during the breeding period in coniferous dominated habitat (i.e., suitable nesting habitat for the species). Breeding evidence: Probable
WL06	Fen	Olive-sided Flycatcher	One individual observed (July 3, 2025) during the breeding period in Spruce dominated habitat (i.e., suitable nesting habitat for the species). Breeding evidence: Probable
WL07	Shrub Swamp	Evening Grosbeak	One individual observed once (April 29, 2025) during the breeding period in deciduous Speckled Alder dominated habitat (i.e., not nesting habitat for the species). Breeding evidence: Unlikely

9.3 Effects Assessment

9.3.1 Potential Effects and Mitigation

Avoidance is the first step outlined in the process for wetland conservation (Nova Scotia Environment, 2019). Wetland delineation data in the PDA were used to inform the design of the AOD, resulting in refinements that avoid and minimize wetland impacts while meeting engineering and design constraints. The layout was also developed to make use of existing roads where feasible, reducing new disturbance and minimizing landscape fragmentation.

Wetland impacts at T2, T14, and T22 are expected to be less than what is currently presented. The AOD at each turbine location includes a buffer around the expected ground disturbance, portions of which may not be impacted. Wetlands will be avoided to the extent practicable through micrositing. Two alternate turbine locations (A3 and A24) have been chosen to allow for flexibility during detailed Project design. Wetland area that falls within these alternate turbine locations will not be impacted if they are not chosen for construction.

Direct and indirect effects of the Project on the wetland environment could occur through several interconnected pathways. Project construction can result in alteration and loss of wetland habitat via direct disturbance. Impacts to wetland hydrology and wetland function may occur during Project operation and maintenance, and decommissioning. Indirect effects are expected to be lesser in comparison to the expected direct loss of wetland area.

The effects can result from short-term activities during the construction phase as well as long-term activities during Project operation and maintenance. Project construction activities, predominantly earthworks, will result in immediate alteration and loss of wetland habitat. Excavation activities can lead to changes in the local groundwater regime with potential indirect effects on wetland hydrology. Project activities can affect the wetland environment as indicated in Table 9.6; identification of these potential effects consider the AOD of the Project but does not consider the implementation of mitigation measures described herein.

Table 9.6 Potential Environmental Effects of the Project on Wetlands

Project Activity	Potential Environmental Effects		
	Loss of Wetland Habitat	Change in Wetland Hydrology	Change in Wetland Function
Construction			
Site Preparation	X	X	X
Access Roads Construction and Modifications	X	X	X
Material and Equipment Delivery and Storage	-	-	X

Project Activity	Potential Environmental Effects		
	Loss of Wetland Habitat	Change in Wetland Hydrology	Change in Wetland Function
Infrastructure Installation	X	X	X
Restoration of Temporary Areas	-	-	-
Testing and Commissioning	-	-	-
Operation and Maintenance			
Turbine Operation and Maintenance	-	-	-
Road Maintenance	X	X	X
Power Line and Substation Maintenance	X	-	X
Vegetation Management	X	X	X
Safety and Security	-	-	-
Decommissioning			
Removal of Infrastructure and Site Restoration	-	-	-

X = Potential Interaction
- = No Interaction

There are specific Project activities that could impact wetland resources.

- Vegetation clearing and grubbing activities during site preparation and maintenance may directly impact wetlands and could lead to changes in vegetation species/community diversity and structure, altered hydrology, or wetland function in downstream wetland areas.
- Site preparation activities involving earthworks (e.g., use of heavy equipment for excavation, grading) may directly impact wetlands by partially or completely infilling wetland area. Direct impacts are expected in the AOD.
- Upgrades to existing roads, new roadbed preparation, and construction of turbine foundations may introduce fill and compact wetland soil, potentially affecting wetland hydrology and function. Introduction of non-native or invasive plant species may occur as a result of introduced fill material.
- Blasting and foundation construction could disturb local bedrock and potentially impact wetland hydrology and subsequent wetland function through alterations to groundwater flow and nutrient inputs.
- Temporary dewatering activities during construction may lower the water table elevation in surrounding wetland areas, and potentially impact wetland saturation, hydric soil, and available nutrients from groundwater.
- Erosion and sedimentation from road crossings, laydown areas and/or work areas could alter the water quality and/or chemistry of wetlands, potentially affecting the

vegetation and wildlife they are able to support. Project-related traffic may contribute to dust and sedimentation.

To minimize effects on wetland habitat, hydrology, and wetland function, mitigation measures outlined in the following subsections will be implemented. Mitigation measures designed to minimize impacts to other VECs, particularly air quality, soil quality, surface water quality, wildlife, wetlands, and the aquatic environment will also aid in minimizing impacts to wetland habitat, hydrology, and function. These mitigation measures are listed in their respective chapters of this EA.

9.3.1.1 Loss of Wetland Habitat

Construction and operation and maintenance activities may result in the direct alteration, degradation, and removal of wetland habitat. The Project may result in the direct loss of wetland habitat in the AOD. This includes the removal of wetland vegetation, organic matter, and hydric soils.

In the AOD, the areas where permanent Project infrastructure will be constructed (e.g., turbine pads, upgrades to existing roads, creation of new roads), site preparation and construction activities may directly impact wetlands through the removal of vegetation and loss of wetland habitat (change in wetland area or fragmentation of wetland habitat).

Clearing, grubbing, and infilling activities may cause loss of wetland flora and wetland organic matter, peat, and mineral soils. The use of heavy equipment and site vehicle traffic may compact wetland substrate, impacting vegetation root systems and hydric soil density/porosity, and affecting saturation. These impacts may result in the loss of habitat used by SAR/SoCC and other wildlife and may alter surface water and groundwater hydrology, further discussed under change in wetland hydrology.

WSS may be altered by the Project, but there will be less impact to WSS where the Project AOD uses pre-existing roads that currently bisect them. Wetland mapping was used to avoid these sensitive features. This will reduce the impact of constructing new infrastructure through wetlands.

The estimated loss of wetland area in the northern AOD is 2.14 ha representing approximately 1 percent of the area of wetland in the LAA. Turbines have been setback 30 m from wetland features where feasible. The two proposed alternate turbine locations (A3 and A24) intersect with areas of WL01 and WL04. The footprint for each alternate turbine is 0.54 ha of WL01 and 0.51 ha of WL04. These proposed alternate turbines are unlikely to be selected for construction. These areas have been excluded from the predicted loss of wetland area calculations.

Table 9.7 presents the likely loss of wetland habitat in the northern AOD and the summary of Project impacts. Avoidance of impacts was implemented in the detailed design of the AOD. Compensation will be required for wetland area lost in the AOD. Wetland compensation ratios will be determined in consultation with NSECC during the permitting stages.

Table 9.7 Estimated Area of Wetland Loss in the AOD

Wetland ID	Wetland Area (ha)			Wetland Loss in LAA (%)
	In AOD	In LAA	In RAA	
WL01*	1.14	161.20	170.15	1
WL04*	0.31	54.93	57.28	0.5
WL05*	0.18	1.65	8.10	11
WL06*	0.22	5.51	5.51	4
WL07†	0.04	3.52	3.52	1
WL08	0.10	0.70	0.70	14
WL10	0.02	1.19	1.19	2
WL11	0.04	0.25	0.25	16
WL13	0.04	0.97	0.97	4
WL14	0.07	0.39	0.39	18
Total	**2.14**	**241.24**	**252.53**	**1%**

*WSS

†Possible WSS (to be determined in consultation with NSECC)

The potential areas of Project impacts to provincially mapped wetlands identified in the proposed transmission corridor AOD are summarized in Table 9.8. Wetlands in the transmission corridor options AOD have not been field delineated and estimated area of wetland that may be affected in the transmission line AOD is presented as an exaggerated maximum area for each option under consideration. Only one of the transmission lines will be chosen for construction. The exaggerated maximum area of potential wetland impact for transmission line option A and option B is 3.7 ha and 1.8 ha, respectively. The actual area of wetland impact in the transmission line AOD will be less once the route is confirmed and micrositing occurs.

Table 9.8 Estimated Area of Wetland in the Proposed Transmission Corridor AOD

Wetland ID	Wetland Type	Maximum Estimated Area of Wetland in AOD (ha)	
		Option A	Option B
WL16	Unclassified Open Wetland	0.4	0.4
WL17	Treed Swamp	-	0.7
WL18	Treed Swamp	0.4	-
WL19	Marsh	-	0.4
WL20	Treed Swamp	0.1	-
WL21	Marsh	1.5	-
WL22	Shrub Swamp	0.3	-
WL23	Shrub Swamp	-	0.3

Wetland ID	Wetland Type	Maximum Estimated Area of Wetland in AOD (ha)	
		Option A	Option B
WL24	Shrub Swamp	1.0	-
Total		**3.7**	**1.8**

The AOD has been designed to avoid and minimize adverse impacts to wetland features to the extent practical. The following key measures to mitigate the potential effects of the Project on wetland habitat will be further detailed in an EPP and will be implemented prior to construction.

- Where wetland avoidance is not possible, wetland alteration will not proceed without obtaining a wetland alteration permit from NSECC and the Proponent will adhere to all conditions of the wetland alteration permit.
- Wetland organic material and topsoil will be stored separately and reused for site restoration where practicable.
- Where disturbance to wetlands in temporary laydown areas is unavoidable, stabilization of the wetland surface will be conducted using protective layers such as matting, mulch, or biodegradable geotextiles to protect the wetland root layers and seed beds from rutting, admixing, or compaction.
- All wetland removals or alterations will be offset via wetland compensation activities, determined in consultation with NSECC and NSDNR.

9.3.1.2 Change in Wetland Hydrology

Construction and operation and maintenance activities may result in changes to surface water and groundwater hydrology (quality and quantity) directly in the AOD and may extend to the adjacent downstream areas, affecting aquatic receptors.

Earthworks activities may directly impact surface water and groundwater hydrology and increase the potential for run-off and flooding. Wetland hydrology may be affected through alteration of the water table and natural flow paths (i.e., saturation, impoundment and/or redirection of water, water storage). Wetland surface water quality may be impacted by sediment-laden runoff or nutrient input. Changes to stream flow quantity and direction may affect wetland area and surface water functions. Impeded drainage may cause wetlands upstream or upgradient of construction activities to flood, or wetlands located downstream of activities could be impacted by a decrease in surface water flow. De-watering and excavation activities may affect the water table within the wetland, affecting hydric soil saturation and the input of nutrients via groundwater, further affecting hydrophytic plant communities and wetland function.

Stormwater flow from roads or other impervious surfaces may enter wetlands in quantities exceeding the natural pre-construction flow. Increased flow velocity may cause increased erosion of wetland soil.

Potential Project effects on wetland hydrology can be effectively mitigated through planning and management of construction activities, including surface water management and ESC measures. The following key measures to mitigate the potential effects of the Project on wetland hydrology will be further detailed in an EPP and will be implemented during construction.

- Site clearing will be kept to a minimum necessary for efficient construction and operation of the Project.
- Where possible, clearing operations will be conducted during winter months on frozen ground to protect the underlying vegetative mat and to reduce erosion and sedimentation of wetlands.
- Sediment fencing will be erected around construction areas prior to commencement of site preparation and construction.
- ESC measures (e.g., erosion control blankets, hydraulic mulches, turf reinforced mats and/or riprap) will be used to line ditches, swales, drainage channels, and steep banks to avoid erosion and siltation of down-gradient wetlands. These control measures will be installed prior to ground disturbance.
- Mitigation measures for aquatic habitat outlined in Chapter 7 (Aquatic Environment) will also serve to maintain wetland hydrology, saturation, and aquatic habitat that contribute to wetland function.
- Material will be stockpiled in such a way as to prevent erosion and sedimentation to adjacent wetlands.
- Surface runoff and runoff from stockpiled material will be managed using standard ESC measures.
- Surface water hydrology will be maintained through culvert placement and appropriate structure sizing. Drainage structures will act to dissipate hydraulic energy and maintain flow velocity to reduce erosion.
- The Proponent will develop and implement surface water management procedures.
- Cleared areas in and immediately adjacent to wetlands will be reseeded or otherwise revegetated to reduce erosion. Mitigation measures for vegetation maintenance are outlined in Chapter 8 (Flora).
- Whenever possible, work will be stopped during periods of inclement weather (e.g., high winds, high rainfall).

9.3.1.3 Change in Wetland Function

Impacts to wetland habitat and hydrology may change wetland function. The loss of wetland habitat and vegetation diversity may have indirect effects on SAR/SoCC fauna that depend on wetlands for necessary life functions. Effects on these species are discussed in Chapter 7 (Aquatic Environment), Chapter 8 (Flora), Chapter 10 (Terrestrial Wildlife), Chapter 11 (Bats), and Chapter 12 (Birds). Impacts to ecological habitat functions that support fish, amphibian and reptile, bird, mammal, and pollinator species may occur.

Potential changes to wetland function may result from impacts to wetland habitat and hydrology. Earthworks and ground-disturbing activities may cause soil disturbance, impacting hydric soil saturation, water storage, soil nutrients, and carbon sequestration, as well as changes to vegetation communities and the introduction of non-native and invasive plant species. Wetland function in the LAA and RAA will be considered.

There is potential for the introduction of invasive plant species, impacting the existing wetland vegetation community, particularly in the wetlands adjacent to construction and laydown areas. There is also potential for spread of invasive species in a wetland or introduction to downstream or downgradient wetlands.

Wetlands could be adversely affected by sediment-laden runoff during construction, operation and maintenance, and decommissioning activities. Exposed soil from earthworks like site clearing, grading, and material storage can lead to erosion and sedimentation through surface runoff. This sediment input into wetlands has the potential to smother vegetation and introduce nutrients.

The loss of wetland habitat may impact hydrologic function; subsequent change in wetland function is strongly driven by the alteration of wetland hydrology. This may impact flood control and water temperatures that contribute to the maintenance and support of aquatic life. If cross drainage is maintained where roads exist, hydrological impacts are not expected.

Impacts to water quality maintenance of a wetland may occur. Changes to nutrient storage and release in wetlands may change water quality and plant communities in the wetlands. The effects of nutrient loading may be greatest in low nutrient systems such as treed bogs and shrub bogs. Changes to hydrology and input of nutrients may impact aquatic receptors downstream, affecting ecological habitat.

Loss of wetland area may impact the ability to filter suspended particulate, reduce flow velocity, and stabilize substrate that contributes to erosion control and storm buffering.

Carbon sequestration as a wetland function is defined as the effectiveness of the wetland for retaining incoming carbon, and through the process whereby wetland vegetation converts CO_2 gas into organic matter (New Brunswick Department of Environment and Local Government, 2018). Direct impacts on wetland habitat may result in the loss or disturbance of the associated carbon stores through vegetation removal (i.e., trees as carbon stores), grubbing, or stripping of organic-rich overburden (e.g., conifer needle rich peat as a carbon store) of the wetland surface. Indirect impacts to wetland hydrology may alter the water table and saturation in a wetland, affecting rates of organic matter decomposition that contributes to carbon sequestration. These impacts were incorporated into the GHG emissions calculations for the Project in Chapter 2 (Project Description).

Potential Project effects on wetland function can be effectively mitigated through planning and management of construction activities, including surface water management and ESC measures, and through restoration of wetland areas that are altered temporarily for construction. The following key measures to mitigate the potential effects of the Project on wetland function will be further detailed in an EPP and will be implemented during construction.

- Where possible, quarried, crushed material will be used for road building in and near wetlands, with portions to be preserved to minimize the risk of introducing or spreading non-native or invasive plant species into wetland communities.
- Dust suppression measures will be used to avoid sedimentation impacts to wetland habitat and function.
- A Wetland Restoration Plan will be prepared within six months of submitting all wetland alterations for the Project, detailing the selected restoration sites and methods.
- Wetland monitoring programs will be carried out for impacted wetlands pre- and post-construction, following NSECC wetland alteration approval conditions.
- Organic overburden removed from wetland areas will be stored for reuse and spread in areas from where it was originally removed. Topsoil will be stabilised and revegetated. These practices will mitigate the release of carbon stores in the organic topsoil layers.
- The Proponent will develop and implement sediment and erosion control and surface water management procedures.

9.3.2 Residual Effects

Residual effects on Project wetlands are expected to be minor but long-term with the possibility of some permanent, direct loss of wetland habitat in the AOD. Wetland alteration approvals will be acquired prior to completing wetland alterations. Residual effects on wetland habitat, hydrology, and function will be minimized in the LAA and RAA through the implementation of proposed mitigation measures, wetland monitoring, and wetland restoration required as part of the Wetland Alteration Approval. Alterations will be compensated (following the NSE Policy of No Net Loss) and monitored. Considering the use of existing roads that have already impacted Project wetlands, the small area of wetland being impacted, and the effort to avoid wetland habitat via changes to Project design, the overall effects of the Project on wetland habitat is predicted to be not significant in the LAA and RAA.

9.4 Monitoring

A Wetland Monitoring Plan will be developed as part of the NSECC Wetland Alteration Approval for the Project wetlands. Post-construction, the extent of the wetland habitat affected will be verified through monitoring. Monitoring will also document the success of wetland compensation. Both the monitoring and the compensation will be implemented in accordance with the NSECC Wetland Alteration Approval.

Monitoring is conducted to document pre- and post-construction ecological and hydrological conditions of the Project wetlands. The Wetland Monitoring Plan is intended to monitor the portion of the subject wetlands that will not be altered by the Project (outside the area of direct wetland disturbance) to determine if ecological characteristics change after the completion of the Project.

Subject wetlands will be assessed for changes in the proportion of wetland versus upland plant species and for the presence of invasive species. Hydrological monitoring will measure current water levels and responses to rain events, documenting a baseline for comparison to conditions during and after construction.

10 Terrestrial Wildlife

10.1 Overview

This chapter addresses the potential effects of the Project on terrestrial wildlife and their habitats, excluding bats and birds, which are assessed separately in Chapters 12 and 13. The assessment considers both direct and indirect Project-related interactions and describes measures to avoid, minimize, and mitigate adverse effects through all phases of the Project. Project interactions with terrestrial wildlife are closely linked to effects on other VECs discussed in related chapters, including noise and light disturbance (Chapter 6), vegetation loss or modification (Chapter 10), and wetland alteration or loss (Chapter 11).

The Project has the potential to affect terrestrial wildlife through direct pathways, such as increased mortality risk from vehicle or equipment movement during construction, operation and maintenance, and decommissioning phases, and through indirect pathways, including habitat loss, fragmentation, and modification. Wildlife may also exhibit behavioural changes, either short- or long-term through avoidance of habitats subject to disturbance or noise, depending on species-specific tolerance to disturbance.

Strategic site planning has been implemented to minimize habitat disturbance, loss, and fragmentation, and other possible Project impacts. This includes using existing roads and previously harvested and disturbed areas, as well as maintaining vegetated buffers around wetlands and watercourses to enhance wildlife connectivity.

The Project has undergone iterative layout refinements to avoid or reduce potential adverse effects on terrestrial wildlife. In response to field assessment findings and regulatory guidance, the Proponent has modified the PDA layout and the AOD to avoid or reduce potential adverse effects on multiple VECs, including terrestrial wildlife. The PDA layout avoids confirmed old-growth forest stands and the AOD was designed to minimize disturbance to wetlands that provide important habitat to terrestrial wildlife. Two turbines identified as being in a Mainland Moose travel corridor (based on observations of moose activity during field surveys and input received through public engagement) were designated as alternate locations, and are not planned to be built unless a major issue is found on the other 22 turbines. These alternate turbine locations, A3 and A25 (Figure 1.1, Appendix A), may not be constructed, therefore reducing potential effects on Mainland

Moose habitat connectivity and movement. The detailed design process will continue to minimize habitat interactions through strategic siting of infrastructure.

As described in the following subsections, measures to reduce habitat loss and fragmentation include use of the using existing road network (including the upgrade of existing roads) and previously disturbed areas. Temporary portions of the access roads required only for construction will be reclaimed and progressively restored in the AOD to mitigate the long-term impacts of habitat loss and fragmentation. Expected effects, mitigation measures, and residual impacts to terrestrial wildlife as a result of the Project are outlined in this chapter and will be further developed in an EPP prior to construction to minimize adverse effects.

10.1.1 Regulatory Context

Assessment of the terrestrial wildlife considers relevant provincial and federal legislation and guidelines:

- SARA
- *Canadian Environmental Protection Act*
- NSESA
- Nova Scotia *Wildlife Act*
- Nova Scotia *Biodiversity Act*
- Nova Scotia *Environment Act*
- Nova Scotia *Wilderness Areas Protection Act*

10.1.2 Boundaries

The AOD represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. The PDA represents the boundaries within which the AOD may occur. For this assessment, the LAA for terrestrial wildlife includes the PDA and a 2 km buffer of the PDA. The RAA for terrestrial wildlife incorporates the concentration area occupied by the Pictou/Antigonish/Guysborough subgroup of Mainland Moose.

10.1.3 Assessment Methodology

The assessment of terrestrial wildlife focused on identifying wild terrestrial fauna species present or likely to occur in or near the LAA, with particular emphasis on SAR and SoCC and their associated habitats. This was accomplished though a combination of literature review, habitat analysis, and field surveys. Information gathered during the literature review and desktop habitat analysis informed the design and implementation of field surveys targeting priority species, as outlined in the *Guide to Addressing Wildlife Species and Habitat in an EA Registration Document* (NSECC, 2009).

Data collected through these efforts were used to evaluate the potential impacts of the Project on terrestrial wildlife, guide the siting of Project infrastructure to reduce potential impacts, and develop measures to minimize adverse effects of Project activities on terrestrial wildlife. The information collected though the assessment process provides baseline data for post-construction monitoring and adaptive management.

The description of the existing environment is based primarily on data collected from the following sources, supplemented by field surveys conducted for this Project:

- Nova Scotia Significant Species and Habitats Database (NSDNR, 2025)
- Species at Risk Public Registry documents for federal SAR
- Species at Risk documents for provincial SAR
- Predictive Ecosystem Mapping for Nova Scotia (Government of Nova Scotia, 2024)
- AC CDC Data Report (AC CDC, 2025)
- iNaturalist.ca Observation Database (2025)
- Global Biodiversity Information Facility Occurrence Database (2025)
- Nova Scotia Forestry Inventory (Government of Nova Scotia, 2021)
- Nova Scotia Wet Areas Mapping (Government of Nova Scotia, 2012)
- Old-Growth Potential Index V2 (NSDNR, 2025)
- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Nova Scotia Hydrographic Network (Government of Nova Scotia, 2025)
- Global Forest Watch Tree Cover Loss 2001-2024 and Gain 200-2020 (Global Forest Watch, 2025)
- Canada Landsat Disturbance 2017
- Assessment of Species Diversity in the Atlantic Maritime Ecozone (McAlpine and Smith, 2010)

Records of terrestrial mammal, herpetofauna, and invertebrate SAR and SoCC within a 100 km radius of the LAA were obtained from the AC CDC report (AC CDC, 2025). A habitat assessment of the LAA was completed using available habitat information and mapping data, including federal critical habitat and provincial core habitat data layers.

Consultation with NSDNR was undertaken to identify priority wildlife species for targeted field surveys. Two terrestrial wildlife species, the mainland Nova Scotia population of Moose (*Alces alces americanus*, herein referred to as Mainland Moose) and Wood Turtle (*Glyptemys insculpta*), were identified as priorities. Detailed habitat assessments and targeted field surveys for these species were conducted in the LAA. Details of the field surveys are provided in Sections 10.2.1 and 10.2.2.

Predictive habitat mapping was developed to identify areas of suitable habitat in the LAA for Mainland Moose throughout its life cycle. The map was used to develop field surveys and inform siting and layout of Project infrastructure. The habitat mapping was also used to evaluate the connectivity of predicted Mainland Moose habitat in the LAA and the surrounding landscape. Details of the habitat mapping are provided in Section 10.2.1.1.

10.1.3.1 Mainland Moose Habitat Mapping

A detailed spatial analysis was undertaken to evaluate and predict habitat suitability in the LAA for Mainland Moose life history stages (Figure 10.1, Appendix A). The habitat model was developed using biophysical parameters that support life cycle requirements for Mainland Moose, consistent with those applied in identifying core habitat in the Recovery Plan for Mainland Moose (NSDNR, 2021). The following datasets were used to extract areas meeting the criteria for biophysical attributes of Mainland Moose habitat in the LAA:

- Nova Scotia Forestry Inventory
- Wetlands and Watercourses of Nova Scotia
- Global Forest Watch Tree Cover Loss and Gain Data supplemented with recent satellite imagery to capture current forest loss from industrial forestry operations

In Nova Scotia, Mainland Moose occupy a variety of forest types, typically selecting mature stands that provide security and thermal cover, interspersed with areas offering forage such as young deciduous trees and shrubs. Data layers were analysed identify suitable habitat for winter cover, summer cover, winter forage, summer forage, and calving areas in the LAA using parameters outlined in Appendix A of the species Recovery Plan.

The Forestry Inventory database was refined using Global Forest Watch tree cover loss/gain datasets and recent satellite imagery to provide the most current representation of suitable habitat for Mainland Moose in the LAA.

The following outlines the criteria for identifying winter and summer cover habitat components:

- Winter cover – Softwood and softwood dominated mixedwood stands at least 5 ha in size meeting the mature stand requirements (60 percent crown closure and at least 12 m in height (or at least 8 m in height with a depth to water table no more than 50 cm)
- Summer cover – Hardwood, mixedwood, and softwood stands at least 5 ha in size meeting the same mature stand requirements above

After selecting winter and summer forest cover, the following criteria were applied to identify seasonal forage and calving area habitat components:

- Winter forage – Any regenerating forested type within 200 m of winter cover, or mature hardwood or hardwood dominated mixedwood within 200 m of winter cover, or mature softwood dominated mixedwood (no distance requirement from cover)
- Summer forage – Any regenerating forested type within 200 m of cover (summer or winter), or mature mixedwood or hardwood (no distance requirement from cover)
- Calving area – Open water within 40 m of any mature stand, or open water within 40 m of regenerating forage (winter or summer) that is within 200 m of a mature stand, or open water within 40 m of mature forage (winter or summer)

10.1.3.2 Field Surveys

The objective of the field surveys was to assess the presence and distribution of terrestrial wildlife across the LAA, focusing on priority terrestrial wildlife species (SAR and SoCC) and their habitats identified during the desktop assessment and in consultation with NSDNR. Surveys to target Mainland Moose included winter tracking, the use of trail camera traps, and PGI. Although a conservation group recommended using radio collars to track Mainland Moose, as noted in the Consultation and Engagement Section (see Section 3.3.3), this method was not adopted due to its invasive nature. Instead, non-invasive survey methods developed in consultation with regulators (e.g., winter tracking, PGI surveys, and camera traps) were deemed sufficient to effectively assess Mainland Moose activity in the LAA.

Surveys to target Wood Turtle included stream habitat assessments and turtle Visual Encounter Surveys (VES). The survey design targeted areas identified through habitat mapping where priority species were expected to be most active and where their habitat intersected with the PDA, while also covering representative habitat types present across the LAA.

Incidental wildlife observations during other field survey programs conducted in the LAA between 2024 and 2025, data on terrestrial wildlife gathered through the 2025 MEKS, and observations of terrestrial wildlife by local community members will also be incorporated into the assessment of the existing environment.

Winter Tracking

Winter tracking surveys were conducted in three rounds on foot by two-person teams over one winter season: round one on January 14 and 15, round two on February 10 and 11, and round three on March 3 and 4. The methods for winter track surveys were developed based on the *Protocol for Mainland Moose Snow Tracking Survey 2022 Update* (NSDNR, 2022a) and informed by habitat parameters in the Mainland Moose Recovery Plan (NSDNR, 2021). The goal of these surveys was to target moose in areas where they are expected to be most active in winter (winter cover and winter forage habitats identified in the Recovery Plan) but were also designed to document signs of wildlife in the winter in representative habitat types present across the LAA.

The winter tracking surveys were conducted along select survey routes within seven days of a large snowfall event (approximately 10 cm or more). Surveys focused on accessible trails and roadways through forested habitats—with an emphasis on winter cover and winter forage—and open areas. The survey covered approximately 50 km over six days between mid-January and early March.

Camera Traps

Camera traps using trail cameras were set up in December 2024 and January 2025 in a variety of habitat types in the PDA along natural corridors for wildlife movement including roadways, wetlands, forest trails, harvested areas, and riparian areas along watercourses and waterbodies. During the field program camera traps were relocated to expand site coverage and in consideration of seasonal wildlife movement and observations from both camera traps and other field programs. In total, 12 trail camera trap locations were established; Table 10.1 presents deployment locations, habitat, deployment days, and total survey days for each camera trap. SD cards in the camera traps were switched every three to four weeks, the images were uploaded, and were then analyzed using AddaxAI, a software tool developed to quickly detect wildlife captures on camera traps. For quality control, a subset of images was manually evaluated for wildlife detections from each SD card upload. The images identified as wildlife captures through AddaxAI were then verified and identified to the species level.

Table 10.1 Camera Trap Deployment and Retrieval Dates, Total Survey Days and Habitat

Camera Trap Name	Date Deployed	Date Retrieved	No. of Survey Days	Habitat
EM-01	18-Dec-24	01-May-25	134	Clearing along road in young softwood forest
EM-02	18-Dec-24	01-May-25	134	Edge of mature mixedwood forest, hardwood dominant
EM-03	18-Dec-24	04-Dec-25	351	Clearing in regenerating softwood forest
EM-04	14-Jan-25	Still deployed		Mature hardwood forest
EM-05	14-Jan-25	13-May-25	119	Clearing in young softwood forest
EM-06	14-Jan-25	07-Nov-25		Mature hardwood forest
EM-07	14-Jan-25	13-May-25	199	Trail in softwood dominant mature mixedwood forest
EM-08	01-May-25	22-Jul-25	82	Wetland on an edge of Vincents Lake, with shrub cover
EM-09	01-May-25	07-Nov-25	190	Mature hardwood forest near a recently cleared area
EM-10	13-May-25	04-Dec-25	205	Along watercourse in a mature softwood dominant mixedwood forest
EM-11	13-May-25	05-Nov-25	176	Mature hardwood forest, with scattered young softwood
EM-12	22-Jul-25	06-Nov-25	107	Mature hardwood forest.

Pellet Group Inventory

PGI surveys were conducted on foot by two-person teams in the LAA to understand the distribution, suitable habitats, and movement corridors of Mainland Moose and White-tailed Deer (*Odocoileus virginianus*). The PGI surveys generally followed the Pellet Group Inventory Data Collection Protocol (NSDNR, 2022b), which involves walking transects and recording winter pellet groups and other evidence of moose and deer. Transect routes were selected to encompass representative habitats in the LAA, with a specific emphasis on areas where Mainland Moose are expected to be active, including winter cover and foraging habitats. Certain transect routes extended beyond the PDA (up to 3 km) to assess moose proximity to Project infrastructure and evaluate moose activity in the broader area. The design of the PGI survey routes to assess for potential impacts and allow for integration into a post-construction monitoring program. Post-construction monitoring programs will help assess the effectiveness of Project-specific mitigation measures and detect unexpected impacts the Project may have had on Mainland Moose behaviour.

PGI transects were surveyed over seven days between April 29 and May 20. In total, seven transects (between 2.5 and 7 km in length) were surveyed, representing 30.2 km of total distance surveyed. Survey teams recorded winter pellet groups of moose and deer along the transect routes. All suspected Mainland Moose activity was recorded (i.e., browse, bedding, tracks) and signs of other animal activity, if observed, were also documented during the PGI surveys.

Turtle Habitat Assessment and Visual Encounter Surveys

Targeted turtle habitat assessments and VES were designed based on survey protocols for Wood Turtle in Nova Scotia (NSDLF, 2021) but were adapted for all turtle species. The turtle habitat assessments were conducted at watercourses that intersected with the PDA with priority given to large permanent watercourses (especially clear, meandering watercourses with moderate flow). Additional assessments were conducted in the LAA where suitable habitat was encountered.

Following habitat assessments, VES were carried out in suitable turtle habitat, with surveyors walking a minimum of 200 m up- and downstream of watercourse crossings or suitable habitat areas parallel to proposed Project infrastructure. Habitat features of each watercourse and surrounding riparian area were evaluated to determine the habitat quality of the watercourse, overwintering sites, nesting sites, and food availability for turtle species. Incidental observations of other herpetofauna (e.g., snakes, salamanders) were recorded if encountered.

Turtle habitat assessments and VES were conducted over two days between April 29 and May 6, 2025, when conditions were suitable as per the NSDNR protocol. Additional habitat assessments were performed outside of this period during the detailed watercourse and wetland assessments if suitable turtle habitat was encountered.

Mi’kmaq Ecological Knowledge Study

Field surveys were completed as part of the MEKS study conducted by the CMM for Project (CMM, 2025). Field survey methods included measured transition transects at Vincent’s Lake to document signs of wildlife, and reconnaissance surveys at four additional sites (Arisaig/Nature Reserve, Doctors Brook/Marsh, South Rights River (Knoydart), and Maple Ridge Road) to identify key habitats, connectivity points, and potential stressors for all species documented at the site.

Community Wildlife Observations
During community engagement activities, members of the local community reported observations of Mainland Moose and other wildlife in the LAA. These observations included descriptions and locations of direct sightings, images of individuals and terrestrial wildlife signs, including scat/droppings, tracks, and browse. This information has been incorporated into this EA Registration Document.

10.2 Existing Environment

10.2.1 Mammals

The NSDNR Significant Species and Habitat Database contains 103 records of species and/or habitat records that relate to terrestrial mammals (excluding bats) within a 100 km radius of the PDA. These records include Deer Wintering (86 records), Species at Risk (12 records), Other Habitat (three records), and Species of Concern (two records). Only four of the records occur within 5 km of the PDA - Species at Risk (one) and Deer Wintering (three).

The Species at Risk record refers to a Mainland Moose polygon overlapping with the northern portion of the Eigg Mountain - James River Wilderness Area 1.4 km north of the PDA. The Deer Wintering records refer to sites important for overwintering White-tailed Deer. The closest important deer wintering area is located on the southern slopes of Brown's Mountain (Figure 10.2, Appendix A).

The AC CDC (2025) Data Report documents observations of nine terrestrial mammal SAR and SoCC (excluding bats) within a 100 km radius of the LAA. Two of these species Mainland Moose, and Fisher (*Pekania pennanti*), have been observed in the LAA.

Mainland Moose are expected in the PDA as the Project overlaps with the Core Habitat identified in the Recovery Plan which spans most of Antigonish county and historical provincial data show that Mainland Moose have been detected in the vicinity of the Project area (Basquill, 2011). A habitat suitability analysis conducted by Snaith et al. (2002) and incorporated into the species Recovery Plan assessed parts of the Pictou-Antigonish Highlands as good suitable habitat for Mainland Moose in the Province.

Mainland Moose were observed in the PDA and LAA during field surveys carried out by CBCL in 2024 and 2025. The results of the surveys carried out by CBCL are summarized in Section 10.2.1.2. Mainland Moose and evidence of Mainland Moose have also been observed through the MEKS and by local community members in the PDA. This evidence is also be provided in Section 10.2.1.2. Individuals in the LAA would be considered part of the Pictou/Antigonish/Guysborough localized population group of Mainland Moose, which was estimated at fewer than 100 individuals in the early 2000s (NSDNR, 2021).

Fisher is confirmed in the LAA, with one observed incidentally during the bird spring migration program. In Nova Scotia, Fisher occurs in mature conifer, hardwood, and mixedwood forest habitats on the mainland and Cape Breton, where prey species such as Snowshoe Hare (*Lepus americanus*), Red Squirrel (*Tamiasciurus hudsonicus*), and Porcupine (*Erethizon dorsata*) are abundant (Milton et al., 2022).

Although Mainland Moose and Fisher are the only species among the nine terrestrial mammal SAR and SoCC confirmed within 100 km of the LAA, the remaining seven species are discussed below due to their broad ranges and greater mobility.

Lynx (*Lynx canadensis*) in Nova Scotia predominantly inhabit the Cape Breton Highlands, with occasional sightings in mainland Nova Scotia (McAlpine and Smith, 2010). The population experiences cyclical abundance, favouring habitats rich in their primary prey, Snowshoe Hare, and is influenced by competition with Bobcats (*Lynx rufus*). It is unlikely that Lynx occur in the LAA as a breeding population. A viable population of Lynx is known only on Cape Breton Island (Nova Scotia Lynx Recovery Team, 2006). The nearest record of Lynx is approximately 32.5 km from the LAA (AC CDC, 2025).

American Marten (*Martes americana*) primarily inhabits mature coniferous and mixedwood forests, with the highest concentrations reported in two distinct populations in Cape Breton and mainland Nova Scotia (which is mostly restricted to the southwest of the province) (NSDNR, 2023). American Martens prefer structurally complex habitats that provide cover and abundant prey, such as small mammals. While the LAA may offer suitable habitat features, no historical records are reported in the species Recovery Strategy from Antigonish County between 2000 and 2021 (NSDNR, 2023). The nearest record of American Marten is approximately 33 km from the LAA (AC CDC, 2025).

Southern Flying Squirrel (*Glaucomys volans*) is a species that relies on the presence of mature forest habitat. The mature forest habitats in the LAA may provide suitable habitat for Southern Flying Squirrel, though the reported range of the Atlantic population of the Southern Flying Squirrel is in southwestern Nova Scotia (COSEWIC, 2006). The nearest record of this species is approximately 78 km from the LAA (AC CDC, 2025).

Southern Bog Lemmings (*Synaptomys cooperi*) can be common in wet areas of recent forest clearcuts and meadows, as well as grassy bogs and in hardwood forests on rocky or talus substrates (McAlpine and Smith, 2010). The recent forest clearcut, meadows, and hardwood forest in the LAA may provide suitable habitat for Southern Bog Lemming. The nearest record of Southern Bog Lemming is approximately 92 km from the LAA (AC CDC, 2025).

Gaspé Shrew (*Sorex dispar gaspensis*) can be found in wooded talus slope habitats often at higher elevations, near forested streams with moss covered rocks (McAlpine and Smith, 2010). The nearest record of Gaspé Shrew is approximately 93 km from the LAA (AC CDC, 2025).

Rock Vole (*Microtus chrotorrhinus*) is typically associated with cool, moist habitats featuring rocky substrates, moss-covered talus slopes, and dense ground vegetation, often in mixedwood or coniferous forests at higher elevations (McAlpine and Smith, 2010). The nearest record of Rock Vole is approximately 93 km from the LAA (AC CDC, 2025). The cool forested slopes in the LAA may provide habitat for both species.

The Eastern Water Shrew (*Sorex albibarbis*) is typically associated with cool, moist habitats near streams, wetlands, and riparian zones, often in mature forests (McAlpine and Smith, 2010). This species is semi-aquatic and relies on invertebrate prey found in aquatic and terrestrial environments. The open meadow wetlands present along watercourses in the LAA may provide suitable habitat for Eastern Water Shrew. The nearest record of Eastern Water Shrew is approximately 60 km from the LAA, in Prince Edward Island (AC CDC, 2025).

10.2.1.1 Mainland Moose Suitable Habitat

In general, the LAA encompasses regions that meet the criteria used to identify core habitat for Mainland Moose in the Recovery Plan. Of the total land area evaluated in the LAA, 33.6 percent meets one or more of the habitat parameters for moose habitat. Table 10.2 presents the breakdown of area habitat components identified in the LAA, PDA and AOD (note: these estimates are conservative as they do not consider existing unvegetated areas such as roads). The results of the Mainland Moose habitat mapping are presented in Appendix A, Figure 10.1.

Table 10.2 Summary of Mainland Moose Habitat Components Identified In in the LAA, PDA and AOD

Habitat Component	Total Area (ha)		
	LAA	PDA	AOD
Winter cover	1312.08	197.52	12.31
Summer cover	5483.93	764.73	72.95
Summer forage	5572.02	1868.12	115.56
Winter forage	4104.91	615.95	53.08
Calving area	4.92	0	0

10.2.1.2 Winter Tracking, PGI Surveys, and Camera Trap Results

A total of 11 terrestrial wildlife species were identified across all field surveys (including incidental observations) conducted in the LAA (Table 10.3). Of these species, seven were captured by camera traps (Table 10.4). Locations of winter tracking transects, PGI surveys, and camera traps are presented in Appendix A, Figure 10.3.

Table 10.3 Summary of Terrestrial Wildlife Species Observed

Scientific Name	Common Name	NS ESA	SARA	COSEWIC	AC CDC
Alces alces americana	Mainland Moose	Endangered	-	-	S1
Canis latrans	Eastern Coyote	-	-	-	S5
Castor canadensis	North American Beaver	-	-	-	S5
Erethizon dorsatum	North American Porcupine	-	-	-	S5
Lepus americanus	Snowshoe Hare	-	-	-	S5
Lynx rufus	Bobcat	-	-	-	S5
Odocoileus virginianus	White-tailed Deer	-	-	-	S5
Pekania pennanti	Fisher	Vulnerable	-	-	S3
Tamiasciurus hudsonicus	Red Squirrel	-	-	-	S5
Ursus americanus	American Black Bear	-	-	Not at Risk	S5
Vulpes vulpes	Red Fox	-	-	-	S5

Table 10.4 Summary of Terrestrial Wildlife Observations via Camera Traps

Camera Trap Name	Animals Observed	Number of Observations
EM-01	White-tailed Deer	1
	Red Fox	1
EM-02	Snowshoe Hare	1
EM-03	White-tailed Deer	17
EM-04	White-tailed Deer	14
	Mainland Moose	6
	Eastern Coyote	1
	Bobcat	1
	American Black Bear	2
EM-05	White-tailed Deer	10
	Eastern Coyote	2
EM-06	White-tailed Deer	6
EM-07	Mainland Moose	1
EM-08	-	-
EM-09	White-tailed Deer	21
EM-10	Eastern Coyote	2
EM-11	-	-
EM-12	-	-

As evident by the observations made during the field programs, Mainland Moose are using habitats in the LAA year-round, though the habitats where moose are present vary seasonally. Signs of Mainland Moose observed included individuals, vocalizations, pellets, beds, tracks, and browse.

Moose tracks and pellets were observed during the winter tracking surveys. Evidence of Mainland Moose was observed during PGI surveys, on trail camera traps, and incidentally during other field programs.

Direct observation of Mainland Moose by field personnel was recorded four times over the field survey period from November 2024 to December 2025. The first of these observations occurred May 2, 2025, when a moose was heard walking through the woods, near several piles of fresh scat. The second occurred May 22, 2025, where a calf was heard calling and then a cow moose was observed directly. The third occurred May 29, 2025, when a cow was observed during routine camera trap maintenance. The fourth occurred October 16, 2025, when a bull moose was heard vocalizing in a manner characteristic of the rutting season, the annual moose mating period.

Two winter tracking survey routes recorded observations of moose tracks, with all moose track observations occurring within mature hardwood forest stands. Evidence of moose was observed along five of the seven PGI transect routes. All five routes contained moose pellet groups, and several routes also showed additional signs such as tracks, scraping, browsing, and hair. One route included a direct sighting of a cow moose. Pellet group observations along PGI routes were documented across a range of habitats, including hardwood, mixedwood, softwood, and wetland areas.

Seven observations of Mainland Moose were captured on two of the 13 trail camera trap locations. One of the trail camera trap moose observations was along a road near an entrance to the Eigg Mountain - James River Wilderness Area. The other trail camera trap observation was in a softwood forest stand.

As described in the MEKS, frequent signs of Mainland Moose and Black Bear were observed during the site visits. Evidence of heavy moose browse was observed in upland areas and shrub zones, and evidence of tracks and trampled trails were observed in peat bog wetland areas. Additionally, evidence of North American Beaver (*Castor canadensis*) was observed. Numerous reports of Mainland Moose direct sightings, pellets, browse, and tracks were submitted by local community members.

As Mainland Moose are a location-sensitive species, the location observations will be provided to NSDNR under separate cover.

In general, the findings indicate that the LAA supports a year-round moose population, with several forested, open, and wetland habitat types providing suitable habitat components for various life stages.

10.2.2 Turtles and Other Herpetofauna

The NSDNR Significant Species and Habitat Database contains 36 records of species and/or habitat records that relate to turtles and other herpetofauna within a 100 km radius of the PDA. These records are all for Species at Risk referring to Wood Turtle (29 records) and Snapping Turtle (seven records).

Six of the NSDNR Significant Species and Habitat Database records occur within 5 km of the PDA. Two records refer to Snapping Turtle observed in Rights and West Rivers and four records refer to Wood Turtle observations in the West River, Rights River, Brierly Brook, and Ohio River.

The AC CDC (2025) Data Report lists observations of four terrestrial herpetofauna SAR and SoCC that have been recorded within a 100 km radius of the LAA (see Appendix F). Table 10.5 summarizes the herpetofauna observed within a 5 km radius of the LAA.

Table 10.5 Herpetofauna SAR and SoCC Observed within a 5 km Radius of the LAA (Source: AC CDC, 2025)

Scientific Name	Common Name	NSESA	SARA	COSEWIC	AC CDC
Glyptemys insculpta	Wood Turtle	Threatened	Threatened	Threatened	S2
Chelydra serpentina	Snapping Turtle	Vulnerable	Special Concern	Special Concern	S3

The Wood Turtle and Snapping Turtle records are associated with the Rights River and Brierley Brook and both watersheds overlap the PDA. The nearest observations of Eastern Painted Turtle are located 19.9 km from the LAA.

10.2.2.1 Turtle Habitat Assessments and Visual Encounter Survey Results

No turtle individuals or signs of turtles were observed during the habitat assessments or VES.

The Rights and West River watersheds, which overlap the LAA, are known to contain habitat for Wood Turtles and some areas of possible habitat were observed along watercourses in these watersheds. The lack of turtles seen during the visual surveys does not indicate the absence of turtles in the LAA. The poor success rate of VES is well known due to Wood Turtles tendency to hide in dense vegetation or retreat to water upon sensing an approaching threat (Flanagan et al., 2013).

A total of six watercourse and possible habitat locations were assessed for turtle habitat suitability and one watercourse was subject to a VES. The surveys were distributed amongst three of the five watersheds that overlap the PDA: in Rights (three habitat assessments and one VES survey), Knoydart (two habitat assessments), and Doctors (one habitat assessment). The other remaining watersheds contained no observed habitat or watercourse crossings that interacted with the PDA. Locations of the turtle habitat assessments and VES are presented in Appendix A, Figure 10.4. No VES were conducted in the transmission line footprint, as the route was not finalized during the 2025 turtle survey period. Once the transmission line footprint is confirmed, VES will be carried out under appropriate conditions as required.

Most of the watercourses assessed were of high velocity with minimal sand or gravel substrate. However, some suitable basking and nesting habitat for Wood Turtle was observed along a small watercourse connecting to Rights River near Connors Mountain Road. Suitable Wood Turtle habitat consists of clear watercourses with moderate flow and hard bottoms of sand or gravel, typically ranging from 2 to 30 m in width (MacGregor & Elderkin, 2003). Although there is little evidence of suitable breeding habitat for Wood Turtles in the assessed watercourse sections, dispersing individuals may travel through the LAA from suitable habitat located farther downstream.

Eight species of herpetofauna were identified (all incidental observations) over the course of the field survey programs conducted in the LAA (Table 10.6).

Table 10.6 Summary of Herpetofauna Observations Recorded during the Field Survey Programs

Scientific Name	Common Name	NSESA	SARA	COSEWIC	AC CDC
Thamnophis sirtalis	Common Gartersnake	-	-	-	S5
Opheodrys vernalis	Smooth Greensnake	-	-	-	S4
Pseudacris crucifer	Spring Peeper	-	-	-	S5
Lithobates pipiens	Northern Leopard Frog	-	-	-	S5
Lithobates sylvaticus	Wood Frog	-	-	-	S5
Storeria occipitomaculata	Red-bellied Snake	-	-	-	S5
Anaxyrus americanus	Eastern American Toad	-	-	-	S5
Ambystoma maculatum	Spotted Salamander	-	-	-	S5

10.2.3 Invertebrates

The AC CDC (2025) data report contains records of 66 invertebrate SAR and SoCC within a 100 km radius of the LAA. Table 10.7 summarizes the six terrestrial invertebrate species observed within a 5 km radius of the LAA.

Table 10.7 Terrestrial Invertebrate SAR and SoCC Observed within a 5 km Radius of the LAA (Source: AC CDC, 2025)

Scientific Name	Common Name	NSESA	SARA	COSEWIC	AC CDC
Bombus terricola	Yellow-banded Bumble Bee	Vulnerable	Special Concern	Special Concern	S3
Danaus plexippus	Monarch	Endangered	Endangered	Endangered	S2?B, S3M
Cecropterus pylades	Northern Cloudywing	-	-	-	S3S4
Ophiogomphus mainensis	Maine Snaketail	-	-	-	S3
Psephenus herricki	Herrick's Water Penny Beetle	-	-	-	S3
Argynnis aphrodite winni	Aphrodite Fritillary	-	-	-	S3S4

No incidental observations of SAR or SoCC terrestrial invertebrates were recorded during the field programs and no observations of Monarch host plants, milkweed (*Asclepias* spp.), were recorded in the PDA. The nearest record is of a Monarch, recorded 11.6 km from the PDA.

10.3 Effects Assessment

10.3.1 Potential Effects and Mitigation

Several changes were implemented during the Project design to minimize potential direct and indirect impacts on terrestrial wildlife, where reasonable, while meeting engineering and design constraints. Detailed design of the Project, including AOD refinement around each turbine location, avoids terrestrial wildlife habitat when practicable and reduces potential interactions between the Project and terrestrial wildlife.

Direct and indirect effects of the Project on terrestrial wildlife could occur through several interconnected pathways. During construction, activities like earthworks and vegetation clearing may lead to habitat loss, alteration, and disruptions in movement patterns, as well as changes in food availability. The Project will require approximately 31.8 km of access roads, 18.9 km (60 percent) of which are existing gravel roads, that will require upgrades in sections. New gravel road sections will be needed where turbines branch from the existing roads, and alternate access routes are proposed, resulting in approximately 12.9 km (40 percent) of new linear disturbance. Increased road width and density may fragment habitat and affect wildlife movement. The rise in Project-related vehicle traffic poses a risk of mortality and injury due to collisions. Additionally, sensory disturbance from light and noise during construction, operation and maintenance, and decommissioning could impact wildlife behaviour.

Project activities may pose increased threats specific to Mainland Moose. Forest clearing and road construction activities could increase White-tailed Deer access to moose habitat, heightening the risk of disease transmission. Additionally, the updated road infrastructure may facilitate non-Project related human access, potentially attracting individuals engaged in illegal moose poaching.

Project activities can affect terrestrial fauna as indicated in Table 10.8; these potential effects do not consider the implementation of mitigation measures described herein.

Table 10.8 Potential Environmental Effects of the Project on Terrestrial Wildlife

Project Activity	Potential Environmental Effects			
	Habitat Loss/ Fragmentation	Collision Risk	Disruption of Life History	Other Threats (Poaching/ Disease)
Construction				
Site Preparation	X	X	X	-
Access Roads Construction and Modifications	X	X	X	X
Material and Equipment Delivery and Storage	-	X	X	-
Infrastructure Installation		X	X	-
Restoration of Temporary Areas	-	-	X	-
Testing and Commissioning	-	X	X	-
Operation and Maintenance				
Turbine Operation and Maintenance	-	X	X	-
Road Maintenance	-	X	X	-
Power Line and Substation Maintenance	-	X	X	-
Vegetation Management	-	X	X	-
Safety and Security	-	-	-	-
Decommissioning				
Removal of Infrastructure and Site Restoration	-	X	X	-

X = Potential Interaction

- = No Interaction

10.3.1.1 Habitat Loss and Fragmentation

The Project will result in some habitat degradation and fragmentation for terrestrial wildlife species in the LAA.

The Project is located in the Pictou/Antigonish/Guysborough Mainland Moose subgroup concentration area, and the area is identified as Core Habitat by the Mainland Moose Recovery Plan (NSDNR, 2021). The Recovery Plan recognizes renewable energy projects and road construction as activities likely to cause adverse effects, including the destruction of important moose habitat, through habitat loss, conversion, degradation, and fragmentation. Construction activities in the AOD, which includes both transmission line options, may lead to the clearance of up to 85 ha of mature forest cover habitat and 168 ha of forage habitat that meet the biophysical parameters for Mainland Moose Core Habitat; the amount of mature forest cover habitat and forage habitat cleared will be less as only one of the two transmission line options will be constructed.

While direct research on the effects of wind-farm clearing and activity on Moose is limited, studies on other large ungulates and on Moose in forestry-cleared areas provide insight into how Project-related habitat loss and fragmentation could influence the local Mainland Moose population. Habitat loss, conversion, degradation, and fragmentation from wind projects are known to present a threat to large terrestrial mammals in Europe (Tolvanen et al., 2023 and Schöll & Nopp-Mayr, 2021). For example, one literature review study found that 67 percent of papers reviewed on large terrestrial mammals reported a displacement. Of these studies, they found a consistent displacement of up to 5 km in response to wind farm disturbance (Tolvanen et al., 2023). The clearing activities of the Project may result in both short-term and long-term loss of suitable moose habitat in the AOD. Forest clearing may reduce cover habitat for thermoregulation and shelter, but the area of foraging habitat may increase post-construction as most of the vegetation around the turbine base and road edges will naturally regenerate, which will minimize the loss of foraging habitat following construction. Currently, the majority of the LAA is subject to industrial timber harvesting activities, with only the old-growth forest stands on Crown land protected from harvest under the Old-Growth Forest Policy.

The estimate of habitat loss or alteration is based on the AOD. Some of the habitat slated for clearing is directly adjacent to existing roads, and the total cleared areas will be less than estimated because these calculations include areas that have been recently cleared and areas currently occupied by roads. The layout of the AOD utilizes habitats along existing roads and lower-quality habitat to minimize habitat loss impacts. Additionally, through the iterative design process of the Project, areas of particularly high-quality habitat were avoided (e.g., old growth, wetlands, and concentrations of moose observations).

The Pictou/Antigonish/Guysborough region currently has the second highest concentration of Mainland Moose in the province, making protection of habitat in the area important for recovery of this species (NSDNR, 2021). Habitat in this region, and especially areas meeting the biophysical requirements for Core Habitat, play a pivotal role in ecological connectivity for moose.

Historical and current land use, including forestry and off-road recreational activities, has considerably fragmented the habitat in the LAA due to degraded forest habitat and abundant road and trail networks. Fragmentation affects the quality and connectivity of habitat for both individual wildlife and populations. Moose in the LAA could be impacted by both further fragmentation of the forests and vegetation removals in foraging areas resulting from turbine, road construction, and road widening. Design considerations to place turbines in previously disturbed areas were incorporated to minimize additional habitat fragmentation, for example, 60 percent of the access roads will be using existing roads in the PDA. In addition, vegetated buffers around wetlands and watercourses will be maintained to support connectivity and cleared areas will be replanted progressively to mitigate fragmentation effects.

Herpetofauna use terrestrial habitats like wetlands, riparian areas, forested areas near water, and rocky/gravelly areas such as roadsides. The Project layout is designed to minimize impacts on intact habitat, especially in riparian areas and surrounding forests. Most watercourses in the PDA were not observed to support turtle habitat. However, turtles move across the landscape, especially between wetlands and watercourses, and may be present in the LAA. The Project design minimizes habitat alteration of watercourses and adjacent habitat by prioritizing pre-existing roads and watercourse crossings. The construction of new roads may create small gravel roadside habitats suitable for nesting turtles.

Other non-priority species use habitats in the LAA; the Project construction and operation and maintenance phases may result in habitat loss and fragmentation for non-priority species. Project construction may remove refugia, increase predation risks, and disrupt ecological balance. Forest interior species, such as Fisher are more sensitive to habitat loss and fragmentation, but the Project layout, which involves using existing roads and avoiding old-growth habitat, is designed to minimize bisecting intact forested areas with substantial unsuitable habitat. In general, it is expected that movement patterns may be affected in the short-term as alternate habitats are sought, but terrestrial wildlife will likely continue using habitats (including new and existing roads) post-construction.

Direct impacts of habitat loss and fragmentation to non-priority species in the LAA will be low to moderate and can be mitigated through strategies to reduce these effects. Careful site planning has been implemented to minimize habitat disturbance and to reduce habitat loss and fragmentation, use existing roads and areas that have been previously altered, such as clearcuts and harvested areas. Habitat modelling, field survey results, and NSDNR guidance have been considered during Project layout design. The iterative Project design process has prioritized avoidance and minimization of interactions with important wildlife habitat such as wetlands and mature forest.

Potential Project effects related to habitat loss and fragmentation can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on terrestrial wildlife habitat will be further detailed in an EPP and will be implemented prior to and during construction.

- Mainland Moose habitat mapping was considered in the design of the Project layout to create wildlife corridors or buffer zones to facilitate species movement.
- Vegetated buffers around wetlands and watercourses will be maintained to support connectivity for wildlife where possible.
- Vegetation management practices that benefit Mainland Moose will be implemented, such as maintaining natural browse areas and creating new foraging opportunities.
- Roads will be decommissioned where possible to reduce long-term effects of habitat loss and fragmentation.
- Temporary areas in the PDA will be naturally restored during Project construction.
- To minimize the impacts of habitat loss during operation and maintenance, particularly for Mainland Moose, compatible vegetation will be maintained in cleared areas (i.e., cutting tree species while preserving low shrub species that do not interfere with Project infrastructure or site access).
- Alternative road de-icing methods will be employed during road maintenance as practicable to prevent the impacts of salt on wildlife and their habitats.
- Measures will be implemented to control and prevent the spread of invasive species.
- A Mainland Moose monitoring plan will be developed and submitted to NSDNR and NSECC prior to construction. The program will be implemented two years from the time turbines become operational.
- The Proponent will develop and implement a Wildlife Management Plan.

10.3.1.2 Collision Risk

Due to an increase in road traffic in the PDA, predominantly during the construction phase, the Project will increase the risk of collision with wildlife using the roadways. Currently the LAA is used by local residents, recreational users (particularly snowmobiles and all-terrain vehicles (ATVs)), and for industrial forestry operations.

Surveys conducted in the LAA (particularly trail camera trap data) show current year-round use of roads by a variety of animals including Mainland Moose, White-tailed Deer, Bobcat, and Eastern Coyote. These species may be at increased risk of injury and death due to collisions through all phases of the Project, but particularly during construction when increases in vehicular traffic will be greatest.

Herpetofauna are particularly vulnerable to increased exposure to road traffic due to their slow movement. During seasonal migrations from their overwintering areas, they often cross roads to reach breeding sites. Wood Turtles, in particular, frequently nest in human-made habitats such as road embankments. Turtle species are highly sensitive to increased mortality among adults and older juveniles due to their delayed sexual maturity and slow reproductive rate. Mortality and injury from road networks (including new road construction, road widening and increased traffic volume and speed) are identified as high-level concerns for the recovery of Wood Turtle (ECCC, 2020). The construction phase of the Project poses the greatest increase in risk of collision injury and mortality due to the increased traffic levels on the roads, but impacts can be mitigated by avoiding construction activities during peak seasonal activity and movement patterns of individual species.

The threat of wildlife vehicle collisions will be local in the medium-term and with the highest likelihood of occurring during the construction phase. It is expected that traffic associated with the Project operational phase (maintenance of equipment and vegetation) will have minimal impact on the potential for wildlife collisions. Considering existing traffic load and the expected minimal impact from the Project beyond the construction phase, the impact of collisions on terrestrial fauna in the LAA due to road traffic is expected to be low.

Flying invertebrates are at risk of mortality due to collisions with operating turbine structures, particularly those exhibiting hill-topping, swarming, and migrating behaviours (Voigt, 2021). A potential influencing factor contributing to the collision risk is the attraction of some insect species to wind turbines, with turbine colour identified as a potential influencing factor (Long et al., 2010; Crawford et al., 2023). However, gaps in the literature persist regarding how attraction to wind turbines influences insect mortality rates and whether turbine-induced fatalities contribute to overall insect population declines (Voigt, 2021). Based on the limited available data, no measurable Project-related effects on flying invertebrates in the LAA have been identified.

Potential Project effects related to wildlife collision risk can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on terrestrial wildlife collision risk will be further detailed in an EPP and will be implemented prior to and during construction.

- Project staff will be briefed on wildlife dangers and hotspots, aiming to minimize traffic and associated stress to wildlife.
- Vehicle speeds will be reduced, especially in key areas during sensitive seasonal windows for wildlife. Signage will be posted in sensitive habitat during sensitive periods for wildlife to caution drivers.
- Traffic signs (speed limit and wildlife warning signs) will be installed to reduce speed and alert road users to presence of wildlife.
- Project related traffic will be minimized to reduce wildlife vehicle collisions.
- The amount of road that parallels a watercourse will be minimized where possible.
- Permanent and temporary road and water crossings will be planned to prevent turtle mortality and protect water quality.
- Onsite monitoring for Mainland Moose, will be conducted during site preparation and construction activities, as outlined in a Wildlife Management Plan.
- Turtle VES will be considered immediately prior to site preparation and construction activities. If SAR turtles are present, ECCC recommends clearing no earlier than mid-October to avoid risk of destruction of individuals.
- If a turtle or nest is encountered during construction activities, work will cease, and the onsite environmental monitor will be made aware to determine next steps.
- Vegetation management practices to enhance visibility for wildlife and reduce the risk of collisions will be implemented.

10.3.1.3 Disruption of Life History

The Project activities may cause habitat disturbance, disrupting the life history of terrestrial wildlife in an area already influenced by human activities such as forestry operations and recreational use. During the Project construction period, disturbance levels are expected to be comparable to active forestry operations, but extended over a longer duration (excluding short-term, isolated activities like blasting). Wildlife may exhibit behavioural changes as a result of the Project and seek out alternate habitats outside of the LAA due to sensory disturbance and stress. In the operation and maintenance phase, sporadic increases in lighting, traffic, and human presence may occur, potentially prompting wildlife to avoid or abandon suitable habitats over the longer term. The greatest difference in the disturbance regime in the LAA as a result of the Project may arise from the noise (and possibly vibration) generated by the operating turbines.

Mainland Moose could be especially sensitive to disruptions in their life history caused by Project roads during construction, operation and maintenance, and decommissioning. Moose experience disturbances from road construction, maintenance, and traffic, with even low-intensity roads such as recreational trails prompting some degree of habitat avoidance (Beazley et al., 2004). Studies on the impacts of road density on moose individuals and populations have been conducted, revealing direct and indirect influences (Yost and Wright, 2001; Beazley et al., 2004; Shanley and Pyare, 2011). Conversely, a study on moose tracked using GPS collars in west-central Alberta found no significant response of moose to the presence of roads (including two-lane gravel roads, single-lane gravel roads, and small truck trails) and found considerable variation amongst individuals tracked. For example, some individuals avoided areas with any human activity, while others selected road edges for foraging areas (Finnegan et al., 2023). Another study in Quebec found that collared cow moose tended to avoid both paved and forest roads, likely due to the associated human disturbance and activity rather than the roads themselves (Gagnon et al., 2024). The extent of the impact of roads on moose may vary based on the road type, the level of use, and overall road density. Areas in the Pictou/Antigonish/Guysborough region surpass the road density threshold considered detrimental to Mainland Moose yet host the province's second highest concentration of individuals (NSDNR, 2021).

Moose could exhibit altered behaviour and movement patterns in response to Project activities that cause loss of habitat, increased vehicular traffic, increased human presence, and noise. Some studies have looked at the impact of operational wind turbines on moose, but the impacts to their behaviour and habitat selection remains unclear (Bernt, 2021). The Mainland Moose Recovery Plan recognizes stress from renewable energy infrastructure, specifically citing artificial lighting sources and the flicker effect as a potential threat to the Mainland Moose (NSDNR, 2021).

While there is limited research on the response of moose to wind turbines, studies on other large mammals like deer, reindeer, and elk show behavioural changes during construction and operation (Łopucki et al., 2017; Skarin et al., 2015; Skarin and Alam, 2017; Skarin et al., 2018), with some studies indicating no significant impact on behaviour during operation (Walter et al., 2006; Colman et al., 2013; Tsegaye et al., 2017; Taylor et al., 2016). Studies on carnivores (including martens) indicate that wind farms can influence habitat use and abundance, especially during construction (Sirén et al., 2016; Łopucki et al., 2017; Sirén et al., 2017). To reduce disruptions to wildlife life history, seasonality will be considered when planning construction, maintenance, and decommissioning activities. The field studies and habitat mapping indicate where Mainland Moose presence is likely the highest and avoiding these areas during sensitive seasonal windows will help reduce the impacts.

Despite existing noise from extensive forestry operations and recreational activities on site; including recreational snowmobiling, ATV use, hunting, and fishing; mammal species were observed in the LAA, including Mainland Moose and Fisher. This suggests wildlife in the area are relatively tolerant or habituated to some sensory disruptions from these existing human activities.

Small-mammal (e.g., rodent and shrew) populations are not likely impacted by wind energy development (De Lucas et al., 2005; Łopucki and Mróz, 2016). Due to lack of studies on the impacts of wind turbines on local small mammal populations it is unclear what impacts the Project may have, if any, on small mammals in the LAA.

Sensitive periods for herpetofauna, related to migration or nesting periods, may be disrupted by Project activities, impacting migratory or breeding behaviours and potentially creating barriers to important habitat due to habitat removal or fragmentation. It is expected that impacts on life history of herpetofauna will be negligible considering the Project use of existing roads and previously disturbed habitats, especially if construction, maintenance, and decommissioning activities are conducted outside of sensitive periods for these species.

Potential Project effects related to disruption of life history can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on life history of terrestrial wildlife will be further detailed in an EPP and will be implemented prior to and during construction.

- Blasting will be undertaken in accordance with regulatory requirements and will only be conducted by qualified blasting professionals.
- Pre-blast wildlife searches will be completed.
- Blasting will be monitored and will be planned to occur on days where weather conditions are less likely to cause excessive noise levels.
- Noise-reducing technologies will be used to minimize the impact of construction noise on wildlife.
- Onsite lighting will be designed to minimize disturbance.
- Project personnel will be prohibited from harassment and feeding of wildlife.
- A Mainland Moose monitoring plan will be developed and submitted to NSDNR and NSECC prior to construction. The program will be implemented for two years from the time turbines become operational.

- The Proponent will develop and implement a Wildlife Management Plan.

10.3.1.4 Other Threats (Disease/Poaching)

Project activities including forest clearing and road construction may increase White-tailed Deer access to moose habitat, potentially increasing the risk of disease transmission, including Brainworm (*Parelaphostrongylus tenuis*) and Winter Tick (*Dermacentor albipictus*). The evidence from the field surveys shows prominent use of the LAA by deer and existing roads connecting the known deer over-wintering area to the PDA. The increased impact from the Project on Mainland Moose disease will be small.

Poaching is recognized as a potential threat to Mainland Moose in the Recovery Plan (NSDNR, 2021). Although increased human access, including local hunters and recreational users, may elevate the risk, the LAA is already highly accessible. Upgrades to existing roads may allow for more types of vehicles accessing moose habitat which could increase the poaching risk. However, the heightened presence of operational and maintenance staff may serve as a deterrent to moose poaching.

Project construction may enhance non-Project-related human access to the LAA, potentially attracting increased use by ATV users, hikers, and hunters, including those engaging in illegal moose poaching—a significant threat to Mainland Moose (NSDNR, 2021). These users might exploit the newly constructed or upgraded access roads. To mitigate this effect, plans for decommissioning and revegetating access roads will be implemented.

Establishment or spread of invasive weed populations through Project construction, operation and maintenance, and decommissioning activities may impact wildlife in the LAA. The Recovery Plan for Mainland Moose lists invasive plant species as a concern for Mainland Moose due to their impact on available food sources. This includes plant species such as Wild Parsnip (*Pastinaca sativa*) which was observed on access roads outside the LAA (Chapter 8: Flora). Best management practices will be implemented during Project activities to limit the spread of invasive species. Additionally, invasive species management procedures will be adopted in the PDA to identify, prevent, control, and mitigate the impact of invasive species.

Impacts of disease, poaching and other threats to priority and non-priority species in the LAA will be low and can be mitigated through strategies to reduce these effects.

Potential Project effects related to other threats (disease/poaching) can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on terrestrial wildlife will be further detailed in an EPP and implemented prior to and during construction.

- As much natural cover as possible will be retained to favour moose habitat over deer habitat to minimize incursion of brainworm and winter tick.
- Invasive species management procedures will be developed and implemented as part of the Vegetation Management Plan.

- Access roads for construction will be decommissioned and revegetated where possible.
- Decommissioning of existing roads in strategic areas or the use of barriers to limit human presence will be considered.
- The Proponent will develop and implement a Wildlife Management Plan.

10.3.2 Residual Effects

Although effects on mammals, herpetofauna, and invertebrates vary, primary concerns include habitat loss, fragmentation, and vehicle collision and the associated disruptions to life history. The magnitude of residual effects is expected to be moderate to large on an immediate scale based on the loss of core habitat for Mainland Moose. Magnitude of the effects of habitat fragmentation is expected to be minor on a local scale. Residual effects are predicted to be long-term for habitat loss and fragmentation but variable for individual species. Habitat disruption and avoidance will most likely occur during periods of construction and may be more intermittent during periods of operation and maintenance when onsite human activities are less frequent and would occur on a short-term basis. This will return to baseline during inactive periods and after the decommissioning of the Project. Timing of residual effects, if the mitigation measures are followed, should be low to moderate. Through proposed mitigation and monitoring, expected effects on terrestrial fauna are expected to be minor and local. These effects are continuous but seasonally varied and reversible.

Based on current site conditions, the impact assessment, and the mitigation measures implemented or planned for construction, the overall residual effects on terrestrial wildlife are predicted to be not significant.

10.4 Monitoring

An environmental monitoring program will be developed prior to Project construction. Additional surveys or mitigations may be identified in consultation with regulators following review of the monitoring program.

A post-construction monitoring program for Mainland Moose will be developed in consultation with NSDNR and implemented for two years post-construction to assess effects of the Project. The results of the post-construction monitoring program will be submitted to NSDNR as required.

11 Bats

11.1 Overview

This chapter addresses the potential effects of the Project on bats, including both migratory and resident species and their habitats. Wind energy projects can adversely affect bats, with turbines posing a risk of increased mortality. Indirect impacts such as habitat loss, fragmentation and sensory disturbance also present risks to bats. Iterative Project layout adjustments have reduced potential impacts on bats and their habitat.

Interactions of the Project with bats are closely linked to potential effects on other VECs discussed in related chapters, including noise and light disturbance (Chapter 6: Atmospheric Environment), vegetation loss or modification (Chapter 10: Flora), and loss or alteration of wetlands (Chapter 11: Wetlands).

For this assessment, studies were completed to examine the existing environment including bat presence and activity and maternity roosting habitat in the LAA, and other features such as hibernacula in proximity to the LAA. The information gathered from pre-construction surveys helps to assess site risk, inform siting of infrastructure, develop mitigation measures, and provide baseline information to support post-construction monitoring and adaptive management (NSDNR, 2022). Mitigation measures have been outlined in this chapter and will be further developed in a Project-specific EPP prior to construction to minimize adverse effects on bat populations.

11.1.1 Regulatory Context

Assessment of bats considers the existing environment and measures effects using relevant provincial and federal legislation:

- Nova Scotia *Wildlife Act*
- NSESA
- SARA
- *Canadian Environmental Protection Act*
- Nova Scotia *Biodiversity Act*
- Nova Scotia *Environment Act*
- Nova Scotia *Wilderness Areas Protection Act*

11.1.2 Boundaries

The AOD represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. The PDA represents the boundaries within which the AOD may occur. For this assessment, the LAA for bats includes the PDA, a 500 m buffer of the PDA, and associated airspace. The RAA is a 5 km buffer around the PDA.

11.1.3 Assessment Methodology

The assessment of bats focused on identifying migratory and resident bat species present on or near the LAA and activity on site. Data was collected through literature review, online databases and reports, habitat analysis, and field surveys conducted during migratory and breeding periods.

The information gathered during the literature review and habitat analysis was used to inform the design of baseline field surveys and reflective of the protocols outlined in *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022), *Bats and Wind Turbines. Pre-siting and preconstruction survey protocols* (Lausen et al., 2010), *Pre-Construction Bat Survey Guidelines for Wind Farm Development in NB* (New Brunswick Department of Fish and Wildlife, 2009), and to a lesser extent, *Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds* (ECCC, 2007b), and *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC, 2022).

Baseline field surveys were designed to determine the presence and diversity of bat species, activity on site, and to identify suitable maternity roost habitats in the LAA. This information was then used to inform and refine siting of Project infrastructure, develop measures to minimize adverse effects of Project construction and operation on bats, and evaluate impacts of the Project. The data collected through the assessment process will also serve as a baseline for post-construction monitoring and adaptive management.

The description of the existing environment is based primarily on data collected through the following resources plus field surveys carried out for this Project:

- Karst Risk Map of Nova Scotia (Drange and McKinnon, 2019)
- Locations of Known Bat Hibernacula in Nova Scotia (Moseley, 2007)
- Nova Scotia Geoscience Atlas - Abandoned Mine Openings (GeoNOVA, 2024)
- Nova Scotia Significant Species and Habitats Database (GeoNOVA, 2024)
- AC CDC Data Report (AC CDC, 2025)
- Global Forest Watch Tree Cover Loss 2001-2024 and Gain 200-2020 (Global Forest Watch, 2025)
- Nova Scotia Forest Inventory (GeoNOVA, 2024)
- Nova Scotia LiDAR Point Cloud (GeoNOVA, 2020)
- Nova Scotia Hydrographic Network (GeoNOVA, 2024)
- Nova Scotia Wetlands Inventory (NSDNR, 2021)
- Nova Scotia Predictive Ecosystem Mapping (GeoNOVA, 2024)

A habitat assessment of bats and important habitat features (e.g., critical habitat) known to occur within a 100 km radius of the LAA was completed using available habitat information and mapping data.

A SAR biologist with NSDNR, the Environmental Protection Operations Directorate – Atlantic, ECCC, and the Environmental Stewardship Branch of ECCC were consulted regarding proposed bat survey methodology. Comments received from reviewers (e.g., M. S. Wade, pers. comm., April 3, 2025), were incorporated into the survey methodology. Details of these surveys are presented below in subsection 11.1.4.

Detailed habitat suitability modelling was developed to identify possible suitable bat maternity roost habitat for Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis (*Myotis septentrionalis*) that may occur in the LAA. These maps were used to inform field survey design and evaluate Project impacts. Details of the habitat suitability modelling for these SAR bats are presented below.

11.1.3.1 SAR Bat Habitat Modelling

Habitat suitability modelling was conducted to assess the quality and quantity of possible suitable maternity roosting habitat for *Myotis* species. Since the summer range of Tri-colored Bat (*Perimyotis subflavus*) is thought to be restricted to southwest Nova Scotia and does not overlap with the LAA (Quinn and Broders, 2007), habitat modelling to identify possible suitable maternity roost habitat was not completed.

Spatial parameters representing biophysical attributes of maternity roost habitat were assigned based on peer-reviewed literature and expert knowledge. The spatial layers used to represent and measure suitable roosting habitat were retrieved from the following datasets:

- Nova Scotia Forest Inventory (GeoNOVA, 2024)
- Nova Scotia LiDAR Point Cloud (GeoNOVA, 2020)
- Nova Scotia Old Growth Potential Index (NSDNR, 2025)
- Nova Scotia Predictive Ecosystem Model (GeoNOVA, 2024)

As forest-dwelling species, natural roosting sites for Myotis are typically tall, large diameter trees located in older stands with open canopies (ECCC, 2018; COSEWIC, 2013: Balzer et al., 2022; Kalcounis-Ruppel et al., 2005; Barclay and Brigham, 1996). While species of *Myotis* sp. have been recorded in both coniferous and deciduous stands, evidence suggests that deciduous and mixedwood forests are preferred for maternity roosts (Broders et al., 2006; Kalcounis et al., 1999; Patriquin and Leonard, 2011; Broders et al., 2006). Among these habitat factors, stand age is more important, likely because older stands contain more snags and decaying trees suitable for roosting (Patriquin and Leonard, 2011; COSEWIC, 2013; Fabianek et al., 2015).

The following biophysical attributes were used to model possible suitable maternity roosting habitat for Myotis species:

- Diameter at Breast Height – Any stand classified as having an average total diameter of 17 cm or greater
- Canopy Height – Any stand with a canopy height of 15 m or greater
- Predictive Ecosystem Mapping – Any stand classified at the 6th level as Acadian Deciduous Forest, Acadian Mixedwood Forest, Acadian Coniferous Forest, Wet Deciduous Forest, Wet Coniferous Forest, Wet Mixedwood Forest
- Old Growth Potential – Any stand with the potential to be old growth at any rank

11.1.4 Field Surveys

The objective of the field surveys was to gather baseline information on bats that use and move through the LAA. Following the *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022), other accepted survey protocols and guidance documents, and consultation with regulators, baseline survey protocols were developed. Passive and active methods for acoustic monitoring were used.

The *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022) states a minimum of two to three survey stations are required for wind energy projects with less than 10 turbines, with an additional survey station for every five turbines beyond this amount. To align with this guidance and provide survey coverage across the LAA, CBCL deployed seven detectors (Figure 11.1, Appendix A) between late April and early November. Active survey methods involved the use of a handheld bat detector at different survey locations and in transit when travelling between survey locations during nightjar surveys. The acoustic monitoring surveys were designed to target areas of potential impact (e.g., in the PDA), particularly the associated airspace around the proposed turbine locations.

Autonomous recording units (ARUs) (Wildlife Acoustics Song Meter Mini Bat) were used to passively sample echolocation calls of bats in the LAA continuously between April 29 and November 5, 2025. This survey period overlaps the key active periods: breeding, migratory periods, and movement by resident species.

Survey locations were selected to target areas where bats are likely to congregate (e.g., wetlands for foraging) and along natural corridors (e.g., valleys, streams, and ridges) where migratory bat movements are likely to occur (Lausen et al., 2010) to maximize recordings of bats foraging or commuting in the area. A desktop assessment to identify suitable locations was conducted prior to the execution of the field program and final locations were selected in the field based on suitable conditions (Table 11.1). Based on an initial desktop level assessment using aerial imagery (e.g., GIS, Google Earth, Pictometry), Project details (e.g., Project layout and the proposed 22 turbines), and provincial guidance documents, seven detectors were deployed to provide representative coverage of the LAA (Figure 11.1, Appendix A).

Table 11.1 Deployment Locations, Habitats, Deployment and Retrieval Dates for each Autonomous Recording Unit (ARU)

ARU ID	Deployed	Retrieved	Habitat
EM ARU01	30-Apr-25	05-Nov-25	Mature hardwood forest
EM ARU02	30-Apr-25	06-Nov-25	Young mixedwood forest, softwood dominant. Approximately 145 m from a watercourse
EM ARU03	30-Apr-25	06-Nov-25	Mature mixedwood forested wetland, softwood dominant. Approximately 160 m from a watercourse
EM ARU04	30-Apr-25	05-Nov-25	Mature hardwood forest
EM ARU05	30-Apr-25	07-Nov-25	Mature hardwood forest along a ridge. Approximately 150 m from a watercourse
EM ARU06	30-Apr-25	07-Nov-25	Mature hardwood forest
EM ARU07	30-Apr-25	07-Nov-25	Mature hardwood forest near small watercourse

Each ARU was programmed to record full spectrum data 30 minutes before sunset to 30 minutes after sunrise. Detector settings (e.g., trigger frequency, recording length) were selected following the North American Bat Monitoring Program (NABat) and Acoustic Guide for Bat Monitoring in Atlantic Canada (McBurney and Segers, 2020). Bat detectors were deployed at ground level (approximately 2 to 3 m from the ground) and were mounted directly to tree trunks. Detectors were deployed on April 30, 2025, and the units were programmed to record until they were retrieved in November 2025.

Data was downloaded from the units every three to four weeks, at which time batteries were replaced. At these times, units were checked to confirm they were functioning properly and had not been interfered with by animals or humans.

Active sampling using a Wildlife Acoustics ARU occurred during one round of nightjar surveys on July 2 and 3, 2025. Fifteen locations were surveyed for six minutes during nightjar surveys once over the span of two nights (Figure 12.6 – Nightjar Survey Locations, Appendix A). When driving between survey locations, methodology aligned with Mobile Acoustic Transect Surveys (NABat; Loeb et al., 2015) was followed. Surveys occurred between 30 minutes before sunset and midnight in suitable weather conditions (e.g., clear weather, low wind speed, no precipitation).

Analytical software (Kaleidoscope Pro Version 5.7.0) was used to interpret and analyze bat calls recorded during passive and active surveys. All recordings were processed using Kaleidoscope Pro's auto-analysis software tool. This process screens out non-bat files (noise) and the remaining files are considered possible bat calls. Bat calls were manually verified using Kaleidoscope. Portions of the non-bat calls were manually vetted to assess whether any bat calls were mislabelled as noise.

When possible, recorded bat passes were identified to species. Where bat calls could not be identified to species with confidence, these calls were classified into groupings of bats with similar or overlapping call characteristics (Table 11.2). *Myotis* calls (Little Brown Myotis and Northern Myotis) were generally classified into one common group, *Myotis*.

Table 11.2 Species and Groupings used during Analysis of Data Recorded in the Project Area

Species	Code
Little Brown Myotis (*Myotis lucifugus*)	MYLU
Northern Myotis (*Myotis septentrionalis*)	MYSE
Tri-colored Bat (*Perimyotis subflavus*)	PESU
Eastern Red Bat (*Lasiurus borealis*)	LABO
Hoary Bat (*Lasiurus cinereus*)	LACI
Silver-haired Bat (*Lasionycteris noctivagans*)	LANO
Big Brown Bat (*Eptesicus fuscus*)	EPFU
Groupings	**Code**
Little Brown Myotis/Northern Myotis	*Myotis*
Eastern Red Bat/ Tri-colored Bat/Little Brown Myotis/Northern Myotis	HighF
Big Brown Bat/Silver-haired Bat	EPFULANO
Hoary Bat/Big Brown Bat/Silver-haired Bat	LowF

After identification, bat passes were analysed to determine seasonal and temporal activity patterns in the LAA. Subsequent analysis was carried out to assess activity of migratory species—those at a higher risk of mortality.

11.2 Existing Environment

Seven species of bats have been recorded in Nova Scotia (Broders et al., 2003) and are protected under Nova Scotia's *Wildlife Act*. Of these, three species are listed as Endangered at both the provincial (NSESA) and federal (Schedule 1 of SARA) levels (Table 11.3).

Table 11.3 Bat Species of Nova Scotia and Conservation Status

Scientific Name	Common Name	NSESA	SARA	COSEWIC	AC CDC
Myotis lucifugus	Little Brown Myotis	Endangered	Endangered	Endangered	S1
Myotis septentrionalis	Northern Myotis	Endangered	Endangered	Endangered	S1

Scientific Name	Common Name	NSESA	SARA	COSEWIC	AC CDC
Perimyotis subflavus	Tri-colored Bat	Endangered	Endangered	Endangered	S1
Lasiurus cinereus	Hoary Bat	--	--	Endangered	SUB, S1M
Lasiurus borealis	Eastern Red Bat	--	--	Endangered	SUB, S1M
Lasionycteris noctivagans	Silver-haired Bat	--	--	Endangered	SUB, S1M
Eptesicus fuscus	Big Brown Bat	--	--	--	SNA

In Nova Scotia, three non-migratory bat species—Little Brown Myotis, Northern Myotis, and Tri-colored Bat—over-winter in caves and abandoned mines (Moseley, 2007). However, the Tri-colored Bat is primarily found in southern Nova Scotia and the Fundy coast of New Brunswick (Broders et al., 2003).

White-nose Syndrome (WNS) poses the most significant threat to the survival of three bat species. WNS is caused by the fungus *Pseudogymnoascus destructans*, which thrives in cold, humid underground environments typical of bat hibernacula and results in bats waking frequently during hibernation, depleting their energy reserves prematurely and often leading to death (ECCC, 2018; NSDLF, 2020). This disease has led to severe population declines, with mortality rates exceeding 90 percent in many hibernacula in eastern Canada, including Nova Scotia (COSEWIC, 2013; ECCC, 2018; US Fish and Wildlife, 2019). Dobony and Johnson (2018) found that despite severe early declines from WNS, the monitored Little Brown Myotis colony in this study exhibited stabilized counts over several years and some individuals survived multiple years after initial exposure, suggesting potential long-term resilience in this population.

The other four bat species known to occur in Nova Scotia are long-distance migratory species, three of which were assessed by COSEWIC in May 2023 as Endangered: Hoary Bat, Eastern Red Bat, and Silver-haired Bat. The fourth migratory species is Big Brown Bat. While the range and population of Big Brown Bat is largely unknown, there have been a few occurrence records for Nova Scotia (Broders et al., 2003).

The NSDNR Significant Species and Habitat Database contains 15 records of species and/or habitat records which relate to bats within a 100 km radius of the PDA. These records include Species at Risk (10 records), Species of Concern (3 records) and Other Habitat (2 records). The details of these records include the following:

- Species at Risk – Records relate to Little Brown Bat (7), Bat (unclassified) (2) and Northern Myotis (1)
- Species of Concern and Other Habitat – Records relate to significant areas (caves and mines) (3)

Two of the Species at Risk polygons (relating to Little Brown Bat and Northern Myotis) overlap with the transmission line area of the PDA near highway. No other records are within 5 km of the PDA.

The AC CDC (2025) Data Report indicates that bat species occurrences or hibernacula have been reported in the LAA or within 5 km. All three SAR bat species are known from within a 100 km radius of the LAA, with the nearest observations being Little Brown Myotis 10.1 km away from the LAA (AC CDC, 2025). Occurrences of two of the migratory bat species, Eastern Red Bat and Hoary Bat, are reported within 100 km of the LAA, with the nearest observations being 35.0 and 100.0 km away from the LAA respectively (AC CDC, 2025).

11.2.1 Bat Detections

Migratory bats and *Myotis* species were recorded in the LAA. There are low levels of bat activity in the LAA, with total of 295 bat passes recorded between April 30 and November 5, 2023. The majority of bat passes are attributed to *Myotis* species (189 passes; 64 percent), with migratory bats contributing to the remaining 36 percent (nine passes classified as EPFULANO (Big Brown Bat/Silver-haired Bat), four as LowF, 91 as HighF, and four as Hoary Bat) (Table 11.4). Surveying commenced in late April and ran until early November. In this time, bats were recorded between May and September, but most bat passes were recorded through July and August.

Table 11.4 Summary of Acoustic Bat Passes Recorded Between April 30 and November 5, 2025

ARU Location	*Myotis*	EPFULANO*	LowF*	High F*	Hoary Bat *	Total	No. of nights bats were detected
EM ARU01	3	-	-	-	-	3	3
EM ARU02	46	7	-	14	-	67	44
EM ARU03	70	1	1	70	1	143	44
EM ARU04	36	1	2	1	1	41	32
EM ARU05	-	-	-	-	-	0	0
EM ARU06	3	-	-	2	-	5	5
EM ARU07	31	-	-	5	-	36	23
Total (% of total bat calls)	189 (64.1%)	9 (3.0%)	3 (1.0%)	92 (31.2%)	2 (0.7%)	295	-

*Migratory bat species

EPFULANO = Big Brown Bat/Silver-haired Bat

LowF = Hoary Bat/Big Brown Bat/Silver-haired Bat

HighF = Eastern Red Bat/ Tri-colored Bat/Little Brown Myotis/Northern Myotis

The highest number of *Myotis* passes were recorded from ARU 03; however, higher numbers were also recorded at ARU 02, ARU 04, and ARU 07. ARU 03 was on the edge of a large wetland, ARU 04 and ARU 07 were in mature hardwood forest, and ARU 02 was in young mixedwood forest, approximately 145 m from a watercourse. Based on the number of calls and the surrounding habitat at ARU 03, it is suspected that this area is used as a foraging site. Most of the migratory bat calls were recorded in August during fall migration (between August and October), suggesting that some migratory bats may traverse through the LAA during fall migration. However, the relatively low number of passes suggest that the LAA does not appear to be serving as a migration corridor for bats.

The average total passes per detector night for the LAA during the survey period, encompassing all species, was 0.22. The average migratory passes per detector night in the Project area was 0.08, and for *Myotis* species it was 0.14.

As stated by Broders and Henderson (2007), low bat activity levels were recorded at the site of another wind power project to the west of the PDA; Glen Dhu Wind Farm. Additionally, all the bat pass sequences from acoustic monitoring at Glen Dhu were *Myotis* species, no migratory bats were detected (Broders & Henderson, 2007). Broders & Henderson (2007) stated that results of studies conducted in 2007 and 2003 (Broders et al., 2003) suggested there is likely no significant movements of migratory bat species through the region.

Bat activity recorded at the Glen Dhu Wind Farm site was dominated by *Myotis* species. It should be noted that the Glen Dhu Wind Farm bat study was conducted in 2007, prior to the white-nose syndrome outbreak in the Maritimes, which has caused >90 percent decline in known numbers of hibernating *Myotis* bats in Nova Scotia (Nova Scotia Department of Lands and Forestry, 2020). The 2007 study found no evidence to suggest that significant numbers of bats are moving through the area during migratory periods and activity levels were very low (Broders & Henderson, 2007).

No bats were recorded or observed during the two nights of active surveys. One Hoary Bat was observed during avian fall migration surveys just before dawn, early October 2025.

11.2.2 Bat Habitat

Regions with limestone karst topography can yield features such as caves and sinkholes, which can be used by bats for roosting and hibernation. The LAA primarily occurs in areas of low relative risk of encountering karst with very small areas of medium and high karst risk occurring near the eastern and southern portions of the PDA (Figure 6.3, Figure 11.2, Appendix A) (Drange and McKinnon, 2019). Several abandoned mine openings occur in and adjacent to the LAA, but no known hibernaculum occur in the LAA. The three closest known hibernacula include the McLellan's Brook Cave (approximately 38 km southwest of PDA), Hirschfield Galena Prospect (approximately 46 km southwest of PDA), and the New Laing Adits (approximately 56 km) (Moseley, 2007).

There are no overlaps with the LAA and critical habitat defined by Environment Canada (2015) for SAR bat species, which I represented as 10 x 10 km standardized Universal Transverse Mercator (UTM) grid squares where the description of critical habitat is met (i.e., hibernacula have been identified). The closest hibernaculum to the PDA, the McLellan's Brook Cave, is close to Stellarton, NS, approximately 38 km from the PDA. The McLellan's Brook Cave is a dissolutional stream cave in limestone. Late summer *Myotis* activity was observed around the cave, but there is no record of underground bat activity (Moseley, 2007).

Fifty-seven abandoned mine openings occur within 5 km of the PDA. Of the 57 mine openings, one occurs in the LAA. The Abandoned Mine Openings database (GeoNOVA, 2024) indicates that the abandoned mine that occurs in the LAA has been filled in.

Many bat species prefer roosting in older forest stands over younger ones. Older forests offer increased snag availability for roosting and provide foraging habitat with a relatively closed canopy (Barclay and Brigham, 1996; Crampton and Barclay, 1996; Krusic et al., 1996; Jung et al., 1999; as cited in ECCC, 2018). Based on habitat modelling, the LAA provides some high-quality habitat (2146.9 ha; 26.6 percent) that may serve as possible maternity roost habitat for Little Brown Myotis or Northern Myotis (Figure 11.3, Appendix A). The AOD contains a small amount of high-quality suitable maternity roosting habitat (74.6 ha; 24 percent), owing to the lack of mature forest stands that intersect with the AOD.

Table 11.5 Suitable bat maternity roost habitat in the LAA, PDA, and AOD.

Suitability	LAA (ha)	Percent of LAA	PDA (ha)	Percent of PDA	AOD (ha)	Percent of AOD
None	3033.1	37.5	1355.6	41.4	138	44.4
Low	1361.9	16.8	555.2	17	51.2	16.5
Moderate	1545.3	19.1	620.6	19	47.2	15.2
High	2146.9	26.6	742.15	22.6	74.6	24

Suitable bat maternity roost trees were recorded when observed in the LAA. Maternity roost sites are typically located in tall, large-diameter trees (DBH >30 cm), in forests (Kalcounis-Ruepell et al., 2005; Olson, 2011; Olson and Barclay, 2013). None of the suitable maternity roost trees identified were in the AOD. The closest maternity roost tree was located approximately 279 m from the AOD.

Foraging Little Brown Myotis are commonly found in open habitats, including ponds, roads, and open forests, whereas Northern Myotis foraging sites include small ponds, forest canopies, and along paths and roadways (ECCC, 2018). Migratory species such as the Hoary Bat and Silver-haired Bat generally forage high above clearings, treetops, or over water. Therefore, a large portion of the LAA can serve as possible foraging habitats for resident and migratory bat species.

11.3 Effects Assessment

11.3.1 Potential Effects and Mitigation

Several measures were implemented to mitigate potential direct and indirect impacts on bats, considering engineering and design constraints. Additionally, the AOD has been refined to minimize disturbance to bat habitat (e.g., foraging and roosting areas) wherever feasible, thereby reducing potential interactions between the Project and bats.

Potential impacts on bats through multiple interconnected pathways, both direct and indirect, may arise. Construction activities such as earthworks and vegetation clearance have the potential to cause habitat loss and modification. If these activities occur during critical periods, such as migratory or breeding seasons, they could result in mortality, injury, or displacement of bats.

Provincial and federal recovery strategies (NSDLF, 2020; ECCC, 2018) recognize anthropogenic disruptions as being additive effects to the challenges of WNS. Bats could be adversely affected, directly or indirectly, through Project activities during construction, operation and maintenance, and/or decommissioning. Collision of individuals with turbines and power lines can directly result in injury and fatality, as can barotrauma[4]. Indirectly, the installation of a wind project can result in habitat loss and fragmentation that can adversely affect long-term survival and reproductive success (Lemaitre et al., 2017). Removal of trees containing cavities or peeling bark could displace bats or directly injure roosting bats if removal occurs during their active period. Project activities can affect bats as indicated in Table 11.6; these potential effects do not account for the refined AOD or the implementation of the mitigation measures described herein.

Table 11.6 Potential Environmental Effects of the Project on Bats

Project Activity	Potential Environmental Effects		
	Habitat Loss/ Fragmentation	Direct Mortality and Injury	Sensory/ Disturbance
Construction			
Site Preparation	X	X	X
Access Roads Construction and Modifications	-	X	X
Material and Equipment Delivery and Storage	-	-	X
Infrastructure Installation	-	-	X
Restoration of Temporary Areas	-	-	X
Testing and Commissioning	-	X	X

[4] Barotrauma is injury resulting from a change in air pressure.

Project Activity	Potential Environmental Effects		
	Habitat Loss/ Fragmentation	Direct Mortality and Injury	Sensory Disturbance
Operation and Maintenance			
Turbine Operation and Maintenance	-	X	X
Road Maintenance	-	X	X
Power Line and Substation Maintenance	-	X	X
Vegetation Management	-	X	X
Safety and Security	-	-	X
Decommissioning			
Removal of Infrastructure and Site Restoration	-	X	X

X = Potential Interaction
- = No Interaction

11.3.1.1 Habitat Loss and Fragmentation

The Project activities that result in removal of trees may affect roosting habitat for bats, and changes to riparian habitat or wetlands has the potential to impact foraging and drinking habitat for bats.

Construction activities such as vegetation/forest clearing and grubbing will result in a short-term and long-term loss of habitat. Vegetation clearing will occur in the PDA for access roads, turbines, transmission lines, and other Project infrastructure. Forest clearing will result in the loss of possible tree roost habitat, and to a lesser extent, possible maternity roost trees. Tree removal or land clearing can also affect the suitability of cave or mine roosts. For the purposes of the assessment, approximately 75 ha (24 percent of the AOD) identified as possible maternity roost habitat (high suitability) will be removed or altered, though all identified suitable maternity roost trees will be avoided. Foraging habitat in the LAA generally includes riparian areas, forests, and wetlands and impacts to these areas are generally covered in Chapter 9 (Aquatic Environment), Chapter 10 (Flora), and Chapter 11 (Wetlands), respectively.

The iterative Project design prioritized avoiding high-quality bat habitat. Careful site planning and refinement went into development of the AOD, where feasible, to avoid identified suitable maternity roost trees, wetlands, minimize habitat disturbance, and reduce habitat loss and fragmentation by using existing roads and previously disturbed areas such as clearcuts and harvested stands. Turbines and access roads were sited or adjusted to avoid areas with suitable maternity roost conditions (e.g., old-growth forests) and many were instead positioned in areas previously disturbed by forestry activities. Because wetland degradation can reduce foraging habitat, the AOD was adjusted in many instances to avoid wetlands and riparian areas, and efforts will be made in the final design stages to refine some parts of the AOD, where possible, to further minimize these potential impacts. Hibernacula do not occur in the LAA and given the distance to the closest known hibernaculum (38 km from the PDA), no impacts to critical habitat are expected.

Although some bat species tend to avoid extensive clearcuts and open spaces, forested and vegetated edges have been observed to offer foraging opportunities for certain bats. These edges may additionally serve as protective zones against predators and wind, and they may concentrate prey (Krusic et al., 1996; Grindal and Brigham, 1998; Swystun et al., 2001; Henderson and Broders, 2008; as cited in ECCC, 2018).

Potential Project effects related to habitat loss and fragmentation can be effectively mitigated through planning and management of construction activities. The following key measures to mitigate the potential effects of the Project on bat habitat will be further detailed in a Project-specific EPP and will be implemented prior to and during construction.

- Existing gravel roads will be used as access roads, to the extent possible.
- Vegetated buffers around wetlands and watercourses will be maintained to support connectivity and foraging habitat where possible.
- Habitat will be restored and revegetate naturally after construction.
- Measures will be implemented to control and prevent the spread of invasive species.
- Work crews will recognize the working limits of the AOD and will refrain from entering surrounding habitat.

11.3.1.2 Direct Injury or Fatality

The Project presents the risk of direct bat mortality and injury during construction, primarily due to vegetation clearing and increased traffic. Once operational, most bat deaths at turbines are due to blunt force trauma from collisions with turbines, with a smaller component of deaths related to barotrauma due to rapid change in air pressure (Baerwald et al., 2008; Rollins et al., 2012). As per COSEWIC (2013), any additional mortality of SARA-listed bat species in WNS affected regions, including fatalities at wind turbines, could adversely affect local population survival, hinder recovery efforts, and potentially impede the development of resistance to the WNS-causing fungus.

Construction activities, such as tree clearing and grubbing, pose a risk for bat mortality. Clearing trees any time during the active season poses a risk for individual bats as they will use trees for day roosting. Tree clearing should be scheduled to avoid the active season to avoid risk to SAR bats that may be passing through the Project area during construction.

Wind turbine collisions are the main direct cause of bat mortality once wind farms are operational, with an estimated loss of 50,000 bats per year through Canada (Zimmerling & Francis, 2016). Mortality levels from wind turbines vary based on species, location, season (Kunz et al., 2007b; Arnett et al., 2008; Baerwald and Barclay, 2011), turbine height (Barclay et al., 2007; Anderson et al., 2022), wind speeds (Arnett et al., 2008; Horn et al., 2008), speed of turbine, and weather (Arnett et al., 2008). A recent study found that fewer Little Brown Myotis fatalities occurred at taller turbines than shorter (turbines ranged from 119 to 186 m (hub height plus blade length) but fatalities of migratory bats increased with increased turbine heights (Anderson et al., 2022). Given *Myotis* species accounted for the majority (64 percent) of bat passes in the LAA, this study suggests the proposed turbine height (hub height plus blade length = 199.5 m) may help to mitigate potential collisions with most bats that occur in the PDA, specifically *Myotis* species.

While wind turbine collisions represent many bat mortalities, there is variability in bat mortality rates across different regions. One study of bat mortality across 64 Canadian wind farms found an average mortality rate of 15.5 ± 3.8 (95 percent confidence interval) bats per turbine per year, but this encompasses a wide range of mortalities, from 0 to 103 bats per turbine per year at individual wind farms. Data collected specifically from wind farms in Nova Scotia was lowest of any province in the country with a mortality rate of 0.5 bats per turbine per year. Similarly, a study conducted by Birds Canada in 2016, focusing on data from wind farms in Atlantic Canada, estimated an average annual bat mortality rate within 50 m of the turbine base (from May 1 to October 31, 2016) to be 0.26 ± 0.11 bats per turbine. These findings emphasize the variability in bat mortality rates across different regions and highlight the importance of localized studies for accurate assessment.

Studies examining bat avoidance of wind turbines have produced variable results. One study conducted in the low mountain ranges of Germany found that gaps in the forest created by clearing around wind turbines attracted bat species, particularly those that tend to forage in open and forest-edge areas (Ellerbrok et al., 2023). The same study found that narrow-space foraging bats (e.g., species that are short-range echolocators and typically forage in the understory), including species of *Myotis*, also showed an increase in use of clear-cuttings from wind turbines, compared to nearby closed forests. However, another study found similar activity of *Myotis* between recently cleared areas and in closed forests, showing no increase of use in recently cleared areas (Kirkpatrick et al., 2017). Another study in a Finnish boreal forest investigated bat activity at various distances from wind turbines. This recent study reported significantly higher *Myotis* activity at sites located more than 800 m from wind turbines, indicating that *Myotis* species were more abundant farther from turbine infrastructure (Gaultier et al., 2023). Although the *Myotis* species in these European studies are not the same as the species of *Myotis* considered in this EA (Northern and Little Brown), they share key similarities due to their common genus and adaptations to northern environments; including insectivorous diets, winter hibernation, and social behaviours (Blomberg et al., 2025; Tidenberg et al., 2019). These two European studies suggest that *Myotis* species, actively avoid wind turbines, which would therefore result in fewer collisions (Kirkpatrick et al., 2017; Gaultier et al., 2023).

There are several reasons why bats may collide with wind turbines. Behaviours such as breeding, swarming, and foraging can involve repeated passes around wind turbines and increase the risk of collision (Cryan and Brown, 2007; Arnett et al., 2008; Rydell et al., 2010a; Roeleke et al., 2016). A few studies have demonstrated that the number of insects present around wind turbines is influenced by the location and arrangement of the turbines (e.g., creation of an opening in the forest, aviation warning lights, roads, turbine colour, and air currents created by movement of the blades) (Horn et al., 2008; Rydell et al., 2010b).

A goal of baseline surveys is to estimate the relative risk of fatality to bats from wind turbines at proposed sites via a sampling bat activity across a proposed project area. To assess this risk, the Wildlife Branch of Alberta Environment and Sustainable Resource Development uses a precautionary principle where the risk is calculated based on the number of migratory bat passes per detector-night. Since an equivalent comparison for Nova Scotia is not available, this model can be generally applied for the purposes of assessing potential mortality risks. The number of bat passes per detector-night in the LAA during the survey period encompassing all species was 0.22, of which 0.08 were migratory bat species and 0.14 were *Myotis* species. These values are considered a potentially acceptable risk (lowest risk), as they are below the threshold of less than one migratory bat pass per night (Government of Alberta, 2013).

Nevertheless, annual fluctuations in bat activity and the potential alteration of activity patterns in the vicinity of turbines (Barclay et al., 2007; Kunz et al., 2007; Horn et al., 2008; Cryan and Brown, 2007) imply that predicting project risk is challenging because pre-construction data might not accurately predict fatality rates (Hein et al., 2013). Hence, post-construction monitoring of fatalities is essential to monitor and assess bat mortalities.

The second year of the two-year baseline study and a post-construction monitoring program will further inform and identify potential Project impacts, assess effectiveness of mitigations, and inform adaptive management programs to reduce the risk to bats in the LAA. This is particularly important because any additional mortality of SAR bats in affected WNS areas has the potential to impact the survival of local populations, their recovery, and possibly the development of resistance to the fungus causing WNS (ECCC, 2018).

A post-construction monitoring program will be developed in consultation with ECCC-CWS and NSDNR and implemented for two years. Carcass searches will be conducted during the spring (minimum of 6 to 8 weeks) and fall (minimum of 8 to10 weeks), regardless of the weather. The *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022), *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC-CWS, 2022), and other accepted guidelines will be referenced when developing the monitoring program.

Ongoing monitoring and adaptive management strategies will be implemented to assess the effectiveness of Project-specific mitigation measures and detect unexpected impacts on bats during the construction, and operation and maintenance phases of the Project.

Potential Project effects related to direct injury or fatality can be effectively mitigated through planning and management of construction and operation activities. The following key measures to mitigate the potential risks of bat collision will be further detailed in a

Project-specific EPP and will be implemented prior to and during Project construction, as well as during operations.

- Tree clearing will be done, to the extent feasible, outside the active period for bats to avoid accidental injury or mortality of any bat, not only maternity roosting bats.
- During construction and operation, install appropriate drainage around turbines to prevent formations of wetted areas or pooled water that might increase insect populations and attract bats.
- Vehicle speed will be reduced, especially in key areas during sensitive seasonal windows for wildlife.
- The Proponent will develop and implement wildlife management procedures during construction.
- Site lighting will be reduced to the extent practicable, reducing insect attraction and subsequent attraction to infrastructure by bats.
- Environmental personnel responsible for site monitoring during construction will receive training to recognize concerns related to bats that may be present in the PDA.
- Guidance specific to minimizing impacts to bats will be provided in a Wildlife Management Plan. The plan will include guidelines to avoid harm to bats, actions/steps to take should a roosting bat be discovered, and appropriate buffers based on disturbance activities.
- A post-construction monitoring program will be developed and implemented in consultation with NSDNR and ECCC-CWS to assess the ongoing impact of wind turbines on wildlife, particularly bats, and inform adaptive management strategies.
- Adaptive management strategies will be employed through the lifespan of the Project, if required based on the findings of the post-construction mortality monitoring program.

11.3.1.3 Sensory Disturbance

Sensory disturbances from noise and lighting at wind projects are considered to pose lower risks than collisions. However, as outlined in the Recovery Strategy (ECCC, 2015), activities that cause excessive disturbance (e.g., light, noise, vibrations) could result in the arousal of bats from torpor. Noise can have an indirect effect on bats through disturbance and light pollution at night has the potential to attract bats to lit project infrastructure due to the potential of increased prey availability and potentially increasing the mortality risk (e.g., collision and barotrauma).

Noise will be generated during all phases of the Project. Heavy equipment during construction, operation and maintenance, and decommissioning will contribute to noise generation. Additionally, turbines will produce noise during operation. Because the closest known hibernaculum is 38 km from the PDA, disturbance to hibernating bats during construction and operation are not expected. Construction and decommissioning activities will primarily occur during daylight hours, limiting sensory disturbance to roosting bats.

Wind turbines during operation generate noise that may impact the ability of bats to carry out a wide range of behaviours such as communication, foraging, and predator avoidance (Oerlemans et al., 2007). Consequently, bats may avoid wind turbines—particularly forest-dwelling species like *Myotis*—and the operation of wind turbines erected at forested sites could represent indirect habitat loss (Ellerbrok et al., 2022). However, other sensory disturbances may be attracting bats to wind turbines (Cryan et al., 2014; Horn et al., 2010). Evidence suggests that wind turbines disrupt sensory cues such as vision, vibration, pressure, temperature, and olfactory cues, at both the scale of individual turbines and wind farms as a whole (Jonasson et al., 2024). Bats may be attracted to wind turbines because these structures have characteristics similar to favourable roost trees (Cryan et al., 2014; Guest et al., 2022). Transmission corridors and roads resemble natural linear features typically used by bats during commuting and migration (Jameson & Willis, 2014; Jonasson et al., 2024). Together, these cues can interrupt bat navigation and movement, especially in forested habitats.

Potential Project effects related to sensory disturbance can be effectively mitigated through planning and management of construction and operation activities. The following key measures to mitigate the potential effects that Project lighting and noise may have on bats will be further detailed in a Project-specific EPP and will be implemented prior to and during Project activities.

- Onsite lighting will be minimized to the extent possible to prevent insect congregation that may attract bats to turbines while maintaining Transport Canada requirements.
- Movement detection lighting will be used on office structures, doors to turbines, gates, etc., which will turn off when not in use.
- Construction will mostly occur during daytime hours and will be restricted at night, when possible, to avoid illuminating the habitat unnaturally.
- Noise-reducing technologies may be considered to minimize the impact of construction noise on bats.
- Intense sound operations (i.e., blasting) will be scheduled to avoid maternity roost windows, when possible.
- Blasting will be undertaken in accordance with regulatory requirements and will only be conducted by qualified blasting professionals.
- The Proponent will develop and implement a Wildlife Management Plan.

11.3.2 Residual Effects

Activities associated with the Project may induce short to long-term impacts on bats in the PDA and LAA, primarily due to vegetation clearing and cutting, collisions with wind turbines, and sensory disturbance.

The residual effects associated with habitat loss during construction are predicted to be long-term in duration and of minor magnitude. The effect will be restricted to the local area and is expected to occur once during a period of low sensitivity for bats.

The residual effects related to bat mortality during the operation and maintenance phase are expected to be minor in magnitude (lowest level of mortality risk (per Government of Alberta, 2013)), restricted to the AOD, and occur during times of moderate to high sensitivity. Based on the low numbers of bats observed in the LAA, the period of observations, and the low numbers of bat fatalities that have been reported in Atlantic Canada from wind turbines, bat fatalities are expected to be intermittent.

Careful detailed design and micrositing of Project infrastructure has already been implemented to avoid high quality habitat, and avoidance of creating areas around turbines that bats may be attracted to will further mitigate potential risks. Through these steps and the implementation of mitigation measures, post-construction monitoring, and adaptive management planning, potential significant effects are not expected. The residual effects of Project activities on the bats (i.e., change in habitat and change in mortality rate) are predicted to be not significant.

11.4 Monitoring

In addition to the onsite monitoring for all wildlife species conducted during site preparation and construction activities, a post-construction mortality monitoring program will be development in consultation with ECCC-CWS and NSDNR and implemented for two years post-construction. Carcass searches will be conducted during the spring (minimum of 6 to 8 weeks) and fall (minimum of 8 to 10 weeks). The *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022), *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC-CWS, 2022), and other accepted guidelines will be referenced when developing the monitoring program.

The results of the post-construction mortality monitoring program will be submitted to the appropriate regulatory agencies as required. Additional surveys or mitigations may be identified in consultation with regulators following review of the results. An Adaptive Management Plan will be prepared in consultation with NSDNR and ECCC-CWS.

Data from post-construction mortality surveys may also be shared with the AC CDC and *The Wind Energy Bird and Bat Monitoring Database* (NatureCounts - Wind Energy Bird & Bat Monitoring Database) (Birds Canada, 2022).

12 Birds

12.1 Overview

This chapter assesses the potential effects of the Project on migratory and resident bird species and their habitats. Wind energy developments can affect birds through direct pathways, such as collision mortality with turbines and associated infrastructure, and through indirect pathways, including habitat loss or alteration, fragmentation, and sensory disturbance. Iterative refinements to the Project layout, such as removing turbines from old-growth forest stands and wetland areas, have reduced the potential for adverse effects.

Project interactions with birds are closely connected to environmental effects on other VECs, including noise and lighting (Chapter 5: Atmospheric Environment), vegetation removal or alteration (Chapter 10: Flora), and wetland loss or modification (Chapter 11: Wetlands). These VECs, and the Project effects on them, influence habitat availability, quality, and use by birds and therefore inform the effects analysis presented in this chapter.

Four-season field studies were completed to characterize bird presence, distribution, and habitat use in the LAA. Pre-construction survey results informed Project infrastructure siting decisions, supported the effects assessment, and guided the development of mitigation measures for all phases of the Project (construction, operation and maintenance, and decommissioning). Baseline data will also support post-construction mortality monitoring and adaptive management. Mitigation measures presented in this chapter will be refined and integrated into a Project-specific EPP prior to construction to minimize adverse effects.

12.1.1 Regulatory Context

Assessment of birds considers the following relevant provincial and federal legislation and guidelines:

- *Migratory Birds Convention Act, 1994* and Migratory Birds Regulations, 2022
- SARA
- *Canadian Environmental Protection Act*
- NSESA
- Nova Scotia *Wildlife Act*
- Nova Scotia *Biodiversity Act*

- Nova Scotia *Environment Act*
- Nova Scotia *Wilderness Areas Protection Act*

12.1.2 Boundaries

The AOD represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. The PDA represents the boundaries within which the AOD may occur. For this assessment, the LAA for birds includes the PDA, a 500 m buffer, and associated airspace. The RAA is a 5 km buffer around the PDA.

12.1.3 Assessment Methodology

The assessment of birds focused on identifying migratory and resident bird species present or likely to occur in or near the LAA, with emphasis on SAR, SoCC, and their habitats. Information was collected through a combination of literature review, online databases and reports, habitat analysis, and field surveys conducted across all seasons.

Information gathered during the desktop review and habitat analysis informed the design of baseline field surveys that are reflective of the Project site sensitivity and risk level (Category 4) as outlined in the *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC, 2022a), *Wind Turbines and Birds: A Guidance Document for Environmental Assessment* (ECCC, 2007a) and *The Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia* (NSDNR, 2022a). Survey methods followed protocols outlined in *Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds* (ECCC, 2007b), *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC, 2022), and *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022).

Baseline field surveys were designed to document bird presence, diversity, and abundance of bird species and their habitats in the LAA and to evaluate the potential impacts of the Project. The results were used to inform and refine infrastructure siting and to develop mitigation measures to avoid or minimize adverse effects on birds during construction, operation and maintenance, and decommissioning. The data collected through the assessment process will also serve as a baseline to support post-construction mortality monitoring and adaptive management.

Additional information on birds was collected during the MEKS site visits conducted by the CMM and these results are incorporated into the assessment.

The description of the existing environment in this chapter is based primarily on data from the following sources, supplemented by field surveys completed for this Project:

- Critical Habitat for Species at Risk National Dataset – Canada (ECCC, 2025)
- Nova Scotia Significant Species and Habitats Database (NSDNR, 2025a)
- Important Bird Areas (IBAs) (Birds Canada & Nature Canada, 2025)
- Migratory Bird Areas and National Wildlife Areas (NWAs)

- Species at Risk Public Registry documents for federal SAR
- AC CDC Data Report (AC CDC, 2025)
- Second Atlas of Breeding Birds of the Maritime Provinces (Maritimes Breeding Bird Atlas (MBBA)) (Stewart et al., 2015)
- eBird (2025)
- Global Forest Watch Tree Cover Loss 2001-2024 and Gain 2000-2020 (Global Forest Watch, 2025)
- Old-Growth Potential Index V2 (NSDNR, 2025b)
- Predictive Ecosystem Mapping for Nova Scotia (GeoNOVA, 2024)
- Nova Scotia Hydrographic Network (GeoNOVA, 2025a)
- Nova Scotia Wet Areas Mapping and Flow Accumulation Channel (GeoNOVA, 2025b)
- Nova Scotia Wetlands Inventory (NSDNR, 2021b)
- Nova Scotia LiDAR Point Cloud (GeoNOVA, 2020)

A habitat assessment was completed for SAR and SoCC bird species known or expected to occur within a 100-km radius of the LAA. This assessment used available habitat information and spatial data, including federal critical habitat and provincial core habitat data layers.

A SAR biologist with the Wildlife Division of NSDNR, the Environmental Protection Operations Directorate – Atlantic, ECCC, and the Environment Stewardship Branch of ECCC were consulted regarding the proposed bird survey methodologies. Comments received from reviewers (M. McGarrigle, pers. comm., February 27, 2025; S. Wade, pers. comm., April 3, 2025), were incorporated into the survey methodologies. Details of these surveys are presented below in subsection 12.1.3.2.

Land cover in the LAA was characterized using the Predictive Ecosystem Mapping (PEM) layer for Nova Scotia, a nine-level hierarchical classification system for mapping the diversity and distribution of ecosystems across Nova Scotia based on existing biotic and abiotic spatial data. Land cover was further refined using Global Forest Watch Tree Cover Loss and Gain Data and recent satellite imagery to capture current forest loss associated with industrial forestry operations. Additional refinements were made through field programs, including forest ecosystem classification completed during the flora inventory (Chapter 8).

Detailed habitat suitability models were developed to identify suitable breeding habitat for eight SAR birds in the LAA (Table 12.1). These spatial analyses informed field survey design and supported the evaluation of Project effects. Details of the SAR habitat suitability models are described in the subsections that follow.

Table 12.1 SAR Birds for which Habitat Suitability was Modelled in the Eigg Mountain LAA.

Scientific Name	Common Name	Status			
		NSESA	SARA	COSEWIC	AC CDC
Cardellina canadensis	Canada Warbler	E	T	SC	S3B
Chaetura pelagica	Chimney Swift	E	T	T	S2S3B,S1M
Chordeiles minor	Common Nighthawk	T	SC	SC	S3B
*Coccothraustes vespertinus**	Evening Grosbeak	V	SC	SC	S3B,S3N,S3M
Contopus cooperi	Olive-sided Flycatcher	T	SC	SC	S3B
Contopus virens	Eastern Wood-pewee	V	SC	SC	S3S4B
Euphagus carolinus	Rusty Blackbird	E	SC	SC	S2B
Riparia riparia	Bank Swallow	E	T	T	S2B

E – Endangered, T – Threatened, V – Vulnerable, SC – Special Concern, NAR – Not at Risk

12.1.3.1 SAR Bird Habitat Modelling

Spatial parameters representing key biophysical attributes of breeding habitat were selected based on peer-reviewed literature, jurisdictional guidance, and expert knowledge. The spatial layers used to develop the habitat suitability models were obtained from the following datasets:

- PEM for Nova Scotia (GeoNOVA, 2024)
- Nova Scotia Hydrographic Network (GeoNOVA, 2025a)
- Nova Scotia Wet Areas Mapping and Flow Accumulation Channel (GeoNOVA, 2025b)
- Nova Scotia Wetlands Inventory (NSDNR, 2021)
- Nova Scotia Old Growth Policy (GeoNOVA, 2025c)
- NSDNR Old Growth Potential Index V2 (NSDNR, 2025)
- Global Forest Watch Tree Cover Loss 2001-2024 (Global Forest Watch, 2025)
- Nova Scotia LiDAR Point Cloud (GeoNOVA, 2020)

Where available, field-delineated spatial wetland data collected through the wetland survey program (Chapter 9: Wetlands) was incorporated into the analysis.

Canada Warbler

Canada Warbler generally breeds in wet deciduous or mixedwood forests with a dense understory and high canopy (Haché et al., 2014; NSDLF, 2021; COSEWIC, 2020). In Nova Scotia, Westwood (2016) found that Canada Warbler habitat was correlated with mixedwood forests dominated by Black Spruce and Red Maple, with lesser quantities of Red Spruce and Balsam Fir. However, overall forest structural diversity appears to be a more important predictor of habitat suitability than tree species composition alone (Stewart et al., 2015).

The following parameters were used to model suitable breeding habitat for Canada Warblers in the LAA (Figure 12.8, Appendix A):

- Depth to water table – Sites with a depth to water table less than or equal to 2 m Depth to water has been identified as a strong predictor of habitat suitability for forested wetland–associated species such as Canada Warbler (Westwood, 2016; Westwood et al., 2019).
- PEM – Polygons classified at the 7th level as Shade Tolerant Deciduous Forest, Mixedwood Forest, Wet Mixedwood Forest, Wet Deciduous Forest, or Hemlock Forest
- Canopy closure – Forest stands with a canopy closure between 5 and 85 percent (Westwood et al., 2017)
- Structural diversity – Forested stands with a standard deviation of canopy height exceeding the LAA's average

Chimney Swift

Chimney Swift primarily nests in artificial structures like chimneys, silos, air shafts, wells, and barns. However, this species will nest in natural habitats, including large hollow trees and tree cavities in mature and old-growth forests (COSEWIC, 2018; Zanchetta et al., 2014). Because of the limited suitable artificial structures in the PDA, the model focused on natural habitats that may provide suitable breeding habitat.

The following parameters were used to model suitable breeding habitat for Chimney Swifts in the LAA (Figure 12.9, Appendix A):

- Old-Growth Potential Index - Values 10 and 11, representing stands with high potential for old-growth characteristics
- Tree Cover Loss – Any site where tree cover loss has not occurred within the last 24 years
- PEM – Polygons classified at the 5th level as a forested ecosystem type

Common Nighthawk

Common Nighthawk nests on open ground and in clearings. A variety of habitats provide suitable breeding conditions, including open forests (particularly those with recent cuts, burns, or rocky outcrops), grasslands, wetlands, rocky areas such as quarries, gravel pits, and railway margins, and cultivated lands such as orchards and blueberry fields (COSEWIC, 2018; ECCC, 2016).

The following parameters were used to model suitable breeding habitat or Common Nighthawks in the LAA (Figure 12.10, Appendix A):

- PEM – Areas classified at the 7th level as active agriculture, blueberries, gravel pits, old field, old field coniferous forest, open peatland, powerlines, railways, regenerating clearcut, seral intolerant karst mixedwood forest, shrub peatland, tall shrubland, tamarack forest, and urban areas
- Tree Cover Loss – Sites where tree cover loss occurred within the last two years
- Canopy Closure – Forested stands with canopy cover of 40 percent or less

Eastern Wood-pewee

Eastern Wood-pewee primarily inhabits open deciduous and mixedwood forests with high canopies, as well as forest edges and clearings (ECCC, 2023c). In Nova Scotia, both treed swamps and mature upland forests provide important habitats for the species (Brazner & MacKinnon, 2020). Eastern Wood-pewee generally avoids human-occupied areas and regenerating forests (NSDNR, 2022; COSEWIC, 2012).

The following parameters were used to model suitable breeding habitat for Eastern Wood-pewees in the LAA (Figure 12.11, Appendix A):

- PEM – Polygons classified at the 5th level as a forested ecosystem types
- Canopy Closure – Forested stands among the above types with canopy cover between 55 percent and 70 percent
- Tree Cover Loss – Sites where no tree cover loss has occurred within the past 24 years
- Distance to Clearings – Forested stands located within 150 m of a clearing or habitat edge

Evening Grosbeak

Evening Grosbeak prefers to breed in mature, old coniferous and mixedwood stands, often dominated by fir, spruce, Tamarack, pine, and aspen with relatively low canopy cover (COSEWIC, 2016; ECCC, 2022b). Nests are typically located in trees greater than 40 m in height (Bekoff et al., 1987).

The following parameters were chosen to model suitable breeding habitat for Evening Grosbeaks in the LAA (Figure 12.12, Appendix A):

- Old-Growth Potential Index - All Values (7 to 11)
- PEM – Polygons classified at the 6th level as Acadian Coniferous Forest, Acadian Mixedwood Forest, Wet Coniferous Forest, and Wet Mixedwood Forest
- Tree Cover Loss – Sites where tree cover loss has not occurred within the last 24 years

Olive-sided Flycatcher

Olive-sided Flycatcher prefers to breed in moist, coniferous, or mixedwood forest, and is often associated with wetlands, forest edges (particularly adjacent to wetlands), and gaps created by recent burns or clearcuts (NSDLF, 2021b). In Nova Scotia, this species is typically found in stands dominated by spruce, Balsam Fir, and Red Maple, with lesser amounts of pine and Tamarack (Staicer et al., 2015). While the species prefers forested areas for nesting, Olive-sided Flycatchers rely on open areas or clearings in their breeding habitat to forage for insects on the wing. Nests are built in tall trees, typically 5 to 20 m above ground, with snags nearby (COSEWIC, 2018b). Studies in Nova Scotia indicate a preference for stands with lower canopy cover but greater canopy height (Staicer et al., 2015).

The following parameters were chosen to model suitable breeding habitat for Olive-sided Flycatchers in the LAA (Figure 12.13, Appendix A):

- Canopy Height – Stands with an average canopy height of 5 m or greater
- PEM – Polygons classified at the 7th level as coniferous and mixedwood forest

- Tree Cover Loss – Sites where tree cover loss has not occurred within the last 4 years
- Structural diversity – Forested stands with a standard deviation of canopy height higher than the LAA average
- Tree Cover – Forested stands with a canopy closure between 20 and 70 percent
- Wet Area Mapping – Areas with a depth to water table of 2m or less

Rusty Blackbird

An obligate wetland species, Rusty Blackbird requires wetland habitats for nesting, foraging, and shelter (ECCC, 2015). In Nova Scotia, the species nests in coniferous and mixedwood forested wetlands, bogs, beaver ponds, marshes, and in riparian zones (COSEWIC, 2006). Breeding habitat in forested wetlands are characterized by short (0.5 to 6 m), dense canopies consisting mainly of Black Spruce, Balsam Fir, Tamarack, White Cedar, and Red Maple (Stacier et al., 2015; COSEWIC, 2006). Rusty Blackbirds will also breed in disturbed wetland habitats in Nova Scotia, including wetlands surrounded by regenerating clearcuts or forest plantations (COSEWIC, 2006).

The following parameters were used to model suitable breeding habitat for Rusty Blackbirds in the LAA (Figure 12.14, Appendix A):

- PEM – Polygons classified at the 7th level as Balsam Fir Forest, Mixedwood Forest, Open Peatland, Red Spruce Forest, Shallow Water Wetland, Shrub Peatland, Shurb Swamp, Spruce-Pine Forest, Tall Shrubland, Tamarack Forest, Unclassified Open Wetland, Wet Coniferous Forest, Wet Mixedwood Forest, White Spruce Forest
- Depth to Water Table – Sites where the depth to water table is 50 cm or less
- Riparian Zones – Areas within 20 m of a watercourse or waterbody (Whitaker and Montevecchi, 1999)
- Canopy Height – Stands with an average canopy of height between 0.5 m and 6 m

Bank Swallow

Bank Swallow breeds in burrows typically excavated from vertical or near-vertical earthen banks of composed of sand or silt (ECCC, 2022). Nests and nest colonies are most often found along riverbanks, lakeshores, or coastlines where regular erosion occurs but have also been found in human-made environments such as aggregate pits, road cuts, gravel, sand and sawdust piles, and holes in retaining walls (ECCC, 2022). Suitable habitat generally requires a minimum height of 0.5 m above the base of a bank (ECCC, 2022).

The following parameters were used to model suitable breeding habitat for Bank Swallow in the LAA (Figure 12.15, Appendix A):

- Slope Model – Slopes greater than 45° were considered to provide moderate suitability for nesting; slopes greater than 70° were considered to provide high suitability for nesting

12.1.3.2 Field Surveys

The objective of the field surveys was to collect baseline information on bird species using and moving through the LAA any time during the year. Survey protocols followed seasonally appropriate guidance, including *Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds* (ECCC, 2007b), *Wind Energy & Birds Environmental Assessment Guidance Update* (ECCC, 2022), and *Guidance for Bird and Bat Surveys Pre- and Post-Construction Surveys and Monitoring – Wind Energy* (NSDNR, 2022), other standard survey protocols and guidance documents, and consultation with regulators.

Surveys were designed to target areas of potential impact, including the PDA and associated airspace near proposed turbine locations. Winter surveys identified resident species present during the general non-breeding season for migratory birds; breeding bird surveys, including nocturnal owl and nightjar surveys, assessed species diversity and abundance during the general nesting period for migratory birds; and migration surveys, including point counts, passage counts, radar, and acoustic monitoring, assessed species at potential risk of turbine collisions during spring and fall migration periods.

Winter Bird Surveys

Winter bird surveys were conducted in the LAA from December 18, 2024, to March 4, 2025, using area searches to document species presence and abundance. Survey areas included access roads, areas near proposed infrastructure at the time of the surveys and representative habitat types across the LAA. Surveys were conducted in two-person teams over seven days, covering approximately 48 km on foot (see Figure 12.1, Appendix A).

Nocturnal Owl Surveys

A nocturnal owl survey was conducted in the LAA on April 2, 2025, under suitable weather conditions (e.g., minimal wind and precipitation). Surveys generally followed the protocols described in *Guidelines for Nocturnal Owl Monitoring in North America* (Takats et al., 2001) and *Nova Scotia Nocturnal Owl Survey: Guide for Volunteers* (Birds Canada, 2019).

Fourteen survey stations were established across the LAA in various habitat types (see Figure 12.2, Appendix A). Local owl vocalizations (provided by Birds Canada) were broadcasted at each survey station. While the focus was to target nocturnal owls, all detected species including species that sing or display at dusk (e.g., American Woodcock (*Scolopax minor*), were recorded.

Migration Surveys

Migration monitoring included point counts, passage migration surveys, as well as radar and acoustic monitoring, to assess the presence, abundance, and movement of birds in the LAA during migration.

Migration Point Count Surveys

Ten-minute, unlimited radius point counts were conducted between dawn (30 minutes before sunrise) and approximately 10:00 a.m. in suitable weather conditions (e.g., minimal wind and precipitation). Survey locations were typically spaced apart 250 m or more and stratified across major habitat types to provide representative coverage of the LAA. This stratified approach was developed using spatial layers on GIS. Point counts were generally placed along existing roads (i.e., proposed access roads) near prospective turbine locations as songbirds are readily detected along the edges of habitats.

At each survey location, all species seen or heard were recorded as well as an estimate of the number of individuals of each species during the survey period. The distance to each bird was estimated using fixed distance categories (0 to 50 m, 51 to 100 m, and further than 100 m) and individuals were monitored for the duration of each point count to limit double counting. General observations including date, time, and weather conditions (temperature, wind speed, presence of any precipitation) were also recorded.

Spring migration point counts were conducted between April 3 and May 30, 2025. Four rounds of surveys were completed at 26 locations, totaling 104 point counts (Figure 12.3, Appendix A).

Fall migration point counts were conducted between August 28 and November 7, 2025. Four rounds of surveys were completed at 26 locations during the fall migration period for a total of 104 point counts (Figure 12.4, Appendix A).

Passage Migration Counts

Passage migration counts were conducted at two suitable observation points in the LAA (Figures 12.3 and 12.4, Appendix A). The counts were conducted during the spring and fall migration periods to assess the number of birds flying through the LAA, particularly where turbines are proposed to be built. Observation points were placed in locations that provided a clear view of multiple proposed turbine locations.

The species, number of individuals, and the direction and height of passing birds were recorded. The easternmost passage migration observation point, labelled PM02, provided a nearly 360-degree view facing several planned turbine pads as well as the transmission line. While the westernmost observation point, labelled PM01, did not provide as expansive of a view (approximately 180 degrees), it was the best location found in the western portion of the LAA to conduct passage migration surveys from. This vantage point provided a view for potential migratory interactions with several planned turbine pads.

Passage migration counts started as early as 9 a.m. and continued for 1 to 6 hours. Some surveys were terminated early due to weather conditions (e.g., rain or heavy fog). Three rounds of passage migration surveys were completed at each observation point in spring, resulting in a total of 28.5 hours of survey effort. Four rounds were completed in the fall at the same observation points, resulting in a total of 40.5 hours of survey effort.

Radar Monitoring

Nocturnal migration monitoring was completed using radar technology, which detects volume and flight height (i.e., passage rate) of nocturnal migrants that traverse the LAA. The radar unit detects all organisms using the airspace, which may include birds, bats, and insects. During data analysis, particular filters are placed on values to remove clutter and non-target individuals (i.e., insects and bats) from the data, but it is difficult or impossible to know if this is 100% effective. Therefore, detections are generically referred to as targets. The full radar and acoustic monitoring report can be found in Appendix I.

An automated magnetron radar unit was deployed in the LAA and monitored by Tabanid Consulting Ltd during the spring and fall of 2025:

- March 24 through June 9, 2025, for a total of 78 operational nights
- July 15 through November 22, 2025, for a total of 117 operational nights

The radar functioned properly for all nights deployed during the spring season. In August, there was an extreme risk of forest fire throughout Nova Scotia, resulting in the provincial government restricting access to forested areas and allowing only essential activity. The solar power supply for the radar unit posed a small fire risk, and was therefore shut down from August 17 to 31. The radar did not collect data for two nights in September due to a data storage issue, and for three nights in November due to power issues relating to extended periods of cloud cover (thereby preventing sufficient solar input).

The radar unit operated from sunset to sunrise each night. The location of the radar unit was selected to maximize detection of nocturnal migrants that pass through the LAA at the height of the rotor-swept zone (RSZ), in an area with a clear, unobstructed view of the overhead sky. The unit was oriented to align with the expected movement of targets through this area during migration. Further details can be found in Appendix I.

Acoustic Monitoring

A network of eight to 15 automatic recording units (ARUs; AudioMoths) was deployed within the LAA by Tabanid Consulting Ltd at any given time, concurrent with radar monitoring during the spring and fall migration periods (March 24 to June 9, 2025, and July 15 to November 22, 2025). These ARUs were deployed to record nocturnal flight calls of migrating birds through the LAA. They were set up to record between sunset and sunrise, on a 10 minute on/off duty cycle to capture approximately half of the night while extending battery life. The ARUs were positioned in open areas with minimal clutter (e.g., branches) surrounding the microphone, which were pointed up towards the sky and covered in a protective plastic film.

Breeding Bird Surveys

Breeding bird surveys were conducted in and adjacent to the PDA to determine which species regularly use the area for nesting, for foraging during the breeding season, or for raising their young.

Breeding Bird Point Count Surveys

Following the point count methodology used during migration surveys, 10-minute, unlimited radius point counts were conducted between dawn (half an hour before sunrise) and approximately 10:00 a.m. in suitable weather conditions (e.g., minimal wind and precipitation). Observed breeding evidence was recorded using standard MBBA breeding bird codes.

Twenty-six survey locations were distributed across the PDA (e.g., at or near turbine pads and access roads) to target the different habitat types and in suitable breeding habitat for SAR birds that may breed in the PDA (refer to Section 12.1.3.1) (Figure 12.5, Appendix A). Each location was surveyed twice with the aim to detect both early and late breeders. A total of 52 point count surveys were conducted between June 12 and July 4, 2025.

Bank Swallow Habitat Surveys

Based on the Bank Swallow habitat prediction model, areas of moderately suitable habitat adjacent to the LAA were predicted. No areas of highly suitable Bank Swallow habitat were predicted in or adjacent to the LAA. Areas predicted to be moderate Bank Swallow habitat adjacent to the LAA were field verified and surveyed for signs of Bank Swallow nesting activity. Bank swallow burrows were also to be reported if observed during watercourse assessments or other field programs in and surrounding the LAA.

Nightjar Surveys

Common Nighthawk is listed under the federal SARA as Special Concern and Eastern Whip-poor-will (*Antrostomus vociferus*) is listed under the federal SARA as Threatened; both are listed under the provincial NSESA as Threatened. Because Common Nighthawk are crepuscular and Eastern Whip-poor-will are nocturnal, these species are not typically detected during standard breeding bird surveys (as outlined above) and targeted surveys are needed to determine the presence of these species in a particular geographical area.

Following the general methodology outlined in the *Canadian Nightjar Survey Protocol* (Birds Canada, 2022), 15 survey stations were spread across the LAA (Figure 12.6, Appendix A). Two rounds of nightjar surveys were conducted 30 minutes before sunset and extended until approximately two hours after sunset to capture the Eastern Whip-poor-will window. The first round was completed on June 11 and 12, 2025, and the second round was completed on July 2 and 3, 2025. Because there is potential for Eastern Whip-poor-will in the PDA, surveys were timed to coincide with the full moon which occurred on June 11 and July 10, 2025. At each survey station, the surveyor listened for six minutes, recording all species identified by sight or sound. Attention was also given to other species that sing or display at dusk (e.g., American Woodcock).

Pileated Woodpecker

Targeted surveys were carried out for Pileated Woodpecker in conjunction with other field programs. The nests of this species are protected year-round under the Migratory Birds Regulations, 2022, and there is suitable nesting habitat in the PDA. Evidence of current or historical nesting was recorded during the execution of bird surveys and other biological field programs conducted in the LAA in 2024 and 2025. These incidental observations are included in the assessment of the existing environment.

Bald Eagle

Over the course of the field season, raptor nests observed in and surrounding the LAA were recorded and monitored opportunistically during field programs for breeding activity.

Mi'kmaq Ecological Knowledge Study

As part of the MEKS conducted by the CMM, site visits were conducted to describe the existing environment. These site visits included targeted measured transect surveys conducted at Vincent's Lake, and reconnaissance surveys conducted at four other locations: Arisaig/Nature Reserve, Doctors Brook/Marsh, South Rights River (Knoydart), and Maple Ridge Road. Birds were recorded during these site visits.

12.2 Existing Environment

Bird conservation and wilderness areas occurring in proximity to the LAA are shown on Figure 12.7, Appendix A. The PDA borders the Eigg Mountain - James River Wilderness Area, which protects large stands of old growth, contiguous forest and provides habitat for numerous species of birds that require expansive, contiguous forests, such as American Goshawk (*Astur atricapillus*).

The IBA nearest the PDA is Pomquet Beach Region IBA (NS009), located approximately 13 km east, as measured from the closest proposed turbine. This IBA consists of a series of barrier beaches, including Pomquet Beach, Mahoneys Beach, Dunns Beach, and Monks Head Beach. This region provides habitat for the endangered Piping Plover (*Charadrius melodus*) and has supported a breeding population for many years. In 1996, this IBA had 12 breeding birds, equalling 3 percent of Atlantic Canada's Piping Plover population. Areas in this IBA have been designated federally as critical habitat for Piping Plover in the Critical Habitat for Species at Risk National Dataset (ECCC, 2022). Parcels of Provincially Significant Migratory Bird Habitat has also been identified in this IBA and along the shores of St. Georges Bay. The Pomquet Beach Region also attracts other shorebird species, due to the presence of tidal marine invertebrates. A Great Blue Heron (*Ardea herodias*) colony is also present in the region, located on Pomquet Island.

The Tracadie River Wilderness Area is a 2,526-ha parcel of land situated in the Mulgrave Hills region, protecting old growth upland hardwood stands at the watershed divide between Northumberland Strait and Chedabucto Bay. The boundary of the protected area is approximately 35 km southeast of the PDA. The Tracadie River valley provides an important travel corridor for wildlife between the lowlands and plateau regions of the Wilderness Area.

The Ogden Round Lake Wilderness Area is a 5,606-ha parcel of land in eastern Guysborough County, protecting a variety of ecosystems and important habitat for many wildlife species. The landscape of this wilderness area contains numerous lakes and spans the watershed divide between Salmon River and Roman Valley River. The immature and old growth hardwood forests in this wilderness area are considered regionally significant. The boundary of the Ogden Round Lake Wilderness Area is approximately 41.5 km southeast of the PDA.

A parcel of Provincially Significant Migratory Bird Habitat exists on the Milford Haven River in Guysborough and is approximately 6 km by 1 km in size. This area, located near the mouth of the river at Chedabucto Bay, is known to provide habitat for species of sea ducks during the non-breeding season. This area is roughly 45 km southeast of the PDA.

Based on the Critical Habitat for Species at Risk National Dataset (ECCC, 2022), no critical habitat for SAR birds occurs in the LAA. The closest proposed critical habitat identified is for Bank Swallow (*Riparia riparia*) in the Lismore area along the Northumberland Strait (Site ID: 1233_NS_14), approximately 3 km from the closest turbine in the PDA. Critical habitat for Bank Swallow is also identified in Livingstone Cove, approximately 13.5 km from the PDA. Several parcels of Piping Plover critical habitat have also been identified nearby, with sites on Big Merigomish Island approximately 10 km away, and sites along St. Georges Bay approximately 13 km away.

The NSDNR Significant Species and Habitat Database contains 874 historical records of species and/or habitat records that relate to birds within a 100 km radius of the PDA. These records include Migratory Bird (150 records), Species at Risk (135 records), Species of Concern (264 records), and Other Habitat (325 records). A polygon for Species at Risk (representing Common Nighthawk and Bobolink) overlaps with the PDA near the intersection of Connors Mountain Road and Pleasant Valley Road. No other records are within 5 km of the PDA. Some of the records in this database do not reflect current species status (e.g., Common Loon).

The details of these records include the following:

- Migratory Bird – Most records relate to Willet (37), Common Eider (*Somateria mollissima*) (35), Double-crested Cormorant (*Phalacrocorax auritus*) (20), migratory birds (13), shorebirds (unclassified) (7), Great Blue Heron (*Ardea herodias*) (9), and Great Cormorant (5)
- Species at Risk – Most records relate to Piping Plover (*Charadrius melodus*) (23), Canada Warbler (17), Eastern Wood-Pewee (14), Harlequin Duck (9), Evening Grosbeak (7), Common Night Hawk (5), Boreal Chickadee (5).
- Species of Concern – Most relate to Tern (unclassified) (65), Boreal Chickadee (40), Common Loon (32), Common Tern (23), Canada Jay (19), Northern Goshawk (17), Bay-breasted Warbler (11), and Red Crossbill (8).
- Other Habitat – These records relate to Bald Eagle (*Haliaeetus leucocephalus*) (274), Osprey (*Pandion haliaetus*) (40), Great Blue Heron (9), and Great Horned Owl (2).

Different bird groups demonstrate differences in potential sensitivity to wind turbines (Kingsley and Whittam, 2004). Based on the species observed in the LAA, Project-specific functional groups were selected (Table 12.2). Common Nighthawks may be susceptible to collision with turbines and associated blades due to foraging and breeding behaviour. Common Nighthawk is an aerial insectivore known to occupy open habitat areas in search of flying insects at various heights and defend their territories by aerial displays (wing booms). Due to these factors, Nightjars is considered as a functional group for further assessment. Songbirds (passerines) are the bird group reported to be most affected by wind energy facilities in North America (Zimmerling et al., 2013); as such, this group is also separate from the functional group Other Landbirds.

Table 12.2 Project-specific Functional Groups

Functional Group	Description
Waterfowl	Order Anseriformes (e.g., Ducks, Geese, and Swans), Order Suliformes (Cormorants)
Waterbirds	Includes seabirds (i.e., marine birds), Order Podicipediformes (e.g., Grebes), Order Gaviiformes (e.g., Loons), Order Pelicaniformes (e.g., Herons), Order Coraciiformes (e.g., Kingfishers), Order Guriformes (e.g., Rails, Gallinules, Coot)
Shorebirds	Order Charadriiformes (Sandpipers, Plovers, Snipes, Woodcocks)
Diurnal Raptors	Eagles, buteos, accipiters, Northern Harrier, Osprey and falcons. Turkey Vultures were included in this group due to their similarity to many soaring raptors
Nocturnal Raptors	Order Stringiformes (i.e., Owls)
Nightjars	Order Caprimulgiformes (e.g., Nighthawks and Whip-poor-wills).
Passerines	Order Passeriform (songbirds)
Other Landbirds	Orders Apodiformes (e.g., Swifts, Hummingbirds), Order Columbiformes (e.g., Pigeons), Order Cuculiformes (i.e., Cuckoos), Order Galliformes (e.g., Grouse, Pheasants), Order Piciformes (e.g. Woodpecker, Flicker, Sapsucker)

The desktop habitat assessment identified that the LAA is predominantly composed of forested landcover types. Key landcover classes include hardwood, softwood, mixedwood forests and wetlands. As noted above and in Chapter 8 (Flora), portions of the forested landscape in the LAA are subject to ongoing industrial forestry activities, including thinning and plantation management. Several forest stands in the LAA have been confirmed as old-growth under the Nova Scotia Old-Growth Forest Policy.

Based on historical eBird records, 103 species of birds across nine functional groups were observed within 5 km of the LAA (Appendix I, Table 12.3). These species may currently use the LAA during their life cycle. Most of the species observed in the LAA are passerines.

Table 12.3 Functional Groups and Species Diversity Known to Occur within 5 km of the LAA based using eBird data.

Functional Group	Total Species	Percent of Total
Diurnal Raptors	7	7
Nightjars	1	1
Nocturnal Raptors	1	1
Other Landbirds	13	13
Passerines	68	66
Shorebirds	4	4
Waterbirds	1	1
Waterbirds	1	1
Waterfowl	7	7
Total	103	100

The following historical records of bird species in or in proximity to the LAA have been documented:

- AC CDC (2025) Data Report – 119 SAR and SoCC bird species within a 100 km radius of the LAA and 62 were observed within 5 km of the LAA (Appendix I, Table 12.2)
- eBird – 1,213 records representing 97 species and six unidentified taxa (Parulidae, Picidae, Accipitriformes/Falconiformes, Anatidae, Phasianidae, and Fringillidae species) within 1 km of the LAA (Appendix I, Table 12.3)
- MBBA – LAA intersects or occurs directly adjacent to six MBBA squares. Of the 135 species recorded, 91 were classified as confirmed breeders in one or more atlas squares. Seven of the species categorized as confirmed breeders are listed federally or provincially at risk (Table J3 in Appendix I)

The PDA and LAA contain suitable breeding habitat for eight SAR birds, although suitable habitat for most SAR is limited (Table 12.4; Figures 12.8 to 12.15, Appendix A). The most abundant suitable SAR habitat present is that for Olive-sided Flycatcher, Eastern Wood-pewee, and Chimney Swift.

Table 12.4 Summary of Suitable SAR Breeding Habitat in the LAA, PDA, and AOD

Species	Suitability	LAA (ha)	Percent of LAA	PDA (ha)	Percent of PDA	AOD (ha)	Percent of AOD
Rusty Blackbird	High	51.9	0.6	15.2	0.5	1.3	0.4
Rusty Blackbird	Moderate	335.8	4.2	137.8	4.2	11.5	3.7
Rusty Blackbird	Low	4189.8	51.8	1881.6	57.5	180.4	57.9
Chimney Swift	High	1633.8	20.2	550.7	16.8	43.2	13.9
Chimney Swift	Moderate	3588.6	44.4	1428.9	43.6	141.3	45.3
Chimney Swift	Low	923.6	11.4	343.9	10.5	27.5	8.8
Canada Warbler	High	249.9	3.1	138.1	4.2	11.7	3.8
Canada Warbler	Moderate	1747.2	21.6	825.0	25.2	63.3	20.3
Canada Warbler	Low	5661.9	70.0	2145.7	65.5	226.9	72.8

Species	Suitability	LAA (ha)	Percent of LAA	PDA (ha)	Percent of PDA	AOD (ha)	Percent of AOD
Eastern Wood-pewee	High	614.0	7.6	218.9	6.7	75.0	24.1
Eastern Wood-pewee	Moderate	2661.6	32.9	1043.5	31.9	158.6	50.9
Eastern Wood-pewee	Low	3740.9	46.3	1466.6	44.8	68.3	21.9
Evening Grosbeak	High	207.5	2.6	83.4	2.6	6.6	2.1
Evening Grosbeak	Moderate	1123.6	13.9	504.6	15.4	39.5	12.7
Evening Grosbeak	Low	3561.9	44.1	1292.3	39.5	125.9	40.4
Common Nighthawk	High	874.6	10.8	415.8	12.7	18.8	6.0
Common Nighthawk	Moderate	1439.9	17.8	657.0	20.1	76.7	24.6
Common Nighthawk*	Low	-	-	-	-	-	-
Olive-sided Flycatcher	High	467.9	5.8	229.8	7.0	19.2	6.2
Olive-sided Flycatcher	Moderate	4792.2	59.3	1902.4	58.1	188.6	60.5
Olive-sided Flycatcher	Low	2089.8	25.9	719.3	22.0	58.2	18.7
Bank Swallow	High	0.1	0.0	0.1	0.0	0.0	0.0
Bank Swallow	Moderate	8.4	0.1	4.2	0.1	0.2	0.1
Bank Swallow*	Low	-	-	-	-	-	-

*Low habitat suitability unable to be calculated based on parameters

In 2025, a total of 3,076 individuals, representing 94 species and two unidentified taxa (finch species and warbler species) were observed (Table I2 in Appendix I). Of the 94 species identified, 13 SoCC and seven SAR were observed (Table 12.5). The most abundant species observed include Black-capped Chickadee (*Poecile atricapillus*; 233 observations), Dark-eyed Junco (*Junco hyemalis*; 176 observations), White-throated Sparrow (*Zonotrichia albicollis*; 152 observations), American Robin (*Turdus migratorius*; 146 observations), and Golden-crowned Kinglet (*Regulus satrapa*; 141 observations). Eleven of the 20 SAR and SoCC species listed in Table 12.5 have been categorized in the MBBA as confirmed breeders in the LAA.

Survey information and weather conditions at the time of each survey are outlined in Table I4 in Appendix I.

Table 12.5 Summary of SAR and SoCC Recorded Across all Bird Surveys Completed at Eigg Mountain in 2025

Functional Group	Scientific Name	Common Name	Status				Numbers of Observations Recorded during 2025 Field Surveys								
			NSESA	SARA	COSEWIC	AC CDC	Nocturnal Owls	Winter Residency	Spring Migration		Fall Migration		Breeding Birds	Nightjar	Total
									Point Counts	Passage Migration	Point Counts	Passage Migration			
Diurnal Raptors	*Accipiter cooperii*	Cooper's Hawk			NAR	S1?B,SUN,SUM		1			1				2
Diurnal Raptors	*Buteo lagopus*	Rough-legged Hawk			NAR	S3N				1					1
Passerines	*Cardellina canadensis*	Canada Warbler	E	T	SC	S3B							2		2
Diurnal Raptors	*Cathartes aura*	Turkey Vulture				S2S3B,S4S5M			1						1
Diurnal Raptors	*Falco sparverius*	American Kestrel				S3B,S4S5M				2					2
Nightjars	*Chordeiles minor*	Common Nighthawk	T	SC	SC	S3B								1	1
Shorebirds	*Charadrius vociferus*	Killdeer				S3B			1	1	9		2		13
Passerines	*Coccothraustes vespertinus*	Evening Grosbeak	V	SC	SC	S3B,S3N,S3M			7		1				8
Passerines	*Contopus cooperi*	Olive-sided Flycatcher	T	SC	SC	S3B				1			6		7
Passerines	*Contopus virens*	Eastern Wood-Pewee	V	SC	SC	S3S4B							1		1
Passerines	*Dolichonyx oryzivorus*	Bobolink	V	T	SC	S3B			1						1
Passerines	*Hylocichla mustelina*	Wood Thrush		T	T	SUB			1						1
Passerines	*Perisoreus canadensis*	Canada Jay				S3		3	2		6	7	2		20
Passerines	*Poecile hudsonicus*	Boreal Chickadee				S3		3	3	1	6	1	1		15
Passerines	*Setophaga castanea*	Bay-breasted Warbler				S3S4B,S4S5M					1		7		8
Passerines	*Setophaga pinus*	Pine Warbler				S2S3B,S4S5M					1				1
Passerines	*Setophaga tigrina*	Cape May Warbler				S3B,SUM			1		1		3		5
Passerines	*Spinus pinus*	Pine Siskin				S3			3		2				5
Passerines	*Tyrannus tyrannus*	Eastern Kingbird				S3B							1		1
Passerines	*Vireo gilvus*	Warbling Vireo				S1B,SUM							1		1
E – Endangered, T – Threatened, V – Vulnerable, SC – Special Concern, NAR – Not at Risk															

12.2.1 Winter Birds

A total of 144 individuals, consisting of 13 species, were recorded during the winter bird surveys in 2024 and 2025. Of the 13 species, three SoCC were recorded: Boreal Chickadee (three observations), Canada Jay (three observations), and Cooper's Hawk (one observation). The most abundant species included Black-capped Chickadee (51 observations), Golden-crowned Kinglet (25 observations), and American Goldfinch (*Spinus tristis*; 24 observations) (Table I2 in Appendix I).

12.2.2 Owls

During the 2025 nocturnal owl survey, one species was recorded: Barred Owl (*Strix varia*) (Appendix I, Table 12.5). Three individual owls were heard calling. One Barred Owl was also heard during nightjar surveys, and one was observed while conducting fall migration point counts.

Results of acoustic monitoring during spring migration included several detections of Northern Saw-whet Owl (*Aegolius acadicus*), and a small number of scattered Great-horned Owl (*Bubo virginianus*) recordings. Fewer Northern Saw-whet Owls were detected during the fall migration period, and no Great-horned Owls; however, a single recording of a Long-eared Owl (*Asio otus*) was detected in late September (Appendix I).

12.2.3 Migration

12.2.3.1 Spring Migration

A total of 786 individuals, consisting of 61 species and one unidentified taxa (finch species) were recorded during the spring migration point count surveys in the LAA in 2025 (Table I2 in Appendix I). Of these 61 species, six are SoCC and three are SAR (Table 12.5). Passerines (91 percent) and Other Landbirds (8 percent) represent most species detected.

A total of 162 individuals, representing 42 species, were observed during spring passage migration surveys conducted in the LAA in 2025 (Table I2 in Appendix I). Of the 42 species identified, four are SoCC and one is SAR (Table 12.5). Passerines (82 percent), Other Landbirds (10.5 percent), and Diurnal Raptors (6 percent) were the three most abundant functional groups detected.

No large flocks were observed during spring passage migration surveys. The largest flock observed was a group of Cedar Waxwings (*Bombycilla cedrorum*; four individuals). On one day, five individual Common Yellowthroats (*Geothlypis trichas*) were observed as incidentals at the survey location. When altitude of flight was noted, most individuals (32 percent; 11 individuals) were recorded 101 to 200 m above ground level and the remaining were recorded between 0 and 50 m (29 percent; 10 individuals), 50 and 100 m (23.5 percent; eight individuals), and over 200 m (14.7 percent; five individuals) above ground level. These results suggest that more than half of the individuals recorded were within the RSZ; the area between the lowest and highest rotor tip height or where the blades are moving (i.e., approximately 37 to 200 m above ground level).

No concentrations of raptors were observed during spring migration point counts or passage migration surveys, however individuals from six species were observed on multiple occasions: Bald Eagle, Red-tailed Hawk (*Buteo jamaicensis*), American Kestrel, Merlin (*Falco columbarius*), Rough-legged Hawk, and Turkey Vulture (*Cathartes aura*).

12.2.3.2 Fall Migration

Fifty-seven species, totalling 827 individuals, were recorded in the LAA during the fall migration point count surveys in 2025 (Table I2 in Appendix I). Of the 57 species (86 percent Passerines), one is a SAR (Evening Grosbeak) and eight are SoCC. A summary of the SAR and SoCC observed during the fall migration point counts are provided in Table 12.5.

A total of 206 individuals, representing 32 species and one unidentified taxa (warbler species), were observed during fall passage migration surveys conducted in the LAA in 2025 (Table I2 in Appendix I). Of the 32 species identified, two SoCC were observed (Table 12.5). No SAR were identified during the fall passage migration survey. The most abundant functional bird groups detected include Passerine (85 percent), Waterfowl (6 percent), and Other Landbirds and Diurnal Raptors (3.4 percent, respectively).

The most abundant species observed during fall passage migration surveys were Yellow-rumped Warblers (*Setophaga coronata*), Black-capped Chickadees, Dark-eyed Juncos, Cedar Waxwings, and Common Ravens (*Corvus corax*), and 89.5 percent of these individuals were flying through the LAA at 0 to 50 m above ground level.

The largest flocks observed during fall migration were flocks of Canada Geese (13 individuals) and Yellow-rumped Warblers (10 individuals). Small flocks of American Goldfinch (five individuals) and Cedar Waxwing (four individuals) were also observed flying through the survey area. Most individuals (50 percent; 41 individuals) were observed at a height of 0 to 50 m above ground level, 41.5 percent (34 individuals) were observed between 101 and 200 m above ground level, and 8.5 percent (seven individuals) were observed between 51 and 100 m above ground level. These observations suggest that most individuals may fly within the RSZ of the turbines.

No concentrations of raptors were observed during point counts or migration surveys, however, individuals from five species were observed on multiple occasions: Red-tailed Hawk, Bald Eagle, Northern Harrier (*Circus hudsonius*), Cooper's Hawk (*Accipiter cooperii*), and Barred Owl.

12.2.3.3 Radar Monitoring

Radar monitoring conducted during spring and fall 2025 demonstrated that nocturnal migration in the PDA is episodic and influenced by weather conditions. Approximately 50 percent of total spring migration activity and 45 percent of total fall migration activity occurred over nine peak migration nights in each season. In spring, peak activity occurred in mid-April, early May, mid-May, and late May. In fall, peak activity occurred between mid-September and mid-October (refer to Appendix I – Eigg Mountain 2025 Radar and Acoustic Monitoring Report).

In each season, on all but one peak migration night, the greatest concentration of radar targets was observed between 200 and 1000 metres above ground level (magl). On one spring night in late May and one fall night in mid-September, cooler temperatures and headwind conditions were associated with a greater proportion of targets flying at lower altitudes (80 to 200 magl). A similar pattern was observed during the latter portion of one mid-April spring migration night. This pattern has also been documented at other sites in eastern Nova Scotia.

Across all monitoring nights, radar targets were detected across a broad altitudinal range (80 to 1,000 magl). Detections of individuals were generally more numerous between 80 and 200 magl, with the number of detections decreasing with increasing altitude. However, this pattern is influenced in part by reduced radar detection probability at greater distances from the radar and therefore does not necessarily indicate a true decline in migrant density with height. During high-volume migration nights, approximately 40 to 45 percent of targets were observed between 80 and 200 magl, overlapping the RSZ (36 to 200 magl). On most peak migration nights, however, the greatest concentration of activity occurred above 200 magl.

Migration intensity increased with favourable tailwind assistance and decreased with higher relative humidity in both spring and fall, consistent with established migration patterns documented in Atlantic Canada. Overall, the radar results indicate migration patterns typical of northeastern Nova Scotia, with variation in flight height primarily influenced by weather conditions rather than consistent concentration of migrants within the RSZ.

12.2.3.4 Acoustic Monitoring

Spring nocturnal acoustic monitoring results revealed that the bulk of nocturnal flight call (NFC) detections in early spring were sparrows, with warblers arriving later in the season (refer to Appendix I – Eigg Mountain 2025 Radar and Acoustic Monitoring Report). Shorebird and thrush species were detected in low numbers through the season, while nightjars were not detected at all. American Woodcock and Northern Saw-whet Owl detections were common during the spring monitoring period. NFC detections occurred through the night for most species, with crepuscular species, such as American Woodcock, peaking at sunset and sunrise when individuals are performing courtship displays.

During the fall monitoring period, the bulk of detections were from warblers early in the season, followed by thrushes and then sparrows. Shorebirds and owls were detected at low numbers during the season. Nightjars were not present during their migratory period in late August. An abundance of Canada Warblers migrated through the LAA, with 181 NFCs detected during the fall period (of which 152 occurred in August). This area is part of a known migratory route for the species. The overall number of NFC detections rapidly trailed off by late October. Canada Warbler detections occurred almost exclusively during the night, suggesting that these birds are flying through the PDA during migration but not using the area as a migratory stopover.

Overall, the composition and timing of species migrating through the LAA were consistent with what is expected in this area. The absence of Common Nighthawk detections suggests that the LAA does not fall into a migratory route for this species. However, the LAA is positioned on a migratory route for another SAR, the Canada Warbler.

12.2.4 Breeding Birds

In 2025, 66 species, totalling 878 individuals, were recorded in the LAA during the breeding bird point count surveys (Table I2 in Appendix I). Of these 66 species (95 percent Passerines), three are SAR and seven are SoCC. A summary of SAR and SoCC and associated breeding evidence codes are provided in Table 12.6. The most abundant species included Red-eyed Vireo (71 individuals), Ovenbird (68 individuals), Black-throated Green Warbler (66 individuals), and American Redstart (45 individuals). There was no evidence of colonial breeding (e.g., Bank Swallows) or roosting birds observed in the LAA.

According to the Second Atlas of Breeding Birds of the Maritime Provinces (MBBA; Stewart et al., 2015), the three SAR observed during breeding bird surveys are confirmed breeders in the LAA. Olive-sided Flycatchers were heard singing several times during surveys, and incidentally while completing other field programs. Suitable breeding habitat for Olive-sided Flycatchers is abundant in the LAA. Confirmed breeding evidence is often difficult to obtain, so CBCL conservatively assumes individuals, and species, in addition to those observed by CBCL are likely breeding in the LAA.

Six of the seven SoCC observed during surveys are categorized as confirmed or probable breeders (Table 12.6). Warbling Vireo was not recorded in MBBA records for the atlas squares covering the Project Area. Bay-breasted Warbler, Boreal Chickadee, and Canada Jay were observed and heard vocalizing many times during breeding and migration seasons, indicating their use of the area for breeding and migration habitat.

Table 12.6 Summary of SAR and SoCC Recorded during the Breeding Bird Point Count Surveys in 2025

Scientific Name	Common Name	NSESA	SARA	COSEWIC	S-Rank	No. of records	Breeding Evidence Category
Setophaga castanea	Bay-breasted Warbler	-	-	-	S3S4B,S4S5M	7	Probable

Scientific Name	Common Name	NSESA	SARA	COSEWIC	S-Rank	No. of records	Breeding Evidence Category
Poecile hudsonicus	Boreal Chickadee	-	-	-	S3	1	Confirmed
Perisoreus canadensis	Canada Jay	-	-	-	S3	2	Confirmed
Cardellina canadensis	Canada Warbler	E	T	SC	S3B	2	Confirmed
Setophaga tigrina	Cape May Warbler	-	-	-	S3B, SUM	3	Confirmed
Tyrannus tyrannus	Eastern Kingbird	-	-	-	S3B	1	Confirmed
Contopus virens	Eastern Wood-Pewee	V	SC	SC	S3S4B	1	Confirmed
Charadrius vociferus	Killdeer	-	-	-	S3B	2	Confirmed
Contopus cooperi	Olive-sided Flycatcher	T	SC	SC	S3B	6	Confirmed
Vireo gilvus	Warbling Vireo	-	-	-	S1B,SUM	1	-

E – Endangered, T – Threatened, SC – Special Concern, V - Vulnerable

On one occasion, an agitated pair of American Redstarts were observed during breeding bird point counts, evidence of breeding behaviour. Several instances of Song Sparrows and White-throated Sparrows producing chipping calls occurred during surveys, suggesting these species are likely breeding in the LAA. Many species with confirmed or probable breeding status were observed calling in suitable breeding habitat in the LAA, establishing territories and attracting mates for the breeding season.

12.2.5 Nightjar Surveys

A total of 28 species (70 individual observations) were recorded during nightjar surveys conducted in the LAA in 2025 (Table I2 in Appendix I). One SAR species, Common Nighthawk, was detected. A single individual was recorded out of two rounds of surveys (i.e., one record in total). No incidental observations of Common Nighthawk were recorded in the LAA during other field programs.

12.2.6 Pileated Woodpecker

Pileated Woodpecker roosting, feeding, and nesting cavities were observed in and adjacent to the LAA during the execution of field programs. One nesting cavity suitable for current use was identified approximately 175 m outside the PDA at the nearest point. No active Pileated Woodpecker nesting activity was observed.

During breeding bird surveys, three individual Pileated Woodpeckers were recorded calling between June 11 and 13, 2025, at two different locations. No breeding evidence was observed in the PDA. Thirteen individuals were recorded during migration point count surveys (spring and fall combined) at nine different locations. During fall and spring passage migration watches, four individuals were recorded in total at both locations.

12.2.7 Bald Eagle

One Bald Eagle nest was identified. This nest is located on private land in the vicinity of the planned transmission line corridor, where options A and B converge. A site visit was conducted on May 30, 2025, to confirm the location, visually observe the nest from a distance, conduct a systematic ground search around the nest tree for signs of activity, and capture photos. Upon arrival, an adult Bald Eagle was perched at the nest for approximately 30 minutes, occasionally peering into the nest. A juvenile Bald Eagle was also observed flying over the area. Evidence of recent activity observed around the base of the nest tree included fresh droppings on vegetation, several eagle feathers, and prey remains in the form of muskrat and beaver skulls. Based on these observations, the nest is considered an active nest.

12.2.8 Mi'kmaq Ecological Knowledge Study

During the measured transition transects and reconnaissance surveys at Vincent's Lake and surrounding areas as part of the MEKS site visits, the following bird species were identified: Common Raven, Blue Jay, Brown Creeper, Golden-crowned Kinglet, Northern Flicker, Swamp Sparrow, Tree Swallow, and Yellow Warbler, Wood Thrush, and Common Yellowthroat. Of these species observed, Wood Thrush was the sole SAR/SoCC observed. Its status under SARA is listed as Threatened.

12.3 Effects Assessment

12.3.1 Potential Effects and Mitigation

Several measures were undertaken in the Project design to minimize potential direct and indirect impacts on birds within engineering and design constraints. Detailed design of the Project resulting in the proposed AOD in this EA Registration Document aimed to avoid bird habitat, when practicable, and reduce potential interactions between the Project and birds.

The Project could impact birds through several interconnected pathways, both directly and indirectly. During construction, activities such as earthworks and vegetation clearing can lead to habitat loss and alteration. If these activities occur during the nesting season, these activities could kill, injure, or displace nesting birds, their young, or their eggs.

Project related vehicle traffic poses a risk of mortality and injury due to collisions with birds. Collisions with turbine blades, towers, and transmission lines are possible during the operation and maintenance phase of the Project. Project activities can affect birds as indicated in Table 12.7; these potential effects do not consider the implementation of mitigation measures described herein.

Table 12.7 Potential Environmental Effects of the Project on Birds

Project Activity	Potential Environmental Effects		
	Habitat Loss/ Fragmentation	Direct Mortality and Injury	Sensory Disturbance
Construction			
Site Preparation	X	X	X
Access Roads Construction and Modifications	X	X	X
Material and Equipment Delivery and Storage	-	X	X
Infrastructure Installation	-	-	X
Restoration of Temporary Areas	-	-	X
Testing and Commissioning	-	X	X
Operation and Maintenance			
Turbine Operation and Maintenance	-	X	X
Road Maintenance	-	X	X
Power Line and Substation Maintenance	-	X	X
Vegetation Management	-	X	X
Safety and Security	-	-	X
Decommissioning			
Removal of Infrastructure and Site Restoration	-	X	X

X = Potential Interaction
- = No Interaction

12.3.1.1 Habitat Loss and Fragmentation

The Project may result in habitat loss, degradation, and fragmentation for bird species in the LAA. Construction activities such as vegetation clearing and grubbing will result in a short-term and long-term loss of habitat. Vegetation clearing will occur in the AOD for the construction or installation of access roads, turbines, transmission lines, and other Project infrastructure.

Three SAR birds were observed during breeding bird surveys: Olive-sided Flycatcher (six observations), Canada Warbler (two observations), and Eastern Wood-Pewee (one observation). Over 2,100 ha (approximately 65 percent) of the PDA is modelled as moderately to highly suitable breeding habitat for Olive-sided Flycatcher, 1,200 ha (approximately 38 percent) for Eastern Wood-pewee, and over 900 ha (approximately 29 percent) for Canada Warbler. However, much of this suitable habitat is avoided in the refined AOD layout, with 207.8 ha of Olive-sided Flycatcher habitat present in its boundaries, 233.6 ha of Eastern Wood-pewee habitat, and 75 ha of Canada Warbler habitat. According to acoustic monitoring results during migration, Canada Warblers appear to use the PDA more prominently as a pass-through migratory route rather than a breeding location.

The iterative Project design process prioritized avoidance and minimization of interactions with high-quality habitat (see Figure 2.2, Appendix A). Adjustments were made to mitigate the loss of old-growth and mature forests, interior forest habitat, and wetlands. These changes are particularly advantageous for SAR bird species reliant on wetlands (e.g., Olive-sided Flycatcher and Canada Warbler) and those typically associated with interior forest habitats (e.g., Evening Grosbeak) as the LAA has experienced heavy disturbance from forestry activities.

The impact of roads and trails on migratory birds is unclear. Some studies show that access roads and trails have a negative impact on bird nest survival, species richness, diversity, fitness, and increased predation by providing travel corridors for predators (Kroeger et al., 2022; Khamcha et al., 2018; Summers et al., 2011; Pescador & Peris, 2007). Roads can also lead to habitat fragmentation (Quiles & Barrientos, 2024). Some research suggests that roads and trails may not have as much of an impact on birds as might be expected. For example, some studies show no significant effect of roads on nest predation (Ortega & Capen, 2002; Cull et al., 2025). In addition, other studies have shown that certain common and omnivorous bird species increase in abundance with exposure to roads and recreational trails, likely due to an increase in food sources (Cooke et al., 2020; Bötsch et al., 2018). Overall, these findings indicate that the effect of access roads on birds is variable and depends on factors such as habitat type, road type, and traffic intensity.

The Project will require approximately 31.8 km of access roads. To reduce habitat disturbance (e.g., clearing and ground alteration), 60 percent (18.9 km) of this total will be pre-existing roads. However, even minor amounts of vegetation clearing creates edges and can alter bird communities occupying these areas. The clearing required for transmission lines and new access roads in the AOD will lead to loss of bird habitat for some species, but it will simultaneously provide habitat for edge-loving species and species that prefer open environments (e.g., Yellow-rumped Warbler, Pine Siskin, White-throated Sparrow).

Not all habitat alterations will be permanent, and the areas reclaimed during restoration will return to the site's pre-disturbance condition.

Potential Project effects related to habitat loss and fragmentation can be effectively mitigated through planning and management of construction and operation activities. The following key measures to mitigate the potential effects of the Project on bird habitat will be further detailed in a Project-specific EPP and will be implemented before and during construction.

- Based on the proposed AOD, careful site planning was undertaken to minimize habitat disturbance, reduce habitat loss and fragmentation, and use existing roads and previously disturbed areas (e.g., forestry clearcuts) where technically feasible. Further

refinements to the AOD will be considered during final design to reduce disturbance to wetlands where possible.
- Vegetation clearing will be completed outside of the general nesting period for migratory birds. If clearing activities occur during the nesting period, procedures outlined in the Wildlife Management Plan, will be implemented. Vegetated buffers around wetlands and watercourses will be maintained to support connectivity for wildlife wherever possible.
- Grubbing and topsoil will be stockpiled for use during restoration.
- Cleared areas will be stabilized and allowed to revegetate naturally.
- Measures will be implemented to control and prevent the spread of invasive species.
- Work crews will recognize the working limits of the AOD and will refrain from entering surrounding habitat.
- The Proponent will develop and implement ESC procedures.
- The Proponent will develop and implement a Wildlife Management Plan.

12.3.1.2 Direct Mortality and Injury

Project construction including activities such as vegetation clearing and increased traffic may result in direct mortality and injury to birds. During the operational phase, birds may collide with turbines and transmission lines during, leading to injury and mortality.

Construction activities, such as vegetation clearing and grubbing, pose a high risk of increased mortality for birds. Without mitigation measures, there is a potential for nest destruction and subsequent mortality of nesting birds, young birds, and eggs, especially if these activities occur during the migratory bird nesting period. To address these risks, vegetation clearing will be scheduled outside of the general nesting period for migratory birds (e.g., mid-April to late August for Nesting Zone C3 (ECCC, 2023)).

During the construction and decommissioning phases, there is an increased threat of birds colliding with vehicles due to higher levels of traffic and activity on site. This threat primarily arises from the transportation of materials, heavy machinery, and personnel to and from the PDA. This risk will be greater during periods of increased bird activity, including fall and spring migration, and the nesting period. To mitigate this risk, vehicle speed will be limited in the LAA. Project-related traffic associated with maintenance during the Project operation is expected to be minimal.

The Project can result in a direct increase in mortality risk for birds during operation through collisions with transmission lines, wind turbines, and collisions with other Project infrastructure. Transmission lines have the potential to harm, injure, or kill migratory birds through increasing risks of collision and electrocution. In Canada, annual bird mortality estimates from transmission line collisions are anywhere between 1 million and 229.5 million (Rioux et al., 2013). Larger birds with low maneuverability, such as Canada Geese and duck species, are particularly vulnerable (Quinn et al., 2011). To mitigate this risk, the transmission line has been positioned to avoid wetlands, watercourses, and larger bodies of water where possible, as these are areas where birds may congregate. To increase line visibility, line-marking devices will be installed, as necessary, and measures such as vegetation management around the transmission poles and lines will be implemented to reduce the risk of electrocution.

Mortality from wind turbine collisions at 43 Canadian wind farms was found to be an average of 8.2 (± 1.4) birds per turbine per year, with a large variation among wind farms, between 0 to 26.9 birds (Zimmerling et al., 2013). Additionally, data from five Atlantic Canadian wind projects (2008 to 2012) showed non-raptor turbine mortality at approximately 1.17 (± 1.01) birds per turbine, ranging from 0 to 7.09 birds, with no recorded raptor fatalities (Birds Canada, 2016).

Predicting collision risk between turbines and nocturnally migrating birds using baseline radar and acoustic data remains challenging to achieve with confidence. The primary indicator of risk is the volume of birds migrating within the RSZ, although only a small fraction of these birds may collide with turbine rotors. Various models have been developed to estimate collision risk based on factors such as flight volume, species, rotor height, and RSZ. However, post-construction research suggests that these models often underestimate actual mortality rates, emphasizing the need for post-construction monitoring, especially following nights with unfavourable conditions.

During both spring and fall, peak migration generally occurred between 200 and 1,000 magl in altitude. Migration intensity was positively correlated with tailwind assistance in both seasons. Across all monitoring nights, however, most targets were detected within the rotor-swept zone (80 to 200 magl), although detection probability likely decreases with altitude (Eigg Mountain Radar and Acoustic Monitoring Report; Appendix I). Lower-altitude migration pulses were influenced by headwinds and cooler temperatures, a pattern also observed elsewhere in Nova Scotia. These findings indicate that collision risk may be elevated under certain weather conditions during migration.

The acoustic data collected during fall migration recorded an abundance of Canada Warbler migration activity through the PDA. These detections almost exclusively occurred during the night, suggesting that these birds are flying through the PDA during migration but not using the area as a migratory stopover location. Given the findings of the radar data, the risk of Canada Warbler collisions with turbines may be elevated during migration on nights with cooler temperatures and headwinds.

A post-construction mortality monitoring program will be developed in consultation with ECCC-CWS and NSDNR and implemented for two years. Carcass searches will be conducted to target periods of increased activity (e.g., migration and breeding) and periods following unfavourable weather conditions (e.g., rain and headwinds). Surveys will be designed to account for searcher efficiency and scavenger rates. Additionally, ongoing monitoring and adaptive management strategies will be implemented to assess and mitigate potential impacts on birds during all phases of the Project.

Potential Project effects related to direct mortality and injury can be effectively mitigated through planning and management of construction and operation activities. The following key measures to mitigate the potential risks of bird collision will be further detailed in a Project-specific EPP and will be implemented prior to and during construction and during operation and maintenance.

- Vegetation clearing will be completed outside of the general nesting period for migratory birds. If clearing needs to occur within this period, the guidelines to avoid harm to migratory birds (ECCC, 2023) and regulators will be consulted for guidance on developing additional mitigation measures.
- Vehicle speed will be reduced, especially in key areas during sensitive seasonal windows for wildlife. This will be informed from predictive habitat modelling for bird species.
- The Project-specific EPP will include emergency response protocols to protect birds from harm during accidents and/or malfunctions, including contacts of the nearest emergency wildlife rehabs. Bird mortality incidents of 10 or more birds in a single event, or of an individual SAR, will be reported to ECCC and/or NSDNR.
- The discovery of nests by staff will be reported to the environmental monitor at site and appropriate action or follow-up will be guided by the Project-specific EPP, or with guidance from ECCC.
- Guidance specific to minimizing impacts to birds will be captured in a Wildlife Management Plan. These will include guidelines to avoid harm to migratory birds, actions/steps to take should a nest or unfledged birds be discovered, and appropriate buffers based on disturbance activities.
- If large unattended piles of soil will be left on site during the migratory bird period, the Proponent will consider measures to cover or to prevent birds, such as Bank Swallows, from nesting.
- Vegetation management practices to enhance visibility for birds and reduce the risk of collisions will be implemented.
- Overhead power line installation, operation and maintenance will follow, at minimum, the NSPI nesting birds and vegetation management protocols (NSPI, 2023).
- Vegetation around the transmission poles and lines will be managed to reduce the risk of electrocutions with birds and other wildlife.
- Transmission line visibility will be increased by bird flappers or other bird-flight diverters, as indicated by regulation.
- A two-year post-construction mortality monitoring program will be developed and implemented in consultation with NSDNR and ECCC-CWS to assess the ongoing impact of wind turbines on birds, and inform adaptive management strategies.
- If post-construction mortality monitoring identifies significant annual bird mortality or significant bird mortality events, adaptive management strategies will be implemented, as outlined in the Adaptive Management Plan..

12.3.1.3 Sensory Disturbance

The Project has the potential to result in indirect effects to bird habitat through sensory disturbances, including noise, light pollution, dust, and vibrations. This disturbance may cause birds to abandon or avoid habitat and can lead to stress or other physiological effects. These effects pose the greatest risk during periods of migration and nesting.

The Project lighting infrastructure can present a risk to birds, particularly through attraction to lights during low-visibility conditions or night. Birds flying in these conditions are known to aggregate around artificial light, which can lead to disorientation and collisions (Adams et al., 2021; Lao et al., 2020). This risk is the greatest during migration periods, as artificial light can interfere with migration cues that birds use to navigate. Birds disoriented from artificial light sources may circle these lights, deplete energy reserves, and lead to exhaustion or force landings, which also increases their vulnerability to predation. Poor weather conditions exacerbate these effects, as they lower flight heights, potentially moving within the RSZ. Artificial light can also change birds' perceptions of habitat quality, resulting in selection or avoidance of illuminated areas (Adams et al., 2021).

To reduce disruptions to birds, seasonality will be considered when planning construction and maintenance activities. Only lighting essential to meeting safety and security needs during the Project activities will be used. For essential lighting, spill-over light will be minimized, side-shielded, and directed downwards to reduce the attraction of birds, where possible. Construction activities will be limited to daylight hours, where possible, and will avoid illuminating habitat adjacent to worksites. Turbine and transmission lighting will be minimized where possible, while maintaining Transport Canada's requirements for aeronautical safety. With these mitigations, impacts on birds pertaining to lighting is expected to be low through the Project lifespan.

Noise generated by Project activities can impact birds in several ways, particularly during sensitive periods, such as the nesting period. Noise can disrupt bird communication, directly impact the health of birds by triggering stress responses, and disrupt foraging and reproductive behaviours, potentially leading to decreased breeding success (Quinn et al., 2006; Mockford & Marshall, 2009; Mockford et al., 2011; Blickley et al., 2012). Noise disturbance can cause birds to avoid certain areas and potentially displacing them from their important habitats (Marques et al., 2020). Project noise may also mask environmental cues for birds, such as predator detection. Thus, careful planning and consideration of noise impacts is essential to minimize adverse effects on birds near the Project.

To reduce the risk of noise disturbance to birds, seasonality will be considered when planning very loud and random noise disturbance (e.g., blasting programs) during construction. Construction works in areas away from natural vegetation will be prioritised during the breeding window, when possible. Construction equipment and vehicles will be kept in good working order and loud machinery will be muffled.

Dust deposition during construction and decommissioning may cause birds to avoid or abandon habitat in the LAA. Impacts from dust generated from the Project are captured in Chapter 5 (Atmospheric Environment). Through the implementation of mitigation and management plans, these impacts are expected to be low.

Temporary sensory disturbance during construction and decommissioning is expected to have minimal impact on bird populations. This disturbance will be mostly restricted to daylight hours. There are no significant environmental effects expected.

Potential Project effects related to sensory disturbance can be effectively mitigated through planning and management of construction and operation activities. Effects of light, noise, and dust to birds in the LAA will be low and can be mitigated through strategies to reduce these effects. The following key measures to mitigate the potential effects of the Project on birds will be further detailed in a Project-specific EPP and will be implemented prior to and during construction.

- Seasonal construction restrictions or phased construction plans will be implemented to avoid sensitive bird periods (including the general nesting season) to the extent possible.
- Onsite lighting will be restricted during Project activities to minimize disturbance.
- The fewest number of site-illuminating lights possible will be used in the PDA.
- Turbine lighting will not exceed the minimum standards in the Canadian Aviation Regulations (i.e., Standard 621, Section 12.2 and Figure 5.3 (Appendix A)) (Transport Canada, 2025).
- Site lighting will be designed to focus on human safety and security. It will be shielded downward to minimize light pollution to the surrounding environment and adjacent habitat.
- Movement detection lighting will be used on office structures, doors to turbines, gates, etc., which will turn off when not in use.
- Noise-reducing technologies will be used to minimize the impact of construction noise on wildlife.
- Intense sound operations (i.e., blasting) will be scheduled to avoid the general nesting period for migratory birds, when possible.
- Blasting will be undertaken in accordance with regulatory requirements and will only be conducted by qualified blasting professionals.
- Construction equipment and vehicles will be kept in good working order and loud machinery will be muffled.
- To avoid attracting birds and/or predators to the PDA, the site will be kept clean of food scraps and garbage, transporting waste to an approved landfill on a regular basis.
- The Proponent will develop and implement Wildlife Management Plan.

12.3.2 Residual Effects

Activities associated with the Project may induce short to long-term impacts on birds in the PDA and LAA, primarily due to vegetation clearing and cutting; collisions with wind turbines, transmission lines, vehicles, equipment, or infrastructure; and sensory disturbance.

Residual effects related to habitat loss during construction are predicted to be long-term, minor to moderate in magnitude, with this being a conservative estimate, assuming all habitat in the LAA is suitable and occupied. The extent of the effect will be local and will occur once during periods of low to moderate sensitivity (i.e., clearing will not occur within the general nesting period for migratory birds) and reversible.

Residual effects related to direct mortality and injury during the operation and maintenance phases are expected to be moderate in magnitude, immediate (i.e., restricted to the AOD), occurring during times of moderate to high sensitivity, long-term, intermittent, and reversible.

Through careful detailed design of the AOD to avoid high quality habitat, and the implementation of post-construction monitoring and adaptive management planning, potential significant effects can be mitigated and are therefore not expected.

12.4 Monitoring

Onsite monitoring for all wildlife species will be conducted during site preparation and construction activities, including birds.

As outlined in Section 12.3.1.2, a post-construction mortality monitoring program will be developed in consultation with ECCC-CWS and NSDNR and implemented for two years. Carcass searches will be conducted to target periods of increased activity (e.g. migration and breeding) and periods following unfavourable weather conditions (e.g., rain and head winds). The radius searched around each turbine will be determined based on the height of the turbine (as this affects fall distance of fatalities) and field conditions. Surveys will be designed to account for searcher efficiency and scavenger rates. These results will be used to measure mortality rates for the Project.

The results of the post-construction mortality monitoring program will be submitted to the appropriate regulatory agencies as required. Additional surveys or mitigations may be identified in consultation with regulators following review of the results. An Adaptive Management Plan will be prepared in consultation with NSDNR and ECCC-CWS.

13 Socio-Economic Environment

13.1 Overview

The current state and recent trends in the human environment, such as population, economy, land and resource use, access to utilities and transportation, recreational opportunities, and health are components of the socio-economic environment that may be affected by the Project. The Project will provide a source of revenue for the Municipality of the County of Antigonish, create jobs in the region, and reduce provincial carbon emissions; there may also be effects to other components of the socio-economic environment such as recreational activities and land use. Effects to other VECs described herein, such as air and water quality, could affect population or human health. Effects and mitigation for human-health-related changes specific to air quality and groundwater are presented in Chapter 5 (Atmospheric Environment) and Chapter 6 (Geophysical Environment) and are not further assessed in this chapter.

It is predicted that the Project will interact with the socio-economic environment via several pathways during construction, operation and maintenance, and decommissioning. While existing roads will be used to the extent possible, construction of the Project may cause temporary disruptions to recreational trails and traffic. During operation and maintenance, there will be changes in the visual landscape, where turbines will be visible from communities around Eigg Mountain. Consultation with stakeholders and careful design were conducted to avoid interactions with communication and radar systems.

Effects, mitigation measures, and residual impacts to the socio-economic environment as a result of the Project have been assessed in this Chapter. Mitigation measures to minimize adverse effects will be further developed in a Project-specific EPP prior to construction, as well as contingency and management plans, such as a Traffic Management Plan. Project implementation is expected to positively contribute to the economy through job creation, training opportunities, community investment, support for local businesses, and tax revenues.

The Project will provide economic, and social benefits to the Municipality of the County of Antigonish and t he Province of Nova Scotia. Locally, it will generate sustained revenue through municipal taxes (approximately $1.3 million annually), annual landowner royalties, and a community benefit fund contributing $1,000 yearly to support community infrastructure, recreation, environmental initiatives, and social programs. Additional benefits include educational bursaries (approximately $25,000), a dedicated school fund of $10,000 a year, and training and employment opportunities for local workers, including individuals with disabilities. At the provincial level, the Project will support renewable-energy expansion, contribute to GHG reduction goals, attract private investment, and strengthen Nova Scotia's clean-energy workforce.

13.1.1 Regulatory Context

Assessment of the socio-economic environment considers the legislation, regulations, and guidelines or policies that are relevant to Project activities:

- *Crown Lands Act*
- *Electricity Act*
- *Environment Act*
- *Environmental Goals and Climate Change Reduction Act*
- *Forestry Act*
- *Mineral Resources Act*
- *Motor Vehicle Act*
- *Off-highway Vehicles Act*
- *Public Utilities Act*
- *Special Places Protection Act*
- *Trails Act*
- *Wilderness Areas Protection Act*
- *Wind Turbine Facilities Municipal Taxation Act*
- Canadian Aviation Regulations
- Municipality of the County of Antigonish Land Use By-law – Wind Turbine Development
- ECCC Guidelines for Wind Turbine and Weather Radar Siting
- A Proponent's Guide to Environmental Assessment (NSECC, 2025)
- Nova Scotia Class I Environmental Assessment Checklist (NSECC, 2025)
- Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025)
- Guidelines for Environmental Noise Measurement and Assessment (NSECC, 2023)

13.1.2 Boundaries

The AOD represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. The PDA represents the boundaries within which the AOD may occur. The LAA and RAA boundaries are defined as follows for each subcomponent of the socio-economic environment VEC.

- **Human Health:** The LAA is defined as 2 km from the AOD to include the LAA for Air Quality (500 m as determined in Chapter 5 (Atmospheric Environment)), Groundwater (1 km as outlined in Chapter 6: Geophysical Environment), and 2 km for sensory disturbance.

- **Land Use and Value, Visual Landscape, and Recreation and Tourism:** The LAA is defined as 2 km from the PDA, where construction, operation and maintenance, and decommissioning may be visible and audible. An RAA of 5 km for these effects in consideration of other ongoing or planned activities.
- **Population and Economy, Electricity, and Other Utilities, Communication and Radar Systems, and Transportation:** The LAA is defined as Antigonish County and the RAA extends North Shore Region of Nova Scotia.

13.1.3 Assessment Methodology

The description of the existing environment is based primarily on publicly available online data sources such as the following:

- Statistics Canada (StatCan)
- Health Canada
- Non-government organizations, such as the Community Foundation of Nova Scotia (CFNS), the ATV Association of Nova Scotia (ATVANS), and the Snowmobilers Association of Nova Scotia (SANS)
- The Municipality of the County of Antigonish
- The Town of Antigonish
- Public and stakeholder engagement
- Aerial and topographic imagery
- The Nova Scotia Mineral Rights Online Registry System
- The Nova Scotia Civic Address File (NSCAF)
- Nova Scotia Geographic Data Directory
- Other federal and provincial government websites and publications

Feedback received through public, Indigenous, community, and non-government organization engagement, as outlined in Chapter 3 (Consultation and Engagement), was also incorporated.

The following studies were undertaken to support effects assessment relevant to the socio-economic VECs:

- Visual Impact Assessment (Nortek Resource Solutions Inc. (Nortek), 2026a; Appendix J)
- Shadow Flicker Analysis (Nortek, 2026b; Appendix K)
- Noise Assessment (Nortek, 2026c; Appendix E)

13.1.3.1 Visual Impact Assessment

The visual impact assessment provides graphics that illustrate how the public viewscape is expected to appear following project construction. The visual simulations, completed by Nortek Resource Solutions Inc. (Nortek, 2026a; Appendix J), considered the Eigg Mountain Project and the existing Glen Dhu and Maryvale wind projects and are presented as panoramic photocompositions (Nortek, 2026a; Appendix J). At each viewpoint, a zone of visual influence was calculated from existing aerial LiDAR data to determine positions from which the Project may be visible. Professional grade cameras and lenses were used to obtain imagery at those pre-designated sites. The resulting images were produced using georeferenced images with camera/lens specific parameters to determine the orientation of each image. Model turbines were then added to the image to depict the same scene after construction of the proposed Project (Nortek, 2026a; Appendix J).

13.1.3.2 Shadow Flicker Analysis

Shadow flicker is the alternation of shadow and light that occurs when a wind turbine is between the sun and a receptor. The sun shining through the spinning turbine blades causes this effect (NSECC, 2021). Nortek Resource Solutions Inc. (Nortek) (2026b) completed a shadow flicker assessment (Appendix K) using the method in Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, n.d.). A total of 31 receptors within 2 km of the AOD were identified through satellite/aerial imagery and field verification, and these were used in the analysis.

The shadow flicker analysis used the WindPro software package and included locations of the turbine and nearby dwellings, ancillary structures, and camps. Shadow flicker assessments typically include receptors located within a maximum of 2 km from wind turbines, beyond that, the intensity of the shadow cast has diminished.

The shadow flicker analysis evaluated two conservative modelling scenarios: the theoretical worst-case scenario and the realistic case. The theoretical worst-case scenario makes several key assumptions: that the sun shines 100% of the time when it is above the horizon, that the turbine rotor is always perpendicular to the sun, shadow flicker starts as the sun moves above three degrees from the horizon, shadows dissipate at a maximum distance from the blade as a result of atmospheric conditions and light diffusion, and that the rotor blades are always spinning. The realistic case assessment incorporated site-specific wind conditions and monthly sunshine probabilities. Both these assessment cases applied conservative assumptions that receptors are sensitive to shadow flicker in every direction (i.e. each receptor assumed to have windows facing in all directions).

13.1.3.3 Noise Assessment

The acoustic assessment for the Project evaluated potential sound effects on receptors in the vicinity of the Project using turbine-specific sound power data and spatial analysis. Modelling of operational sound levels was completed using the current version of WindPRO software by Nortek Resource Solutions Inc. (Nortek) (2026c). The model incorporated the proposed turbine specifications, hub height, digital elevation model, and the location of identified receptors.

Sound propagation and attenuation was calculated in accordance with International Organization for Standardization (ISO) 9613-2: Acoustics—Attenuation of sound during propagation outdoors, Part 2: General method of calculation (ISO, 1996). The computer modelling predicted noise levels from operation of the Project and of turbines in the Maryvale and Glen Dhu wind projects that are within 3 km of the AOD and incorporate wind turbine sound emissions and environmental conditions known to influence noise propagation (e.g., ground attenuation, temperature, and humidity).

As described in Chapter 5 (Atmospheric Environment), Nortek (2026c) established an assessment area for the noise assessment as a 2 km buffer from the Project turbines and substation, based on provincial guidance (NSECC, n.d.). The assessment used a baseline acoustic value recommended by Health Canada, 35 dBA. This is considered to be the average baseline acoustic level in quiet, rural areas during the night (Health Canada, 2017).

13.2 Existing Environment

13.2.1 Population and Economy

Much of the information about the local and regional economy, such as demographics and employment data, presented in this section was garnered from the 2016 and 2021 Census reports available online from Statistics Canada (StatCan, 2025). This was supplemented through Proponent meetings with the Municipality of the County of Antigonish and the Eastern District Planning Commission (EDPC), as the latter is responsible for apply the County's Land-Use by-law, and supporting general siting issues. Meetings occurred in person or online (see Chapter 3: Consultation and Engagement).

The proposed Project lies in Antigonish County census division, which comprises two rural census subdivisions (A and B), the Town of Antigonish, and the Paqtnkek–Niktuek No.23 Reserve (Table 13.1); the PDA is in Subdivision A. Comparing the results of the past two census surveys (2016 and 2021), Antigonish County had a lower population growth of 4.3 percent compared to that of the province's 5.2 percent. Population density is lower in the county than that of the province, averaging 13.8 people per km^2.

Table 13.1 Local Populations

Census Area	2021	Change from 2016 (%)	2021 Population Density (per km^2)
Antigonish County Division	20,129	+4.3	13.8
Subdivision A	8,963	+8.3	9.7
Subdivision B	6,138	-2.7	11.8
Antigonish (Town)	4,656	+6.7	934.5
Paqtnkek-Niktuek No. 23	372	+5.4	137.0
Nova Scotia Province	969,383	+5.0	18.4

StatCan, 2025

Between 2016 and 2021, the average monthly shelter costs for rented and owned properties in Antigonish County increased by 24.5 percent and 3.6 percent, respectively (StatCan, 2023). The median after-tax income in 2020 was $34,000 with 97.7 percent of those employed speaking English. In 2021, 7.5 percent of the population of Antigonish County identified as Indigenous.

Antigonish County is situated in the North Shore Region of Nova Scotia. The North Shore region has an estimated working age population of 130,700 and a workforce size of 72,800. The percentage of the workforce that is employed full-time is roughly 83%, while 17% are part-time. An estimated 69% of positions are permanent (Nova Scotia Works, 2026). The four largest employment industries of the region are healthcare and social services, wholesale and retail trade, manufacturing, and construction. Overall, full-time and part-time employment in the North Shore Region is increasing by 2.2% and 5.4% respectively (Nova Scotia Works, 2025). Jobs increased in both the healthcare, and wholesale and retail trade industries, but decreased in the manufacturing and construction industries.

13.2.2 Land Use and Value

Land in and surrounding the PDA is primarily forested interspersed with blueberry fields, agricultural lands, and residential areas to the south and east. Most of the land in the general area is Crown land, with private land interspersed between. The predominant industry is commercial forestry; there are several plantations in the PDA with Crown land harvest plans permitting treatments including thinning and early competition control. These treatments refer to selective harvesting methods to improve the overall stand composition for later harvest. Stand thinning refers the practice of spacing better-quality trees by removing lower quality stems or entire trees (McGrath, 2018). Early competition control is a type of forestry management practice where vegetation that may stunt or prevent the growth of desirable timber species, such as raspberry bushes and grass species, is removed. Various methods are used to remove competing vegetation such as selective and shelterwood harvesting, herbicides, and weeding. During biophysical surveys on site, active clearcutting was observed on Crown lands and interpreted aerially on private land.

In the region, sand and gravel deposits are numerous and some are currently exploited. Nova Construction Company Limited operates an active aggregate quarry in the southwestern portion of the PDA, at Brierly Brook. The quarry is 14 ha and produces roughly 100,000 tonnes of aggregate per year, used primarily for roads and local construction (Conestoga-Rovers & Associates, 2015). South of the Brierly Brook Aggregate Quarry is the Brierly Brook Gypsum Quarry, also owned by Nova Construction Company Limited. The gypsum from this quarry is mainly used for the cement industry and the production of wallboard. Approximately 95,629 tonnes of gypsum were shipped from this quarry in 2022 (NSDNR, 2024). Another active aggregate quarry, the James River Quarry, is within 1 km of the PDA. The James River Quarry is 31 ha and produces approximately 100,000 to 200,000 tonnes of aggregate per year (Municipal Enterprises Limited, 2014). There are multiple active mineral exploration licences in the south portion of the PDA, listed on the NovaROC database (Province of Nova Scotia, 2025). The expiry date for these licences is September 2027, except for one licence set to expire March 2026.

There is currently no active oil and gas production taking place in the PDA, LAA, and RAA.

Eighty-two civic addresses located in the PDA are recorded in the Nova Scotia Civic Address File (NSCAF), and are associated with the communities of Addington Forks, Brierly Brook, Beaver Meadow, James River, and Pleasant Valley. Forty-five of the addresses are in Brierly Brook and represent the majority, 21 are in James River, seven in each of Beaver Meadow and Pleasant Valley, and two in Addington Forks (Service Nova Scotia, 2025). Most of these addresses are in the south of the PDA, along Highway 4, and are associated with farms or residential properties. There is one civic address located 936 m from the nearest turbine.

Homeowners in the County of Antigonish estimated that the average value for their single-detached dwelling was $209,703 (StatCan. 2016); in 2021 estimates averaged $254,200 (StatCan, 2023).

13.2.3 Visual Landscape

The visual landscape of the PDA is mostly in the Pictou Antigonish Highlands Ecodistrict, and is characterized by rolling plateaus, forests, and river valleys. Eigg Mountain is the highest point in the region, with an elevation of 319 m. In the LAA, elevations range from approximately 30 to 320 masl. Being in mountainous, fragmented terrain, high points of the PDA are visible from lower elevations including Lismore, Airsaig, Pleasant Valley, Maryvale, Conners Mountain, and Vincent Lake. Existing turbines from the nearby Glen Dhu Wind Farm are visible from Lismore, Airsaig and Dunmaglass Road. The visual simulations captured photos of the area as it currently exists from several viewpoints (Appendix J).

13.2.4 Utilities

13.2.4.1 Energy

While 13 percent of electricity generated in Nova Scotia is supplied by renewable energy, the province's power supply is still reliant on fossil fuels (CanREA, 2021). Local governments in the region, including the Town of Antigonish and the Municipality of the County of Pictou, have been exploring the merits of renewable energy for over a decade. To achieve net-zero emissions, the Town of Antigonish partnered with the Alternative Resource Energy Authority (AREA), a municipally-owned company formed in 2014 by the towns of Antigonish, Berwick, and Mahone Bay. AREA supplies the Town of Antigonish with energy generated by the Ellershouse Wind Farm and is developing a 1.65 WM community solar power generation facility on behalf of the Town of Antigonish. The town owns and operates its own municipal electricity utility, with about 64 percent of its energy coming from renewable resources provided through AREA. Additional power needs are supplemented with purchases from the open market. In neighbouring Pictou County, the community wind farms of Auld's Mountain and Pictou Landing were established under the Nova Scotia Community Feed-in Tarriff (ComFIT), a government initiative guaranteeing generated power is sold at fixed rate for a set period. These community wind farms are owned by local individual investors through Community Economic Development Investment Funds (CEDIF) or local governments.

The NSPI website (NSPI, 2025) lists other wind power producers currently operating nearby in Antigonish and Pictou County that are owned or partially owned by NSPI and contribute to the provincial grid:

- Maryvale, Antigonish – four turbines, 6 MW
- Fairmont, Antigonish – two turbines, 2 MW
- Glen Dhu, Antigonish – 27 turbines, 62.1 MW
- Pictou Landing, Pictou – one turbine, 1.6 MW
- Auld's Landing, Pictou – four turbines, 6.4 MW

There are other wind producers listed for Antigonish County and nearby Pictou County that are part of the community feed-in tariff program used for local infrastructure such as Avondale (one turbine, 1.7 MW) and Fitzpatrick (three turbines, 150 KW). There are several additional proposed onshore wind farm developments across Antigonish County and across the border in neighbouring Pictou County that will tie into the provincial grid:

- Weaver's Mountain, Antigonish County – 16 turbines, 94.4 MW
- Sugar Maple, Pictou County – 16 turbines, 112 MW
- Yellow Birch, Pictou County – 22 turbines, 149.6 MW

Future undertakings recently approved by the province are discussed in Chapter 15 (Consideration of Cumulative Effects).

Two existing NSPI power corridors traverse the PDA, one 138 kV transmission line near Browns Mountain Road, and one 230 kV line south of Highway 104. The Project transmission line interconnection will be installed and connected to the provincial power grid at the power corridor south of Highway 104.

13.2.4.2 Other Utilities and Waste Management

Rural residents located in the County north of the Town, in and closely surrounding the LAA, use domestic water wells and on-site wastewater disposal systems, and residents in the municipal boundaries of the Town of Antigonish receive water from the Town of Antigonish Water Utility. The water supply for the Town of Antigonish is the James River Watershed, which is protected under provincial legislation as the James River Watershed Protected Water Area. The boundary for the protected watershed is approximately 2.5 km southwest of the PDA. The Brierly Brook Water Treatment Plant is the drinking water treatment facility for the Town of Antigonish. The County of Antigonish operates centralized water supply systems to serve areas immediately outside the town boundaries in the fringe areas where water is taken from the Town's system, and in Lower South River, St. Andrews, and Saint Josephs, drawing from surface water and groundwater wells before being treated and distributed (Municipality of the County of Antigonish, 2024). The County of Antigonish operates centralized sewage collection and treatment systems for Pomquet, Havre Boucher, Heatherton, Lower South River, and the areas surrounding the Town of

Antigonish. The central solid waste facility for the County is the Beech Hill Solid Waste Resource Management Facility, located in the County of Antigonish south of town. The facility accepts municipal solid waste, source-separated recyclables, organic materials, construction and demolition debris, clean concrete, scrap metal, tires, and select household hazardous wastes, which are managed through designated handling and diversion streams in accordance with provincial requirements (Municipality of the County of Antigonish, 2020).

13.2.5 Communication and Radar Systems

As described in Chapter 3 (Consultation and Engagement), stakeholders and regulators were contacted with information regarding turbine technical specifications and locations to determine potential concerns due to EMI caused by Project turbines. The area of consultation for EMI varies by signal source, referred to in the RABC and CanWEA Guidelines (2025). Confirmation was received from DND, the RCMP, the Canadian Coast Guard, ECCC, NavCan, and Bell Aliant that they did not expect any interference by the Project. Eastlink Inc. and NCS Managed Services Inc. acknowledged receipt (Chapter 3). ISED Canada indicated that further consultation may be required for a communication tower in the vicinity of the Project.

Two communication towers are in the vicinity of the Project. One is an NSPI point-to-point microwave link tower that communicates to another tower south of the PDA. The other communication tower is privately owned by Atlantic Broadcasters Inc. with an FM emitting station and a microwave link.

13.2.6 Transportation

13.2.6.1 Road Network and Project Access

The proposed PDA will include the existing Connors Mountain Road and MacQuarrie Road. Both roads are local, unpaved roads and can be accessed by Pleasant Valley Road via Highway 245 approximately 4 km northwest of the nearest turbine. Pleasant Valley Road intersects with Clydesdale Road 6.5 km to the south, connecting to Highway 104 via Highway 245. Additionally, the AOD incorporates Maple Ridge Road, an unpaved offshoot of Connors Mountain Road, used for recreational purposes and for forestry operations. There are several other roads in the PDA that include K-class roads and roads that are either abandoned or used as recreational trails that travel through private and Crown land. Furthermore, the proposed transmission line route(s) intersect Browns Mountain Road, Highway 4, Highway 104 (Trans Canada Highway), and several other roads in the southernmost part of the PDA.

The primary route to enter the PDA during construction for delivery of turbine components is expected to be via Route 245, Clydesdale Road, Pleasant Valley Road, and Connors Mountain Road. The route for other construction components is expected to follow a similar route.

The Province of Nova Scotia regularly conducts traffic counts along its 100 Series Highways, 1 to 99 Series Trunks, and 200/300 Series Routes, and makes the dataset available online. Data from the traffic count locations for the roads in the network closest to the PDA are summarised in Table 13.2. Information from the province included the location and date of the count, and the average daily traffic (ADT) and annual average daily traffic (AADT). The AADT is more reflective of long-term average daily traffic conditions, and is the metric used in this assessment.

Table 13.2 NSDPW Traffic Count Summary for Nearby Roads

Road	Date	Description	ADT	AADT
Highway 4	26-04-2023	HWY 104 Connector (James River) to HWY 104 (Exit 31)	1396	1600
Highway 245 (EB)	10-05-2023	Pleasant Valley Rd (Maryvale) to Antigonish North Town Line	922	960
Highway 245 (WB)	10-05-2023	Pleasant Valley Rd (Maryvale) to Antigonish North Town Line	904	940
Highway 104 (EB)	03-05-2023	1.25 km east of Exit 31 (Addington Forks)	3645	3910
Highway 104 (WB)	03-05-2023	1 km west pf Exit 32 (Antigonish)	3604	3860

EB = Eastbound
WB = Westbound

13.2.6.2 Alternative Transportation

The Cape Breton & Central Nova Scotia Railway (CBNS) operates a track running from Truro to Point Tupper. CBNS is a freight railroad that connects eastern Nova Scotia with the CN railway in Truro, a Class 1 railroad. The rail line is not used for passenger transportation. While most residents travel by car, the Antigonish Community Transit Society (ACTS) provides transportation services including fixed route bus services in the Town of Antigonish during daytime hours on weekdays, and reduced hours on Saturday. ACTS also offers on demand, door-to-door service in town, and to neighbouring towns including Port Hawkesbury, New Glasgow, Truro, and Halifax. There is a Maritime Bus terminal in Antigonish that provides courier and passenger transportation services to many connections in the Maritime provinces.

13.2.6.3 Airports

The two closest airports are located on the outskirts of New Glasgow: Thornburn Airport and Trenton Airport. The Thornburn Airport is approximately 36 km from the closest turbine and has one runway used for private aircraft. The Trenton Airport is approximately 35 km from the closest turbine and is a commercial airport (airport code CYTN) with one 1,615-m long runway used for private aircraft and public transportation, and is maintained year-round (Town of Trenton, 2025).

13.2.7 Recreation and Tourism

The private and Crown properties that constitute the LAA are used year-round for off-roading activities, particularly by ATVs and snowmobiles.

As described in Chapter 3 (Consultation & Engagement), the Proponent has engaged with special interest groups pertaining to recreation in the area. These groups included the Antigonish SnoDogs, the Snowmobile Association of Nova Scotia (SANS), Friends of Eigg Mountain, the Eigg Mountain Trails Association, the Moose Conservation Association of Nova Scotia (MCANS), and Nature Nova Scotia.

A portion of the PDA borders a portion of the Eigg Mountain – James River Wilderness Area, where low impact recreational activities such as hiking, backcountry skiing, bird watching, mountain biking, and limited hunting and trapping are permitted. Off-highway vehicle use in the wilderness area is restricted to designated routes approved by the NSECC, through management agreements with SANS and ATVANS. In the LAA, three designated off-highway vehicle trails overlap with the PDA—Trail 715A (2 km), Trail 716 (1 km), and MacQuarrie Road (1 km)—and are managed by ATVANS and SANS; the associations limit access to these trails by permit. The same routes are also designated bicycle trails.

Two provincial parks are in the RAA: Arisaig Provincial Park and Beaver Mountain Provincial Park. Arisaig Provincial Park is often frequented by hikers, beachgoers and picknickers in summer. Beaver Mountain Provincial Park is popular for its 6 km trail system. The trail system is multi-purpose and is used for hiking in the summer, and cross-country skiing and snowshoeing in the winter.

There are several unmaintained wilderness hiking trails that intersect the LAA, including Doctor’s Brook Falls accessed from the abandoned Maple Ridge Road. Many of the managed ATV and snowmobile trails are also used for hiking and have amenities such as look-out points and warm-up stations. During field surveys, bear and deer hunters were encountered in the LAA. Other mammalian hunting or trapping may occur in the LAA, though no signs were observed during field studies. No fishing activities were observed during field studies; however, Vincent Lake is listed as one of the lakes in Recreational Fishing Area 2 and is part of the province’s fisheries management. During public consultation for the designation of the Eigg Mountain – James River Wilderness Area sport-fishing was identified as a recreational value (NS Environment and Labour, 2005), and is an activity permitted in all wilderness areas across the province (Wilderness Areas Protection Act, 1998).

The southern portion of the LAA is more densely populated than the north, and recreational activities include golfing at Grays Driving Range (approximately 11 km from the PDA) and equestrian sport at Deverness Stables (approximately 9 km from the PDA) in addition to outdoor activities. One major recreational facility is Keppoch Mountain (approximately 14 km from the PDA), a former alpine ski hill converted into a non-profit four-season outdoor recreation facility. Keppoch Mountain provides 40 km of multi-use wilderness trails for mountain biking, off-road cycling, hiking, trail running, snowshoeing, fat-tire biking, and cross-country skiing. Included in the trail system is one fully wheelchair-accessible trail. Swimming at nearby Cameron's Lake, camping, lodge rentals, and disc golf are additional recreational activities offered at Keppoch Mountain. Keppoch Mountain also puts on multiple local events through the year such as races, trail clean ups, and social hikes.

The Northumberland Shore is known for the warmest beaches in Nova Scotia and attract many visitors over the summer. The Sunrise Trail is a scenic travel route that runs along the Northumberland Shore and goes through the RAA. This trail includes multiple roads, and Route 245 is the one that passes through the RAA. The stretch of Route 245 that is part of the Sunrise Trail is approximately 2.5 km from the PDA.

Approximately 10 km southeast of the nearest Project turbine, there are several restaurants, accommodations and tourist attractions in Antigonish, as well as St. Francis Xavier University which hosts regional, national, and international events through the year.

13.2.8 Human Health

This section describes the existing human health conditions in the LAA and provides context for assessing how the Project may affect public health, including social and environmental determinants.

Social and economic conditions that are contributing determinants of human health in a community, such as community demographics, landscape characteristics, and infrastructure, are described in the previous sections in this chapter. Human health also relies at least partially on several environmental factors. Ambient light and acoustic environments are described in Sections 5.2.3 and 5.2.4, respectively.

Both air and drinking water quality, previously discussed in this document (Chapter 5: Atmospheric Environment and Chapter 6: Geophysical Environment), can affect human health, with potential for adverse effects if unacceptable exposure to elevated chemical concentrations occurs. The potential for accidents and malfunctions, such as ice throw, and mitigation for such are discussed in Chapter 18 (Accidents and Malfunctions).

13.2.8.1 Air and Water Quality

As discussed in Chapter 5, Nova Scotia evaluates air quality against the CAAQS which were developed by the CCME to protect the health of all Canadians. Based on the 2022 air quality monitoring data, the most current available during the EA preparation, the CAAQS have been met in the northern air zone where the Project is located (NSECC, 2024).

The Nova Scotia Groundwater Database (NSECC, 2023b) has a limited amount of information available for registered wells, particularly for results of laboratory analysis.

Therefore, a total of 41 registered wells in and surrounding the AOD were reviewed for water quality records, of which only 12 to 37 included some chemical parameters (Table 13.3). These wells are underlain by the same types of bedrock that influence groundwater quality in the AOD (Chapter 6: Geophysical Environment; Figure 6.1, Appendix A).

Health Canada lists maximum acceptable concentrations (MACs) for contaminants associated with risks to human health (Health Canada, 2025). Of the 12 records that included arsenic analytical results, none had a concentration of arsenic that exceeded the MAC value for that parameter (Table 13.3). Of the 28 records that included analytical results for manganese, four (10 percent) had a concentration of manganese that exceeded the MAC value for that parameter. Iron concentrations exceeded the aesthetic objective in 7 of the 37 available records (17 percent) that included analytical results for that parameter. The exceedance of the aesthetic objective value is not a health concern but affects the palatability of the water; iron can also stain laundry and plumbing fixtures.

Table 13.3 Well Water Quality

Parameter	MAC (mg/L)	Number of Records	Number and Rate of Exceedances
Arsenic	0.010	12	0 (0%)
Iron	0.3*	37	7 (17%)
Manganese	0.12	28	4 (10%)

*Indicates an aesthetic objective

Radon readily vaporizes from water and is therefore more of a health concern for release and concentration in indoor air than a concern for drinking water. Health Canada, therefore, does not list a MAC value for radon (Health Canada, 2025).

Effects and mitigation for changes specific to air quality and groundwater are presented in Chapter 5 (Atmospheric Environment) and Chapter 6 (Geophysical Environment) and are not further assessed in this chapter.

13.2.8.2 Healthcare and Emergency Response Services

The region lies in the Nova Scotia Health Authority's Eastern management zone. The St. Martha's Regional Hospital in Antigonish is the full-service 24-hour emergency hospital nearest the LAA. There is one RCMP detachment nearby in Antigonish.

The Emergency Management Office is responsible for emergency planning and response in the province, including storm preparation and support, and administers the 911 phone system to dispatch paramedics and RCMP first responders. There are three fire stations in the vicinity of the turbines and turbine access roads: the Antigonish County Volunteer Fire Department (5 Sears Ross Dr., 11.39 km from the nearest turbine access road), the Antigonish Town Fire Department (16 Sydney St., 9.7 km from the nearest turbine access road), and the Four Valleys Volunteer Fire Station (3331 NS-254, 7.2 km from the nearest turbine access road).

13.3 Effects Assessment

13.3.1 Potential Effects and Mitigation

The results of environmental baseline studies as well as regulatory and public engagements were used to implement Project changes that minimize potential direct and indirect adverse impacts on the socio-economic environment, where reasonable. Direct and indirect effects of the Project on components of the socio-economic environment could occur through several interconnected pathways for the lifetime of the Project.

Most effects to the socio-economic environment will be positive. There will be employment opportunities and a stimulus to local businesses during all phases, and the Project will create a source of revenue to the Municipality of the County of Antigonish during operation and maintenance. Access to natural resources and recreational activities will be affected; adversely during construction but positively overall during operation and maintenance with improved access in the LAA. The municipality's goal to lower their own carbon footprint and efficiencies in electrical power distribution will be achieved in the long-term. Project activities can affect the socio-economic environment as indicated in Table 13.4 without implementation of mitigation measures described herein.

Table 13.4 Potential Environmental Effects of the Project on the Socio-Economic Environment

Project Activity	Potential Interactions						
	Change in Population and Economy	Change in Land Use and Value	Change in Visual Landscape	Change in Utilities	Change in Transportation	Change in Recreation and Tourism	Change in Human Health
Construction							
Site Preparation	X	X	-	-	X	X	X
Access Roads Construction and Modifications	X	X	-	-	X	X	X
Material and Equipment Delivery and Storage	X	-	-	-	X	X	X
Infrastructure Installation	X	-	X	-	-	X	-
Restoration of Temporary Areas	X	-	-	-	-	X	X
Testing and Commissioning	X	-	-	-	-	-	-
Operation and Maintenance							
Turbine Operation and Maintenance	X	X	X	X	-	X	X
Road Maintenance	X	X	-	-	X	X	X
Power Line and Substation Maintenance	X	-	-	-	-	-	-

Project Activity	Potential Interactions						
	Change in Population and Economy	Change in Land Use and Value	Change in Visual Landscape	Change in Utilities	Change in Transportation	Change in Recreation and Tourism	Change in Human Health
Vegetation Management	X	-	-	-	-	-	X
Safety and Security	-	-	-	-	-	-	-
Decommissioning							
Removal of Infrastructure and Site Restoration	X	-	-	-	X	X	X

X = Potential Interaction

- = No Interaction

13.3.1.1 Population and Economy

During Project planning and construction, the Proponent intends to resource local labour and skillsets to support the work needed as part of the Project. In addition to using local expertise across the environmental, engineering, archaeological, public relations, and land surveying sectors to support with Project planning, construction activities will require local and regional labourers, equipment, and materials. Much of this will be considered standard construction services that do not require training specific to wind turbines.

Staffing will be needed for the lifetime of the Project. Approximately 200 to 250 workers will be employed during the construction phase; a part-time and full-time staff complement of 10 to 20 will be needed to support operation and maintenance. The influx of workers to the region will also contribute wealth back into the local economy through spending on goods and services such as restaurants, stores, and accommodations during all Project phases. Given the number of wind projects already implemented in Nova Scotia, it is expected that wind turbine specialists (such as those in turbine commissioning, crane operators, and/or specialized transport vehicle drivers) can be sourced from within the province.

Local businesses will have the opportunity to provide construction materials, such as crushed rock for the construction and modifications to access roads, concrete for foundations, and general construction equipment. Engagements with local businesses are discussed in Chapter 3 (Consultation and Engagement).

The Proponent has also committed to several direct benefits to members of the community.

- The Proponent will pay annual tax revenues of approximately $1.3 million to the Municipality of the County of Antigonish as per the provincial *Wind Turbine Facilities Municipal Taxation Act*.
- The Proponent will establish landowner royalties.
- The Proponent will establish a Community Benefit Fund with the Municipality of the County of Antigonish with an annual allocation of $154,000).
- The Proponent will establish a Maryvale School Fund to provide $10,000 annually to fund programs or projects for the H.M MacDonald School and its students, with priority given to underrepresented students or groups to achieve increased accessibility.
- The Proponent will establish five $5,000 bursaries to fund scholarships for residents of the Municipality who would like to enter training or education programs that would be applied to the construction or operation of a wind energy facility.
- The Proponent is committed to working with the local Canadian Association of Community Living (CACL) to develop a Capacity Building Plan aimed to enhance the skills, knowledge, and abilities of individuals with disabilities, enabling them to participate effectively in the wind Project while simultaneously developing the capacity of the Project to support and integrate individuals from the local community.

Overall, the economy of the Municipality of the County of Antigonish will benefit from Project implementation.

13.3.1.2 Land Use and Value

Implementation of a wind facility will impose limitations for other land uses in the PDA, but road upgrades and new access road construction may facilitate the use of land in the LAA. Harvesting of natural resources, such as forestry, may be adversely affected in the LAA during construction, as access will be interrupted intermittently during road upgrades. There are, however, existing access roads in the LAA and not all would be under construction at once; access via other routes will therefore be open. During operation and maintenance, while there may be less overall forested land due to clearing activities associated with the Project, these adverse effects are expected to be offset on the private land parcels due to the increase in revenue received through land lease agreements as previously described. Additionally, those using the area for harvesting natural resources may benefit from the road upgrades that will provide improved access and road conditions that will reduce wear on equipment. Approximately 18.9 km of existing roads will be included in the PDA and another 12.9 km will be constructed. There will be a low land use density of one turbine per 170 ha (i.e., one turbine per 420 acres) on average.

Although not raised as a concern during the public engagement for the Project, potential effects on property value have been considered. Extensive research examining the impacts of wind projects on property values has been conducted through the years. Community demographics and wind facility characteristics are site-specific, and effects on property values often largely depend on perception of visual impacts. While several studies have indicated that even large-scale wind farms have no significant impacts on property values, a peer-reviewed study using a 133-turbine wind farm in a rural community in Ontario has shown that, although the wind farm did not generally affect property values, the value of individual properties in close proximity to wind turbines can be adversely affected and impacts may be affected by community support (Vyn, 2015). Another more recent study in the US indicated that property values may decrease during construction only to have a subsequent increase once operation begins (Brunner and Schwegman, 2022).

A study published in 2024 compared data on commercial wind turbines and residential property transactions between 2005 to 2020 in both urban and rural areas across much of the US (Brunner et al., 2024). The study concluded that property values for homes located beyond 2.4 km of a turbine in an urban area were unaffected. Those within 2.4 km of a turbine that experienced adverse effects (approximately 11 percent decrease) were predominantly located in urban communities with a population greater than 250,000 people. However, the authors found that there was no impact on property values found in rural (agricultural and forested) areas with homes in proximity to wind turbines (population less than 250,000). Given that the Antigonish County census division has a population of approximately 20,000 people, and the Project turbines are located a minimum of 900 m from all residences, it is unlikely that there will be adverse impacts on property values as a result of Project implementation.

Early consultation with the Eastern District Planning Commission and the Municipality of the County of Antigonish, as well as information gained through the EA process and public engagements resulted in commitments to promote positive effects to land use and value.

Potential Project effects related to land use and value can be effectively mitigated through planning and management of construction and operation activities. The following key measures to mitigate the potential effects of the Project land use and value will be further detailed in a Project-specific EPP.

- Access to the AOD uses existing roads and the AOD design itself has maximized the use of existing public K-Class and other gravel roads.
- Once permission is granted, long-term leasing fees will be paid for Crown lands and to private property owners for land in the AOD.
- The local public will be notified prior to construction.
- The Proponent will communicate Project activities and timing to local resource users and the public for the lifetime of the Project.
- Merchantable timber will be salvaged and used in accordance with Project agreements.
- The Proponent will continue to engage with local resource stakeholders about effects to resource use and the planned mitigation measures.
- The area of disturbance will be limited to the AOD
- Clearing will be minimized to the extent possible.
- An EPP will be implemented that includes procedures for waste removal.
- A Complaint Resolution Plan will be developed and implemented by the Proponent.

13.3.1.3 Visual Landscape

Visual impacts are based on public perception of wind turbines, including lighting, paint colour, and degree of visual contrast from the surrounding landscape (Sullivan et al., 2012). The visual impact of wind turbines can also be influenced by its operating status. Visual impacts associated with an operating turbine are lower than that of one that is stationary (Saidur et al., 2011). When the blades are in motion, they can be less visible from a distance.

A recent study by Hamza et al. (2022) concluded that, over the past three decades, there has been an evolution in the public perception of wind turbines, and there are notable differences in how the landform affects the perceived aesthetics. Responses to visual images of sites, proximities, landscapes, and maturity of wind turbine technology were recorded and the results revealed positive reactions to wind turbine vistas in seascape and landscape settings; reactions to images of wind turbines as an addition to buildings in urban contexts were unfavourable. While gender did not affect perception, younger individuals were more apt to react positively to wind farm images, which indicates that early exposure to wind turbine landscapes is driving an upward shift in positive perception.

Visual simulations of the proposed turbine locations, conducted by Nortek (2025), show the number of turbines visible from various points surrounding Eigg Mountain. Turbines will be visible from all viewpoints that were included in visual simulations: Lismore Wharf, Dummaglass Road, Steinhart Distillery, Arisaig Wharf, MacPherson Lane, Maryvale, Pleasant Valley, Connors Mountain Road, and Vincent Lake (Appendix J). Although turbines will be visible from these viewpoints, landscape, topography, and tree cover reduce the visibility of turbines from inhabited areas. Furthermore, per the visual simulations, only a few turbines will be seen at a time. Visual impact was not a concern raised during public engagement.

13.3.1.4 Utilities

Utilities, such as water distribution lines and local power lines, may be temporarily affected by construction of the Project. Construction of the transmission line traversing roads with water lines or power lines and upgrades of existing roads leading to temporary disruptions will be mitigated by careful construction planning, notifications to local utility providers, and obtaining necessary permits and crossing agreements.

13.3.1.5 Communication and Radar Systems

Two turbines were repositioned and the Project layout adjusted to comply with land-use bylaws and avoid interference with an FM radio station. Although two turbines are 1.8 km from the station—slightly under the recommended 2 km consultation zone—Atlantic Broadcasters Inc. have been notified. No response was received, despite multiple notification attempts by the Proponent. A study confirmed no expected interference, and results were shared with the broadcaster. With these siting adjustments and study findings, negligible impact on communication towers is expected.

Confirmation was received from DND, the RCMP, the Canadian Coast Guard, ECCC, NavCan, and Bell Aliant that they did not expect any interference by the Project and had no objections to it as proposed.

Responses received from stakeholders and regulators are based on a previous turbine layout; however, the currently proposed turbine layout has only slightly changed. Therefore, the determinations from the agencies consulted are not expected to change. Furthermore, the Proponent will be submitting a final notification prior to construction and will request a final response from all the agencies previously consulted (Chapter 3).

13.3.1.6 Transportation

During construction, there will be an increase in traffic from crew commuters; trucks to transport soil, rock, and waste; and flatbed trailer trucks transporting construction equipment approaching from both the east and west. There will be traffic interruptions as a result of increased road users and slower moving vehicles. Some disruption may occur as a result of construction activities related to the transmission line in proximity to, and crossing, both the highway and the railway.

The proposed construction is expected to add a maximum of 75 to 100 light trucks and 50 to 60 dump trucks per day to the local road network at peak of construction. When considering the traffic impacts, each truck represents one trip in and one trip out from the site, resulting in an increase of 200 trips per day for light trucks, and 120 trips per day for dump trucks, for a total of 320 additional trips per day during construction.

According to the AADT figures for adjacent roadways (Table 13.2) and projected daily trip counts during the construction period, traffic volumes are anticipated to rise by approximately 8% on the TransCanada Highway 104, 20% on Highway 4, and 34% on Route 245. These projections represent conservative estimates, reflecting a worst-case scenario in which all truck movements are funnelled through a single access point on any given day. However, it is expected that truck traffic will be distributed among multiple access points rather than concentrated along one route. The anticipated increase in traffic is temporary and will be limited to peak construction intervals throughout the construction phase.

Turbine components will be transported to the province via ship to the Strait of Canso Superport in Mulgrave, Nova Scotia. They will be transported approximately 68 km to the PDA via Highway 344, TransCanada Highway 104, Clydesdale Road, and Pleasant Valley Road. Turbine components will then be mobilized to the turbine pads prior to assembly.

A Traffic Management Plan will be developed to prepare for the delivery of turbine components. The Proponent is evaluating multiple entrances to determine which would have the least impact and spread out the Project vehicle traffic in the LAA to reduce traffic impacts at individual entrances to the PDA. Both Highway 104 and Trunk 4 are Schedule C Maximum Weight roads, having a weight restriction of 62,500 kg (NSDPW, 2023).

The following key measures to mitigate the potential effects of the Project on transportation resources will be further detailed in a Traffic Management Plan and will be implemented prior to and during construction:

- Permits for work in public roads and crossing agreements will be obtained with the Department of Public Works, as well as with the Cape Breton and Central Nova Scotia Railway.
- A Special Move Permit will be procured for vehicles with weights or dimensions greater than those listed in the Weights and Dimensions of Vehicles Regulations under the Nova Scotia *Motor Vehicle Act*.
- The regional RCMP will be notified of equipment deliveries that require Special Move Permits expected to affect traffic.
- The local public will be notified of the expected equipment delivery schedule.
- Access to and from the Project should follow predefined travel routes. Multiple entrances are being evaluated to minimize effects.
- The routing of Project traffic through residential areas will be avoided during the peak traffic periods.
- Adequate safety signage, fencing, guardrails, and/or warning tape will be installed to indicate restricted Project areas to advise members of the public.

- Safety warnings and signage will be clearly posted to advise hikers, cyclists, snowmobilers, and other resource users of the Project activities.
- Onsite equipment and vehicles will operate only within the PDA.
- Project vehicles will abide by posted speed limits.
- A Complaint Resolution Plan will be developed prior to construction.

13.3.1.7 Recreation and Tourism

The effects that a wind farm may have on local recreation and tourism depend on the visibility of wind turbines, the number of tourist attractions and tourists that frequent the area, and the area's degree of existing disturbance (Sæþórsdóttir et al., 2021), as well as perception of wind energy (Frantal and Kunc, 2011).

Some of the trails that cross or are in the AOD (Figure 13.1, Appendix A) may be temporarily unavailable during the construction period and may see traffic on access roads during operation and maintenance, where light-duty trucks, snowmobiles, and tracked vehicles will travel to access turbine sites. Several designated off-highway vehicle routes managed by SANS and ATVANS travel though the lands in and adjacent to the Project and the Eigg Mountain-James River Wilderness Area. A detailed Traffic Management Plan will be developed to mitigate the potential for incidents, which is discussed further in Chapter 18 (Accidents and Malfunctions).

During construction, snowmobile and ATV users may temporarily lose access to sections of trail and need to adapt to detours during road upgrades and clearing. Such effects may occur during operation and maintenance as well, but only in the event that a turbine would require major works (such as a blade replacement). As outlined in Chapter 3 (Consultation and Engagement), the Proponent has been working with local clubs to maintain access to all trails in the AOD for snowmobilers and ATV users during Project operation through considerations in layout design, construction practices, and operational strategies. One practice during winter operation and maintenance, for example, will be to use tracked vehicles to access turbines to reduce the need to plough or intentionally ploughing snow onto snowmobile trails to increase the trail base. During the operations phase, ongoing communication with snowmobile and ATV users will remain a top priority to ensure shared use of access roads in the AOD.

Access road routes and the transmission line RoW will be widened in some areas, which could lessen the natural experience of hikers where an existing access road forms part of the trail. Conversely, increasing access routes and the transmission line RoW may increase opportunities for some snowmobile and ATV users. Other recreational activities such as hunting and fishing are not expected to be impacted by the Project since access to the surrounding area will not be severed, and new or improved access may be created.

Although the layout of the AOD was strategically sited to use existing roads as much as possible, increased traffic on access roads during construction may lead to temporary interruptions or detours to ATV and/or snowmobile operators as well as hikers due to rerouting to avoid areas of construction in the PDA as well as decrease the probability of traffic incidences (further discussed in Chapter 18: Accidents and Malfunctions).

The Project commits to keeping recreation spaces open to local users and working proactively with clubs to engage and communicate with the members. The following key measures to mitigate the potential effects of the Project on recreation and tourism will be further detailed in a Project-specific EPP as well as a Traffic Management Plan and will be implemented prior to and during construction and operation.

- Open engagement will be continued with SANS, the local Antigonish SnoDogs club, and ATVANS. These organizations will be notified regularly about Project activities that may affect trail use to minimize disturbance.
- Public notifications of construction and traffic disruption will be issued.
- Temporary detour and traffic control signage will be erected when and where necessary.
- Where trail paths enter safety setbacks, the Proponent will establish trail detours.
- The Traffic Management Plan will include community education and notification, as well as provision of escort vehicles for wide loads or vehicles that require increased turning radius to avoid disruption to tourism.
- Tracked vehicles will be used in the winter for regular turbine and general Project maintenance.

13.3.1.8 Human Health

Sensitivities to nighttime lighting, noise, shadow flicker, and electromagnetic field (EMF) have been cited as public concerns associated with wind farms. Sensory disturbance may also be affiliated with vibrations and visual impacts such as obstruction of views and aesthetics (Health Canada, 2025). Some Nova Scotians consider wind turbines a source of annoyance (Union of Nova Scotia Municipalities, 2015). Annoyance levels are typically self reported and can be influenced by the attitude individuals have with respect to wind turbines (Ellenbogen et al., 2012). Health Canada considers annoyance an indicator of a health effect, as it can impact quality of life. The World Health Organization (WHO) also recognizes annoyance as an adverse health effect (Union of Nova Scotia Municipalities, 2015). Potential for accidents and malfunctions that could also affect human health (i.e., ice throw, structural damage, and fires) are discussed in Chapter 18 (Accidents and Malfunctions).

This Project fully complies with provincial setback requirements for residences, which are also required under the County's Land Use Bylaw. All turbines are located more than 798 m from a residence; the closest turbine to a residence is 936 m. Legislated requirements and best practices associated with shadow flicker and noise exposure are also met. At these distances, no human health impact is expected.

Generally speaking, despite the potential adverse effects of wind energy projects on human health, proper siting of turbines, such as at distances proposed on this Project, are expected to avoid human health impacts; further, wind energy projects can ultimately promote positive effects to human health by displacing emissions from other higher impact energy sources.

Ambient Light

Aside from National Parks and Dark Sky Preserves, in Nova Scotia and in Canada there are no guidelines applicable to outdoor ambient light levels and/or effects on human health. Potential effects of the Project on ambient light are assessed in Chapter 5 (Atmospheric Environment) and are not further assessed in this section. The key measures to mitigate the potential effects of the Project on human health as a result of changes to ambient light levels are itemized in Section 5.3.1.2 and will be further detailed in a Project-specific EPP to be implemented during all Project phases.

Acoustic Environment

The 2014 Health Canada study on the impacts of wind turbines on community health and wellbeing found that self-reported instances of sleep disturbance, illnesses, chronic diseases, and stress were not affiliated with wind turbine noise exposure. Nonetheless, increasing wind turbine noise levels statistically correlated with increasing annoyance levels (Health Canada, 2025).

Health Canada (2023) and the Union of Nova Scotia Municipalities support WHO’s recommendation for a nighttime noise limit of 40 dBA at the exterior of homes as being protective of sleep, general health, and does not exacerbate pre-existing medical conditions (Union of Nova Scotia Municipalities, 2015). The Project noise assessment has adopted this value (Nortek, 2026b; Appendix E).

Wind turbines produce noise from two main sources, the generator and the wind passing over the blades. Low frequency noise is not usually heard by humans, but there is potential that it could make small vibrations more noticeable (Canadian Centre for Occupational Health and Safety, 2023). Low frequency noise has been used to describe frequencies less than approximately 30 hertz (Hz), the perception of which is often described as a feeling or pressure rather than something that is heard (Health Canada, 2021). Health Canada has found that the scientific evidence base in relation to wind turbine noise exposure and health is limited, which includes uncertainty as to whether it contributes to the observed community response and potential health impacts (Health Canada, 2019).

Changes to noise levels from baseline during all phases of the Project were assessed in the context of human health in Chapter 5 (Atmospheric Environment). In combination with natural and non-industrial anthropogenic sources, Nortek (2026b) determined that Project operation will comply with the permissible sound levels outlined in the provincial noise guidelines for all receptors in both the LAA and the RAA (Appendix E). No tonal components were identified with turbine operation and, therefore, the Project will not cause low frequency noise issues.

Potential noise effects during Project construction are short-term (expected to take less than two years) will vary based on the type of construction activities and the shifting proximity to receptors during this phase (Nortek, 2026b). The primary noise sources associated with construction will include trucks and other vehicles, backhoes and graders, cranes, and smaller equipment such as welding units as well as back-up alarms on mobile equipment. Noise levels at receptors during construction will depend primarily on the number, type, and proximity of noise sources. Construction noise levels will decrease as the distance between the receptors and construction activities increases and nighttime construction activities will be avoided as much as possible.

The key measures to mitigate the potential effects of the Project on human health as a result of changes to the acoustic environment are itemized in Section 5.3.1.3 and will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

Shadow Flicker

Shadow flicker occurs when sunlight passes through the blades of an actively rotating wind turbine and reaches an observer on the ground, resulting in flickering light. The distance of the shadow flicker depends on several factors such as the time of day and season as well as the location of the observer relative to the wind turbine (Ellenbogen et al., 2012). Turbines have also been known to produce glint (i.e., flashes of reflected light) when the turbine blades are reflective. However, modern wind turbine blades, including those proposed for the Project, are treated with a non-reflective coating to minimize glint.

Studies suggest that shadow flicker is not experienced beyond 1.4 km from the turbine for large-scale turbines (Ellenbogen et al., 2012). Other studies reveal that, beyond 15 rotor diameters from a wind turbine, shadow flicker is decreased to a point where it is not observable (Haac et al., 2022). A scientific review of turbines and human health noted that, by 2014, there were roughly 60 scientific peer-reviewed articles that studied the links between turbines and human health and that the available scientific evidence suggested that shadow flicker is not likely to affect human health (Knopper et al., 2014).

NSECC standards stipulate a maximum of 30 hours of flicker over the course of a year or no more than 30 minutes per day. The shadow flicker assessment using the theoretical worst-case found that 8 of the 31 receptors would experience greater than 30 hours of shadow flicker per year, and 20 receptors would experience more than 30 minutes per day. The realistic case, however, found that all receptors comply with the less than 30 hours of shadow flicker per year. The maximum shadow flicker per day cannot be calculated, due to the use of monthly sunshine probabilities, which cannot be scaled into minute time steps. The realistic case scenario is more comprehensive, as compared to the theoretical worst-case scenario, in which assumptions are quite conservative in nature. The realistic values of shadow flicker ranged from 0 to 22.1 hours per year, well below the 30 hours per year threshold. Modeled results indicate that the Project is not expected to result in unacceptable shadow flicker effects (Nortek, 2026a).

A Complaint Resolution Plan will be developed and implemented by the Proponent (including an investigation process to confirm any potential reported exceedances).

Electromagnetic Field Exposure

EMF is composed of invisible waves that travel through space and exert force on charged particles in the frequency range of 1 Hz to 3 kilohertz, which is outside the visible range of the electromagnetic spectrum. In Canada, electrical distribution has a frequency of 60 Hz (Health Canada, 2022a), which is considered extremely low frequency EMF. Common sources of extremely low frequency EMF include household wiring, electrical appliances and household electrical products, power lines, transformer boxes, and electrical substations. The technical specifications for the turbines selected for this Project list a frequency of 50 and 60 Hz for the electrical system and transformer.

There has been public perception that EMF exposure from wind turbines can lead to adverse health effects (McCallum et al., 2014). Available scientific evidence suggests that EMF associated with the operation of wind turbines is not likely to adversely impact human health (Knopper et al., 2014) and that EMF levels in the vicinity of wind turbines are less than those produced by common household electrical devices (McCallum et al., 2014).

Health Canada, along with WHO, monitors scientific research on EMF and human health as part of its mission to help Canadians maintain and improve their health (Health Canada, 2012). International exposure guidelines for exposure to EMF have been established by the International Commission on Non-Ionizing Radiation Protection. Health Canada does not consider that any precautionary measures are needed regarding daily exposures to EMF. There is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those just outside the A of power lines (Health Canada, 2022). EMF exposures in Canadian homes, schools, and offices are far below these guidelines. Therefore, there is no indication that EMF levels from the Project wind turbines, collector lines, or the associated transmission line will affect public health in the LAA.

The key measures to mitigate the potential effects of the Project on human health as a result of changes to the acoustic environment are itemized in Section 5.3.1.3 and will be further detailed in a Project-specific EPP to be implemented prior to and during construction.

The Proponent is committed to operating the Project in compliance with applicable regulations. Key measures to mitigate the potential effects of the Project on human health as a result of changes to the acoustic environment or changes to ambient light levels are itemized in Section 5.3.1.3 and Section 5.3.1.2, respectively. The following additional measures to mitigate the potential effects of the Project on the human health, will be further detailed in a Project-specific EPP and will be implemented prior to construction.

- Turbines blades will have a non-reflective coating to minimize blade glint.
- To minimize light diffusion, only the minimum amount of obstruction avoidance lighting will be placed on the turbines.

- Ground lighting, such as construction and security lighting, will be focused toward the ground to minimize visibility at a distance.
- The intensity of light flashes will be minimized as much as Transport Canada allows.
- A Complaint Resolution Plan will be submitted to NSECC. The plan will include an investigation process to confirm reported exceedances of noise and shadow flicker.

13.3.2 Residual Effects

13.3.2.1 Changes in Economy

Construction and decommissioning of the Project will provide medium-term employment for not only local residents of the RAA, but within the province as a whole where goods and services will need to be procured. During operation and maintenance, there will be training opportunities for Indigenous peoples for long-term employment. The Proponent will also be contributing to the local economy through community benefit funds and long-term leasing agreements for property owners. The Proponent will make annual tax payments to the Municipality of the County of Antigonish as per the provincial *Wind Turbine Facilities Municipal Taxation Act*. In addition, the Proponent has committed to providing financial support for a variety of community benefits and bursaries in the municipality. Implementation of the Project is therefore expected to result in an overall continuous, significant long-term benefit to the community's economy.

13.3.2.2 Changes in Land Use and Value

Based on initial stakeholder engagement and Project infrastructure plans, the magnitude of positive change with respect to the property values for those in the LAA is expected to be moderate for the lifetime of the Project. There will be long-term positive effects for those who will be leasing their land to the Proponent (PIDs provided in Chapter 1: Introduction) and those who use the existing access roads for natural resources industry. Changes will be reversible upon decommissioning. Where landowners opt to retain constructed and/or upgraded access roads during decommissioning, improved access through the PDA will be permanent. The Project will not have significant effects on land use and property values.

13.3.2.3 Changes in Visual Landscape

Based on stakeholder engagement and changes made to the originally proposed design, the magnitude of change with respect to the visual landscape for those in the LAA is expected to be moderate in the LAA. Turbines will be visible continuing long-term through the life of the Project, but this residual effect is reversible through decommissioning. The perception of wind turbines is subjective among demographics, and individuals tend to be more receptive to wind farms in rural locations such as the Project area.

13.3.2.4 Changes in Transportation

There will be moderate and intermittent traffic disturbances in the LAA. Existing access roads are normally used for slow-moving, off-road vehicles. Those roads will be upgraded to manage the turning radius needed for the expected trailer lengths, which will improve movement inside the LAA for the long-term, and those effects will be reversible.

Increased traffic in the RAA during construction and decommissioning is expected to be minor on an intermittent basis. Turbine components will be transported mainly via the Trans-Canada Highway, which is already a high-traffic route capable of handling large transport vehicles. Adverse effects during those phases will be more apparent on Route 245 where the proposed access roads to the PDA are located. Effects will be temporary during the construction phase.

The timing is considered to have a low effect on this VEC. A Traffic Management Plan will be developed prior to construction and will include procedures to alert the public and transportation authorities and arrange escorts for wide-load vehicles during intermittent periods of infrastructural component deliveries to the PDA.

13.3.2.5 Changes in Recreation and Tourism

Changes in recreation and tourism are expected to be moderate, medium-term, and limited to the LAA. During construction and decommissioning, portions of trails may be inaccessible or diverted intermittently where they share the RoW with the existing access roads or where safety set-backs need to be temporarily established. The timing of when these residual effects is moderate, considering that the trails are considered all-season. The effects are reversible, however, and the Proponent has engaged recreational trail user organizations through Project planning with the intent to enhance trail stability and enjoyment. The Proponent will continue to do so to minimize disruption. During operation and maintenance, the site will be open to public access. Mitigation outlined for noise and visual effects will also minimize effects to recreation and tourism.

13.3.2.6 Changes in Human Health

Changes in human health related to changes in air quality, groundwater water quality, ambient light, shadow flicker, and noise are expected to be minor in magnitude in an LAA of up to 2 km, where there may be discernible noise, light, dust, and vehicle emissions during Project activities. These effects will be predominantly isolated to the construction and decommissioning phases, will occur intermittently, and Project-related changes in human health factors will be reversible. During the course of the Project, the Proponent will be responsive to public complaints as per a Complaint Resolution Plan to be submitted to NSECC prior to construction.

13.4 Monitoring

Monitoring is not required for these VEC components, although the Proponent will be responsive to complaints. As noted in Chapter 6 (Geophysical Environment), pre-blast well water quality surveys will be completed for domestic water wells within 800 m of blasting as per a Blasting Management Plan to be submitted to NSECC prior to construction. As part of that plan, notification protocols will be developed for contacting NSECC and NSDNR should elevated levels of uranium be encountered.

14 Heritage and Cultural Resources

14.1 Overview

The assessment of Project effects on heritage and cultural resources considers sites of archaeological, historical, cultural, and architectural significance, as well as resources of social, cultural, or spiritual importance to Indigenous peoples.

Boreas Heritage Consulting Inc. (Boreas) conducted an initial Archaeological Resources Impact Assessment (ARIA) for the Project in 2025 (Boreas, 2025). An archaeological potential model was developed to identify areas considered to exhibit high potential for encountering archaeological resources in the PDA of the wind farm, which served to inform the subsequent field assessment. In total, 11 high potential areas (HPAs) were identified, and field reconnaissance surveys were conducted between June 24 and August 1, 2025. As the transmission line route was not confirmed at the time of the ARIA, this area was not included in the reconnaissance, and additional assessment will be conducted after the final route is selected.

The results of the ARIA have been submitted to the Nova Scotia Department of Communities, Culture, Tourism and Heritage (NSCCTH). Additionally, NSECC will be provided with the acceptance letter from NSCCTH prior to any disturbance of the identified HPAs. An ARIA of the transmission line route will be completed in 2026 and will be submitted to NSCCTH when completed.

An MEKS was conducted by the CMM, which provides further historical, cultural, and ecological context through an Indigenous lens. Information gathered as part of the MEKS is used to describe the existing environment (CMM, 2025).

Ground disturbance and clearing activities during construction—including grubbing, excavation, and blasting—can damage archaeological and heritage resources and/or features in the AOD. During decommissioning of the Project, previously undisturbed archaeological and heritage artifacts may be moved, damaged, and/or buried deeper when infrastructure is removed and the ground graded.

Effects, mitigation measures, and residual effects to archaeological and heritage resources resulting from the Project are outlined in this chapter. Project-specific mitigation measures will be included in a Project-specific EPP and a Contingency Plan prior to construction to minimize adverse effects.

14.1.1 Regulatory Context

Assessment of heritage and cultural resources considers relevant provincial and federal legislation and guidelines:

- *Constitution Act, 1982*
- *Special Places Protection Act*
- *Heritage Property Act*
- *Cemeteries and Monuments Protection Act*
- NSCCTH (2014) Archaeological Resource Impact Assessment Guidelines
- Mi'kmaq Ecological Knowledge Study Protocol, 2nd Edition (Assembly of Nova Scotia Mi'kmaq Chiefs, n.d.)

14.1.2 Boundaries

The AOD represents the Project footprint and the maximum limit of potential direct physical disturbance associated with the Project. The LAA and RAA boundaries are defined as follows for each subcomponent of the heritage and cultural resources VEC.

- **Archaeological Resources:** Effects to archaeological artifacts and features as a result of the Project will be isolated to the AOD for the lifetime of the Project.
- **Indigenous Cultural Resources:** The boundary of the LAA has been established as the Eigg Mountain Study Area by CMM that considered biophysical environments at Vincent Lake; Arisaig/nature reserve–blueberry block; Doctors Brook/marsh; South Rights River–Knoydart; and Maple Ridge Road, scoping targets near the Project. The RAA is defined as the Mi'kma'ki district Epekwitk aq Piktuk.

14.1.3 Assessment Methodology

14.1.3.1 Archaeological Resource Impact Assessment

Heritage and archaeological resources were identified through an ARIA conducted under Heritage Research Permit A2025NS106 (Boreas, 2025). Additional heritage and archaeological resources may be identified in the transmission line corridor, which has yet to be selected; identification of such will be carried out through a separate heritage research permit and field study planned to be completed in 2026.

The 2025 ARIA was based on background research of the area, including environmental, archaeological, and historical context of the region, within which lies the PDA. Environmental context was examined to identify past and current environmental influences or conditions that could elevate archaeological potential in the PDA, including topography, local resources, and potential for agriculture. Archaeological context of the region was examined to determine how people used and occupied the surrounding landscape based on evidence from registered archaeological sites and past archaeological work conducted near the PDA. Historical context of the region was examined to identify how people used and occupied the local area based on evidence in published archival documents, ethnohistoric records, local oral traditions, historic maps, local and/or regional histories, scholarly texts, and available property records.

The 2025 ARIA is based primarily on available online data sources for the general region:

- The Maritime Archaeological Resource Inventory maintained by the Nova Scotia Museum on behalf of NSCCTH
- Present-day and historic aerial photographs and topographic maps
- Previous archaeological survey reports from surveys conducted in the surrounding area
- Documentation of existing identified heritage sites near the AOD
- Archaeological and historical literature for the region
- National and/or provincial historic sites or designations in the surrounding area

Boreas (2025) identified topographical and hydrological attributes that correlate with archaeological potential and incorporated that data into an archaeological potential model they developed in-house. Following the desktop research and archaeological potential modelling, in-person non-intrusive reconnaissance was conducted to ground truth and delineate the areas of high archaeological potential and to visually examine the PDA for evidence of archaeological resources, such as artifacts, soil staining, or built features. The surveys consisted of parallel pedestrian transects, at intervals of 50 to 60 m in areas of low archaeological potential, and 30 m in areas exhibiting high archaeological potential.

Following Project refinement and development of the AOD, the mapped high potential areas were overlain with the AOD. This was conducted to determine how many high potential areas would overlap with the AOD and may therefore be impacted by Project development.

14.1.3.2 Mi'kmaq Ecological Knowledge Study

The MEKS was conducted in summer and fall of 2025, with one site visit being conducted in summer 2025, and the second follow-up visit conducted late November. The MEKS was completed in accordance with the Mi'kmaq Ecological Knowledge Protocol, 2nd Edition. The MEKS approach has two primary components.

- Mi'kmaq Traditional Land and Resource Use Activities – This component considers past and present uses of the LAA using interviews with Mi'kmaq Knowledge Holders as the key source of information regarding Mi'kmaq use.
- A Mi'kmaq Significance Species Analysis – This component identifies species in the area and considers resources that are important to Mi'kmaq use (food/sustenance resources, medicinal/ceremonial plant resources, and art/tools resources). It also considers resource availability/abundance in the area and its surroundings, their use, and their importance with regards to the Mi'kmaq.

The field components of the MEKS were completed in an initial site visit from May 15 to 17, 2024, and in a follow-up site visit on November 21, 2025. The second site visit was conducted to document and assess seasonal conditions, hydrological changes, species presence, disturbance patterns, and connectivity in the South Wright River corridor and its relationship to the Vincent Lake peatlands and canal system (CMM, 2025).

In addition to the site visits, interviews were conducted with Mi’kmaq Knowledge Holders, which included Elders, harvesters, gatherers, and other community members with recognized expertise and knowledge of the area (CMM, 2025). These interviews were conducted between May to mid November 2025. Interviews were composed of community workshops and individual interviews. The Knowledge Holders were provided information about the Project, including maps, and were asked about predetermined topics. Questions asked in the interviews/community workshops were designed to be open-ended, and explored themes such as species behaviours, habitat change, knowledge-sharing practices, and resource use in the general assessment area. The interviews resulted in a collection of data reflecting the most recent Mi’kmaq traditional use in the area, as well as historic accounts. The data gathered will inform mitigation measures specific to Project activities in the LAA.

14.2 Existing Environment

Proximity to water for subsistence resources and transportation is a key factor in identifying precontact and historic resources for Mi'kmaq, as well as early Euro-Canadian and African Canadian archaeological potential. The South Rights River, Knoydart Brook, Doctors Brook, and Arisaig headwaters in the Eigg Mountain region lead into the Northumberland Strait and the Antigonish Harbour, linking the upland ecosystems of the Eigg Mountain region with coastal environments that have long sustained Mi’kmaq communities.

14.2.1 Archaeological and Heritage Sites

14.2.1.1 Background

A review of the Maritime Archaeological Resource Inventory database revealed an absence of registered archaeological sites in or near the PDA. This may reflect a lack of archaeological investigation rather than an absence of archaeological sites. The review identified the presence of seven registered archaeological sites within an approximate 10 km radius of the PDA. These sites represent mainly remains of historic settlements, with a single shell midden site potentially dating back to the Kejikawe’k L’nu’k (also known as the Maritime Woodland or the Ceramic period).

Of the seven registered archaeological sites within a 10 km radius of the PDA, six are from the historical cultural period. These sites include cellars, stone foundations, and one culvert site. The nearest registered prehistoric site with evidence for pre-contact Mi’kmaw activity is along the Northumberland Strait near the community of Ponds, approximately 8.8 km west of the AOD, where the sole artifact found was a shell midden. The shell midden may represent the eastern-most extent of Mi’kmaw occupation around the Merigomish Harbour area (Smith & Winterberg, 1929, in Boreas, 2025). Additionally, local historians from Saint Francis Xavier University in Antigonish have identified the locations of several historical farms on Eigg Mountain. These are not listed on the Maritime Archaeological Resource Inventory database, and are mainly cellar depressions, stone foundations, or scatters of artifacts (Boreas, 2025). These sites should be considered important archaeological assets, as they retain historical and cultural value in the local community.

To provide historical context for the Eigg Mountain area, it is important to understand the early settlement of the region. The first European to settle on the Eigg Mountain plateau was an Irish immigrant in 1822. Soon after, settlers from Scotland's Isle of Eigg arrived, which is how the area got its name (Fergusson, 1967, in Boreas, 2025). By the late 1800s, a small farming community had developed on the plateau, complete with a small schoolhouse. However, this settlement was short-lived, and the last resident reportedly left in 1936 (Bantjes 2025a, in Boreas, 2025). Many of the roads on Eigg Mountain, such as Connors Mountain Road and MacQuarrie Road, date back to at least 1879, and were named after early settlers who lived along them (Bantjes, 2025a, in Boreas, 2025). After the original farming settlement was abandoned, likely due to declining soil fertility and reduced agricultural productivity, the region became primarily known as a popular hunting ground, a use that continued at least into the 1960s (Boreas, 2025).

14.2.1.2 Results of Archaeological Potential Model and Field Surveys

The results of the Boreas (2025) archaeological potential model suggest that the PDA has low potential for encountering archaeological resources, due to the distance from major watercourses and the steeply sloping terrain. There are small areas of elevated potential in the PDA, typically consisting of small water crossings, and one moderately sized area of elevated potential along the southeastern portion of the proposed access roads. While the route of the transmission line was not confirmed at the time the ARIA was conducted, areas of elevated archaeological potential that could potentially intersect with the transmission line RoW included water crossings of the South Rights River, Brierly Brook, Pushies Brook, and other small tributaries to the West River. There is also elevated potential around Brierly Brook Road, the Trunk 4 highway, and Addington Forks Road.

Archaeological resource modelling resulted in the identification of 11 high potential areas for encountering archaeological sites and/or archaeological resources in the PDA. However, no archaeological features or areas of significant cultural modification were observed during the field reconnaissance surveys. Ten of these high potential areas demonstrate areas of high historical archaeological potential; one is an area of high Precontact archaeological potential (Precontact defined as ca. 13,000 to 500 years before present).

Through the development of the AOD, the number of high potential areas that may be impacted by Project activities was reduced from 11 to three. These three small high potential areas could not be avoided and overlap with proposed Project access roads. As such, Boreas (2025) has stated that subsurface assessment involving a systematic shovel testing program must be conducted in these high potential areas prior to development activities.

14.2.2 Indigenous Cultural Resources

The network of navigable rivers, streams, coastal routes, portage routes, and footpaths provided travel routes and access to resource areas in Mi'kma'ki. The Eigg Mountain LAA, located in the Epekwitk aq Piktuk District, is part of a tightly connected river-estuary-upland system, rich in culturally significant species and places, important to Mi'kmaq food security, ceremony, and identity. The area is an active site of Mi'kmaw presence and practice.

Mi'kmaw placenames that have survived the influence of European settlement demonstrate that the Mi'kmaq held significant understanding of the local landscape and resources. Within a 20 km radius of the PDA, Mi'kmaw placenames are known for at least 24 landmarks, and these names include descriptions of the landscape, reference specific human experience on the land, and indicate local species and resources. There is no recorded Mi'kmaw placename for Eigg Mountain; however, this is not a reflection of a lack of Mi'kmaw use of the area (Boreas, 2025).

Historically, Mi'kmaw encampments were established along the shores of Merigomish Harbour, and one settlement was recorded to the east of the AOD near Antigonish in the mid 17th century. Through hardships and suffering endured by the Mi'kmaw as European settlers arrived on the land, the Mi'kmaw community at Merigomish Harbour persisted. Eventually, this land was granted to Pictou Landing First Nation as reserve land in 1865. Merigomish Harbour, part of the Pictou Landing First Nation, is the closest Mi'kmaw community, approximately 24 km west of the AOD. Paqtnkek First Nation is the second closest community, approximately 27 km east.

Culturally significant Mi'kmaq resources at Eigg Mountain include features of the landscape, as well as species of wildlife and plants (CMM, 2025). For example, landscape features significant to Mi'kmaq communities in the LAA include water-centred indicators (e.g., springs, seepages, eel/trout/salmon habitats, beaver complexes); travel/harvest corridors for large mammals and culturally important species; and plant gathering areas in wetland margins and interior mixed woods (CMM, 2025).

14.3 Effects Assessment

14.3.1 Potential Effects and Mitigation

Changes were implemented for the Project to minimize potential direct and indirect impacts on heritage and cultural resources, where reasonable, while meeting engineering and design constraints.

Direct and indirect effects of the Project on heritage and cultural resources could occur through several interconnected pathways. During construction of the Project, blasting and/or excavation will occur in some locations of the AOD, including excavation in some areas where drainage infrastructure will be installed to prevent flooding and ground subsidence. Fill will also be used in the AOD for developing access roads and turbine pads. These activities could damage artifacts unseen at the surface or underground in the AOD or could damage or obscure culturally significant Mi'kmaq resources. Restoration of the AOD during decommissioning of the Project could also damage and/or move artifacts not previously disturbed. Similarly, heritage features, such as historical foundations, may be discovered in the AOD and Indigenous cultural resources could be disturbed. As indicated in Table 14.1, Project activities can affect heritage and cultural resources. These potential effects consider the detailed design of the Project, but not the mitigations outlined herein.

Table 14.1 Potential Environmental Effects of the Project on Heritage and Cultural Resources

Project Activity	Potential Environmental Effects
	Effects on Archaeological, Heritage, and Cultural Resources
Construction	
Site Preparation	X
Access Roads Construction and Modifications	X
Material and Equipment Delivery and Storage	-
Infrastructure Installation	X
Restoration of Temporary Areas	X
Testing and Commissioning	-
Operation and Maintenance	
Turbine Operation and Maintenance	-
Road Maintenance	X
Power Line and Substation Maintenance	-
Vegetation Management	X
Safety and Security	-
Decommissioning	
Removal of Infrastructure and Site Restoration	X

X = Potential Interaction
- = No Interaction

Specific Project activities could adversely affect buried artifacts and archaeological or heritage features (including historical foundations and/or infrastructure) in the AOD:

- Site preparation involving earthworks could cause exposure of, or damage to, buried artifacts and heritage features.
- Site preparation activities, such as clearing and grubbing, can cause damage to surficial, unnoticed, artifacts and features.
- Construction and upgrades of access roads will introduce new material that could further cover or compact buried artifacts and heritage features.
- Site drainage and erosion during operation and maintenance can result in exposure or damage to artifacts and features that were undisturbed during construction activities.
- Site restoration activities involving earthworks could cause exposure of, or damage to, buried artifacts and heritage features.

Of the 11 high potential areas that overlap with the PDA, through Project layout refinement, three high potential areas were determined to overlap with access roads in the AOD. Late-stage engineering design will aim to avoid these remaining three areas, but if these three areas (or parts thereof) cannot be avoided during Project construction, a subsurface assessment to identify potential archaeological resources or features will be completed prior to construction activities at these locations. Additional field reconnaissance will be carried out for the transmission line AOD, after the route is finalized.

Specific mitigation measures will be developed based on the findings of the shovel testing program where it occurs. These measures will be included in the Project-specific EPP as well as in a Contingency Plan for response and communications should there be a suspected archaeological or heritage artifact or featured discovered during the Project life cycle.

Archaeological and heritage sites fall under the jurisdiction of the *Special Places Protection Act*, administered by NSCCTH and the Nova Scotia Museum. A Contingency Plan for discovery will be established prior to construction activities. The plan will contain elements of the province's Generic EPP for the Construction of 100 series highways (Nova Scotia Department of Transportation and Public Works, 2007) for archaeological discovery response.

- A chain of communications will be established for reporting a discovery that includes the environmental monitor, the Proponent, the Project Archaeologist, and NSCCTH.
- Should a potential archaeological or heritage resource be encountered during construction, all work will be halted immediately.
- Construction crews will flag off the area of concern, prevent public entry, and not attempt to move or remove any artifacts unless the integrity of those artifacts is threatened.
- The Project Archaeologist will conduct an initial investigation and, if necessary, report the findings to the relevant authorities. The Project Archaeologist will, at a minimum, contact the Curator of Archaeology, Nova Scotia Museum, and the Coordinator of Special Places at NSCCTH.
- Work activities at that location will not recommence until approval is given by NSCCTH.

- Should human remains be encountered, work shall immediately stop, and the RCMP will be notified. If the resources are suspected to be of Mi'kmaq origin, KMK will also be contacted.

The results of the MEKS by CMM impart that Indigenous cultural resources in the area can be maintained by preserving intact areas, prioritizing erosion and sedimentation areas near built infrastructure for restoration, improving watercourse flow and fish passage where feasible, and monitoring hydrology, sediments, and species over time. The MEKS also emphasized the importance of preserving connectivity between upland and coastal areas, a relationship that has long been significant to Mi'kmaq communities (CMM, 2025). Effects on Indigenous cultural heritage, as reported by CMM through the MEKS, could include sedimentation and erosion in watercourses, a reduction in watercourse flow and fish passage, and obstruction to habitat connectivity between the upland areas of Eigg Mountain to the coast. Many of these effects have previously been discussed previous chapters pertaining to the biological environment, including the Aquatic Environment (Chapter 9), Flora (Chapter 10), Wetlands (Chapter 11), and Terrestrial Wildlife (Chapter 12) chapters. Mitigations have also been considered as part of these chapters.

14.3.2 Residual Effects

14.3.2.1 Archaeological and Heritage Resources

The ARIA was based on background research and modelling to identify high potential areas for archaeological and heritage resources. There are risks, however, to encountering buried heritage features in low potential areas as well. The geographical extent of adverse effects will be isolated to the AOD.

The majority of the proposed AOD avoids the HPAs identified in the PDA. However, three HPAs may not be avoided; if they cannot be avoided completely, further shovel testing at these three locations will be conducted prior to the start of construction.

After incorporating the results of the ARIA shovel testing, and application of mitigation measures, the magnitude of effects on archaeological and heritage resources will be minor. This residual effect will be immediate, but possibly irreversible. The potential for a significant effect on archaeological and heritage resources and knowledge can be mitigated through field investigations and development of a Discovery Plan for reporting revealed artifacts and features.

14.3.2.2 Indigenous Cultural Resources

Based on the findings of the MEKS report, the implementation of recommended mitigation measures, such as maintaining landscape integrity, restoring areas affected by erosion and sedimentation, and persevering ecological connections, will help minimize adverse effects on Indigenous cultural resources. With these measures in place, the residual effects of the Project on the ability of the Mi'kmaq of Nova Scotia to continue traditional use of the PDA are expected to be minor, localized to the AOD, and reversible. Ongoing monitoring of hydrology, sediments, and species will further support the early identification and management of any unforeseen impacts. The final determination of significance will be informed by the review of the MEKS by KMK and NSCCTH, and additional mitigations will be implemented if required to ensure that residual effects remain not significant.

14.4 Monitoring

Consultation with NSCCTH will determine whether there are high potential areas that warrant archaeological monitoring during construction activities. NSECC will be provided with the acceptance letter from NSCCTH prior to completion of any disturbance in newly proposed areas. Should KMK have any monitoring method recommendations, these will be implemented to ensure the ongoing ability of the Mi'kmaq to access and practice traditional activities in the LAA.

15 Consideration of Cumulative Effects

15.1 Overview

Cumulative environmental effects refer to the combined impact of multiple stressors on the environment over time. Rather than considering individual impacts in isolation, cumulative effects assessments look at the overall consequences of multiple overlapping human activities or undertakings on VECs.

The cumulative effects assessment identifies existing, planned, and reasonably foreseeable projects and activities for which environmental effects could overlap in time and space with those of the proposed Project. Where such overlap is recognized, the potential for cumulative effects and requirements for additional mitigation measures are discussed.

Cumulative effects assessment for this EA focuses on residual effects of Project activities that may interact with the residual effects of other projects and activities, including those that have shaped the existing environment of the LAA and RAA. While the existing environment for each VEC may itself be a result of cumulative effects that have occurred through historical activities, potential additive or synergistic effects of residual Project-related effects are considered.

Other wind projects have already been constructed or are in stages of development in Antigonish county. There are registered projects listed for EA under federal and provincial jurisdictions in the area. Residual effects of natural resource harvesting and other land use activities are evident in the RAA.

15.1.1 Regulatory Context

Assessment of the potential for cumulative environmental effects considers relevant provincial and federal legislation and guidelines:

- Nova Scotia *Environment Act*
- Nova Scotia EA Regulations
- A Proponent's Guide to Environmental Assessment (NSECC, 2025)

- Policy Framework for Assessing Cumulative Effects under the *Impact Assessment Act* (IAAC, 2023)

15.1.2 Boundaries

As outlined in Chapter 4 (Assessment Methods and Initial Screening), an RAA boundary has been established for VECs where potential effects of this Project may interact with those of other activities, resulting in cumulative effects. The boundaries of the RAAs are illustrated in Figure 15.1, Appendix A. While some residual effects have been identified, most are expected to be contained in the respective VEC's LAA and considered to be short-term with low significance. The following RAAs have been defined:

- Atmospheric Environment – 5 km from PDA
    - Air Quality - Nova Scotia's northern air zone assessed in the AQMS by ECCC
    - Ambient Light – 5 km
    - Acoustic Environment - 2 km from PDA
- Flora – Contiguous natural habitat areas
- Wetlands – 1 km surrounding AOD
- Terrestrial Wildlife – Concentration area occupied by the Pictou/Antigonish/ Guysborough Mainland Moose subgroup
- Bats – 5 km
- Birds – 5 km
- Population and Economy – Antigonish County
- Land Use and Value, Visual Landscape, and Recreation and Tourism – 5 km
- Electricity and Other Utilities – Antigonish County
- Transportation – Antigonish County
- Indigenous Cultural Resources – Mi'kma'ki district Epekwitk aq Piktuk

15.1.3 Assessment Methodology

The assessment of potential cumulative environmental effects generally follows the approach outlined in the *Policy Framework for Assessing Cumulative Effects under the Impact Assessment Act*, in the Practitioner's Guide to the *Impact Assessment Act* (Impact Assessment Agency of Canada (IAAC), 2023).

The cumulative effects assessment approach is similar to and builds upon the methods implemented in this EA to identify and evaluate the Project-specific environmental effects presented in Chapter 4 (Assessment Methods and Initial Screening).

The scope of the cumulative environmental effects assessment is based on the following:

- Identification of residual environmental effects of the Project that may occur even after implementation of avoidance and mitigation measures. It is the residual environmental effects of the Project that have potential to interact with effects of other projects or activities and result in a cumulative environmental effect.

- Identification of VECs that will be carried through the cumulative environmental effects assessment (i.e., those VECs that are likely to have residual environmental effects).
- Defining the spatial and temporal boundaries within which cumulative effects could potentially occur. Boundaries are primarily based on ecosystem-centred spatial and temporal boundaries; where such boundaries are unclear or do not exist, activity-centred or administrative and technical boundaries are applied.
- Identification of other projects and activities that are considered in the cumulative environmental effects assessment. Past and existing projects and/or activities are identified based on evidence available from reliable resources, such as government databases or published reports. Future projects and activities are identified if they are registered or recently approved under the NSECC EA registry, identified in a publicly available development plan, or officially announced by a proponent.

Analysis of potential cumulative environmental effects follows a similar pathway of effects assessment that was used to evaluate the Project-specific environmental effects. Several resources were consulted to identify other activities and upcoming projects in the region whose environmental effects may interact with those of the Project:

- NSECC Environmental Assessment Project Data Viewer Gallery (NSECC, 2026)
- Canadian Impact Assessment Registry (IAAC, 2026)
- Public and Indigenous engagements
- Onsite field studies

The following definitions are used to describe the Project contribution to cumulative effects (Table 15-1).

- **Low**: The Project is expected to contribute minimal change to cumulative effects when considered alongside the combined effects of other existing projects, undertakings, and activities in the RAA.
- **Moderate**: The Project is expected to contribute noticeable change to cumulative effects when considered alongside the combined effects of other existing projects, undertakings, and activities in the RAA, but does not compromise overall system(s) integrity.
- **High**: The Project is expected to contribute change to cumulative effects that significantly degrades overall system function and/or sustainability when considered alongside the combined effects of other existing projects, undertakings, and activities in the RAA.

The following definitions were used when describing the degree of cumulative effects of all projects, undertakings, and activities.

- **Low**: Cumulative effects from projects, undertakings, and activities in the RAA on the VEC are limited in extent and intensity, reflecting relatively low overall disturbance. The VEC remains largely intact and functional in the RAA.
- **Moderate**: Cumulative effects from projects, undertakings, and activities in the RAA on the VEC are evident and measurable. While the VEC remains functional in the RAA, localized or partial reductions in condition are apparent.

- **High**: Cumulative effects from projects, undertakings, and activities in the RAA on the VEC are widespread and pronounced. The VEC is already near or past acceptable thresholds, such that further decline will threaten long-term viability or sustainability of the VEC.

15.2 Other Projects and Activities

15.2.1 Wind Projects

There are several other wind power projects that have been developed in the area or are planned on being developed. These developments in Antigonish and Pictou Counties are illustrated in Figure 15.2, Appendix A:

- Maryvale Wind Project, Antigonish County, four turbines
- Glen Dhu Wind Power Project, Antigonish & Pictou Counties, 27 turbines
- Fairmont Wind Project, Antigonish County, two turbines
- Auld's Landing Wind Farm, Pictou County, two turbines
- Pictou Landing, Pictou County, one turbine
- Weaver's Mountain Wind Energy Project, Antigonish & Pictou Counties, 16 turbines
- Sugar Maple Wind Energy Project, Antigonish County, 16 turbines
- Yellow Birch Wind Energy Project, Antigonish & Pictou Counties, 22 turbines

The Sugar Maple and Yellow Birch Wind Energy Projects are projects in the Antigonish and Pictou Counties that have been selected as part of the Province's Green Choice Program. As such, it is expected that these two projects will be constructed during or within several years of the Project construction. Weaver's Mountain Wind Energy Project has its EA approval and it is expected that the construction phase will overlap that of this Project (Strum, 2023). The operation of these wind power project swill overlap temporally.

The three closest wind power projects to the Project are Maryvale, Glen Dhu, and Fairmont Wind Farm. The distance from the closest turbine in the PDA to the nearest turbine located at Maryvale, positioned northeast of the Project site, is approximately 2.7 km. The distance from the closest turbine in the PDA and the nearest turbine at Glen Dhu (original site), situated to the west of the Project, is an approximate 1.9 km. The distance from the closest turbine in the PDA and the nearest turbine at Fairmont, situated to the east of the Project, is approximately 8 km.

In neighbouring counties, other wind farms have also received approval under provincial EA legislation or have already been constructed:

- Goose Harbour Lake Wind Farm Project, Guysborough County
- Setapuktuk Wind Project, Guysborough County
- Mulgrave Community Wind Power Project, Guysborough County
- McLellan's Brook Wind Energy Project, Pictou County
- Limerock Wind Project, Pictou County

15.2.2 Past and Existing Land Use and Activities

Past and existing land use and activities are described in Chapter 13: Socio-economic Environment. The following sub-sections provide a brief synopsis of those that could result in cumulative environmental effects in combination with residual environmental effects of the Project.

15.2.2.1 Natural Resources Industry

As summarized in Chapter 13 (Socio-Economic Environment, Section 13.2.2), historical and current forest harvesting and mining activities occur in the Project RAA. These activities have led to forest loss and fragmentation. As observed through the Global Forest Watch tree cover loss tool (Global Forest Watch, 2026), a substantial amount of forest has been harvested in the Project RAA. Forestry operations have influenced the present condition of the RAA, distinguished by predominantly fragmented forests, harvested zones, and forestry roads that create edge environments. Figure 15.3 (Appendix A) illustrates the area of forest loss that has occurred between 2001 and 2025 in the area, as documented through field observations, satellite imagery, and the Global Forest Watch's Tree Cover Loss data (Global Forest Watch, 2026).

The Project RAA lies within areas that have undergone mineral exploration over the years, resulting in a myriad of abandoned mine openings and active quarries (Figure 15.2, Appendix A) There are several quarry expansion projects that have required environmental assessments in the RAA. The three of these closest to the AOD include the Northumberland Rock Quarry Extension Project, Brierly Brook Quarry Expansion Project, and the James River Quarry Expansion Project.

Combined, these natural resource extraction activities have resulted in a highly visible cumulative effect of land disturbance (Figure 15.3, Figure 15.2, Appendix A) over the past two decades. These industries will persist and potentially increase during the lifetime of the Project.

15.2.2.2 Transportation

The Project RAA contains multiple existing public roads that access the nearby Town of Antigonish, dwellings that use existing roads that form portions of the PDA, Route 245, the Trans-Canada highway to the south (Highway 104), and Trunk 4 to the north (Figure 13.1, Appendix A). Highway 104 serves as a major transportation corridor between Nova Scotia and New Brunswick and has undergone an extension of highway twinning over the past six years. In 2019, the twinning of Highway 104 between Sutherlands River and the Town of Antigonish received EA approval and subsequent construction began in 2020. Highway 104 frequently accommodates large volumes of traffic and is well-suited for the regular movement of heavy equipment and oversized loads. Highway 104 will serve as the primary transportation route to access the respective collector roads for the projects in the RAA planned or under development (Figure 15.1, Appendix A).

15.2.2.3 Recreation and Tourism

An extensive network of all-season trails used for hiking, ATVs, and snowmobiles has been established in the RAA and will continue to be used during the lifespan of the Project (Figure 13.1, Appendix A). These trails facilitate access to the RAA for hunting, fishing, and other recreational activities, and there is heavy ATV and snowmobile presence in the RAA (see Chapter 15: Socio-Economic Environment). Other wind energy projects across the RAA, including Maryvale and Glen Dhu, indicate that recreation, human presence, and fragmentation from trails are similar in those project areas (Maryvale Wind Energy LP, 2009; Shear Wind Inc., 2008).

15.3 Cumulative Effects Assessment

15.3.1 Potential Cumulative Effects and Mitigation

Table 15.1 presents the expected interactions that may lead to cumulative effects of the Project in combination with other projects and activities that are described in Section 15.2. The Project contribution to cumulative effects describes the individual contribution of the Project to cumulative effects in the RAA. The degree of cumulative effects of all projects and activities characterizes the combined effects of undertakings, projects, and activities across the RAA.

Table 15.1 Screening of Potential Cumulative Environmental Effects

VEC	Dominant Cumulative Effects Drivers	Dominant Spatial and Temporal Nature	Potential Cumulative Effects	Potential Interaction with Other Projects and Activities	Project Contribution to Cumulative Effects	Degree of Cumulative Effects of all Projects, Undertakings, and Activities	Mitigation
Acoustic Environment	Proximity of projects	2 km, long-term	Construction and turbine noise	Neighbouring wind facilities, recreational activities, natural resource harvesting, traffic	Low	Low, no threshold exceedances	Conventional project-specific
Ambient Light	Proximity of projects	5 km, long-term for turbine lights	Lighting from turbines	Neighbouring wind facilities	Low	Low, no threshold exceedances	Conventional project-specific
Flora	Connecting habitat	Contiguous natural habitat	Loss of habitat and introduction of invasive species	Forestry, recreational activities, Highway 104 twinning, neighbouring wind facilities	Low	Low	Conventional project-specific
Wetlands	Connecting hydrology	1 km	Loss of wetland habitat	Forestry, recreational activities, Highway 104 twinning.	Low	Low, wetland alteration permitting and restoration will be completed	Conventional project-specific
Terrestrial Wildlife	Connecting habitat	Pictou/Antigonish/Guysborough Mainland Moose subgroup concentration area, long-term	Behavioural disturbance and habitat loss	Forestry, recreational activities, off-highway vehicles (e.g., snowmobiles, all-terrain vehicles), Highway 104	Low	High, Mainland Moose are endangered in Nova Scotia, and the loss of one or more breeding individuals is significant on the	Mitigation and monitoring across all wind projects in RAA

VEC	Dominant Cumulative Effects Drivers	Dominant Spatial and Temporal Nature	Potential Cumulative Effects	Potential Interaction with Other Projects and Activities	Project Contribution to Cumulative Effects	Degree of Cumulative Effects of all Projects, Undertakings, and Activities	Mitigation
				twinning, neighbouring wind facilities		declining population.	
Bats	Mobile ecology	5 km	Collision and habitat loss	Forestry, neighbouring wind projects	Low	Low	Mitigation and monitoring across all wind projects in RAA
Birds	Mobile ecology	5 km	Collision and habitat loss	Forestry, recreational activities, neighbouring wind projects	Moderate	Low	Mitigation and monitoring across all wind projects in RAA
Population and Economy	Multiple contributors	Antigonish County	Monetary benefits to residents and municipality	Multiple wind projects and natural resources industry	Moderate	Low	Positive effect; no mitigation required
Visual Landscape	Multiple receptors	5 km	Change in vista	Multiple wind projects and natural resources industry	Low	Moderate	Conventional project-specific
Electricity and Other Utilities	Multiple users	Antigonish County	Strengthened grid resource and protection	Proponent agreements with NSPI.	Low	Low	Positive effect; no mitigation required
Transportation	Multiple users	Antigonish County	Traffic disruption	Forestry, Highway 104 twinning, neighbouring wind facilities	Low	Low	Conventional project-specific

VEC	Dominant Cumulative Effects Drivers	Dominant Spatial and Temporal Nature	Potential Cumulative Effects	Potential Interaction with Other Projects and Activities	Project Contribution to Cumulative Effects	Degree of Cumulative Effects of all Projects, Undertakings, and Activities	Mitigation
Recreation and Tourism	Multiple users	5 km	Disruption and possible trail detours	Forestry, Highway 104 twinning, neighbouring wind facilities	Low	Low	Conventional project-specific
Indigenous Cultural Resources	Combined areal span	Mi'kma'ki district Epekwitk aq Piktuk	Facilitated access to hunting/ fishing areas	Forestry, neighbouring wind facilities	Low	Low	Review of MEKS by NSCCTH and KMKNO will determine if mitigation measures are required

15.3.1.1 Atmospheric Environment

The RAA for air quality comprises an extent of 5 km around the PDA; for others, the extent of Nova Scotia's northern air zone, which includes neighbouring wind projects.

Project construction will partially coincide with other wind facilities in Antigonish and Pictou counties. Individual Project effects for non-GHG emissions of noise, light, and dust are not expected to be significant. Noise modelling (see Chapter 5 Atmospheric Environment) included turbines from other wind developments, namely Maryvale and Glen Dhu, within 3 km of proposed Project turbine locations. Noise modelling among the Project and these two additional wind developments determined that noise will not exceed provincial guidelines at Project receptors (Appendix E). As such, the potential for cumulative effects on the acoustic environment from the Project with neighbouring wind power projects is negligible.

The Project will contribute to a reduction in GHG emissions for the province, supporting Nova Scotia's climate action targets. By supplying renewable energy through the Green Choice Program (Government of Nova Scotia, 2025), the Project enables large-scale electricity customers to purchase up to 100% of their electricity from locally generated renewable sources. This initiative provides a direct pathway for organizations to decarbonize their operations and demonstrate environmental leadership, while also encouraging further investment in clean energy infrastructure across Nova Scotia. The Green Choice Program supports Nova Scotia's 2030 Clean Power Plan, which sets a goal for the province to generate 80% of its electricity from renewable sources by 2030. By integrating the Project output into the provincial grid, Nova Scotia can reduce its reliance on fossil fuels, thereby lowering overall GHG emissions and contributing to improved air quality and public health. Additionally, the program is designed to enhance grid resilience, providing reliable access to clean power for participating customers. The cumulative effect of these renewable energy projects, including the Project, positions Nova Scotia as a leader in Canada's transition to a sustainable energy future, supporting both provincial and national climate commitments.

The net effects of the renewable energy projects in Antigonish County and surrounding areas will result in a positive cumulative effect to the atmospheric environment that needs no mitigation beyond that already outlined in Chapter 5: Atmospheric Environment.

15.3.1.2 Flora

The RAA for flora is the contiguous habitat where fragmentation could result in loss of rare species and flora habitat as well as facilitate the introduction and spread of invasive species. With careful detailed design and micrositing of Project infrastructure to avoid sensitive habitats and active habitat enhancement efforts, effects on terrestrial flora are expected to be not significant. Vegetation around the turbine base and road edges will naturally regenerate, which will offset the long-term loss of vegetation following construction.

15.3.1.3 Wetlands

The Project is located in an active forest management area. Current and historic use of the 1 km RAA for forestry and recreational offroad vehicle use has visibly altered wetland habitat. Forestry activities have resulted in a loss of wetland habitat or altered wetland function through vegetation clearing and compaction by machinery. Several wetlands in the LAA that may be impacted by the Project have been harvested in other areas. For example, during the field wetland assessment of WL06 (see Chapter 9), active forestry operations were observed in the northern portion of the wetland. Project-related loss of wetland habitat and function will be offset through wetland compensation. The residual impacts of the Project on wetland habitat will be confined to the AOD. Hydrology will be maintained, thereby minimizing the potential for long-term effects on wetland function or the contribution of the Project to cumulative impacts in the RAA.

15.3.1.4 Terrestrial Wildlife (Mainland Moose)

Concerns from members of the public have largely focused on Mainland Moose. The Project RAA for terrestrial wildlife incorporates area occupied by the Pictou/Antigonish/Guysborough subgroup of Mainland Moose that is identified as Core Habitat in the Mainland Moose Recovery Plan (NSDNR, 2021). Forestry, ongoing natural resource extraction, renewable energy projects, electrical infrastructure development, road building, and recreational activities like ATV and snowmobile use have all contributed to fragmentation and habitat loss of Mainland Moose Core Habitat. These activities contribute to fragmentation and habitat loss through forest clearing and road building that affect wildlife movement, while also increasing wildlife mortality and injury (from collisions), and creating sensory disturbances from an increase in light and noise. Forest clearing reduces cover habitat for thermoregulation and shelter; however, it can encourage foraging habitat through natural regeneration. Forest clearing and road construction can allow a larger number of White-tailed Deer to access moose habitat, which heightens the risk of disease transmission. Increased accessibility to the forested areas of the RAA could also make illegal moose poaching more prevalent.

The Provincial Recovery Plan for Mainland Moose states that the loss of any breeding individuals from a depressed population is significant (NSDNR, 2021). Therefore, cumulative effects across the area encompassing the Pictou/Antigonish/Guysborough subgroup of Mainland Moose that result in the loss of at least one breeding individual should be deemed as a high effect, before implementation of mitigation strategies.

It is not expected that the Project alone will result in the loss of an individual(s), particularly after planned mitigation strategies, as discussed in Chapter 10 (Terrestrial Wildlife). These mitigations include utilizing mainly existing roads/trails and lower quality moose habitat, where possible. Areas of particularly high-quality habitat for moose were avoided wherever possible, such as avoiding mature forest and wetlands. Two proposed turbine locations with observed moose activity and likely in a Moose travel corridor as indicated through survey efforts and engagement with members of the public, A3 and A24 (Figure 1.1,

Appendix A), are considered alternative turbine locations as a contingency measure, in case one of the intended turbine locations is deemed to be unsuitable for environmental or structural reasons.

Vegetated buffers around wetlands and watercourses will be maintained to support habitat connectivity, and cleared areas will be progressively replanted to mitigate the Project impact on habitat fragmentation. Other wind developments in the area have also committed to similar mitigation strategies.

Although individually, the Project and other wind development projects in the RAA may not pose a significant threat to Mainland Moose, the cumulative effects from these projects in addition to existing and historic forestry operations, mineral resource extraction activities, road and trail construction, and recreational activities is expected to be high. These projects, undertakings, and activities have resulted in noticeable changes in Mainland Moose habitat across the RAA. Additionally, although there is little recent evidence available to support this, with the known risks to Mainland Moose resulting from these projects, undertakings, and activities, it is likely that cumulative effects have resulted in the loss of individual(s). Based on available information, and discussions with local community members, cumulative effects on Mainland Moose from projects, undertakings, and activities in the RAA exceed acceptable ecological and social limits. Reversibility of these cumulative effects is likely limited, and would require a substantial amount of management, time, and resources. The loss of Mainland Moose has been experienced on a regional scale, in the Pictou/Antigonish/Guysborough subgroup, and beyond, on a provincial scale.

To recover Mainland Moose across the RAA, significant effort and resources are needed. Post-construction monitoring efforts in the Project PDA and surrounding area, in addition to post-construction monitoring for other wind development projects can provide the province with data on moose activity and presence, which NSDNR could use for provincial population monitoring and recovery efforts.

RES is open to engaging with other wind development proponents in the RAA to potentially share data and to foster collaborative approaches for monitoring Mainland Moose and adaptive management. By exchanging information, proponents can collectively support a broader understanding, helping to inform adaptive management and future planning. This cooperative approach can facilitate a more comprehensive understanding of cumulative effects across the region.

Per EA Approval conditions, monitoring at wind farms in the RAA will be conducted for a minimum of two years once their respective turbines become operational and the monitoring approach must be approved by NSDNR and ECCC-CWS. Monitoring efforts conducted for the Project and other wind projects in the RAA will provide a broader picture of residual effects on Mainland Moose for the regulatory agencies than that of a Project-specific program. Cumulative effects may also be detected through analysis of data collected through these monitoring programs.

15.3.1.5 Bats

The RAA for bats is an extent of 5 km around the PDA, which contains portions of the Maryvale and Glen Dhu wind projects. Low levels of bat activity were detected in the LAA during baseline monitoring—the majority of which were identified as *Myotis* species. Provincial and federal recovery strategies recognize anthropogenic disruptions as being additive effects to the challenges of WNS. Ongoing natural resource industry and the development of renewable energy projects and electrical infrastructure in the region could increase the risks of collisions with turbines and power lines as well as habitat loss and fragmentation. The proximity of known hibernacula in the region indicates the presence of migration pathways that could traverse this and other local wind farms.

After implementation of mitigation measures in the LAA during Project activities, effects are expected to be minor. Cumulative effects on bat populations of the RAA will be detected by monitoring plans to be approved by ECCC-CWS and NSDNR for the Project. It is assumed that post-monitoring surveys have already been conducted at Glen Dhu and Maryvale, the two other wind developments in the RAA. Results of the post-construction monitoring program will be submitted to the appropriate regulatory agencies as required.

Additional surveys or mitigation measures may be identified in consultation with regulators following review of the results. Should post-construction monitoring indicate that further mitigation is needed, an Adaptive Management Plan will be prepared in consultation with NSDNR and ECCC-CWS.

15.3.1.6 Birds

The RAA for birds is an extent of 5 km around the PDA, which contains portions of the Maryvale and Glen Dhu wind developments. Similar to the effects on other wildlife, clearing vegetation leads to a loss of habitat for some birds while simultaneously providing habitat for species favouring edge or open environments. While ongoing natural resource industry and the development of renewable energy projects and electrical infrastructure in the area will continue to change habitat and potentially alter avian behaviour, fragmentation is already evident, and the existing environment is a result of historic disturbance in the RAA.

A recent report states that that wind power projects have a relatively small impact on bird populations compared to those of other human-related hazards and the use of fossil fuel sources (Murphy and Anderson, 2019). The Project layout is carefully planned to avoid sensitive areas, make use of existing access roads, and place turbines mainly in habitats that are already disturbed whenever possible.

Through implementation of mitigation measures during Project activities, expected effects are expected to be minor to moderate. Cumulative effects on bird populations of the RAA will be detected by monitoring plans to be approved by NSDNR and ECCC-CWS for the Project and other nearby wind projects. Data sharing between the Proponent and other wind developers in the RAA, detailed above in 15.3.1.4 can help inform and plan post-construction monitoring programs. Should post-construction monitoring indicate that further mitigation is needed, an Adaptive Management Plan will be prepared in consultation with NSDNR and ECCC-CWS. Monitoring efforts across nearby wind development projects will provide a broader picture of effects on birds for regulators than that of a Project-specific program.

15.3.1.7 Socio-economic Environment

For some socio-economic components, the RAA spans 5 km around the PDA; for others, cumulative effects may occur at the county or provincial level. The construction and implementation of the Sugar Maple, Yellow Birch, and Weaver's Mountain projects within a similar time frame, and within approximately 38 km of one another could create competition for equipment, labour, and material resources for construction and Project components. Traffic interruptions resulting from the transportation of turbine components could be cumulative if construction at other sites coincides with that of this Project, particularly on Highway 104 which will serve as the major transportation route for the turbines from the Strait of Canso Superport in Mulgrave, NS. However, these potential effects, if they occur, will be isolated to the short-term construction phase.

The Project has been selected as part of the Green Choice Program and will contribute to greening the provincial grid by providing clean energy to Nova Scotia ratepayers. As described in Chapter 1, the Green Choice Program will allow 11 of the largest energy consumers in the province to procure up to 100% of their energy from renewable sources. This initiative will help to reach the province's green energy targets and reduction of GHG emissions (Government of Nova Scotia, 2025). These goals include generating 80 percent of the provincial grid by renewables by 2030 and eventually leading into a net-zero emissions future by 2050 (NSDNR, 2023). On a local scale, the Project will also support the Municipality of the County of Antigonish in achieving its goal for a 35 percent reduction in GHG emissions by buildings in the county by 2031 and their goal in supporting local renewable sources of energy (Efficiency Nova Scotia, 2021).

In addition to green energy benefits and contribution to the provincial energy and emissions targets, the economic contributions to the Municipality of the County of Antigonish from the Project will include the following (as outlined in 15.3.1.1):

- $1.3 million in municipal taxes annually
- Annual landowner royalties
- A Community Benefits Fund
- $10,000 annually to fund programs and/or projects at the H.M MacDonald School in Maryvale
- Five $5000 bursaries to fund scholarships for residents of the County of Antigonish to enter training or education programs related to construction or operation of a wind energy facility

- Employment of approximately 200-250 workers during the construction phase and a staff of 12-20 (including part-time and full-time employees).

The net effects of these and other renewable energy projects in Antigonish County and the surrounding counties will result in a positive cumulative effect to the socio-economic environment of the province that needs no mitigation beyond that already outlined for the VEC's LAA.

15.3.2 Significance

The Project will result in some residual environmental effects similar those of other historic and/or current activities already evident in the area. Cumulative effects for this Project are not expected to be significant after proper planning and mitigation measures are established for this and other projects under development in the RAA. Monitoring programs described for biological VECs such as moose, birds, and bats will facilitate early detection of adverse effects and inform further mitigation, should it be necessary.

16 Effects of the Environment on the Project

Natural hazards are defined herein as the effects of the environment on the Project and can arise from natural phenomena such as extreme weather events or natural disasters. These have the potential to affect the Project components, schedule, and/or costs. The Project has been designed to best resource and withstand the existing environment and effects of the changing climate. All phases of the Project, however, are subject to effects such as delays in construction and decommissioning as well as changes in power generation and requirements for infrastructure repairs during operation and maintenance.

The following sections outline natural hazards that could impact project infrastructure.

16.1 Hurricanes, Tropical Storms, Extreme Winds, and Nor-easters

Nova Scotia is in the path of storms that move up the Atlantic coast. Within the monitored historical period (1981 to 2024) available from the National Oceanic and Atmospheric Administration, the area within a radius of 60 nautical miles of Halifax has been impacted by tropical storms and hurricanes in the past, for example, Hurricane Earl in 2010 (making land fall as a Category 1) and Hurricane Juan in 2003 (making land fall as a Category 2, with record-breaking wind gust speed of 143 kilometres per hour (km/h)).

On September 24, 2022, Hurricane Fiona significantly impacted southeastern Nova Scotia. Fiona was the deepest cyclone on record to make landfall in Canada with maximum winds near 157 km/h (Pasch et al., 2023). The storm resulted in thousands of downed trees and power lines across Atlantic Canada. Most recently, Hurricane Lee made landfall in southwestern Nova Scotia on September 16, 2023, as a tropical storm, with gusts of 117 km/h recorded at the Halifax Stanfield International Airport (Bauman, 2023).

Rising sea surface temperature could result in increases in intensity of hurricanes and warm water could also enhance their ability to hold moisture, leading to heavier rainfall during the events (Knutson et al., 2020).

Hurricanes and tropical storms that bring high winds and torrential rains are expected to increase in intensity with climate change. There is a projected increase in the frequency of Category 4 and 5 hurricanes in the Atlantic, and the latitude of maximum intensity may move northward (Knutson et al., 2020; ClimateData.ca, 2024a) (see Figure 16.1 for projections from Knutson). However, confidence level varies among researchers and uncertainty level is high in climate model projections.

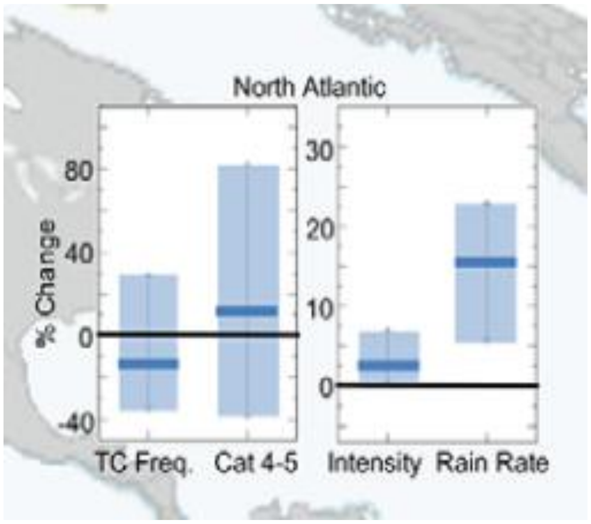

Figure 16.1: Tropical Cyclone Projections at 2C Global Warming (Knutson et al., 2020).

Extra-tropical cyclones, in certain cases referred to as nor'easters, are most intense in Atlantic Canada between November and March (Plante et al. 2014). Historically, Nova Scotia has experienced high year to year variability in the frequency and intensity of winter storms. White Juan, an intense blizzard that occurred in 2004, is notable as one of the most severe winter storms in recent history. Historical trends show overall decreases in days with heavy snowfall and highest 1-day snowfall in the region (Vincent et al., 2018). In addition, studies found the strongest nor'easters have become stronger, with both the maximum wind speeds and hourly precipitation rates increasing since the 1940s (Chen et al., 2025).

An upwards shift of average temperature and a resulting shift in winter precipitation from snow to rain may lead to less snowfall. However, extreme winter storms are still expected to occur in the Atlantic Canada, owing to the potential northern shifting of storm tracks. Projections depict that intense high-impact snowfall events can be expected to continue to occur with warming surface temperatures; however, there is high uncertainty due to high year-to-year variability (McCray et al., 2023).

There is very high uncertainty in historical and projected trends of wind extremes in North America. Projections for extreme design wind pressures (1 in 50 year) in North America are up to approximately 20 percent, with the largest increase experienced by the 2080s. An increase of approximately 10 percent is projected by the 2050s (Cannon et al., 2020).

Although turbines are built to withstand high winds, operations are typically paused at maximum wind speeds in the range of approximately 22 to 30 m/s (depending on the turbine model), which can be experienced during large storm events and ETC; this may negatively affect energy production and revenue. Rapid changes to wind direction caused by storm events could cause potential yaw system stress, stress to blades due to changes in loading, and structural stress due to dynamic loading (Kapoor et al., 2020).

High wind loads can present stress to other project infrastructure such as the operation and maintenance building and overhead power lines. Pressures from high wind loads on main structural systems and secondary components of building (e.g., envelope) and exterior equipment (e.g., poles, lighting) can result in damages and potential impacts to operations such as loss of primary power. The most frequent weather-related power outages in Nova Scotia are caused by downed trees and branches resulting from high winds and contacting power lines (NSPI, 2024). Typically, building infrastructure is designed to withstand extreme design wind pressures (1 in 50 year) (Cannon et al., 2020). However, more frequent and intense storm events resulting in extreme high winds may result in an increased risk to infrastructure.

Despite the PDA's relatively high elevation, extreme precipitation could cause localized flooding, leading to washout or scour of materials around equipment pads and access roads. This may result in damage to roads, degradation of pad stability, and ponding around the operation and maintenance building, potentially causing access restrictions and operational disruptions. Flooding is covered in more detail in Section 16.2.

16.2 Flooding

16.2.1 Pluvial and Fluvial Flooding

Extreme precipitation can cause fluvial flooding (i.e., within and surrounding watercourses) and pluvial flooding (i.e., surface flooding caused by intense rainfall).

There are several identified watercourses and wetlands, and one lake, that intersect the PDA (refer to Section 7.2.1 Hydrology/ Watersheds).

Significant runoff resulting from extreme rainfall events can lead to pluvial flooding and cause erosion of access roads, ditches, and increase scour around culverts and equipment pads. Flooding at the Project site can also affect operation and maintenance through impacts to site and infrastructure access, and damages to the operation and maintenance building or other site infrastructure that require repairs. The intensity and frequent of rainfall events are projected to increase over time; therefore, risks associated with site flooding and runoff are expected to increase over time.

Increasing temperatures resulting from climate change, cause an acceleration of the water cycle, which results in an increase in the frequency of precipitation events. Furthermore, a warmer atmosphere can hold more moisture; therefore, precipitation events are projected to be more intense (greater amount of precipitation falling over a shorter period). Precipitation intensity is projected to scale at a rate of approximately 7 percent with each degree of warming for temperatures below 12°C and 14 percent for temperatures above 12°C (Westra, et al., 2014).

In previous studies conducted by CBCL across the province, typical ranges for projected percentage increase in precipitation using the Clausius-Clapeyron method (Westra, et al., 2014) were found to range from 10 to 15 percent from 2021 to 2050, from 20 to 30 percent for 2041 to 2070, and from 40 to 60 percent for 2071 to 2100. These values are meant as general guidance only and can vary depending on the climate-change scenario, the percentile of the model ensemble, and the geographic context. Since the stormwater drainage will be designed and modelled using hydrologic and hydraulic modeling as part of the adaptation measures (Section 16.11), updated climate-change projections can be obtained at that time.

Snowmelt, driven by temperature fluctuations or rain-on-snow events, can introduce water into substations or around collector lines, potentially causing localized damage such as short-circuiting or corrosion on exposed components. Underground electrical equipment is typically designed to be waterproof under normal conditions; however, prolonged or excessive surface water accumulation near access points, vaults, or joints could lead to water ingress and localized equipment risk.

16.2.2 Coastal Flooding

Coastal flooding was considered for the PDA; however, due to the high elevation of the PDA (>250m above mean sea level (CGVD2013) at nearest point 8 km from coast), the site is not vulnerable to coastal flooding.

16.3 Extreme Temperatures

Historical extreme temperatures are discussed in Chapter 5 (Atmospheric Environment).

Climate change is expected to have the following effects on extreme temperatures in Atlantic Canada (Cohen et al., 2019):

- Extreme high temperatures will increase
- Heatwaves will become more frequent, longer and more intense
- Extreme low temperatures will become less severe

According to ClimateData.ca (2025), the climatological average minimum temperature (coldest temperature of the 24-hour day) at Eigg Mountain is projected to increase in the range of 2°C to 6°C by the year 2050, and increase by the range of 3°C to 10°C by the year 2100, depending on the choice of emissions scenario under the Coupled Model Intercomparison Project Phase 6 (CMIP6) global climate models (GCMs), which were used in the latest Intergovernmental Panel on Climate Change (IPCC) Assessment Report (AR6).

Extreme temperatures can affect the operation of wind turbines when conditions exceed operational design ranges of approximately -30°C to +40°C (Nordex, 2025). As discussed in Chapter 5 (Atmospheric Environment), heat extremes did not reach 40°C during the 1991 to 2020 climate normals period at the Collegeville station. According to this data, extreme low temperatures have exceeded -30°C, but only for approximately 8 hours during the 30-year period.

According to ClimateData.ca (2025), there are zero days projected to be below -30°C from years 2020 to 2080s. The PDA was found to experience approximately 86 days above 20°C from 1991 to 2020, and is projected to have 104 days above 20°C in the 2030s, 117 days in the 2050s, and 141 days in the 2080s. Zero days over 40°C or 50°C are projected to occur over any of these time periods (ClimateData.ca, 2025). Therefore, low temperatures are not expected to be an increasing risk to turbine operation; however, high temperatures could become an increasing risk.

Extreme temperatures can create operation and maintenance hazards for personnel, increasing the risk of heat-related illnesses (e.g., heat stroke) or cold-related conditions (e.g., hypothermia). These conditions can also lead to higher operation and maintenance costs due to increased energy use for cooling buildings, with costs expected to rise as climate extremes intensify. The Project operation and maintenance is not adversely affected by drought or growth seasons for agriculture and forestry.

16.4 Average Wind

While storm-related winds are expected to increase in strength and frequency, there has been evidence for decreasing mean wind speeds in North America (–0.084 m/s per decade) during the period of 1979 to 2018 (Intergovernmental Panel on Climate Change (IPCC), 2021) as a result of climate change. This ‘stilling’ tendency has possibly been reversing after 2010 and the global mean surface winds strengthened, although the robustness of this reversal is unclear given the short period of study and interannual variability (IPCC, 2021).

Historically, average surface wind speeds exhibit both decreasing and increasing trends depending on regions or seasons in Canada (Cannon et al., 2020). There is very high uncertainty in historical and projected trends wind extremes in North America. While uncertainties remain, current climate projections do not identify declining local wind resources as a likely factor affecting energy production over the approximate 35-year lifespan of the Project.

16.5 Snowfall and Snow Cover

Warming temperatures are expected to result in an overall decrease in snowfall, more precipitation falling as rain instead of snow, changes in snow density (i.e., wetter snow), and a shortening snow season caused by late snowfall and early snowmelt. Abnormal years with high snow fall and snow cover are still expected to occur.

Historically, the area of the site experienced increasing maximum snow water equivalent (SWEmax) but decreasing snow cover fraction (Mudryk et al., 2018). Based on these factors, both SWEmax and snow cover fractions are projected to decrease, leading to smaller snow loads compared to the baseline. The 1-in-50-year snow load, used to design infrastructure such as roofs to withstand snow loads, is expected to decrease by approximately 40 percent in the mid-term and 65 percent in the long-term (see Figure 16.2).

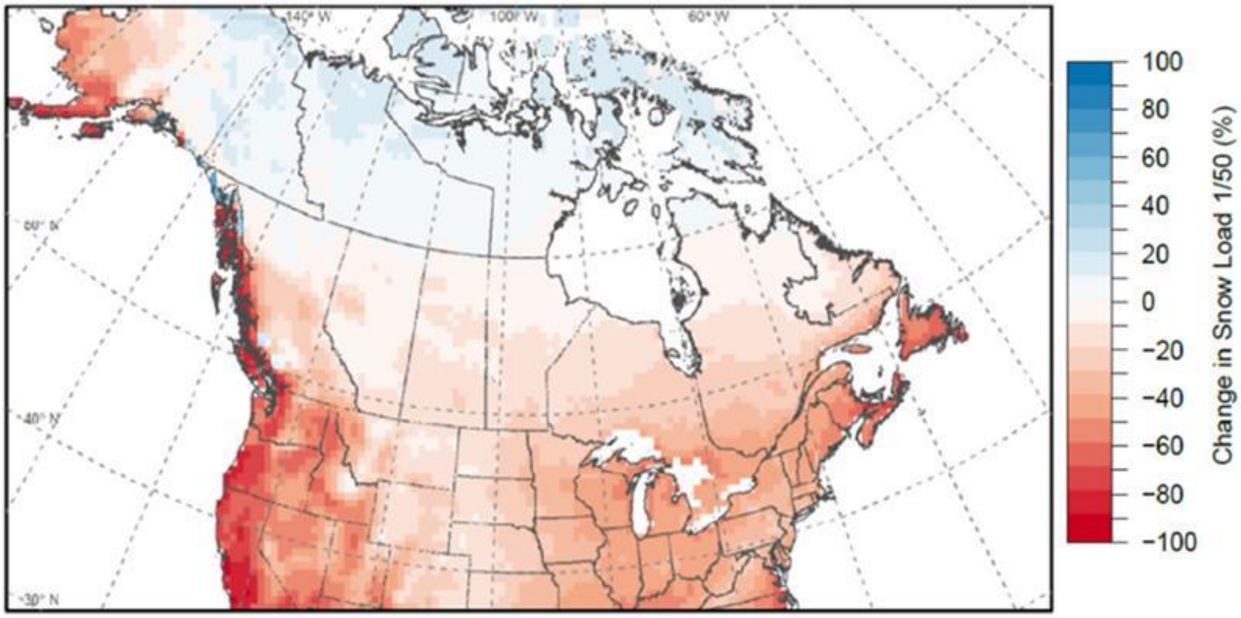

Figure 16.2: Projected changes (in %) for snow load for +3°C global warming (Cannon et al., 2020).

Changes in snow cover have already been experienced such as an annual decreasing trend in snow cover extent across Canada from 1972 to 2021 and a decrease in snow cover duration of approximately 10 to 20 percent from 1999 to 2018 in the Project region (ECCC a., 2022; ECCC b., 2022). Furthermore, climate change will continue to impact the formation, duration, depth, and quality of snowpacks over time. Impacts to snowpack conditions may lead to an increased frequency of inactive trails, temporary closures, and maintenance.

As climate change progresses, average and minimum winter temperatures as well as winter precipitation are projected to increase over time. The warming climate will negatively impact snow cover duration, with more frequent seasonal snow melt events, later timing of onset of snow cover in fall/winter and earlier spring melt. Potential impacts to snowpack conditions due to warming temperatures include the following:

- Increased pooling of water on trails and access roads
- Slushy or icy conditions on trails and access roads
- Thinner snowpacks
- More frequent melting episodes
- Decreased snowpack accumulation and retention
- Increased snowpack density

An increase in winter rainfall events, including rain-on-snow events, and decrease in snowfall events is expected in the Project region over time (NSECC, 2022). Winter rain events can impact snowpack, melt conditions, and runoff regimes, which in turn can impact the condition of access roads and trails. Potential impacts to snowpack conditions due to increased winter rainfall include the following:

- Increased flood conditions and pooling of water on trails
- Increased melting, thinner snowpack, and decreased snow retention
- Increased frequency of wet, slushy, or icy conditions

Winter recreation sports such as snowmobiling rely on good snowpack conditions for operation. Several climate indices derived from temperature, precipitation, and snow depth may be used as key operating indicators as they relate to the formation, duration, depth, and quality of snowpacks. It is noted that local ground cover conditions are influenced by factors such as tree cover, drainage, wind exposure, and altitude and may significantly spatially vary from collected meteorological station data. Snow mobiles and ATVs regularly travel though the lands in and adjacent to the PDA and the Eigg Mountain-James River Wilderness Area. Changing snowpack conditions could impact access for these vehicles, resulting changes to trail distribution and access road crossings in the PDA.

A heavy snowfall event can reduce access to the site and result in high snow loads on the operation and maintenance building causing structural loading and falling snow and ice. Snow can present risks to the turbine and substation and collector line operation when it leads to ice accretion (See Section 16.6). Snow loads, however, are projected to decrease over time due to climate change, resulting in a reduction of snow load risks.

16.6 Icing

Atmospheric icing refers to any type of accumulation of ice or snow on a surface during a meteorological event. This type of icing is mainly caused by precipitation, such as freezing rain and wet snow, or passing clouds and fog. Ice formation on wind turbine blades is dependent upon air temperature, wind speed, surface shape, and liquid water content of the air (Canadian Renewable Energy Association (CanREA), 2020). Icing is most likely to occur between temperatures of -4°C and 2°C.

Atmospheric icing on structures, including wind turbines, generally occurs under two conditions: in-cloud icing (rime or glaze) and precipitation icing (freezing rain or wet snow). The following describes ice build-up on wind turbines.

- Rime ice is in-cloud icing where water droplets form a rime on the blades (See Extreme Temperatures 17.3 for temperature projections with climate change).
- Glaze ice is caused by freezing rain or wet in-cloud icing and forms a smooth layer of ice that is strongly adhered to the blades at temperatures between 0 and -6°C.
- Wet snow is partly melted snow crystals with high liquid water content that become sticky and are able to adhere to the surface of the turbine blade and occurs when the air temperature is between 0 and 3°C.

According to the Canadian Highway Bridge Design Code, the area of the site is in a heavy to extreme ice zone, with an average nominal ice thickness of 31 to 45 mm (Figure 16.3). A decreasing trend in the frequency of freezing rain was found in the past decade compared to earlier times in the Atlantic provinces (Groisman et al., 2016). Projections depict decreases in the 1 in 20-year ice accretion thickness by approximately 25 percent in the mid-term and 50 percent in the long-term (Cannon et al., 2020) (Figure 16.4).

According to the International Energy Agency's (IEA's) five icing classes, where Class 1 has the lowest risk and Class 5 the highest, the Project is located in a Class 2 area, meaning meteorological icing is expected only about 0.5 to 3 percent of the year (approximately 2 to 10 days), based on the VTT Wind Power Icing Atlas (2024).

Note: *The nominal ice thickness and corresponding range (mm) is indicated for each zone*

Figure 16.3: **Ice Zone (CSA CHBDC, 2019).**

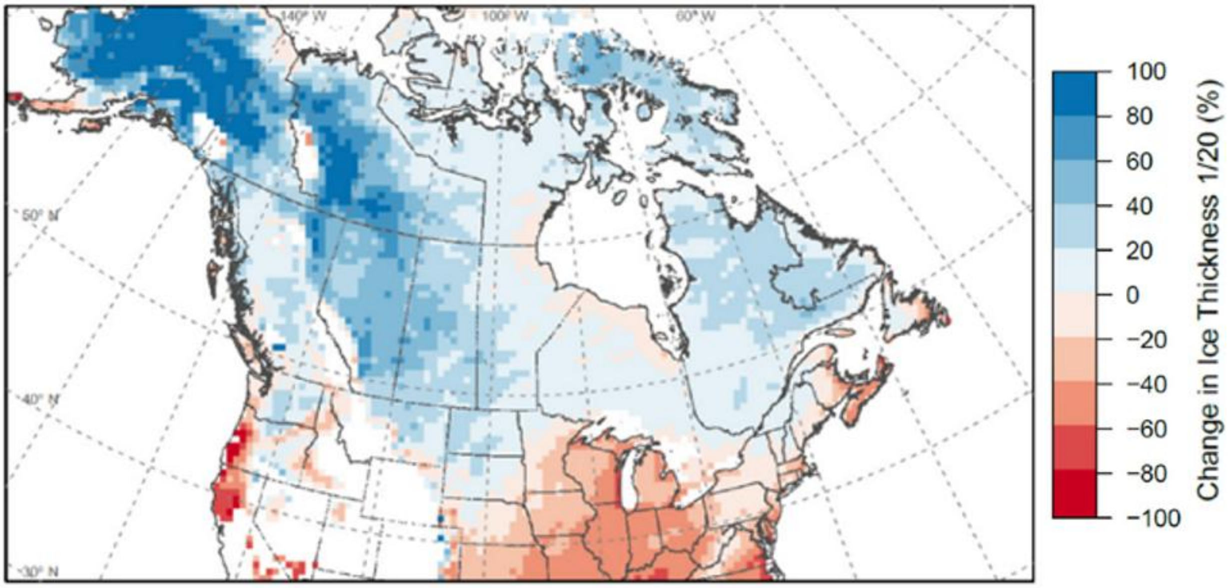

Figure 16.4: **Projected change in 1 in 20-year ice accretion thickness for +3°C global warming (2080s).**

The duration of rotor icing strongly differs for a wind turbine blade at standstill compared to that of a rotating turbine whose flow velocity and vibration reduces ice incubation time (IEA Wind, 2017). Therefore, ice is more likely to form on other Project infrastructure such as above-ground power lines, roads, towers, nacelles, hubs and the MET tower.

Ice accretion on rotor blades reduces the aerodynamic performance of the turbine, which can result in production losses. Blade icing also increases vibrations and fatigue loads that can reduce turbine lifespan, leading to measurement and control errors that cause mechanical and/or electrical failures. Structural damage as a result of icing and other environmental conditions is discussed in Section 17.5 Structural Damage. Ice accretion in the study area is expected to decrease over time due to climate change, leading to a corresponding reduction of associated in risks to project components, although ice accretion events are still projected to occur over the Project life.

Heavy or prolonged precipitation during extreme events can cause ice to accumulate on access roads, creating hazardous conditions. Using salt to melt ice may create pooled saltwater, which can infiltrate underground electrical infrastructure and potentially cause short circuits in components such as insulators (NSPI, 2024). Although underground equipment is generally sealed and rated to withstand moisture and short-duration flooding, prolonged exposure or high-salinity water can still compromise these systems. Salted roads can also cause arcing when wind-driven salt is blown onto overhead wires, although this scenario is considered unlikely. Both situations have the potential to result in power outages and disruptions to operation and maintenance.

Ice shedding is most likely to occur when there is ice accumulation on the blades that becomes subject to milder temperatures (usually at and above 0°C) that prompt melting (CanREA, 2020). The risks of ice throw to human health and safety may lead to temporary shutdowns of individual turbines. Ice throw and ice shed hazards are considered accidental events described in more detail in Chapter 18 (Accidents and Malfunctions).

16.7 Wildfires

Historically, the Maritime Provinces have generally experienced low wildfire occurrences, particularly compared to other parts of Canada (e.g., western regions). Fire season is described by the NS *Forests Act* as the period of greatest fire risk, listed as March 15 to October 15 inclusive for Antigonish County (NSDNR, 2021). Uncontrolled wildfires can be caused by natural occurrences such as lightning strikes, human negligence or by accident, and sparks from equipment including ATVs and chainsaws. Fire origins are most associated with populated areas. Only 3 percent of fires in the province are started by lightning; 97 percent are started by human activity, much of which is arson (NSDNR, 2021). While uncontrolled fires usually begin in residential areas, most land damaged by wildfire is Crown land.

As the climate changes, warmer temperatures, coupling with changes in precipitation patterns, enhance potential evapotranspiration and drier climate, which would lead to greater fuel availability, lengthened fire season, longer spread days, therefore, more extensive and frequent fires (Flannigan et al., 2013; Wang et al., 2015; Wotton et al., 2017). Overall, it is projected that the number and extent of wildfires may increase, and the proportion of days in fire season with the potential for unmanaged fires will increase.

Inherently, wildfires pose significant risks to human health and safety, can cause extreme damages and loss of project infrastructure, destruction or blockage of access roads and transportation. These risks are projected to increase over time as climate change drives higher wildfire frequency, greater fire intensity, and more severe burn conditions in the region, thereby elevating the overall likelihood and consequences of wildfire-related impacts. Refer to Section 17.6 for more information on Fires.

16.8 Lightning

Lightning has been known to strike turbines, causing fires and structural damage. Due to their height, fire suppression from ground crews is often ineffective for turbine fires and therefore fire can result in complete loss of the structure (New Brunswick Department of Energy, 2008).

The frequency and intensity of lightning and thunderstorms are affected by climate change in terms of increases in convective available potential energy (CAPE) due to warming. A warmer troposphere and higher sea surface temperature will result in increased heat and moisture fluxes, causing high instability in air mass and, therefore, increased CAPE. As a result, more energy is available to drive severe weather, including thunderstorms and lightning (Climatedata.ca, 2024b). Lepore et al. (2021) found that with each degree Celsius increase in global temperature, the frequency of environments favourable for severe weather could rise by 5 percent to 20 percent. This increase is more pronounced in the Northern Hemisphere's higher latitudes, where it is primarily driven by a substantial rise in CAPE (Figure 16.5).

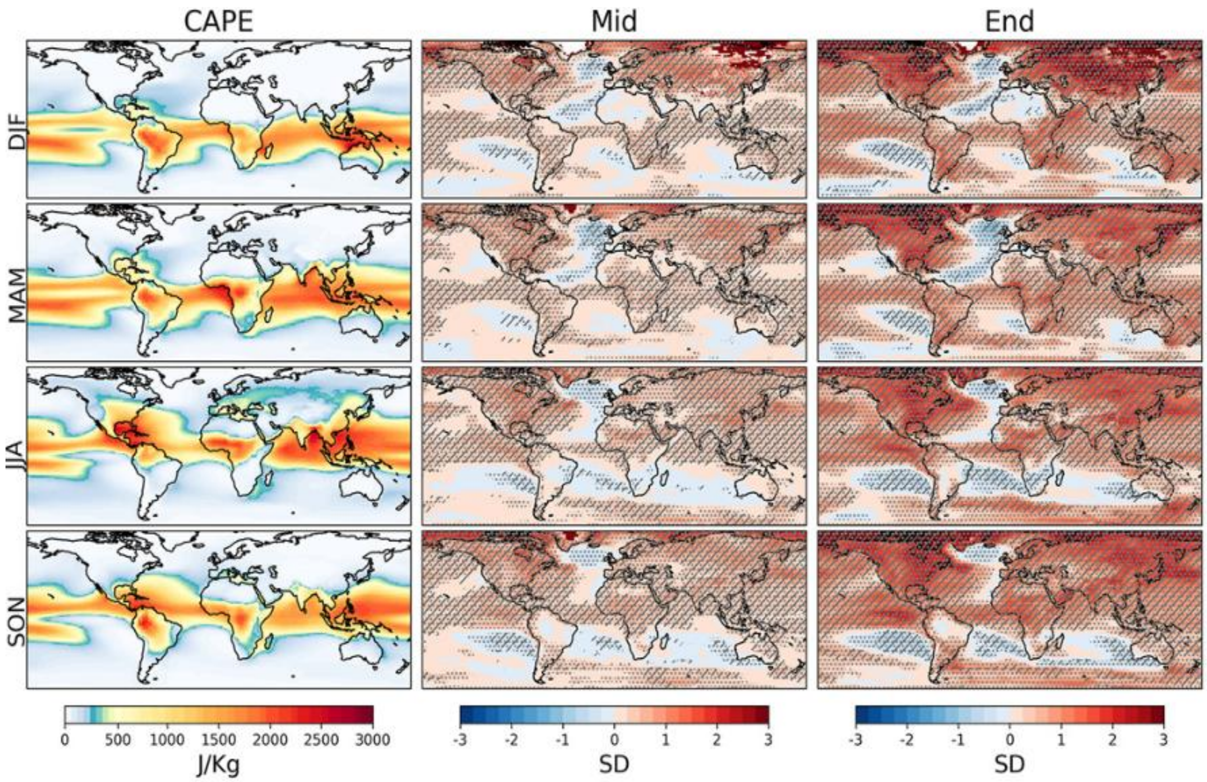

Figure 16.5: **Projected change in CAPE. Stippling indicates significance at the 0.05 level, hatching 100 % sign agreement in the response across all models (Lepore et al., 2021).**

Lightning strikes pose a significant risk to project infrastructure due to the high elevation and exposed nature of wind turbines. Direct strikes can cause blade damage, degrade or destroy Project electrical components such as converters, transformers, substations, and cables, and increase the likelihood of equipment failure, unplanned downtime, higher operation and maintenance costs, and fire risk. While grounding systems and surge protection substantially reduce these risks, even properly protected equipment can experience damage from high-energy strikes. Climate change is projected to increase the frequency and intensity of thunderstorms and associated lightning strike potential, which in turn increases lightning-related risks to the Project over time. Refer to Section 17.6 for more information on Fires.

16.9 Seismic Activity

As outlined in Section 6.2.1 (Topography and Seismicity), the Hollow Fault and Browns Mountain Fault extend in a northeast–southwest direction across the Ecodistrict, overlapping the PDA, with several smaller faults extending perpendicular to both. The fault series is not, however, located near the edges of tectonic plates.

Nova Scotia is considered to have a relatively low risk for earthquakes that have the strength of magnitude (MN) 5 or more that is associated with causing damages to infrastructure (NRCan, 2021). There has not been an earthquake of 5 MN or more centred in Nova Scotia since 1855. There have, however, been reports of events felt in the region, such as the 2.6 MN event felt in Dartmouth in March 2020, a 3.0 MN near Yarmouth in 2016, and a 3.6 MN near Digby in 2015 (CBC News, 2020).

Climate change was not considered to have an impact on seismic activity, and it is not expected that seismic activity will impact the Project.

16.10 Sinkholes and Subsidence

Sinkholes can cause extensive damage to buildings, roads, and other infrastructure—the primary hazard being collapse of cavities in the bedrock created by the dissolution of soluble evaporite or carbonate rocks in karst topography. As discussed in Section 6.2.3, there is one sinkhole in particular that is mapped less than 100 m east of the PDA along the railroad that runs south of Brierly Brook Road. All the turbine pads are set on areas of low-risk karst. Project operation and maintenance does not depend on the availability of natural resources such as groundwater or surface water.

The province's high-risk areas account for 96 percent of the sinkholes in the Nova Scotia Sinkhole Database (Drage and McKinnon, 2019). Some high-risk karst areas intersect Highway 104, which could cause interruptions to transportation to and from the site. Should subsidence or sinkholes damage the highways used to access the PDA during any phase of the Project, there could be delays for deliveries and staff commutes during road repairs. It is possible that, should sinkholes cause major traffic detours, transportation via alternate collector roads may be considered.

Human activities that result in water table decline (such as groundwater pumping) and changes to surficial water drainage patterns are the two main causes of subsidence. High rates of groundwater pumping and well development near high-risk karst area to the south of the site could potentially speed up the dissolution of the bedrock local to the cone of drawdown of the well, which could lead to sinkholes.

16.11 Management and Adaptation

The following section outlines management and adaptation strategies included in the Project to mitigate risks of the natural hazards outlined in Section 16.1 to 16.10. Project components and design have considered the existing environment and the need to adapt to climate change.

The following natural hazards, as outlined in Sections 16.1 through 16.10 may pose a risk to the Project infrastructure and operations:

- Hurricanes, tropical storms, nor-easters and high winds
- Pluvial and fluvial flooding
- Extreme temperatures
- Average wind
- Snowfall and snow cover
- Icing
- Wildfires
- Lightning
- Seismic activity
- Sinkholes and subsidence

Extreme weather events such as hurricanes, tropical storms and nor-easters could bring extreme winds and precipitation to the site. Such weather events are expected to intensify in future years due to climate change, therefore, associated risks to project components are expected to increase. Extreme temperatures, ice accretion, and snow load could also impact project components. Climate change is expected to affect extreme temperatures in future years by increasing both extreme high and extreme low temperatures. Ice accretion and snow accumulation are expected to reduce with climate change. Therefore, project risks associated with extreme high temperatures are expected to increase in future years due to climate change, however, risks associated with low temperature, ice accretion and snow load are expected to reduce. To mitigate risks arising from these events the following have been considered in the design or will be undertaken during operation and maintenance.

- The modern turbine model selected for this Project has been manufactured to withstand extreme weather conditions (i.e., extreme winds and ice accretion) to prevent structural damage. Vibration sensors in the turbine detect conditions that can lead to damage of rotating blades, such as ice accumulation or high winds, and trigger auto-shutdown of the turbine.
- The selected turbines can withstand temperatures of -30°C to +40°C without damage (Nordex, 2025). Even with increasing extreme temperatures over time, according to projections, 40°C is not expected to occur at the site over the life of the Project.
- The Advanced Anti-Icing System (AAIS) will be installed on all turbines and will operate when temperatures are in the range of -20°C to +3°C, which uses meteorological ice sensors, power deviation warnings, and weather forecasts to heat blades prior to potential icing, thus mitigating the risk of imbalance, vibration, and structural stress caused by icing (Nordex, 2022).

- To prevent damage to overhead power lines and power interruptions during extreme weather, the power corridor RoW will be kept clear of trees.
- The overhead electrical systems and operation and maintenance building are designed to comply with relevant Standards (NBCC Section 4.1.6 and Section 4.1.7 for building snow and wind load design and CSA C22.3 for overhead systems for wind pressure).
- Snow clearing and de-icing will be completed as part of normal operation and maintenance procedures to reduce snow and ice related risks on access roads across the site.

Extreme precipitation can cause pluvial and/or fluvial flooding which could impact project components. Risks associated with flooding are expected to increase in future years due to climate change due to projected increases in precipitation. To mitigate risks arising from these events the following measures will be undertaken.

- Effective drainage infrastructure, such as culverts, will be installed during construction to prevent surface water pooling around foundations and access roads. A detailed hydrologic and hydraulic study with modelling will be completed to size culverts for the PDA to ensure effective surface water diversion. Standard extreme precipitation events will be modelled, which will incorporate climate projections into sizing.
- Surface water management measures may require upgrades and maintenance over time to accommodate increasingly severe precipitation events and will be considered during site restoration at the time of decommissioning.
- An ESC Plan (See Section 17.2) and a Surface Water Management Plan will be developed for the site.
- An EPP with erosion control measures will be developed prior to the beginning of construction activities.

Wildfires could also impact project components and are expected to cause increased risk to the Project over time due to climate change. More information on fires is found in Section 17.6 under Accidents and Malfunctions. To mitigate risks arising from these events the following measures will be undertaken.

- The provincial fire indices, which are updated twice daily online during fire season, will be monitored.
- Project activities will be restricted and/or suspended during any phase of the Project should NSDNR mandates require.
- To prevent spread of fire to Project components during operation and maintenance, areas around the structures will be kept clear of scrub, low brush, and long grass.
- Burning will be prohibited on site. Should a fire be observed by onsite staff, it will be reported immediately to the NSDNR hotline 1-800-565-2224 or 911 emergency services.
- Road improvements will facilitate ground access for emergency responders.

Seismicity and sinkholes and subsidence could also impact project components. To mitigate risks arising from these events the following measures have been or will be undertaken.

- A seismic survey has been completed and results provided in the draft geotechnical report indicate that the site is expected to be either Class A or Class B as defined in the

National Building Code of Canada (final report pending), and that either class is favourable for the development of this Project (Strum, 2023).

- Operation and maintenance staff will report signs of subsidence to the Proponent and be cognizant of activities that can lead to water accumulation.
- Earthworks during decommissioning will incorporate grading that will not contribute to risks of subsidence and sinkholes in the restored areas.

17 Accidents and Malfunctions

Accidental events and malfunctions are unplanned events with a low probability for occurrence. Although unlikely, an accidental event or malfunction can cause significant adverse environmental effects and have the potential to affect one or more of the VECs identified in Table 4.1 in Chapter 4 (Assessment Methods and Initial Screening). The following accidents and malfunctions were identified as having the potential to occur during construction, operation and maintenance, and/or decommissioning:

- Transportation-related accidents
- Erosion control malfunctions
- Hazardous materials spills
- Ice throw
- Structural damage
- Fires

RES has established a stringent Health, Safety, Quality, and Environment system that is integrated into every project and addresses spill and accident prevention, personal protective equipment (PPE), and emergency response. In 2025, RES became a leading member of the Global Wind Organisation (GWO), a non-profit industry association that develops international safety standards for the wind industry (GWO, 2025).

A Project-specific EPP will be developed prior to the commencement of Project activities; EPP components are outlined in Chapter 2 (Project Description). The EPP will include a Contingency Plan that will provide emergency response measures for accidental occurrences. NSECC has a generic guide for developing contingency plans (NSECC, 2021). Through the Project Contingency Plan, staff will be informed of the appropriate communication channels, including contact information that is readily accessible to field crews and site environmental monitors.

17.1 Transportation-related Accidents

Accidents and malfunctions of vehicles and heavy equipment have the potential to adversely affect the environment and pose human health and safety risks. Traffic accidents that result in vehicular damage can result in injuries and/or damages to infrastructure that force activity shutdowns and use provincial emergency response resources. A Traffic

Management Plan will be developed prior to the construction phase and posted on the Project website. Mitigation measures to prevent transportation-related accidents are to be considered for both public roads and onsite access roads.

- Special weather statements and warnings issued by ECCC will be considered before driving.
- Speed limits will be established and enforced on access roads.
- Speed limits will be adhered to on public roads.
- Cell phone use while driving will be prohibited.
- Should the site be snow-covered, site personnel are to drive only on known terrain.
- Appropriate training for onsite personnel will be provided that includes site safety protocols and emergency response procedures.

17.2 Erosion Control Malfunctions

Malfunctions of drainage infrastructure may occur during any phase of the Project, leading to runoff and discharge to nearby waterbodies. Overwhelmed drainage networks can be eroded and cause subsidence on the site. Runoff can produce elevated levels of total suspended solids that can adversely affect the aquatic environment, particularly fish and fish habitat.

ESC measures are particularly important to prepare for spring runoff and extreme or prolonged rainfall events. The Project will be designed and constructed to consider both typical and extreme weather functionality. An ESC Plan and a Surface Water Management Plan will be developed and implemented by the Proponent. As part of the EPP, a Contingency Plan will be included that addresses emergency response to malfunctions that can damage roads, cause pooling around foundations, and/or lead to drainage into waterbodies. The onsite environmental monitor will report damaged and/or poorly functioning drainage components to the Proponent as part of daily operation and maintenance. Proper sloping and drainage will also be considered during decommissioning.

The Contingency Plan will be implemented in the event of an erosion control malfunction. Contingency measures recommended by the NSDPW's Generic EPP for the Construction of 100 Series Highways (NSDPW, 2007) are applicable to this Project:

- Conduct staff training (e.g., tailgate safety and environmental meetings to inform staff of potential problems and hazards).
- Plan and practice storm alertness measures, outlining conditions for work stoppages, pre-storm staff meetings, inspections, and preventative maintenance of ESC measures such as covering highly erodible surfaces, emptying of settlement ponds, and proactive measures to ensure critical ESC measures near watercourses will withstand storm runoff, seasonal impacts, and wind.

- Confirm availability of equipment and operators that can be mobilized on short notice to install/repair berms, dams, diversion ditches, catchment ponds, and turbidity curtains.
- Stockpile ESC materials, including quantities and locations for strategic placements
  - ESC blankets/matting and staples (or tarps/plastic sheeting)
  - Sandbags, clear stone
  - Water pumps and hoses
  - Turbidity curtains
- Implement typical approaches for temporary control of water flow and erosion until new ESC measures can be implemented, such as excavation of cross ditches to divert runoff away from surface water bodies and into catchment ponds or vegetated areas; excavation of temporary water storage areas; berm construction; bank stabilization, and deployment of backup turbidity curtains. Approaches will vary depending on season, and the contractor will indicate approaches for summer (low flow periods), spring-fall (high flow periods), and frozen ground (high-flow periods).
- Develop standard protocols for notification of failures to the Proponent, NSDPW, and NSECC/DFO inspectors.
- Develop standard protocols for incident and near miss reporting to the Proponent and NSECC to provide documentation of the failure (a Near Miss Report details failures that did not result in the loss/release of sediment), the intention being to identify the cause and help prevent future occurrences.

17.3 Hazardous Materials Spills

A hazardous material spill has the potential to cause significant adverse environmental effects depending on the size and location of the spill. Accidental discharges of POL or other hazardous materials can contaminate the soil, leaching through the unsaturated zone to local groundwater flow systems, which could further spread the contamination plume in the groundwater LAA. Spills can also travel via runoff to surface waters or wetlands. Volatile compounds can vaporize into the surrounding air. Through pathways such as these, wildlife habitat can be adversely affected and there could be effects to human health.

Since POL on site will primarily be those associated with the operations of vehicles and heavy equipment, as well as the turbine nacelles, there is a low probability for occurrence of POL release and the magnitude will be limited to the volume of POL contained by the equipment. The Nordex platform chosen for the Project uses an electric motor drive for pitching the wind turbine blades, as opposed to a hydraulic ram pitch system. This engineering shift has eliminated the potential release of hydraulic fluid and provides a more environmentally friendly solution.

Standard operating procedures developed by RES for other renewable resource projects include protocols for spill response and the requirement of onsite spill kits.

Fuel and hazardous materials spill response will be included in a Contingency Plan to be developed as part of the Project-specific EPP. Spills will be reported immediately by onsite personnel to the NSECC using their 24-hour emergency response hotline: 1-800-565-1633.

As a reference, the NSDPW (2007) Generic EPP provides guidelines for waste management as well as the handling and storage of POL.

- Hazardous material containers will be properly labeled in compliance with the requirements of the Workplace Hazardous Materials Information System (WHMIS).
- Onsite personnel will have training in WHMIS, transportation of hazardous goods, spill response, and site-specific procedures.
- Safety Data Sheets (SDS) will be available for all hazardous materials in use or stored on site.
- The equipment used on site will be monitored to ensure that it is in good working condition.
- Hazardous materials will be handled only by site personnel who are trained and qualified in the handling of these materials, and only in accordance with manufacturer's instructions and government regulations.
- Waste hazardous materials will be separated, stored, transported, and handled in accordance with regulatory requirements and disposed of at an approved hazardous recycling or disposal facility.
- Equipment used will be mechanically sound with no oil or gas leaks. Equipment will be regularly checked for leaks and leaks will be repaired immediately.
- There will be no fuelling, storage, washing, or servicing of vehicles within 30 m of a watercourse, drainage ditch, areas with a high water table, or exposed and shallow bedrock.
- There will be designated refuelling and POL storage areas, each located a minimum of 30 m from any waterbody or environmentally sensitive feature. Storage and refuelling procedures must meet the Nova Scotia Petroleum Management Regulations under Sections 25 and 84 of the *Environment Act*.
- Fuel storage areas will be clearly marked and/or barricaded to prevent damage from vehicles.
- Spill clean-up materials shall be accessible and maintained in the designated areas of fuel and chemical storage as well as heavy equipment vehicles.

17.4 Ice Throw / Shed

Wind turbines operating during specific meteorological conditions can introduce the hazard of ice throw or ice shed (fall) in the surrounding area. The risk of an individual or vehicle being struck by ice is very low, but setback distances to non-participating property lines and roadways are key to minimize the potential for an incident. The potential risk to public safety is determined by the size of the ice fragments thrown, distance thrown, and probability that someone will be within the landing zone. The risk of wind turbine blade icing is discussed in Section 16.6 (Icing).

In recent years there have been several peer-reviewed papers where field studies of ice throw in the Nordic states have demonstrated that most ice pieces of the size that could cause serious injury or fatality are thrown within the tip height of the turbine (Lunden, 2017; Bredesen et al., 2017). In 2017, Swedish researchers published the findings of their IceThrower study (Lunden, 2017). This involved icing wind turbine blades in the field and then determining the area where ice was thrown surrounding the turbine. This study showed that 75 percent of the ice thrown was found within one rotor diameter distance from the turbine tower and only 1 percent of very small fragments were identified beyond 1.5 times the rotor diameter distance (which was the same as the total height of the turbine). This is the basis of the common setback of 1.1 times the total height of a turbine to roads and non-participating property lines. This distance has become an almost universal setback across North American jurisdictions to protect non-participating property owners and vehicles on roads.

The Nordex wind turbines proposed to be used at the Project have a rotor diameter of 163 m, hub height of 118 m and a total height of 199.5 m. Based on the IceThrower study this would predict that 99 percent of ice thrown from the Nordex turbines would be less than 200 m, or the tip height of the turbine. Only one percent of ice thrown would be beyond this distance and would be of a size that would likely not cause serious injury or death.

CanREA currently recommends a formula to predict maximum distance for ice throw (CanREA, 2020):

[$dt = 1.5 * (D + H)$], where:
dt = Maximum throwing distance (m)
D = Rotor diameter (m)
H = Hub height (m)

At maximum, the Project turbines will have a hub height of 118 m and a rotor diameter of 163 m. Using the CanREA (2020) formula, the maximum ice throw distance is expected to be 422 m. However, it should be noted that this formula does not include consideration of gravity, aerodynamic drag, turbine specifications, operational mode, and site topography (IEA, 2022). Should those factors be considered, it is predicted that actual ice throw distance would be within 219 m (1.1 x tip height).

The Project turbines, in accordance with the Minimum Planning Requirements Regulations, are set-back four times the total height of the turbine from dwellings: 798 m for the Project turbines. The Land Use By-Law of the Municipality (2024, amended 2025) requires a 60-m setback from maintained public roads; however, all Project turbines are not within 200 m from maintained public roads. This effectively means that ice throw will not reach dwellings or traffic on maintained public roads.

IEA recommends mitigation measures to reduce the risk of ice throw from wind turbines (IEA, 2018). The Proponent has committed to follow the IEA recommendations below, as well as other key safety measures.

- During detected meteorological conditions that would be conducive to icing, wind turbines may be temporarily shut down, and safety protocols will be implemented.
- Ice build-up on turbine blades during operation causes them to vibrate. This vibration triggers automatic imbalance sensors in the turbines and they are automatically shut down to avoid damage to the turbines and avoid throwing ice.
- Safety perimeters will be set up around turbines in the event of a detected rotor icing event
- Signage will be placed on trails near turbines
- The Project's turbines will be equipped with the AAIS, which will significantly reduce the potential for ice formation on the rotor blades.

With these measures in place, ice formation is reduced to a minimum and the possibility of ice throw or shedding is low. Further, given the low passage rates on the K-Class roads and recreational trails near the turbines, it is estimated that the likelihood of a safety incident with recreational users is negligible. It should be noted that the installed cumulative wind capacity at locations with icing conditions across Europe, North America and Asia was approximately 119 GW at the end of 2020 (IEA Wind TCP Technical Report, 2022), and there has not been one single reported injury or death to the public as a result of ice-shedding or ice-throw, from anywhere in the world (https://safetyon.com/work-programme/statistics).

The largest risk to onsite work crews is ice shed/fall of the ice from blades to the base of the tower. CanREA's (2020) *Best Practices for Wind Farm Icing and Cold Climate Health & Safety* recommends mitigation that applies to initial approaches by onsite maintenance personnel to investigate both ice throw and blade breakage that will protect occupational safety. In addition, the Project will develop a site-specific Health and Safety Plan and training to protect worker safety.

- Observe with binoculars whether the turbine is iced before entering the throw zone.
- Remotely turn the nacelle to face opposite side of the access door.
- If necessary, shut down the turbine and those near the route to your destination.
- Park vehicles outside throw zones.

The Project is not proposed to be gated; therefore, the public will be able to continue to use the area for recreational purposes. There will be signs posted at turbine access road entrances that warn during winter that icing conditions can occur and that individuals should remain away from the turbines. In addition, information sessions with the local snowmobile clubs and recreational users will be held to communicate the risks of approaching turbines during icing conditions. The likelihood of ice falling onto public roads is very low and given the low traffic density on the public roads in question, the likelihood of an incident occurring is extremely low. As such, the probability of an individual being struck by ice is extremely low given automatic shutdown of turbines during icing conditions and appropriate setback distances. The risk to individuals is estimated to be non-significant.

17.5 Structural Damage

Extreme weather, manufacturing faults, and turbine blade wear can lead to fatigue loads that can reduce turbine lifespan through various means, including blade damage and breakage. Extremely cold weather can induce additional blade fatigue, such as brittle material fracture and nonuniformities on the surfaces (Algolfat et al., 2023). Most accidents are caused by natural causes such as lightning and high winds, although some may be attributable to manufacturing defects, such as air bubbles (Bošnjaković et al., 2024). Effects of wind, lightning and icing, are discussed in Chapter 17 (Effects of the Environment on the Project).

Damage to wind turbine blades results in increased or irregular vibrations (Algolfat et al., 2023). Blade damage can cause the blades to break and their parts to fly off, posing danger to people, animals and other objects in the vicinity, including other Project infrastructure. Studies show that blade components are flung within 700 m from the base turbine structure at rotational speeds of 70 m/s (Bošnjaković et al., 2024). To maintain durability, sustainability, and public safety, the turbines chosen for this Project will be shut down at speeds exceeding 26 m/s.

The turbine selected for this Project contains vibration sensors that will detect these conditions and trigger auto-shutdown of the turbine. Poor management, monitoring, and maintenance can lead to severe structural damage that has been reported for some wind facilities. The Nordex N163/6.X turbines are equipped with certified safety systems that continuously monitor operational parameters and automatically stop the turbine and set it to a safe state when specified thresholds are exceeded (e.g., high wind conditions). The turbines are integrated into the Nordex OS™ SCADA EDGE platform, which supports remote monitoring and operational control of individual turbines and the overall wind farm by the operator.

Total turbine collapse or structure failure is also rare. If a turbine tower fails it falls within tip height of the turbine. Rogers and Costello (2022) modelled the probability of blade failure and impact on roads:

> *Results for these example turbines show that the typical setback of 1:1 x tip height is generally sufficient at reducing risk to extremely low levels (between 1 impact in 1 million years and 1 impact in 10 million years) for roads in rural areas which tend to be lightly traveled.*

Therefore, given the setback distances to roads and homes (minimum of 800 m), it is unlikely that structural failure of turbines or blades would significantly impact public health.

The Proponent recognizes that strict monitoring and regular structural inspection is necessary for wind production facilities and will promptly repair/replace damaged parts, and prevent operation of iced turbine rotors, for the sustainability of the Project. During operation and maintenance, the Proponent will implement the following measures:

- Ensure replacement parts share the same temperature rating as the original components.
- Use POL appropriately rated for the climate to avoid thickening in the generators, gearboxes, motors, gears, etc.
- Remove frost from high voltage circuits prior to energizing.
- Routinely perform system inspection and calibration procedures.
- Monitor ECCC weather forecasts for warnings and special weather statements.
- Be prepared to quickly employ remote shutdown of the system during high-risk conditions, such as extreme weather events, or when there are indications of equipment malfunction.
- Shut down individual turbines with worn or damaged equipment until replaced or repaired.
- Develop and implement a Contingency Plan.

Further, the Project was designed to locate turbines at a minimum setback of 798 m from civic addresses, per the provincial guidelines and the land-use bylaw, which mitigates risks to local infrastructure and public safety.

17.6 Fires

Project construction, operation and maintenance, and decommissioning activities that may accidentally cause a fire include the following:

- Sparking equipment or hot vehicular exhaust
- Refuelling
- Vehicle accidents
- Other human activities

Accidental fires may have serious adverse effects such as habitat loss, mortality to wildlife and vegetation, atmospheric emissions, and damage or loss of property. In addition, there is potential for fire suppressant chemical runoff during firefighting (NSDPW, 2007).

Flammable materials used in wind turbines such as fiberglass-reinforced polymers, foam insulation, wires, and the POL needed to lubricate mechanical components of the nacelle can fuel such fires.

The selected turbine model for this Project has lightning/surge protection that is based on the electromagnetic compatibility compliant lightning protection zone concept, which comprises the implementation of internal and external lightning/surge protection measures under consideration of the International Electrotechnical Commission standard

61400-24. The nacelle components are equipped with an automatic lubrication system that prevents friction in the rotors and cools the gearbox.

Guidance for mitigation measures and contingency plans for fire prevention is available in the NSDPW generic EPP (NSDPW, 2007) and will be specifically addressed in the Project EPP.

As outlined in Chapter 17 (Effects of the Environment on the Project), the Nova Scotia Fire Index is to be monitored during construction, operation and maintenance, and decommissioning activities. An area around each turbine base will be grubbed to act as a form of a fire break. Onsite personnel will have fast access to fire suppressant equipment and PPE. Flammable chemicals/POL will be stored at a designated fuelling and hazardous material storage site with secondary containment.

In the event of a fire, local and provincial emergency response services and procedures would be initiated, starting with a call to 911. Fires will also be reported immediately by the environmental monitor to the NSDNR using their 24-hour emergency response hotline: 1-800-565-2224. Onsite staff would be advised to remove obstacles on access roads, such as vehicles that could impede emergency response crews. Local fire departments will not be asked to fight a turbine fire, rather to set a permitter around the base of the turbine to ensure that fire from the turbine will burn itself out and not catch adjacent vegetation. The Proponent will provide local fire departments information about points of access, as well as education on the Project and a site tour.

Mitigation measures recommended by the Canadian Electricity Association (2020) will be implemented to prevent and control fires near electrical infrastructure applicable to this Project.

- Staff will be trained on how to use extinguishers safely and effectively.
- Onsite personnel will be trained on procedures for extinguishing small nacelle fires.
- The Proponent will replace wood components (e.g., power poles) that have deteriorated due to wear and/or pose a risk as an ignition source if they are subject to weather conditions that exceed their operating design standards.
- Power lines will be regularly inspected to identify lines that require rebuilds. Old lines will be replaced as needed to preserve safety and meet new operating standards and fire mitigation standards.
- RoWs will be regularly maintained through vegetation management to prevent vegetation or other material coming in contact with transmission and distribution lines, reducing ignition risk.
- Fuel hazards (e.g., tree trimmings, slash) will be removed from RoWs.
- RoWs and other open spaces will be gravel, mineral soil, frequently mowed grass, or maintained vegetation (e.g., ground-cover, shrubs) to act as firebreaks—an obstacle to the spread of a fire.
- Animal deterrents will be installed around the substation to reduce wildlife contact with equipment that can trigger fires.

- Hazardous materials in the substations will be protected by following WHMIS standards.
- A Contingency Plan will be developed and implemented.

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APPENDIX A

Figures

APPENDIX B

Greenhouse Gas Emission Calculations

APPENDIX C

Consultation and Engagement Tables

APPENDIX D

Noise Assessment

APPENDIX E

Aquatics Tables

APPENDIX F

AC CDC Data Report

APPENDIX G

Flora Species Tables

APPENDIX H

WESP-AC Functional Scores and Summary Tables

APPENDIX I

Bird Tables, Eigg Mountain 2025 Radar and Acoustic Monitoring Baseline Report

APPENDIX J

Visual Simulations

APPENDIX K

Eigg Mountain Shadow Flicker Report

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