EVERWIND STRAIT CROSSING TRANSMISSION LINE PROJECT
Environmental Assessment Registration Document

Prepared for: EverWind Fuels

strum
CONSULTING

February 2025

February 27, 2025

Meghan Rafferty
Nova Scotia Department of Environment and Climate Change
Environmental Assessment Branch
#2085 - 1903 Barrington Street
PO Box 442
Halifax, Nova Scotia
B3J 2P8

Dear Meghan Rafferty,

Re: Environmental Assessment Registration Document
EverWind Strait Crossing Transmission Line Project

Please find enclosed the Environmental Assessment Registration Document for the EverWind Strait Crossing Transmission Line Project.

The undersigned approves and accepts the contents, as submitted to Nova Scotia Environment and Climate Change, Environmental Assessment Branch.

Sincerely,

Trent Vichie, CEO
EverWind Fuels
2101, 1969 Upper Water St.
Halifax, Nova Scotia
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EXECUTIVE SUMMARY

EverWind Fuels, carrying on business as EverWind NS Holdings Ltd. (EverWind, the “Proponent”) is proposing to construct and operate the EverWind Strait Crossing Transmission Line Project (the “Project”), a 345 kilovolt overhead transmission line that will span the Strait of Canso from Steep Creek, Guysborough County, to the Point Tupper Hydrogen and Ammonia Production Facility (the “Facility”) in Richmond County. The Project will allow for the transmission of renewable energy generated from EverWind’s Phase 2 wind farms, proposed to be developed in the Municipality of the District of Guysborough and St Mary’s, to the Facility. The development of this Project will enable the province to become a national and international leader in the clean renewable energy sector.

The Project is located on private lands on either side of the Strait of Canso. Nearby communities include Steep Creek and Pirate Harbour within the Guysborough Municipality, as well as Point Tupper and Port Malcolm within the Richmond Municipality. Land around the Steep Creek side of the Study Area is primarily used for forestry. Land around the Point Tupper side of the Study Area is used for a mix of forestry, industrial applications, and renewable energy generation, including wind turbines. The Project incorporated the use of existing disturbance areas within the Study Area into the design, to the extent possible.

The transmission crossing span is 1.5 kilometres and requires specialized suspension towers that are approximately 210 metres in height. The expected operational life of the crossing is 80 years. The engineering and design considered a 150-year return period weather event, which exceeds typical high voltage transmission line design criteria to ensure the proposed towers, hardware, and conductors crossing over the Strait of Canso can avoid failures, damage, and safety related hazards over the life of the Project.

The Project is considered a Class I Undertaking under Schedule A of the Nova Scotia Environmental Assessment Regulations, N.S. Reg. 26/95. This Environmental Assessment Registration Document was completed according to methodologies and requirements outlined in A Proponent’s Guide to Environmental Assessment (NSECC, 2017).

EverWind has and will continue to engage and collaborate with members of the public, local communities, the Mi’kmaq of Nova Scotia, and government representatives during all Project phases. Through this process, several iterations of the Project layout were considered before a preferred alignment was finalized for the purposes of this Environmental Assessment. Adjustments included revising the transmission line alignment to allow for a greater setback to a residence on the Steep Creek side and reduced wetland alteration requirements.

The following valued components were identified and evaluated as part of this environmental assessment based on provincial guidance, desktop analysis, and subsequent field studies:

- Atmosphere and air quality
- Climate change

- Sound
- Electric and magnetic fields
- Geophysical environment
- Surface water, fish and fish habitat
- Wetlands
- Terrestrial habitat
- Terrestrial flora
- Terrestrial fauna
- Bats
- Avifauna
- Economy
- Land use and value
- Recreation and tourism
- Archaeological resources

The results of the assessment indicated that the Project, with the implementation of mitigation and monitoring measures, will not result in significant adverse residual effects. The Project is being developed to support the production of a Certified Green hydrogen and ammonia project in Nova Scotia, supporting the reduction of greenhouse gas emissions (i.e., production of renewable energy) and economic prosperity within Nova Scotia.

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LIST OF ACRONYMS

°C	Degrees Celsius
μm	Micrometres/micron
AAQMS	Ambient air quality monitoring stations
ACCDC	Atlantic Canada Conservation Data Centre
ACOA	Atlantic Canada Opportunities Agency
AMO	Abandoned mine opening
APA	Atlantic Pilotage Association
AQHI	Air Quality Health Index
ARD	Acid Rock Drainage
ARIA	Archaeological Resource Impact Assessment
ARS	Avian radar system
ARU	Autonomous recording units
ATV	All-terrain vehicle
B&V	Black and Veatch
BMPs	Best Management Practices
BT	Biological targets
CAAQS	Canadian Ambient Air Quality Standards
CCG	Canadian Coast Guard
CCME	Canadian Council of Ministers of the Environment
CCOHS	Canadian Centre for Occupational Health and Safety
CDOT	California Department of Transportation
CEA	Cumulative Effects Assessment
CEO	Chief Executive Officer
CEPA	Canadian Environmental Protection Act
CH_4	Methane
CLC	Community Liaison Committee
cm	Centimetres
CNWI	Canadian Wetland Inventory
CO	Carbon monoxide
CO_2	Carbon dioxide
CONI	Common Nightjar
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPUE	Catch Per Unit Effort
CRI	Canadian Rivers Institute
CRM Group	Cultural Resource Management Group Ltd
CWS	Canadian Wildlife Service
dBA	Decibels A (sound level)
DBH	Diameter at Breast Height
DEM	Digital Elevation Model
DFO	Fisheries and Oceans Canada
DWC	Diurnal watch counts
E	Ephemeral

EA	Environmental Assessment
EARD	Environmental Assessment Registration Document
ECCC	Environment and Climate Change Canada
ELF	Extremely low frequency
EMFs	Electric and magnetic fields
EP	Eel Pot
EPA	Environmental Protection Agency
ERP	Emergency response plan
ESA	Endangered Species Act
ESRI	Environmental Systems Research Institute
ETT	Electrical Transmission Towers
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
FEC	Forest Ecosystem Classification
FEL 1	Feasibility Report
FN	Fyke Net
FORNON	Forest/non-forest
FTE	Full-time equivalent
FWI	Fire Weather Index
gCO_2e/MJ	Grams of CO_2 equivalent per megajoule of energy produced
GDP	Gross Domestic Product
GHG	Green House Gas
GIS	Geographic Information System
GOC	Government of Canada
GPS	Global Positioning System
GW	Gigawatts
H_2	Hydrogen
ha	Hectare
HDD	Horizontal directional drilling
HRP	Heritage research permit
HVTL	High voltage transmission lines
Hz	Hertz
I	Intermittent
IBA	Important Bird Areas
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IPCC	Intergovernmental Panel on Climate Change
km	Kilometre
km/h	Kilometres per hour
km^3	Cubic kilometre
KMK	Kwilmu'kw Maw-klusuaqn
KMK-ARD	Kwilmu'kw Maw-klusuakn's Archaeological Research Division
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
kV	Kilovolt

LAA	Local Assessment Area
Lpm	Litres per minute
m	Metre
m/s	Metres per second
m/s	Metres per second
m^2	Metres squared
m^3	Cubic metres
MANE Pipeline	Maritimes and Northeast Pipeline
MARI	Maritime Archaeological Resource Inventory
masl	Metres above sea level
MBA	Mi'kmaq Benefits Agreement
MBBA	Maritime Bird Breeding Atlas
MBCA	Migratory Bird Conservation Act
MEKS	Mi’kmaq Ecological Knowledge Study
mG	Milligauss
mg/L	Milligram per liter
MLA	Members of the Legislative Assembly
mm	Millimetre
MODG	Municipality of the District of Guysborough
MOR	Municipality of Richmond
MTRI	Mersey Tobeatic Research Institute
MW	Megawatts
N_2O	Nitrous oxide
nBTs	Number of biological targets
NFC	Nocturnal flight call
NH_3	Ammonia
NI	No Indicator status
NL	Not Listed
NLM	Natural Landscapes of Maine
NO	Nitric oxide
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxide
NREL	National Renewable Energy Laboratory
NREL	National Renewable Energy Laboratory
NS	Nova Scotia
NS AAQS	NS Ambient air quality standards
NSAQR	Nova Scotian Air Quality Regulation
NSCCTH	NS Communities, Culture, Tourism and Heritage
NSECC	Nova Scotia Environment and Climate Change
NSNR	Nova Scotia Natural Resources
NSPI	Nova Scotia Power Incorporated
NSPW	Nova Scotia Public Works
NSSU	Nova Scotia Southern Upland
O_3	Ozone

OBL	Obligate
OEM	Original equipment manufacturer
OLA	Office of L'nu Affairs
P	Perennial
pH	Potential of Hydrogen
PID	Property Identification
PM	Particulate matter
PM10	Particulate matter 10 micrometres or less in diameter
PM2.5	Particulate matter 2.5 micrometres or less in diameter
PPB	Parts per billion
PPE	Personal Protective Equipment
PTMS	Point Tupper Marine Services Co.
Q_{20}	Safe long-term yield
RAA	Regional Assessment Area
RCMP	Royal Canadian Mounted Police
ROW	Right-of-way
SAR	Species at Risk
SARA	Species at Risk Act
SGEM	Nova Scotia Silvicultural Guide for the Ecological Matrix
SMP	Special Management Practices
SO_2	Sulphur dioxide
SOCI	Species of Conservation Interest
SOPs	Standard Operating Procedures
SO_x	Sulfur oxides
SP1	Leading Species
S-Rank	Subnational rank
TC	Transport Canada
tCO_2e	Tonnes of carbon dioxide equivalent
tCO_2e/kg	of carbon dioxide equivalent per kilogram
tCO_2e/tonne·km	Tonnes of carbon dioxide equivalent per tonnes by kilometer
tCO_2e/year	Tonnes of carbon dioxide equivalent per year
TRS	Total reduced sulphur
TSP	Total Suspended Particulate
TTs	Transmission towers
UPL	Upland
USDA-NRCS	United States Department of Agriculture Natural Resources Conservation Service
VCs	Valued Components
WAM	Wet Area Mapping
WESP-AC	Wetland Ecosystem Services Protocol – Atlantic Canada
WHO	World Health Organization
WSS	Wetland of Special Significance
YOY	Young of Year

1.0 PROPONENT DESCRIPTION

EverWind Fuels, carrying on business as EverWind NS Holdings Ltd. (EverWind, the “Proponent”) is a Nova Scotia-based private developer of green hydrogen and ammonia production that has extensive energy storage facilities and associated transportation assets. EverWind is proposing to construct and operate the EverWind Strait Crossing Transmission Line (the "Project"), a 345 kilovolt[1] (kV) overhead transmission line that will span the Strait of Canso from Steep Creek to the Point Tupper Hydrogen and Ammonia Production Facility (the “Facility”) (Drawing 1.1). The Project will allow for the transmission of renewable energy generated from the Proponent’s Phase 2 wind farms, proposed to be developed in the Municipality of the District of Guysborough and St Mary’s, to the Facility. The Facility received Environmental Assessment (EA) Approval in February 2023 and is currently under development. The Facility will be co-located with existing infrastructure (collectively referred to as the “Point Tupper Site”), including:

- A tank farm with 39 storage tanks, a butane pressure tank, above and below ground piping racks and secondary containment dykes.
- A marine terminal with a 120 metres (m) earthen causeway (jetty) with two berths for vessels.
- An effluent treatment system, consisting of an oil/water separator, settling and aeration ponds, and effluent discharge (into the Strait of Canso).
- Other infrastructure, including transmission lines, rail and water lines, and a portion of the Maritimes and Northeast Pipeline (MANE pipeline).

The Project is being developed to support the production of Certified Green hydrogen and ammonia in Nova Scotia. Products will be shipped from the pre-existing marine jetty at the Point Tupper Site to support the clean renewable energy initiative.

The EverWind team includes experienced Canadian wind farm developers, contractors, and operators who have designed, financed, constructed, and operated wind and solar energy projects in Nova Scotia, Atlantic Canada, Western Canada, and across North America over the past 20 years.

EverWind retained Strum Consulting to undertake required technical studies, manage technical subconsultants, and undertake regulatory consultations which have all contributed to the preparation of the Project’s Environmental Assessment Registration Document (EARD). Strum Consulting is an independent multi-disciplinary team of consultants with extensive experience undertaking EAs throughout Atlantic Canada.

EverWind retained CIMA+ and Hardline Engineering for the Project’s design. CIMA+ cumulates decades of experience in the design and construction of power facilities in Canada and the

[1]A 230 kV overhead transmission line is also being considered. To be conservative, the EA is based on a 345 kV transmission line. Following detail design, the EA Branch will be updated on the determination.

United States. CIMA+ provides consulting engineering services and has extensive experience in transmission line design, refurbishing and upgrading. Hardline Engineering provides a variety of substation, transmission, and distribution services that includes planning, permitting, asset management, engineering, operations, and commissioning.

Contact information for the Proponent and their consultant is included in Table 1.1.

Table 1.1: Proponent and Consultant Contact Information

Proponent Information	
Project Name	EverWind Strait Crossing Transmission Line
Proponent Name	EverWind NS Holdings Ltd.
Chief Executive Officer(s) / Principal(s)	Trent Vichie – CEO EverWind Fuels 1969 Upper Water Street, Suite 2101 Purdy's Wharf II Halifax, NS B3J 2V1
Mailing and Street Address	1969 Upper Water Street – Suite 2101 Purdy's Wharf II B3J 2V1 Halifax, NS
Proponent Contact Information for the EA Registration	Jeff Bonazza, Director, Environment and Permitting, EverWind Fuels 902-292-7010 jeff.bonazza@everwindfuels.com
Consultant Information	
Name of Consultant	Strum Consulting
Mailing and Street Address	211 Horseshoe Lake Road, Unit #210 Halifax, NS B3S 0B9
EA Contact	Angus Doane, Project Manager 902-835-5560 adoane@strum.com

2.0 PROJECT INFORMATION

2.1 Project Introduction

The Proponent's overall vision is to develop an Atlantic Canada green energy hub in Point Tupper, Nova Scotia. The Project aims to utilize renewable energy sources, such as wind and solar, to produce green hydrogen and ammonia for both local use and export. The portfolio of projects is divided into two phases in Nova Scotia:

- Phase 1 includes the construction of the Facility, powered by onshore wind and solar energy that will generate approximately 650 megawatts (MW) of clean energy. EA Approvals have been received for the Facility and three wind power projects (Bear Lake, Kmtnuk, and Windy Ridge Wind Power projects).

- Phase 2 includes the development of approximately 2 gigawatts (GW) of renewable energy from up to three additional onshore wind projects, the associated transmission line, the Phase 2 Facility expansion, and the portion of the transmission line that crosses the Strait of Canso to provide a connection directly to the facility (i.e., the Project).

This Project includes the construction, operation and maintenance, and decommissioning of a 345 kV overhead transmission line running from Steep Creek, Guysborough County, across the Strait of Canso directly to the Facility, in Point Tupper, Richmond County (Drawing 1.1). The Project will be completely owned and funded by the Proponent.

The Project location (i.e., crossing location) was determined based on having the shortest possible span length, property ownership for structure placement, proximity to the future Phase 2 wind farms in Guysborough, and proximity to the Facility in Point Tupper, among other factors discussed in Section 2.3.2.

CIMA+ and Hardline Engineering were contracted by the Proponent to develop the engineering design for the Project. The proposed crossing configuration consists of two high suspension and two dead-end towers on each side of the Strait of Canso.

Each suspension tower will have an overall height of approximately 210 m with the lowest conductor attachment height of approximately 175 m. The tower supports the two circuits with a vertical configuration of one circuit on each side of the tower. Final tower specifications will be confirmed during detailed engineering.

The total height of the dead-end towers is approximately 43 m, with the lowest conductor attachment height of approximately 20 m. It has the same vertical configuration as the suspension tower, with one circuit on each side of the tower. Final tower specifications will be confirmed during detailed engineering. The geometry of both structures is presented in Figure 2.1.

Behind each dead-end structure, there is a small temporary laydown area for a stringing pad, which is needed for laying and tensioning the cables during construction. The stringing pad on the Point Tupper side lies within the tank farm area of the Point Tupper Site due to engineering constraints on maintaining secondary containment earthen berms and an intact fence around the terminal area (Drawing 2.1A and 2.1B).

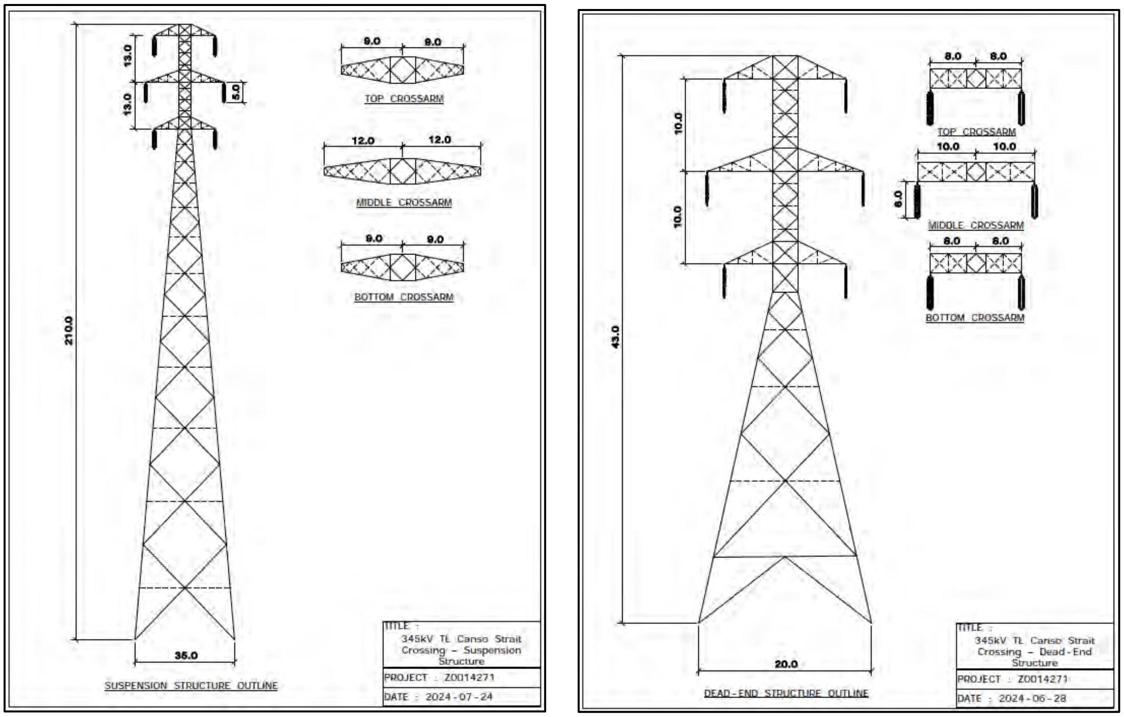

Figure 2.1: Preliminary Suspension (210 m) and Dead-end Structures (43 m) Profile

Based on the Project requirements, a 1.5 kilometre (km) span is required to cross the Strait of Canso. The Strait crossing structures will be designed to withstand a 150 year return period sever weather event which is in excess to typical code requirements for similar transmission line infrastructure (50 to 75 year return periods). The design criteria specifies a water clearance of 75 m above the high-water mark at midspan (Figure 2.2) under high temperature and typical icing/wet snow operating conditions. A 75 m midspan clearance has been selected to accommodate sufficient clearance for the air draft of the largest vessels likely to pass through the Strait of Canso. For the readers reference, the Halifax Harbour bridges both have a clearance of 46.9 m above the high-water mark at center span.

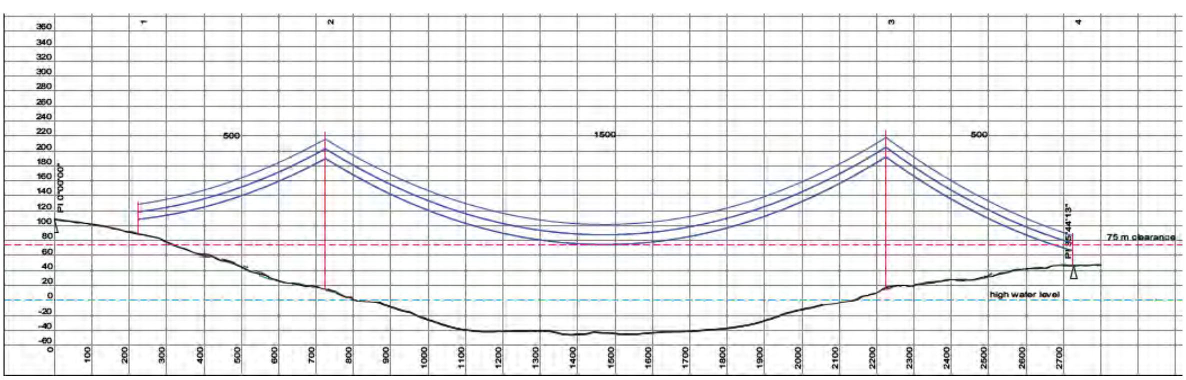

Figure 2.2: Crossing Profile

Construction activities are proposed to begin in 2026 pending EA Approval, and once constructed, the Project is expected to be operational for a minimum of 80 years.

2.2 Purpose & Need for the Undertaking

The Project is being developed to support the production of Certified Green hydrogen and ammonia in Nova Scotia. The Project is needed to support provincial and federal goals and enable global decarbonization. Nova Scotia has a vision to become a national and international leader in the clean renewable energy sector, through green hydrogen and ammonia production and export to create sustainable energy solutions.

As explained by Tory Rushton, Minister of Natural Resources, "Green hydrogen is a clean-burning fuel that can help with our transition to green, renewable energy in circumstances where fossil fuels cannot easily be replaced." EverWind is well-positioned to become Canada's first commercial Certified Green hydrogen and ammonia production facility, and the Project is needed to supply the green energy required for production as part of EverWind's Phase 2 development.

The production of green energy for green hydrogen and ammonia production for export is widely supported as a means to stimulate investment from the private sector, support global energy security, and facilitate global decarbonization (CGEP, 2024; Morrison et al., 2023). The Project will also provide for the advancement of social and economic reconciliation, representing investments in Indigenous majority-owned and Indigenous-led projects.

Need for the Green Hydrogen and Ammonia

The Project will provide a direct power connection between Phase 2 renewable energy projects for the purpose of producing green hydrogen and ammonia.

Ammonia (NH_3) is a key component in the production of agricultural fertilizers, with over 50% of the world's food crop farmers relying on it to keep their soils productive through improvement of crop nutrition, growth, and quality (Erisman et al., 2008). In 2019, the global production of ammonia was approximately 235 million tonnes (Ghavam et al., 2021). Although ammonia-based fertilizers are necessary to produce the food crops required to feed over seven billion people worldwide, industrial ammonia production emits more carbon dioxide (CO_2) than any other chemical production process (Boerner, 2019). The direct emissions from ammonia production total approximately 450 metric tonnes of CO_2 per year (IEA, n.d.).

The green ammonia produced with power transmitted by the Project will be supplied to support the global demand for agricultural fertilizer products while significantly reducing the carbon footprint of conventional ammonia production methods.

In addition to its use as a feedstock in agricultural fertilizers, green ammonia can also be used as a fuel for global land-based and marine transport, an energy source for electricity power generation and building heating, and a feedstock for heavy industrial and manufacturing applications (Mallouppas et al., 2022).

Green hydrogen can be used as a direct replacement for natural gas applications, such as for heating or electricity production. The off-taker markets for green hydrogen produced in Atlantic Canada are emerging as international demand for clean energy grows. A prime example is the Canada-Germany Hydrogen Alliance, which highlights the potential for Atlantic Canada to export green hydrogen to Europe, where it is sought to meet decarbonization goals in sectors such as transportation and heavy industry. With its abundant renewable energy resources, Atlantic Canada is well-positioned to supply countries seeking to transition to low-carbon energy sources, driving new market opportunities for green hydrogen exports.

It is expected that the demand for green hydrogen and ammonia will also increase in Nova Scotia and Canada in the coming years, and these green fuels will be made available to support local decarbonization as this market evolves.

2.3 Project Alternatives

As a component of the EA, the Proponent retained the engineering firm Black and Veatch (B&V) to support with assessing Project alternatives through a Feasibility Report (FEL 1) (B&V, 2023). The feasibility study evaluated crossing the Strait of Canso by a horizontal directional drilling (HDD), a sub-marine cable, and an overhead transmission line. CIMA+ also provided additional details on HDD and overhead transmission to cross the Strait of Canso.

Additionally, an assessment was completed to determine the viability of using the existing and abandoned ExxonMobil Canada gas pipeline that crosses the Strait of Canso as a conduit for the proposed transmission line crossing.

2.3.1 Crossing Alternatives

2.3.1.1 Underground Trenchless – Horizontal Directional Drilling

HDD is a trenchless method that allows cables to be installed entirely underground across the Strait of Canso without disturbing the waterway's surface. This technique involves a specialized steerable drill to create a borehole beneath the Strait, which is then expanded using larger reamers until it reaches the desired diameter. Afterward, polymer conduits housing the cables are pulled through. Drilling fluid, made of water and bentonite clay, stabilizes the borehole walls and is constantly recycled and monitored to minimize potential for environmental contamination. The excavation of large drill pits is required on each side of the crossing to complete the HDD and install riser structures transitioning from underground cable to overhead conductors. This method tends to provide the best reliability due to being well-protected from external factors. However, when cable or structural failures do occur on underground facilities, replacement and/or repair is prohibitively costly and can take years to complete. This requires additional redundancy to be incorporated into the crossing design and makes the economics of this kind of solution unviable. Heat dissipation and electrical capacity is another factor that is challenging in underground transmission applications. It is estimated that this crossing could require as many as 24 individual conductors to achieve the capacity and redundancy needed for the crossing. Additionally, this option carries risks associated with potential drilling fluid leaks through geological fractures.

2.3.1.2 Submarine Cable

This method involves laying electrical cables directly on or slightly beneath the seabed using various installation techniques. For soft sediments, a jet plow is commonly used, which buries the cable while creating minimal disturbance. In harder substrates, prepared trenches may be required, which involves mechanical trenching or even blasting to create a trench for the cables. Additional protection, such as concrete mats or aggregate covering, are added in areas with high risks from anchoring or other underwater activities. The submarine cable approach is suitable for short underwater spans, offering a relatively straightforward installation process for most seabed conditions. However, it has the longest lead time—up to three to five years—due to global demand for submarine cables in renewable energy projects, leading to a high cost and long lead times. Impacts to the marine environment from this crossing method are the greatest (i.e., seabed disturbance), which would require additional environmental approvals, and may require ongoing monitoring and maintenance, especially in shallower areas prone to external impacts.

2.3.1.3 Overhead Transmission Line

The overhead transmission line option involves constructing tall towers onshore on either side of the Strait of Canso to suspend cables across the water. Due to the crossing's required span distance (1.5 km) and to maintain a 75 m midspan clearance above the water, the design incorporates specialized suspension towers (approximately 210 m in height) and conductors, and dead-end structures. The transmission towers will be built using lattice steel, with construction involving heavy-duty support equipment, including helicopters. This method is the most cost-effective, and it has relatively low environmental impacts (i.e., no impacts to the marine environment). While it comes with visual and aesthetic considerations and can be vulnerable to severe weather, overhead lines are easier to monitor and access for maintenance and repairs, and the time required for construction is less than for submerged or underground methods. The overhead option offers a balance of viable economics and practical implementation.

2.3.1.4 Use of Existing Gas Pipeline

ExxonMobil Canada owns one of the existing twin gas pipelines that cross the Strait of Canso from Steep Creek to Point Tupper (the "NGL Pipeline"). The second pipeline is owned and operated by Maritimes & Northeast Pipeline. The NGL Pipeline was used to transport natural gas liquids from Goldboro Gas Plant to the Point Tupper Fractionation Plant as part of the Sable Offshore Energy Project. The NGL Pipeline has been abandoned and was reviewed for its suitability to house underground transmission cables. The NGL Pipeline is 219 millimetres (mm) in diameter pipeline with a wall thickness of 4.78 to 8.18 mm (ExxonMobil Canada Properties, 2019). This option would require the least amount of environmental disturbance and would allow for the use of existing infrastructure; however, based on the preliminary sizing and quantity of conductors required for the Project, it was confirmed that it is not possible to use the NGL pipeline for an underground transmission crossing. This limitation has deemed this option as not viable.

2.3.1.5 Preferred Crossing Method

Based on the economics, contingencies, reliability, environmental interactions, permitting effort, schedule, maintenance, restoration, and technical feasibility, the overhead transmission line was selected as the most appropriate and preferred option for the Project.

2.3.2 Project Location and Layout

Following a decision on the crossing type, a constraints analysis was undertaken to select the landing locations and infrastructure layout. Landing locations were constrained by:

- Mechanical and electrical engineering considerations that pertain to the towers and maximum length of the span.
- Gradient.
- Vessel clearances (75 m is required to accommodate air draft of the largest vessels expect to pass through the Strait of Canso).
- Environmental features (e.g. wetland and watercourse setbacks).
- Land ownership.
- Existing residential receptors.
- Other infrastructure, including public roads and the MANE pipeline.
- Proximity to the Proponent's proposed Phase 2 wind farm project(s).
- Proximity to and orientation for terminating the line at the Facility.

Several design iterations for Project infrastructure at each landing location were considered and optimized to reduce environmental interactions. The crossing location was selected due to the availability of land (which was subsequently purchased by the Proponent) in Steep Creek, and adjacent to the Facility in Point Tupper. This allowed for the narrowest crossing (1.5 km) that would lead directly to the Facility and accommodate other constraints. Following detailed engineering and design, infrastructure placement will be refined but will remain in the areas assessed as part of this EA.

2.4 Regulatory Framework

2.4.1 Federal

A federal impact assessment is not required for the Project as it is not located on federal lands or listed as a physical activity that constitutes a designated project as listed in the Physical Activities Regulations under the *Impact Assessment Act*.

Federal approval, permit, notification, and compliance requirements for the Project are provided in Table 2.1.

Table 2.1: Federal Regulatory Requirements

Requirement	Regulatory Body	Status/Comments
Notification of Project	Royal Canadian Mounted Police (RCMP)	Will be completed following the detailed design phase.

Requirement	Regulatory Body	Status/Comments
Land Use Proposal	NAV Canada	Submission form has been delivered to NAV Canada. Waiting on response.
Aeronautical obstruction clearance	Transport Canada	Will be completed following the detailed design phase.
Lighting design for navigational purposes	Transport Canada	Will be completed following the detailed design phase.
Navigation Protection Program	Transport Canada	Will be completed following the detailed design phase, if required.
Application to Occupy (Ports Program)	Transport Canada	Will be completed following the detailed design phase, if required.
Fisheries Act	Fisheries and Oceans Canada (DFO)	Compliance legislation – an authorization under the *Fisheries Act* is not anticipated. If, during the detailed design phase potential effects to fish or fish habitat are identified that may require authorization under the *Fisheries Act*, the Proponent will submit a Request for Review to DFO.
Species at Risk Act (*SARA*)	Environment and Climate Change Canada (ECCC), and DFO	Compliance legislation – the requirement to obtain a SARA permit is not anticipated.
Migratory Bird Convention Act, 1994 (*MBCA*)	ECCC	Compliance legislation – the requirement to obtain a *MBCA* permit is not anticipated.

2.4.2 Provincial

The Project is subject to a Class I EA as defined by the Environmental Assessment Regulations, N.S. Reg. 26/95 under the *Environment Act*, S.N.S. 1994-95, c. 1. This Project triggers a Class 1 EA as it would involve the construction of a corridor for electric power transmission lines that have a cumulative power rater of 345 kV. As such, this submission has been prepared in accordance with A Proponent's Guide to Environmental Assessment (NSECC, 2017).

Other provincial approval, permit, notification, and compliance requirements for the Project are provided in Table 2.2.

Table 2.2: Provincial Regulatory Requirements

Requirement	Regulatory Body	Status/Comments
Watercourse Alteration Permit Wetland Alteration Permit	Nova Scotia Environment and Climate Change (NSECC)	Alteration applications will be submitted to NSECC in accordance with the Activities Designation Regulations following EA approval, as required. Locations requiring alteration are described in Sections 7.3.1-7.3.3.

Requirement	Regulatory Body	Status/Comments
Endangered Species Act (*ESA*)	Nova Scotia Natural Resources (NSNR)	Compliance legislation – the requirement to obtain an ESA permit is not anticipated.
Overweight/Special move permit	Nova Scotia Public Works (NSPW)	Future approval, potentially required to support construction activities.
Access permit Work within highway right-of-way (ROW) Use of transmission line ROW for pole lines	NSPW	Future approval, potentially required to support construction activities.
Archaeology Field Research Permit	NS Communities, Culture, Tourism and Heritage (NSCCTH)	CCTH Permit A2024NS010 was obtained to complete the Archaeology Resource Impact Assessment (ARIA).
Nova Scotia Temporary Workplace Traffic Control Manual	NSPW	Compliance with the Manual, for the use of provincial roads during the construction, operation, and decommissioning phases of the Project.

2.4.3 Municipal

Municipal approval, permit, notification, and compliance requirements for the Project are provided in Table 2.3.

Table 2.3: Municipal Requirements

Requirement	Regulatory Body	Status/Comments
Building and Development Permits	Municipality of the District of Guysborough (MODG)	Vertical and horizontal setback requirements for watercourses and waterbodies, including the ocean.
Noise Control By-Law	MODG	Compliance with schedule restrictions for construction activities.
Building and Development Permits	Municipality of Richmond (MOR) - West Richmond Planning Area	Will be completed following the detailed design phase.
Noise Control By-Law	MOR	Compliance with schedule restrictions for construction activities.

2.5 Funding

The Proponent is arranging debt project financing for the Project. Leading investment banks are engaged to lead the financing of the Project. Commercial banks have been approached to participate in the Project as a lender, and various financing support letters have been received for the funding.

3.0 DESCRIPTION OF THE UNDERTAKING

3.1 Geographical Location

The Project is located on private lands on either side of the Strait of Canso, a channel that is approximately 1.5 km wide, and separates Guysborough Country in mainland Nova Scotia from Richmond County on the island of Cape Breton (Drawing 3.1). Nearby communities include Steep Creek and Pirate Harbour within the Guysborough Municipality, as well as Point Tupper and Port Malcolm within the Richmond Municipality. The Project is centered at approximately 45°33'54.76'' N, 61°20'25.73'' W.

A Study Area was established based on land parcels (i.e., PIDs) that are included in the development area (Table 3.1, Drawing 1.1) and represents the boundaries of where field data collection was completed. The Study Area consists entirely of private land.

Table 3.1: Land Parcels within the Study Area

PID	Landowner
35015809	EverWind Terminals Canada
35015791	EverWind Terminals Canada
35015817	Nova Scotia Limited - EverWind
35164573	Road Parcel
75035709	Nova Scotia Business Inc
75193805	Nova Scotia Business Inc
75006593	Point Tupper Marine Services - EverWind
75125450	Point Tupper Marine Services - EverWind

The Project Area includes the physical footprint where the direct disturbance is expected to occur for the transmission line ROW and structure foundations and is based on designs by CIMA+ and Hardline Engineering.

The areas of the Study Area and Project Area are provided in Table 3.2.

Table 3.2: Areas of Study

Area of Study	Area (ha) – Steep Creek	Area (ha) – Point Tupper
Study Area	80.7	102.4
Project Area[1]	15.2	20.0

[1]Project Area is a conservative estimate of the permanent footprint of the Project, including the ROW, access roads and all permanent infrastructure. Following the detailed design, the area will be refined.

3.1.1 Siting Considerations

As part of the Project planning process, a constraints analysis was undertaken that considered potential effects to the environment, nearby residents, and sociocultural resources. The constraints analysis was informed by the results of Project-specific technical studies which included: desktop studies, field investigations, environmental resource / potential effects evaluation, as well as information collected through engagement with the Mi'kmaq of Nova

Scotia, government agencies, stakeholders, and local communities. Through this process, several iterations of the Project layout were considered before a preferred alignment was finalized for the purposes of this EA.

The minimum setbacks and separation distances applied during the development, design, and siting of the Project are summarized in Table 3.3.

Table 3.3: Summary of Minimum Setbacks and Separation Distances

Setback Category	Distance	Relevant Regulators / Stakeholders
Watercourses	30 m from watercourses, where possible or otherwise where authorized by NSECC	NSECC
Wetlands	30 m from wetlands, where possible or otherwise where authorized by NSECC	NSECC, NSNR
Wetlands of Special Significance	30 m from Wetlands of Special Significance (WSS), to be determined in consultation with NSECC	NSECC, NSNR
Protected Areas	To be determined in consultation with NSECC and NSNR, as appropriate	NSECC, NSNR
Rare Plants and Lichens	Species-specific (Section 7.4.2)	NSNR
Noise	As necessary to meet noise guidance	MODG, MOR
Residential Receptors	>250 m from transmission structures.	Proponent commitment

The Project Area also offers considerable development opportunities that were incorporated into the Project design to minimize potential effects to surrounding land uses, local residents, and environmental features. Project development opportunities include the following:

- Use of privately owned land which has been subject to previous and ongoing disturbance from forestry activities, that includes road construction, tree clearing, silviculture, and other recreational uses, and use of historically disturbed land in the Point Tupper Industrial Park.
- Use of existing roads, and existing cleared areas to minimize habitat fragmentation; clearing of mature vegetation stands; and impacts to wetlands and watercourses.

3.2 Physical Components

3.2.1 Transmission Line Specifications

The Proponent is proposing the construction, operation and maintenance, and decommissioning of a 345 kV overhead transmission line crossing the Strait of Canso, with landing structures in Steep Creek and Point Tupper. This transmission line will be completely owned and funded by the Proponent. Tables 3.4 and 3.5 provide the transmission line and structure specifications.

Table 3.4: Transmission Line Technical Specifications

Parameter	Value
Nominal System Voltage	345 kV
Number of Circuits	2
Number of Phases per Circuit	3
Bundle	1-2 Cables per phase
Configuration	Vertical
Shield Wire	2
Line Power Rating	1000 MW per circuit (2000 MW total)
Clearance above the Strait of Canso	75 m[1]

[1] Design clearance under all thermal and typical icing conditions.

Table 3.5: Structures Specifications

Structure	Structure Location	Structure type	Station (m) [1]	Ahead Span (m) [1]	Tower height (m) [1]	Lowest conductor height (m) [1]	Footprint (m) [1]
Western dead-end	Steep Creek	Dead-end Tower	0	500	43	20	20 x 20
Western suspension	Steep Creek	Suspension Tower	500	1500	210	175	50 x 50
Eastern suspension	Point Tupper	Suspension Tower	2000	500	210	175	30 x 30
Eastern dead-end	Point Tupper	Dead-end Tower	2500	0	43	20	25 x 25

[1]Structure specifications are approximate and subject to change based on detailed engineering and design

On the Steep Creek side, a transmission line will extend from the future EverWind Phase 2 wind power substation (which will be evaluated in a subsequent EARD) to the western dead-end structure, before spanning the Strait of Canso from the western suspension tower. A temporary stringing pad will be located within the 100 m transmission line ROW to the west of the western dead-end structure (Drawing 2.1A).

On the Point Tupper side, the transmission line will be supported by a suspension tower located immediately to the west of Bear Island Road and anchored to a dead-end structure to the immediate north of Port Malcolm Road, south of the existing tank farm at the Point Tupper Site. From there, the transmission line will tie into a substation located immediately to the south of Port Malcolm Road (and southwest of the Facility). A temporary stringing pad will be located within the existing tank farm to the northeast of the eastern dead-end structure (Drawing 2.1B). The stringing pad is not considered part of the Project Area because it is temporary and located on developed, industrial land owned by the Proponent. From the substation, power will be distributed to the northeast and parallel Port Malcolm Road to tie into the Facility.

Additional transmission structures (wooden or steel structures) will be required beyond the two dead-end structures within the ROW. The exact placement and structure configuration will be determined in the detailed design phase and they will be sited to avoid interactions with sensitive environmental features (e.g., wetlands and watercourses). Span distance between the additional structures is anticipated to vary between approximately 150 m and 300 m.

All infrastructure will be designed to adhere to the following standards for their respective components:

- CSA C22.3 No. 1, Overhead Systems
- CSA C22.3 No. 60826, Design Criteria of Overhead Transmission Lines

3.2.2 Right Of Way and Access Roads

The transmission line ROW will consist of a corridor approximately 100 m wide where all trees are removed. The total linear length and total area of the transmission line ROW associated with this Project is 3.88 km and 35.2 hectares (ha) (land portion only), respectively. Compatible vegetation, such as grasses, herbs and low shrubs will be maintained throughout the Project's lifespan.

The need for new access roads is minimal due to the proposed infrastructure's siting near existing roads. On the Steep Creek side, an existing road extends from Highway 344 westward through the area proposed to site the suspension tower and continues to a turnaround area approximately 550 m west of Highway 344. This roadbed will be re-used; however, upgrades will be required (i.e., widening and resurfacing) and the turnaround area will also require upgrades. A new access road (255 m) will be required as a small offshoot from the existing road to facilitate access to the western dead-end structure.

On the Point Tupper side, the majority of access roads are also existing. The eastern suspension tower will be directly accessible from Bear Island Road. A very short new access road (62 m) will be required to be constructed to access the eastern dead-end structure from Port Malcolm Road. An additional new access road (60 m) will be required to access the supporting infrastructure closer to the substation from Port Malcolm Road.

Within the Study Area, 86% (2,272 m) of access roads are existing and 14% (377 m) will require new construction.

3.3 Project Phases

The Project will include three phases:

- Site preparation and construction
- Operations and maintenance
- Decommissioning

Activities and requirements associated with each phase are discussed in the following sections.

3.3.1 Site Preparation and Construction

Safe work practices, including applicable occupational health and safety requirements, will be adhered to during the construction of the Project.

Site preparation activities include:

- Land surveys for placement of towers and associated infrastructure
- Geotechnical investigations
- Placement of erosion and sedimentation control measures
- Installation of temporary bridges, stream crossings, and other controls on the land portion of the Project
- Clearing of trees
- Grubbing areas for construction

General construction activities include:

- Existing access road upgrading
- New access road construction
- Construction pad (e.g., assembly pad, crane pad, stringing pad) construction
- Tower foundation construction
- Transportation of tower components
- Tower assembly
- Tower erection
- Stringing
- Removal of temporary works and site reclamation
- Commissioning

Access Road Construction

Existing roads and access points will be used with the aim of minimizing land disturbance and habitat fragmentation.

Approximately 2,272 m of the existing road network will be re-used as part of the Project.

Approximately 377 m of new road construction is required to provide direct access to the structure foundations. Access roads will have a 6 to 12 m wide road surface and including ditching and grading will be 15 to 18 m wide.

Aggregate material for road construction will be transported from local off-site quarries and stored temporarily until used. Any material removed for road construction will be stored or disposed of in accordance with regulations and best practices for road construction. Any material stored on-site will be managed with appropriate erosion and sedimentation control measures or re-used.

The following equipment is typically used during road upgrading and construction:

- Excavators
- Dump trucks
- Bull dozers
- Loaders
- Rollers
- Graders
- Crusher
- Light trucks

During operations, roads will be maintained with additional gravel and/or periodic grading. Road maintenance is required to allow for maintenance and inspection of the transmission structures and transmission line.

Construction Pads and Tower Foundation Construction

The Project includes the construction of pads and tower foundations at each side of the crossing, along with the installation of two circuits. Laydown areas will be required to serve as crane and stringing pads during construction and for storage of material (Drawing 2.1A and 2.1B).

Laydown and tower foundation construction may include:

- Installation of erosion and sedimentation control measures
- Removal of vegetation
- Removal of overburden and soils
- Blasting/chipping of bedrock (to be determined, based on geotechnical conditions and foundation design)
- Pouring and curing of concrete pads (complete with reinforcing steel)
- Placement of competent soils to bring area to grade
- Compaction of soils
- Excavation for electrical conduits and fiber optic communication trenches

Each laydown area is expected to be approximately 30 m by 75 m. The exact arrangement of each tower foundation and crane pad will be designed to suit the specific requirements of the tower, the geotechnical conditions, and the surrounding topography during the detailed design process.

Foundations for transmission towers will be located within the construction pads. Construction of a typical tower foundation (from clearing to final preparation for erecting the transmission towers) can take up to four months, depending on weather, soil, and construction vehicle availability/access. The following equipment may be used for the laydown area and tower foundation construction:

- Excavators
- Dump trucks
- Bull dozers
- Rollers
- Graders
- Crusher (not required if a local quarry can supply gravel sizes)
- Concrete trucks and pumper trucks
- Light cranes
- Light trucks

Transportation of Components, Equipment, and Materials

Additional traffic will be generated by the Project throughout its entire lifespan, though it will be concentrated during construction and decommissioning phases due to associated heavy machinery on site.

The Project requires tower erection on both sides of the Strait of Canso. The Steep Creek side of the Project will be accessed via Highway 344, a main coastal route also known as Marine Drive that connects several rural communities (i.e., Mulgrave, Pirate Harbour, Saint Francis Harbour, and Port Shoreham) between Highway 104 near the Canso Causeway and Highway 16 at Boylston. This section of Highway 344 saw an annual average daily count of 320 vehicles per day measured in 2023, the majority of which (96%) are non-truck traffic (NSPW, 2024, p. 261). Traffic consists largely of commuters from the aforementioned communities traveling to workplaces and amenities in the communities of Mulgrave and Port Hawkesbury.

The Point Tupper side of the Study Area will be accessed via Industrial Park Road, Bear Island Road, and Port Malcolm Road, and two public roads with good access to the Project. Bear Island Road and Port Malcolm Road connect and become Industrial Park Road which connects with Highway 104 approximately 4 km north, in Port Hawkesbury. There are no traffic statistics available for these roads, but they are known to be low and primarily comprised of industrial and local commuter traffic travelling throughout the Point Tupper Industrial Park area.

The following permits and considerations are anticipated to be required for the transportation of tower components:

- Work Within Highway Right of Way Permit (NSPW)
    - Required if installing access to sites from the roadway, erecting structures within 100 m of the highway or removing access signs and guard rails.
- Over-Weight Moves Special Move Permit (Service NS and Internal Services)
    - Required to transport oversized and overweight components. In some cases, due to the size and weight of the components, some may only be transported on Sundays.
- Provincial road weight restrictions will also need to be considered, especially spring weight restrictions, for heavier equipment and materials that will be transported to the Project.
- Access points will be designed with proper height and width to accommodate large trucks and will adhere to commercial stopping sight distances.

Different volumes and types of traffic will be generated throughout the Project's lifecycle, with the highest volumes expected during construction. Access road construction will require delivery and operation of appropriate machinery to clear and grade the land for roads, tower foundations, and laydown areas, then deliver and distribute aggregates for surfaces. Tower delivery and construction will see delivery of the components from the local ports to the Study Area on each side of the Strait of Canso by truck then use of cranes or helicopters to move the elements into place.

During construction, most days will have five to 30 trucks per day. In Guysborough County, materials will travel from a local port on port trucks along Highway 334 to the Study Area. To reach the Point Tupper side of the Study Area, materials will travel from Highway 344 across the Strait of Canso on Highway 104. Traffic will then follow Highway 104 through Port Hawkesbury and then turn south on Industrial Park Road, which leads directly to the Study Area. This route is entirely on highways that frequently carry industrial traffic. The operational phase requires minimal visitation by technicians to routinely assess and maintain the infrastructure. Finally, decommissioning will require a similar amount of traffic to the tower component delivery and construction.

The public road portion of the transportation route is unlikely to require road modifications except to provide access to the Project Area. In Guysborough County, this is limited to modifications and upgrades to existing unpaved roads that exit from Highway 344 to allow larger truck traffic to turn off the main road and to travel on the Project's gravel access roads. In Richmond County, site access will be facilitated through the addition of access roads that exit from Port Malcolm Road and Bear Island Road. Modifications to overhead wires, branches, and signs are not likely necessary except to facilitate Project Area access, more likely in Guysborough County.

The Proponent has committed to not restricting access to public roads in the area except for active construction sites such as excavations or lift sites where restrictions are necessary due to safety considerations. In such circumstances, signs will be posted and physical barriers such as cones, candle sticks, t-posts and rope will be erected, and all regulatory requirements for safe traffic management will be adhered to. Additionally, the Proponent will, to the extent possible, direct its contractors to avoid transportation of Project components through urban areas (including Mulgrave and Port Hawkesbury) during high traffic times, especially weekday commuter hours. The Proponent will require that proper traffic control measures are employed as needed and all regulatory requirements for traffic control measures are met for work within a highway ROW.

The Proponent is committed to establishing a road use agreement with the Province and Municipalities, which will include terms requiring the Proponent to remediate any damage to public roads caused during construction and deliveries. All Project access roads will be constructed/upgraded and maintained at the cost of the Proponent.

Tower Assembly and Erection

Due to the size and height of the suspension and dead-end towers and the Project location, the transmission towers will be pre-assembled as much as possible off-site, then delivered and constructed on-site using cranes and helicopters. The assembled parts will be delivered by flatbed trucks, and the components will require cranes for removal at each of the prepared laydown areas.

The tower sections will be erected in sequence on the tower foundation, followed by the bottom, middle, and top cross arms. This assembly and erection will occur with the use of cranes, and a helicopter. Erection will depend on weather, specifically wind and lighting conditions. Typical assembly duration per tower is expected to be three to four weeks The following equipment is expected to be used for tower assembly and erection:

- Helicopter
- Main crane unit
- Assembly cranes
- Manufacturer’s support vehicles

Stringing of Conductor

The transmission towers will transmit power via a dedicated overhead transmission line crossing the Strait of Canso. Electrical conductors will be installed to form a continuous electrical circuit. Laydown areas will serve as the pulling and tensioning areas during stringing activities.

The following equipment is expected to be used during the conductor stringing process:

- Pullers
- Line trucks
- Tensioners
- Helicopter
- Cranes

No interaction with the marine environment will occur. Guide ropes will be strung over the Strait of Canso using a helicopter and used to pull the power cables to the other side.

Substation Construction

Substation construction includes grading, foundation installation, spill containment installation, assembly, erection, and commissioning.

- Material Laydown Yard: The Project Area includes areas for material laydown which will serve as the primary material storage location for the substation. The material storage areas will also be used for office trailers, vehicle, and equipment parking and will act as the base of operations for the construction crews.

- Site Grading: The proposed substation area will be graded. Topsoil is removed and the substation area is graded and compacted to final elevation.

- Foundation Installation: Structure foundations will be prepared and/or installed within the substation area. Foundations can include screw pile, concrete caisson, concrete pad or precast pads. Soil conditions may require other types of foundations based on the engineering requirements.

- Spill Containment Installation: The secondary oil containment is installed in the area around the substation power transformer to provide assurance that in the event of an oil release from the substation transformer that the oil is contained within the substation site for appropriate removal and cleanup.

- Equipment: The following general equipment will be used during the construction of the substation:
  - Tracked excavators
  - Skid steers
  - Pick-up trucks
  - Transport trucks
  - Loaders
  - Cranes
  - Graders
  - Dump trucks
  - Site trailers and site offices

- Substation Assembly and Erection: Materials, structures, equipment and sub-assemblies are transported to the work area and installed according to engineering plans.

- Substation Commissioning: Following the completion of all required construction and quality control, final commissioning is completed to ensure the Facility can be energized and placed into service.

Removal of Temporary Works and Site Reclamation

Once construction has been completed, all temporary works will be removed, and the site will be appropriately graded. The site will either be left to revegetate naturally or seeded. The following equipment is expected to be used in this process:

- Excavator and/or backhoe
- Grader
- Hydroseeder (if natural revegetation is not selected)
- Light trucks

Commissioning

The Project will undergo a series of inspections and tests for mechanical, electrical, and operational controls prior to delivery and installation. Once the start-up sequence has been initiated, another series of performance checks for safety systems will be completed by qualified electrical engineers. All quality control tests will be carried out by the electrical engineering contractor. Rock anchors will be tested. Additional testing may also be required for transformers, power lines, and substation components; all of which will be performed by qualified engineers and technical personnel. When the transmission lines have cleared all tests, the commissioning of the units can begin.

3.3.2 Operations & Maintenance

Maintenance will conform to original equipment manufacturer specifications, industry best management practices (BMPs), and standard operating procedures.

The life span of the Project is estimated to be 80 years; however, the transmission line towers and conductors proposed for the crossing have a typical life span of approximately 100 years. During this time, roads will be used to access the transmission towers by staff and maintenance personnel. The roads will be maintained with additional gravel and grading, as required. During the winter months, roads used for the Project will be plowed, sanded, and/or salted, as required for driving safety and to ensure access to all site locations in the event of an emergency.

A vegetation management plan will be initiated to ensure that access roads and tower locations remain clear of vegetation. Timing of vegetation management will depend on site specific conditions and requirements by the Proponent and/or their operations and maintenance contractors.

Due to the potential for public access to the transmission towers, signage will be affixed and maintained on all access roads to provide essential safety information such as emergency contacts and telephone numbers, speed limits, and the hazards associated with being in proximity to the transmission towers and transmission lines. These signs will be maintained during the life of the Project. The Proponent is also considering the installation of gates on private roads leading to the transmission structures to restrict unauthorized access.

Scheduled maintenance and line inspection work will be carried out periodically. Actual ground inspection may be completed every three to five years. Maintenance work may require the use of a helicopter and a variety of cranes for brief periods for replacement and repairs. Ground inspection may be conducted with an all-terrain vehicle (ATV) or on foot.

3.3.3 Decommissioning

Prior to decommissioning, NSECC will be provided with decommissioning plans for review and compliance with the Project's EA conditions.

Generally, the decommissioning phase will follow the same steps as the construction phase:

- Dismantling and removal of the towers from the Project Area.
- Decommissioning the tower foundations.
- Removal, recycling (where possible), and disposal of power collection system, conductor.
- Final clean up will include soil analysis in the substation to confirm no contamination remains.
- Removal of all other equipment and reinstatement and stabilization of land.

3.4 Project Schedule

Table 3.6 presents the Project schedule from EA registration to Project decommissioning.

Table 3.6: Project Schedule

Project Activity	Anticipated Timeline
EA Registration	March 2025
Post-EA Environmental Monitoring Programs	2025 and onward (as required by the EA Approval)
Geotechnical Assessment	Q3 2025
Detailed Engineering Design	Q4 2025
Clearing	Q1 2026
Construction	2026
Commissioning	2027
Operation	2027 to 2107
Decommissioning	2107

4.0 PROJECT SCOPE & ASSESSMENT METHODOLOGY

As a Class 1 EA, this Registration Document and supporting studies have been developed to meet all requirements under Section 9(1A) of the *Environment Act*, S.N.S 1994-95, c. 1. As such, this submission has been prepared in accordance with:

- A Proponent's Guide to Environmental Assessment (NSECC, 2017)
- The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009)

The Project Team has engaged with the following regulatory bodies to provide input and advice into the EA scope and planning for the Project:

- NSCCTH
- NSECC
- NSNR
- Nova Scotia Office of L'nu Affairs (OLA)
- Transport Canada (TC)
- Canadian Coast Guard (CCG)
- Atlantic Pilotage Association (APA)
- Canadian Wildlife Service (CWS)
- NAV Canada

4.1 Assessment Scope & Approach

EA is a planning tool used to predict the environmental effects of a proposed project, identify measures to mitigate adverse environmental effects, and predict the significance of any effects after the application of mitigation measures.

The EA focuses on Valued Components (VCs), which are specific components of the atmospheric, geophysical, biophysical, and socioeconomic environments that the Project has the potential to interact with. If VCs are altered by the Project, it may be of concern to the Mi'kmaq of Nova Scotia, regulators, stakeholders, and/or the public. The scope of the EA for this Project includes:

- Identify VCs with which the Project may interact with (by activity and phase) within established spatial and temporal boundaries.
- Establish the existing conditions for VCs.
- Identify potential interactions between the Project and the VCs.
- Assess the potential effects that could occur from the interaction.
- Identify mitigation measures to reduce or eliminate those effects.
- Evaluate the significance of the environmental effects after the implementation of mitigation measures using VC-specific criteria.
- Identify monitoring or follow-up programs to verify predictions and/or evaluate the need to implement adaptive management.

4.2 Identification of Valued Components

The following VCs were identified based on the experience of the Project Team and through engagement with the Mi'kmaq of Nova Scotia, regulators, stakeholders and the public:

- Biophysical environment
    - Weather, climate, air quality, sound, electromagnetic fields
    - Geology, hydrogeology/groundwater
    - Watercourses, fish and fish habitat, marine environment
    - Wetlands

    - Terrestrial flora, fauna (including mainland moose), habitat
    - Bats
    - Avifauna
    - Species at risk (considered in the appropriate VC chapter, as necessary)

- Socioeconomic environment
    - Economy, land use, recreation and tourism
    - Archaeological and cultural resources

4.3 Boundaries of the Assessment

Spatial and temporal boundaries were established for the EA to evaluate potential Project interactions with VCs.

4.3.1 Spatial Boundaries

Spatial boundaries are considered separately for each VC and are typically based on natural system boundaries or administrative/political boundaries, as appropriate. The following spatial boundaries have been established for the effects assessment:

- Local Assessment Area (LAA) – the area where Project-related effects can be predicted or measured for assessment. The LAA is VC-specific and defined in each VC chapter.
- Regional Assessment Area (RAA) – includes the area in which accidents and malfunctions are assessed. The RAA is VC-specific and defined in each VC chapter.

Additional boundaries were also identified for the purpose of field data collection and to describe the area containing Project infrastructure. As detailed in Section 3.1, a Study Area was established based on land parcels (i.e., PIDs) that are included in the development area (Table 3.1, Drawing 1.1) and represents the boundaries of where field data collection was completed. The Project Area includes the physical footprint where the direct disturbance is expected to occur, and infrastructure will be placed.

4.3.2 Temporal Boundaries

The temporal boundaries in Table 4.1 apply to all VCs unless otherwise stated in the individual chapters.

Table 4.1: Temporal Boundaries

Project Phase	Temporal Boundary
Site Preparation and Construction	6 months (approximately)
Operation and Maintenance	80 years
Decommissioning	6 months (approximately)

4.4 Potential Project-Valued Component Interactions

The potential interactions between the Project and the VCs, by phase, are presented in the individual VC chapters (Sections 7 to 9), following a description of existing conditions. Where an adverse effect on a VC is identified, strategies for mitigation, avoidance, or compensation are proposed. Where possible, mitigation measures are incorporated into Project design to eliminate or reduce potential adverse effects.

4.5 Effects Assessment Criteria

The significance of the effects after mitigation is determined using defined criteria. Most criteria will be the same for all VCs (Table 4.2); however, the magnitude criteria are VC-specific and are provided in the individual chapters.

Table 4.2: Effects Assessment Criteria

Rating Criteria	Rating
Magnitude The amount of change in measurable parameters or the VC relative to existing conditions	VC-specific as outlined in individual chapters
Geographic Extent The geographic area in which an effect occurs	**Project Area –** residual effects are restricted to the Project Area **LAA –** residual effects extend into the local assessment area **RAA –** residual effects extend into the regional assessment area
Duration The time required until the measurable parameter or VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short term –** residual effect restricted to no more than the duration of the construction phase (~6 months) **Medium term –** residual effect extends through the operation and maintenance phase (80 years) **Long term –** residual effect extends beyond the decommissioning phase (>80 years)
Frequency Identifies how often the residual effect occurs and how often in a specific phase	**Single event –** occurs once **Intermittent –** occurs occasionally or intermittently during one or more phase of the Project **Continuous –** occurs continuously
Reversibility Describes whether a measurable parameter or the VC can return to its existing condition after the activity ceases	**Reversible –** the residual effect is likely to be reversed after the activity is completed **Irreversible –** the residual effect is unlikely to be reversed **Partially reversible** – the residual effect will be partially reversed after the activity is completed.

If, based on the criteria in Table 4.2, a residual effect is identified, its significance is then evaluated based on the Criteria in Table 4.3.

Table 4.3: Definition of Significant Residual Environmental Effect

Significance Level	Definition
Significant	The potential effect could threaten sustainability of a resource or result in a moderate to high change in baseline levels within the RAA. The effect is anticipated to last for a medium to long-term duration and will occur on a continuous basis. Research, monitoring, and/or recovery initiatives should be considered and may be required.
Not Significant	The potential effect may result in a negligible to low change in a resource or condition in the RAA but should return to baseline levels within the short-term and occur only once or on an intermittent basis. Research, monitoring, and/or recovery initiatives are not recommended.

4.6 Monitoring & Follow-Up

Follow-up programs and monitoring, in some cases developed in conjunction with regulators, may be recommended to verify predictions and/or assess effectiveness of mitigation measures and the need to implement adaptive management. Follow-up programs and monitoring are presented, as necessary, in individual VC chapters.

4.7 Assessment for Wild Species

The assessment for wild species (e.g. birds, mammals, fish, plants, etc.) was conducted in accordance with the Guide to Addressing Wildlife Species and Habitat in an EARD (NSECC, 2009). Special consideration of species at risk (SAR), listed under SARA (Canada, 2002) and the Nova Scotia *Endangered Species Act* (ESA, Nova Scotia, 1998a), along with species of conservation interest (SOCI), which, for the EARD includes species that are:

- Assessed as ‘Endangered’, ‘Threatened’, or ‘Special Concern’ by the Committee on the Status of Endangered Wildlife in Canda (COSEWIC) that are not already listed under SARA.
- Have a subnational rank (S-Rank) or ‘S3’, ‘S2’, or ‘S1’ from the Atlantic Canada Conservation Data Centre (ACCDC).

For SAR, said species and their dwellings are provided protection under SARA, ESA, and the *Biodiversity Act* (Nova Scotia, 2021).

Priority species were developed based on the SAR and SOCI identified through desktop review or field assessments that have the potential to interact with the Project through their presence, or the potential for presence, in the Study Area.

5.0 MI’KMAQ OF NOVA SCOTIA

The Mi’kmaq are the founding people of Nova Scotia and currently live throughout the province including 13 Mi’kmaq communities (OLA, 2015). The Project is located within the Mi’kmaq territory called Unama’kik, which means ‘Mi’kmaw territory (Parks Canada, 2023).

The Mi’kmaq in the provinces of Nova Scotia, New Brunswick, and Prince Edward Island, and the Gaspé Peninsula in Quebec, are founded on land historically occupied by the ancestors of the Mi’kmaq. The earliest evidence of the Mi’kmaq of Nova Scotia in the Maritimes Region indicates that the ancestors of the Mi’kmaq have existed on the land for more than 11,000 years (Mi’kmawey Debert Cultural Centre, 2024).

The Mi’kmaq of Nova Scotia have established Aboriginal and Treaty rights, including the right to fish for a “moderate livelihood” which flows from the Peace and Friendship Treaties, and Aboriginal rights to hunt, fish, and gather for food, social, and ceremonial purposes, more broadly referred to as “traditional” purposes. Mi’kmaq rights are communal rights and therefore shared amongst all members of the Mi’kmaq Nation in Nova Scotia.

The Crown has a duty to consult with the Mi’kmaq of Nova Scotia, which is achieved in accordance with the Mi’kmaq-Canada-Nova Scotia Consultation Terms of Reference. As per Supreme Court of Canada instruction and subsequent guidance from governments, such as the Updated Guidelines for Federal Officials to Fulfill the Duty to Consult (Government of Canada, 2011) and the Proponents' Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia (Office of Aboriginal Affairs, 2012), the Crown may delegate procedural aspects of consultation to proponents. However, the duty to consult, and ultimate decision-making authority, remains with the Crown. The results of the Proponent’s Mi’kmaq of Nova Scotia engagement program and EA development is expected to be considered by the provincial government in the EA decision-making process.

For the purposes of consultation, 11 of the 13 Mi’kmaq communities are represented by the Kwilmu’kw Maw-klusuaqn Negotiation Office (KMKNO), which reports to the Assembly of Nova Scotia Mi’kmaq Chiefs. At this time, Millbrook First Nation and Sipekne’katik First Nation represent their own communities in consultation through their elected Chiefs and Councils.

The nearest Mi’kmaq community to the Project is the Paq’tnkek Mi’kmaw Nation community on the Paqtnkek-Niktuek Reserve (No. 23) with a population of 614 individuals (2023, Paq’tnkek). Paq’tnkek is located approximately 30 km west of the Project. Other, further Mi’kmaq communities include Potlotek First Nation on the Chapel Island (No. 5) Reserve (population 405; 46 km northeast), and the We’koqma’q First Nation on the Whycocomagh Reserve (No. 2) (population 877; 48 km north).

The nearest known Mi’kmaq placename to the Project Area is Ki’taqne’kati which means “Steep Creek” (Ta’n Weji-sqalia’tiek, 2024). This placename corresponds to the area of Steep Creek along Highway 344.

5.1 Engagement

As an integral component of any project development activity in Nova Scotia, the Proponent prioritized engagement with Nova Scotia Mi'kmaq communities.

The Proponent initiated consultation with OLA in May 2024 and followed up with additional Project information in October 2024.

The Proponent notified the Mi'kmaq of Nova Scotia of the Project, extended an offer to meet, provided as much information as possible, met with the KMKNO, completed a Mi'kmaq Ecological Knowledge Study (MEKS) with Membertou Geomatics, and documented the engagement process (Table 5.1) per steps one through six of the Proponents' Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia (Office of L'Nu Affairs, 2012).

On January 23, 2025, Project introduction letters which included an offer to meet and an invitation to the February 5 and 6, 2025, Information Sessions were provided via email to Membertou First Nation, Potlotek First Nation, Paq'tnkek First Nation, Pictou Landing First Nation, Eskasoni First Nation, L'stikuk First Nation, Wagmatcook First Nation, We'koqma'q First Nation, Sipekne'katik First Nation, and Millbrook First Nation. This letter was also provided to the KMKNO.

Millbrook First Nation responded with a question on capacity funding for consultation and the Proponent offered to meet to discuss the Project and to better understand what capacity funding is required to assess the Project. The Proponent and Millbrook First Nation are in the process of organizing this meeting.

The Proponent is also initiating the community-based consultation process, Sipekne'katik Governance Initiative, with Sipekne'katik First Nation for all EverWind Projects, including the EverWind Strait Crossing Transmission Line Project. The Proponent and Sipekne'katik First Nation are in the process of organizing this meeting.

On February 4, 2025, a meeting was held between the KMK (Patrick Butler; Senior Mi'kmaq Energy & Mines Advisor) and the Proponent (Jeff Bonazza; Director of Environment and Permitting and Mark Stewart; Director of Engagement). A presentation was provided by the Proponent that outlined the need for the Project, provided Project details, and EA registration timing. Mr. Butler indicated that he followed up individually with all of the Chiefs of the communities that KMK represents about the Project and requested the presentation to provide to the communities as well. Mr. Butler inquired about the Memorandum of Understanding and whether it considers all of EverWind's project phases. Mr. Butler also asked about the clearance height of the transmission line crossing above the Strait of Canso and whether it may cause any restrictions.

Table 5.1 presents a log of engagement with the Mi'kmaq of Nova Scotia.

Table 5.1: Engagement with the Mi'kmaq of Nova Scotia

First Nation / Organization	Representative(s)	Communication Details
First Nations		
Eskasoni First Nation	Chief Leroy Denny Michael Denny Steve Parsons	Project introduction letters sent on January 23, 2025. Awaiting response.
L'sitkuk First Nation	Chief Carol Dee Potter	Project introduction letters sent on January 23, 2025. Awaiting response.
Membertou First Nation	Chief Terrance Paul	Email sent on January 23, 2025. Letter of support received on February 18, 2025 (Appendix A).
Millbrook First Nation	Chief Robert Gloade Claire Marshall Gerald Gloade	Project introduction letters sent on January 23, 2025. Ms. Marshall responded with a question regarding capacity funding for consultation. EverWind requested a meeting to discuss the portfolio of projects
Paq'tnkek First Nation	Chief Cory Julian	Project introduction letters sent on January 23, 2025. Letter of support received on February 19, 2025 (Appendix A).
Pictou Landing First Nation	Chief Tamara Young	Project introduction letters sent on January 23, 2025. Awaiting response.
Potlotek First Nation	Chief Wilbert Marshall	Project introduction letters sent on January 23, 2025. Letter of support received on February 18, 2025 (Appendix A).
Sipekne'katik First Nation	Chief Michael P Sack Cheryl Maloney	Project introduction letters sent on January 23, 2025. Awaiting response.
Wagmatcook First Nation	Chief Norman Bernard Donald Hanson	Project introduction letters sent on January 23, 2025. Awaiting response.
We'koqma'q First Nation	Chief John Leonard Bernard	Project introduction letters sent on January 23, 2025. Awaiting response.
Organizations		
KMKNO	Tracy Menge Patrick Butler Twila Gaudet	Project introduction letters sent on January 23, 2025. KMKNO cc'd EverWind on emails to represented First Nations. Follow-up meeting held on February 4, 2025.

5.1.1 Review of Concerns

Key areas of interest identified through engagement were related to the following:

- Capacity funding
- Clearance height of the transmission line over the Strait of Canso

The Proponent is committed to ensuring the Mi'kmaq of Nova Scota can meaningfully engage and supports capacity funding. The Proponent responded on January 29, 2025 to the request for capacity funding with an invitation to meet to discuss the Proponent's projects and better understand the capacity funding that is required.

Based on current use cases, the Proponent does not anticipate any restrictions on active vessel movements in the Strait of Canso. Under all thermal and typical icing scenarios and high tide, the minimum clearance between the conductors and the water at midspan will be 75 m. This clearance applies only at the center of the crossing and gradually increases towards each shoreline. The transmission line is being designed to structurally withstand extreme ice loading conditions in excess of typical on-land transmission lines. The Proponent has committed to installing transmission line sag monitoring systems and if, under the low probability of an extreme ice load circumstance, sag reduces the clearance between the Strait of Canso and the conductor below 75 m, the Proponent will implement additional mitigations (e.g., manual removal of ice from conductors) to maintain the 75 m minimum clearance at midspan.

Additionally, the Proponent has consulted with the CCG and conducted an assessment of the Project's potential interference with Aids to Navigation; no impacts were identified (Table 6.1).

5.1.2 Ongoing Engagement

The Proponent is committed to on-going, meaningful engagement and economic reconciliation with the Mi’kmaq of Nova Scotia and will continue to provide regular updates and seek feedback throughout the life of the Project. Additionally, the Proponent is developing a Mi'kmaq Benefits Agreement (MBA) with the Assembly of First Nations and the KMKNO. A Memorandum of Understand was signed with the Assembly in 2022, and a binding Memorandum of Agreement is set to be signed in early 2025.

The Proponent is also committed to minimizing footprint disturbance and impacts to the Mi’kmaq of Nova Scotia while generating positive economic and environmental benefits. The Proponent will develop a Mi’kmaq Communication Plan that outlines an ongoing two-way communication process throughout the life of the Project.

5.2 MEKS

A MEKS presents a thorough and accurate understanding of the Mi’kmaq’s use of the land and resources within an area. It is a report of gathered, identified, and documented ecological knowledge which is held by individual Mi’kmaq people. In addition, the MEKS report provides information on proposed Project activities that may impact the traditional land and resources of the Mi’kmaq. The MEKS for this Project was developed by Membertou Geomatics Solutions and was geographically scoped to include an evaluation of the Project Area along with a 5 km buffer surrounding the Project Area (referred to as the “Study Area” in the MEKS report). Due to the sensitive nature of the information presented in the MEKS, a copy of the MEKS will be provided directly to the required reviewers under separate cover. A summary of the findings of the MEKS is included in this section.

MEKS considers the land and water areas in which the proposed Project is located to identify what Mi’kmaq traditional use activities have occurred or are currently occurring within the “Study Area”; and what Mi’kmaq ecological knowledge presently exists with respect to the area. This process is done in accordance with the Mi’kmaq Ecological Knowledge Protocol, 2nd Edition, which was established by the Assembly of Nova Scotia Mi'kmaq Chiefs and speaks to the process, procedures, and results that are expected of a MEKS.

The MEKS consists of two major components:

- Mi'kmaq Traditional Land and Resource Use Activities
    - Considers both past and present uses of the area.
    - Uses interviews as the key source of information regarding Mi'kmaq use.

- A Mi'kmaq Significance Species Analysis
    - 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).
    - Considers resource availability/abundance in the area (along with adjacent areas or in other areas outside), their use, and their importance, with regards to the Mi'kmaq.

Interviews were undertaken by the MEKS Team with Mi'kmaq knowledge holders from the First Nation communities nearest the Project. The interviews took place between June and December 2024. A summary of the MEKS findings is provided below.

Traditional Use in the MEKS Study Area (i.e., 5 km surrounding the MEKS Project Area)

- There is recent and historic Mi'kmaq use within the MEKS Study Area[2].
- Trout fishing and rabbit hunting were reported with the highest frequency in the MEKS Study Area.
- These activities took place in each of the current use (28%), recent past (50%), and historic past (22%) timeline categories

Traditional Use in the MEKS Project Area (i.e., the EA Study Area)

- There is recent and historic Mi'kmaq use within the MEKS Project Area.
- Trout and mackerel fishing were reported with the highest frequency in the MEKS Project Area.
- These activities took place in each of the current use (31%), recent past (62%), and historic past (7%) timeline categories

Historic Review

- There are very few known archaeological finds/sites within the vicinity of the Study Area, and none within the MEKS Project Area.
- There are known sources of Black Ash (*Fraxinus nigra*) within a proximity to the MEKS Study Area. Black Ash was and is a valuable resource for tool handles and craft-basket making to early peoples then and to the Mi'kmaq today.

[2] "Current Use" – a time period within the last 10 years; "Recent Past" – a time period from the last 11 – 25 years ago; "Historic Past" – a time period previous to 25 years past

- There is sparse suitable stone for making tools found within the MEKS Study Area.
- Traditional hunting territories were assigned to local Mi'kmaq hunters along the Strait of Canso.
- A review of Specific Claims shows no current and active First Nation Claims within or that affect the MEKS Project Area or Study Area.

No recommendations were provided in the MEKS.

5.3 Mi'kmaq Partnerships

The Proponent has equity partnerships with Paq'tnkek, Potlotek, and Membertou First Nation for various aspects in a portfolio of projects. Paq'tnkek, Potlotek, and Membertou First Nation have provided support letters for the Project (Appendix A).

5.4 Commitments to the Mi'kmaq of Nova Scotia

The Proponent is committed to the following mitigation measures to reduce the Project's impact on traditional practices and Mi'kmaq archaeological features (if identified), as follows:

- Provide the Mi'kmaq of Nova Scotia an opportunity to walk the site prior to clearing to document sensitive sites and harvest traditional plants.
- Halt work during construction if archaeological deposits or human remains are encountered. The Proponent will immediately contact NSCCTH and the KMKNO Archaeological Division.
- Provide a tour of the Project to the Mi'kmaq of Nova Scotia, once constructed.
- Develop a Mi'kmaq Communication Plan.
- Develop a Complaints Resolution Plan.
- Continue to work with the Assembly First Nations to develop a MBA that will enable the Mi'kmaq of Nova Scotia to actively participate in the Project through education, training, mentorship, employment, and procurement opportunities.
- Continue to engage with the Mi'kmaq of Nova Scotia for the life of the Project.
- Include the Project as a component of the MBA which includes training, education, mentoring, employment and procurement opportunities for the Mi'kmaq of Nova Scotia implemented through the Assembly of Nova Scotia.

6.0 GOVERNMENT AND PUBLIC ENGAGEMENT

The Proponent is committed to meaningful engagement with government, public, stakeholders, and the Mi'kmaq of Nova Scotia. To date, the Project Team has participated in meetings, delivered presentations, established a community liaison committee (CLC; for the EverWind Portfolio of Projects in Guysborough), and hosted 14 open house events. The first 11 were held in the Municipality of the District of Guysborough and the Municipality of the District of St. Mary's detailing EverWind's Phase 2 developments, while one each in the town of Mulgrave, the town of Port Hawkesbury, and the Municipality of the County of Richmond, were held specifically detailing the EverWind Strait Crossing Transmission Line Project.

Associated poster, notices, and feedback forms are provided in Appendix A.

6.1 Engagement with Government Departments, Agencies & Regulators

The Project Team has met with government entities and officials representing federal, provincial, and municipal jurisdictions (Table 6.1) to open lines of communication about the Project and ensure all regulatory requirements are met.

Table 6.1: Government Meetings and Events

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
Federal Government		
Transport Canada (TC)	Jason Flanagan Carl Ripley Allison Baker	October 31, 2024 Project introduction email sent to TC and request for a call made to discuss the Project in more detail. November 19, 2024 Presentation provided to TC. TC notified EverWind of post-EA approvals and of navigation aids in the Strait of Canso.
Canadian Coast Guard (CCG)	Shannon Sellers	November 21, 2024 Provided the CCG with an introduction to the Project. Provided crossing specifications (crossing location, tower heights, etc.) to confirm no interference with navigation aids in the Strait of Canso. Offered a call to discuss the Project in more detail. December 4, 2024 Elevations of lights on aids to navigation provided by CCG. CCG recommended contacting the APA. December 9, 2024 EverWind requested spatial files of aids to navigation. December 10, 2024 CCG provided spatial file of the Aids to Navigation (fixed and floating) in the Chedabucto Bay/Strait of Canso system.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
		January 28, 2025 EverWind confirmed that there is no expected interference between the Project and the aids to navigation, based on an assessment completed by Strum. EverWind also noted that consultation with APA has occurred, as recommended by CCG.
Atlantic Pilotage Association (APA)	David Anderson	November 21, 2024 Provided the APA with the crossing specifications (crossing location, tower heights, etc.) to confirm that there are no concerns with pilot boats in the Strait of Canso. Offered a call to discuss the Project in more detail. December 6, 2024 APA identified potential concerns with possible future impacts to other port users of the Strait due to air draft restrictions. January 17, 2025 EverWind informed the APA of ongoing engagement with several industrial users of the Strait of Canso to provide information on the Project. EverWind also inquired about typical vessel traffic routes in the Strait of Canso. January 20, 2025 The APA indicated that the crossing's mid-span corresponds with the navigation ranges that commercial traffic will be following.
Canadian Wildlife Service (CWS)	Suzanne Wade	January 28, 2025 Introduction to Project and provision of avian survey methods in advance of EA Registration.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
NAV Canada		February 25, 2025 EverWind informed NAV Canada of the four tower locations and heights proposed for the Project.
Atlantic Canada Opportunities Agency (ACOA)	The Honourable Gudie Hutchings Neil MacIsaac Kevin Lemkay Chuck Maillet Joe Cashin	February 11, 2025 General overview of EverWind Portfolio of Projects including this Project.
Members of Parliament	Mike Kelloway	February 11, 2025 General overview of EverWind Portfolio of Projects including this Project.
Provincial Government		
NSCCTH	Beth Lewis	September 3, 2024 On Behalf of the Proponent, CRM Group acquired Heritage Research Permit (HRP) A2024NS173 to conduct ARIA studies within the Study Area. The final report will be provided to CCTH upon completion.
NSECC	Helen MacPhail Bridget Tutty Mark McInnis Lynda Weatherby	May 10, 2024 Project introduction, EA study design including biophysical survey plans, stakeholder engagement plans, and anticipated timelines. October 4, 2024 Confirmation of crossing type (overhead), update on public and First Nations engagement, and update on EA registration timing. December 2, 2024, January 2, 2024, and February 9, 2025 Updates on timing for EA registration provided to the EA Branch.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
NSNR	Mark McGarrigle	May 10, 2024 Project introduction, EA study design including biophysical survey plans, stakeholder engagement plans, and anticipated timelines. November 22, 2024 Confirmation of crossing type (overhead) and details on biophysical surveys targeting avifauna as there are potential interactions with birds and bats with an overhead crossing (compared to other crossing methods). January 28, 2025 Avian survey methods provided to NSNR in advance of the EA registration. February 5, 2025 NSNR confirmed receipt of avian survey methods.
Office of L'nu Affairs	Gillian DesRoche	May 17, 2004 Project introduction, stakeholder and Mi'kmaq of Nova Scotia engagement plans, MEKS update, and anticipated timelines. October 4, 2024 Confirmation of crossing type (overhead), update on public and Mi'kmaq engagement, and update on EA registration timing.
Members of the Legislative Assembly (MLA)	Minister Greg Morrow Minister Trevor Boudreau	January 24, 2025 Project information email and invitation for the open houses sent to local MLAs Minister Greg Morrow and Minister Trevor Boudreau

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
Municipal Government		
MODG Council and Staff	Sean O'Connor	December 17, 2024 Provided update on the EverWind Portfolio of Projects in Guysborough and discussed specifically this Project, proposed presentation to industry representatives and intended open houses.
Richmond County Council and Staff	Martin Thomsen	January 20, 2025 Shared the presentation the Proponent was delivering to the Strait of Canso industrial users and offered to walk through the presentation with the energy team, Chief Administrative Officer, Warden, and councillors.
	Lois Landry Amanda Mombourquette Troy MacCulloch Martin Thomsen	February 6, 2025 Richmond County Council and Staff attended the open house presentations and discussed the Project with the Project Team. February 12, 2025 Follow up email sent to Richmond County Council and Staff with specific design considerations February 19, 2025 Follow up meeting to walk through a presentation and discuss alternative considerations.
	Lois Landry Amanda Mombourquette	February 11, 2025 General overview of EverWind Portfolio of Projects including this Project.
Town of Port Hawkesbury Mayor and Council	Terry Doyle Iaian Langley	February 6, 2025 Attended the open house presentations and discussed the Project with the Project Team.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
	Iaian Langley	February 6, 2025 The Proponent presented to the Strait of Canso Superport Board where representatives from the Town of Port Hawkesbury, Mulgrave, and Inverness County were present. February 20, 2025 Discussed the Project and the structure of the EverWind Strait Region CLC.

6.1.1 Review of Government Concerns

As outlined in the above table, discussions with federal regulators focused on the crossing location and design, status and timing of the EA registration, and post-EA permitting requirements. TC inquired about clearance between the Strait of Canso and the conductor and recommended consulting with the CCG and the APA.

The CCG also recommended consulting with the APA and noted that a review of potential interference on Aids to Navigation should be completed. The Proponent retained Strum to assess for potential impacts and no expected interference was identified based on the elevation of the Aids to Navigation and the height of the transmission lines and location of associated infrastructure.

The APA identified potential concerns with possible future impacts to other port users of the Strait of Canso due to air draft restrictions and recommended that the Proponent engage with industrial users of the Strait Canso, north of the proposed crossing location (refer to Section 6.2.4 for details on this engagement).

Discussions with provincial regulators focused on plans for the EA, including an introduction to the Project, the biophysical studies planned, public engagement plans, regulatory engagement plans, and engagement with the Mi'kmaq of Nova Scotia. No concerns were raised with the Proponent by provincial regulators.

The Project Team has had engagements with the MOR, the MODG, and the Town of Port Hawkesbury. These engagements focused on crossing location and design, status and timing of the EA registration. The MOR and the Town of Port Hawkesbury noted concerns related to the transmission line crossing being a potential barrier to future use within the Strait of Canso. Follow up meetings were held with municipal representatives to discuss alternative considered and mitigation strategies to negotiate constraints.

Engagement with government officials will continue through development, construction, and operational phases of the Project.

6.2 Public and Stakeholder Engagement

The Project Team has been involved in formal engagement activities with the public and stakeholders, including digital communications, newsletters, presentations, and open house events, to ensure the community was made aware of the Project and given opportunity to receive information, ask questions, and share local knowledge.

6.2.1 Digital Communications

The Proponent has maintained a website since July 4, 2024 (https://guysboroughwind.ca/home). It includes information about the Project, Proponent, and the CLC. This publicly accessible website continues to be updated regularly.

A dedicated email inbox was set up on July 14, 2023, (guysboroughwind@everwind.ca) to address all aspects of the EverWind Portfolio of Projects in Guysborough. The email inbox is actively monitored by the Proponent. The Proponent has invited the public to reach out and engage with the lead contact through the Project social media channels, including LinkedIn and Facebook. The public was specifically invited to provide feedback and questions.

6.2.2 Newsletters

The Proponent publishes a monthly newsletter to their social media (LinkedIn, Facebook) and mailing lists, which provides updates on the EverWind Portfolio of Projects. Sign-up for this newsletter is available on both the Project website, as well as at the open houses, as detailed below.

6.2.3 Public Open House Events

Eleven public open houses took place throughout Guysborough County from St. Francis Harbour to Sherbrooke in May and June 2024 (Table 6.2). The objective of these early engagement sessions was to introduce the community to the EverWind Phase 2 Projects, present the general Project location, and gather community feedback to inform the Projects' design. The Project Team presented posters detailing the full scope of the EverWind Portfolio of Projects, answered questions, and took feedback from the local community and various stakeholders in each of the different communities where Open Houses were held. The open houses were publicized in the local paper, on local radio and delivered to all residents via a Canada Post mail drop.

Three additional open houses were held on February 5 and 6, 2025 in Mulgrave, Port Hawkesbury, and West Arichat. These open houses presented details of this specific Project to the local communities in closest proximity to the Project (Table 6.2; Figure 6.1).

Table 6.2: Open House Summary

Open House Date	Location	Number of Public Attendees
May 28, 2024	Boylston Community Centre	10
May 28, 2024	Lincolnville Community Hall	11
May 29, 2024	Chedabucto Lifestyle Complex, Guysborough	29
May 30, 2024	St. Francis Harbour Hall	27
June 4, 2024	Erinville Fire Hall	6
June 4, 2024	Larry's River Communities Along the Bay multi Use Facility	7
June 5, 2024	Harbourview Community Centre, New Harbour	6
June 5, 2024	Goldboro Interpretive Centre	14
June 10, 2024	District of St. Mary's Lions Club, Sherbrooke	35
June 11, 2024	Country Harbour Community Centre	9
June 11, 2024	Port Bickerton Fire Department and Community Centre	11
February 5, 2025	Mulgrave Fire Hall	33

Open House Date	Location	Number of Public Attendees
February 6, 2025	Port Hawkesbury Civic Centre	22
February 6, 2025	Acadiaville Community Centre, West Arichat	8

Figure 6.1: Open house from February 2025

Notices of the three most recent open houses detailing Project-specific information were published on January 22 and January 29, 2025 in the Guysbourough Journal and the Port Hawkesbury Reporter (Appendix A). Two weeks in advance of the open houses, notices were posted at EverWind's Guysborough office, the Guysborough Post Office, the Mulgrave Post Office, the Independent Grocer (Guysborough), the entrance of the MODG office (Guysborough), the Port Hawkesbury Civic Centre, the Arichat Post Office (Richmond County) and at the Acadiaville Community Centre (Richmond County). Additionally, EverWind representatives visted 17 residences in proximity to the Steep Creek side of the Project and spoke with the homeowners to invite them to the open houses or left an invitation at the door, if the homeowner was not present.

Sign-in sheets were available for participants to provide their contact information and enable follow up. Exit surveys were also avaibile for participants to provide anonymous feedback. Feedback received on exit surveys was very positive and showed an appreciation for the open house format and the project details provided (Appendix A). All materials presented at the engagement sessions were also made available on the Project website.

6.2.4 Engagement with Strait of Canso Industrial Users

The Proponent met with several industrial users of the Strait of Canso to provide an overview of the Project, Project details, and EA registration timing. These industrial users and the dates the meetings took place are as follows:

- Martin Marietta (January 9, 2025)
- Cabot Gypsum (January 13, 2025)
- Melford Terminals (January 14, 2025)
- Port Hawkesbury Paper (January 13, 2025)
- Strait of Canso Superport (January 10, 2025, and February 6, 2025)
- McNally Construction (February 25, 2025).

Generally, the industrial users of the Strait of Canso were supportive of the Project and did not have concerns. The following list outlines the questions and comments noted during these meetings:

- Overhead crossing may present a constraint that is not currently present in the Strait of Canso (e.g., for towing erected floating offshore wind turbines, if erected north of the Project).
- Will there be any restrictions to vessel movement during stringing activities?
- Was an alternatives assessment completed?
- What is the height of the suspension towers compared to those at the existing Aulds Cove transmission line crossing?
- Who will EverWind employ? How will EverWind fill these jobs?

Refer to Section 6.2.6 for a review of these comments and the responses provided.

The Proponent plans to continue engagement with these industrial users and set up meetings with other stakeholders in the area that it has not yet met with.

6.2.5 Community Liaison Committee

A CLC has been established for the EverWind Portfolio of Projects in Guysborough called the Wind Farm 1 CLC, with the first meeting having been held on November 12, 2024 (Table 6.3; Appendix A). The EverWind Strait Region CLC also meets regularly to discuss the development of the Facility in Point Tupper.

Table 6.3: Wind Farm 1 CLC Meeting Summary

CLC Meeting Date	Agenda
November 12, 2024	Introduction, discussed objectives and the Terms of Reference
February 11, 2025	Project update and community feedback discussed

6.2.6 Engagement with Neighbouring Landowners

The Proponent engaged with neighbouring landowners during the design process. Engagement with the nearest residential receptor on the Steep Creek side of the Study Area resulted in the transmission line alignment being adjusted to allow for a greater setback to their residence.

6.2.7 Office

A publicly accessible EverWind office is open in Guysborough. Office hours were advertised in the EverWind e-newsletter beginning in May 2024. Community members are encouraged to drop by the office to ask questions or discuss concerns with a Project representative.

6.2.8 Review of Concerns

Issues and concerns raised by the public have been grouped into broader categories and reference to the relevant section(s) of the EA, which provide additional details, are referenced (Table 6.4).

Table 6.4: Comments Received from the Public

Key Issues	Community Question/Concern	Proponent Response	Section of EA
Socio Economic Impacts			
Local Energy Access	Will the community have access to electricity generated by the project, or will all of it be exported?	Direct access to electricity from the Phase 2 wind farms will not be available to the community, as these projects will not be connected to the NS grid. However, EverWind's Phase 1 projects will be grid-connected, with an interrupter clause agreement in place with Nova Scotia Power Incorporated (NSPI), allowing energy to be directed to Nova Scotia residents in times of need. Additionally, excess energy is expected to spill into the NS grid during normal operations specific to Phase 1 projects.	2.2
Project Construction Timeline	When will construction begin for the transmission line and wind projects in Guysborough County?	Construction for both this Project and the first Phase 2 wind farm is expected to begin in Q1 2026, contingent on obtaining all necessary permits and approvals.	2.1 and 3.4

Key Issues	Community Question/Concern	Proponent Response	Section of EA
Transmission Infrastructure	What is the clearance distance from water to transmission line? Why not utilize a subsea cable or the existing pipeline to feed route the transmission crossing across the Strait without creating an overhead restriction? Was an alternatives assessment complete?	Under all thermal and typical ice load conditions and high tide, the minimum clearance from the waterline to the transmission line would be 75 m (at midspan). The primary factors influencing the decision to use an overhead transmission line instead of a subsea cable or horizontal directional drill were based on an alternatives assessment that analyzed cost, reliability, and maintenance along with environmental impacts, permitting timelines, and material lead times. While a subsea cable or HDD is technically possible to construct, a major concern is the extended repair and maintenance timelines and high construction costs. These cables are custom-ordered with long lead times, which could result in prolonged facility downtime if a failure occurs. Additionally, the feasibility of utilizing the existing pipeline was assessed and confirmed to be unviable as a solution, due to the volume and size of the required cables exceeding the available space in the pipeline.	2.1
Repairs to Public Roads	Who is responsible for fixing any damage that may occur to the roads during the construction and operation of the projects.	EverWind will establish a road use agreement with the Province and Municipalities, which will include terms requiring the Proponent to remediate any damage caused during construction and deliveries. All Project access roads will be constructed/upgraded and maintained at the cost of the Proponent.	3.3
Local Employment Opportunities	What job opportunities will be available for locals? When will hiring start, how many jobs will be created, and how can residents stay informed?	Local job opportunities will be available throughout all stages of the Project, spanning both construction and operations. During construction, employment will include roles in civil installation, such as land clearing, road building, forming, concrete supply, and grouting. Electrical installation jobs	8.1

Key Issues	Community Question/Concern	Proponent Response	Section of EA
		will cover overhead line work, electrical testing, and instrument installation, while turbine installation will require crane operators, component offloading personnel, and mechanical technicians. In the operations phase, ongoing employment opportunities will include high-voltage and medium-voltage electricians, wind technicians, road maintenance crews, administrative support, and inventory management personnel. EverWind will look to hold job fairs one to two months prior to the start of construction and is committed to employing local workers, where possible. To assess the economic contributions of EverWind's portfolio of Projects, EverWind engaged Deloitte to prepare an independent report estimating the economic impact of each phase. Their findings indicate that Phase 1 of construction is expected to contribute $1,271 million to gross domestic product (GDP), with $670 million in labour income, supporting approximately 5,190 full-time equivalent (FTE) jobs, and generating $311 million in government revenue. Once operational, Phase 1 is projected to contribute $344 million annually to GDP, with $51 million in labour income, supporting 820 FTE jobs per year, and generating $32 million in government revenue annually. Phase 2 of construction is expected to have an even greater impact, contributing $3,852 million to GDP, with $2,031 million in labour income, supporting 516,880 FTE jobs, and generating $945 million in government revenue. During operations, Phase 2 is projected to contribute $1,096 million annually to GDP, with $151 million in labour	

Key Issues	Community Question/Concern	Proponent Response	Section of EA
		income, supporting 2,400 FTE jobs per year, and generating $92 million in government revenue annually.	
Ownership of the Transmission Line	Will EverWind own the transmission line once it is constructed? Who will be responsible for maintaining it? Is private ownership of a transmission line permitted in Nova Scotia?	Yes, EverWind will retain ownership of the transmission line once constructed and will be responsible for its maintenance and upkeep. All costs associated with the construction, operation and maintenance of the transmission line will be solely the responsibility of EverWind. Private ownership of transmission lines is permitted in Nova Scotia, and this transmission line is needed to transfer electricity from the EverWind owned Phase 2 wind farms in Guysborough to the EverWind owned Facility in Point Tupper.	2.1
Restrictions during stringing	Will there be any restrictions to vessel movement during stringing activities?	There will be temporary restrictions for vessel travel under the crossing during stringing activities for safety reasons. The Proponent will aim to time stringing activities during times with low traffic and will notify users of the Strait of Canso of any restrictions in advance of stringing activities.	3.3
Environmental Impacts			
Safety and Incident Response	Are there any safety concerns related to the transmission line crossing?	EverWind has sited the transmission towers at a distance greater than 280 m to the nearest residential receptor. The engineering and design considered a 150-year return period weather event, which exceeds typical high voltage transmission line design criteria to ensure the proposed towers, hardware, and conductors crossing over the Strait of Canso can avoid failures, damage, and safety related hazards over the life of the Project.	7.1.3, 7.1.4 and 12.0
Tower Footprint and Land Clearing	What is the footprint of the tower infrastructure? How many acres of trees will need to be cleared for the project?	Suspension towers and dead-end towers will require a footprint of approximately 0.34 and 0.1 ha, respectively. The total cleared footprint for the Project (including ROW, tower footprint, access roads etc.) is approximately 32.5 ha, much	3.2.1

Key Issues	Community Question/Concern	Proponent Response	Section of EA
		of which will be revegetated during the operational phase.	
Water and Well Protection	What is the process for baseline testing of waterways and wells to ensure there are no adverse effects from the project?	EverWind has microsited Project infrastructure to avoid wetlands and watercourses, where possible. Watercourse and wetland alteration approvals will be obtained prior to any instream work or wetland alteration, if required. Additionally, EverWind will conduct pre-blast surveys of wells within 800 m of blast locations. These surveys will establish baseline water quality and quantity, ensuring that if proven adverse effects related to Project activities occur despite mitigation, the Proponent will be responsible for restoring the water source.	7.2
General			
Environmental Assessment Timeline	What is the anticipated timeline for the EA submission for Strait Crossing Transmission Line Project?	The Proponent anticipates registering the EA March 2025.	NA
Impact on Strait Navigation	Will the transmission line restrict vessel movement in the Strait?	Based on current use cases, the Proponent does not anticipate any restrictions on active vessel movements in the Strait of Canso. Under all thermal and typical icing scenarios and high tide, the minimum clearance between the conductors and the water will be 75 m. This clearance applies only at the center of the crossing and gradually increases towards each shoreline. The transmission line is being designed to structurally withstand extreme ice loading conditions in excess of typical on-land transmission lines. The Proponent has committed to installing transmission line sag monitoring systems and if, under the low probability of an extreme ice load circumstance, sag reduces the clearance between the Strait of Canso and the conductor below 75 m, the Proponent will implement additional mitigations (e.g., manual	2.1

Key Issues	Community Question/Concern	Proponent Response	Section of EA
		removal of ice from conductors) to maintain the 75 m minimum clearance at midspan. Additionally, the Proponent has consulted with the CCG and conducted an assessment of the Project's potential interference with Aids to Navigation; no impacts were identified.	
Complaint Process	What is the process for resolving complaints and concerns related to the project?	Prior to commencement of construction, EverWind will develop and implement a comprehensive complaint resolution plan for receiving and responding to complaints related to the Project. The plan will include, but not be limited to, a reporting system which records all complaints received, sets out a timeline for responding to complaints and establishes a recording system that details all corrective measures taken to alleviate the cause and prevent its recurrence.	To be addressed post-EA
Tower Heights	What is the height of the suspension towers compared to those at the existing Aulds Cove transmission line crossing?	The suspension towers for this Project are approximately 210 m tall and the towers for the Aulds Cover crossing are 164 m tall.	2.1

6.2.9 Ongoing Engagement

The Project Team is committed to continuing to work to address any concerns raised by stakeholders and members of the public over the duration of the Project’s development. Additionally, the CLC will continue to meet at regular intervals throughout the lifespan of the Project, until such a time that it is deemed unnecessary.

7.0 BIOPHYSICAL ENVIRONMENT

7.1 Atmospheric Environment

7.1.1 Atmosphere and Air Quality

7.1.1.1 Overview
The assessment of the atmospheric environment included a review of weather, climate, air and quality data.

7.1.1.2 Regulatory Context
Relevant legislation includes:

- *Environment Act*, S.N.S. 1994-95, c. 1
- Air Quality Regulations, N.S. Reg. 8/2020

7.1.1.3 Assessment Methodology
The assessment was completed through a review of the following resources:

- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- ECCC Weather and Climate (ECCC, 2024b)
- NSECC Ambient Air Quality Data (NSECC, n.d.-a)

7.1.1.4 Assessment Results

Weather and Climate
Nova Scotia's climate is quite varied and is largely governed by coastal influences and elevation (Davis & Browne, 1996). The Study Area is in both Guysborough and Richmond counties and falls primarily within the Mulgrave Plateau Ecodistrict (360) and the Cape Breton Coastal Ecodistrict (810) (Drawing 7.1). These ecodistricts are typically cooler and more humid, prone to strong coastal winds (Neily et al., 2017).

To assess the local climate, available weather data (2010 to 2023) was obtained from the Port Hawkesbury meteorological station (Climate ID 8204495) (Table 7.1); the closest weather station approximately 15 km from the Project. While the meteorological station is near the Project, this data may not exactly represent the conditions observed within the Study Area.

Table 7.1: Climate Data from the Port Hawkesbury Meteorological Station (2010 to 2023)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (°C)													
Daily Avg.	-4.2	-5.3	-2.4	3.2	8.4	13.4	18.4	18.6	14.9	9.5	4.0	-0.4	6.5
Daily Max.	-0.2	-1.0	1.9	7.6	13.7	18.4	23.6	23.9	20.0	14.0	8.0	3.1	11.1
Daily Min.	-8.2	-9.5	-6.6	-1.4	3.0	8.4	13.2	13.4	9.7	5.0	0.0	-3.7	1.9
Extreme Max.	12.9	13.6	23.7	20	31	32.5	33.3	33.6	30.7	25	23.2	15.6	24.6
Extreme Min.	-21.4	-27.4	-21.7	-11.1	-5.4	-1.5	4.6	4.2	-1.1	-3.6	-13.1	-18.5	-9.7
Precipitation (mm)													
Precipitation	109.1	95.6	76.8	117.9	79.9	116.5	92.0	91.9	95.9	138.0	140.7	130.6	1285.1

(ECCC, 2024b)

Between 2010 and 2023, the mean annual temperature was 6.5°C, with a mean daily maximum of 11.1°C and a mean minimum of 1.9°C. The coldest months were January and February, with mean daily averages of -4.2°C and -5.3°C, respectively. July and August were the warmest, averaging 18.4°C and 18.6°C, respectively. Over this period, the meteorological station did not record mean annual snowfall or mean annual rainfall but recorded monthly average precipitation, with the highest occurring in October and November (138 mm and 140.7 mm, respectively) (ECCC, 2024b).

Wind speed and direction data were also obtained from the Port Hawkesbury meteorological station (Table 7.2)

Table 7.2: Wind Data from the Port Hawkesbury Meteorological Station (2010 to 2023)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Hourly Speed (km/h)	111	98	93	94	78	83	76	91	91	98	98	117
Most Frequent Direction	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW

Source: (ECCC, 2024b)

From 2010 to 2023, the maximum hourly wind speeds recorded at the Port Hawkesbury meteorological station ranged from 76 km per hour (km/h) in July to 117 km/h in December. The prevailing wind direction recorded is from the northwest. Wind directions may occur in all directions; however, the direction during calm wind flows is not recorded at the meteorological station (ECCC, 2024b).

The windrose plot for Port Hawkesbury meteorological station (CYPB) illustrates the wind directions from 2010 to 2023 (Figure 7.1). Wind speeds above 12 m per second (m/s) (43.2 km/h) occurred most frequently from the northwest (ISU, 2024).

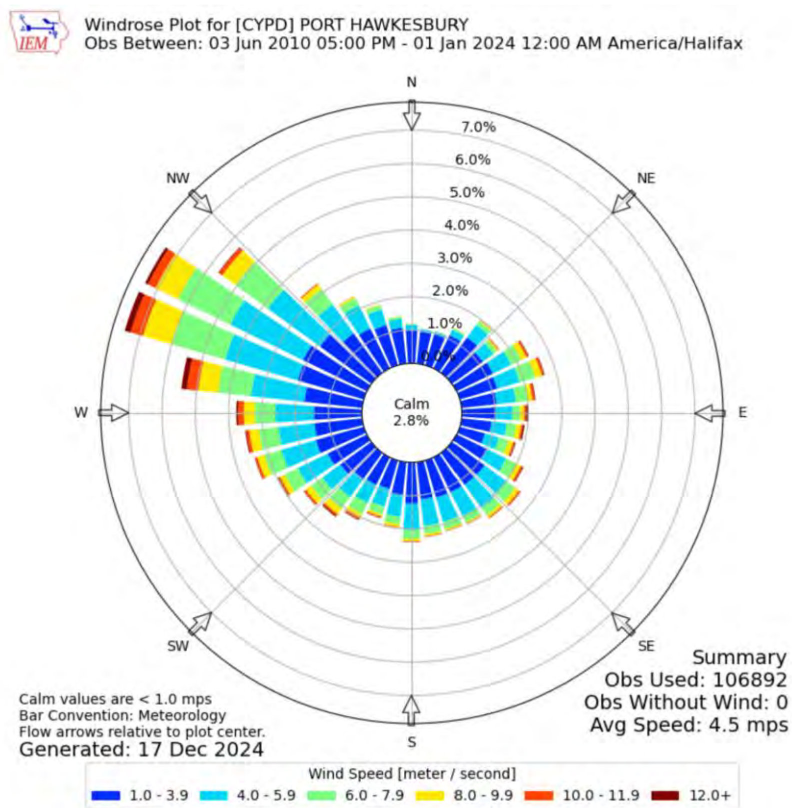

Figure 7.1: Windrose Plot for Port Hawkesbury Meteorological Station (CZDB) – January 1, 2014, through December 31, 2023 (ISU, 2024)

Air Quality

The Canadian Council of Ministers of the Environment (CCME) has established Canadian Ambient Air Quality Standards (CAAQS) for fine particulate matter [≤2.5 micrometres (µm) ($PM_{2.5}$) or ≤10 µm (PM_{10}) in size], ozone (O_3), sulphur dioxide (SO_2), and nitrogen dioxide (NO_2) over select averaging time periods (CCME, n.d.); while the Government of Nova Scotia has legislated Air Quality Regulations (NSAQR) (NSECC, 2020a) under the *Environment Act* (Nova Scotia, 1995b).

The ambient air quality standards published in the NSAQR set the maximum permissible ground-level concentration limits (Table 7.3).

Table 7.3: Summary of Regulations Pertaining to Ambient Air Quality in Nova Scotia

Contaminant	Averaging Period	Regulatory Threshold ($\mu g/m^3$)
		Provincial [1]
Carbon Monoxide (CO)	1-hour	34,600
	8-hour	12,700
Nitrogen Dioxide (NO_2)	1-hour	400
	24-hour	-
	Annual	100
Ozone (O_3)	1-hour	160
$PM_{2.5}$	24-hour	-
	Annual	-
PM_{10}	24-hour	-
	Annual	-
Sulphur Dioxide (SO_2)	1-hour	900
	24-hour	300
	Annual	60
Total Suspended Particulate (TSP)	24-hour	120
	Annual	70[2]

[1]Ambient Air Quality Standards (NS AAQS) (Air Quality Regulations, N.S. Reg. 8/2020).
[2]Geometric mean.

Nova Scotia monitors air quality at eight ambient air quality monitoring stations (AAQMSs) located throughout the province (NSECC, n.d.-a). Measured parameters at these locations may include the following:

- Sulphur dioxide (SO_2)
- Carbon monoxide (CO)
- Nitrogen oxides (NO_x)
- Nitric oxide (NO)
- Nitrogen dioxide (NO_2)
- Particulate matter ($PM_{2.5}$)
- Ground-level ozone (O_3)
- Total reduced sulphur (TRS)

The NO_2, O_3, and $PM_{2.5}$ values from seven of the eight AAQMSs are used to calculate a score on the Air Quality Health Index (AQHI) (ECCC, 2025; NSECC, n.d.-a). The AQHI is a scale from 1 to 10+, in which scores represent the following health risk categories: Low (1-3), Moderate (4-6), High (7-10), and Very High (10+) (ECCC, 2025).

The closest AAQMS with available data is the Port Hawkesbury station, approximately 15 km north of the Project Area at 45.565472 N, 61.340981 W.

Table 7.4 summarizes the maximum ambient air quality conditions observed at the Port Hawkesbury AAQMS from 2019 to 2023 (baseline). The monitored parameters are compared to the current NSAQR.

Table 7.4: Maximum Ambient Air Quality Conditions at Port Hawkesbury (2019 to 2023)

Parameter	Averaging Period	O_3 (ppb)	SO_2 (ppb)	NO_X (ppb)	NO (ppb)	NO_2 (ppb)	$PM_{2.5}$ (ug/m^3)	TSP (ug/m^3)	CO (ppb)	H_2S (ppb)
Port Hawkesbury AAQMS 2019 to 2023	1-hour	92.5	89.7	139.1	93.9	49.3	64.6	-	-	-
	24-hour	47.6	15	41	21.2	19.7	21.8	-	-	-
	Annual	28.9	0.6	3.5	1.1	2.3	5.3	-	-	-
NS AAQS Schedule A[1]	1-hour	82	340	-	-	210	-	-	30,000	30
	24-hours	-	110	-	-	-	-	120	-	6
	Annual	-	20	-	-	50	-	70[2]	-	-
Fraction of NS AAQS Schedule A	1-hour	113%	26%	-	-	23%	-	-	-	-
	24-hours	-	14%	-	-	-	-	-	-	-
	Annual	-	3%	-	-	5%	-	-	-	-

Source: (NSECC, n.d.-a)
[1]Current Ambient Air Quality Standards (NS AAQS) (Air Quality Regulations, N.S. Reg. 8/2020).
[2]Geometric mean.

As shown in Table 7.4, existing air quality conditions (i.e., baseline data) indicate that most of the measured contaminants are well below their respective NS AAQS Schedule A limits except O_3, which is 113% of the 1-hour limit. The reported AQHI typically scores 'low' for risk at all times of the year (ECCC, 2025).

7.1.1.5 Effects Assessment

Project-Atmospheric Interactions

Project activities will interact with the atmospheric environment through fugitive dust and exhaust emissions from construction equipment (Table 7.5), predominantly during the construction phase. There are no air emissions associated with the transportation of renewable power (operation) via the transmission line.

Table 7.5: Potential Project-Atmospheric Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Atmospheric Environment		X	X	X	X	X	X	X	X	X		X	X	X	X

Assessment Boundaries

The LAA for the atmospheric environment is the Study Area (Drawing 1.1). The RAA for atmospheric is not applicable.

Assessment Criteria

The assessment criteria provided in Section 4.5 apply to the atmospheric environment. The VC-specific definition for magnitude is as follows:

- Low – Air quality is expected to remain less than or equal to the maximum permissible ground-level concentrations as defined by the NSAQR
- High – Air quality is expected to exceed the maximum permissible ground-level concentrations as defined by the NSAQR.

Effects

Fugitive dust emissions consist of particulate matter (PM) and may be generated from open-air activities (e.g., moving earth/disturbing soil, wind erosion, increase in traffic). Fugitive dust emissions are composed mainly of soil minerals, but can also contain salt, pollen, spores, and tire particles. There are two forms of PM which pose the greatest concern for human health: PM with a diameter of 10 µm or less (PM_{10}) and PM with a diameter of 2.5 µm or less ($PM_{2.5}$). PM is measured by total suspended particulate (TSP) and is defined as the mass of airborne particles having a diameter of less than 44 µm.

When fugitive dust enters the atmosphere, it has the potential to affect lung and heart functions depending on its composition, concentration, and proximity to a human receptor. Particulate matter has been linked to premature death (people with lung and heart disease), non-fatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms such as irritation of the airways, coughing, or difficulty breathing. People with underlying lung and heart disease, children, and the elderly are the most susceptible to particulate pollution exposure (US EPA, 2024d).

Fugitive dust may also affect the environment through visibility impairment and environmental damage. Fine particles are the leading cause of reduced visibility in many cities, national parks, and wilderness areas. In addition, fugitive dust particles can be carried over long distances (via wind), deposited in other locations, and within surface water features. Some of the potential effects of particulate deposition may include the following (US EPA, 2024d):

- Increasing lake and stream acidity.
- Altering the nutrient balance in coastal waters and large river basins.
- Depleting the nutrients in the soil.
- Damaging sensitive forests and farm crops.
- Affecting the diversity of ecosystems.
- Contributing to acid rain effects.

Anticipated sources of fugitive dust emissions from the Project will be primarily associated with construction and may include the following activities:

- Soil disturbance during site preparation (e.g., clearing/grubbing, grading, blasting).
- Wind erosion from soil or rock stockpiles during grading.
- Increase in traffic on roadways from travel by Project personnel (to/from the site).
- Management of on-site materials transfers (i.e., loading/unloading).

The interaction with local receptors was assessed to determine environmental impacts on ambient air quality from fugitive dust emissions. All structures within the Study Area are participating receptors (i.e., structures are owned by the Proponent). The closest non-participating receptor is 144 m from an access road on the Steep Creek side of the Project Area (separated by intact vegetation), which facilitates access to and the construction of one tower. This upgrade will widen the existing roadbed (expected construction footprint 1.53 ha) (Drawing 7.2).

The effect of fugitive dust sources on air pollution depends on both the composition and quantity of the dust produced, as well as how the particles behave once released into the atmosphere. Larger particles tend to settle quickly near their source, while smaller particles disperse significantly farther. The distance particles can travel is influenced by factors such as the height at which they are released, their deposition velocity, wind speed, and the degree of atmospheric turbulence. For instance, theoretical calculations indicate that at an average wind speed of 4.4 m/s, particles larger than 100 μm typically settle within 10 m of their emission point (Holsen et al., 2011). However, particles that are 30 to 100 μm in diameter are likely to deposit within 100 m from the emission source (e.g. road, construction area) (US EPA, 2024b). Other finer particles have a slower settling velocity and may travel further before they settle (US EPA, 2024b). Although particles under 30 μm may travel further before they settle, it is anticipated that these will disperse with respect to distance.

The Steep Creek side of the Study Area between the Project Area and the nearest non-participating receptor is well forested, which will reduce the travel distance, and entrap and settle particles of all sizes, acting as a buffer to reduce the amount of dust and particulate matter that remains airborne (US EPA, 2014).

Though the Point Tupper side of the Study Area has more pre-existing disturbance which may have less capacity to trap particles, there are no receptors located within the LAA. The closest non-participating receptors are located over 400 m away, beyond the extent to which fugitive dust emissions are expected to have an impact.

Construction of the Project may result in an increase of combustion residuals and/or exhaust tailpipe emissions, primarily PM, NOx, SO2, and CO from vehicles (i.e., travel by Project personnel, transport/delivery activities), helicopters, and heavy equipment. Exhaust emissions are primarily anticipated to be associated with local roadways and roads developed for the Project within the Project Area. The US Environmental Protection Agency (EPA) (2014) determined that for major roadways, emissions are contained within the first 200 m from the emission source, and emission quality improves with respect to distance from the source. The roads within the Study Area will be used for construction-related vehicles and are not major roadways. While there is a receptor within 200 m of the Project Area, it is separated by intact vegetation, situated adjacent an existing access road (i.e., no new access is required in proximity to this receptor), and situated adjacent an existing public road (Highway 344). This section of Highway 344 has an annual average daily count of 320 vehicles per day measured in 2023 (NSPW, 2024, p. 261).

Mitigation

Measures to minimize and mitigate the creation and emission of pollutants, including fugitive dust and exhaust emissions, will be implemented for the Project (particularly for the construction phase). General mitigation measures for fugitive (dust) emissions include:

- Minimize the footprint of disturbance to the extent practicable.
- Time the commencement of grading and site preparation activities until just prior to construction activities, wherever possible.
- Stabilize exposed soil surfaces by sloping or using vegetation, stone, soil, or geotextiles to prevent dust and airborne particles.
- Compact and/or ridge disturbed soil to prevent dust formation.
- Cease dust-generating construction activities during periods of excessive wind, where practical.
- Wet (with water) aggregate and soil stockpiles to control dust, as required.
- Design storage areas and material stockpiles with prevailing wind directions in mind.
- Wet roadways and heavy traffic areas with water or other approved dust suppressant technologies to minimize airborne emissions, as required.
- Tie down, cover, and/or store loose site materials and/or products prior to inclement weather and wind events to prevent materials from becoming airborne.
- Wash down vehicles and equipment using hoses and water to remove accumulated mud/dirt on undercarriages, tracks, or wheel wells.
- Require that Project personnel adhere to all safety protocols and wear appropriate personal protective equipment (PPE) in the event of significant fugitive emissions events (i.e., windstorms, dust storms).

General mitigation measures for exhaust emissions include:

- Require that equipment meets all applicable provincial and air quality regulations and emissions standards.
- Maintain engines and exhaust systems according to the manufacturer's specifications and the recommended maintenance schedule.
- Remove from service malfunctioning equipment and/or equipment generating excess amounts of smoke, odour, or noise until an assessment and necessary repairs can be completed.

- Remove from service construction equipment with improperly functioning emissions control systems.
- Restrict the idling of equipment where feasible.

Monitoring

No monitoring is recommended.

Conclusion

After mitigations, residual effects on atmosphere and ambient air quality are characterized as follows:

- **Magnitude** – Low magnitude, as air quality is expected to remain less than or equal to the maximum permissible ground-level concentrations as defined by NSECC within the NSAQR.
- **Geographic extent** – Within the LAA.
- **Frequency** – Intermittent frequency.
- **Duration** – Short duration, as effects are mainly confined to the construction phase and decommissioning phases.
- **Reversibility** – Reversible, as air quality levels will return to baseline following construction (and decommissioning).
- **Significance** – Not significant.

7.1.2 Climate Change

The Project is being developed to support the production of a Certified Green hydrogen and ammonia project in Nova Scotia. Climate change for this Project is addressed in terms of greenhouse gas (GHG) emissions and per NSECC's Guide to Preparing an EA Registration Document in Nova Scotia (NSECC, 2017) and Guide to Considering Climate Change in Project Development in Nova Scotia (NSECC, 2011e). For the purposes of this EA, the GHG emissions only consider the emissions from the construction phase of the Project.

7.1.2.1 Overview

Climate change is a long-term alteration of weather patterns and conditions strongly impacted by changes in temperature and precipitation. Climate change typically involves changes in average conditions, as well as changes in variability. The main contributor to climate change is GHGs from anthropogenic sources. Since GHGs disrupt the natural heat transfer processes within the Earth's atmosphere, a build-up of these gases has enhanced the natural greenhouse effect. These human-induced enhancements are especially of concern since ongoing GHG emissions have the potential to warm the planet to levels that have yet to be experienced (ECCC, 2019c).

The impacts of climate change on the Project are assessed separately under Section 11.1.

7.1.2.2 Regulatory Context

The climate change assessment considered the following Acts and Regulations:

- *Environment Act*, S.N.S. 1994-95, c. 1
  - Regulations Respecting Greenhouse Gas Emissions, N.S. Reg. 305/2013
- *Environmental Goals and Sustainable Prosperity Act,* S.N.S. 2007, c. 7
- *Canadian Environmental Protection Act* (CEPA), 1999
  - Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations, S.O.R./2010-201
  - Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations, S.O.R./2013-24
- Ozone-depleting Substances and Halocarbon Alternatives Regulations, S.O.R./2016-137

Regulatory guidance was used to determine the appropriate assessment methodologies, mitigation controls, best management practices, and emissions targets.

7.1.2.3 Assessment Methodology

The objectives of this assessment include the following:

- Establish the sources of GHG contributions from the Project.
- Mitigate and minimize GHG generation from Project-related activities.

Project-generated GHGs were quantified in accordance with the specifications described in the International Standard ISO 14064 (ISO, 2019), and using published values found in the literature (sources provided in applicable sections that follow) and emission factors published in the NSECC Standards for Quantification, Reporting, and Verification of Greenhouse Gas Emissions (Nova Scotia, 2018).

GHG emissions and removal enhancements are stated in tonnes of carbon dioxide equivalent (tCO_2e).

7.1.2.4 Sources of Greenhouse Gas Emissions

The main GHGs of concern include:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Halocarbons
- Water vapour

GHGs may be natural or anthropogenic in origin, except halocarbons, which are human-made (ECCC, 2019a). The following subsections describe GHGs and their contributors (sources) as anticipated during each phase of the Project.

Carbon Dioxide

The primary source of atmospheric CO_2 is burning carbon-containing fossil fuels (i.e., coal, oil, and natural gas) and deforestation/land clearing activities.

Site preparation and construction for the Project will include several activities that are likely to produce CO_2; including, but not limited to:

- Use of heavy equipment (excavators, dozers, cranes, etc.).
- Use of light-duty vehicles and equipment (pick-up trucks, light plants, generators, etc.)
- Land clearing, including the decay of cut foliage (which releases CO_2 slowly).
- Cement production results in the heating of limestone, which releases CO_2 (ECCC, 2019a).

During the operations phase, CO_2 emissions will be limited to maintenance activities (i.e., the transmission line ROW landscaping and access road maintenance). Where these activities are intermittent and short-term, the GHG contributions from operations are negligible and are not considered further.

Methane

Methane (CH4) is produced when fossil fuels are burned with insufficient oxygen to complete combustion (ECCC, 2019a). The Project's construction phase requires different heavy- and light-duty equipment, contributing to methane emissions.

During the operations phase, methane emissions will be limited to maintenance activities (i.e., the transmission line ROW landscaping and access road maintenance). Where these activities are intermittent and short-term, the GHG contributions from operations are negligible and are not considered further.

Nitrous Oxide

The primary sources of N_2O are related to the use of nitrogen-based synthetic fertilizers and manure. These sources have added significant amounts of reactive nitrogen to Earth's ecosystems. Other contributors include the release of N_2O into the atmosphere during the combustion of fossil fuels and biomass (e.g., trees or wood-based fuels) and from some industrial sources (ECCC, 2019a).

The Project's construction phase requires heavy- and light-duty equipment, which can contribute to nitrous oxide emissions. Land restoration activities (i.e., soil amendments and reclamation) following construction will also contribute to nitrous oxide emissions. Overall, the production of N_2O in association with this Project is anticipated to be minimal.

During the operations phase, N_2O emissions will be limited to maintenance activities (i.e., transportation and materials). Where these activities are intermittent and short-term, the GHG contributions from operations are negligible and are not considered further.

Halocarbons

Halocarbons are a group of synthetic chemicals containing a halogen group (e.g., fluorine, chlorine, and bromine) and carbon (ECCC, 2019a). They are typically used in refrigerants, fire-extinguishing agents, solvents, foam-blowing agents, and fumigants (ECCC, 2013a). There are various industrial sources, but a main contributor is aluminum production (US EPA, 2024a). The primary source of halocarbon emissions from the Project will be associated with coolants in air conditioning units found in vehicles, portable construction buildings (i.e., trailers), and equipment. Fire-extinguishing agents (containing halocarbons) may also be used in the event of an emergency which requires a fire-fighting response. Overall halocarbon use is anticipated to be minimal and not considered further.

During the operations phase, halocarbon emissions will be limited to maintenance activities (i.e., transportation and materials). Where these activities are intermittent and short-term, the GHG contributions from operations are negligible and are not considered further.

Water Vapour

Water vapour is the most important naturally occurring GHG. Human activities do not directly influence the amount of water vapour in the atmosphere as it is a function of the atmosphere's temperature. The atmosphere can hold approximately 7% more water vapour for every additional degree Celsius in air temperature. When the air becomes saturated with water vapour, the water vapour condenses and falls as rain or snow, leading to climate change effects (i.e., variances in weather patterns).

As climate warming gases (i.e., CO_2, CH_4, N_2O) increase in the atmosphere, the temperature rise increases water evaporation from the Earth's surface and increases the atmospheric water vapour concentrations. This increased water vapour, in turn, amplifies the warming from the initial GHGs, causing the cycle to repeat and temperatures to keep rising (ECCC, 2019a).

Project activities contributing to GHG emissions are not anticipated to impact water vapour concentrations in the atmosphere.

7.1.2.5 Quantification of the Project-generated GHG Emissions

Green Hydrogen and Ammonia Production

The Project is being developed to support the production of Certified Green hydrogen and ammonia at the Facility. The Facility will utilize renewable energy sources, such as wind and solar, to produce green hydrogen and ammonia for both local use and export, significantly reducing GHG from conventional methods of hydrogen production. As discussed in the EverWind Point Tupper Green Hydrogen/Ammonia Project - Phase 1 EA (Strum Consulting, 2022), conventional methods of hydrogen production, such as Steam Methane Reforming, emit approximately 8 to 10 kg of CO_2 per kg of hydrogen produced (Siemens Energy, 2022). However, renewable energy is designated to supply the hydrogen electrolyzers via the transmission connection provided by this Project. Therefore, virtually no CO_2 emissions are emitted from the input energy source (ERM, 2023).

ERM Worldwide Group Limited (third-party) completed a carbon footprint model. Ammonia production through electrolytic hydrogen (using renewable electricity resources) and the Haber-Bosch process results in significantly lower greenhouse gas (GHG) emissions [0.13 g of CO_2 equivalent per megajoule of energy produced (gCO_2e/MJ)] compared to steam reformation technologies which produce up to 99 gCO_2e/MJ (ERM, 2023; Timmerberg et al., 2020). Combining the Haber-Bosch process with EverWind's various wind energy projects are anticipated to reduce CO_2 emissions significantly. These emission savings are applied to the EverWind Point Tupper Green Hydrogen/Ammonia Project and its ammonia production process, as well as the associated wind farm projects. Therefore, these reductions are not discussed in the sections below.

Construction Phase

Access Roads

The construction of new roads and upgrading of existing roads will require the removal of vegetation and overburden, which will create fugitive dust and GHG emissions. However, where fugitive dust and GHG contributions for these activities are temporary, short-term, and represent a small incremental addition compared to the overall Project emissions, they were not quantified.

Section 7.1.1 discusses fugitive dust and air emissions as they relate to the Project.

Right-of-way and Laydown Areas

Laydown areas (estimated area 30 m x 75 m = 2,250 m^2 each) are intended to temporarily store equipment, the tower foundation, and the crane pad. The laydown areas and the transmission line ROW for the Project will be prepped by removing the vegetation and overburden and placing competent soils. Construction activities and equipment associated with the laydown areas are anticipated to create fugitive dust and GHG emissions. However, where fugitive dust and GHG contributions for these activities are temporary, short-term, and represent a small incremental addition compared to the overall Project emissions, they were not quantified. Additionally, a vegetation management plan will be initiated to recover the lost flora and reduce dust resuspension while maintaining access and clearances to the transmission line ROW and the transmission towers.

Concrete Foundation

Each transmission tower (four total) will require a concrete foundation; therefore, the Project will require a significant quantity of concrete to be produced and delivered to each transmission tower location.

The total quantity of concrete used was estimated based on the footprint dimensions for the foundation structures (Table 3.5) and an assumed depth of the foundations was 4 m for the dead-end structures and 5 m for the suspension structures. The foundation structures required to erect the transmission towers consist of two suspension towers and two dead-end towers. The volume of concrete required for each structure is:

- Steep Creek (Western) dead-end – 1,600 m^3
- Steep Creek (Western) suspension – 12,500 m^3
- Point Tupper (Eastern) suspension – 4,500 m^3
- Point Tupper (Eastern) dead-end – 2,500 m^3

The quantification of the GHG emissions requires the following inputs:

- The distance travelled to and from the concrete manufacturer to the transmission tower sites.
- The freight and weight associated with each trip (to and from each tower location).
- The quantity of concrete produced for the transmission tower foundations.
- The vehicle size and fuel type.

Heavy-duty diesel concrete trucks will be required to transport concrete to the Project Area. For this assessment, transportation distances are based on the nearest known concrete supplier (Ideal Concrete Ltd.), which is located approximately 4 km from Point Tupper and 27 km from Steep Creek (Table 7.6).

According to Ready Mixed Concrete Association of Ontario (RMCI, n.d.) a concrete truck can carry approximately 22 tonnes of concrete per delivery. Assuming a total volume of 21,100 m^3 of concrete, the total mass of concrete required is approximately 50,640 tonnes. This results in 2,302 truckloads for the entire Project distributed across the Steep Creek and Point Tupper sides of the Study Area.

Table 7.6: Distance from the Nearest Known Concrete Supplier to Individual Transmission Tower Locations

Structure	Structure Location	Approximate Distance (km)	Number of Trips Required (one-way)	Total Distance (km)
Western dead-end	Steep Creek	4	1364	5,455
Western suspension	Steep Creek	4	175	698
Eastern suspension	Point Tupper	27	491	13,255
Eastern dead-end	Point Tupper	27	273	7,364
Total		**62**	**2,302**	**26,772**

The calculations presented in Table 7.6 are one-way. However, GHG quantification considered travel to and from the nearest concrete supplier to the transmission tower locations (with and without freight).

Table 7.7 summarizes the GHG emission factors for the different components used for concrete-related activities.

Table 7.7: Concrete Manufacturing and Transportation Emission Factors

Component	Emission Factor
Concrete Production	$3x10^{-4}$ tCO_2e/kg
Concrete Truck (Diesel) with Freight	$1.35x10^{-4}$ $tCO_2e/tonne{\cdot}km$
Concrete Truck (Diesel) without Freight	$1.106x10^{-3}$ tCO_2e/km

Source: GHGenius v5.0d (Squared Consultants Inc, 2022)

Given the travelling distances, the quantity of concrete required for the Project, and the emission factors (Table 7.7), the CO_2e emissions for constructing all the tower foundations are expected to be approximately **15,301.12 tCO2e**.

Detailed CO_2e calculations are provided in Appendix B.

Transmission Towers

To quantify GHG contributions from the transmission towers during the construction phase, the following items were assessed:

- The transmission tower materials and quantity.
- The transmission towers transportation distances from the manufacturer to the intended tower laydown.
- The vehicle size and fuel type used to transport the transmission towers.

For quantification purposes, the assessment assumed the following; however, other manufacturing locations or local ports may be used:

- Manufacturing Material: Steel
- Manufacturing Location: Ankara, Turkey
- Nearest Turkey Shipping Port: Port of Derince, Turkey
- Nearest NS Shipping Port: Strait of Canso Superport, Mulgrave, NS, CA

Transmission towers are typically made up of six principal components (Savree, 2024):

- Peak of the tower
- Cross arm of the tower
- Boom of tower
- Cage of tower
- Body of tower
- Leg of tower

According to the American Iron and Steel Institute (AISI, n.d.) the total weight of manufacturing material (steel) for transmission towers is approximately 27,216 kg. The Project transmission towers are anticipated to be approximately 210 m tall, whereas most large transmission towers are approximately 100 m tall (Hydro-Québec, 2025). Therefore, the steel required to manufacture the Project transmission towers is anticipated to be more than estimated. However, transmission tower manufacturing represents a small contribution to the emission totals for Project construction and any resulting changes to this total are not expected to influence the conclusions of this GHG assessment.

The GHG emission factor for steel manufacturing is provided in Table 7.8.

Table 7.8: Transmission Tower Manufacturing Emission Factor

Component	Emission Factor (tCO_2e/kg)
Transmission Tower Material (Steel) [1]	$1.5x10^{-3}$

[1]Estimated from the UK's mixture of steel types, excluding stainless steel (University of Bath, 2011).

Given the steel required to produce the transmission towers for the Project and the emission factor (Table 7.8), the CO_2e emissions from the manufacturing of all the transmission towers are expected to be approximately **163.29 tCO_2e**.

Transmission towers are assumed to be manufactured in Ankara, Turkey. They will likely travel to the Port of Derince, Turkey, by heavy diesel hauler (transport), where they will likely be shipped via diesel cargo vessel to the Strait of Canso Superport, Mulgrave, NS (or other local port). Table 7.9 summarizes the transportation distances from the manufacturer to the Project.

Table 7.9: Transmission Tower Transportation Distances

Originating Destination	Final Destination	Distance[1] (km)
Manufacturing Facility: Ankara, Turkey	Port of Derince, Turkey	350 (Land)
Port of Derince, Turkey	Strait of Canso Superport, Mulgrave, Nova Scotia	8,140 (Marine)
Strait of Canso Superport, Mulgrave, NS	Project Area	7 to 27 (Land)

[1]These measurements were based on a desktop geospatial analysis; the exact routes and distances may vary.

To determine the travel distance for a transmission tower, the following assumptions were made:

- Each component will be individually transported via a single diesel heavy hauler.
    - Five components per transmission tower to travel from the manufacturing facility in Ankara, Turkey, to the Port of Derince, Turkey (total of 1,825 km per tower).
    - Five components per transmission tower to travel from the Strait of Canso Superport, Mulgrave Port, NS, to the tower location (distance will vary from one tower location to another).
- Each transmission tower will be transported in its entirety using a dedicated diesel cargo vessel, with one vessel per transmission tower.

Land transportation distances were calculated according to the assumptions in Table 7.10.

Table 7.10: Land Distance from the Manufacturer to Individual Transmission Tower Locations

Transmission Tower	Structure Location	Approximate Distance[1] (km)
Western dead-end	Steep Creek	1,860
Western suspension	Steep Creek	1,860
Eastern suspension	Point Tupper	1,785
Eastern dead-end	Point Tupper	1,785
Total		**7,290**

[1]Estimated distances from the Strait of Canso Superport to the individual transmission tower one way. The number of trips and the number of transport vehicles should be considered for a cumulative travel distance.

Based on Table 7.10, the total land transportation distance (not including marine transportation) is **7,290 km**. The total marine transportation distance from Ankara, Turkey, to the Strait of Canso Superport, Mulgrave, NS, is **32,560 km**. The distances travelled consider travel from the manufacturer to the Project Area only; an equivalent return distance is not considered as the hauling companies would have commitments with other clients, and those GHG emissions would not be attributable to the Project.

GHG emission factors for the different components of transmission tower transportation are provided in Table 7.11.

Table 7.11: Transmission Tower Transportation Emission Factors

Component	Emission Factor (tCO_2e/tonne·km)
Heavy Duty Truck (Diesel) with freight	1.35×10^{-4}
Marine Cargo and Container Vessel (Diesel) with Freight	1.51×10^{-5}

Source: GHGenius v5.0d (Squared Consultants Inc, 2022)

Given the land transportation distances required to deliver the transmission towers to the Project and the emission factors (Table 7.11), the CO_2e emissions from land transportation of the towers are expected to be approximately **5.36 tCO_2e**. In addition, the marine transportation distances required to deliver the transmission towers from Turkey to Canada will contribute **13.38 tCO_2e**.

Detailed CO_2e calculations are provided in Appendix B.

7.1.2.6 Operations Phase

The operation of the Project will require infrequent maintenance activities along the ROW. Activities will include vegetation management and structure and/or line replacement generally scheduled within short timelines of one or two days based on inspections of vegetation growth along the ROW. These activities will require the use of mechanical equipment, including hydro-axes, excavators with mulching heads, and bush hogs.

Transmission line maintenance will be carried out on three-to-five-year cycle. The inspection work could potentially be conducted from the air using a helicopter. No significant emissions are expected from these activities to contribute to GHG emissions.

7.1.2.7 Effects Assessment

Project-GHG Interactions

While the following effects assessment is intended to isolate and evaluate the GHG emissions from the specific activities for this Project (i.e., the transmission connection to the Facility), it is important to recognize that the Project is part of a broader GHG emission mitigation initiative that intends to greatly reduce the overall GHG emissions from the operation of the green hydrogen and ammonia production facility. This Project will allow for an overall net benefit and a positive reduction of GHG emissions in running the Facility versus conventional hydrogen production methods.

Project activities will emit GHGs during all phases of the Project (Table 7.12).

Table 7.12: Potential Project-GHG Interactions

Valued Component	Site Preparation and Construction										Operations and Maintenance		Decommissioning		
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
GHG		X		X	X	X	X	X	X	X		X	X	X	X

Assessment Boundaries

GHGs can be considered in a global and provincial context. Therefore, the province of NS is the LAA for GHG emissions, and the RAA is the global environment. However, due to the small scale of the Project emissions, only the LAA is evaluated.

Assessment Criteria

The 2022 (latest data) GHG emissions for the NS electricity sector were consulted to quantify the magnitude of Project-related GHG emissions. In 2022, approximately 5,800,000 tCO_2e were emitted from the electricity sector across NS (ECCC, 2024a).

The Greenhouse Gas Emissions Regulations (Nova Scotia, 2009) stipulate emission caps for facilities emitting more than 10,000 tCO_2e annually. Although the Project is not a facility with continuous GHG emissions, the Greenhouse Gas Emissions Regulations benchmark of 10,000

tCO_2e (0.17% of the 2022 NS electricity sector GHG emissions) has been established to determine whether the Project-related GHG emissions are negligible.

If the Project GHG emissions are not considered negligible, the GHG emissions will consider the threshold (increasing by an order of magnitude) and be compared to the 2022 NS electricity sector emissions benchmark and expressed as a percentage (%) to quantify the magnitude of the Project's emissions. Therefore, the VC-specific definition of magnitude is as follows:

- Negligible - GHG emissions are expected to be ≤ 0.17% of the 2022 NS electricity sector GHG Emissions.
- Low – GHG emissions are expected to be > 0.17% and ≤ 1.72% of the 2022 NS electricity sector GHG Emissions.
- Medium – GHG emissions are expected to be > 1.72% and ≤ 17.2% of the 2022 NS electricity sector GHG Emissions.
- High – GHG emissions are expected to be > 17.2% of the 2022 NS electricity sector GHG Emissions.

Effects

The Project impact on GHG emissions within the LAA is expected to be low (Table 7.13).

Table 7.13: Project GHG Emission Summary

Component	Emissions (tCO_2e)
Construction Phase	
Concrete Production and Transportation	15,301.12
Transmission Tower Manufacturing	163.29
Transmission Tower Transportation	18.74
Total	**15,483.15**

Rounding errors may cause the values in this table to differ from those in Appendix B; however, the rounding errors are negligible and do not change their representation.

The Project construction phase is expected to generate approximately **15,483.15 tCO2e** emissions (Table 7.13). This represents only **0.27%** of Nova Scotia's total electricity-related emissions of **5,800,000 tCO_2e** of CO_2e, highlighting the Project as a low contributor to the overall emissions.

The GHG emissions from the Project are expected to decline once construction is completed. During the operational phase, negligible GHG emissions are expected to be released.
The assumptions considered in this assessment propose an estimate of GHG emissions, based on preliminary Project information from the Proponent, professional judgement, and discretion where assumptions are needed to be made. While actual values may change, the results remain constant; the Project has a relatively low effect on the GHG environment. As previously stated, this Project is a component of EverWind's Phase 2 development that will allow for an overall net benefit and a positive reduction of GHG emissions from the production of green hydrogen and ammonia compared to conventional hydrogen production methods.

Mitigation

Mitigation measures to reduce the Project's contributions to GHG emissions, reducing the overall impact to climate change, include:

- Use of locally sourced materials, where possible, to reduce CO_2, CH_4, and NO_x emissions associated with transport.
- Incorporate the shortest construction/transport routes where possible to minimize the use of fossil fuels during construction.
- Recover and recycle construction and demolition waste, where possible.
- Minimize deforestation during land clearing by only clearing the area that will be needed.
- Plan construction activities to reduce the double handling of materials, reducing GHG emissions associated with heavy equipment operations.
- Require that Project equipment meets all applicable provincial and air quality regulations and emissions standards.
- Require that engine and exhaust systems are maintained according to the manufacturer's specifications and applicable maintenance schedule.
- Remove from service malfunctioning equipment or equipment generating excess amounts of smoke, odour, or noise until an assessment and necessary repairs can be completed.
- Ensure construction equipment with an improperly functioning emission control system is not operated.
- Require that regular equipment maintenance is undertaken to maintain good operations and fuel efficiency.
- Require that equipment containing coolant (i.e., air conditioning units) undergoes preventative maintenance and inspections (i.e., leak testing).
- Train Project personnel (as appropriate) in the proper disposal of halocarbon-containing substances.
- Dispose of halocarbon-containing substances at an approved hazardous waste facility per applicable regulations and in compliance with local requirements.
- Ensure trucks removing waste from or bringing materials to the Project are filled to the maximum allowable capacity where practical (dependent on the truck size and load weight) to reduce transportation requirements and limit the number of trips.
- Implement an anti-idling policy to limit GHG emissions from vehicles and equipment and limit the use of fossil fuels.

Monitoring

No monitoring programs are recommended.

Conclusion

The Project is being developed to support the production of a Certified Green hydrogen and ammonia project in NS, contributing to a broader GHG mitigation initiative.

After mitigations, residual effects on climate change are characterized as follows:

- **Magnitude** – Low magnitude, as predicted Project GHG emissions are expected to be > 0.17% and ≤ 1.72% of the 2022 NS electricity sector GHG Emissions during the construction (emitter) phase of the Project.
- **Geographic Extent** – Project GHG emissions will extend beyond the LAA.
- **Frequency** – Occurs continuously through the construction phase, intermittently in the operations and maintenance phase, and continuously in the decommissioning phase.
- **Duration** – Short duration, as the residual effects will decline once the construction phase (and decommissioning phase) is completed.
- **Reversibility** – Irreversible.
- **Significance** – Not significant.

7.1.3 Sound

7.1.3.1 Overview

The assessment of sound considered both construction and operational noise generated from the Project.

During construction, heavy equipment, machinery, light vehicles, and helicopters will emit noise to the surrounding environment from activities associated with the development of the transmission line ROW (i.e., clearing), preparation of the tower foundations, transmission line assembly and erection, and the conductor stringing. Noise generated during decommissioning activities will be similar to those during construction based on the same process/activities (just in reverse). Therefore, for this assessment, when describing construction noise and Project interactions, it will act as a proxy for the decommissioning phase of the Project.

Operational noise will be limited to intermittent maintenance of the transmission towers and related infrastructure, as well as corona-related sound.

7.1.3.2 Regulatory Context

Changes to the acoustic environment during construction and operational activities could result in annoyance and interference with communication, sleep, and/or working efficiency.

Table 7.14 summarizes sound level thresholds presented in various municipal and provincial sources. Limits identified in the Guidelines for Environmental Noise Measurement and Assessment (NSECC, 2023) are not listed as they apply to activities that are regulated under the Activities Designation Regulations, for which this Project is not.

Municipal by-laws are generally established to protect the peace and tranquility of communities. For all those referenced in Table 7.14, there are provisions to allow construction activities during certain hours if a Building Permit has been issued.

Table 7.14: Summary of Sound Level Guidelines

Regulated By	Regulation/Guidance	Sound Level (dBA)	Hours / Duration
For Residential Receptors			
NSECC	Guidelines for Environmental Noise Measurement and Assessment (NSECC, 2023)	Not Applicable	Not Applicable
Town of Port Hawkesbury[1]	Town of Port Hawkesbury Noise Control By-Law N-1 (TPH, 2002)	< 65	0700 to 2200
Municipality of the County of Richmond	Municipality of the County of Richmond Noise Control By-Law #65 (MCR, 2019)	Not Applicable	Not Applicable
Municipality of the District of Guysborough	Municipality of the District of Guysborough Noise Control By-Law (MODG, 2011)	≤ 65	0600 to 2300
		≤ 55	2300 to 0600
For Occupational Safety			
Nova Scotia Workplace Health and Safety Regulations & Canadian Centre for Occupational Health and Safety (CCOHS)	Noise – Occupational Exposure Limits in Canada (CCOHS, 2024; Nova Scotia, 2013)	85	8-hour maximum

[1]The Project is not located in the Town of Port Hawkesbury; however, it is the nearest municipality to Point Tupper with specific noise related guidance. As such, this guidance is used to help quantify Project related sound.

7.1.3.3 Existing Environment

Aerial imagery and field observations were used to identify nearby sources of sound and characterize the ambient sound within the Study Area.

The Steep Creek side of the Study Area falls mostly within a rural/residential area. Therefore, sound levels are dominated by residential activities, vehicle traffic along nearby highways and secondary roads, the natural environment and other various activities with no industrial sources. Highway 344 directly abuts the Study Area on the Steep Creek side. This roadway is travelled daily by vehicular traffic emitting different levels of sound. Health Canada (2017) estimates quite rural communities as having baseline sound levels of approximately 45 dBA. However, several developments in/near the Study Area also contribute to ambient sound levels including, which may increase sound levels above what is defined by Health Canada:

- Porcupine Mountain Aggregate Quarry and Bulk Coal Handling Facility
- Strait of Canso Commercial Port

The Point Tupper side of the Study Area is situated within an existing industrial area that is frequented by heavy equipment and vehicular traffic; industrial activities are currently ongoing in the area. Based on Health Canada guidance (2017), the Point Tupper side of the Study Area would resemble a noisy urban residential area, due to its location within an industrial area, which has an estimated baseline sound level of 63 dBA to 67 dBA Nearby industrial developments that would contribute to the elevated baseline sound level include:

- Port Hawkesbury Paper
- Raw Steel Fabrication Limited
- Point Tupper Wind Farm
- Strait of Canso Superport
- Cabot Gypsum Plant
- Point Tupper Generating Station
- EverWind Terminal
- McNally Construction

7.1.3.4 Assessment Methodology

The assessment of construction sound includes a discussion of expected noise sources and a qualitative assessment of potential effects to receptors.
The assessment of operational sound is based on desktop studies and a literature review. The objectives aim to achieve the following:

- Establish the potential operational sound levels produced by the Project.
- Identify nearby potential receptors that may be exposed to operational sound produced by the Project.
- Determine if the applicable guidelines are met/exceeded.
- Mitigate and minimize any impacts experienced by nearby potential receptors.

The Proponent relied on the Corona and Field Effects Version 3.1 Program to calculate operational audible noise levels using the following modelling assumptions:

- The transmission facilities are operating at a nominal voltage of 345 kV.
- Fair-weather ambient air temperature is 32°C.
- Levels are calculated based on a sensor height of 1.0 m above ground.

Potential receptors (including sensitive receptors such as schools, daycares, and senior residences) located within 500 m of the transmission line were identified using GIS data from the Nova Scotia Geomatics Centre and aerial imagery, with supporting field data used where available. As a conservative measure, no distinction was initially made between habitable dwellings and barns, sheds, or outbuildings.

Sound levels and impacts from blasting activities are not included in this assessment as blasting requirements have not been confirmed. If blasting is determined to be required during construction, the Proponent will notify NSECC and apply for any required permits and approvals. Any potential impacts, mitigation, and subsequent required monitoring will be described in a Project-specific Blasting Plan.

7.1.3.5 Sound Assessment Results

Construction Sound

Sound will predominantly be generated through construction equipment and heavy machinery such as cranes, backhoes, excavators, dump trucks, graders, and transportation vehicles during construction activities (Table 7.15).

Table 7.15: Decibel Limits of Construction Equipment Required for the Project

Equipment	Average Noise Level Ranges (in dBA)
Backhoe	85-104(1)
Dozer	89-103(1)
Dump Truck	84-88(1)
Excavator	97-106(2)
Concrete Truck/Pump	103-108(2)
Roller	95-108(2)
ATV	97(3)
Pickup Trucks	95(3)
Harvesting Equipment (log truck, manual faller, etc.)	85-103(4)
Loaders	88(4)
Tracked Drilling Units	91-107(5)
Tracked Dump Truck/Decks	91(6)
Tracked Man Lift/Bucket Machines	85(6)
Tracked Radial Boom Derricks/Cranes	93-98(2)/(6)
Crane	78-103(1)
Handheld Air Tools	115(7)
Compressor (drilling, etc.)	85-104(7)
Helicopter	79-86* (8)

Note that measurements shown are relevant to the decibel level ranges within close proximity (i.e., less than 15 m of distance) between a receptor and the relevant piece of equipment.
Sources: (1) WorkSafe BC (2019)
(2) Transport Scotland (2018)
(3) Oregon Parks and Recreation Department (n.d.)
(4) WorkSafe BC (2016)
(5) (The Driller, 2005)
(6) SCE (2015)
(7) Government of Ontario (2022)
(8) US Federal Aviation Administration (2012)
*Flying at a distance of approximately 150 m from the receptor.

The construction phase will also involve the use of helicopters. According to the US Federal Aviation Administration (US FAA, 2012), the sound exposure levels at ground level near a helicopter flying at approximately 150 m altitude is expected to range between 79 dBA and 86 dBA.

Overall, the range of decibels anticipated for the Project's construction activities will be between 78 dBA to 115 dBA (from a single piece of equipment within 15 m from the source).

Operational and Maintenance Sound

The audible noise level resulting from the proposed transmission line at the ROW edge under the normal conditions was calculated to be 31.3 dBA.

Maintenance activities related to infrastructure and vegetation maintenance within the transmission line ROW will also generate noise during the operations phase. The higher range of decibels anticipated during maintenance activities is 85 dBA to 103 dBA (associated with harvesting equipment and pickup trucks). The operational sound level attenuation based on the expected median and maximum sources are shown in Table 7.16.

Table 7.16: Attenuation of Operations Related Noise

Case	Example Equipment Type	Sound Level @ 15 m (dBA) [1]	Point Source Sound Levels (dBA) at Incremental Distances					
			50 m	100 m	200 m	500 m	1,000 m	2,000 m
Median	Pickup/ATV	95	84.5	78.5	72.5	64.5	58.5	52.5
Maximum	Harvesting Equipment (higher-range)	103	92.5	86.5	80.5	72.5	66.5	60.5

[1]Approximate point source sound levels. Combined sound levels produced by multiple pieces of equipment operating simultaneously is not included in the assessment.

Receptor Identification

Based on the desktop review:

- Five receptors are located within 500 m of the transmission line ROW (Drawing 7.2).
- Two of these receptors are owned by the Proponent and located along the Steep Creek side of the Study Area.
- The nearest non-participating receptor is located 144 m from the nearest point of construction, 230 m from the transmission line ROW, and 280 m from the centre of the suspension tower.

7.1.3.6 Effects Assessment

Project-Sound Interactions

Project activities will interact with the acoustic environment during all phases of the Project (Table 7.17).

Table 7.17: Potential Project-Sound Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Sound		X	X	X	X	X	X	X	X	X	X	X	X	X	X

Assessment Boundaries

The LAA for sound includes a 500 m area around the transmission line (Drawing 7.3). The RAA is not applicable for sound.

Assessment Criteria

Assessment criteria provided in Section 4.5 apply for sound. The VC-specific definition for magnitude is provided for operational sound as follows:

- Low – sound levels from Project activities are expected to be ≤ 65 dBA at residential and sensitive receptors.
- Moderate – sound levels from Project activities may exceed 65 dBA at residential and/or sensitive receptors, but only during maximum-case activities (intermittently).
- High – sound levels from Project activities may exceed 65 dBA at residential and/or sensitive receptors during multiple activities.

Effects

Construction Sound

The median sound level from construction is similar to the sound produced from pick-up trucks, which is already a common source of sound along Highway 344, which abuts the Steep Creek side of the Study Area. The nearest non-participating receptor to Project construction is 144 m; however, construction will be kept within daylight hours (0700 to 1900), based on local noise by-laws, and is considered a temporary and intermittent source of noise generated by the Project.

On the Point Tupper side, larger dump trucks are more frequent as they move between the Point Tupper Generation Station, and the coal stockpile to the southeast of the Study Area. Therefore, most Project-related construction sound will be consistent with existing sound levels.

Activities producing higher levels of sound, such as handheld air tools, will be less frequent and last for a very short duration. In addition, there are no non-participating receptors within the Study Area where the majority of construction noise is anticipated.

Operational Sound

Modern transmission lines, like those selected for the Project, are designed, constructed, and maintained to minimize corona-related sound, especially during dry conditions. Generally, any corona-related sound is limited to the extent of the transmission line ROW and is attenuated beyond this (Hydro One, 2023). The audible noise levels resulting from the proposed transmission line at the ROW edge under the normal conditions were calculated to be 31.3 dBA. Therefore, operational sound of the transmission line is not anticipated to exceed municipal by-laws.

Operational sound levels associated with maintenance activities are expected to occasionally exceed 65 dBA at the nearest receptor during specific activities (with the closest non-participating receptor located approximately 230 m from the transmission line ROW). However, maintenance activities will be on a three-to-five-year cycle, and therefore, intermittent and infrequent. In addition, sound generated by pickup trucks and harvesters during maintenance activities is consistent with existing sound sources along Highway 344 (which abuts the Steep Creek side) and on the Point Tupper side. Further, it is anticipated that maintenance activities will be kept to daylight hours (except for when deemed necessary such as during emergencies).

Mitigation

To minimize the effects of sound, the following mitigation/protective measures will be implemented:

- Use noise suppressants (e.g., mufflers) on vehicles/equipment.
- Limit vehicle idling.
- Conduct construction activities within the recommended daytime hours of 7:00 am to 7:00 pm.
- Follow the guidelines and requirements in the Blasting Safety Regulations, if determined necessary based on geotechnical studies. Mitigation and monitoring for potential blasting will be included in a Project-specific Blasting Plan, as required.
- Maintain equipment in good working order as recommended by the manufacturer.
- Develop and implement a Complaint Resolution Plan.

Monitoring

No monitoring programs are recommended.

Conclusion

After mitigations, residual effects on noise are characterized as follows for the operational phase:

- **Magnitude** – Low magnitude, as operational sound levels from Project activities are anticipated to comply with municipal by-laws at all non-participating receptors.
- **Geographic extent** – Constrained to the LAA.
- **Frequency** – Continuous and intermittent duration (depending on the source).
- **Duration** – Medium-term duration.
- **Reversibility** – Reversible as the noise will cease once the Project is decommissioned.
- **Significance** – Not significant.

7.1.4 Electric and Magnetic Fields

7.1.4.1 Overview

Electric and magnetic fields (EMFs) are associated with any production, transmission, and use of electrical energy (NIEHS, 1999). High voltage transmission lines (HVTLs) are frequently found in urban, densely populated areas, demonstrating that they are deemed, in practice, to be co-located with humans near where they live. In North America, energy is typically transmitted and used as alternating current, oscillating at 60 cycles per second (Hertz, Hz). At this frequency, electricity is defined as extremely low frequency (ELF), which applies to any frequency below 300 Hz (Health Canada, 2012). There are commonly expressed concerns about potential effects of EMFs on human health, including around high-voltage transmission lines (NIEHS, 1999). EMFs are divided into ionizing and non-ionizing categories based on their frequency or position on the electromagnetic spectrum, and ELF EMFs are a form of non-ionizing radiation that generally pose no risk to a low risk to human health (Health Canada, 2012).

The focus of this assessment was to review the literature on ELF EMFs, with consideration for the specific context of this Project.

7.1.4.2 Regulatory Context

Canada presently has no guidelines or standards for acceptable levels of ELF EMF exposure for residential receptors (EC, 2018). This is due in large part to a lack of evidence linking ELF EMFs to health concerns (Health Canada, 2012). Rather, Health Canada defers to the International Commission on Non-Ionizing Radiation Protection (ICNIRP) for guidelines on safe exposure limits (see Section 7.1.4.4 for an explanation of limits). The intent of ICNIRP's guidelines is to prevent exposure to EMFs that induces electric currents in human bodies that are stronger than those made by human bodies themselves (Health Canada, 2022; ICNIRP, 2010).

Compliance with international guidelines in Canada is ensured through the application of design standards, including CSA standards C22.3 No. 1:20, Overhead systems and C22.3 No. 60826:19, Overhead transmission lines (CSA Group, 2017, 2020).

7.1.4.3 Existing Environment

Nova Scotia has approximately 5,300 km of HVTLs carrying 69 kV to 345 kV between generation facilities and substations where lower voltages are distributed to end-users (NSPI, 2016). These HVTLs are required not only to connect Nova Scotian energy producers to domestic consumers, but also to connect the province with regional grids. Transmission projects continue to be proposed and developed to increase connectivity as energy production and consumption patterns shift along with the introduction of greater renewable energy generation capacity (NSPI, 2023). The most recent major HVTL proposed in Nova Scotia was for 96 km of 345 kV transmission line connecting Onslow, Nova Scotia, with lines in New Brunswick to increase connectivity (NSPI, 2023).

The Strait of Canso area presently has two HVTL crossings that connect Cape Breton with mainland Nova Scotia. The second and most recent of these two crossings, a 345 kV span of similar specifications as this Project, was installed between 2017 and 2018, following EA Approval in 2016 (NSPI, 2016). Greater connectivity for people and resources across the Strait of Canso is important for the integration of Cape Breton Island's economy with both mainland Nova Scotia and the overall region.

On the Steep Creek side of the Study Area, there is minimal pre-existing electrical infrastructure. Distribution lines follow Highway 344, bringing electricity and other utilities to communities along the highway.

On the Point Tupper side of the Study Area, there is both a higher density of electrical infrastructure, and the use of higher voltage systems. This is expected with the density of both power generating facilities (Point Tupper Generating Station and Point Tupper Wind Farm) and industrial energy users.

7.1.4.4 Effects Assessment

Project-EMF Interactions

The Project will interact with the atmospheric environment through the production of EMFs, almost exclusively during the operation and maintenance phase of the Project (Table 7.18).

Table 7.18: Potential Project-Atmospheric Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Atmospheric Environment												X			

Assessment Boundaries

The LAA for EMF effects is a 91 m buffer laterally along the ground from centreline of the transmission lines (Figure 7.2; Drawing 7.4). At this distance, mean magnetic fields of 230 kV to 500 kV transmission lines experienced at ground level are comparable to (or lower than) levels experienced by users of several different household appliances (NIEHS, 2002).

Assessment Criteria

Assessment criteria provided in Section 4.5 apply for EMF. The VC-specific definition for magnitude is applied to individual receptors as follows:

- Negligible – residential or periodically occupied, non-participating receptors are outside of the range of effects from EMFs (91 m or greater).
- Low – receptors are within range of EMFs consistent with low levels of magnetic field exposure from household sources (e.g., appliances, between 61 and 91 m).
- Moderate – receptors are within the range of EMFs consistent with or exceeding moderate to high levels of magnetic field exposure from household sources (between 0 and 61 m), but exposure is within ICNIRP guidelines.
- High – receptors are within range of EMFs higher than ICNIRP guidelines.

Effects

EMFs diminish exponentially with increasing distance from the source such as a transmission line (Figure 7.2). Magnetic fields (measured in milligauss, mG) in particular, are of interest as they are difficult to shield from and pass through many materials, including typical housing construction. Background magnetic field levels in typical homes range from 0.5 to 4.0 mG, varying within a home based on the location, types, and usage of appliances. Magnetic fields in homes are sometimes as high as 50 mG in densely populated areas where distribution lines are very close to living spaces (US EPA, 1992). Exposure to EMFs from transmission lines drops to below typical household levels at or beyond 91 m from the source even for transmission lines conveying 500 kV, higher than the 345 kV in this Project (NIEHS, 2002). For comparison, the ICNIRP guidelines recommend a maximum exposure of 2,000 mG for the general public (Hydro-Québec, n.d.; ICNIRP, 2010). Residents of a house situated directly under a 500 kV HVTL (as demonstrated in Figure 7.2) would be subjected to EMFs substantially lower than these exposure recommendations.

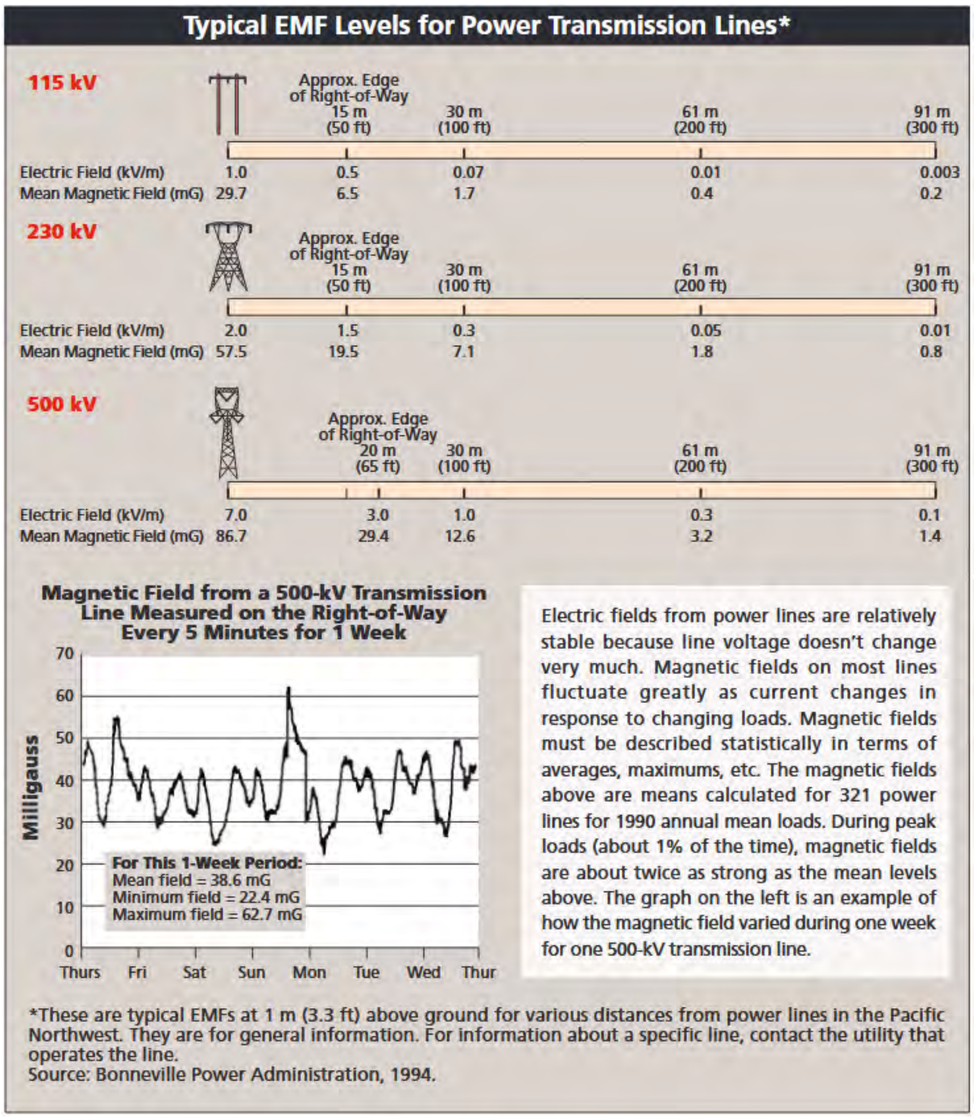

Figure 7.2: EMF Levels for High-Voltage Transmission Lines (NIEHS, 2002)

On the Steep Creek side of the Study Area, the closest non-participating receptor is 280 m from the transmission line centreline (and 230 m from the edge of the transmission ROW). This receptor is outside of the LAA (Drawing 7.4). There are also no receptors within the LAA on the Point Tupper side of the Study Area.

Those passing through the LAA will be exposed to EMFs at varying intensities and durations depending on proximity to the conductor and time spent. To understand the potential effect of this exposure, it is important to relate the possible exposure levels to those already experienced daily through interactions with, and proximity to electrical circuits and appliances.

Health Canada notes that “when you are inside your home, the magnetic fields from high voltage power lines and transformer boxes are often weaker than those from household electrical appliances” (2012). There is insufficient evidence to draw a causal link between exposure to EMFs and cancer rates, and Health Canada notes that “the evidence of a possible link between ELF magnetic field exposure and cancer risk is far from conclusive and more research is needed to clarify this “possible” link.” (Health Canada, 2012). As a result, Canadian regulators do not provide limitations on the placement of electrical transmission lines, and design and construction standards ensure the safety of people living nearby transmission infrastructure (EC, 2018).

In addition, the World Health Organization (WHO) is clear in its summary of the evidence gathered to date: “In the area of biological effects and medical applications of non-ionizing radiation approximately 25,000 articles have been published over the past 30 years. Despite the feeling of some people that more research needs to be done, scientific knowledge in this area is now more extensive than for most chemicals. Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields. However, some gaps in knowledge about biological effects exist and need further research” (WHO, 2016).

Mitigation

Siting the Project in its current location avoids residential receptors within the LAA and thus the zone where elevated EMFs could be detected. Therefore, no additional EMF-specific mitigation is recommended.

Monitoring

No monitoring programs are recommended.

Conclusion

Following mitigation, the residual effects of EMFs are characterized as follows:

- **Magnitude** – Effects of EMFs are expected to be negligible whereas no residential (or non-participating) receptors are found within the LAA.
- **Geographic extent** – Within the LAA.
- **Frequency** – Continuous throughout the operating lifespan of the Project.
- **Duration** – Of medium-term duration from initiation of power transmission until deactivation of infrastructure in decommissioning.
- **Reversibility** – Reversible upon decommissioning.
- **Significance** – Not significant.

7.2 Geophysical Environment

7.2.1 Overview

The assessment of the geophysical environment included a review of topography, surficial geology, bedrock geology, and hydrogeology/groundwater.

7.2.2 Regulatory Context

Relevant legislation includes:

- Sulphide Bearing Material Disposal Regulations, N.S. Reg. 57/95
- *Environment Act,* S.N.S. 1994-95, c. 1 (protected water/watershed areas)

If blasting is required for construction, groundwater wells within 800 m will undergo an assessment in accordance with NSECC's Procedure for Conducting a Pre-Blast Survey (1993).

7.2.3 Assessment Methodology

The desktop assessment was completed through a review of the following resources:

- Aerial imagery and topography
- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Nova Scotia Geoscience Atlas (NSNR, n.d.-a)
- Mineral Resource Land-Use Atlas (NSNR, 2021c)
- Nova Scotia Groundwater Atlas (NSNR, 2024c)
- Karst Risk Map (Nova Scotia, 2019b)
- Well Logs Database (NSECC, 2020b)
- Nova Scotia Pumping Test Database (NSNR, 2022b)
- Nova Scotia Groundwater Observation Well Network (NSECC, 2015a)
- Potential for Radon in Indoor Air (NSNR, 2009)

7.2.4 Assessment Results

Topography

The Steep Creek side of the Study Area lies within the Mulgrave Plateau (360) Ecodistrict (Drawing 7.1). The Mulgrave Plateau is located west of the Strait of Canso and northwest of Chedabucto Bay in Antigonish and Guysborough counties. The ecodistrict consists of a till plain with gentle to moderate elevation changes, having a mean elevation of 130 metres above sea level (masl). The Mulgrave Plateau is separated into two by the Chedabucto Fault, but both sides have a similar level to hummocky terrain with extensive pockets of imperfectly drained soils. Steep slopes are also found within this ecodistrict along the edges of elevated plateaus (which rise to approximately 200 masl) (Nova Scotia, 2019b). The topography within the Study Area is inclined, decreasing in gradient to the northeast.

The Point Tupper side of the Study Area lies within the Cape Breton Coastal (810) Ecodistrict (Drawing 7.1), which is a long and narrow landscape that encompasses a range of coastal features (e.g., coastal cliffs or islands) along with adjacent low-lying areas further inland. The coastal landscape is shaped by the waters and winds of the Atlantic Ocean, producing a stunning variety of islands, isthmuses, and inlets. Along the coastline, there are knobs and knolls with few surface boulders and little to no bedrock outcroppings. The ecodistrict consists of a narrow, generally low-lying coastal landscape which gently rises further inland to approximately 130 masl at its highest point. Topography is variable, from flat to rolling hills with few surface boulders and deep till which masks bedrock undulations, except along coastal areas of exposed bedrock (Nova Scotia, 2019b). The topography within the Study Area is inclined, decreasing in gradient to the southwest.

Within the Study Areas specifically, elevations range from 130 masl to 15 masl on the Steep Creek side, and 55 masl to 10 masl on the Point Tupper side (Drawing 7.5).

Surficial Geology

Surface geology of the Mulgrave Plateau Ecodistrict consists predominately of near surface/exposed bedrock with thin overlying deposits of glacial till. Within the Cape Breton Coastal Ecodistrict, surficial geology is dominated by up to 30 m deposits of glacial till that are interspersed with drumlin formations. Soils within both ecodistricts vary depending on the parent material and underlying bedrock present, but generally range from stony to gravelly to clay loams (Neily et al., 2017).

The Steep Creek side of the Study Area predominantly consists of exposed bedrock and/or bedrock overlain by a thin discontinuous layer of till formed from glacial scouring, erosion, and/or non-deposition (Drawing 7.6). These features are composed of various ages and types of bedrock and result in exposed ridges of hard rock (NSNR, n.d.-a).

Areas of silty till plain dating back to the Quaternary period are concentrated on the Point Tupper side of the Study Area (Drawing 7.6). The plain is 3 m to 30 m of compact material derived from distant and local sources that was deposited at the base of melting ice sheets. Silty till plains provide moderate drainage due to stoniness and have calcareous bedrock components which provide good acid rain buffering capacity (Stea et al., 1992).

Bedrock Geology

The bedrock on the Steep Creek side of the Study Area consists of the Horton Group ($D\text{-}_{E}C_{H}$) (Drawing 7.7). The Horton Group was formed between the Devonian to early Carboniferous period and is generally composed of sandstone, siltstone, conglomerate, and shale (NSNR, 2024c). Specifically, the Steep Creek side is within the Steep Creek Formation ($DC\text{-}_{E}C_{HCS}$) a smaller subdivision of the Horton Group and comprises black shale, red, green-grey and grey mudrock, pale grey and green-grey, fine- to coarse-grained sandstone and polymictic conglomerate. Interbedded sandstone and conglomerate units are also common within the Steep Creek Formation (Ténière et al., 2001).

On the Point Tupper side, the bedrock is fairly uniform within the Study Area and primarily consists of the Mabou Group ($_{E\text{-}L}C_M$) and the Cumberland Group ($_{L}C_{C}$) (Drawing 7.7). The Mabou Group is characterized as early to late Carboniferous sedimentary bedrock composed of sandstone, fluvial siltstone, anhydrite, limestone, shale, gypsum, and conglomerate (Keppie, 2000). The Cumberland and Mabou Groups are divided by an east-west trending fault line. The Cumberland Group is characterized as sedimentary bedrock dating back to the late Carboniferous era and consists of fluvial sandstone, coal, shale, siltstone, conglomerate, limestone, and mudstone.

Two fault lines also exist within proximity of the Study Area that are associated with the contact of the Horton and Mabou groups: one within the eastern extent of the Study Area and the other south of the Study Area. Eastern Canada has a low rate/risk of earthquake activity (Blouin et al., 2014).

According to the Mineral Resource Land-Use Atlas, there are no occurrences of sulphide-bearing slates within the Study Area (NSNR, 2021c). A review of the NS Karst Risk Map (Drawing 7.8) (based on provincial geology maps, sinkhole occurrence data, lidar data and hydrogeological databases) indicates that the Steep Creek side of the Study Area is within a "Medium to High Risk" region, while the Point Tupper side of the Study Area lies within a “Low to Medium Risk” region (Nova Scotia, 2019b). Karst refers to the distinctive terrain that develops over soluble bedrock and includes features such as sinkholes, caves, and springs. Sinkhole development in karst terrain can cause extensive damage to buildings, roads, and other infrastructure. The primary geohazard in karst areas is the sudden catastrophic subsidence of the ground. This may occur when soil is washed into openings in underlying soluble bedrock, which creates a void in the soil that migrates upwards by progressive collapse.

Groundwater Wells

An assessment of nearby groundwater wells was conducted using the NSECC Well Logs Database (2020b). This database contains records of well locations and characteristics within the province, dating back until approximately 1920. The database was reviewed to identify groundwater wells that may exist within proximity of the Study Area. There are significant limitations associated with the spatial accuracy of this database. For the purposes of this assessment, any groundwater wells that had a spatial uncertainty of greater than 1,000 m were not considered/assessed.

A total of 21 wells were identified within 2 km of the Study Area using the NSECC Well Logs Database (2020b) (Drawing 7.9). Of these 21 wells, only four are within the 800 m of the Project Area. However, the two wells located on the Point Tupper side and one on the Steep Creek side are owned by the Proponent based on their well log information. A single groundwater well was identified within the Steep Creek side of the Study Area, approximately 4 m from the Project Area.

It should be noted that based on the spatial resolution of some of these well records, the well locations are overlapped at certain locations, and some positions are several hundred metres from their true location (Drawing 7.9)

Most (14 of 21 wells; 67%) of the wells identified are located along the Strait of Canso in Guysborough County. A summary of well statistics is provided in Table 7.19.

Table 7.19: Summary of Water Well Records within 2 km of the Study Area

	Drilled Date (year)	Well Depth (m)	Bedrock Depth (m)	Static (m)	Yield (Lpm)	Elevation (masl)
Minimum	1961	14.62	0.91	0.91	4.54	5
Maximum	2009	90.13	14.31	9.44	227	73
Average Guysborough Wells	n/a	33.98	5.98	4.26	40.54	31.43
Average Richmond / Inverness Wells	n/a	42.76	5.91	4.61	58.37	20.00

Source: (NSECC, 2020b)

NSECC maintains the Nova Scotia Groundwater Observation Well Network (2015a) to monitor groundwater level, water quality, evaluate impacts of human activities and evaluate long-term water trends. The nearest active provincial observation well to the Steep Creek side of the Study Area is Monastery (#028) located approximately 23 km to the west of the proposed transmission line. This well was drilled in 1976 to a depth of 158.4 m through the Canso Group Formation and is currently active. In 2023, the average annual water level was 13.15 masl, and the annual water level fluctuation was approximately 0.61 m. The average depth to water in this well is 23.1 m below the top of casing (NSECC, 2015a).

The nearest active provincial observation well to the Point Tupper side of the Study Area is Long Point (#082) located approximately 29 km to the northwest of the proposed transmission line. This well was drilled in 2008 to a depth of 158.4 m through the Mabou Group bedrock formation and is currently active. In 2023, the average annual water level was 69.44 masl, and the annual water level fluctuation was approximately 0.90 m. The average depth to water in this well is 71.8 m below the top of casing (NSECC, 2015a).

Groundwater Quality and Quantity

The Study Area is underlain by sedimentary bedrock (NSNR, 2024c). Wells located in sedimentary bedrock typically have higher dissolved solids, hardness, and well water yields as groundwater can flow through the rock itself and along fractures. Naturally occurring trace metals such as iron, arsenic, and manganese can be found in all groundwater regions; however, are more often associated with plutonic and metamorphic groundwater regions (NSECC, 2020b; NSNR, 2009).

The NSNR Pumping Test Database provides long-term yields for select wells throughout the province and includes details about the well construction and pumping test and the interpreted hydrogeological properties. The nearest pumping test well to the Study Area (ID: 670616) is located at the Point Tupper Generating Station. It was completed in 1967 for NSPI. This well was drilled to a depth of 61 m below the surface and had a static water level of 11 m and a safe long-term yield (Q_{20}) of 53.2 litres per minute (NSNRR, 2024).

A review of the groundwater risk mapping indicated that the Study Area is in a “Low to High Risk” zone for arsenic in bedrock wells. Along the Steep Creek side of the Study Area, the southern portion is “High-Risk” while the northern portion is “Medium-Risk” for arsenic (Drawing 7.10). Only two wells are located within 800 m of the Project Area on the Steep Creek side; one of which is owned by the Proponent. The other well that is on adjacent private property is within the “Medium-Risk” area for arsenic.

Along the Point Tupper side of the Study Area, the southern portion is “Low-Risk” while the northern portion is “High-Risk”. Only two wells are located within 800 m of the Project Area on the Point Tupper side; both are within the “High-Risk” area for arsenic; however, these wells are owned by the Proponent.

If blasting is required, a pre-blast survey for wells within 800 m of the blast will be completed. It should be noted that arsenic is considered the most prevalent naturally occurring groundwater contaminant in the province. Arsenic is normally treatable using conventional treatment systems (Kennedy & Drage, 2016, 2017).

The Study Area along both sides of the Strait of Canso is considered a “Low-Risk” for uranium in bedrock groundwater wells (Drawing 7.11) (NSNR, 2021c).

7.2.5 Effects Assessment

Project-Geophysical Interactions

Project activities will primarily interact with the geophysical environment during earth moving activities (Table 7.20).

Table 7.20: Potential Project-Geophysical Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Geophysical Environment		X	X	X	X	X				X				X	X

Assessment Boundaries

The LAA for the geophysical environment is a radius of 800 m around the Project Area (Drawing 7.12). The RAA is not applicable.

Assessment Criteria

The assessment criteria provided in Section 4.5 apply to the geophysical environment. The VC-specific definition for magnitude is as follows:

- Negligible – no expected changes to local topography or geology; no anticipated impacts to the quality/quantity of groundwater wells (no wells located within 2 km of the Project Area).
- Low – changes to local topography/geology are possible but not anticipated as no geologic hazards are present within the Study Area; impacts to the quality/quantity of groundwater wells are not anticipated (wells exist within 2 km of the Project Area).
- Moderate – changes to local topography/geology are possible as geologic hazards exist within proximity to the Project Area but can be mitigated with routine measures; impacts to the quality/quantity of groundwater wells are possible if blasting is required (wells are located within the LAA).
- High – changes to local topography or geology are anticipated due to the presence of geologic hazards within the Project Area that cannot be mitigated with routine measures; impacts to the quality/quantity of groundwater wells are anticipated if blasting is required (wells are located within the Project Area).

Effects

The geophysical environment will be disturbed within the Project Area during the site preparation and construction phase (e.g., grading and pad construction), and again during infrastructure removal and site reinstatement. During these phases, potential impacts related to the geologic environment are primarily due to the presence and subsequent disturbance of geologic hazards including:

- Sulphide bearing slates (i.e., acid generating rock)
- Karst topography
- Colluvial deposits
- Radon
- Arsenic and/or uranium containing bedrock

In Nova Scotia, several bedrock formations are known to contain acid generating rock (sulphide minerals such as pyrite, pyrrhotite) that, when disturbed, can result in the production of acid rock drainage (ARD). ARD occurs when sulphide-bearing rocks are disrupted and exposed to air or water, producing sulphuric acid and metal oxides that are subsequently mobilized/leached through freshwater systems (NSNR, 2021a). Based on provincial risk mapping, there are no sulfide-bearing slates or formations recorded within the Study Area (NSNR, 2021c). The presence/absence of sulfide bearing minerals and likelihood of ARD will be confirmed following the results of the geotechnical evaluation.

Karst topography is characterized by naturally occurring sinkholes, underground drainage systems, and caves which are formed by the dissolution of soluble bedrock (e.g., limestone). The presence of karst terrain has the potential to cause extensive damage to infrastructure and the local landscape due to the risk of sudden collapse/subsidence. A review of the karst Risk Map (Drawing 7.8) identified that portions of the Project Area are within “Medium to High-Risk” areas for karst.

Colluvial deposits (also known as talus slopes) are loose deposits of surficial material at the base of steep slopes. These geologic features can pose significant hazards as they are subject to sudden and rapid slides/failures. No records of colluvial deposits were identified within the Study Area (Stea et al., 1992).

The radon potential mapping (Drawing 7.13) shows that most of the Study Area lies within “Medium-Risk” area for radon in indoor air (NSNR, 2009). There is no indoor air pathway for radon gas associated with the Project; radon gas is not considered a risk for outdoor inhalation.

Construction activities, primarily blasting (if required), have the potential to impact the quality and quantity of surrounding groundwater supply depending on the proximity to drinking water wells and extent of disturbance caused by construction activities. Disturbance of arsenic and/or uranium-containing bedrock can mobilize arsenic/uranium within groundwater and subsequently degrade nearby groundwater well quality. Risk mapping shows the Study Area is situated in a region with a “Low to High-Risk” of arsenic in bedrock water wells (Drawing 7.10).

Blasting (if required) would only occur where the tower footings are planned. The risk mapping for the tower footings on the Steep Creek side is within a "Medium-Risk" area for arsenic in bedrock water wells. Only two wells are located within the LAA on the Steep Creek side, and one is owned by the Proponent. If blasting is required, blasting surveys will be conducted to mitigate the risk of this construction-related activity.

On the Point Tupper Side, the tower footings will be installed in “High-Risk” areas for arsenic (Drawing 7.10). However, no wells are located down-gradient of the footings on the Point Tupper side. Furthermore, the nearest wells are owned by the Proponent. Therefore, the risk to groundwater well quality is reduced on the Point Tupper side.

The entire Study Area is in a “Low-Risk” for uranium in bedrock wells.

Potential impacts to nearby groundwater well quality because of arsenic and uranium are not anticipated based on:

- Construction activities will primarily consist of clearing, grubbing, and grading within the surficial layer. Contact with/disturbance of groundwater is not anticipated.
- If blasting for the tower footings is required, blasting monitoring and mitigation plans will be developed, and regulatory guidelines will be adhered to. Furthermore, areas mapped as “High-Risk” of arsenic do not have groundwater supply wells down-gradient of the tower footings.

In addition to water quality, groundwater quantity can also potentially be impacted if blasting activities (as required) alter local hydrogeological flow regimes, resulting in groundwater draining from or flowing towards existing wells. As a result, wells located within 800 m of blasting activities require monitoring per NSECC’s Procedure for Conducting a Pre-Blast Survey (1993). Detailed characteristics of water wells identified within 2 km of the Study Area can be found in Appendix C. The requirement for blasting and pre-blast surveys will be confirmed and assessed further during geotechnical investigations.

Mitigation

The use of existing road networks, and siting Project components in previously disturbed areas, all contributed to minimizing the Project’s impact to the geologic environment.

The following mitigation measures are also recommended to minimize impacts to the geologic environment:

- Conduct blasting, if required, in accordance with provincial legislation and subject to terms and conditions of applicable permits.
    - Conduct pre-blast surveys for wells within 800 m of blasting activities, which may include ground-truthing for nearby well locations.
        - If demonstrable changes in groundwater quantity or quality to a well are detected due to Project activities, an alternative water supply, of equal or better quantity/quality than that impacted, will be provided to the landowner.
    - Require that all blasts are conducted and monitored by certified professionals.
    - Notify landowners in advance of any blasting activities.
    - Recover and revegetate exposed soils or bedrock as required to minimize any exposure following blasting.

- Assess for elevated sulphide potential in bedrock during pre-construction geotechnical surveys. If identified, develop a site-specific mitigation plan for sulphide bearing materials.
- Store any soil needed for backfilling, after foundations have been poured, temporarily adjacent to the excavations until needed. Any remaining excavated material will be used on-site or removed and sent to an approved facility.
- Limit the Project Area and disturbed areas to the extent practical.
- Install erosion and sedimentation control measures prior to excavation activities and inspect controls on a regular basis.
- Remove temporary erosion and sedimentation controls once backfilled material has stabilized. Attention will be paid during site reinstatement to ensure areas will promote wildlife return to the area, to the extent possible.

Monitoring
No monitoring programs are recommended at this time in relation to the geophysical environment.

If geologic hazards (ARD, etc.) are identified within the Project Area during geotechnical investigations, a site-specific mitigation plan will be developed.

If blasting activities are required to construct the Project, groundwater wells within 800 m of blasting activities will undergo an assessment as per the Procedure for Conducting a Pre-Blast Survey (NSECC, 1993).

Conclusion
After mitigations, residual effects on the geophysical environment are characterized as follows:

- **Magnitude** – Moderate magnitude as there is one privately-owned water well within 800 m of the Project Area.
- **Geographic extent** – Within the LAA.
- **Frequency** – Intermittent as disturbance of the geophysical environment will only occur occasionally or intermittently during the construction phase.
- **Duration** – Short-term duration as the residual effects will not extend beyond the duration of the construction phase.
- **Reversibility** – Partially reversible.
- **Significance** – Not significant.

7.3 Aquatic Environment

7.3.1 Surface Water, Fish and Fish Habitat

7.3.1.1 Overview
The objective of the aquatic assessment was to inform the Project's design and collect the information necessary to assess baseline biophysical data and potential impacts to surface

water and fish and fish habitat, resulting from the Project. This was accomplished using the following approach:

- Identify surface water, fish and fish habitat within watercourses within the Study Area using desktop resources (Drawings 7.14).
- Traverse the entirety of the Study Area to ground truth surface water features and provide characterization of any identified features (Drawings 7.15A and 7.15B).
- Use the information collected to inform the Project design (e.g., avoid/minimize impacts to surface water).
- Assess the quality of potential impacts to fish habitat within the Study Area via field surveys.
- Use the information collected to inform mitigation and management practices.

7.3.1.2 Regulatory Context

Under the *Environment Act* (Nova Scotia, 1995b), NSECC has the authority to promote the sustainable management of water resources in Nova Scotia. More specifically, as per section 5A of the Activities Designation Regulations (Nova Scotia, 1995a), the alteration of a watercourse or the flow of water within a watercourse is an activity that requires an approval from NSECC, or a notification to NSECC if the work will be completed in accordance with the Nova Scotia Watercourse Alterations Standards (NSECC, 2015c). Therefore, it is necessary to understand what watercourses and water resources are present within the Study Area prior to development.

The Nova Scotia *Environment Act* (Nova Scotia, 1995b, Section 3be) defines a watercourse as:

> "Any creek, brook, stream, river, lake, pond, spring, lagoon, or any other natural body of water, and includes all the water in it, and also the bed and the shore (whether there is actually any water in it or not".

Using this guidance, watercourses were identified and described throughout the Study Area to support the description of fish habitat, and effects to regulated watercourses which may require provincial approval. While groundwater is included in the regulatory definition of a watercourse under the *Environment Act*, this section focuses on surface water features in the context of fish habitat provision. In addition to the above-mentioned definition, the watercourse parameters listed in the Guide to Altering Watercourses (NSECC, 2015b) were used to aid in determining the presence of a watercourse.

Federally, DFO is responsible for the protection of fish and fish habitat in accordance with the *Fisheries Act*. The *Fisheries Act* (Canada, 1985b, Section 2 (1)) defines fish as "(a) parts of fish, (b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and (c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans, and marine animals;" and fish habitat as *"*all waters frequented by fish and any other areas upon which fish depend directly or indirectly to carry out their life processes. The types of areas that can directly or indirectly support life processes include but are not limited to spawning grounds and nursery, rearing, food supply and migration areas" (DFO, 2019).

Section 34.4(1) of the *Fisheries Act* states that no person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish, and Section 35(1) of the *Fisheries Act* restricts any work, undertaking or activity that results in the harmful alteration, disruption, or destruction of fish or fish habitat (Canada, 1985b). Under Section 35(2) of the Act, authorization may be granted for a proposed work, undertaking or activity that may, respectively, result in the death of fish or the harmful alteration, disruption or destruction of fish habitat. The *Fisheries Act* provides additional protection to fish and fish habitat through means such as permitting, licensing, regulations, habitat restoration, marine refuge, and fish stocks (Canada, 1985b).

7.3.1.3 Desktop Assessment Methods

The goal of the surface water desktop evaluation was to identify watercourses and waterbodies within or in proximity to the Study Area based on mapped systems, topography, and satellite imagery, while also identifying where the Study Area lies within primary and secondary watersheds.

The desktop review included a query of the following resources and databases:

- CanVec Database – Hydrographic Features (NRCan, n.d.)
- Significant Species and Habitats Database (NSNR, 2024f)
- NS Topographic Database – Water Features (GeoNOVA, 2024c)
- Wet Areas Mapping (WAM) (NSNR, 2022c)
- NS 1:10,000 Primary Watersheds (NSECC, 2011a)
- 1:10,000 Secondary and Shore Direct Watershed of Nova Scotia (NSECC, 2011b)
- Aquatic Species at Risk Map (DFO, 2024)
- Atlantic Canada Conservation Data Centre (ACCDC) Data Report (ACCDC, 2024)
- Inland Fishes of New Brunswick, Canadian Rivers Institute (CRI) distribution (Gautreau & Curry, 2020)

7.3.1.4 Field Assessment Methodology

The results of the desktop review were used to inform the field assessment. Efforts were focused on potential Project and watercourse interactions as no interactions with waterbodies are expected.

Surface Water and Fish and Fish Habitat

Desktop-identified watercourses, along with WAM data and predicted flow data, were provided to field staff to guide the identification and assessment of watercourses within the Study Area. Watercourse delineations were completed in conjunction with wetland delineation in July 2024. Any watercourses identified were delineated (until their extent reached the buffer/Study Area boundary end or the watercourse terminated), assessed for general watercourse characteristics, and evaluated for the presence of fish habitat and potential ability to support fish species during initial identification.

Additional assessment was completed for each watercourse identified that has the potential to be impacted by the Project. This assessment documented habitat characteristics that may influence fish presence such as channel morphology, stream channel characteristics, substrate composition and cover. Watercourses were classified as either large permanent, small permanent, intermittent, or ephemeral.

Each surveyed watercourse was delineated into individual reaches defined by discrete homogeneous units (e.g., riffle, run, pool, flat, etc.) as determined in the field in an upstream to downstream direction. Each habitat type contains discrete gradient, substrate types, water depth, and velocity ranges which have been determined using the described biological 'preferences' outlined in Grant and Lee (2004), whenever possible. In smaller, first-order streams, habitat types were often found to be extremely short and variable. For efficiency in the field, when individual habitat types were less than 5 m in overall length, they were grouped together into one reach containing multiple smaller habitat units (i.e., "microhabitats"). The upstream and downstream ends of each reach were recorded with a handheld GPS device.

For each reach (i.e., homogenous section of watercourse), a detailed fish habitat survey was completed which included riparian habitat descriptions, and barrier assessments. Cross-sectional measurements (transects) were established to describe morphological (i.e., channel and wetted widths, bank heights), flow (i.e., velocities and depths), substrate, and cover characteristics within the reach. Transect measurements were recorded roughly every 25 m length of reach – for example, if a reach was 100 m in total length, four transects were established within the reach. The number of transects and transect locations were selected and modified as needed in the field based on specific habitat features observed, or limitations related to access and safety concerns.

Each of the systems identified was evaluated for the presence of fish habitat and potential ability to support fish species during initial identification. Fish habitat is described in the context of any aquatic feature which is contiguous with a fish bearing system, whether it is located within a watercourse, wetland, or waterbody. Throughout this report, fish habitat is described in the context of watercourses and wetlands, as no waterbodies are within the Study Area.

The Project layout underwent several iterations to minimize potential interactions and limit the number of required watercourse crossings. Information collected on watercourses was also used to guide further freshwater species assessments (i.e., fish habitat, in-situ water quality sampling, and herpetofauna).

7.3.1.5 Desktop Assessment Results

Surface Water

The Project lies within two primary watersheds: the Clam Harbour / St. Francis River watershed in Steep Creek and the River Inhabitants Watershed in Point Tupper.

A review of the federal CanVec Database – Hydrographic Features (NRCan, n.d.) within the Study Area showed four watercourses (no named watercourses) and no water bodies within the Study Area .

Nine waterbodies were identified within 5 km of the Study Area (Table 7.21), including hree major waterbodies, including Goose Harbour Lake and Englands Lake on the Steep Creek side of the Study Area; and Landrie Lake, on the Point Tupper side, near the Facility. Landrie Lake is a provincially and municipally protected source of drinking water for the Town of Port Hawkesbury and community of Point Tupper.

Table 7.21: Named Waterbodies Within 5 km of Study Area

Name of Waterbody	Distance (km)[1]
Butlers Lake	3.9
Carters Lake	2.5
Critchetts Lake	2.5
Englands Lake	3.7
Goose Harbour Lake	2.9
Hines Lake	4.3
Landrie Lake	1.0
Little River Reservoir	4.8
Wheatons Lake	1.5

[1]Measurement from the nearest point of the Study Area.

An unnamed mapped watercourse runs through the northern extent of the Study Area on the Steep Creek side. This watercourse begins from several wetlands (140 masl) and flows through steep terrain, directing the water flow towards the Atlantic Ocean. A second unnamed mapped watercourse with similar characteristics runs close to the center of the Study Area on the Steep Creek side. Both watercourses belong to the Clam Harbour/St. Francis River primary watershed (1ER). The drainage for this portion of the Study Area flows through a secondary watershed known as the Melford Brook Watershed (1ER-2).

Two unnamed mapped watercourses run through the Point Tupper side of the Study Area. This watercourse belongs to River Inhabitants primary watershed (1FA). The drainage for this portion of the Study Area flows through three secondary watersheds known as the Southwest Mabou (1FA-7).

According to the Significant Species and Habitats Database (NSNR, 2024f), numerous unnamed watercourses in the northwest portion of the Study Area on the Point Tupper side and as well as Englands Lake and West Lake are recorded as areas containing significant species and/or their habitat. Avian SAR and SOCI species have been recorded in these areas and include the following:

- Canada Warbler (*Cardellina canadensis*)
- Olive-sided Flycatcher (*Contopus cooperi*)
- Common Nighthawks (*Chordeiles minor*)

As these records are related to avifauna, refer to Section 7.4.5 for further details.

Throughout the Study Area, WAM data indicates that groundwater ranges from 0 to 100 centimetres (cm) for all sites (Drawing 7.16). WAM results generally aligned with the locations of watercourses identified using topographic mapping and highlighted the potential for additional watercourses throughout the Study Area (NSNR, 2022c).

Fish

The NS Significant Species and Habitat Database contains 62 unique species and/or habitat records pertaining to aquatic freshwater and marine species within a 100 km radius of the Study Area (NSNR, 2024f). These records include:

- 11 SOCI records of six species:
    - Muskeg emerald (*Somatochlora septentrionalis*) (4)
    - Triangle floater (*Alasmidonta undulata*) (3)
    - Black meadowhawk (*Sympetrum danae*) (1)
    - Lesser ram's horn snail (*Gyraulus parvus*) (1)
    - Northern bluet (*Enallagma cyathigerum*) (1)
    - Sphagnum Sprite (*Nehalennia gracilis*) (1)

- 41 SAR records of five species:
    - Yellow lampmussel (*Lampsilis cariosa*) (24)
    - Delicate lamp mussel (*Lampsilis cariosa*) (13)
    - Brook floater (*Alasmidonta varicosa)* (2)
    - Lesser ram's horn snail (1)
    - A freshwater isopod (*Caecidotea communis*) (1).

- 10 “Other Habitat” records
    - Sandworm area (3)
    - Gray seal (*Halichoerus grypus*) (3)
    - Willaimson’s emerald (*Somatochlora williamsoni*) (2)
    - Clamptipped emerald (*Somatachlora tenebrosa*) (1)
    - Subartic bluet (*Coenagrion interrogatum*) (1)

None of these records were identified within 10 km of the Study Area.

The Aquatic Species at Risk Map (DFO, 2024) is a federal database showing the distribution of SAR and their associated critical habitat within Canadian waters. A review of this database determined that there is no known critical habitat in the Study Area. Both databases documented observances of potential marine SAR within proximity of the Project. Due to the inland location of the Project and its negligible impacts on the marine environment, marine species are not discussed further in this report.

The CRI shows the following species as potentially present within the River Inhabitants and Clam Harbour/St. Francis primary watersheds:

- American eel (*Anguilla rostrata;* COSEWIC threatened)
- White sucker (*Castostomus commersoni;* S5)
- Alewife (*Alosa pseudoharengus*; S3B)
- Creek chub (*Semotilus atromaculatus;* S5)
- Golden shiner (*Notemigonus crysoleucas*; S4)
- Lake chub (*Couesius plumbeus*; S5)
- Pearl dace (*Margariscus nachtriebi*, S3)
- Banded killifish (*Fundulus disphanus*; S5)
- White perch (*Morone americana*, S5)
- Atlantic tomcod (*Microgadus tomcod;* S5)
- Threespine stickleback (*Gasterosteus aculeatus;* S5)
- Ninespine stickleback (*Pungitius pungitius;* S5)
- Rainbow smelt (*Osmerus mordax*; S5B)
- Brook trout (*Salvelinus fontinalus;* S3)
- Brown trout (*Salmo trutta*; SNA)
- Eastern Cape Breton population of Atlantic salmon (*Salmo salar* pop. 4*;* COSEWIC Endangered)
- Southern upland population of Atlantic salmon (*Salmo salar pop. 6;* COSEWIC Endangered)

Atlantic tomcod and rainbow smelt were removed from desktop results as their habitat preferences do not coincide with habitat found within the Study Area. The list of above fish species within the two primary watersheds is extensive, the likelihood of all these fish being present within the Study Area is highly unlikely.

ACCDC Records

The ACCDC database identified 34 fish, aquatic invertebrate, and aquatic mammals SAR and SOCI within 100 km of the Study Area (Table 7.22). No SAR or SOCI fish were documented within 5 km of the Study Area (ACCDC, 2024) (Appendix D).

Table 7.22: Fish and Aquatic Invertebrate SAR and SOCI within a 100 km Radius of the Study Area

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Fish					
Alewife	*Alosa pseudoharengus*	---	---	---	S1
American Eel	*Anguilla rostrata*	Threatened	---	---	S1
Atlantic Salmon	*Salmo salar*	Endangered, Threatened, Special Concern	---	---	S3N
Atlantic Salmon - Eastern Cape Breton population	*Salmo salar pop. 4*	Endangered	---	---	S1
Atlantic Salmon - Gaspe - Southern Gulf of St. Lawrence population	*Salmo salar pop. 12*	Special Concern	---	---	S2S3N
Atlantic Salmon - Nova Scotia Southern Upland population	*Salmo salar pop. 6*	Endangered	---	---	S2S3B, S2S3N
Brook Trout	*Salvelinus fontinalis*	---	---	---	S1B, S1N
Striped Bass	*Morone saxatilis*	Endangered, Special Concern	---	---	S3
Striped Bass - Southern Gulf of St. Lawrence population	*Morone saxatilis pop. 1*	Special Concern	---	---	S3B
Aquatic Invertebrates					
Black Meadowhawk	*Sympetrum danae*	---	---	---	S3S4
Brook Floater	*Alasmidonta varicosa*	Special Concern	Special Concern	Threatened	S3
Brook Snaketail	*Ophiogomphus aspersus*	---	---	---	S3
Eastern Pearlshell	*Margaritifera margaritifera*	---	---	---	S2
Eastern Red Damsel	*Amphiagrion saucium*	---	---	---	S3S4
Elfin Skimmer	*Nannothemis bella*	---	---	---	S3S4
Forcipate Emerald	*Somatochlora forcipata*	---	---	---	S3
Lance-Tipped Darner	*Aeshna constricta*	---	---	---	S3S4
Maine Snaketail	*Ophiogomphus mainensis*	---	---	---	S3
Muskeg Emerald	*Somatochlora septentrionalis*	---	---	---	S2
Ocellated Darner	*Boyeria grafiana*	---	---	---	S3S4
Rusty Snaketail	*Ophiogomphus rupinsulensis*	---	---	---	S3

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Seaside Dragonlet	*Erythrodiplax berenice*	---	---	---	S3S4
Seaside Lady Beetle	*Naemia seriata*	---	---	---	S3
Tidewater Mucket	*Atlanticoncha ochracea*	---	---	---	S1
Triangle Floater	*Alasmidonta undulata*	---	---	---	S2S3
Vernal Bluet	*Enallagma vernale*	---	---	---	S3
Williamson's Emerald	*Somatochlora williamsoni*	---	---	---	S2S3
Yellow Lampmussel	*Lampsilis cariosa*	Special Concern	Special Concern	Threatened	S1
Aquatic Mammals					
Atlantic White-sided Dolphin	*Lagenorhynchus acutus*	Not At Risk	---	---	S1
Fin Whale - Atlantic population	*Balaenoptera physalus pop. 1*	Special Concern	Special Concern	---	S2S3
Harbour Porpoise - Northwest Atlantic Population	*Phocoena phocoena pop. 1*	Special Concern	---	---	S4
Humpback Whale	*Megaptera novaeangliae*	Not At Risk	---	---	S2S3
Long-finned Pilot Whale	*Globicephala melas*	Not At Risk	---	---	S3
North Atlantic Right Whale	*Eubalaena glacialis*	Endangered	Endangered	---	S3S4

Source: (ACCDC, 2025); [1] (ECCC, 2024e); [2] (NSNR, n.d.-b); [3] (ACCDC, 2025)

7.3.1.6 Field Assessment Results

Thirteen watercourses were identified within the Study Area (Appendix E and Drawing 7.15A to 7.15B): small permanent (2), perennial-intermittent (2), intermittent (3), intermittent-ephemeral (3), and ephemeral (3) features ranging in channel width from 0.46 m to 8.35 m (Table 7.23). Characteristics presented are limited to the extent of the watercourse contained within or overlapping the Study Area. A more detailed habitat assessment was performed on the watercourse (WC3) anticipated to be directly affected by the Project, from the installation of a crossing structure (i.e., culvert) to support access, and is delineated into reaches.

There were no incidental observations of aquatic SAR or SOCI identified during the watercourse assessment.

Table 7.23 presents the results from fish habitat data collected and suitable habitat for the 15 species deemed probable to reside within these systems.

Table 7.23: Watercourse Characteristics

WC#	Flow[1]	Gradient	Velocity	Length (m)	Channel Width (m) Range	Depth (m) Range	Substrate (%)	Habitat Types	Cover Types	Suitable Habitat[2]			
										Spawning	YOY	Juvenile	Adult
WC1	I	Moderate	Moderate	1087	4.00-8.35	0-0.07	Gravel 30 Cobble 35 Boulder 15 Rubble 20	Riffle	Instream	EEL, SU ATS, WHS, BKT, BNT	EEL, SU ATS, WHS, BKT, BNT	EEL, SU ATS, WHS, BKT, BNT, WHP	EEL, WHS, BKT, BNT
WC2	E/I	Moderate	Moderate	165	0.46-1.25	0.01-0.03	Boulder 20 Rubble 25 Cobble 15 Gravel 15 Sand 15 Silt 10	Run, riffle, step pool	Instream, overhanging and aquatic vegetation	EEL, WHP, BKT, BNT, WHS	EEL, WHP, BKT, BNT	EEL, WHP, BKT, BNT, WHS, 9SB,	EEL, WHP, BKT, BNT, 9SB
WC3 Reach 1	I	High	Moderate-High	425	0.9-2.9	0.0	Bedrock 25 Boulder 25 Rubble 15 Cobble 15 Gravel 10 Muck 10	Rapid, cascade, step-pool	Instream and aquatic vegetation	EEL, BNT	EEL, BNT	EEL, BNT	EEL, BNT
WC3 Reach 2	I	High	High	471	2.1-5.0	0.0	Bedrock 15 Boulder 25 Rubble 15 Cobble 20 Muck 25	Cascade	Instream	EEL	EEL	EEL	EEL
WC4	E/I	Moderate	Moderate	237	0.85-1.40	0.03-0.08	Boulders 15 Rubble 10 Cobble 70 Gravel 5	Riffle	Overhanging vegetation	EEL	EEL, EBC ATS	EEL, BKT, BNT, EBC ATS	EEL, BKT, BNT
WC5	E/I	Moderate	Moderate	182	0.7-1.3	0-0.1	Muck 100	Riffle	Overhanging vegetation	ALE, EEL	ALE, EEL	ALE, EEL, WHS	ALE, EEL, WHS
WC6	I/P	Low	Low	292	0.8-6.0	0.04-0.11	Rubble 15 Cobble 15 Gravel 50 Sand 10 M/D 10	Run, flat, pool, riffle	Instream, overhanging and aquatic vegetation	EEL, CRC, GSH, PLD, LKC, BKF, BKT, BNT, WHS	EEL, CRC, GSH, PLD, LKC, BKF, BKT, BNT, ECB ATS, WHS	EEL, CRC, GSH, PLD, LKC, BKF, BKT, BNT, ECB ATS, WHS, 3SB	EEL, CRC, GSH, PLD, LKC, BKF, BKT, BNT, WHS, 3SB
WC7	E	Low	Low	65	0.8-1.2	0-0.05	Muck 100	Run	Instream, overhanging and aquatic vegetation	ALE, EEL, GSH, LKC, BKF, 3SB	ALE, EEL, GSH, LKC, BKF, 3SB	ALE, EEL, GSH, LKC, BKF, 3SB, WHS	ALE, EEL, GSH, LKC, BKF, 3SB, WHS
WC8	I	Low	Low	77	0.7-1.1	0.0-0.02	Muck 100	Run, step pool	Large woody debris, overhanging vegetation	ALE, EEL, GSH, BNT	ALE, EEL, GSH, BNT	ALE, EEL, GSH, BNT, WHS	ALE, EEL, GSH, BNT, WHS
WC9	E	Low	Low	104	0.8-2.45	0.0	Boulder 10 Rubble 10 Silt 70 Muck 10	Run	Instream	EEL, GSH, BKF, 3SB	EEL, GSH, BKF, 3SB	EEL, GSH, BKF, 3SB, WHS	EEL, GSH, BKF, 3SB, WHS
WC10	I/P	Low	Low	539	1.2-2.3	0.0-0.09	Boulder 5 Rubble 5 Muck 90	Run	Overhanging vegetation	ALE, EEL, GSH	ALE, EEL, GSH	ALE, EEL, GSH, WHS, BKF	ALE, EEL, GSH, WHS, BKF

WC#	Flow[1]	Gradient	Velocity	Length (m)	Channel Width (m) Range	Depth (m) Range	Substrate (%)	Habitat Types	Cover Types	Suitable Habitat[2]			
										Spawning	YOY	Juvenile	Adult
WC11	P	Low	Low	51	0.6-1.3	0.01-0.28	Bedrock 40 Rubble 10 Cobble 20 Gravel 10 Sand 10 Silt 10	Pool, riffle	Overhanging vegetation	EEL, GSH, PLD, LKC, BKF, BKT, BNT, WHS	EEL, GSH PLD, LKC, BKF, BKT BNT	EEL, GSH, PLD, LKC, BKF, BKT, BNT, WHS, CRC, 3SB	EEL, GSH, PLD, LKC, BKF, BKT, BNT, WHS, CRC, 3SB
WC12	E	Low	Low	85	1.05-3.15	0.03-0.14	Boulder 15 Silt 40 Muck 45	Flat, riffle	Overhanging vegetation	EEL, GSH, LKC	EEL, GSH, LKC, BKF	EEL, GSH, LKC, BKF, WHS	EEL, GSH, LKC, BKF, WHS
WC13	P	Low	Low	236	1.3-2.3	0.03-0.22	Boulder 15 Ribble 15 Cobble 15 Gravel 15 Sand 5 Silt 20 Muck 15	Run, flat, pool	Overhanging vegetation	EEL, WHS, GSH, PLD, LKC, BKF, 3SB, BKT, BNT, EBC ATS, CRC	EEL, WHS, GSH, PLD, LCK, BKF, 3SB, BKT, BNT, EBC ATS, CRC	EEL, WHS, GSH, PLD, LKC, BKF, 3SB, BKT, BNT, EBC ATS, CRC	EEL, WHS, GSH, PLD, LKC, BKF, 3SB, BKT, BNT, CRC

[1]Perennial (P) – A stream that flows continuously throughout the year, Intermittent (I) – Streams that go dry during protracted rainless periods when percolation depletes all flow, Ephemeral (E) – A watercourse that flows during snowmelt and rainfall runoff periods only (AT, 2009).
[2]Species Code – ALE (alewife), EEL (American eel), SU ATS (Atlantic salmon southern upland population), ECB ATS (Atlantic salmon eastern Cape Breton population), BKF (banded killifish), BKT (brook trout), BNT (brown trout), CRC (creek chub), GSH (golden shiner), LCK (lake chub), PLD (pearl dace), WHP (white perch), WHS (white sucker), 3SB (threespine stickleback) and 9SB (ninespine stickleback)

These small permanent features are often second or third order streams fed by lakes, wetlands, springs, groundwater, and run-off. They are often tributaries to larger features, creating larger permanent features at their confluence. Large permanent features often exhibit lower flow path gradients, larger channel dimensions, and an increased flow (US EPA, 2013).

Intermittent watercourse features observe variances in consistent flow throughout the year, either due to changes in their water source in other abiotic factors such as temperature or geological properties (Buttle et al., 2012). Intermittent watercourses are often first and second order streams fed by lakes, wetlands, springs, groundwater, and run-off. They are often also episodic and flow more prominently following rainfall events and snowmelt conditions. Intermittent flow can occur underground as well as above the water table, along the surface. These features also differ in that they can observe partial channelization but will often enter below the surface (Buttle et al., 2012).

Ephemeral features are often surface water flows and only present following snowmelt periods or rainfall events. These conditions are the sole sources of stream flow present in many of these features and as a result, their flow is always observed above the water table near the surface (Buttle et al., 2012). In Nova Scotia, and within the Study Area, ephemeral conditions can also be observed between and within wetlands which are sometimes referred to as “wetland corridors”.

A more detailed habitat assessment was performed on Watercourse 3. This watercourse was described in two reaches. Both reaches had high gradients (6 to 7%) resulting in rapid and cascade habitat; however, the watercourse was relatively dry at the time of assessment. Both reaches were dominated by large to moderate rocks, with little instream cover. This watercourse provides limited and seasonal fish habitat.

Priority Species

The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009) was utilized to identify any priority species and habitat associated with this Project. Mobile aquatic SAR and SOCI within 25 km and sessile within 10 km of the Study Area were identified from desktop resources and their respective habitat associations were compared to the habitat present within the Study Area. Only those aquatic SAR or SOCI, and their respective habitats, with potential to interact with the Project have been designated as Project-specific priority species. Interactions may include removal or disturbance of a SAR or SOCI and/or their associated habitat. Priority species include:

- Alewife
- American eel
- Atlantic salmon (Southern Upland Population)
- Brook trout

Alewife (*Alosa pseudoharengus)*

Alewives are not listed under federal (SARA) or provincial (ESA) legislation as SAR; however, are listed as 'S3B' by ACCDC (ACCDC, 2025) They are a small, herring-like fish, usually less than 30 cm long and 400 g in weight (Jessop, 1986). They are an anadromous species that spawns in freshwater but travels between freshwater and marine environments and are also found in rivers and streams (DFO, 2016). Adult alewives typically live in coastal marine waters 56 to 110 m deep (NSSA, 2005). As they are anadromous, they can adjust to a wide range of salinities and may prefer cooler water than other anadromous fish. Optimal spawning, egg, and larval habitat includes substrates with 75% silt or other soft material containing vegetation and detritus (ASMFC, n.d.).

The closest ACCDC observation of alewife is 17.6 ± 0.5 from the Study Area (ACCDC, 2024). Watercourses 5, 7, 8, and 10 provide suitable habitat for various life stages of alewife.

American Eel (*Anguilla rostrata*)

The American eel is listed as 'Threatened' under COSEWIC and 'S3N' by ACCDC (2025). American eels are a migratory species with life stages in freshwater, estuary, and marine environments (COSEWIC, 2012). Though much is still unknown about the American eel, several studies have shown a temperature preference of around 16.7° C (Blakeslee et al., 2018). American eel spawning occurs in the marine environment at the Sargasso Sea and only once during their lifespan. American eel larvae, known as leptocephali, drift westward towards the coast, where they grow into glass eels and begin to migrate inland to freshwater habitats for maturation (COSEWIC, 2012). Within freshwater habitats, this species of eel is typically found in rivers and lakes, and will readily burrow into mud, sand, fine gravel, cobble, and woody debris. Within marine environments, American eels are commonly associated with protected shallow waters containing submerged vegetation (e.g., eelgrass) and woody debris (COSEWIC, 2012).

The closest ACCDC observation of American eel is 12.0 ± 0.2 km from the Study Area (ACCDC, 2024). All watercourses within the Study Area provide suitable habitat for various life stages of American eel.

Atlantic Salmon (*Salmo salar*)

The Atlantic salmon – Nova Scotia southern upland (NSSU) population is listed as 'Endangered' by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and as "S1" by ACCDC (2025). NSSU Atlantic salmon are a genetically distinct population of Atlantic salmon that occupy rivers in both the Eastern Shore and South Shore, draining into the Atlantic, as well as Bay of Fundy Rivers south of Cape Split (DFO, 2013). The NSSU Atlantic salmon are present in 22 rivers out of 74 that were historically used (ECCC, 2013b). Rivers from northeastern mainland Nova Scotia, along the Atlantic coast and into the Bay of Fundy as far as Cape Split serve as breeding habitats for NSSU Atlantic salmon population (COSEWIC, 2011).

In general, the freshwater habitat preference of Atlantic salmon includes clear, well-oxygenated waters in streams with bottoms of gravel, cobble, and boulder. Atlantic salmon prefer cool waters, with spawning typically observed in the 4.4 to 10° C range, and growth typically observed in the 5 to 19° C range (US Fish and Wildlife Service, 2021a). As temperatures rise above 23° C, habitat potential decreases, and Atlantic salmon will search for cooler waters. Riffles, rapids, and pools are also necessary components for various life stages, with the preferred depth being in the 10 to 40 cm range (US FWS, n.d.). Furthermore, Atlantic salmon prefer a circumneutral pH ranging from 6.5 to 7.5 (MDEP, 2022).

Atlantic salmon species undertake long feeding migrations to the ocean as older juveniles and adults and return to freshwater streams to reproduce. Marine habitat features for NSSU Atlantic salmon have not been identified due to the vast spatial and temporal variations (DFO, 2013). NSSU Atlantic salmon smolts migrate seaward from rivers during May to July and adults return to the rivers in the late fall to spawn (COSEWIC, 2011).

The closest ACCDC observation of Atlantic salmon NSSU subspecies is 11.5 ± 1.0 km from the Study Area (ACCDC, 2024). Watercourse 1 provides suitable habitat for various life stages of the southern upland Atlantic salmon population and watercourses 4, 6, and 13 provide suitable habitat for various life stages of the Eastern Cape Breton Atlantic salmon population.

Brook Trout (*Salvelinus fontinalis*)

Brook trout are not listed under federal (SARA) or provincial (ESA) legislation as a SAR; however, they are listed as ‘S3’ by ACCDC (2025). This species of trout is typically found in cold, clear, and well oxygenated rivers and lakes with plenty of shade and gravel substrate (US FWS, 2009). They prefer water temperatures that do not exceed 20° C, though adult fish can tolerate temperatures of up to 25° C for short periods of time. Furthermore, despite being able to reproduce in waters with a pH as low as 4.5, they do best in a pH range of 5.0 to 7.5 (MDNR, 2012).

Brook trout are a migratory species that migrate further inland to rivers and lakes during the fall months to spawn. Sea-run Brook trout may spend April to June in marine environments, but migration to marine habitat does not always occur year to year, with some Brook trout never entering marine environments (DFO, 1988). In Nova Scotia, Brook trout are considered the number one sportfish, with approximately 2 million trout stocked within the province on an annual basis (NSFA, 2005).

The closest ACCDC observation of Brook trout is 10.1 ± 0.5 km from the Study Area (ACCDC, 2024). Watercourses 1, 2 ,4 ,6 ,11, and 13 provide suitable habitat for various life stages of brook trout

7.3.1.7 Effects Assessment

Project-Surface Water and Fish and Fish Habitat Interactions

Project activities, primarily those that involve a watercourse crossing, earth moving or vegetation removal, have the potential to impact surface water, and fish and fish habitat (Table 7.24). These potential interactions could affect fish habitat and surface water features through direct alteration, or changes to water quality or quantity.

Table 7.24: Potential Project-Surface Water and Fish and Fish Habitat Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Tower Components	Tower Assembly	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Surface Water, Fish and Fish Habitat			X	X	X	X				X			X		X

Assessment Boundaries

The LAA for surface water and fish and fish habitat includes the Study Area (Drawing 1.1). The RAA is not applicable.

Assessment Criteria

Assessment criteria provided in Section 4.5 also apply to surface water and fish and fish habitat. The VC-specific definition for magnitude is as follows:

- Negligible – no loss of aquatic or fish habitat. No expectation for altered hydrology or impact to fish behaviour.
- Low – small loss of aquatic and fish habitat, with minimal potential for altered hydrology or impact to fish behaviour.
- Moderate – moderate loss of aquatic and fish habitat. Altered hydrology expected but can be managed with routine measures. Impacts to fish behaviour will only be experienced by individuals rather than entire populations and can be managed with routine measures.
- High – loss of aquatic and fish habitat. Altered hydrology expected that would be challenging to manage with routine measures. Impacts to fish behaviour will be experienced by entire populations and cannot be managed with routine measures; the population's life history is permanently altered.

Direct Effects

Watercourse alterations required for the Project have the potential to impact aquatic and fish and fish habitat, including habitat loss.

The removal of overhanging vegetation from stream banks decreases shade/cover for fish resulting in increased vulnerability to predators. Likewise, the removal of instream cover, such as coarse woody debris or edge habitat (e.g., undercut banks) can have a negative effect on both fish and aquatic invertebrate habitat (MTO, 2009). Furthermore, alterations to channel morphology including altered substrate composition and interference with sediment transport can also result in aquatic habitat degradation.

Thirteen watercourses were identified within the Study Area. To be conservative, all watercourses identified are presumed to be accessible to fish, even though there may be seasonal restrictions to the ephemeral and intermittent watercourses.

Surface water features were identified as a constraint to be avoided in the planning process for the Project layout, where possible. As a result, potential interactions with surface water features and associated fish habitat were avoided to the greatest extent practicable. The only predicted direct impact to fish habitat involves a standard road crossing which will be required to provide access across Watercourse 3.

While the detailed road design and culvert sizing has not yet been finalized, it is estimated that the road width will be between 6 m and 12 m. The total impact area for the crossing is estimated at 8.4 m^2. The Proponent will proceed through NSECC permitting under the watercourse alteration/notification process (NSECC, 2015b). DFO will review the watercourse alteration application to determine whether this road crossing will result in harmful alteration, disruption or destruction of fish habitat (HADD). However, Strum is experienced in the process of culvert design, crossing characteristics, construction and construction monitoring, and implementation of mitigation measures to limit effects during construction, and based upon that experience, is of the professional opinion that the crossing can be designed and constructed using standard methods and there is no expectation for a HADD determination. No additional direct impacts are expected to watercourses, waterbodies, or wetlands which support fish habitat.

Indirect Effects

Indirect effects such as erosion and sedimentation or changes in water quantity and quality can be farther reaching, extending outside of the LAA. These effects are often foreseeable, and research based, standardized BMPs can be implemented to mitigate the resulting outcomes, and the magnitude at which they are felt. Ensuring that any construction or operation of machinery does not fall within a 30 m buffer of any mapped or delineated watercourse (without authorization from NSECC) will assist with mitigating indirect effects to these systems.

Blasting

If required, blasting may result in sensory disturbance to fish, impacting fish behaviour, spawning grounds, and migration patterns. The detonation of explosives near watercourses can produce post-detonation shock waves which involves a rise to a high peak pressure and then a subsequent fall to below ambient hydrostatic pressure. This pressure deficit can cause impacts in fish (Wright & Hopky, 1998). An overpressure in excess of 100 kilopascals can result in effects to fish including damage to the swim bladder in finfish, and potential rupture and hemorrhage to the kidney, liver, spleen and sinus venous. It is also possible that fish eggs and larvae can be damaged (Wright & Hopky, 1998). The degree of damage is related to the type of explosive, size and pattern of the charges and the distance to the watercourse, depth of water within the watercourse, and species, size and life stage of the fish.

Sublethal effects have also been observed including changes in fish behavior as a result of noise produced during blasting (Wright & Hopky, 1998). Should blasting be required, guidance outlined by Wright and Hopky (1998) will be used to develop a Blast Management Plan. The Blasting Management Plan will be designed to ensure that appropriate setback distances are maintained, or mitigations are implemented to protect fish and fish habitat from the potential impacts of blasting.

Erosion and Sedimentation

The mobilization of sediment within aquatic environments can cause shifts in ecological integrity, including changes to the plant species composition, the distribution of primary and secondary producers, and the habitat suitability for vulnerable species (Tilman et al., 1997). Erosion and sedimentation can occur throughout the lifecycle of the Project; however, the highest potential for these effects is related to the construction and upgrading of access roads, the installation of crossing structures and the routine maintenance during the operational phase. The alteration or removal of riparian vegetation can also result in bank instability and erosion.

Changes in Surface Water Quantity

Changes to the amount of flow can alter channel morphology, increase flood potential, and disrupt habitat characteristics that support vulnerable species (MTO, 2009). These impacts could result from the alteration of a catchment area from road or other infrastructure development, or the compaction of soil from the heavy machinery required for tower assembly and conductor stirring.

Changes in Surface Water Quality

Changes in the quality of surface water can arise from alterations to the surrounding environment and can include an increase in water temperature from decreased shade, an increase in pollutants from machinery and infrastructure, and the mobilization of sediments (MTO, 2009). Given the dynamic nature of channeling water, effects upon water quality can quickly spread downstream.

Mitigation

As required, all work completed under the provincial watercourse alteration notification process will be done in accordance with the Nova Scotia Watercourse Alterations Standards and will be executed by a certified Watercourse Alteration Installer/Sizer. For work requiring an approval, specific and detailed mitigation will be developed and submitted to NSECC as part of the application process.

In addition, the following mitigation measures will be implemented:

Habitat Loss

- Educate Project personnel on the sensitivity of aquatic habitat.
- Flag watercourses and avoid impacts to the watercourse and adjacent riparian habitat to the extent possible.
- Obtain watercourse alteration approval from NSECC and adhere to the terms and conditions of the approval, as required.
- Require that the crossing is installed by a certified Watercourse Alteration Installer/Sizer, and designed to avoid any permanent diversion, restriction or blockage of natural flow, such that the hydrologic function of the watercourse is maintained.
    - Follow BMPs during culvert installation (e.g., installation in the dry and following appropriate timing windows, where possible).
- Require that Project activities (fuelling included) or removal of vegetation shall not be conducted within 30 m of any delineated or mapped watercourse, without authorization from NSECC.
- Revegetate along the watercourse edge and above the ordinary high-water mark to facilitate the stabilization of the area, and restoration of fish habitat.
- Conduct any work within the bed of a watercourse between June 1 and September 30 to avoid sensitive periods in the life cycles of fish, to better control water flow, and to allow for a faster revegetation period (NSECC, 2015b).
    - Consult with NSECC and DFO if work is required outside of appropriate timing windows.
- Plan any activities to align with low-flow periods, where possible.
- Design any necessary alterations in a way that maintains the natural grade of the watercourse, to ensure the hydroperiod remains as it was pre-alteration.
- Complete a fish rescue, as required, during culvert installation.

Blasting

- Develop a Blast Management Plan, if blasting is required, that is informed by the guidance provided in Wright and Hopky (1998).

Erosion and Sedimentation

- Develop a site-specific erosion and sedimentation plan during the detailed design phase.
    - The plan will target the disturbance to banks (as required) and adjacent land, and will address the type of control structures, proper installation techniques, grading, maintenance and inspection, timing of installation, and revegetation.

- Properly install, monitor, and maintain erosion and sediment control devices.
- Limit the area of exposed soil and the length of time soil is exposed without mitigation (e.g., mulching, seeding, rock cover).
- Limit the slope and gradient of disturbed areas to minimize the velocity of surface water runoff.
- Minimize surface run-off containing suspended materials or other harmful substances.
- Direct run-off from construction activities away from wetlands and watercourses.

Changes in Surface Water Quantity

- Integrate water management systems including diversion and collection ditches, roadside drainage channels, vegetated swales, and stormwater retention ponds, where required.
- Design any necessary alterations in a way that maintains the natural grade of the watercourse, to ensure the hydroperiod remains as it was pre-alteration.
- Fit any watercourse crossings with appropriately sized infrastructure, as prescribed by a certified Watercourse Alteration Installer/Sizer.

Changes in Surface Water Quality

- Leave riparian vegetation as intact as Project developments will allow.
- Integrate outlet protection features to dissipate flow velocities and decrease erosion at the outflow.
- Require that if concrete is to be used, it is pre-cast and cured for at least one week prior to use at a crossing site (NSECC, 2015b).
- Use rock material that is clean, coarse granular, non-ore-bearing, non-watercourse-derived, and non-toxic to aquatic life (NSECC, 2015b).

Monitoring

If the crossing is subject to provincial notification requirements, visual monitoring will be completed during the installation process to ensure the work is conducted in accordance with the Nova Scotia Watercourse Alteration Activity Standards (NSECC, 2015c). If the crossing will require an approval, monitoring will be determined as part of the permitting process.

A watercourse monitoring plan, if required as part of the permitting phase, may include hydrological, sediment, and stability assessments upstream, downstream, and at the crossing of the watercourse.

Conclusion

After mitigations, residual effects on fish and fish habitat are characterized as follows:

- **Magnitude** – Low magnitude as a small loss of fish habitat or impacts to fish behaviour, with minimal potential for altered hydrology may occur as a result of alterations to potential or confirmed fish-bearing watercourses and wetlands.
- **Geographic extent** – Within the LAA, as direct impacts will occur only within the LAA and indirect impacts are expected to be minimized through the implementation of effect-specific active management and mitigation measures.

- **Frequency** – A single event, as the direct impacts will occur once, during the construction phase.
- **Duration** – Short duration as the residual effects will be restricted to the construction phase.
- **Reversibility** – Reversible, as the effect will terminate at the end of the Project lifespan.
- **Significance** – Not significant.

7.3.2 Wetlands

7.3.2.1 Overview

Wetland assessments were conducted to identify and delineate wetland habitat so that impacts to wetland area and function could be avoided and minimized, to the extent possible. This was achieved by using the following approach:

- Identify wetland habitat in the Study Area using desktop resources.
- Ground-truth and delineate wetland habitat within the Study Area.
- Complete functional assessments for delineated wetlands within the Study Area.
- Identify the potential for and confirm the presence of WSS within the Study Area.
- Use the results to refine the Project design to avoid/minimize impacts to wetlands, to the extent possible.

7.3.2.2 Regulatory Context

The Nova Scotia Wetland Conservation Policy (NSECC, 2019) outlines a policy goal of no loss of WSS and no net loss in area and function for other wetlands. Wetlands are considered WSS based on the wetland having significant species or species assemblages, high levels of biodiversity, significant hydrological value, or high social or cultural importance. Under this policy, the following wetlands are considered WSS:

- All salt marshes.
- Wetlands that are within or partially within a designated Ramsar site, Provincial Wildlife Management Area (Crown and Provincial lands only), 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 the Nova Scotia Eastern Habitat Joint Venture program.
- Wetlands known to support at-risk species as designated under SARA or ESA.
- Wetlands in designated protected water areas as described within Section 106 of the *Environment Act,* S.N.S. 1994-95, c. 1 (Nova Scotia, 1995b).

As per Section 5 of the *Environment Act* (Nova Scotia, 1995b), approval from NSECC is required to alter a wetland. Nova Scotia considers a wetland alteration to be any activity that may affect wetland function and habitat. Such activities include, but are not limited to, excavating, flooding, infilling, or draining (Nova Scotia, 1995b).

7.3.2.3 Desktop Review

A desktop review for the location and extent of potential wetlands across the Study Area was completed using the following information sources:

- Wetlands Inventory (NSNR, 2021g)
- WSS Database (NSECC, 2020d)
- NS Hydrographic Network (ODNS, 2024)
- WAM Database (NSNR, 2022c)
- NS Digital Elevation Model (DEM) (GeoNOVA, 2024b)
- Provincial Landscape Viewer (NSNR, 2024e)
- Satellite and aerial imagery

The NSNR Wetland Inventory (2021g) identified one wetland within the Point Tupper side of Study Area, classified as a swamp. The wetland is <1 ha in size (Drawing 7.17).

According to the NSNR WSS database (2020d), no WSS are located within the Study Area. The nearest WSS is less than 0.5 km north of the Study Area (Drawing 7.17).

The NS Hydrographic Network (ODNS, 2024) was used in conjunction with the WAM database (NSNR, 2022c) and DEM layer to further assess the distribution of confirmed and potential wetland habitat within the Study Area. These sources identified potential wet areas and predicted flow based on the assumed depth-to-water generated from digital elevation data (Drawing 7.16). The depth-to-water ranged from 0 m to >10 m from the surface across the Study Area, with the majority of the Study Area being well to moderately-well drained.

The Provincial Landscape Viewer (NSNR, 2024e) was consulted to further confirm the presence or absence of both wetlands and WSS. This online tool showed no additional wetlands beyond the polygon identified in the NSNR Wetland Inventory.

Satellite and aerial imagery were used as a quality assurance/quality control tool when reviewing desktop resources.

The results of the desktop review assisted in scoping field studies and were ultimately used to conduct a constraints analysis thus refining tower locations/road siting locations to avoid known wetland features to the extent possible.

7.3.2.4 Field Assessment Methodology

General

Wetland field assessments were completed throughout the Study Area from July 15 to September 19, 2024, except for the eastern extent of the Point Tupper side of the Study Area, which was assessed on May 15 and 16, 2023. Surveys included high-level assessments for hydrology, complemented by in-depth wetland delineations and functional assessments. Wetland surveys were done in conjunction with watercourse assessment surveys (Section 7.3.1).

To accompany wetland field surveys, a list of SAR and SOCI known to occur within the region of the Project was compiled to help with incidental identification, as discussed in Sections 7.4.2 to 7.4.5. During the wetland surveys all incidental observations of SAR and SOCI were noted; details of these observations are captured under their respective reporting sections, as applicable to the species observed.

Field Delineations

Strum ecologists surveyed the Study Area, delineating and characterizing each wetland identified. In accordance with the U.S. Army Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987), wetland boundaries were determined by confirming the following:

- Presence of hydrophytic (water loving) vegetation.
- Presence of hydrologic conditions which result in periods of flooding, ponding, or saturation during the growing season.
- Presence of hydric soils.

A positive indicator must typically be present for all three parameters to definitively identify any given site as a wetland (Environmental Laboratory, 1987). Field staff walked meandering transects throughout the landscape to look for wet areas. When wetlands were identified, the boundary was flagged, and the spatial boundaries were recorded on iPads using the ESRI software Survey 123.

Identification of Hydrophytic Vegetation

Hydrophytic vegetation is defined as the sum of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produces permanent or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present (Environmental Laboratory, 1987). Hydrophytic vegetation should be the dominant plant type observed in wetland habitat (Environmental Laboratory, 1987).

Dominant plant species observed in each wetland were classified according to indicator status (probability of occurrence in wetlands), in accordance with the U.S. Fish and Wildlife Service National List of Vascular Plant Species that Occur in Wetlands: NE Region (Region 1) (US FWS, 1988) (Table 7.25). These indicators are used as this region most closely resembles the flora and climate regime of Nova Scotia.

Table 7.25: Classification of Wetland-Associated Plant Species[1]

Plant Species Classification	Abbreviation[2]	Probability of Occurring in Wetland
Obligate	OBL	>99%
Facultative Wetland	FACW	66-99%
Facultative	FAC	33-66%
Facultative Upland	FACU	1-33%
Upland	UPL	<1%
No indicator status	NI	Insufficient information to determine status
Plants That Are Not Listed (assumed upland species)	NL	Does not occur in wetlands in any region.

[1] Source: (US FWS, 1988)
[2] A '+' or '-' symbol can be added to the classification to indicate greater or lesser probability, respectively, of occurrence in a wetland.

If the majority (greater than 50%) of the dominant vegetation at a data point is classified as obligate (OBL), facultative wetland (FACW), or facultative (FAC), then the location of the data point is considered to be dominated by hydrophytic vegetation.

Identification of Hydric Soils

A hydric soil is formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper layer (USDA, NRCS, 2003). Indicators of the presence of hydric soils include soil colour (gleyed soils and soils with bright mottles and/or low matrix chroma), aquic or preaquic moisture regimes, reducing soil conditions, sulfidic material (odour), soils listed on the hydric soils list, iron and manganese concretions, organic soils (histosols), histic epipedons, high organic content in the surface layer of sandy soils, and organic streaking in sandy soils.

During field surveys, soil pits were excavated to a minimum depth of 40 cm or until (auger) refusal. The soil in each pit was then examined for hydric soil indicators. The matrix colour and mottle colour (if present) of the soil were determined using Munsell Soil Colour Charts.

Determination of Wetland Hydrology

Wetland habitat, by definition, either periodically or permanently has a water table at, near, or above the land surface. To be classified as a wetland, a site should have at least one primary indicator or two secondary indicators of wetland hydrology (Table 7.26). Wetland habitat is assessed for signs of hydrology via visual observations across the area and through the assessment of soil pits.

Table 7.26: Indicators of Wetland Hydrology[1]

Examples of Primary Indicators	Examples of Secondary Indicators
Surface Water	Oxidized Root Channels in the Upper 30 cm
Saturation	Local Soil Survey Data
Sediment Deposition	Dry Season Water Table
Drainage Patterns	Stunted or Stressed Plants
Water-stained Leaves	Drainage Patterns
Sparsely Vegetated Concave Surfaces	Surface Soil Cracks
Hydrogen Sulfide Odor	Moss Trim Lines

[1]As identified in the Nova Scotia Wetland Delineation Data Form (NSECC, 2011d) which has been adapted from the U.S. Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia ((Environmental Laboratory, 1987)

Functional Assessments

Wetland functional assessments were completed for all wetlands identified within the Assessment Area. Functional assessments were completed using the Wetland Ecosystems Services Protocol – Atlantic Canada (WESP-AC) evaluation technique (Adamus, 2021). The WESP-AC process involves the completion of three forms; a desktop review portion (Office Form) that examines the landscape level aerial conditions to which the wetland is situated, and two field forms identifying biophysical characteristics of the wetland (Field Form) and stressors to the wetland (Stressors Form), if any. The process serves as a rapid method for assessing individual wetland functions and values. WESP-AC addresses 17 specific functions that wetlands may provide, presented in Table 7.27.

Table 7.27: WESP-AC Function Parameters

Grouped Wetland Function	Specific Wetland Functions
Hydrologic Function	Surface Water Storage
Aquatic Support	Aquatic Invertebrate Habitat
	Stream Flow Support
	Organic Nutrient Export
	Water Cooling
Water Quality	Sediment Retention & Stabilization
	Phosphorus Retention
	Nitrate Removal & Retention
	Carbon Sequestration
Aquatic Habitat	Anadromous Fish Habitat
	Resident Fish Habitat
	Waterbird Feeding Habitat
	Waterbird Nesting Habitat
	Amphibian and Turtle Habitat
Terrestrial Habitat	Songbird, Raptor, & Mammal Habitat
	Pollinator Habitat
	Native Plant Habitat

Source: (Adamus, 2021)

The specific wetland functions are individually allocated into grouped wetland functions and measured for "functional" and "benefit" scores. Wetland function relates the wetland's natural ability (i.e., water storage), whereas wetland benefits are benefits of these functions, whether it is ecological, social, or economic. The highest functioning wetlands are those that have both high 'function' and 'benefit' scores for a given function. WESP-AC enables a comparison to be made between individual wetlands within a province to gain a sense of the importance each has in providing ecosystem services.

In addition to the grouped wetland functions above, WESP-AC also measures the following specific wetland functions, however, these are only evaluated by their benefit scores:

- Wetland Condition
- Wetland Risk (i.e., sensitivity to potential impacts)

The following individual functions are assessed to determine the benefit scores associated with each wetland:

- Public Use & Recognition
- Wetland Sensitivity
- Wetland Ecological Condition
- Wetland Stressors

For each wetland evaluated, the WESP-AC process calculates the overall score for the seven grouped wetland functions and the 17 specific wetland functions listed in Table 7.27. One score each is provided for function and benefit. Scores are ranked as 'Lower', 'Moderate', or 'Higher', allowing for analysis of the wetland as compared to calibrated baseline wetland scores in Nova Scotia to date. A 'Higher' WESP-AC score means that wetland has a greater capacity to support those processes as compared to other wetlands in the province. A 'Higher' WESP-AC score in both the function and benefits category means the wetland supports the natural ecosystem functions and provides services with potentially societal importance.

Additionally, the WESP-AC process assesses the wetland for a determination of WSS based on the functional results. The grouped functions outlined in Table 7.27 are further combined into "supergroups" for habitat (Aquatic Habitat and Transition Habitat) and support (Hydrologic Support, Water Quality Support and Aquatic Support) functions. WSS designation is dependant on a certain combination of 'moderate' and 'high' scores within these groups.

The WESP-AC functional evaluation technique recognizes that, in many cases, delineation of entire wetlands where they extend beyond a Study Area is not always feasible (e.g., property ownership) or required to complete an appropriate assessment using this tool (NBDELG, 2021). Instead, WESP-AC permits the delimitation of an assessed area, defined as the wetland or portion of wetland physically assessed in the field, while the Office Form considers the broader landscape characteristics and functions that extend beyond the assessed area and/or Study Area.

7.3.2.5 Field Assessment Results

General

Field surveys completed during spring 2023 and summer 2024 identified 28 wetlands either partially or fully within the Study Area (Drawing 7.15A and 7.15B). Five wetlands were identified on the Steep Creek side, and 23 wetlands were identified on the Port Tupper side. Detailed results are found in the Wetland Characterization Table (Appendix F). Some wetlands were only delineated up to the edge of the Study Area boundary and therefore are larger than shown in Drawings 7.15A and B. The partially indicated wetlands are indicated in the Wetland Characterization Table (Appendix F).

Of the 28 identified wetlands, swamp (n= 24) was the most prominent wetland type. The Canadian Wetland Classification System (NWWG, 1997) defines a swamp as a wetland characterized by the dominance of woody vegetation in which the water table is typically at or near the surface or inundates the soil for a significant portion of the growing season. Swamps are often associated with poorly drained or saturated soils, and they provide important habitat for various plant and animal species adapted to wet conditions. Swamps can be further sub-divided into treed swamps or shrub swamps, depending on their physiological makeup. Two wetlands (WL25 and WL28) are considered wetland complexes, meaning that they are made up of a combination of more than one wetland type.

Of the 28 identified swamps, 15 were classified as full or partial treed swamps. Treed swamps are characterized by the presence of trees as the dominant vegetation type and an environment that is not as waterlogged as other wetland types, such as shrub swamps or marshes. These wetlands typically experience their highest hydroperiod during spring and fall precipitation events (NSNR, 2018b). As a result, treed swamps provide deciduous trees [e.g., red maple (*Acer rubrum*) and yellow birch (*Betula alleghaniensis*)] and coniferous trees [e.g., black spruce (*Picea mariana*) and balsam fir (*Abies balsamea*)] the opportunity to establish themselves and adapt to the inconsistent inundation periods (NSNR, 2018b). Typical species composition of the identified treed swamps consisted of bunchberry (*Cornus canadensis*), cinnamon fern (*Osmundastrum cinnamomeum*), fowl mana grass (*Glyceria striata*), three-seeded sedge (*Carex trisperma),* red spruce (*Picea rubens*), and balsam fir. Surface water was typically not observed, though saturation was often present as identified through the excavation of soil pits.

The remaining nine identified swamps were classified fully or partially as shrub swamps. Shrub swamps are dominated by shrubs and smaller woody plants with a denser understory and tend to form in permanently or seasonally flooded areas where the surface is moist from ground saturation. Trees may be present but are less dominant than in treed swamps. In many cases, shrub swamps eventually transition into treed swamps via succession (NSNR, 2018b). The typical species composition of shrub swamps identified within the Study Area included swamp dewberry (*Rubus hispidus*), fowl manna grass, speckled alder, red maple, and balsam fir. Surface water was more common than within treed swamps, though the temporal extent of the surficial hydroperiod is expected to be seasonal.

Two marshes were observed within the Study Area, and two complexes had marsh portions. These types of wetlands often display more persistent surface water areas that tend to shrink as the growing season progresses. Furthermore, the lack of canopy cover and high water table in marshes often facilitate vigorous growth of herbaceous vegetation (NSNR, 2018b). Vegetation composition included swamp candles (*Lysimachia terrestris*), soft rush (*Juncus effusus),* speckled alder (*Alnus incana*)*,* and black spruce.

Two bogs were also observed within the Study Area. These wetlands are characterized by their poor drainage, accumulation of peat, and dense coverage of either sphagnum moss or grass-like sedges (Province of NS, 2018). Bogs typically have a high water table and receive most of their water from precipitation, resulting in a nutrient-poor environment (NWWG, 1997). Typical species composition observed included Canadian bunchberry (*Cornus canadensis*), three-seeded sedge *(Carex trisperma),* bog cranberry (*Vaccinium oxycoccos*), Tamarack *(Larix laricina),* and black spruce. Trees, when present, were often stunted and scattered throughout. Two of the delineated wetlands on the Point Tupper side (WL26 and WL28) fall within the Port Hawkesbury Municipal Water Supply Area, which is a protected water area, and are therefore considered WSS (as outlined in Section 7.3.2.2).

Functional Assessments

Functional assessments were completed for all wetlands. WESP-AC results are summarized in in Table 7.28. WESP-AC results present that the averaged grouped function and benefit scores for wetlands in the Study Area range from low to high.

Table 7.28: WESP-AC Results, Grouped Function Scores for All Wetlands in the Study Area

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Functional WSS?
	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit	
1	7.19	4.51	7.19	1.78	5.58	0.57	1.51	2.54	6.17	9.53	N/A	4.78	N/A	7.17	No
2	7.66	4.46	7.30	1.78	6.90	0.50	1.46	2.47	6.23	9.51	N/A	6.52	N/A	7.13	No
3	1.01	4.57	3.20	3.96	7.21	5.80	3.08	7.53	8.21	9.97	N/A	7.10	N/A	5.89	No
4	1.29	3.89	2.32	3.32	6.78	5.25	3.44	7.62	8.04	9.72	N/A	8.26	N/A	7.51	No
5	6.62	0.73	9.13	3.38	7.53	3.22	6.64	7.65	6.32	8.76	N/A	0.00	N/A	8.05	No
6	1.80	9.87	2.80	4.28	7.51	5.00	4.90	5.18	7.58	6.66	N/A	5.36	N/A	6.30	No
7	6.78	6.77	9.36	4.23	6.02	3.33	5.37	4.01	7.28	5.18	N/A	1.88	N/A	7.45	No
8	2.43	7.61	3.52	4.36	6.59	4.07	7.56	3.95	5.51	4.64	N/A	1.88	N/A	6.98	No
9	1.76	7.84	2.88	5.94	7.66	4.60	4.18	3.95	7.55	5.29	N/A	7.10	N/A	6.16	No
10	6.91	4.91	7.03	3.62	4.42	0.34	1.36	2.31	6.32	8.02	N/A	3.62	N/A	8.07	No
11	3.86	4.51	3.22	4.86	5.05	3.20	5.13	7.69	7.39	8.19	N/A	3.62	N/A	5.77	No
12	0.96	7.16	1.97	3.64	6.17	5.13	4.04	7.65	8.05	8.23	N/A	5.94	N/A	7.92	No
13	8.92	7.78	7.99	3.55	5.24	0.42	1.45	2.38	6.85	8.06	N/A	7.10	N/A	7.45	No
14	6.63	8.18	6.96	5.03	4.45	0.26	1.20	2.24	6.22	8.00	N/A	5.36	N/A	9.65	No
15	1.05	6.32	1.60	7.33	5.07	2.75	1.15	2.09	5.34	7.93	N/A	0.72	N/A	6.58	No
16	1.33	7.16	4.11	9.53	5.16	3.58	1.28	2.19	6.90	8.03	N/A	3.91	N/A	6.36	No
17	1.34	6.88	2.44	10.00	6.46	4.45	3.81	7.64	7.67	8.20	N/A	1.01	N/A	6.92	No
18	1.05	7.61	2.70	3.55	4.59	4.02	1.78	0.77	5.54	7.99	N/A	0.72	N/A	7.05	No
19	6.91	8.18	6.98	4.18	4.16	0.23	1.28	2.20	6.24	8.01	N/A	3.62	N/A	8.18	No
20	6.91	7.44	7.02	3.55	4.47	0.34	1.36	2.31	6.27	8.01	N/A	3.62	N/A	7.45	No
21	1.93	8.18	2.25	9.62	5.97	5.28	3.82	7.65	8.28	8.24	N/A	7.10	N/A	8.01	No
22	4.17	7.90	5.04	3.55	4.65	4.10	0.00	2.28	6.84	8.05	N/A	6.52	N/A	7.34	No
23	3.01	0.00	2.13	10.00	0.00	1.73	3.42	0.92	6.56	2.71	N/A	7.10	N/A	4.17	No
24	2.54	10.00	3.02	6.10	4.13	5.71	6.38	2.63	6.02	4.35	N/A	4.20	N/A	6.91	No
25	6.72	10.00	8.82	5.73	3.84	3.25	5.90	3.01	7.24	4.90	N/A	4.35	N/A	7.62	No
26	3.18	3.33	3.61	6.27	8.05	5.57	7.82	3.26	6.79	3.18	N/A	6.52	N/A	8.47	No

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Functional WSS?
	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit	Function	Benefit	
27	3.14	3.21	1.56	3.93	3.76	0.41	1.73	0.50	5.61	2.74	N/A	0.72	N/A	5.97	No
28	2.66	3.21	3.51	4.72	5.58	4.99	7.58	2.44	6.29	2.81	N/A	0.72	N/A	6.67	No

Higher
Moderate
Lower

Hydrological Group

The hydrologic group evaluates the effectiveness of a wetland to store or delay the downslope movement of surface water. However, the model does not account for wetland size, and in turn, the ability of larger wetlands to store more water than smaller wetlands. Wetlands that have the highest benefit scores within this group tend to be located within developed areas, where water storage is more valuable to reduce flood risks. The majority of the wetlands (57%) had a lower hydrologic function score, and a higher hydrologic benefit score.

Water Quality Group

The water quality group is compiled from four different functions: sediment retention and stabilization; phosphorus retention; nitrate removal; carbon sequestration. The main function of this group is to evaluate the wetland's potential to intercept, retain, and filter sediments, particulates, and organic matter. Similar to the hydrologic group, the wetlands that have the higher benefit score in this regard include those that do not have a surface water outlet and instead are isolated from flowing surface water. This model also does not account for wetland size and as such, larger wetlands do not necessarily score higher than small wetlands, although size may factor into this function. The wetlands had a mix of moderate (39%) to high (36%) functional water quality score, and the majority (68%) had a high water quality benefit score. The higher function rank is likely a result of the numerous isolated wetlands in the Study Area which do not have a defined outflow and therefore have greater ability to retain and filter particulate and organic matter. These wetland types are commonly hydrologically isolated and/or receiving (inflow) wetlands, such as swamps, which are the dominant wetland class in the Study Area.

Aquatic Support Group

The aquatic support group comprises four individual functions: stream flow support; aquatic invertebrate habitat; organic nutrient export; and water cooling. The main function of this group is to determine the wetland's ability to support ecological stream functions that promote habitat health. Wetlands lying adjacent to or containing flowing water score higher than those that do not (e.g., isolated wetlands). Additionally, headwater wetlands are crucial for supporting stream flow during the dry season by contributing to water flow via groundwater input and storage capacity. Headwater wetlands provide stream flow and cooling functions due to their typically limited exposed surface water, insulating properties and groundwater water storage and retention time. Treed swamps can also provide aquatic support through groundwater discharge (e.g., seeps) and vegetation shading. Wetlands were evenly split between moderate and high scores for the aquatic support functional group, and a slight majority of wetlands (54%) had a lower aquatic support group benefit score. This is likely because some wetlands are hydrologically isolates, while others have watercourses flowing through them.

Aquatic Habitat Group

The aquatic habitat group is compiled from five different functions: anadromous fish habitat, resident fish habitat, amphibian and turtle habitat, waterbird feeding habitat, and waterbird nesting habitat. Wetlands that have the higher functions within this group include those that are adjacent to or contain water features with potential habitat characteristics (e.g., in-stream cover, aquatic vegetation, etc.). The majority of wetlands (82%) received low or moderate aquatic habitat functional scores, while aquatic habitat group benefit scores were mostly (89%) moderate or high.

Transition Habitat Group

The transition habitat group comprises three different functions: songbird, raptor, and mammal habitat, native plant habitat and pollinator habitat. The main function of the collective group is to evaluate the wetland's ability to support healthy habitat for birds, mammals, and native plants. The Study Area has a mix of remote habitat and fragmented or disturbed habitat. All wetlands scored moderate or high on transition habitat function, while the majority of wetlands (82%) scored lower or moderate on transition habitat group benefit.

Wetland Condition

Wetland condition refers to the integrity or health of a wetland as defined by its vegetative composition and richness of native species. Scores are derived from the similarity between the wetland being evaluated and reference wetlands of the same type and landscape setting (Adamus, 2021). The wetlands in the Study Area had a range of wetland condition scores with 43% lower scores, 25% moderate scores, and 32% higher scores. The wetlands with moderate to higher ranks contain a relatively good level of ecological integrity and species diversity. Lower ranked wetlands are typically smaller wetlands associated with historic disturbances such as roads, trails, timber harvesting etc., which may be more susceptible to changes in their surroundings.

Wetland Risk

Wetland risk takes sensitivity and stressors into account by averaging the two. Sensitivity is the lack of intrinsic resistance and resilience of the wetland to human or naturally caused stress (Niemi et al., 1990). Stress relates to the degree to which the wetland is or has recently been anthropogenically altered in a way that degrades natural condition and/or function. The functional assessment tool uses five metrics to measure sensitivity: abiotic resistance, biotic resistance, site fertility, availability of colonizers, and growth rate. The model applies four stress groups: hydrologic stress, water quality stress, fragmentation stress, and general disturbance stress. Wetlands that are highly resilient may have lower risk scores despite their exposure to multiple stressors. Additionally, wetlands exposed to fewer threats, but with low resilience may have higher risk scores. Wetland resilience is tied to multiple factors, such as size, proximity to natural land cover, and presence of invasive species. Most of the wetlands in the Study Area scored moderate (29% of wetlands) or higher (68% of wetlands) for wetland risk (Table 7.28), meaning they have a reasonable resilience and are not highly susceptible to change. Only one wetland scored lower, indicating a greater risk and susceptibility to anthropological impacts.

Wetlands of Special Significance (WSS)

None of the wetlands were determined to be WSS, as dictated by the Functional WSS Interpretation Results within the WESP-AC spreadsheet calculator. Desktop review results, however, show that two of the wetlands delineated within the Study Area are WSS because they fall within a Municipal Water Supply Areas, as described in Section 7.3.2.2. These scores aligned with the results of other field surveys, including no lichen or plant SAR/SOCI within field-delineated wetlands within the Study Area. The results of the wetland field assessments were also cross-referenced with breeding bird survey results, specifically for avian SAR and SOCI with wetland habitat requirements, with no bird SAR/SOCI observed within field delineated wetlands within the Study Area.

7.3.2.6 Effects Assessment

Project-Wetland Interactions

Project activities have the potential to interact with wetlands directly and indirectly through clearing and grubbing, new access road and tower construction, removal of infrastructure, and site reclamation, as presented in Table 7.29. These potential interactions could impact wetlands through direct alteration (e.g., infilling), or indirect impacts to wetland function (e.g. hydrology, habitat integrity, and/or displacement of sediment). Direct and indirect effects to wetlands are discussed in the following sections, along with avoidance and mitigation measures to eliminate or minimize the described interactions.

Table 7.29: Potential Project-Wetland Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Wetlands				X	X	X				X			X		X

Assessment Boundaries

The LAA for wetlands is the Study Area (Drawing 1.1). The RAA for wetlands includes the Study Area and the secondary watersheds that they lie within (Drawing 7.14).

Assessment Criteria

The assessment criteria provided in Section 4.5 apply for wetlands. The VC-specific definition for magnitude is as follows:

- Negligible – no direct loss of wetland habitat or alteration to wetland functions expected.

- Low – direct loss of wetland habitat, but overall wetland functions remain intact.
- Moderate – direct loss of wetland habitat and impact to wetland functions, but wetland area loss will not impact the hydrology of the wetland’s watershed and/or the impacted wetland areas do not directly support SAR.
- High – direct loss of wetland habitat and impact to wetland functions; and wetland area loss will affect the hydrology of the wetland’s watershed and/or the impacted wetland areas directly support SAR.

Direct Effects

Direct effects on wetland habitat and functionality such as habitat loss and changes to hydrology can occur throughout the life of the Project but are likely to be most prominent during construction. Effect-specific active management, mitigation, and monitoring are required to eliminate, mitigate, or otherwise manage the magnitude of these direct effects.

Habitat Loss

Habitat loss can occur both directly (i.e., excavation or infilling) and indirectly (i.e., altered hydrology or canopy cover) from the Project (Trombulak & Frissell, 2000). Loss of habitat can fragment wildlife corridors, potentially isolating species and lowering species richness. Habitat loss can also disrupt vital habitat characteristics that support vulnerable species. Further, the removal or infilling of wetland habitat can impact the hydroperiod of neighbouring wet areas, resulting in farther reaching impacts on habitat quality (Mitsch & Gosselink, 2000).

A GIS suitability analysis was conducted to design a Project Area that would optimize the placement of Project infrastructure to avoid and minimize loss of wetland area and function, to the greatest extent possible. Only one wetland will be directly impacted: Wetland 9 is expected to be partially altered by a pulling area (808 m^2, 18% of total wetland area). Five other wetlands within the Project Area require clearing (WL2 and WL5 – Steep Creek side; WL6, WL7 and WL14 – Point Tupper side), which is not considered a wetland alteration (NSECC, 2013). Trees and tall vegetation will be cleared and tall vegetation to maintain the transmission line ROW.

Hydrological Effects

The hydrology of a wetland is one of the most important aspects of its overall structure and function. Project infrastructure within or near a wetland can result in changes in the timing and quantity of flow, potentially impacting species composition, water treatment capabilities, and nutrient export (Mitsch & Gosselink, 2000). Further, disruption to the hydrology of one area may hinder the hydrological connectivity to other areas, thus resulting in impacts being felt in neighbouring wet areas.

The results of the field assessments indicate that there is a potential for one Project-wetland interaction to facilitate the construction of a tower foundation, at WL9 on the Point Tupper side of the Study Area for a total of 808 m^2 (0.08 ha).

Within the 183.1 ha Study Area, 6.15 ha was identified to be wetland habitat, making up 3.36% of the Study Area. Within the 35.2 ha Project Area, only 0.68 ha is wetland habitat. Field delineated wetland habitat that may be directly impacted comprises just 0.23% (0.08 ha) of the total Project Area and 12% of the total wetland within the Project Area. The final Project Area and subsequent area of impact will be determined following the detailed design phase.

Indirect Effects

The temporal and spatial extent of indirect effects such as erosion and sedimentation, dust, invasive species, and compaction can be far reaching, but are often foreseeable, and research based, standardized BMPs can be implemented to mitigate the resulting outcomes. Indirect impacts are mitigated by maintaining a vegetated buffer between Project activities and unaltered wetlands.

Erosion and Sedimentation

Erosion and sedimentation can occur throughout the lifecycle of the Project, including during construction efforts, daily traffic, routine road and transmission line ROW maintenance. The accumulation of sediment within wetland environments can cause shifts in ecological integrity, including the plant species composition and subsequent nutrient retention potential, hydrological storage capabilities, and habitat suitability for vulnerable species (Tilman et al., 1997).

Dust

The potential for dust deposition will likely be highest during the construction phase, though the risk will be present throughout the Project's lifecycle. Dust primarily impacts vegetative health, with particle size influencing the scale of the impact (Farmer, 1993). Smaller particulate can result in clogged pores, hindering vital biochemical processes including photosynthesis, respiration, and transpiration; and larger particulate can result in lacerations in plant tissues, thus jeopardizing the health of the plant (Farmer, 1993).

Invasive Species

The colonization of invasive species can result in detrimental impacts on wetland environments, including alterations to evapotranspiration rates, infilling from reduced decomposition rates, and ultimately a reduction in the complexity of the wetland and its subsequent species richness (Zedler & Kercher, 2004). The creation of roadways can act as a vector for invasive species, with the potential for seed dispersal increasing with both vehicular and animal traffic. Further, because many invasive species thrive in disturbed soils, routine maintenance of roadways can provide ideal conditions for their establishment (Trombulak & Frissell, 2000).

Compaction

Compaction can hinder both the vegetative and hydrological structure of a wetland, with a loss of pore space restricting root growth and groundwater infiltration (Duiker, 2004). This impacts the absorption of moisture and nutrients, thus impacting the ecological integrity of the wetland and the ecosystem services it provides. Further, compaction can decrease percolation rates, resulting in prolonged periods of saturation, and increasing the potential for flooding (Duiker, 2004).

Mitigation Measures

The following specific mitigative measures will be implemented to avoid and mitigate any potential effects on wetlands.

Habitat Loss

- Ensure wetlands are clearly marked to avoid interference with wetland habitat to the extent possible.
- Avoid impacts to wetlands to the extent possible.
    - Where wetland impacts are unavoidable, wetland alterations will be completed in accordance with the NSECC Wetland Conservation Policy (2019). The wetland alteration process will occur during the permitting stage, which includes a requirement to compensate for lost wetland habitat and functions.
        - Adhere to the terms and conditions of the wetland alteration approval.
    - For wetlands along the transmission line corridor, orient placement of lattice towers and support poles in dry areas adjacent to wetlands thus allowing transmission cables to span wetlands, to the extent possible.
    - If temporary access roads are required within wetlands, appropriate mitigations, including the use of swamp mats, will be implemented to prevent disturbance.

Hydrology

- Require that wetland alterations will not result in permanent diversion, restriction, or blockage of natural flow, such that hydrologic function of wetlands will be maintained to the extent possible.

Erosion and Sedimentation

- Develop a site-specific erosion and sedimentation plan during the detailed design phase.
    - The plan will address the type of control structures, proper installation techniques, grading, maintenance and inspection, timing of installation, and revegetation.
- Limit the area of exposed soil and the length of time soil is exposed without mitigation (e.g., mulching, seeding, rock cover).
- Use the existing roads and access routes to the extent feasible.
- Avoid travel through wetlands.
    - If travel through wetlands is required, use swamp mats and if possible, time work to occur during frozen ground conditions and/or travel through the drier portions of the wetland.
- Ensure surface run-off containing suspended materials or other harmful substances is minimized.
- Direct run-off from construction activities away from wetlands.
- Maintain existing vegetation cover where possible.

Dust Deposition

- Use water or an approved dust suppressant to control dust on roads as required.
- Establish site speed limits to minimize dust generation.

Invasive Species

- Use quarried, crushed materials for road construction to reduce the introduction of invasive vascular plant species.
- Clean and inspect work vehicles prior to use to prevent the introduction of invasive/non-native species.

Compaction

- Require that wetland delineation tape is in place and visible to avoid unnecessary compaction within wetlands.
- Hold pre-construction site meetings to educate staff on the sensitivity of wetlands.
- Avoid travel through wetlands.
    - If travel through wetlands is required, use geotextile matting and time work to occur during frozen ground conditions, or travel through the drier portions of the wetland, as appropriate.

Monitoring

A site-specific post-construction wetland monitoring plan will be developed to facilitate adaptive management and contribute to the safeguarding of ecological integrity and environmental stability. The plan will be provided to NSECC as part of the permitting process and will likely consist of detailed monitoring and general spot checks. Detailed monitoring typically includes vegetative, hydrological, and soil assessments within the wetland habitat adjacent to the infill site. Spot checks typically involve a general overview of vegetative, hydrological, and soil conditions, focusing on evidence of significant hydrologic alterations and sedimentation.

Conclusion

Following mitigation, residual effects to wetland habitat and functionality are characterized as follows:

- **Magnitude** – Low magnitude as there will be a direct loss of wetland habitat, but overall wetland functions remain intact.
- **Geographic extent** – Within the LAA.
- **Frequency** – Occur as a single event during construction.
- **Duration** – Short-term as impacts will be restricted to the construction phase.
- **Reversibility** – Partially reversible as any loss will be compensated for through the permitting process.
- **Significance** – Not significant.

7.4 Terrestrial Environment

7.4.1 Terrestrial Habitat

7.4.1.1 Overview

The terrestrial habitat assessment focused on the identification of sensitive and important habitats through a combination of desktop review and field surveys. The goals of the assessment were to inform the biophysical surveys, and to avoid or mitigate Project impacts to sensitive and important habitats. Wetland habitats are addressed in Section 7.3.2, and habitat assessment related to specific fish, fauna, bats, and bird species are addressed in Sections 7.3.1, and 7.4.3 to 7.4.5.

Sensitive habitats are variably defined in literature, but herein refer to:

- Habitats that are known to support or are capable of supporting SAR and SOCI.
- Old growth stands, as defined in the Old-Growth Forest Policy (NSNR, 2022a).
- Lands that have legal protection such as parks, conservations areas, conservation easements, and restricted land use.

To assess the terrestrial habitat within the Study Area, a desktop review was conducted prior to field surveys to identify different habitats and key areas of interest. The extent and diversity of habitat types were then confirmed during field surveys. Results of the desktop and field studies informed the siting of suspension towers, dead-end towers, laydown areas, spur roads, and other infrastructure. This was an iterative process, with the layout being refined through ground-truthing sensitive and important habitats. The results were also used to develop targeted mitigation and best management practices.

7.4.1.2 Regulatory Context

Applicable laws and regulations relevant to terrestrial habitat are within the *Environment Act*, S.N.S. 1994-95, c 1 as well as the Old-Growth Forest Policy for Nova Scotia (NSNR, 2022a), and the Nova Scotia Silvicultural Guide for the Ecological Matrix (SGEM) (McGrath et al., 2021).

The *Environment Act* (Nova Scotia, 1995b) supports and promotes the protection, enhancement, and use of the provincial environment while maintaining ecosystem integrity and sustainable development. The Old-Growth Forest Policy (NSNR, 2022a) and SGEM regulate forestry and forest management practices on Crown land in Nova Scotia and inform best practices for management of forested areas on private lands. These policies provide requirements and/or guidance on how best to maintain ecological integrity and allow for the determination of whether old-growth forests exist. These requirements include no net loss of old-growth forests on Crown land, and guidance for avoiding development within 100 m of a confirmed old-growth stand. The province defines old-growth forest as “an area where 20% or more of the basal area is in trees greater than or equal to the reference age for that forest (ecosystem classification vegetation) type” (NSNR, 2022a).

For species designated as rare or at risk, individual species and/or their dwellings are provided protection federally, under SARA, and provincially, under the ESA and *Biodiversity Act*. The potential Project impacts to rare and at-risk species are further discussed in Section 7.3.2, and 7.4.3 to 7.4.5.

7.4.1.3 Desktop Review

To assess the terrestrial habitat, a desktop review was undertaken prior to any field activities, and a predictive habitat model was created. The following resources were reviewed:

- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Provincial Landscape Viewer (NSNR, 2024e)
- Nova Scotia Forest Inventory (NSNR, 2021d)
- Significant Species and Habitat Database (NSNR, 2024f)
- Nova Scotia Parks and Protected Areas Map (NSECC, 2020c)
- Old-Growth Policy Layer (NSNR, 2024d)
- Atlantic Canada Conservation Data Centre database results (ACCDC, 2024)
- Natural Resources Restricted and Limited Use Lands (NSNR, 2007))
- West Richmond Plan Area – Zoning Map (MCR, 2023b)
- Important Bird Areas (IBA Canada, 2024)
- NSNR predictive habitat mapping for boreal felt lichen (*Erioderma pedicellatum*) (2012)
- Government records of Abandoned Mine Openings (AMOs; NSNR, 2024b) as a proxy for potential bat habitat

The Steep Creek side of the Study Area lies within the Mulgrave Plateau Ecodistrict (360), within the Nova Scotia Uplands Ecoregion (Drawing 7.1). The Mulgrave Plateau Ecodistrict is the most easterly physiographic feature in mainland Nova Scotia and is located west of the Strait of Canso and northwest of Chedabucto Bay. These two bodies of water make the area prone to strong coastal winds. Portions of the ecodistrict comprise extensive areas of imperfectly drained level to hummocky topography. The steep slopes of these plateaus, approximately 200 masl, are well-drained and support a mixture of shade-tolerant hardwoods and softwoods (Neily et al., 2017). Tolerant hardwood hills dominate the Study Area. This element naturally supports climax forests of long-lived species that generally grow well in shade, such as sugar maple (*Acer saccharum)*, American beech (*Fagus grandifolia*), and yellow birch, which dominate on crests and upper and middle slopes. On lower slopes, shade-tolerant species such as red spruce (*Picea rubens)*, hemlock (*Tsuga canadensis*), and yellow birch are found, along with white spruce (NSNR, 2019).

The Point Tupper side of the Study Area lies within the Cape Breton Coastal Ecodistrict (810). This ecodistrict makes up 36% of the Atlantic Coastal Ecoregion, which extends along the coast of Nova Scotia from Scatarie Island to Yarmouth (Neily et al., 2017). This ecodistrict is characterized by its coastal features, adjacent low-lying inlands, and large islands that experience a cool climate dominated by strong wind, rain, and fog. The forests are dominated by white spruce, balsam fir, and black spruce, and also contain hardwood forests of red maple, yellow birch, and white birch. This ecodistrict also contains wetlands, coastal beaches, and salt marshes (Neily et al., 2017).

Land cover within the Study Area is varied, including built infrastructure, clear cuts, and mixed wood forest and some softwood forest. To better understand habitat types on site, a desktop habitat model was developed by merging the Nova Scotia Forest Inventory, the provincial canopy height model (GeoNOVA, 2024a), and the WAM Database (NSNR, 2022c), and then recategorizing the resulting polygons into 12 categories. Polygons were also manually adjusted based on disturbances visible on aerial imagery (sourced form July 2022). The resulting 12 categories and the estimated percent cover of each within the Study Area are presented in Table 7.30 and Drawing 7.18.

Table 7.30: Predicted Land Cover Types within the Study Area and their Respective Percent Cover based on habitat modelling

Land Cover Type	Total area within Steep Creek side of the Study Area (ha)	Total area within Point Tupper side of the Study Area (ha)	Percentage of total Study Area (%)
Mixedwood forest	46.2	37.3	45.6
Mixedwood wet forest[1]	2.0	3.6	3.1
Softwood forest	11.6	21.7	18.1
Softwood wet forest[1]	0.8	1.6	1.3
Hardwood forest	0	1.4	0.8
Hardwood wet forest[1]	0	0	0
Urban/ developed	7.0	28.8	19.6
Cutover upland	9.8	1.7	6.3
Cutover wetland[1]	0	0.1	0.1
Open wetland[1]	0	0.4	0.3
Shrubs and alders	0	2.8	1.5
Open Areas	3.4	3.0	3.4
Total	**80.7**	**102.4**	**100**

[1]Wetland data is from habitat model data and does not include field delineated wetlands.

Though the model shows that 69% of the Study Area is composed of untreated (i.e., not treated silviculturally) natural forest stands, this number is likely lower than that now, as aerial imagery is not updated with every harvest. A significant portion of the Study Area has been previously disturbed. The cutover areas and urban or developed areas total 50.6 ha or 28% of the Study Area. The remaining 3% consists of shrubs and alders, and open areas.

A review of the NSNR Significant Species and Habitat Database (2024f) identified no polygons within the Study Area (Drawing 7.19) and three SAR polygons within 1 km of the Study Area. The presented polygons outline areas that have been identified by NSNR as containing significant habitat for SAR, thereby informing the types of field surveys that should be completed. The polygons located within 1 km of the Study Area are as follows:

1. Site GU1110, located 50 m east of the Steep Creek side of the Study Area, is for mainland moose (*Alces alces americana*).
2. Site GU1047, adjacent to the southern boundary of the Steep Creek side of the Study Area, is for ruby-crowned kinglet (*Regulus calendula*), yellow-bellied flycatcher

(*Empidonax flaviventris*), olive-sided flycatcher (*Contopus cooperi*), common nighthawk (*Chordeiles minor*), gray jay (*Perisoreus canadensis*), Wilson's snipe (*Gallinago delicata*), pine siskin (*Carduelis pinus*), black-backed woodpecker (*Picoides arcticus*), boreal chickadee (*Poecile hudsonicus*), Swainson's thrush (*Catharus ustulatus*), northern goshawk (*Accipiter gentilis*), Canada warbler (*Cardellina canadensis*), and mainland moose.

3. And Site GU1049, located 800 m east of the Point Tupper side of the Study Area, is for common nighthawk, gray jay, ruby-crowned kinglet, and osprey (*Pandion haliaetus*).

The Nova Scotia Parks and Protected Areas Map (NSECC, 2020c) was screened to identify any protected areas in or near the Study Area. The nearest protected area is the Janvrin Island Nature Reserve, located more than 7 km east of the Point Tupper side of the Study Area (Drawing 7.19).

No forested areas protected under the Old-Growth Forest Policy were found within the Study Area. The closest Old-Growth Forest Policy polygon is located over 3 km south of the Steep Creek side of the Study Area (Drawing 7.19).

The Port Hawkesbury Protected Water Area is provincially designated, delineated, and protected under the *Environment Act* (Nova Scotia, 1995b). The area has a set of prohibited activities as defined in the Port Hawkesbury Watershed Protected Water Area Designation and Regulations (Nova Scotia, 1982). Under these regulations, the construction and maintenance of power lines is permitted with permission from NSECC.

The Municipal Water Supply Area is managed at the municipal level under the Municipality of the County of Richmond West Richmond Planning Area Land Use By-law (MCR, 2023a). The Municipal Water Supply Area includes W-1 and W-2 (Watershed Protection Periphery) Zones. Under the Land Use by-law, within Zone W-2, development permits may be issued for the expansion of pre-existing industrial activities, public and private utilities, or green energy facilities subject to Heavy Industrial Restricted (I-4) zone requirements, pending approval of the Minister of NSECC (Municipality of the County of Richmond, 2023b).

The ACCDC special areas database shows that the Port Hawkesbury Municipal Water Supply Area overlaps 6.5 ha of the northeastern corner of the Point Tupper side of the Study Area (Drawing 7.19). Approximately 2.2 ha of the Study Area overlaps with the W-2 Watershed Protection Periphery (MCR, 2023b). The W-1 Watershed Protection polygon is located more than 700 m northeast of the Study Area. There are no other overlapping managed or significant areas (ACCDC, 2024).

The desktop review showed that several sensitive locations for flora and fauna were located well outside the Study Area. The closest important bird areas (IBA) are more than 34 km from the Point Tupper side of the Study Area (IBA Canada, 2024) and the closest boreal felt lichen predictive habitat polygons are more than 400 m from the Steep Creek side of the Study Area (NSNR, 2012) (Drawing 7.19). There are no AMO locations within the Study Area; however, 38 AMOs are documented within 25 km of the Study Area (NSNR, 2024b, Drawing 7.19). See section 7.4.4.3 for further details on these AMOs and the potential for bat habitat.

7.4.1.4 Field Assessment Methodology

The findings of the desktop review guided the field survey design, ensuring that all habitat types, including both natural habitats and those affected by anthropogenic disturbance, were assessed.

Vegetation community assessments were completed by Strum terrestrial ecologists and occurred concurrently with the wetland delineation and rare flora inventory programs from May to September 2024. Surveys were completed by walking meandering transects throughout the Study Area. Habitat points (n=21) were taken whenever a new community type was encountered and were recorded on iPads using the ESRI software ArcGIS Survey 123. Surveyors also noted changes in composition and configuration of vegetation communities.

Several resources were referenced to identify the vegetation communities found (Table 7.31). While Nova Scotia has several resources for classified forested and barren communities (Neily et al., 2023), literature is lacking for many of the non-forested communities (e.g. shrub bogs, marshes, fens etc.). By using several different classification systems, communities that were not well defined in the Nova Scotia guides were able to be classified. By merging these classifications, the communities within the Study Area can be accurately described beyond only forested communities.

Table 7.31: Classification System Guides Used in the Surveys

Classification System	Author(s)	Vegetation Community Types Defined
Forest Ecosystem Classification System (FEC)	(Keys et al., 2023)	Forested uplands, forested wetlands, and woodlands.
Natural Landscapes of Maine (NLM)	(Gawler & Cutko, 2018)	Defines forested and non-forested communities. This was used to define non-forested wetland communities within the Study Area.
Classification of Heathlands and Related Plant Communities on Barrens Ecosystem in Nova Scotia	(Porter et al., 2020)	Describes barrens, heathlands and shrublands.

Specific surveys were separately conducted to assess wetland and watercourse habitats (Sections 7.3.1 and 7.3.2), as well as targeted assessments for specific species, including vascular plants, lichens, terrestrial fauna, and avifauna (Sections 7.4.2 to 7.4.5).

7.4.1.5 Field Assessment Results

As predicted in the desktop habitat model, the Study Area is comprised of a range of forest types, shrublands, wetlands, and anthropogenic disturbance. Historic and ongoing forestry and industrial operations within the Study Area have extensively modified natural habitat conditions. Coastal winds, especially on the steep slopes of the Steep Creek side, further contribute to habitat disturbance. These combined natural and anthropogenic disturbances have created patches of open canopy, fostering the growth of various understory species. Vegetation and habitat community surveys identified several different upland and wetland vegetation groups within the Study Area.

While the landcover types presented in Drawing 7.20 are the results of the predictive model (Section 7.4.1.3, Table 7.30), the field surveys did not include a full delineation of landcover types. The diversity of forest groups and vegetation types were recorded and are represented by the habitat points (Drawing 7.20). Table 7.32 presents the different forest groups found within each side of the study area, split into upland and wetland communities. Forest groups are further divided into their vegetation type (according to the FEC) or the equivalent category in the NLM classification system. Locations of the corresponding habitat point locations are presented in Drawing 7.20 and for representative photos of each, see the photolog in Appendix G.

Table 7.32: Vegetation Groups and Vegetation Types Observed within the Study Area

Community Type	Forest Group	Vegetation Type or Equivalent	Classification System	Habitat Point
Upland Communities, Point Tupper Side	Open Areas/ Barrens	• Roadside meadow • Rocky coastline • ROW corridor	N/A	HP1, HP10, HP12
	Tolerant Hardwood	• TH1 (sugar maple / Wood fern – Hay-scented fern)	FEC	HP11
	Intolerant Hardwood	• IH6 (white birch - red maple / sarsaparilla / bracken)	FEC	HP2, HP3, HP9
	Mixedwood Forest	• MW6 (white spruce – red maple [white birch]/ starflower/ Schreber's moss)	FEC	HP4, HP6, HP8
	Spruce Pine Forest	• SP7 (black spruce / lambkill – wild raisin – mountain holly)	FEC	HP5, HP7
		• SP10 (black spruce – white spruce / twinflower / Schreber's moss)	FEC	HP15
Upland Communities, Steep Creek Side	Tolerant Hardwood	• TH8a (red maple – yellow birch / striped maple. White ash variant)	FEC	HP16
	Mixedwood Forest	• MW8 (white birch – balsam fir / starflower)	FEC	HP17, HP18
Wetland Communities, Point Tupper Side	Wet Coniferous	• WC 2 (black spruce/ lambkill – Labrador tea/ sphagnum) • Wetland 7	FEC	HP14
	Shrub/ Open Wetland	• Alder floodplain	NLM	HP13

Community Type	Forest Group	Vegetation Type or Equivalent	Classification System	Habitat Point
	Wet Deciduous	• WD2 (red maple/ cinnamon fern sphagnum) • Wetland 18	FEC	HP21
Wetland Communities, Steep Creek Side	Wet Coniferous	• WC1 (black spruce/ cinnamon fern/ sphagnum) • Wetland 4	FEC	HP19
		• WC11 (black spruce woodland bog) • Wetland 3	FEC	HP20

Point Tupper Side of the Study Area

There were 16 habitat points recorded within the Point Tupper side of the Study Area.

The upland vegetation communities (Drawing 7.20) on the Point Tupper side consist of:

- Tolerant hardwood forest (TH1: sugar maple / wood fern – hay-scented fern, represented by HP11)
- Intolerant hardwood forest (IH6: white birch - red maple / sarsaparilla / bracken, represented by HP2, HP3, and HP9)
- Mixedwood forest (white spruce – red maple (white birch)/ starflower/ Schreber's moss, represented by HP4, HP6, and HP8)
- Spruce pine forest (SP7: black spruce / lambkill – wild raisin – mountain holly, represented by HP5 and HP6; and SP10: black spruce – white spruce / twinflower / Schreber's moss, represented by HP15).

Many hardwood stands in the Study Area are young and even-aged, indicating that they are regenerating from past forestry activities. The mature forests are heavily wind-disturbed, likely due to Hurricane Fiona, a Category 4 hurricane that made landfall in Nova Scotia on September 24, 2022, and caused varying degrees of disturbance across the province. Many of the already sparse large softwood trees near the coastline were felled, while hardwood trees sustained limited damage. The loss of mature softwoods in hardwood-dominated stands created canopy openings, promoting secondary succession.

In addition to these forest types, the Point Tupper side of the Study Area has open areas consisting of roadside meadows, a rocky coastline, and maintained ROW corridors (see HP1, HP10, and HP12 on Drawing 7.20).

The southwestern section of the Point Tupper side features extensive shrubland areas, dominated by species such as sheep laurel (*Kalmia angustifolia*), mountain holly (*Ilex mucronata*), and red maple. This shrubland resulted from intensive forestry, evidenced by stumps, woody debris, and harvester tracks. EverWind cleared the northern extent of the Study

Area to support the construction of the Facility in March of 2023. Downslope from this section, near the coast, several poorly drained, open sections feature thick fern cover. Although these areas do not meet wetland criteria, they contain patches of saturated sphagnum moss and scattered hydrophytic vegetation. Drainage features, ranging from narrow ephemeral channels to deeply entrenched watercourses, run down this slope.

The wetland communities on the Point Tupper side of the Study Area consist of wet coniferous forests (WC2: black spruce/ lambkill – Labrador tea/ sphagnum, represented by HP14), wet deciduous forests (WD2: red maple/ cinnamon fern sphagnum, represented by HP21), and an alder floodplain (represented by HP13). Balsam fir and black spruce dominate poorly drained areas, while black spruce, eastern tamarack (*Larix laricina*), and red maple are common in treed swamps and riparian zones around watercourses and wetlands. Speckled alder (*Alnus incana*) is abundant in areas with through-flow wetlands or saturated harvester corridors. The understory of most mature forests contains a rich diversity of herbaceous and shrub species, characteristic of this ecodistrict.

Steep Creek Side of the Study Area

There were five habitat points recorded within the Steep Creek side of the Study Area.

The upland vegetation types on the Steep Creek side of the Study Area were less diverse, with the majority consisting of two main vegetation groups:

- Tolerant hardwood forest (TH8a: red maple – yellow birch / striped maple, white ash variant, represented by HP16),
- Mixedwood forest (MW8: white birch – balsam fir / starflower, represented by HP17 and HP18).

Hardwood species dominate slopes in riparian areas of established watercourses. Primary canopy tree species include sugar maple, red maple, white ash (*Fraxinus americana*), balsam fir, black spruce, white spruce (*Picea glauca*), and white birch (*Betula papyrifera*). Understory species in hardwood stands include American mountain ash (*Sorbus americana*) and striped maple (*Acer pensylvanicum*).

As in the Point Tupper side of the Study Area, forests on the Steep Creek side are a mixture of young regenerating stands and older mature forest. Many of the mature forests have been greatly impacted by windthrow, and ATV trails or old logging roads intersect the stands.

The wetland communities on the Steep Creek side of the Study Area consist of treed swamps which are in the wet coniferous forest groups. They are subdivided into two main vegetation types:

- WC1 (black spruce/ cinnamon fern/ sphagnum, represented by HP19)
- WC3 (black spruce woodland bog, represented by HP20)

Stand cover of trees is moderate to high, often with extensive sphagnum cover and acidic and nutrient poor soils. Fern species, such as cinnamon fern (*Osmundastrum cinnamomeum*) and sedges such as the three-seeded sedge (*Carex trisperma*) are often associated with these vegetation community group.

7.4.1.6 Effects Assessment

Project-Terrestrial Habitat Interactions

Project activities, primarily those that involve earth moving or vegetation removal, have the potential to impact terrestrial habitat (Table 7.33). These activities could result in habitat removal or alteration.

Table 7.33: Potential Project-Terrestrial Habitat Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Terrestrial Habitat		X		X	X	X				X			X		X

Assessment Boundaries

The LAA for the terrestrial habitat includes the Project Area, while the RAA includes the Study Area (Drawing 1.1).

Assessment Criteria

Assessment criteria provided in Section 4.5 apply for terrestrial habitat. The VC-specific definition for magnitude is as follows:

- Low – small loss of terrestrial habitat, but overall habitat functions remain intact.
- Moderate – small to moderate loss of sensitive terrestrial habitat (as defined in Section 7.4.1.1) or loss of key habitat functions.
- High – high loss of sensitive terrestrial habitat or key habitat functions.

Effects

There were few sensitive or important terrestrial habitat features identified in either the desktop review or field surveys. The wetland habitats identified (Section 7.3.3) informed the refinement of siting for Project infrastructure, with the aim of avoiding or minimizing impacts on these key habitats.

Habitat Loss and Fragmentation

The loss or conversion of undisturbed habitat to construct roads, transmission line corridors, and towers can impact the terrestrial habitat. Habitat to consider includes habitat for flora and fauna SAR/SOCI, priority habitat features, areas of special concern for conservation or protection, and unfragmented, undisturbed areas.

No terrestrial habitat for SAR/SOCI was identified within the Study Area through the NSNR Significant Species and Habitat Database (2024f) and field surveys. There is no confirmed old growth forested areas within 3 km of the Study Area (NSNR, 2024). No pending or designated conservation areas, wilderness areas, or protected areas are found within the Study Area, however there is one overlapping managed area: the Port Hawkesbury Municipal Water Supply (6.5 ha of overlap) (ACCDC, 2024; NSNR, 2007).

All Project infrastructure located within the Port Hawkesbury Municipal Water Supply will be subject to Port Hawkesbury Watershed Protected Water Area Designation and Regulations, NS Reg 149/82. Effects of concern within Municipal Water Supply Areas include the alteration of wetland habitat (Section 7.3.3), hazardous material spills (Section 13.4), and erosion and sediment control failures (Section 13.1).

Of the 6.5 ha of Study Area that overlaps with the Port Hawkesbury Municipal Water Supply, 3.0 ha is already developed, as there is a road and an industrial facility. The remaining 3.5 ha of overlapping Port Hawkesbury Municipal Water Supply will potentially be cleared to maintain the ROW, but no permanent Project infrastructure is proposed for this area.

It is anticipated that this clearing will be acceptable within the Port Hawkesbury Municipal Watershed Area, based on the development exemption made for transmission lines and utility development. As this area is classified as Zone W-2, a development permit from NSECC will be required if alteration is to occur in the overlapping area (MCR, 2023a).

The majority of land cover within the Study Area is mixedwood and softwood forests, including natural and treated stands, as determined by desktop review and confirmed through field surveys. Table 7.34 summarizes habitat types identified within the Project Area and the expected direct impacts of the Project (i.e., removal of habitat for infrastructure).

As outlined in Section 3.0, the total footprint area of the two dead-end towers will be 0.1 ha and the area of the two suspension towers will be 0.0.34 ha, which is a total of 0.44 ha of direct impact from tower construction. The switching/ substation footprint is 3.77 ha. There will be minimal road construction, as the existing road network in the area will meet most of the transportation needs of this Project. Proposed new access roads will lead to 377 m of road construction, with an expected maximum impact area of 0.8 ha. The total expected area of direct habitat loss is 5.0 ha.

Vegetation under the proposed transmission line will be cleared during the construction phase, and a transmission line ROW buffer will be maintained throughout the Project's lifespan. The transmission line ROW area may shift vegetation community type, but this does not represent a total loss of terrestrial habitat (and therefore is not included in the calculations in Table 7.34).

Table 7.34: Predicted Landcover Types and Impacts within the Project Area

Landcover Type	Hectares within the Project Area	Hectares Directly Impacted by the Project	Percentage Impact of the Total Landcover Type Available in Project Area
Mixedwood forest	19.5	4.3	22.1
Mixedwood wet forest	0.5	0.1	20.0
Softwood forest	4.7	0.1	2.1
Softwood wet forest	0.1	0	0.0
Hardwood forest	0.0	N/A	N/A
Hardwood wet forest	0.0	N/A	N/A
Urban or developed	6.0	0.4	6.7
Cutover upland	2.3	0	0.0
Cutover wetland	0.0	N/A	N/A
Open wetland	0.0	N/A	N/A
Shrub or alders	0.5	0	0.0
Fields or barrens	1.7	0	0.0
Total	35.2	5.0	14.2

The largest direct impact from the Project is expected to be mixedwood forests which is the most common vegetation community within the Project Area (19.5 ha, or 55.4% of the Project Area). Note that the extent of regenerating forests and stands with a significant proportion of deadfall due to windthrow were found to be greater than the estimates predicted from the desktop habitat model.

As seen in Table 7.34, many landcover types will see no impacts, while those that are impacted, as the most abundant with the Project Area. Impacts to undisturbed and unfragmented habitat will be low and although there will be small losses to terrestrial habitat associated with the Project, habitat functionality will remain intact relative to pre-construction conditions.

Upon Project completion and reclamation, the habitat types may differ from baseline conditions. Although succession will be induced by anthropogenic factors, the natural process will, in time, persist, and this new habitat will be used by a variety of species. Mitigation measures will be designed to ensure the process can proceed as naturally as possible.

Indirect Effects

Removal of vegetation and habitat loss during the construction phase of the Project can result in edge effects for vegetation communities that are not directly impacted. The effects include changes in microclimate, increased light availability, and changes in vegetation communities. Clearing of habitats could also create conditions for invasive plant species to establish an area. The Project is not expected to impact surface water flows (Section 7.3.1) and, thus, is not anticipated to impact vegetation communities or species changes from changes in access to water.

Mitigation Measures

To address effects to terrestrial habitat, the following mitigation measures will be implemented:

- Minimize overall area to be cleared, fragmentation of habitats, and isolation of existing habitats by utilizing pre-existing roads and previously altered areas (i.e., clearcuts), where possible.
- Avoid disturbance to important habitat features identified during desktop and field assessments (e.g. wetlands) by micro-siting where possible.
- Restore impacted areas where possible to reduce permanent habitat loss, primarily through revegetation of road ROWs.

Monitoring

No monitoring programs specific to the terrestrial habitat are recommended.

Conclusion

Following mitigation, the residual effects to terrestrial habitat are characterize as follows:

- **Magnitude** – Habitat loss and creation are expected to be of low magnitude as overall habitat functions will remain intact relative to pre-construction functionality.
- **Geographic extent** – Within the LAA.
- **Frequency** – Single event for construction impacts (habitat loss) and intermittent frequency for operations impacts, as vegetation management will be ongoing until decommissioning.
- **Duration** – Medium-term duration as habitat loss will remain until the Project is decommissioned.
- **Reversibility** – Partially reversible upon decommissioning of the Project as vegetative communities may have changed.
- **Significance** – Not significant.

7.4.2 Terrestrial Flora

7.4.2.1 Overview

The terrestrial flora assessment included both desktop and field studies components. The objectives of the terrestrial flora assessment included the following:

- Classify habitat that supports terrestrial flora SAR/SOCI in the Study Area using available desktop resources.
- Identify important and sensitive habitat features that support terrestrial flora SAR/SOCI within/near the Project Area.
- Design a field program to document the diversity of terrestrial flora within the Study Area and identify terrestrial flora SAR/SOCI.
- Use the information collected through field studies to update the Project design to avoid or minimize interactions between Project infrastructure and confirmed locations of terrestrial flora SAR/SOCI or the habitats that are known to support terrestrial flora SAR/SOCI.
- Apply mitigation, construction, and operational management practices to minimize effects to terrestrial flora (i.e., apply setbacks to lichen SAR/SOCI).

7.4.2.2 Regulatory Context

The following section describes terrestrial flora resources with the potential to occur in the Study Area, with a focus on vascular plant and lichen SAR/SOCI, that may be potentially impacted by Project activities. Plant and lichen SAR receive protection under SARA and/or ESA which prohibits their disturbance and destruction. Special management practices are required around occurrences of certain rare lichen, as prescribed in the At-Risk Lichens – Special Management Practices (NSNR, 2018a). Additional regulations discussed in Section 7.4.1 aim to protect important habitat features, such as old-growth forests or wetlands, that support many plant and lichen SAR/SOCI in Nova Scotia.

7.4.2.3 Desktop Review

The desktop review included a review of the following databases for terrestrial flora:

- ACCDC Data Report (ACCDC, 2024).
- Boreal Felt Lichen Habitat Layer (NSNR, 2012).
- Mersey Tobeatic Research Institute (MTRI) Vole Ears and Extant Boreal Felt Lichen GIS Databases (MTRI, 2019, 2019).
- Nova Scotia Forest Inventory (NSNR, 2021d).

ACCDC records (ACCDC, 2024) identified 14 flora species within 5 km of the Study Area (Appendix D). Of the 14 species, 11 are vascular plants and 3 are lichen species (Table 7.35; Drawing 7.21).

Table 7.35: ACCDC Plant and Lichen SAR/SOCI Identified within 5 km of the Study Area

Common Name	Scientific Name	COSEWIC Status	*SARA* Status	*ESA* Status	NS S-Rank
Plants (Vascular)					
Amelanchier spicata	Running serviceberry	---	---	---	S3S4
Asplenium trichomanes	Maidenhair spleenwort	---	---	---	S3S4
Atriplex glabriuscula var. franktonii	Frankton's saltbush	---	---	---	S3S4
Diphasiastrum sitchense	Sitka ground-cedar	---	---	---	S3S4
Dryoperis fragrans	Fragrant wood fern	---	---	---	S3
Geocaulon lividum	Northern comandra	---	---	---	S3S4
Neottia bifolia	Southern twayblade	---	---	---	S3
Platanthera hookeri	Hooker's orchid	---	---	---	S3
Platanthera obtusata	Blunt-leaved orchid	---	---	---	S3S4
Salix pellita	Satiny willow	---	---	---	S2S3
Senecio pseudoarnica	Seabeach ragwort	---	---	---	S3
Lichens (Non-vascular)					
Heterodermia neglecta	Fringe lichen	---	---	---	S3S4
Peltigera collina	Tree pelt lichen	---	---	---	S3
Pectenia plumbea	Blue felt lichen	Special Concern	Special Concern	Vulnerable	S3

Source: (ACCDC, 2025)

The Boreal Felt Lichen Layer (provided to Strum by NSNR) was reviewed and no potential habitat for boreal felt lichen was found within the Study Area (Drawing 7.21). The closest predicted polygon is 500 m west-southwest of the Study Area. The habitat model is based on the known distribution of boreal felt lichen, which is known to grow on the trunks of balsam fir trees in peatland and in close proximity (<30 km) to the Atlantic Ocean (NSNR, 2012). Boreal felt lichen – Atlantic population is a rare species listed as “Endangered” under Schedule 1 of SARA and ESA and is also listed as “S1” by ACCDC.

According to the MTRI Vole Ears and Extant Blue Felt Lichen GIS Databases (MTRI, 2019, 2019), no extant boreal felt lichen populations are within 50 km of the Study Area, and the closest vole ears lichen population is over 84 km away.

The Nova Scotia Forest Inventory (NSNR, 2021d) provides information pertaining to forest characteristics, including stand age, determining suitable lichen habitat. The specific habitat requirements of each priority lichen vary, though many require mature to old growth forest. Therefore, stand age is one of the major determinants of the presence of many rare epiphytic lichens (McMullin et al., 2008). The inventory layer indicated no confirmed old growth within the Study Area (Drawing 7.19).

As described in Section 7.4.1, the Study Area consists of both disturbed and intact habitats. Intact natural habitat constitutes 69% of the Study Area, and is dominated by softwood and mixedwood stands, shrub and alder areas, and some wetland areas. The remaining 31% of disturbed area consists of urban/developed land, as well as cutover wetlands and upland (Drawing 7.18). Many of the SAR/SOCI lichens in Nova Scotia prefer mature forested communities, often in association with wetlands, lakes, and watercourses. The most promising habitat for SAR/SOCI lichens within the Study Area lies in proximity to watercourses and the sharply sloped portions on the Steep Creek side of the Study Area, which have the potential to provide suitable habitat for cyanolichens such as blue felt lichen (*Pectenia plumbea*), or the calicioid frosted glass-whiskers (*Sclerophora peronella*). Hardwood dominance was common there, particularly with trembling aspen (*Populus tremuloides*), white ash, and red maple components.

7.4.2.4 Field Assessment Methodology

Terrestrial flora surveys were conducted throughout the Study Area from July 17 to August 18, 2024. Vascular plant surveys focused on examining habitats considered particularly suitable for vascular plant SAR/SOCI (such as mature forest, wetlands, and riparian areas), as well as examining general vascular plant diversity and community composition within the Study Area. The search pattern used in the field was a random meander across the entire site, while maintaining a cumulative list of each plant species encountered. This is an accepted method for detecting the presence or absence of plant species, including rare flora. Field staff conducting wetland and watercourse surveys were also briefed on a short list of plant SAR/SOCI likely to be encountered prior to conducting surveys.

For each species sighting, the plant was identified and tabulated on an overall species inventory. Photos were taken and when necessary, specimens were collected for identification (assuming the plant in question appeared abundant). In addition to the prior knowledge of the surveyors, the study team had access to dichotomous keys and descriptions from various print and electronic resources.

Meandering transects were completed on foot and targeted mature trees appropriate for hosting lichen SAR/SOCI. Host trees were visually inspected, focusing on tree trunks, branches, and twigs. Any identified SAR/SOCI lichen species were clearly marked with flagging tape. The following information, along with photos of the species and the surrounding habitat, was recorded for any SAR/SOCI lichen species identified during field surveys:

- Surveyor name
- Weather conditions
- Survey conditions
- General site location
- Date
- Scientific name
- Count (# of thalli)
- Size of thallus or thalli
- Habitat (host substrate and general habitat – including whether the thalli presented within wetland or upland)
- Location (waypoint in UTM NAD83)

- Height of the organism
- Direction the species was facing
- Relevant comments

If a lichen specimen could not be readily identified in situ, photos and/or specimens were collected and identified ex situ in laboratory conditions via microscopy and standard chemical spot tests in accordance with Brodo et al. (2001) and using a variety of literature resources to aid in identification. Specimens were only collected if they were abundant on site. Specimens were not collected if only one or two individuals were observed.

Throughout the lichen surveys, a list of lichen species observed was recorded, with a focus on macrolichens (i.e., foliose, fruticose, and some squamulose species). Observations of vascular and non-vascular SAR/SOCI within the Study Area were also recorded by Strum staff during wetland and watercourse surveys in 2024.

7.4.2.5 Field Assessment Results

During the plant and lichen surveys, 91 vascular species and 55 lichen species were observed within the Study Area. There were also six incidental bryophytes observed (Appendix H). No SAR/SOCI vascular plants or lichens were observed. A complete list of flora species identified during all field surveys completed in 2024 is provided in Appendix H.

Twenty non-native plants (22% of all plants identified) were also encountered during field surveys (Table 7.36). Of these non-native plants, five are considered invasive species in Nova Scotia (MTRI, 2022).

Table 7.36: Non-Native Flora Encountered during Flora Surveys

Scientific Name	Common Name	Exotic Status[1]	Invasive (Yes/No)[1]
Ajuga reptans	Creeping bugleweed	--	No
Centaurea nigra	Black knapweed	Widespread	Yes
Cirsium arvense	Canada thistle	Widespread	Yes
Dactylis glomerata	Orchard grass	Widespread	No
Hemerocallis fulva	Orange day lily	--	No
Hieracium lachenalii	Common hawkweed	Widespread	Yes
Lapsana communis	Common nipplewort	Locally common	Yes
Leucanthemum vulgare	Oxeye daisy	Widespread	No
Myosotis scorpioides	True forget-me-not	Fairly common	No
Phleum pratense	Common Timothy	Widespread	No
Potentilla reptans	Creeping cinquefoil	Rare	No
Ranunculus acris	Common buttercup	Widespread	No
Ranunculus repens	Creeping buttercup	Widespread	Yes
Trifolium arvense	Rabbit's foot clover	Widespread	No

Scientific Name	Common Name	Exotic Status[1]	Invasive (Yes/No)[1]
Trifolium aureum	Yellow clover	Widespread	No
Trifolium campestre	Low hop clover	Widespread	No
Trifolium pratense	Red clover	Widespread	No
Typha angustifolia	Narrow-leaved cattail	--	No
Veronica chamaedrys	Germander speedwell	Uncommon	No
Veronica officinalis	Common speedwell	Widespread	No

[1]As presented in the WESP-AC guide supplementary information (NSECC, 2011c)

Priority Species

The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009) was used to identify any priority terrestrial flora species and their associated habitats within the Study Area. All terrestrial flora SOCI and their respective habitat associations identified within the Study Area through desktop review and field inventory were considered. Only those terrestrial flora SOCI, and their respective habitats, with potential to interact with the Project have been designated as Project-specific priority species. Interactions may include removal or disturbance of a SOCI and/or their associated habitat.

No terrestrial flora SAR or SOCI were identified through desktop or field studies within the Study Area, and therefore no priority terrestrial flora species were identified for this Project.

7.4.2.6 Effects Assessment

Project-Terrestrial Flora Interactions

Project activities, primarily those that involve earth moving or vegetation removal, have the potential to impact terrestrial flora (Table 7.37). These activities could result in changes to, or loss of habitat and plants, or the introduction of non-native species that may become invasive in the environment.

Table 7.37: Potential Project-Flora Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Terrestrial Flora		X		X	X	X				X			X		X

Assessment Boundaries

The LAA for terrestrial flora includes the Project Area, while the RAA includes the Study Area (Drawing 1.1)

Assessment Criteria

Assessment criteria provided in Section 4.5 apply for terrestrial habitat. The VC-specific definition for magnitude is as follows:

- Negligible – no loss of terrestrial flora SAR/SOCI individuals or alteration to habitat known to support terrestrial flora SAR/SOCI expected.
- Low – small loss of habitat supporting terrestrial flora SAR/SOCI, but no terrestrial flora SAR/SOCI individuals lost.
- Moderate – small loss of terrestrial flora SOCI individuals (and associated habitat), but their populations remain largely intact.
- High – high loss of the habitat that supports terrestrial flora SOCI and/or loss of an entire population of terrestrial flora SOCI.

Effects

Loss of SAR/SOCI

A desktop review and targeted surveys were conducted to identify locations of plant and lichen SAR/SOCI across the Study Area, with no SAR/SOCI identified. Additionally, the habitat within the RAA has been substantially degraded, limiting its potential to support flora SAR/SOCI. Consequently, there are no anticipated direct or indirect impact on flora SAR/SOCI or their habitat.

Invasive species

Terrestrial flora, particularly rare flora, may be at risk due to threats from invasive species (BCMECCS, 2018). Non-native species, often introduced into a landscape accidentally by humans, can become invasive when they cause harm to the environment, economy, or human health through rapid reproduction and out-competing native species (Rutledge et al., 2024). Industrial projects can lead to the introduction of invasive species in two main ways:

- Revegetation of cleared land with non-native seed mixes.
- Increased access to remote areas with equipment carrying seeds, spores, or other reproductive materials from non-native species.

Twenty non-native plants were identified within the Study Area, as much of the Study Area is already heavily disturbed. Five of those species are considered to be invasive in Nova Scotia (NSECC, 2011c). Although the magnitude of effects is expected to be negligible to low, mitigation strategies to minimize the risk of introducing and/or spreading invasive species across the Study Area are provided.

Mitigation Measures

To address effects to terrestrial flora, the following mitigation measures will be implemented:

Loss of SAR/SOCI Species (chance-find)

- Minimize overall area to be cleared by utilizing pre-existing roads and previously altered areas (i.e., clearcuts).
- Minimize (through avoidance) the loss of habitat which could support a chance-find terrestrial flora SAR/SOCI (i.e., wetlands and watercourses) during the detailed design phase.
- Educate Project personnel about the potential for plant or lichen SAR/SOCI during construction. Consult with NSNR if an unexpected flora SAR/SOCI is encountered during construction activities. Additional mitigations will be implemented as a contingency if flora SAR/SOCI are unexpectedly encountered during construction activities.

Habitat Loss

- Minimize overall area to be altered by utilizing pre-existing roads and previously disturbed areas (i.e., clearcuts).
- Restore as much habitat as possible through revegetation (with native seed mix) to promote continued growth of terrestrial flora across the Study Area.

Invasive Species

- Use native seed mixes when revegetating cleared areas.
- Ensure equipment is as clean as possible to prevent the introduction of non-native species into previously untouched areas.
    - Because non-native and invasive species are already present within the Study Area, care will be taken when travelling from developed areas to intact areas so that plant material is not transferred between locations.

Monitoring

No flora SAR/SOCI were identified, therefore, no monitoring of terrestrial flora is recommended.

Conclusion

After mitigations, residual effects to terrestrial flora associated with the Project have been assessed, including the potential for SAR/SOCI loss, habitat loss, and the introduction of invasive species. Based on this assessment and the implementation of proposed mitigation, residual effects on terrestrial flora are characterized as follows:

- **Magnitude** – Negligible magnitude as no loss of terrestrial flora SAR/SOCI individuals or alteration to habitat known to support terrestrial flora SAR/SOCI is expected.
- **Geographic extent** – Within the LAA.
- **Frequency** – Intermittent throughout the Project's lifespan as vegetation clearing will continue to prevent interference with infrastructure (frequency not applicable for individual SAR/SOCI).
- **Duration** – Long-term from initial clearing during construction until after decommissioning.
- **Reversibility** – Partially reversible, as the cleared areas will be allowed to revegetate following decommissioning though communities may have changed.
- **Significance** – Not significant.

7.4.3 Terrestrial Fauna

7.4.3.1 Overview

The terrestrial fauna assessment was completed using a combination of desktop and field assessments to achieve the following objectives:

- Identify significant species and habitat supporting SAR/SOCI within/near the Study Area using desktop resources.
- Determine the likelihood of SAR/SOCI occurring in the Study Area.
- Use data from targeted surveys as well as incidental observations for different groups of terrestrial fauna to document the presence of species within the Study Area, particularly SAR/SOCI.
- Use the information collected through field studies to update the Project design, as necessary, to avoid or minimize interactions between Project infrastructure and confirmed locations of terrestrial fauna SAR/SOCI or the habitats that are known to support terrestrial fauna SAR/SOCI.
- Apply mitigation, construction, and operational management practices to minimize effects to terrestrial fauna.

7.4.3.2 Regulatory Context

Applicable laws and regulations relating to the protection of fauna (i.e., mammals and herpetofauna) including the following:

- SARA (Canada, 2002)
- ESA (Nova Scotia, 1998a)
- *Canada Wildlife Act* (Canada, 1985a)
- *Wildlife Act* (Nova Scotia, 1989b)
- *Biodiversity Act* (Nova Scotia, 1989b)
- CEPA (Canada, 1999)
- *Environment Act* (Nova Scotia, 1995b)

The ESA and SARA prohibit harm to SAR listed as Endangered and Threatened along with their habitually occupied spaces and core/critical habitat (respectively). The *Canada Wildlife Act* provides a framework for the creation of protected wildlife areas, and the Nova Scotia *Wildlife Act* provides policies and programs for wildlife to maintain diversity of species at levels of abundance to meet specific management objectives. The *Wildlife Act* includes a clause for the protection of den/habitation of a furbearer [48(3)]. The Nova Scotia *Biodiversity Act* provides a framework for the creation of Biodiversity Management Zones used for conservation and sustainable biodiversity values. Lastly, *CEPA* and the Nova Scotia *Environment Act* both provide measures for the protection of the environment and pollution prevention.

7.4.3.3 Desktop Review Methods

Prior to undertaking the terrestrial field assessment, a detailed desktop review of known fauna observations and potential habitat for terrestrial fauna was completed to support the survey design. The following databases were reviewed:

- ACCDC Report (Appendix D)
- NSNR Significant Species and Habitat Database
- Provincial Landscape Viewer
- SARA and ESA recovery strategies
- Special Management Practices (SMP) Layers (i.e. wood turtle SMP layer)

In addition to databases listed above, Strum also reviewed two EARDs for nearby Projects:

- EverWind Point Tupper Green Hydrogen/Ammonia Project – Phase 1 EARD (Strum Consulting, 2022)
- Goose Harbour Lake Wind Farm Project Environmental Assessment Registration Document (Strum Consulting, 2023)

The two specific EARDs included in the desktop review were selected as they provide publicly available and regionally relevant data for terrestrial fauna on the Steep Creek and Point Tupper side of the Study Area.

7.4.3.4 Desktop Review Results

Mammals

The ACCDC Data Report (ACCDC, 2024) indicates that seven terrestrial mammal SAR/SOCI (excluding birds and bats, and aquatic mammals; see Sections 7.4.4, 7.4.5, and 7.3.2.5, respectively) have been recorded within a 100 km radius of the center of the Study Area (Table 7.38). None of the identified SAR/SOCI have records within the Study Area.

Table 7.38: Terrestrial Mammal Species Recorded within a 100 km Radius of the Centre of the Study Area

Common Name	Scientific Name	COSEWIC Status	*SARA* Status	*ESA* Status	NS S-Rank
American Marten	*Martes americana*	---	---	Endangered	S2S3
Canada lynx	*Lynx canadensis*	---	---	Endangered	S2S3
Fisher	*Pekania pennanti*	---	---	---	S3
Mainland moose[1]	*Alces alces americana*	---	---	Endangered	S1
Moose	*Alces alces*	---	---	---	S1
Rock vole	*Microtus chrotorrhinus*	---	---	---	S2
Southern bog lemming	*Synaptomys cooperi*	---	---	---	S3

Source: (ACCDC, 2024)
[1]Reported by ACCDC as 'Moose – *Alces alces americanus*', which has been changed to reflect most up to date nomenclature

The ACCDC also records marine mammals within 100 km radius of the center of the Study Area, but there are no foreseeable impacts from the Project to the marine environment.

The NSNR Significant Species and Habitat Database (2024f) contains 346 unique species and/or habitat records pertaining to terrestrial mammals within a 100 km radius of the Study Area. These records include:

- 309 records of "Species at Risk" relating to:
    - American marten (*Martes americana*) (135)
    - Canada lynx (*Lynx canadensis*) (97)
    - Mainland moose (*Alces alces americana*) (76)
    - Gray seal (*Halichoerus grypus*) (one).
- 16 records of "Species of Concern" relating to rock vole (*Microtus chrotorrhinus*; six), fisher (three), southern bog lemming (*Synaptomys cooperi*) (two), and Gaspe shrew (*Sorex gaspensis*; two).

The EverWind Point Tupper Green Hydrogen/Ammonia Project – Phase 1 EARD (Strum Consulting, 2022) was reviewed for terrestrial fauna data relevant to the Point Tupper side of the Study Area, as there is overlap with the respective study areas. Focused terrestrial fauna surveys were not completed; however, incidental observations included white-tailed deer and snowshoe hare.

The Goose Harbour Lake EARD (Strum Consulting, 2023) was reviewed for terrestrial fauna data relevant to the Steep Creek side of the Study Area (it is approximately 5 km southwest of the Steep Creek side of the Study Area). As outlined in detail in the EARD, terrestrial mammal surveys included winter tracking surveys, spring pellet group inventory surveys, and trail camera deployment. Through these surveys and incidental observations, 12 mammal species were observed within the Goose Harbour Lake Wind Farm Study Area and can reasonably be expected to inhabit the Steep Creek side of the Study Area (Table 7.39).

Table 7.39: Terrestrial Mammal Species Observed at the Goose Harbour Lake Wind Farm Project (Strum Consulting, 2023)

Common Name	Scientific Name	COSEWIC Status	*SARA* Status	*ESA* Status	NS S-Rank
American Black Bear	*Ursus americanus*	Not at Risk	---	---	S5
Bobcat	*Lynx rufus*	---	---	---	S5
Eastern Coyote	*Canis latrans*	---	---	---	S5
Fisher	*Pekania pennanti*	---	---	---	S3
Mainland moose	*Alces alces americana*	---	---	Endangered	S1
North American Beaver	*Castor canadensis*	---	---	---	S5
North American Porcupine	*Erethizon dorsatum*	---	---	---	S5
Red Squirrel	*Tamiascirius hudsonicus*	---	---	---	S5
Snowshoe Hare	*Lepus americanus*	---	---	---	S5
Striped Skunk	*Mephitis mephitis*	---	---	---	S5
Unknown rodent species	*N/A*	N/A	N/A	N/A	N/A
White-tailed Deer	*Odocoileus virginianus*	---	---	---	S5

Source: (ACCDC, 2025)

Based on the results of the desktop rare species review, two SAR/SOCI have elevated potential to occur within the Study Area. Mainland moose and fisher warrant further discussion in terms of habitat suitability and potential usage of the Study Area.

Mainland moose are listed as “Endangered” under the ESA with a subnational ranking of S1 (highest priority) (ACCDC, 2025). In 2021, NSNR published a recovery plan for moose in mainland Nova Scotia, thereby assigning the common name ‘mainland moose’. Threats to mainland moose include habitat loss and fragmentation, particularly resulting from industrial activities; loss of habitat connectivity due to the increased placement; and density of roads (NSNR, 2021e). Renewable energy projects were described as medium level threat, as the nature of wind projects usually requires the construction or expansion of road networks and loss of forested habitat.

Evidence of mainland moose was observed in the Goose Harbour Lake Wind Farm Study Area during fall bird surveys in October 2021. Tracks were observed along a road in the southern extent of the Goose Harbour Lake Wind Farm Assessment Area (approximately 10 km west of the Steep Creek Side), in an area of moderate habitat quality as determined by the moose habitat suitability model. No other evidence of moose activity was observed at Goose Harbour Lake, and no incidental observations were recorded at the Steep Creek side of the Study Area. The Steep Creek side of the Study Area has a minor overlap with core habitat for mainland moose, as defined in the Recovery Strategy (NSNR, 2021e). Based on a limited overlap with core habitat, desktop data available from nearby sites, and expected impacts, dedicated surveys for mainland moose were not deemed necessary. This was communicated with NSNR during regulatory consultation on May 10, 2024.

The fisher prefers dense, mature to old-growth forests with continuous overhead cover (Allen, 1983). Generally considered a forest-interior species (OMNR, 2000), fishers require large tracts of well-connected habitat (Meyer, 2007). Fishers are distributed throughout mainland Nova Scotia, and trapping data suggests the population is concentrated in Cumberland, Colchester, and Pictou counties. A total of 37 fishers have been harvested from Guysborough County since 2010, representing just 2.36% of the provincial total during that time (NSNR, 2024a). Snow tracks belonging to a Fisher were observed during winter 2022 in a young hardwood stand that has been previously harvested in the Goose Harbour Lake Wind Farm Study Area. Mature and old-growth forest stands nearby may provide suitable canopy closure and coarse woody debris of sufficient diameter for fishers on site, and these areas will not be directly impacted by the Project.

The majority of the Steep Creek side of the Study Area was identified to consist of tolerant hardwood and mixed wood vegetation groups. The Steep Creek side has a mixture of habitat containing young regenerating stands and older mature forest as identified in Section 7.4.1.5. Much of the mature forest have been greatly impacted by windthrow, ATV trails, and old logging roads. Historic forest harvesting was also identified within the Steep Creek side of the Study Area. As a result of the limited cover of closed canopy mature forest and the extensive cover of young forest, the habitat suitability for fisher on the Steep Creek side is determined to be low. Due to low habitat suitability and expected impacts, dedicated surveys for fisher were not deemed necessary.

Herpetofauna

Data from the ACCDC (2024) report indicate that four herpetofauna SAR/SOCI have been recorded within a 100 km radius of the Study Area (Table 7.40). One marine herpetofauna species was also recorded, but there are no foreseeable impacts to marine species from the Project.

Table 7.40: Herpetofauna Species Recorded by ACCDC within a 100 km Radius of the Centre of the Study Area

Common Name	Scientific Name	COSEWIC Status	*SARA* Status	*ESA* Status	NS S-Rank
Eastern painted turtle	*Chrysemys picta picta*	Special Concern	Special Concern	---	S4
Four-toed Salamander	*Hemidactylium scutatum*	Not At Risk	---	---	S3
Leatherback sea turtle - Atlantic population	*Dermochelys coriacea pop. 2*	Endangered	Endangered	---	S1S2N
Snapping turtle	*Chelydra serpentina*	Special Concern	Special Concern	Vulnerable	S3
Wood turtle	*Glyptemys insculpta*	Threatened	Threatened	Threatened	S2

Source: (ACCDC, 2024)

Wood turtle are documented to occur within 5 km of the Study Area by ACCDC. As this species is considered a location sensitive species, its location is not provided within the ACCDC report; however, an occurrence within 2.5 km of the Project was confirmed by NSNR. It was confirmed in an email received February 4, 2025, that this occurrence is from Cape Breton Island, in line with the wood turtle SMP buffer and expectations from the desktop review (S. Spencer, personal communication, email February 4, 2025).

The Nova Scotia Significant Species and Habitat Database (NSNR, 2024f) contains 319 unique species and/or habitat records pertaining to reptiles and amphibians within a 100 km radius of the Study Area. These records include:

- 319 records of "Species at Risk" relating to Wood turtle (268) and Snapping turtle (*Chelydra serpentina*) (51).

The database does not contain records of reptiles or amphibians within the Study Area.

The EverWind Point Tupper Green Hydrogen/Ammonia Project – Phase 1 EARD (Strum Consulting, 2022) was reviewed for herpetofauna data relevant to the Point Tupper side of this Project's Study Area. Focused herpetofauna surveys were not completed and no incidental herpetofauna observations were documented.

The Goose Harbour Lake EARD (Strum Consulting, 2023) was reviewed for herpetofauna data relevant to the Steep Creek side of the Study. As outlined in detail in the EARD, herpetofauna surveys included dedicated wood turtle transect surveys 200 m upstream and downstream of proposed new or upgraded road crossing in suitable wood turtle habitat. The survey was completed on June 8, 2022. No observations of wood turtle (or wood turtle signs) were recorded, though suitable habitat was observed. No other herpetofauna species were observed incidentally in the Goose Harbour Lake Wind Farm EARD.

According to the Recovery Strategy, wood turtles require water with sufficient flow and depth to provide them with ice-free, well-oxygenated water throughout the winter (ECCC, 2020). In Ontario, wood turtles hibernate in water with an average depth of 91 ± 34.8 cm, approximately 123.3 cm from the shore (ECCC, 2020). Wood turtles tend to hibernate wherever instream structures such as boulders or root-wads provide some cover and rarely hibernate outside of the main channel of a watercourse, as they require well oxygenated water throughout the winter (ECCC, 2020).

Wood turtles nest in well-drained gravelly soil on the banks of inhabited watercourses. While some may be attracted to gravelly roadsides for nesting, this habitat is considered unsuitable due to the danger presented to emerging hatchlings. To support egg incubation, soils need to be well-drained, with a southern aspect, and free of vegetation. This habitat is typically present as sand or gravel bars in depositional areas of dynamic, natural watercourses (ECCC, 2020).

A review of the federal CanVec Database – Hydrographic Features (NRCan, n.d.) within the Study Area showed that four watercourses (no named watercourses) and no waterbodies are identified within the Study Area . Habitat suitability for SAR herpetofauna was assessed during field delineation.

The Steep Creek side of the Study Area has no known occurrences of wood turtle within the secondary watershed according to the SMP layer provided by NSNR. Habitat suitability for wood turtle within the Steep Creek side of the Study Area was determined to be low. As a result of the desktop review and field observations, targeted wood turtle surveys were not completed on the Steep Creek side of the Study Area.

The Point Tupper side of the Study Area lies within a secondary watershed which contains an SMP buffered stream, indicating that wood turtle has been observed in the area. The buffered watercourse flows southwest towards Bear Island Cove, away from the Study Area. Through review of the data collected through desktop review and observation during the wetland and watercourse delineation surveys, wood turtle habitat suitability within the Point Tupper side of the Study Area was determined to be low.

As a result of the desktop review, small size of the Study Area, and data collected during the wetland and watercourse delineation surveys. Targeted wood turtle surveys were not conducted as part of the terrestrial fauna baseline studies. This approach was reviewed with NSNR during regulatory consultation which occurred on May 10, 2024.

7.4.3.5 Field Assessment Methodology and Results

Terrestrial fauna (mammals and herpetofauna) were assessed primarily through desktop reviews outlined above, supported by incidental observations during all other field programs, particularly wetland and watercourse delineation.

Targeted fauna surveys were not completed within the Study Area based on:

- Results of desktop review, including field data collected by Strum in 2022 and 2023 for two nearby EARDs.
- Results of the terrestrial habitat assessment (Section 7.4.1.5) which identified no known or potential significant habitats for rare fauna.
- Previous habitat disturbance and alteration; particularly on the Point Tupper side which is described as having a mixture of young regenerating stands and older mature forest. Many of the mature forests have been greatly impacted by windthrow, and ATV trails or old logging roads intersect the stands.
- The Point Tupper side of the Study Area's location on Cape Breton Island (no concerns regarding mainland moose), and minor overlapping with mainland moose core habitat on the Steep Creek side. This area has low suitability for wood turtles based on habitat characteristics, and the majority of the Study Area has experienced historic timber harvesting.

This approach was reviewed with NSNR during regulatory consultation on May 10, 2024.

Mammals

One incidental observation of an American black bear (*Ursus americanus*, S5) was recorded on the Steep Creek side of the Study Area. There were no additional observations of mammals or their sign during biophysical surveys in 2024. Mainland moose and fisher are the two SAR/SOCI identified as having elevated potential for occurring in the Steep Creek side of the Study Area during the desktop review. Core habitat for mainland moose has a minor overlap with the Study Area (Steep Creek side only), and habitat suitability is not high for mainland moose or fisher.

Common terrestrial mammal species likely to be present within the Study Area include:

- White tailed deer (*Odocoileus virginianus),* S5
- Red squirrel (*Tamiascirius hudsonicus*), S5
- Eastern coyote (*Canis latrans*), S5
- Snowshoe hare (*Lepus americanus*), S5

American porcupine (*Eretrizon dorsatum,* S5) is likely present on the Steep Creek side of the Study Area.

Herpetofauna

No incidental observations of herpetofauna SAR/SOCI were recorded in the Study Area during biophysical surveys (including wetland and watercourse delineation and assessment) in 2024.

As discussed in Section 7.3.1.6, field surveys confirmed the presence of 13 watercourses within the Study Area consisting of small permanent (2), perennial-intermittent (2), intermittent (3), intermittent-ephemeral (3), and ephemeral (3) features ranging in channel width from 0.46 m to 8.35 m. Watercourse substrates were predominantly composed of muck or rocky substrate (cobble or larger) with gravel and sand individually making up 15% or less of the substrate or combined for 30% or less. None of the identified watercourses were described as suitable for SAR/SOCI herpetofauna.

Common species likely to be present within the Study Area include:

- Spring peeper (*Pseudacris cruficer*), S5
- Common garter snake (*Thamnophis sirtalis*), S5
- Green frog (*Lithobates clamitans*), S5
- American toad (*Anaxyrus americanus*), S5
- Wood frog (*Lithobates sylvaticus*), S5
- Eastern smooth green snake (*Opheodrys vernalis*), S4

7.4.3.6 Effects Assessment

Project-Terrestrial Fauna Interactions

Project activities, primarily those that involve earth moving or vegetation removal, have the potential to impact terrestrial fauna (Table 7.41). These activities could result in habitat removal, alterations to wildlife corridors, and reductions in food availability. Other Project-related activities, including during construction and operation, may impact terrestrial fauna behaviours, such as increased traffic and noise.

Table 7.41: Potential Project-Terrestrial Fauna Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Terrestrial Fauna		X	X	X	X	X	X	X	X	X	X	X	X	X	X

Assessment Boundaries

For terrestrial fauna, the LAA includes the Study Area (Drawing 1.1). The RAA is not applicable.

Assessment Criteria

Assessment criteria provided in Section 4.5 apply for terrestrial fauna. The VC-specific definition for magnitude is as follows:

- Low – small loss of habitat supporting fauna, but no impacts to fauna behaviours expected.
- Moderate – moderate loss of fauna habitat or moderate impacts to fauna behaviours, but these impacts will only be experienced by individuals rather than entire populations.
- High – high loss of fauna habitat or high impact to fauna behaviours on a population scale.

Effects

Road Traffic

The Project will result in temporarily increased road traffic within the LAA during the construction phase. Both small and large terrestrial mammals are likely to use the roadways within the LAA. Increased road traffic may affect herpetofauna within the LAA due to the potential for an increase in risk of traffic collisions with herpetofauna species. Watercourses within the Study Area do not contain suitable habitat for wood turtles. Proposed new access roads and widening of existing roads will lead to a total of 377 m of road construction, with no direct impact to suitable herpetofauna habitat. Turtles, salamanders, frogs, and snakes, if present, may cross roads in search of food, or seasonally during migration to find nesting habitat or to escape uninhabitable climatic conditions (Wills, 2021).

A small increase in road traffic along frequently travelled roads will increase the chances of collision and mortality for those animals using the roadways during the construction phase, and to a lesser extent, during the decommissioning phase. There are three roads within the LAA that are currently used by motor vehicles. These roads are Port Malcom Road and Bear Island Road on the Point Tupper Side and Highway 344 on the Steep Creek Side. There are no other active roads within the Study Area. Outside of the construction phase, the Project will only require a small number of technicians to access the site to perform regular maintenance and equipment checks. Considering the small size of the Project's footprint, the pre-existing traffic load and the minimal traffic to be associated with the Project, road traffic is expected to have a negligible to low effect on terrestrial fauna in the Study Area.

Habitat Loss and Fragmentation

The footprint of the Project, particularly the area that will impact intact habitat, is relatively small:

- Suspension tower and dead-end tower foundations (combined impact area for four structures): 0.44 ha
- Substation: 3.8 ha
- Proposed New Roads: 0.8 ha
- Total Impact Area: 5.0 ha

As outlined in Section 3.0, the total footprint area of the four tower foundations will be approximately 0.44 ha. Road impacts are based on an anticipated maximum width of 20 m. Combined with direct habitat loss required for the substation and roads, the total impact area is approximately 5.0 ha, which represents approximately 2.7% of the Study Area (183.6 ha). In addition, vegetation management will be required through the life of the Project associated with the transmission line ROW.

Terrestrial fauna species will be able to move around the impacted area to all adjacent habitats. Additionally, during the field surveys it was observed that the Study Area has been substantially fragmented and disturbed from previous developments including forestry operations on the Steep Creek side, and multiple large-scale industrial projects currently or previously in operation on the Point Tupper side. Therefore, direct habitat loss and fragmentation within the Study Area will be small and can be mitigated through various strategies to reduce the effects of habitat loss.

Terrestrial habitat used by herpetofauna includes riparian areas along wetlands and watercourses, forested areas near watercourses, and rocky or gravelly areas such as roadsides. These different habitat types support different biological needs of species and relate directly to life history strategies. Because the Project generally lacks suitable wood turtle habitat and no herpetofauna SAR/SOCI were identified within the Study Area during desktop review and field surveys, no direct impacts resulting from habitat loss within the Study Area are expected. The Project footprint will cause minimal fragmentation, species will be able to move around the impacted area to all adjacent habitats.

While the Study Area is within mainland moose core habitat; it is not located in an area defined as suitable using criteria of combined habitat suitability index and road density (scores 4-9) as described in the Recovery Strategy (NSNR, 2021e). Given that the Project is located at the very edge of defined core habitat, with low suitability for moose, the Project is not anticipated to result in significant adverse effects to mainland moose or its core habitat.

Sensory Disturbance

Noise and light will be generated during several phases of the Project. During construction, decommissioning, and reclamation, noise and lighting will be generated by workers and machinery. Reproduction and survival strategies of terrestrial mammals may be directly or indirectly impacted by sensory disturbances caused by Project construction and operation. Some species have sensitive windows and may selectively avoid areas with additional noise or light. The iterative Project design process has prioritized avoidance and minimization of interactions with important wildlife habitat such as wetlands and mature forest, which will minimize sensory disturbances in these areas. The Study Area is currently subject to noise from existing roads and an active industrial area on the Point Tupper side. During the site preparation and construction phase and the decommissioning phase, Project related-noise by machinery and personnel may cause terrestrial mammals to avoid the area until activities are completed (NSNR, 2021e). It is expected that operation and maintenance phase activities will not impact terrestrial fauna.

Given the pre-existing traffic load and the minimal traffic to be associated with the Project, sound and light impacts are expected to be low with additional sensory disturbance during the site preparation and construction phase and decommissioning phase. During operations and maintenance, the traffic load is expected to be low.

Mitigation Measures

To address the abovementioned effects to terrestrial fauna, the following mitigation measures will be implemented:

Habitat Loss

- Minimize overall area to be cleared by using previously altered areas (i.e., clearcuts) and existing roads.
- Continue to review habitat modelling results, field survey results, and guidance from NSNR through the detail design phase. This continual review will be used to further reduce impacts.
- Allow for natural revegetation of roadsides to minimize lost habitat as much as possible.

Habitat Fragmentation

- Minimize fragmentation and habitat isolation by using pre-existing roads and previously altered areas during the design phase.
- Support connectivity by maintaining vegetated buffers around wetlands and watercourses, where possible.
- Allow for natural revegetation in as much cleared area as possible to limit the effects of fragmentation (note: maintenance of vegetation will be required within the transmission line ROW).

Road Traffic

- Design the Project footprint to minimize road density and use pre-existing roads to the greatest extent possible.
- Install traffic signs to alert road users of speed limits and the presence of wildlife in the area.
    - Inform all Project-related staff working on the site of dangers to wildlife and create awareness around wildlife hotspots on the site.
- Minimize Project-related traffic to reduce chances of wildlife collisions and traffic-related stress to wildlife.
- Impose restrictions to site access if deemed necessary due to a substantial increase in wildlife collisions and mortality.
- Maintain all equipment and machinery on site to reduce noise and vibration emissions associated with malfunctions. Where practical, install vehicles and machinery with noise muffling equipment to limit disturbance.
- Prohibit harassment and feeding of wildlife by Project personnel.

Monitoring

Project-specific monitoring activities for terrestrial fauna is not recommended.

Conclusion

The effects of the Project on terrestrial fauna considered to be of greatest concern include habitat loss and habitat fragmentation. Based on this assessment, the small size of the Project Area, and through the implementation of proposed mitigation measures, effects on terrestrial fauna are characterized as follows:

- **Magnitude** – Low magnitude, as the Project has been designed to minimize the number of newly created roads and habitat loss and fragmentation within the Study Area, avoidance of wetlands, and no notable change in animal behaviour is expected.
- **Geographic extent** – Within the LAA.
- **Frequency** – Continuous during construction and decommissioning, intermittent during operations.
- **Duration** – Long-term for habitat loss and fragmentation residual effects will extend through the operational and maintenance phase until after decommissioning, and short-term for traffic as it is limited to the construction and decommission phases.
- **Reversibility** – Partially reversible as the effects will be mitigated through reclamation.
- **Significance** – Not significant.

7.4.4 Bats

7.4.4.1 Overview

A desktop review was undertaken to gather information on bat species and associated habitat in the Study Area. Objectives were as follows:

- Assess and characterize potential significant bat habitat (i.e., hibernacula) within the Study Area.
- Use the information collected to inform the Project design (i.e., avoid impacts to SAR/SOCI and their habitats), as necessary.
- Use the information collected to inform mitigation and management practices.

7.4.4.2 Regulatory Context

There are seven species of bats documented within Nova Scotia, of which four are resident species that reside in the province year-round and three are migratory species that overwinter in the southern United States. Note that resident species are also known to undergo smaller-scale migrations (i.e., hundreds of km) to and from hibernacula. Resident species include the little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), tri-colored bat (*Perimyotis subflavus*), and big brown bat (*Eptesicus fuscus*). Migratory species include the eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and silver-haired bat (*Lasionycteris noctivagans*).

Three resident species (the little brown myotis, northern myotis, and tri-colored bat) are protected federally and provincially under SARA and the ESA. These three species were added to the ESA as “Endangered” on July 11, 2013, and were declared “Endangered” under Schedule 1 of SARA on November 26, 2014 (Canada, 2002; Nova Scotia, 1998a). The designations under SARA and the ESA were driven by the emergence of white-nose syndrome (a disease caused by the fungus *Geomyces destructans*), which was first detected in Canada in 2010 and led to a 90% population decline in Nova Scotia by 2013 (COSEWIC, 2013). All three migratory bat species were listed by COSEWIC in May, 2023 as “Endangered” but are currently not listed under SARA or ESA (COSEWIC, 2023). The big brown bat is not listed under either SARA or the ESA.

7.4.4.3 Desktop Review

Databases and online resources referenced as part of this desktop review include:

- Terrestrial Habitat Mapping (Section 7.4.1)
- Locations of Known Bat Hibernacula in NS (Moseley, 2007)
- NS Geoscience Atlas – Abandoned Mine Openings (NSNR, 2024b)
- Significant Species and Habitats Database (NSNR, 2024f)
- ACCDC Data Report (ACCDC, 2024)

Terrestrial Habitat Mapping

Terrestrial habitat mapping from Section 7.4.1 was used to identify locations of ideal bat foraging and over-day habitat (i.e., day roosts) within the Study Area, which include lakes, wetlands, watercourses, forest edges, cliffs, rock outcrops, talus slopes, and mature hardwood forests.

There are three habitat features considered to be significant for bats:

- Hibernacula for overwintering.
- Maternity roosts for birthing and raising young.
- Migratory stopovers for rest periods during spring and fall migration.

Hibernacula are overwintering sites that are typically located in abandoned mines or caves and can support hundreds of bats. Maternity colonies are poorly documented in Nova Scotia, with limited desktop information regarding the locations and uses of these sites (ECCC, 2015; NSNR, 2020b).

Migration is one of the most poorly understood components of bat biology at both a regional (<200 km) and long distance (>1,000 km) scale. Migratory stopovers utilized for short term rest or sanctuary are thought to be located on islands or shorelines of large bodies of water and along linear geographic features, such as riparian zones or mountain ranges (McGuire et al., 2012). Riparian and shoreline habitats were identified during terrestrial habitat mapping.

Locations of Known Bat Hibernacula

Moseley (2007) provides an overview of the known and recorded bat hibernacula located within Nova Scotia. This research indicates two known hibernacula within a 100 km radius of the Study Area (Table 7.42).

Table 7.42: Known Bat Hibernacula within 100 km of the Study Area

Hibernaculum	Approximate Distance to Study Area (km)[1]	Direction
Hirschefield Galena Prospect	66	SW
McLellan’s Brook Cave	98	W

Source: (Moseley, 2007)
[1]Distance measured to the nearest point of the Study Area.

The closest known hibernaculum is the Hirschefield Galena Prospect, located approximately 66 km southwest near Glenelg, NS. This is a significant hibernaculum located in an abandoned mine that is estimated to support 200 to 300+ over-wintering bats. The species composition of this hibernaculum has not been confirmed, but is suspected to be predominantly little brown myotis (Moseley, 2007).

The next closest hibernaculum is McLellan’s Brook Cave, located approximately 92 km west near New Glasgow, NS. McLellan’s Brook Cave is a dissolutional stream cave system carved through limestone bedrock. Though there are recorded observations of Northern myotis near the opening the cave, there are no records of underground bats.

Moseley (2007) is considered the most current inventory of hibernaculum within Nova Scotia, however, it should be noted that these hibernacula were assessed prior to the onset of white-nose syndrome in Nova Scotia; therefore, populations of bats using these habitats may vary from original estimates.

Abandoned Mine Openings

According to the British Columbia Ministry of Environment and Climate Change Strategy, Ecosystems Branch (2019), AMOs may serve as overwintering bat habitat if they have a depth greater than 30 m. Mine openings must also be of a suitable type (i.e., shafts, adits, or pits) and remain accessible to bats (i.e., not flooded, filled, capped, or plugged) to provide suitable habitat. Based on a review of the AMO Database (NSNR, 2024b), there are no recorded AMOs located within the Study Area.

A total of 38 AMOs are documented within 25 km of the Study Area (NSNR, 2024b). Of these, six are open/dry mine shafts, slopes, or adits with an original depth that could potentially support overwintering habitat for resident bat species (Drawing 7.22). All six AMOs are located with Cape Breton near Little River Reservoir and Whiteside, Nova Scotia (Table 7.43).

Table 7.43: Abandoned Mine Openings with Potential to Support Overwintering

Name	Location	Commodity	Opening Type	Original Depth	Distance and Direction from the Study Area
Richmond Coal Mines Ltd. No.3 East Shaft	Little River Reservoir	Coal	Shaft	40	5.4 km northeast
Canadian Consolidated Coal Company Main Shaft	Little River Reservoir	Coal	Shaft	90	5.4 km northeast
Richmond Coal Mines Ltd. 3-Foot Seam Level	Little River Reservoir	Coal	Adit	35	5.4 km northeast
Canadian Consolidated Coal Company Main Slope	Little River Reservoir	Coal	Slope	87	5.3 km northeast
Tidewater Fuel & Navigation Company Basin Slope	Whiteside (Coal Brook)	Coal	Slope	160	12.8 km east
Tidewater Fuel & Navigation Company No.2 Slope	Whiteside (Coal Brook)	Coal	Slope	35	13.3 km east

Source: (NSNRR, 2024b)

Significant Species and Habitat Records

The NSNR Significant Species and Habitats database (2024f) indicates 126 features related to bats and/or bat habitats within a 100 km radius of the Study Area:

- 6 records classified as "Other Habitat" relating to unclassified bats (2) and caves (4).
- 14 records classified as "Species of Concern" relating to caves.
- 106 records classified as "Species at Risk" relating to Silver-haired bats (2), Tri-colored

bats (2), Eastern red bats (3), Hoary bats (7), Northern myotis (8), Little brown myotis (13), Myotis species (22), and unclassified bats (49).

None of the aforementioned records are located within the Study Area. The nearest feature related to bats and/or bat habitats is 7.7 km northwest of the Study Area.

ACCDC Records

The ACCDC Data Report (2024) completed for this Project indicated one bat species and one genus of concern recorded within 100 km of the Study Area (Table 7.44).

Table 7.44: Bat Species Recorded within a 100 km Radius of the Study Area

Common Name	Scientific Name	COSEWIC Status	*SARA* Status	*ESA* Status	NS S-Rank
Little Brown Myotis	*Myotis lucifugus*	Endangered	Endangered	Endangered	S1
bat species	*Vespertilionidae sp.*	---	---	---	S1S2

Source: (ACCDC, 2024)

According the ACCDC Report (2024), a “bat hibernaculum or bat species occurrence” is known to exist within 5 km of the Study Area. Correspondence with NSNR (Sarah Spencer, Species at Risk Biologist, personal communication, January 15, 2025) confirmed that the above record is a bat occurrence that was observed 3 km east of the Study Area.

7.4.4.4 Previous EA Assessments

Publicly available bat assessments were completed for the Goose Harbour Lake Wind Farm Project near Mattie Settlement, Nova Scotia (Strum Consulting, 2023), located approximately 3.8 km west of the Study Area. The assessment consisted of passive acoustic monitoring for a 173-day period between late spring and fall (2021) and resulted in a total of 501 bat passes across four detector locations. Over half of the recorded bat calls (58%) belonged to resident myotis species, with the remaining calls belonging to migratory (38%) and unknown (4%) species. Migratory species detected include hoary bat, eastern red bat, and silver-haired bat. An average of 0.72 bat passes were recorded per detector night. An analysis of monthly bat activity showed higher activity in the summer with a sharp decrease in the fall (Strum Consulting, 2023). Given the close proximity of the Goose Harbour Lake Wind Farm Project, it is anticipated that species identified within the EA have the potential to utilize the Study Area.

Priority Species

Bat SAR/SOCI that have been recorded within a 100 km radius of the ACCDC Study Area or have a likelihood of occurrence based on the desktop review and habitat within the Study Area were screened against the criteria outlined in the document Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009) to develop a list of priority species. These priority species include:

- Myotis species (little brown myotis and northern myotis)
- Eastern red bat
- Hoary bat
- Silver-haired bat

The little brown myotis is the most common bat species in Nova Scotia and is likely ubiquitous in the province (Broders et al., 2003). During the day, the little brown myotis will congregate in tight spaces to roost in under rocks and in buildings, trees, wood piles, and caves (Fenton & Barclay, 1980). As a resident species, little brown myotis hibernates between September and early to mid-May in abandoned mines or caves (Fenton & Barclay, 1980; Moseley, 2007).

The northern myotis, once considered uncommon throughout Nova Scotia (Moseley, 2007), is likely ubiquitous in the forested regions of the province (Broders et al., 2003). This species is widely distributed in the eastern United States and Canada and is commonly encountered during swarming and hibernation (Caceres & Barclay, 2000). During the day, northern myotis show a preference for roosting in trees, however, the habitat preferences of females may vary according to their reproductive status (Garroway & Broders, 2008). Females appear to prefer shade tolerant deciduous trees over coniferous trees, whereas males tend to roost alone in coniferous or mixed wood stands in mid-decay stages (Broders & Forbes, 2004). Northern myotis are also non-migratory and typically associated with the little brown myotis during hibernation, being found in caves or abandoned mines alongside this species (Moseley, 2007). Hibernation of the northern myotis is thought to begin as early as September and can last until May (Caceres & Barclay, 2000).

Eastern red bats are typically found east of the Rocky Mountains within Canada/US and within northeastern Mexico (and are a distinct population from the Western red bats found west of the Rocky Mountains) (COSEWIC, 2023). This species undertakes long distance migrations during the spring and fall months, travelling hundreds to thousands of kilometres. Eastern red bats can be found during the winter in southeastern US and in Canada during the summer months. During the day, eastern red bats can be found roosting within the foliage of trees (and sometimes shrubs) in both coniferous and deciduous forests of any age class; but prefer stands containing overhead/canopy cover and open flight space below. This species is often found roosting alone but can also be found with pups. Maternity roosts for this species are typically found in tall and large diameter trees that reach/exceed the surrounding canopy. Foraging habitat for eastern red bat includes both open and forested (early and late stage) habitats along with forest edges; heavily disturbed habitats such as transportation corridors, urban developments, or mines are typically avoided by this species. Little is known about migration for this species. Migration is thought to occur across coastal areas and/or large open areas (COSEWIC, 2023).

Hoary bats have the widest range among all native terrestrial mammals within the Western Hemisphere and is found within all provinces and territories in Canada and all states in the US (COSEWIC, 2023). As a result, hoary bats travel long distances (i.e., across the continent) during migratory periods and their locations vary seasonally. This species can be found during the winter months in coastal regions of Mexico and US, and in the spring, migrate north into Canadian regions. Roosting and maternity habitat characteristics for the hoary bat mirror the eastern red bat (described above). Foraging habitat for hoary bats is associated with open areas that contain patches of trees, such as fields, grasslands, or wetlands; heavily disturbed habitats such as transportation corridors, urban developments, or mines are typically avoided by this species. Little is known about migration habitats for this species. Migration is thought to occur across coastal areas and/or large open areas (COSEWIC, 2023).

The silver-haired bat is also widely distributed across Canada and US, extending from southern Northwest Territories and from British Columbia to Nova Scotia (COSEWIC, 2023). Similar to the eastern red bat and hoary bat, the silver-hair bat undertakes long distance migrations and their distribution varies seasonally. This species can be found during the winter months in coastal regions of British Columbia and throughout US and Mexico. During the day, silver-haired bats can be found roosting in the cavities or under the bark of large decaying trees. Maternity roosts are usually small and are typically found in deciduous tree species (especially *Populus spp.*) which often contain decay characteristics suitable for maternity roosts (e.g., centre rot, peeling bark, limb breakages/cavities). Silver-haired bats are also known to use buildings for roosting. Foraging habitat is not well characterized but is typically associated with forested habitats (early and late stage) along with forest edges and openings. Little is known about migration requirements for this species (COSEWIC, 2023).

7.4.4.5 Effects Assessment

Project-Bat Interactions

Project activities, primarily those involving vegetation clearing, have the potential to impact bats and bat habitat (Table 7.45). These activities could result in habitat loss and accidental injury or mortality. Other Project activities during construction and operation, such as increased noise and lighting, may impact bat behaviours.

Table 7.45: Potential Project-Bat Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Geophysical Environment		X		X	X	X						X			

Assessment Boundaries

The LAA for bats includes the Study Area as well as the airspace directly surrounding towers and conductors (Drawing 1.1). The RAA for bats is not applicable.

Assessment Criteria

Assessment criteria provided in Section 4.5 applies for bats. The VC-specific definition for magnitude is as follows:

- Negligible – no measurable loss of bat habitat or impact to bat behaviours expected.
- Low – small loss of habitat supporting bats, but loss of individuals is not expected.
- Moderate – loss of habitat supporting bats and minimal loss of individuals or impacts to bat behaviours, and these impacts will only be experienced by individuals rather than entire populations.
- High – high loss of habitat that supports bats and/or loss of individuals or impacts to bat behaviours on a population scale.

Effects

Potential impacts to bat species from the Project's construction, operation, decommissioning, and reclamation include:

- Habitat fragmentation and/or removal.
- Direct mortality.
- Sensory disturbance (i.e., lighting, noise, human activity, etc.).

Habitat Fragmentation and Removal

Vegetation clearing required for construction can result in the removal of bat habitat (snags, roosting trees, etc.) or disrupt corridors between important habitat features (foraging grounds, birthing areas, etc.) (Segers & Broders, 2014). Pregnant and lactating female bats have been shown to be sensitive to habitat degradation as their foraging ranges are more constricted due to decreased energy and caring for young (Henry et al., 2002; Segers & Broders, 2014).

The construction of linear anthropogenic features can potentially impede bat movement, foraging, flight activity, and habitat use (ECCC, 2018). Conversely, one study by Segers & Broders (2014) found that different species of bats respond differently to landscape alteration for development. Suitable habitat may increase within the Study Area for the little brown myotis due to the increase in open areas and forest edges, as these areas are preferred foraging habitats for the species (Segers & Broders, 2014). Alternatively, suitable habitat for northern myotis may decrease due to this species' preference to forage in forested areas and around canopy covered streams (Segers & Broders, 2014).

One study found that power lines did not deter bats from flying nearby regardless of voltage (EirGrid, 2015). Another study found that bats may be attracted to high voltage power lines greater than 220 kV at high relative humidity and may avoid them during low relative humidity (Froidevaux et al., 2023). Falcão et al. (2024) found that transmission line installation and presence does not affect insectivorous bat communities.

Based on habitat data collected in the field as well as desktop analysis and other studies, suitable over-day roosting and foraging habitat for a variety of bat species is present within the Study Area, associated with snags/downed trees, wetlands, riparian areas, forest clearings, and forest edges. However, during field surveys, it was observed that the Study Area is significantly fragmented and disturbed from previous developments including forestry operations on the Steep Creek side, and multiple large-scale industrial projects currently or previously in operation on the Point Tupper side. Additionally, both desktop and field studies found few mature hardwood forest and no old-growth forest. Therefore, it is unlikely that the habitat identified within the Study Area supports bat maternity colonies. Other significant habitat features, including caves and AMOs, that could serve as hibernacula or over-wintering sites, were also not identified within the Study Area.

Impacts to bats from habitat fragmentation and removal are anticipated to be minimal based on the existing disturbance and fragmentation present in the Study Area.

Injury/Mortality

The main injury or mortality threat to bats is related to vegetation clearing that will take place during construction. Individuals may experience injury or mortality if they are roosting in trees being cleared. However, this is unlikely, as suitable roosting habitat (i.e., mature hardwood forest) is limited within the Study Area. Risk of mortality and injury related to vegetation clearing can also be avoided if vegetation clearing takes place during winter when bats are hibernating and summer day roosts are vacant.

There has been little research conducted regarding bat mortality caused by transmission line strikes. Tella et al. (2020) suggested that as electrocution typically occurs when contact is made with multiple wires, bats with larger body sizes are more at risk of direct mortality due to transmission lines. The largest bat in Nova Scotia is the hoary bat, with a wingspan of up to 41 cm (Northwest Territories, 2023). This is significantly smaller than the 1.2 m to 1.5 m wingspan of the Indian flying fox (*Pteropus giganteus*) (Silbernagel, 2005), a species with relatively high rates of mortality due to electrocution caused by collisions with power lines (Tella et al., 2020). Note that this species is native to southern Asia and is not known to reside in Nova Scotia. As transmission lines do not contain moving parts, echolocation should allow most bats to easily detect and avoid transmission lines and their associated structures (EirGrid, 2015).

Sensory Disturbance

Noise and light will be generated during several phases of the Project. During construction, decommissioning, and reclamation, noise and lighting will be generated by workers and machinery. During construction and reclamation, noise will occur predominantly during daylight hours and should not affect nocturnal bat activity such as feeding and foraging. High-impact construction activities (e.g., heavy equipment, blasting, and pile-driving) could affect roosting bats in the immediate area, potentially causing roost abandonment; however, bats are well adapted morphologically, physiologically, and behaviourally to avoid acoustic trauma because they are often exposed to the exceptionally loud sounds of their own (and other bat) echolocation signals (CDOT, 2016). These mechanisms include behavioural avoidance, changing the shape and orientation of the pinnae, closing the cartilaginous fold in the outer ear canal, the tympanic reflex, and resonance absorption (Wever & Vernon, 1961). These mechanisms are very effective in achieving the needed protection from constant noise exposure.

For bats, echolocation calls are in the ultrasonic range beyond the upper frequency limits of construction noise (CDOT, 2016). Thus, there is effectively no echolocation masking effect from construction noise, which is emitted at much lower frequencies. Additionally, construction activities are prioritized outside the active period for bats (30 minutes before sunset to 30 minutes after sunrise), further limiting any potential masking effects in the ultrasonic ranges.

Sensory disturbance associated with lighting during the construction, operation, and decommissioning phases of the Project may impact bat behavior. Lighting has been found to impact bats through the disruption of day-night cycles, foraging activity, habitat connectivity and movement (Seewagen et al., 2023). The effects of lighting vary across bat species as some species are attracted to lights due to insect concentration, while others (most notably the *Myotis* species) are light-adverse. A study by Seewagen et al. (2023) found that little brown myotis and big brown bat activity decreased within proximity of LED floodlights, while activity and presence of eastern red bat and hoary bat were not affected. Temporary lighting may be required during construction and decommissioning but will be removed once these activities are complete. During operation, navigation lights will be installed on the stringing towers and will operate at night as per TC's requirements. Navigational hazard lighting will be minimized and will only flash intermittently to minimize sensory disturbance to wildlife and insect attraction to the stringing towers. As such, the impacts of this necessary lighting to bat behavior and movements are anticipated to be low.

Mitigation

To address the abovementioned effects to bats and bat habitat, the following mitigation measures will be implemented:

- Minimize overall area to be cleared to the greatest extent possible.
- Target clearing activities outside the sensitive bird window (April 15 to August 31) to the extent possible. This timeframe overlaps with the majority of the active bat window and will therefore mitigate interactions with roosting bats.
    - If clearing is required within this window, the Proponent will retain a qualified professional to conduct nest sweeps for birds and searches for bat roosts in advance of clearing activities. If bat maternity roosts are identified during nest sweeps, appropriate setbacks will be maintained.
- Maintain avoidance of important bat habitat (i.e., hibernacula/AMOs, old-growth forest) to the greatest extent possible.
- Retain snags during clearing activities, where possible.
- Use noise controls (e.g., mufflers) on machinery, equipment, etc. during construction and restrict noisy activities at night.

- Install downward facing lights and minimize infrastructure lighting to the minimum required for navigational hazard lighting to reduce insect attraction and sensory disturbance to bats.

Monitoring

No monitoring programs are recommended.

Conclusion

After mitigations, residual effects to bats are characterized as follows:

- **Magnitude** – Low magnitude, as loss of some loss of habitat may occur, but loss of individuals is not expected.
- **Geographic extent** – Within the LAA.
- **Frequency** – Single event during construction; continuous frequency throughout operations.
- **Duration** – Medium duration, as some effects will extend throughout the operation of the Project.
- **Reversibility** – Reversible, as the effects will terminate at the end of the Project lifespan.
- **Significance** – Not significant.

7.4.5 Avifauna

7.4.5.1 Overview

A desktop review, field program, and habitat modelling were undertaken to gather information on avian species and associated habitat in the Study Area. Objectives were as follows:

- Assess abundance, species diversity, and habitat utilization of avifauna within the Study Area during all seasons.
- Use the information collected to inform and refine the Project design (i.e., avoid impacts to SAR and SOCI and their habitats).
- Assess migratory bird activity and assess the risk that the Project poses to migratory birds.
- Use the information collected to inform mitigation and management practices.

All avifauna results are provided in Appendix I, in the following tables:

- Table 1: eBird Occurrence Charts for Species Recorded at Five Hotspots in The Strait of Canso
- Table 2: eBird SAR and SOCI Recorded at Five Hotspots in The Strait of Canso
- Table 3: BirdNET Species List (Filtered for SAR and SOCI)
- Table 4: Species Detectable by Nighthawk
- Table 5: 2023-2024 Diurnal Movement Survey Results Summary
- Table 6: 2023-2024 Diurnal Movement Survey Summary

- Table 7: 2023-2024 Diurnal Movement Survey - Incidental Species
- Table 8: 2023 and 2024 Diurnal Movement Survey - Raw Data
- Table 9: Species Summary - 2024 Breeding Bird Point Count Surveys
- Table 10: Habitat Descriptions for 2024 Point Count Locations based on CWS Habitat Codes
- Table 11: Species Summary - 2024 Nightjar Surveys
- Table 12: 2024 Breeding Bird Incidentals Summary
- Table 13: 2023 Fall Migration Radar Results
- Table 14: 2024 Spring Migration Radar Results
- Table 15: 2024 Summer Radar Results
- Table 16: 2024 Daily Weather Data
- Table 17: 2023 England's Lake BirdNET Manually Verified Acoustic Data
- Table 18: 2023 England's Lake Nighthawk Manually Verified Acoustic Data
- Table 19: Nighthawk Group Definitions
- Table 20: 2023 Melford Loop BirdNET Manually Verified Acoustic Data
- Table 21: 2023 Melford Loop Nighthawk Manually Verified Acoustic Data

7.4.5.2 Regulatory Context
Applicable laws and regulations relating to the protection of avian species include the following:

- MBCA
- ESA
- SARA

The MBCA protects all migratory birds while they are present in Canadian jurisdiction, including on land, in the air, and on the water. The ESA and SARA prohibit harm to listed SAR along with their habitually occupied spaces and core/critical habitat.

7.4.5.3 Desktop Review
Desktop information was utilized to gain insight into protected avifauna habitats, species utilization of the area, and to identify SAR or SOCI potentially occurring within or near the Study Area using the following sources:

- Terrestrial Habitat Mapping (Section 7.4.1)
- Nesting Zone and Regional Nesting Period (ECCC, 2024c)
- Important Bird Areas (IBAs) (IBA Canada, 2024)
- CWS Waterbird Colony Database (Atlantic Region) (Wilhelm & Mahoney, 2021)
- Nova Scotia Parks and Protected Areas (NSECC, 2020c)
- Maritimes Breeding Bird Atlas (MBBA) (Stewart et al., 2015)
- Nova Scotia Significant Species and Habitats Database (NSNR, 2024f)
- ACCDC Data Report (ACCDC, 2024)
- Publicly Available Environmental Assessments
- eBird Records (eBird, 2025)

Desktop information was collected in consideration of the guidance source examples in Section 4.0 of the CWS Wind Turbines and Birds: A Guidance Document for Environmental Assessment (ECCC-CWS, 2007). The Study Area consists of coastline and open water of the Strait of Canso, as well as inland habitat on both the Steep Creek side and Point Tupper side of the Study Area. The Strait of Canso provides habitat for a variety of avian species, particularly cormorants, gulls, and a variety of shorebird and waterfowl species (NSPI, 2016). Regarding inland habitat, the Study Area features predominantly mixedwood stands with smaller stands of hardwood and softwood throughout. Wetlands (i.e., treed swamps, shrub/marsh swamps, and bogs) are also prevalent within the Study Area (Section 7.3.3). The Point Tupper side also consists of disturbed, cleared, and/or developed areas from industrial activity as well as existing roads and wind turbine infrastructure. The diversity of habitat types, in particular the occurrences of edge/transitional habitat and wetlands, provides for the foraging, breeding, and roosting requirements of a variety of resident and migratory bird species.

The Study Area falls within the ECCC nesting zone C3, which has a regional nesting period of mid April to late August (ECCC, 2024c). The number of species reported to nest in wetland, open and forested habitat types in this region are 60, 88, and 84 species respectively.

The closest IBA in Nova Scotia (IBA Canada, 2024) is the Pomquet Beach Region (NS009), approximately 34 km west of the Project (Drawing 7.23). Located on the north coast of Nova Scotia near Antigonish, this IBA features a series of barrier beaches with 1 to 2 m tides and broader expanses of sand flats appearing at low tide. This IBA is known to provide nesting habitat for federally and provincially endangered piping plovers (*Charadrius melodus*) and has supported one of the most stable piping plover populations in Nova Scotia since the species began declining. Marine invertebrates found in the tidal areas provide food for a variety of other shorebird species which stop over during migration. There is a great blue heron (*Ardea herodias*) colony on Pomquet Island, and other coastal birds like osprey (*Pandion haliaetus*) and bald eagles *(Haliaeetus leucocephalus)* are known to breed in the area (IBA Canada, 2024). Due to the distance between this IBA and the Study Area, no interactions with the Project are expected.

The CWS Waterbird Colony database (Wilhelm & Mahoney, 2021) shows several known seabird colonies in the Strait of Canso, all of which are avoided by the Study Area (Drawing 7.23). These include:

- A great black-backed gull (*Larus marinus*) colony near Bear Head, approximately 3 km southeast of the Study Area.
- A great blue heron colony on Boudreau’s Island, approximately 9 km southeast of the Study Area.
- A common tern (*Sterna Hirundo*) colony near Little Spirits Islands, approximately 9 km southeast of the Study Area.

- A common tern colony at Long Pond, approximately 12 km north of the Study Area, an unspecified tern colony at Heffernan's Pond, approximately 16 km north of the Study Area.
- An unspecified tern colony near Walsh's Deep Cove, approximately 10 km southeast of the Study Area.
- An unspecified tern colony near Oyster Ponds, approximately 13 km southwest of the Study Area.
- A colony with records of several species [great blue heron, double-crested cormorant, unspecified tern, great black-backed gull, and herring gull (*Larus argentatus)]*, located on Campbell Island, approximately 13 km southeast of the Study Area.
- A colony with records of several species [great black-backed gull, herring gull, double-crested cormorant, common eider (*Somateria mollissima*), and unspecified tern] located on Green Island, approximately 14 km southeast of the Study Area.

Two Nova Scotia Parks and Protected Areas are located within 10 km of the Study Area. The Mulgrave Hills Nature Reserve is a protected hardwood forest located on the mainland, approximately 5 km southwest of the Steep Creek side of the Study Area. Janvrin Island Nature Reserve is located on Rabbit Island, south of Cape Breton, approximately 7 km east of the Point Tupper side of the Study Area. This reserve provides breeding habitat for shorebirds and is a known area for seabird colonies (NSECC, n.d.-b). The River Inhabitants Nature Reserve is a pending Nova Scotia Lands Protected Area located approximately 10 km northeast of the Point Tupper side of the Study Area (Drawing 7.23) (Government of Nova Scotia, 2020).

The Steep Creep side of the Study Area is contained within the map square 20PR24 of the MBBA (Stewart et al., 2015). In the most recent edition of the MBBA (2006-2010), 72 species were identified as being possible, probable, or confirmed breeders in square 20PR24, including three SAR and 11 SOCI. The three SAR identified were:

- Canada warbler – "Threatened" (SARA), "Special Concern" (COSEWIC), "Endangered" (ESA), "S3B" (ACCDC)
- Common nighthawk – "Special Concern" (SARA), "Special Concern" (COSEWIC), "Threatened" (ESA), "S3B" (ACCDC)
- Olive-sided flycatcher – "Special Concern" (SARA), "Special Concern" (COSEWIC), "Threatened" (ESA), "S3B" (ACCDC)

The 11 SOCI identified were:

- American kestrel (*Falco sparverius*) – "S3B, S4S5M" (ACCDC)
- American robin (*Turdus migratorius*) – "S5B, S3N" (ACCDC)
- Bay-breasted warbler (*Setophaga castanea*) – "S3S4B, S4S5M" (ACCDC)
- Black-backed woodpecker (*Picoides arcticus*) – "S3S4" (ACCDC)
- Boreal chickadee (*Poecile hudsonicus*) – "S3" (ACCDC)
- Canada jay (*Perisoreus canadensis*) – "S3" (ACCDC)

- Pine siskin (*Spinus pinus*) – "S3" (ACCDC)
- Purple finch (*Haemorhous purpureus*) – "S4S5B, S3S4N, S5M" (ACCDC)
- Red-breasted merganser (*Mergus serrator*) – "S3B, S4S5N, S5M" (ACCDC)
- Spotted sandpiper (*Actitis macularius*) – "S3S4B, S5M" (ACCDC)
- Wilson's snipe (*Gallinago delicata*) – "S3B, S5M" (ACCDC)

The Point Tupper side of the Study Area is contained within map square 20PR34 of the MBBA (Stewart et al., 2015). In the most recent edition of the MBBA (2006-2010), 99 species were identified as being possible, probable, or confirmed breeders in square 20PR34, including three SAR and seven SOCI:

The three SAR identified were:

- Common nighthawk – "Special Concern" (SARA), "Special Concern" (COSEWIC), "Threatened" (ESA), "S3B" (ACCDC)
- Evening grosbeak (Coccothraustes vespertinus) "Special Concern (COSEWIC), Special Concern (SARA), Vulnerable (ESA), "S3B,S3N,S3M" (ACCDC)
- Olive-sided flycatcher – "Special Concern" (SARA), "Special Concern" (COSEWIC), "Threatened" (ESA), "S3B" (ACCDC)

The seven SOCI identified were:

- American kestrel – "S3B, S4S5M" (ACCDC)
- American robin – "S5B, S3N" (ACCDC)
- Bay-breasted warbler – "S3S4B, S4S5M" (ACCDC)
- Boreal chickadee – "S3" (ACCDC)
- Purple finch – "S4S5B, S3S4N, S5M" (ACCDC)
- Spotted sandpiper – "S3S4B, S5M" (ACCDC)
- Wilson's snipe – "S3B, S5M" (ACCDC)

The NS Significant Species and Habitats database[3] contains 165 unique records pertaining to birds and/or bird habitat within a 10 km radius of the Project (NSNR, 2024f). These records include but are not limited to:

- 10 records classified as "Species of Concern" which relate to boreal chickadee (3), ruby-crowned kinglet (*Corthylio calendula*) (2), yellow-bellied flycatcher (*Empidonax flaviventris)* (2), Canada jay (1), common loon (*Gavia immer*) (1), and tree swallow (*Tachycineta bicolor*) (1).
- 154 records classified as "Species at Risk", many of which relate to ruby-crowned kinglet (33), common loon (21), Canada warbler (15), yellow-bellied flycatcher (15), Canada jay (12), and olive-sided flycatcher (10).

[3] Several species included in the NS Significant Species and Habitats database are not currently considered SOCI by ACCDC (2024a). These include common loon, ruby-crowned kinglet, Swainson's thrush, tree swallow, and yellow-bellied flycatcher.

The NS Significant Species and Habitats database contains 4,757 unique records pertaining to birds and/or bird habitat within a 100 km radius of the Project (NSNR, 2024f). These records include but are not limited to:

- 2,225 records classified in the database as "Other Habitat", most of which relate to bald eagle (2023) and osprey (173).
- 423 records classified as "Migratory Bird", many of which relate to common eider (*Somateria mollissima*) (97), double-crested cormorant (87), great blue heron (44), willet (*Tringa semipalmata*) (39) and great cormorant (*Phalacrocorax carbo*) (16).
- 939 records classified in the database as "Species of Concern", many of which relate to unclassified tern (218), common eider (104), boreal chickadee (89), northern goshawk (*Accipiter atricapillus*) (85), and common loon (61).
- 1,170 records classified as "Species at Risk", many of which relate to ruby-crowned kinglet (129), yellow-bellied flycatcher (74), Canada warbler (70), boreal chickadee (54), common eider (47), Swainson's thrush (*Catharus ustulatus*) (46), and piping plover (44).

The ACCDC (2024b) database contained records of 110 avian SAR and SOCI within a 100 km radius of the Study Area (Table 7.46). Within the Study Area, the database contained two records of avian SAR, a common nighthawk and an olive-sided flycatcher (Drawing 7.24).

Table 7.46: ACCDC Database Records within a 100 km Radius of the Study Area

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
American Bittern	*Botaurus lentiginosus*	---	---	---	S3S4B, S4S5M
American Coot	*Fulica americana*	Not At Risk	---	---	S1B
American Golden-Plover	*Pluvialis dominica*	---	---	---	S2S3M
American Goshawk	*Accipiter atricapillus*	Not At Risk	---	---	S3S4
American Kestrel	*Falco sparverius*	---	---	---	S3B, S4S5M
American Three-toed Woodpecker	*Picoides dorsalis*	---	---	---	S1?
Arctic Tern	*Sterna paradisaea*	---	---	---	S3B
Atlantic Puffin	*Fratercula arctica*	---	---	---	S2B
Baltimore Oriole	*Icterus galbula*	---	---	---	S2S3B, SUM
Bank Swallow	*Riparia riparia*	Threatened	Threatened	Endangered	S2B
Barn Swallow	*Hirundo rustica*	Special Concern	Threatened	Endangered	S3B
Bay-breasted Warbler	*Setophaga castanea*	---	---	---	S3S4B, S4S5M

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Bicknell's Thrush	*Catharus bicknelli*	Threatened	Threatened	Endangered	S1B
Black Tern	*Chlidonias niger*	Not At Risk			S1B
Black-backed Woodpecker	*Picoides arcticus*	---	---	---	S3S4
Black-bellied Plover	*Pluvialis squatarola*	---	---	---	S3M
Black-billed Cuckoo	*Coccyzus erythropthalmus*	---	---	---	S3B
Black-crowned Night-heron	*Nycticorax nycticorax*	---	---	---	S1B
Black-headed Gull	*Chroicocephalus ridibundus*	---	---	---	S3N
Black-legged Kittiwake	*Rissa tridactyla*	---	---	---	S2S3B
Blackpoll Warbler	*Setophaga striata*	---	---	---	S3B, S5M
Blue-winged Teal	*Spatula discors*	---	---	---	S3B
Bobolink	*Dolichonyx oryzivorus*	Special Concern	Threatened	Vulnerable	S3B
Boreal Chickadee	*Poecile hudsonicus*	---	---	---	S3
Boreal Owl	*Aegolius funereus*	Not At Risk	---	---	S2?B, SUM
Brant	*Branta bernicla*	---	---	---	S3M
Brown Thrasher	*Toxostoma rufum*	---	---	---	S1B
Brown-headed Cowbird	*Molothrus ater*	---	---	---	S2B
Canada Jay	*Perisoreus canadensis*	---	---	---	S3
Canada Warbler	*Cardellina canadensis*	Special Concern	Threatened	Endangered	S3B
Cape May Warbler	*Setophaga tigrina*	---	---	---	S3B, SUM
Chimney Swift	*Chaetura pelagica*	Threatened	Threatened	Endangered	S2S3B, S1M
Cliff Swallow	*Petrochelidon pyrrhonota*	---	---	---	S2S3B
Common Eider	*Somateria mollissima*	---	---	---	S2B, S2N, S4M
Common Goldeneye	*Bucephala clangula*	---	---	---	S4B, S4N, S5M
Common Murre	*Uria aalge*	---	---	---	S1?B

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Common Nighthawk	*Chordeiles minor*	Special Concern	Special Concern	Threatened	S3B
Common Tern	*Sterna hirundo*	Not At Risk	---	---	S3B
Cooper's Hawk	*Accipiter cooperii*	Not At Risk	---	---	S1?B, SUN, SUM
Eastern Bluebird	*Sialia sialis*	Not At Risk	---	---	S3B
Eastern Kingbird	*Tyrannus tyrannus*	---	---	---	S3B
Eastern Meadowlark	*Sturnella magna*	Threatened	Threatened	---	SHB
Eastern Whip-Poor-Will	*Antrostomus vociferus*	Special Concern	Threatened	Threatened	S1?B
Eastern Wood-Pewee	*Contopus virens*	Special Concern	Special Concern	Vulnerable	S3S4B
Evening Grosbeak	*Coccothraustes vespertinus*	Special Concern	Special Concern	Vulnerable	S3B, S3N, S3M
Fox Sparrow	*Passerella iliaca*	---	---	---	S3S4B, S5M
Gadwall	*Mareca strepera*	---	---	---	S2B, SUM
Great Cormorant	*Phalacrocorax carbo*	---	---	---	S2S3B, S2S3N
Great Crested Flycatcher	*Myiarchus crinitus*	---	---	---	S1B
Greater Yellowlegs	*Tringa melanoleuca*	---	---	---	S3B, S4M
Harlequin Duck - Eastern population	*Histrionicus histrionicus pop. 1*	Special Concern	Special Concern	Endangered	S2N
Horned Grebe	*Podiceps auritus*	Special Concern	Special Concern	---	S3N, SUM
Horned Lark	*Eremophila alpestris*	---	---	---	SHB, S4S5N, S5M
Hudsonian Godwit	*Limosa haemastica*	Threatened	---	---	S2S3M
Indigo Bunting	*Passerina cyanea*	---	---	---	S1?B, SUM
Ipswich Sparrow	*Passerculus sandwichensis princeps*	Special Concern	Special Concern	---	S1B
Killdeer	*Charadrius vociferus*	---	---	---	S3B

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Lapland Longspur	*Calcarius lapponicus*	---	---	---	S3?N, SUM
Laughing Gull	*Leucophaeus atricilla*	---	---	---	SHB
Leach's Storm-Petrel	*Hydrobates leucorhous*	Threatened	---	---	S3B
Least Sandpiper	*Calidris minutilla*	---	---	---	S1B, S4M
Lesser Yellowlegs	*Tringa flavipes*	Threatened	---	---	S3M
Long-eared Owl	*Asio otus*	---	---	---	S2S3
Nelson's Sparrow	*Ammospiza nelsoni*	Not At Risk	---	---	S3S4B
Northern Gannet	*Morus bassanus*	---	---	---	SHB
Northern Mockingbird	*Mimus polyglottos*	---	---	---	S1B
Northern Pintail	*Anas acuta*	---	---	---	S1B, SUM
Northern Shoveler	*Spatula clypeata*	---	---	---	S2B, SUM
Northern Shrike	*Lanius borealis*	---	---	---	S3S4N
Olive-sided Flycatcher	*Contopus cooperi*	Special Concern	Special Concern	Threatened	S3B
Pectoral Sandpiper	*Calidris melanotos*	---	---	---	S3M
Peregrine Falcon - anatum/tundrius	*Falco peregrinus pop. 1*	Not At Risk	---	Vulnerable	S1B, SUM
Philadelphia Vireo	*Vireo philadelphicus*	---	---	---	S2?B, SUM
Pine Grosbeak	*Pinicola enucleator*	---	---	---	S3B, S5N,S5M
Pine Siskin	*Spinus pinus*	---	---	---	S3
Pine Warbler	*Setophaga pinus*	---	---	---	S2S3B, S4S5M
Piping Plover melodus subspecies	*Charadrius melodus melodus*	Endangered	Endangered	Endangered	S1B
Purple Martin	*Progne subis*	---	---	---	SHB
Purple Sandpiper	*Calidris maritima*	---	---	---	S3S4N
Razorbill	*Alca torda*	---	---	---	S2B
Red Crossbill	*Loxia curvirostra*	---	---	---	S3S4
Red Knot rufa subspecies	*Calidris canutus rufa*	Endangered, Special Concern	Endangered	Endangered	S2M
Red Phalarope	*Phalaropus fulicarius*	---	---	---	S2S3M

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Red-breasted Merganser	*Mergus serrator*	---	---	---	S3B, S4S5N, S5M
Redhead	*Aythya americana*	---	---	---	SHB
Red-necked Phalarope	*Phalaropus lobatus*	Special Concern	Special Concern	---	S2S3M
Roseate Tern	*Sterna dougallii*	Endangered	Endangered	Endangered	S1B
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	---	---	---	S3B
Rough-legged Hawk	*Buteo lagopus*	Not At Risk	---	---	S3N
Ruddy Duck	*Oxyura jamaicensis*	---	---	---	S1B
Ruddy Turnstone	*Arenaria interpres*	---	---	---	S3M
Rusty Blackbird	*Euphagus carolinus*	Special Concern	Special Concern	Endangered	S2B
Sanderling	*Calidris alba*	---	---	---	S2N, S3M
Scarlet Tanager	*Piranga olivacea*	---	---	---	S2B, SUM
Semipalmated Plover	*Charadrius semipalmatus*	---	---	---	S1B, S4M
Semipalmated Sandpiper	*Calidris pusilla*	---	---	---	S3M
Short-billed Dowitcher	*Limnodromus griseus*	---	---	---	S3M
Short-eared Owl	*Asio flammeus*	Threatened	Special Concern	---	S1B
Spotted Sandpiper	*Actitis macularius*	---	---	---	S3S4B, S5M
Tennessee Warbler	*Leiothlypis peregrina*	---	---	---	S3S4B, S5M
Turkey Vulture	*Cathartes aura*	---	---	---	S2S3B, S4S5M
Vesper Sparrow	*Pooecetes gramineus*	---	---	---	S1S2B, SUM
Virginia Rail	*Rallus limicola*				S2S3B
Warbling Vireo	*Vireo gilvus*	---	---	---	S1B, SUM
Whimbrel	*Numenius phaeopus hudsonicus*	---	---	---	S2S3M
Willet	*Tringa semipalmata*	---	---	---	S3B
Willow Flycatcher	*Empidonax traillii*	---	---	---	S2B

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Wilson's Snipe	*Gallinago delicata*	---	---	---	S3B, S5M
Wilson's Warbler	*Cardellina pusilla*	---	---	---	S3B, S5M
Wood Thrush	*Hylocichla mustelina*	Threatened	Threatened	---	SUB

Source: (ACCDC, 2025); [1] (ECCC, 2024e); [2] (NSNR, n.d.-b); [3] (ACCDC, 2025)

EAs that have been submitted in close proximity to the Point Tupper side of the Study Area were reviewed to gather additional information on SAR and SOCI occurrences in the area. The EverWind Point Tupper Green Hydrogen/Ammonia Project – Phase 1 EA, registered in 2022, mentioned records of barn swallow, Canada warbler, common nighthawk, evening grosbeak, olive-sided flycatcher, and rusty blackbird within 5 km of the proposed Facility in Point Tupper (Strum Consulting, 2022). The Bear Head Energy Green Hydrogen and Ammonia Production, Storage and Loading Facility EA, registered in 2023, mentioned a record of one SAR, olive-sided flycatcher, within their Point Tupper project area (Stantec, 2023).

The citizen science database eBird (2025) contained records of 158 species within approximately 11 km of the Study Area, including nine SAR and 34 SOCI. These records were distributed between five eBird "hotspots" located between the Port Hawkesbury waterfront and Long Pond, just north of the Canso Causeway. The nine SAR identified were as follows:

- Barrow's goldeneye (*Bucephala islandica*) – "Special Concern" (COSEWIC), "Special Concern (SARA), "S1N, SUM" ACCDC)
- Barn swallow (*Hirundo rustica*) – "Special Concern" (COSEWIC), "Endangered" (NS ESA), "Threatened" (SARA), "S3B" (ACCDC)
- Harlequin duck (*Histrionicus histrionicus*) – "Special Concern" (COSEWIC), "Endangered" (NS ESA), "Special Concern" (SARA), "S2N" (ACCDC)
- Horned grebe (*Podiceps auritus*) – "Special Concern" (COSEWIC), "Special Concern" (SARA), "S3N, SUM" (ACCDC)
- Peregrine falcon (*Falco peregrinus*) – "Vulnerable" (NS ESA), "Special Concern" (SARA), "S1B, SUM" (ACCDC)
- Red-necked phalarope (*Phalaropus lobatus*) – "Special Concern" (COSEWIC), "Special Concern: (SARA), "S2S3M" (ACCDC)
- Ross' gull (*Rhodostethia rosea*) – "Endangered" (COSEWIC), "Threatened" (SARA), "SNA" (ACCDC)
- Rusty blackbird (*Euphagus carolinus*) – "Special Concern" (COSEWIC), "Endangerd" (NS ESA), "Special Concern" (SARA), "S2B" (ACCDC)
- Yellow-breasted chat (*Icteria virens)* – "Endangered" (COSEWIC), "Endangered" (SARA), "SNA" (ACCDC

Barrow's goldeneye, harlequin duck, and horned grebe overwinter in this region and may be found in the Strait of Canso during the winter months. Peregrine falcon and rusty blackbird breed in Nova Scotia, although suitable breeding habitat for these species was not identified within the Study Area and these records were primarily during fall or spring migration. Barn swallows were recorded in the Strait of Canso during their breeding season and may use the area for foraging, although suitable breeding habitat was not identified within the Study Area. Red-necked phalarope, Ross' gull, and yellow-breasted chat do not breed in Nova Scotia, and these records are presumably migrants.

7.4.5.4 Field Survey Methodology

Several survey methods were employed to assess avian abundance and avian species diversity within the Study Area and more broadly within the Strait of Canso. Although this is not a wind power project, survey methods for wind power projects are the highest standard. Therefore, survey methods were based on the protocols recommended in CWS' Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds (2007) and Environment and Climate Change Canada's Canadian Wildlife Service (Atlantic Region) Wind Energy and Birds Environmental Assessment Guidance Update (2022), unless otherwise stated. Table 7.47 provides an overview of field surveys conducted during 2023 and 2024.

Table 7.47: 2023 and 2024 Avifauna Field Survey Overview

Survey Type	Season	Dates Surveyed
Diurnal Movement (Paired dawn and dusk surveys)	Spring	• April 25/26, 2024 • May 8/9, 2024
Diurnal Movement (Paired dawn and dusk surveys)	Summer	• June 3/4, 2023 • June 28/29, 2023 • July 12/13, 2023 • August 3, 2023 • August 29/Sep 1, 2023 • June 27/28, 2024 • July 11/12, 2024
Diurnal Movement (Paired dawn and dusk surveys)	Fall	• September 22, 2023 • October 5/6, 2023 • October 19, 2023 • October 31, 2023 • November 15/17, 2023 • November 27/28, 2023
Breeding Bird	Summer	• June 14, 2024 • July 19, 2024
Nightjar	Summer	• July 5, 2024 • July 16, 2024

A memo outlining field survey methodology was shared with CWS and NSNR on January 28, 2025.

2023/2024 Diurnal Movement Surveys

Diurnal movement surveys were conducted to collect data on the daily movements of birds within the Strait of Canso. A total of 30 3-hour surveys were conducted between June 2023 and July 2024, split between two vantage points located on either side of the Strait of Canso (Drawing 7.25). There were 12 surveys conducted during summer, 14 in fall, and four in spring. Each survey round consisted of two 3-hour surveys (one beginning at sunrise and one beginning three hours before sunset) which were completed in tandem. Survey locations were selected based on their ability to provide a clear, open view of the Strait, as well as their proximity to the proposed Project infrastructure. When possible, the west-facing survey (western vantage point) was completed at dawn and the east-facing survey (eastern vantage point) was completed at dusk, so that the sun was at the surveyors' back and did not impede their view. Data was collected in an Excel spreadsheet on a tablet, in which surveyors noted the number of birds observed, their position in the Strait of Canso, direction of travel, and approximate flyover height.

2024 Breeding Bird Surveys

Breeding bird point count surveys were used as a means of identifying species which may be breeding within the terrestrial portion of the Study Area. Point counts conducted were 10 minutes in duration and were completed in June and July (Table 7.47) at predetermined locations on the Point Tupper and the Steep Creek sides of the Study Area (Drawing 7.25). All visual and auditory observations of birds were recorded for each point count location, along with relevant behavioural information (such as breeding evidence). Point count locations were determined using terrestrial habitat resources (Section 7.4.1) and in consultation with an expert birder, with the objective of representing the diversity of habitat within the Study Area, while maintaining safety and adjusting locations to accommodate physical constraints. The species observed, number of individuals, and their approximate distance from the observer was recorded, along with the estimated height and flight direction of flyovers. Observers remained still and silent for the duration of the survey interval. Surveys were completed from 30 minutes before, through four hours after dawn to observe the most active time of day for passerine species. Survey opportunities were maximized for clear weather and minimal wind within the appropriate timeframe, based on CWS guidance. Target species of point counts are primarily passerines, identified audibly, but all species identified were recorded.

2024 Nightjar Surveys

Nightjar surveys were 6 minutes in duration and completed at predetermined locations on the Point Tupper and the Steep Creek sides of the Study Area (Drawing 7.25). As the target species, all nightjars (common nighthawks and eastern whip-poor-wills) heard or observed were recorded with information on direction, behaviour (if applicable) and distance from the observer. Surveys were conducted in July 2024 from dusk until two hours after dusk on clear nights with minimal wind and no precipitation. Nightjar surveys were conducted following the Canadian Nightjar Survey Protocol 2019 (Knight et al., 2019).

7.4.5.5 SAR Habitat Modelling Methodology

Based on the ten species of avian SAR observed within the Study Area and regulatory recommendations, habitat modelling was completed for SAR observed and heard during field and radar/acoustic surveys (i.e., priority species that may be breeding within the Study Area). Habitat preferences for these species were incorporated into a GIS model, which was used to estimate the quality and quantity of habitat for each species. The model criterion for each species is summarized below. Results of each model can be reviewed in Drawings 7.26 to 7.35.

Barn Swallow (*Hirundo rustica*)

Barn swallows forage over a wide range of open and semi-open habitats including natural and anthropogenic environments. They adapt often to nesting on anthropogenic structures such as bridges which were identified in the Study Area and buffered 600 m to allow for their respective foraging range. Open wetlands and open landcover types (e.g., blueberries or barren, brush, harvests, urban, landfill, quarry, transport corridor, utility corridor, water) were considered as valuable habitat in terms of foraging and included in the model (NSNR, 2020a).

Barrow's Goldeneye (*Bucephala islandica*)

For coastal, overwintering waterfowl (e.g., Barrow's goldeneye and harlequin duck) a 14 m buffer was created on the coastline in proximity to the Study Area. The coastline included was confirmed to be rocky using available satellite imagery resources. Buffering the coast also included any proximal headlands. No bays or bodies of water that would serve as a thermal refuge were identified. No thermal discharge was identified. Areas north of the Canso Causeway (e.g., Archie Pond and Long Pond) were not included due to distance from the Study Area.

Bobolink (*Dolichonyx oryzivorus*)

Habitat in the Study Area does not appear to meet the grassland habitat requirements that can be described by vegetation association (e.g., grass) as well as by land use (e.g., grasslands and pasture) as criteria referenced in the recovery plan (ECCC, 2022a). Open habitats were also defined as areas where the combined coverage of trees and tall shrubs (over 1 m) is less than 60%.

Canada Warbler (*Wilsonia canadensis*)

To account for moist forests with a dense, deciduous shrub layer, complex understory, and available perch trees, the WAM was filtered to include values up to 0.5 m. Forest data was queried to include areas where alders compose 75% or more of the crown closure (FORNON code 39). The leading species (SP1) attributes of red maple, balsam fir, and black spruce were used. Furthermore, to account for wetland features and their respective edge habitat, the Canadian Wetland Inventory (CNWI) data was included (ECCC, 2016a).

Including mixedwood and deciduous stands with tall trees >12 m would add significant amounts of habitat and likely cause an over estimation; therefore, they were excluded from the model.

Chimney Swift (*Chaetura pelagica*)

Habitat characteristics that are preferred by chimney swift are mainly urban areas that have access to chimneys, grain towers, or other form of cavities. Rural forested areas are atypical; however, cavities are mainly found in dead trees/forest and windthrow areas which can be habitable by chimney swifts. There were no such areas identified in the Nova Scotia forestry and landcover datasets within the Study Area. Chimney swifts are also known to inhabit cavities in trees that have a diameter above 50 cm. All treed stands in the Study Area have an average total diameter below 50 cm and therefore were not included as a parameter in the analysis. Due to the observation of chimney swift in the Study Area, areas of dead stands were mapped for reference. Areas within 300 m of wetlands were also mapped because 60% of the main insect orders consumed by chimney swifts are associated with wetlands (ECCC, 2023; NSNR, 2023). Dead trees with developed cavities may also exist within wetlands due to the elevated water table (NSNR, 2023). The habitat model is likely an over estimation due to the difficulty of filtering for old growth forest and hallowed out snags, as well as not being able to identify trees with a diameter at breast height of 50 cm at a desktop level.

Common Nighthawk (*Chordeiles minor*)

Open ground/clearings for nesting and foraging (i.e., sandy areas, open forests, grasslands, wetlands, barrens and other rocky areas) were considered by manual classification. A buffer of 10 m was included on the road network/unpaved forestry roads. The nearby quarry may offer appropriate habitat. The CNWI was filtered to include only open wetland types (e.g., bog, bog or fen, fen, marsh). The land cover types of urban, landfill, quarry, transport corridor, utility corridor, or blueberries or barren were filtered (ECCC, 2016b).

Evening Grosbeak (*Coccothraustes vespertinus*)

The forest inventory was used where the leading species (SP1) matched the attribute of large tooth aspen and trembling aspen. None of the latter were found in the Study Area. Since nesting occurs in large mature mixedwood stands with high percentages of fir, spruce, tamarack, pine, and aspen these were filtered this from SP1 to include all pine, fir, and spruce species in addition to tamarack that composed greater than 50% but less than 70% of a given stand. Harvests were included from the land cover dataset (ECCC, 2022b).

Harlequin Duck – Eastern Population (*Histrionicus histrionicus*) pop. 1

For coastal, overwintering waterfowl (e.g., Barrows Goldeneye and Harlequin Duck) a buffer was created on the coastline in proximity to the Study Area. The coastline included was confirmed to be rocky using available satellite imagery resources. Buffering the coast also included any proximal headlands. No bays or bodies of water that would serve as a thermal refuge were identified. No thermal discharge was identified. Areas north of the Canso Causeway (e.g., Archie Pond and Long Pond) were not included due to distance from the Study Area.

Olive-sided Flycatcher (*Contopus cooperi*)

Forest data was queried to include the leading species (SP1) attribute of black spruce, red spruce, white spruce, Scots pine, red pine, jack pine, and eastern hemlock, if present. Harvest land cover class was included as well as the CNWI data. Burn data was included as habitat but no burn areas have been recorded in the Study Area. The nearest burn area is approximately 2.2 km from the edge of the Study Area (NSNR, 2021f).

Peregrine Falcon - anatum/tundrius (*Falco peregrinus* pop. 1)

For peregrine falcon, slope was calculated from a bare earth surface model, and areas of high slope that were identified as rocky or barren from satellite imagery were included.

7.4.5.6 Remote Sensing Methodology

Avian Radar Assessment

Avian radar assessments were undertaken during the fall 2023 and spring 2024 migratory periods. The objective of the avian radar assessments was to assess migratory bird activity in the airspace above the Study Area, and to categorize the movement height of birds in the Strait of Canso. An avian radar system (ARS) was deployed overlooking a portion of the Strait of Canso from September 25 to November 29, 2023, and was redeployed from March 27 to September 5, 2024. The ARS was a Simrad Halo 20+ pulse compression marine surveillance radar angled at 90°. This orientation allowed the radar to detect the height of targets with high precision.

One ARS was deployed with an off grid 12V system that was designed for optimal active monitoring and specificity in deployment. They were designed to charge and store energy using solar panels and a battery bank, while also powering the radar and associated equipment for data collection and remote communications. The systems in their entirety were designed to be mobile, so the movement of the ARS was possible throughout a season, if desired.

The ARS was deployed on the Melford Loop, which was directly adjacent to the coastline overlooking the Strait of Canso (Drawing 7.25). The deployment location was looking into the Study Area was chosen, which also provided a good line of site (relatively few trees in the immediate area) across the Strait of Canso and into the airspace where avifauna would pass through the Study Area. The site also ensures southern exposure for solar charging, sufficient cellular and satellite coverage for remote communications, and accessibility for spot checks. The ARS was deployed on the Melford Loop, which was directly adjacent to the coastline overlooking the Strait of Canso. The ARS was mounted off the ground (approximately 3 m) to minimize ground noise interference and lessen the impacts of local microtopography on data collection and clarity.

Avian radar assessment data was processed using the radR platform, an open-source platform designed for the processing of radar data for biological applications (Taylor et al., 2010). Outputs from this platform were then analyzed using Microsoft Excel. Standard settings for the identification of biological targets (BTs), such as birds and bats, were used. Targets reflected by the radar generated blips in the image of the radar scan. The radR platform helps filter sequential images of radar scans to identify blips that occur in the same area over at least four out of five scans. Should these constraints be met, a target is generated. BTs are most likely generated by birds, but could also be bats and insects, or even drones and planes. Weather occurrences, such as fog, rain, and low cloud cover, may cause interference with the radar (similarly to weather radar), which lowers the effectiveness of the system and reduces the reliability of the system's ability to detect birds. As such, data was excluded from the analysis when the minimum hourly rainfall was ≥ 0.5 mm. Rainfall data was obtained from ECCC's Port Hawkesbury Range Weather Station (ECCC, 2024b).

Avian Acoustic Assessment

In 2023, two autonomous recording units (ARUs), Wildlife Acoustic Song Meter 4s, were deployed in close proximity to the Study Area (Drawing 7.25): located at Englands Lake and the Melford Loop. The monitors were programmed to record from dusk until dawn with the intention of recording avian vocalizations during spring migration, the summer breeding season, and fall migration. The first monitor deployed near Englands Lake, located about 3 km southwest of the Study Area, from May 25, 2023, to November 22, 2023. The Englands Lake monitor is located within the RAA defined for avifauna. The RAA for avifauna includes the surrounding landscape, including Englands Lake, the Strait of Canso between Mulgrave and Middle Melford (see Section 7.4.5.13). The second monitor was deployed with the ARS near Melford Loop, and it recorded supplemental fall migration data between September 6, 2023, and November 2, 2023. The monitors were programmed to record from dusk until dawn with the intention of recording avian vocalizations during spring migration, the summer breeding season, and fall migration.

Avian Acoustic Monitor Data Processing

The acoustic data collected by the ARUs was run through BirdNET and Nighthawk, machine learning models that specialize in the detection and classification of avian vocalizations. The output files from these models were then brought into Raven Pro (Cornell Lab of Ornithology, 2022), a computer program specializing in the visualization and analysis of sounds, for manual analysis.

BirdNET

BirdNET is a machine-learning model developed by the Cornell Lab of Ornithology. BirdNET is capable of detecting over 3,000 species globally and was programmed to use eBird as its occurrence mask; the occurrence mask serves as a filter which either includes or excludes species based on their likelihood to occur in a given area (Cornell Lab of Ornithology, 2024; Kahl et al., 2021). The model detects and identifies avian vocalizations at the species-level, and assigns a confidence value to each detection, ranging from 0 to 1. The "confidence value" produced by BirdNET is not a true probability, but rather an expression of the model's own confidence in its prediction (Wood & Kahl, 2024). This model was designed for the analysis of daytime songs and calls and is not intended to be used for the analysis of avian nocturnal flight calls (NFCs). For the purposes of this analysis, BirdNET was programmed to only detect avian SAR and SOCI that may occur in Nova Scotia, filtering out non-SAR and SOCI and those that are unlikely to occur in this region. BirdNET was programmed with a confidence score floor of 0.3 to help reduce the likelihood of false positive detections. False detections may be attributed to a variety of factors, including an oversensitivity of the software in conjunction with environmental noise (i.e., wind, rain, ambient noise).

BirdNET results were provided to environmental scientists with experience in birding to complete a manual verification process, during which spectrograms and audio clips were analyzed visually and by auditorily. Manual verification was completed using Cornell Lab of Ornithology's Raven Pro software (version 1.6). Each detected vocalization was annotated 'Y' if the species-level identification made by the model was correct, or 'N' if the identification was incorrect.

The manual verification results were then fed into a logistic regression model custom-built using Python programming language. This model was built following guidelines outlined on the Cornell Lab website (Symes et al., 2023). The model was able to generate probability scores (the likelihood of a correct identification being made by the model) for some of the species identified. This is useful because the previously mentioned "confidence value" produced by the BirdNET model is not a true probability (Wood & Kahl, 2024). It should be noted that in instances where all verified detections were correct (annotated 'Y') or all verified detections were incorrect (annotated 'N') the model was unable to run because it requires at least two correct and two incorrect verifications to generate a probability.

The parameters used for the BirdNET detection included:

- Frequency range: 250 – 12000 Hz
- Length of detection: 3 s
- Minimum confidence score: 0.3

Nighthawk

The acoustic data was also run through Nighthawk, a deep learning model designed by researchers at Cornell Lab of Ornithology (Van Doren et al., 2023). The Nighthawk model was designed to detect and identify vocalizations made by nocturnally migrating birds and was trained using recordings from throughout the Americas. For the purposes of this analysis, Nighthawk was run in its own computer programming environment using Python programming language, and was set using the following default parameters:

- Model sample rate: 22050 Hz
- Model input duration: 1 s
- Hop size: 20% (percentage of the model input duration)
- Length of detections: 0.2 s

Unlike BirdNET, Nighthawk can assign a probability score to each detection it makes, which represents the likelihood of the model making a correct prediction. For this analysis, only detections with a probability score of 0.8 (80%) or above were considered.

The Nighthawk model is capable of identifying 82 bird species, although a species-level identification is not always possible (Van Doren et al., 2023). In instances where a species-level identification cannot be reached, the model may identify vocalizations to the order, family, or group level. The group level in this case refers to a subset of species with similar sounding NFCs. For example, the ‘ZEEP’ group consists of several similar-sounding warbler species that can be exceptionally difficult to separate. To limit false species-level identifications, Nighthawk was fed a list containing only species that are likely to occur in this region.

Like BirdNET, the output of Nighthawk is a series of text files containing all its detections and predictions for a given audio file input. The text files and audio files were then brought into Raven Pro (version 1.6) for manual verification. For each species identified by Nighthawk, 30 vocalizations (or all vocalizations if fewer than 30 were detected) were manually listened to by environmental scientists with experience in bird identification. The vocalizations were annotated ‘Y’ if the species-level identification made by the model was correct, or ‘N’ if the identification was incorrect.

7.4.5.7 Field Survey Results

2023-2024 Diurnal Movement Survey Results

A total of 30 3-hour surveys (total effort of 90 survey hours) were conducted between June 2023 and July 2024, during which 5,848 birds were observed, representing 65 species. The most commonly observed species was double-crested cormorant, which accounted for 42% of all observations. Other commonly observed species included herring gull (20%), Canada goose (*Branta canadensis*) (5%), surf scoter (4%), and American black duck (*Anas rubripes*) (3%). Taxonomically or behaviorally similar bird species were grouped into categories to allow for easier analysis and visualization of data (Figure 7.3). Cormorants were assigned their own category due to their high abundance.

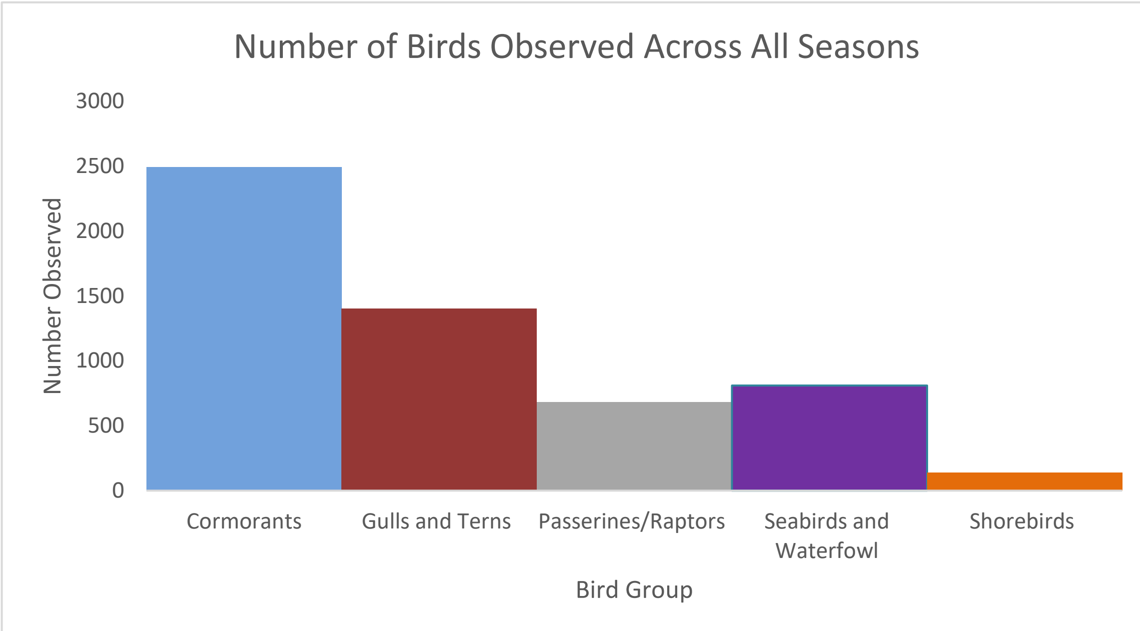

Figure 7.3: The most commonly observed bird groups in the Strait of Canso between June 2023 and July 2024 across all seasons

Seasonally, 2,654 birds were observed during the fall (six paired surveys completed), 3,055 birds were observed during the summer (seven paired surveys completed), and 247 birds were observed during the spring (two paired surveys completed) (Figure 7.4). Double-crested cormorants were regularly observed moving in and out of the Strait of Canso during the summer months, suggesting a breeding colony may be present in the area. Observers noted a trend during the summer months in which cormorants typically flew north towards the Canso Causeway in the morning, and south, away from the causeway in the evening.

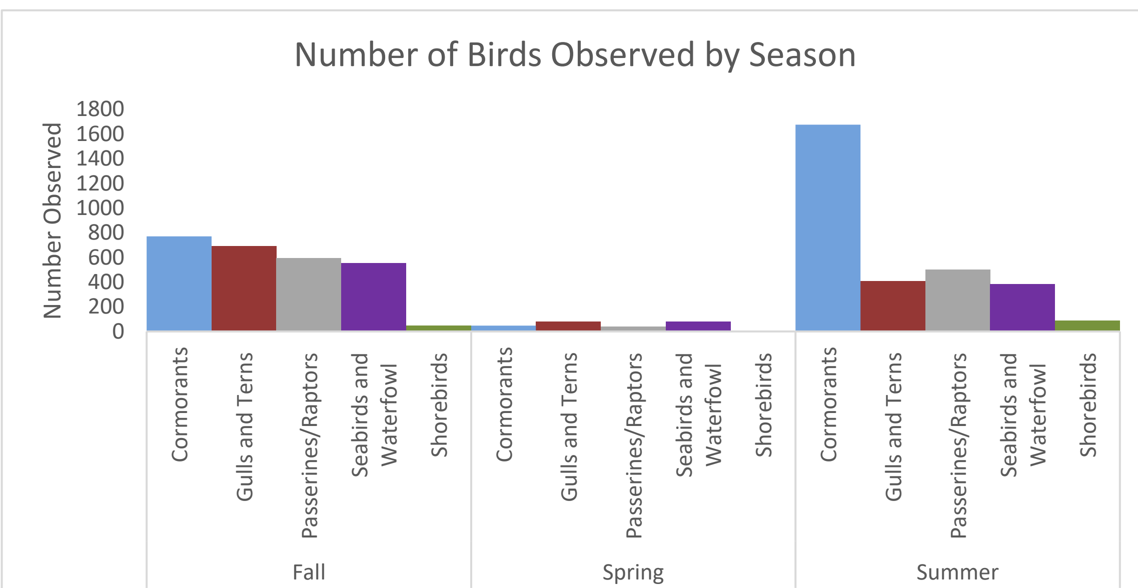

Figure 7.4: The most observed bird groups in the Strait of Canso by season

Five SAR and 20 SOCI were observed during the diurnal surveys (Table 7.48).

Table 7.48: SAR and SOCI Species Observed During 2023-2024 Diurnal Movement Surveys

Common Name	Scientific Name	COSEWIC Status[1]	SARA Status[1]	NS ESA Status[2]	NS S-Rank[3]
American Robin	*Turdus migratorius*	-	-	-	S5B, S3N
Barn Swallow	*Hirundo rustica*	Special Concern	Threatened	Endangered	S3B
Barrow's Goldeneye	*Bucephala islandica*	Special Concern	Special Concern	-	S1N, SUM
Black-headed Gull	*Chroicocephalus ridibundus*	-	-	-	S3N
Black-legged kittiwake	*Rissa tridactyla*	-	-	-	S2S3B
Bufflehead	*Bucephala albeola*	-	-	-	S3S4N
Chimney Swift	*Chaetura pelagica*	Threatened	Threatened	Endangered	S2S3B, S1M
Common Nighthawk	*Chordeiles minor*	Special Concern	Special Concern	Threatened	S3B
Common Eider	*Somateria mollissima*	-	-	-	S2B, S2N, S4M
Common Goldeneye	*Bucephala clangula*	-	-	-	S4B, S4N, S5M
Common Murre	*Uria aalge*	-	-	-	S1?B
Common Tern	*Sterna hirundo*	NAR	-	-	S3B
Greater Yellowlegs	*Tringa melanoleuca*	-	-	-	S3B, S4M
Harlequin Duck – Eastern Population	*Histrionicus histrionicus pop. 1*	Special Concern	Special Concern	Endangered	S2N
Northern Gannet	*Morus bassanus*	-	-	-	SHB
Red-breasted Merganser	*Mergus serrator*	-	-	-	S3B, S4S5N, S5M
Ruddy Duck	*Oxyura jamaicensis*	-	-	-	S1B
Pine Siskin	*Spinus pinus*	-	-	-	S3
Semipalmated Plover	*Charadrius semipalmatus*	-	-	-	S1B, S4M

Common Name	Scientific Name	COSEWIC Status[1]	SARA Status[1]	NS ESA Status[2]	NS S-Rank[3]
Semipalmated Sandpiper	*Calidris pusilla*	-	-	-	S3M
Spotted Sandpiper	*Actitis macularius*	-	-	-	S3S4B, S5M
Surf Scoter	*Melanitta perspicillata*	-	-	-	S2N, S4M
Whimbrel	*Numenius phaeopus*	-	-	-	S2S3M
White-winged Scoter	*Melanitta deglandi*	-	-	-	S2N, S4M
Willet	*Tringa semipalmata*	-	-	-	S3B

Source: (ACCDC, 2025); [1] (ECCC, 2024e); [2] (NSNR, n.d.-b); [3] (ACCDC, 2025)

During the surveys, data on movement patterns of observed birds was recorded. In terms of height, most birds (42%) were observed travelling between 2 m and 50 m above ground/water level. This trend was consistent across all seasons. Gulls and terns accounted for approximately 45% of birds observed travelling within this height bracket, while cormorants accounted for 30%. The second most common height bracket was ‘skimming’, which consisted almost entirely of (82%) movement from double-crested cormorants. The proposed transmission line towers would sit at 210 m tall with the lowest conductor attachment at 175 m, posing the biggest risk to birds flying in the 100 m to 200 m height bracket and the 200 m+ height bracket above ground/water level. The surveys showed that birds flying within the 100 m to 200 m height bracket represented approximately 6% of all observations, and species composition consisted of a mix of different bird groups. Birds flying at a height of 200 m or more accounted for approximately 4% of all observations, and species composition at this height was dominated by the seabirds and waterfowl category. A single large flock of migrating surf scoters observed in September 2023 accounted for 88% of the birds in this height bracket (Figure 7.5).

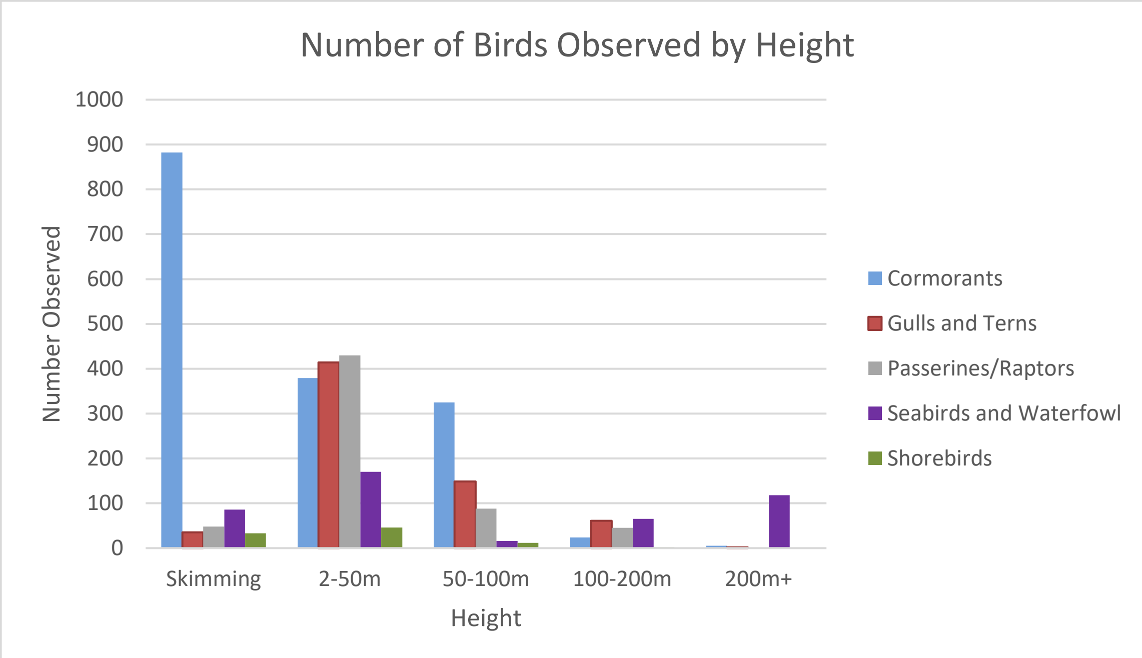

Figure 7.5: Height of birds observed crossing the Strait of Canso between April 2023 and July 2024 across all seasons

Most birds (44%) were observed crossing on the far east side of the Strait. Double-crested cormorants represented 39% of the birds observed in this area of crossing, while gulls and terns represented 27%. A smaller peak (18%) was observed in the center west category, which consisted primarily of movement from double-crested cormorants (71%). The other areas of crossing were similar in terms of the number of birds observed and overall species composition (Figure 7.6). These trends were similar across all seasons.

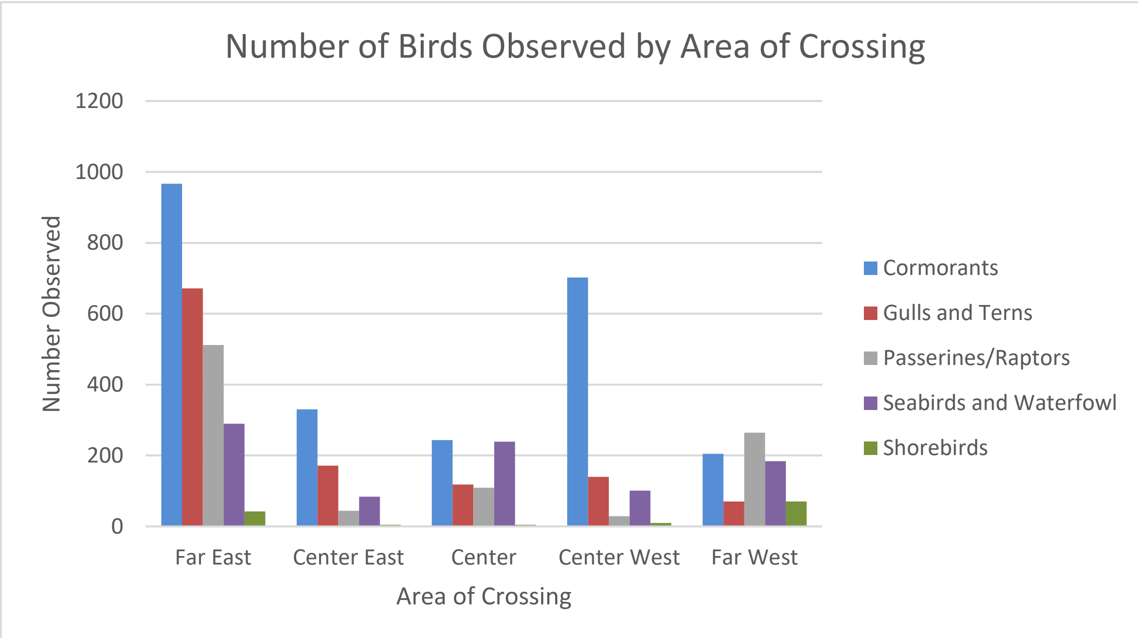

Figure 7.6: Area of crossing of birds observed in the Strait of Canso between April 2023 and July 2024 across all seasons

In terms of direction of travel, most birds (43%) were observed moving in the "other" category, which represents birds that were either crossing the Strait directly or not following a clear flight pattern (circling, moving back and forth, etc.). An additional 31% of birds were observed moving from south to north, while 26% moved from north to south (Figure 7.7). This trend differed slightly by season, with north to south being the dominant movement category in fall, and the "other" category dominating in both spring and summer.

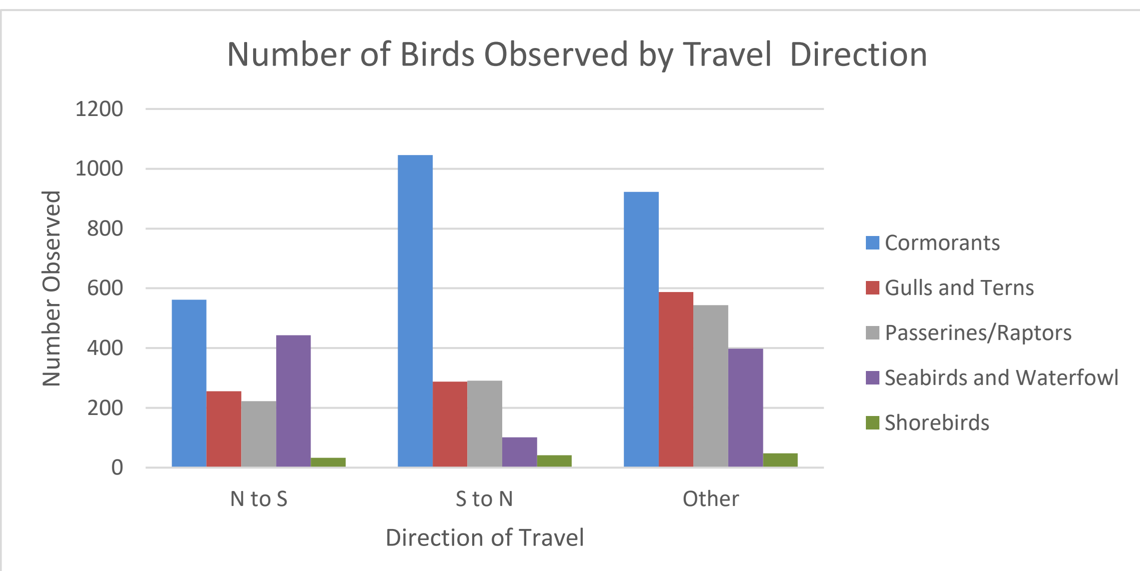

Figure 7.7: Travel direction of bird movement within the Strait of Canso between April 2023 and July 2024 across all seasons

Breeding Bird Surveys

Two rounds of breeding bird surveys were conducted within the Study Area on June 14 and July 19, 2024. In total, 15 10-minute point counts were completed (total effort of 2.5 survey hours) covering a wide range of habitat types and an even spatial distribution (Drawing 7.25). A total of 265 individual birds were observed, representing 56 species. The most commonly observed species were American robin, magnolia warbler (*Setophaga magnolia*), American crow (*Corvus brachyrhynchos*), and red-eyed vireo (*Vireo olivaceus*) (Table 7.49).

Table 7.49: Total Observations by Bird Group – 2024 Breeding Bird Point Count Surveys

Bird Group	# Individuals	# Species
Waterfowl	3	1
Shorebirds	6	3
Other Waterbirds	2	2
Diurnal Raptors	2	2
Nocturnal Raptors	0	0
Passerines	237	44
Other Landbirds	15	4
Total	**265**	**56**

SOCI observed within the Study Area included bay-breasted warbler, purple finch, and Wilson's warbler (*Cardellina pusilla*). SAR observed was limited to one olive-sided flycatcher, heard singing in a treed swamp just outside the southern boundary of the Steep Creek side of the Study Area.

Nocturnal Bird Surveys

Nocturnal surveys for nightjars were completed on July 5 and 16, 2024. Three surveys were completed within the Study Area, during which no nocturnal species were observed.

Incidental Surveys

Across all survey types, 355 individual birds were observed incidentally (i.e. non-target species observed during targeted surveys or birds observed while travelling between survey locations), consisting of 35 different species (Table 7.50). During the 2023 and 2024 diurnal movement surveys, 319 birds were observed incidentally, representing 23 different species. While conducting diurnal movement surveys, surveyors made note of birds that were present in the area but not necessarily moving in or around the Strait (e.g., songbirds foraging in the bushes). The most observed incidental species were song sparrow (*Melospiza melodia*), European starling (*Sturnus vulgaris*), and American goldfinch (*Spinus tristis*). No SAR or SOCI were observed incidentally.

Incidental observations were also recorded during breeding bird and nocturnal bird surveys, while walking or driving between point count locations. A total of 36 birds were recorded incidentally during these surveys, representing 15 different species. SAR observations included a group of approximately 20 common nighthawks, and one peregrine falcon that was observed just north of the Study Area in the Town of Mulgrave.

Table 7.50: Total Observations by Bird Group – 2023/2024 Incidental Bird Observations (All Survey Types)

Bird Group	Group #	# Individuals	# Species
Waterfowl	1	2	1
Shorebirds	2	1	1
Other Waterbirds	3	1	1
Diurnal Raptors	4	2	2
Nocturnal Raptors	5	0	0
Passerines	6	325	26
Other Landbirds	7	24	4
Total		**355**	**35**

7.4.5.8 Habitat Trends with Avian Abundance and Species Diversity

The Study Area supports a variety of avian species and features several different habitat types, including softwood dominant forest, mixedwood forest, clearings, industrial land, and coastline. During 2024 breeding bird surveys, survey locations (Drawing 7.25) that represented mixedwood forest, wetland, and edge habitat (i.e., forested habitat on the edge of a clear-cut, wetland, or open area) had the highest abundance of birds and the highest species diversity.

During the first round of 2024 breeding bird surveys, survey locations with higher avian abundance and species diversity consisted of mixedwood forest as well as wetlands and wet areas. One SAR, an olive-sided flycatcher, was observed in a treed swamp outside of the Study Area boundary. Species abundance and diversity was also found to be high in open/disturbed areas.

During the second round of 2024 breeding bird surveys, survey locations with higher avian abundance and species diversity consisted primarily of younger softwood dominant forest, older and new clear-cut areas at or near the survey locations, and roadside areas near industrial land.

During the 2024 nightjar surveys, both survey points were open, disturbed, roadside areas. No nightjars were observed during the surveys, although an incidental observation of 20 common nighthawks was recorded on the drive to one of the survey locations. This observation was also made in an open, disturbed, roadside area.

7.4.5.9 Probable and Confirmed Breeding in and Near the Study Area During Field Surveys

During the 2023 and 2024 field seasons, there were several observations of probable and confirmed breeding evidence, as per the MBBA breeding evidence codes (Birds Canada, n.d.). None of the observations involved SAR or SOCI.

Probable and Confirmed Breeding Evidence – 2023 and 2024 Diurnal Movement Surveys

Probable breeding behaviour:

- Black guillemot (*Cepphus grille*): a pair was observed in suitable breeding habitat.
- Spotted sandpiper: a pair was observed in suitable breeding habitat.

Confirmed breeding behaviour:

- Belted kingfisher (*Megaceryle alcyon*): a pair was observed on many occasions at the diurnal movement survey location (eastern vantage point) throughout the breeding season. Defensive behaviour and food carrying behaviour was observed.

Probable and Confirmed Breeding Evidence - 2024 Breeding Bird Surveys

Probable breeding behaviour:

- Common yellowthroat (*Geothlypis trichas*): agitated behaviour or anxiety calls of an adult were observed.
- Yellow-rumped warbler (*Setophaga coronata*): a pair was observed in suitable nesting habitat.

Confirmed breeding behaviour:

- Osprey: a pair was observed tending to an active nest.
- Song sparrow: an adult was observed building a nest or carrying nesting materials.

Overall, it is important to note that any other species observed in appropriate breeding habitat during the breeding/nesting season could be considered as possible breeders.

7.4.5.10 SAR Habitat Modeling Results

Following a review of desktop resources and the completion of field assessments, habitat models for observed SAR were constructed as described in section 7.4.5.5.

Table 7.51 lists all avian SAR observations and the amount of habitat within the Study Area that the model calculated as predictive habitat.

Table 7.51: SAR Habitat Modelling Results – Amount of SAR Habitat by Species within the Study Area

Species	Scientific Name	Amount in Study Area (ha) [1]	% of Study Area
Barn swallow	*Hirondelle rustique*	0	0%
Barrow's goldeneye	*Bucephala islandica*	3.76	2.05%
Bobolink	*Dolichonyx oryzivorus*	0	0%

Species	Scientific Name	Amount in Study Area (ha) [1]	% of Study Area
Canada warbler	*Cardellina canadensis*	6.22	3.40%
Chimney swift	*Chaetura pelagica*	41.39	22.60%
Common nighthawk	*Chordeiles minor*	38.20	20.86%
Evening grosbeak	*Coccothraustes vespertinus*	54.63	29.84%
Harlequin duck	*Histrionicus histrionicus*	3.76	2.05%
Olive-sided flycatcher	*Contopus cooperi*	57.12	31.20%
Peregrine falcon	*Falco peregrinus*	0	0%

[1]Study Area = 183.1 ha.

The SAR habitat models did not predict any potential habitat for barn swallow, bobolink, or peregrine falcon (anatum/tundrius) within the Study Area. Potential habitat for these species was predicted outside of the Study Area as shown on Drawings 7.26 to 7.35.

Further details on habitat suitability and SAR observations will be included in subsequent sections of this report. The results of the SAR habitat modelling are shown on Drawings 7.26 to 7.35.

7.4.5.11 Remote Sensing Results

Avian Radar Assessment

Data collected by the ARS for the 2023 fall monitoring period and 2024 spring monitoring period were analyzed to provide the number of biological target (nBTs) by date, wind direction, and height. Data was divided into three monitoring periods: fall (September 25 to November 30, 2023), spring (March 27 to May 31, 2024) and summer/fall (June 1 to September 7, 2024).

The ARS identified 1,322 BTs during the fall 2023 monitoring period (September 25 to November 30). Most of these BTs were detected on October 21, 2023 (nBTs = 523), followed by a large number of detections on November 11, 2023 (nBTs = 529). Most targets detected during the 2023 fall monitoring program were between the heights of 250 m to 2,000 m. The largest number of BTs were detected between 500 m and 1,000 m (nBTs = 501).

The ARS identified 1073 BTs during the spring 2024 monitoring period (March 27 to May 31, 2024). Most of these BTs were detected on March 30 and May 9, nBTs = 428 and 239 respectively. Most targets detected during the 2024 spring monitoring program were between 250 to 3,000m and the largest number of BTs were detected between 250 m and 500 m (nBTs = 257).

The ARS identified 3,657 BTs during the summer/fall 2024 monitoring period (June 1 to September 7, 2024). Because the 2024 monitoring period continues into August and early September, the dataset was included with the summer months to present both summer breeding and early fall migration data. Most of these BTs occurred on June 24 (nBTs = 912), with smaller sporadic spikes on other dates. In the latter half of the monitoring period, the highest BT detection occurred on July 29 (nBTs = 364) with another spike on August 4 (nBTs = 331). Most targets were between the 250 m to 3,000 m height bins. The largest number of BTs occurred within the 500 m to 1,000 m height range.

The data indicates that avian migration activity was highest in early March and dropped later in the season. For fall migration, the activity was sporadic with spikes in late July, early August, late October, and early November.

The results of the 2023 and 2024 ARS monitoring campaign suggest that avian migration activity occurred stochastically throughout the monitoring period. The ARS detected a small number of large migration events that would occur over the course of three to five consecutive days in the spring and fall. It is likely that migration conditions were favourable during these relatively short mass migration events.

Effect of Weather and Other Cues on Bird Migration

The stochastic nature of migratory bird activity observed by the avian radars at both locations is likely attributable in large part, to weather, as it is well understood that weather and atmospheric conditions influence bird migration activity (Richardson, 1990), especially wind speed and direction (Liechti & Bruderer, 1998). Most birds in the region migrate south in the fall from breeding grounds in northern North America, to wintering grounds in Central and South America. Likewise, in spring, most species make the reverse journey, moving northward. The Nova Scotia peninsula extends along a southwest to northeast axis, and birds in the province often migrate along this axis, following the Atlantic coast. As such, birds migrating in Nova Scotia during the spring likely also proceed in an easterly direction in addition to north. Likewise in the fall, migrating birds may move to the west and south as they head to southerly wintering grounds.

Cues that are theorized and studied to play a role in avian migration include the following:

- Wind speed and direction (Liechti & Bruderer, 1998)
- Photoperiod (Assadi & Fraser, 2021; Helm & Liedvogel, 2024; Robart et al., 2018; Sockman & Hurlbert, 2020)
- Temperature (Brisson-Curadeau et al., 2020; Burnside et al., 2021)
- Changes in Migration Cohort or Population Sizes (Miller-Rushing et al., 2008)
- Food Availability (Robart et al., 2019)
- Lunar cycle (Bonnet-Lebrun et al., 2021; Korpach et al., 2024; Norevik et al., 2019; Pyle et al., 1993)

A combination of cues may also play a role in avian migration, depending on the species (Helm & Liedvogel, 2024; Korpach et al., 2024; Pyle et al., 1993). It has known that internal species clocks play a role in avian migration, but correlating this with radar monitoring data proves challenging (Helm & Liedvogel, 2024; Korpach et al., 2024).

Figure 7.8 shows during the fall 2023 monitoring season the majority of BTs were detected by the ARU when the winds were from the east (40%) and the north (11%). These results are expected, given the expected movement of birds in a southwesterly direction during the fall migration period. It should also be noted that birds may show no wind selectivity during migration depending on their energy cost of travel and their need for migratory stopovers (Thorup et al., 2006). In these cases, migration cues may be related to other factors such as temperatures, food availability, and photoperiod (Brisson-Curadeau et al., 2020; Robart et al., 2019; Sockman & Hurlbert, 2020).

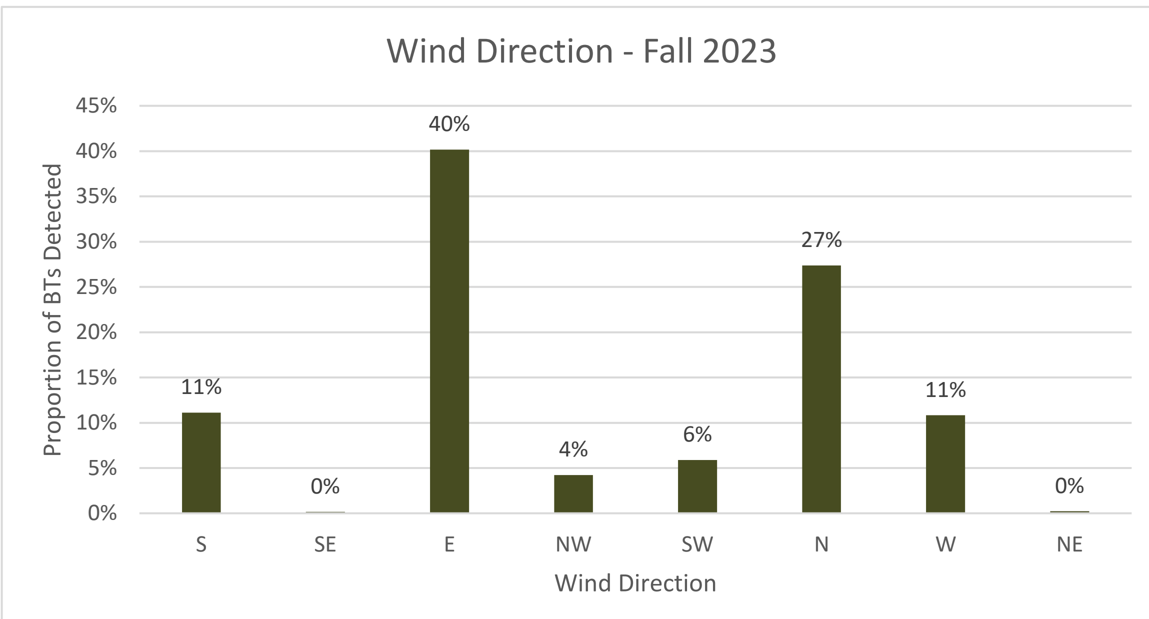

Figure 7.8: Wind Direction by Proportion of BTs Detected, Fall 2023

Figure 7.9 shows during the spring 2024 monitoring season the highest number of BTs were detected when the winds were from the southwest (40%) and the east (31%). Similar to the 2023 fall migration data, these results are align with the expectation that the majority of birds would move in a northeasterly direction to achieve their migratory goal (Brisson-Curadeau et al., 2020).

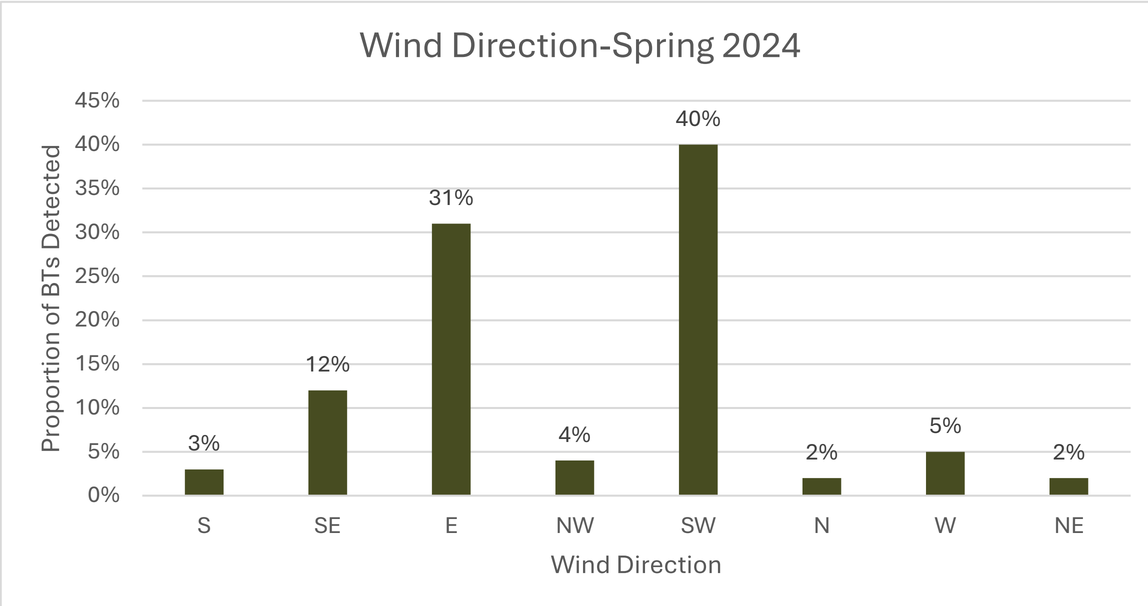

Figure 7.9: Wind Direction by Proportion of BTs Detected, Spring 2024

Figure 7.10 shows that most BTs detected during the summer/fall 2024 monitoring period observed the highest detections within wind directions coming from the southwest (32%), west (23%), and south (23%).

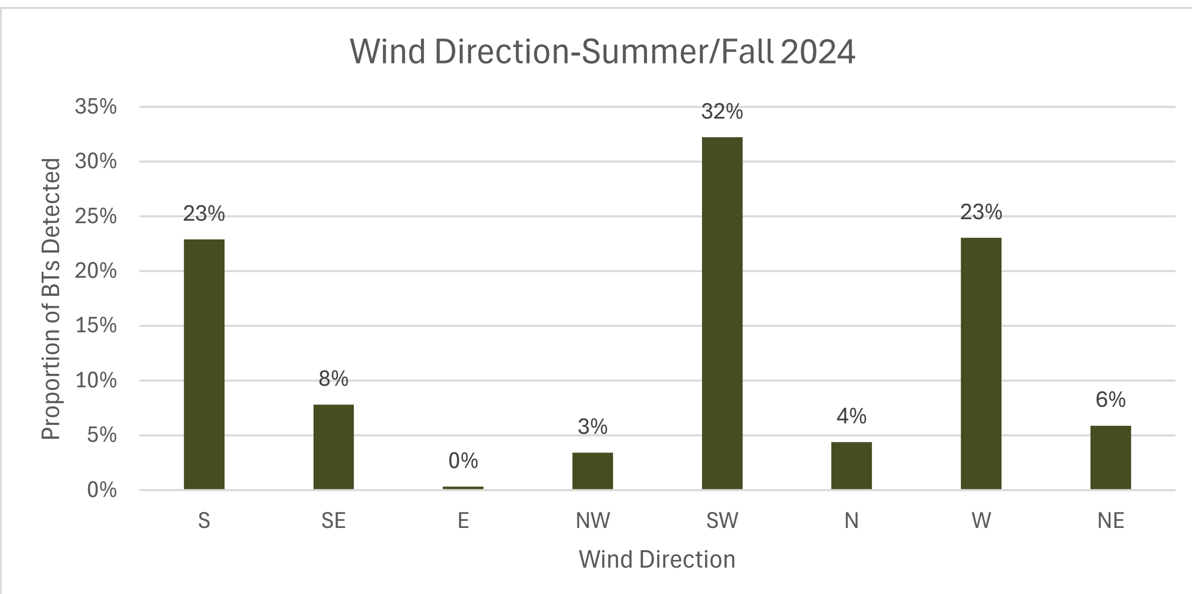

Figure 7.10: Wind Direction by Proportion of BTs Detected, Summer/Fall 2024

Figure 7.11 and 7.12 shows the number of BTs detected based on daily mean temperatures for the 2023 fall monitoring period and 2024 spring monitoring period. Bird migration can depend on consistent temperature cues to indicate migration departure, comparing daily mean temperature with ARS data may provide guidance on predicting peak migration events (Burnside et al., 2021; Klinner & Schmaljohann, 2020).

During the fall 2023 monitoring period, most migration events occurred when average temperatures were decreasing towards the seasonal low (Figure 7.11). Further, all migration events occurred before temperatures dropped below 0°C. Similarly, peak spring and summer events occurred when temperatures were increasing to a seasonal high during the 2024 spring and summer monitoring periods. These results are expected as climate change and unpredictable temperature fluctuations may cause later fall migration events and early spring migration movements (Brisson-Curadeau et al., 2020; La Sorte et al., 2015). Similarly, high activity during the summer months when temperatures were highest also suggest increased breeding bird activity outside of incubating in their nest (e.g., foraging) (Matysioková & Remeš, 2018).

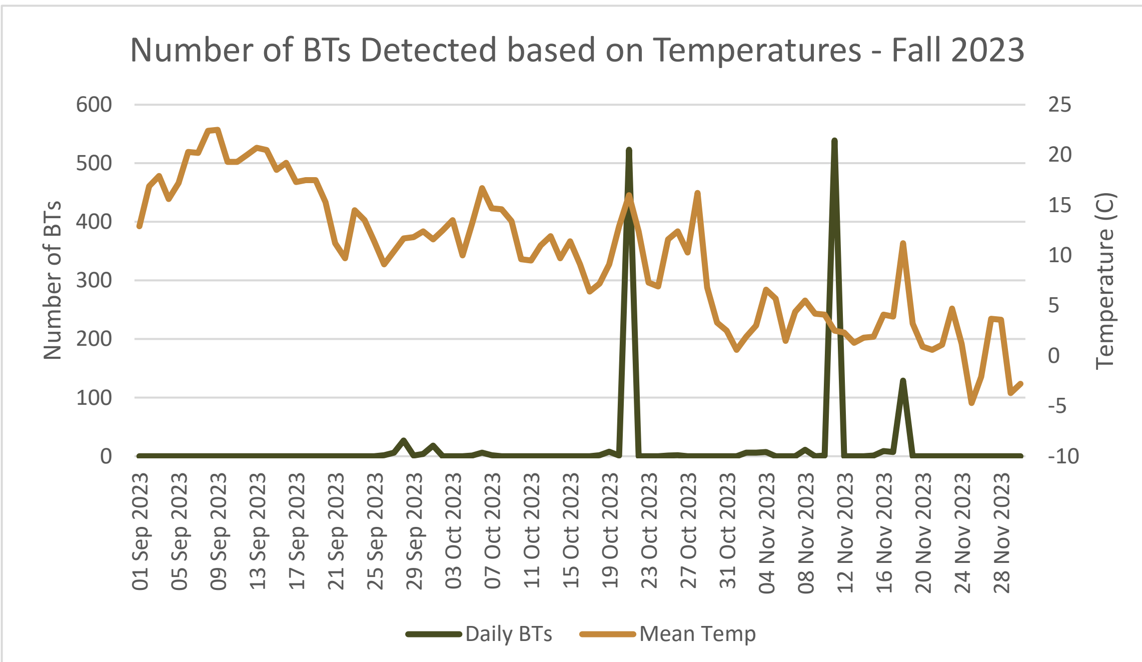

Figure 7.11: Number of biological targets detected during the 2023 ARS fall monitoring campaign compared to daily mean temperatures (°C)

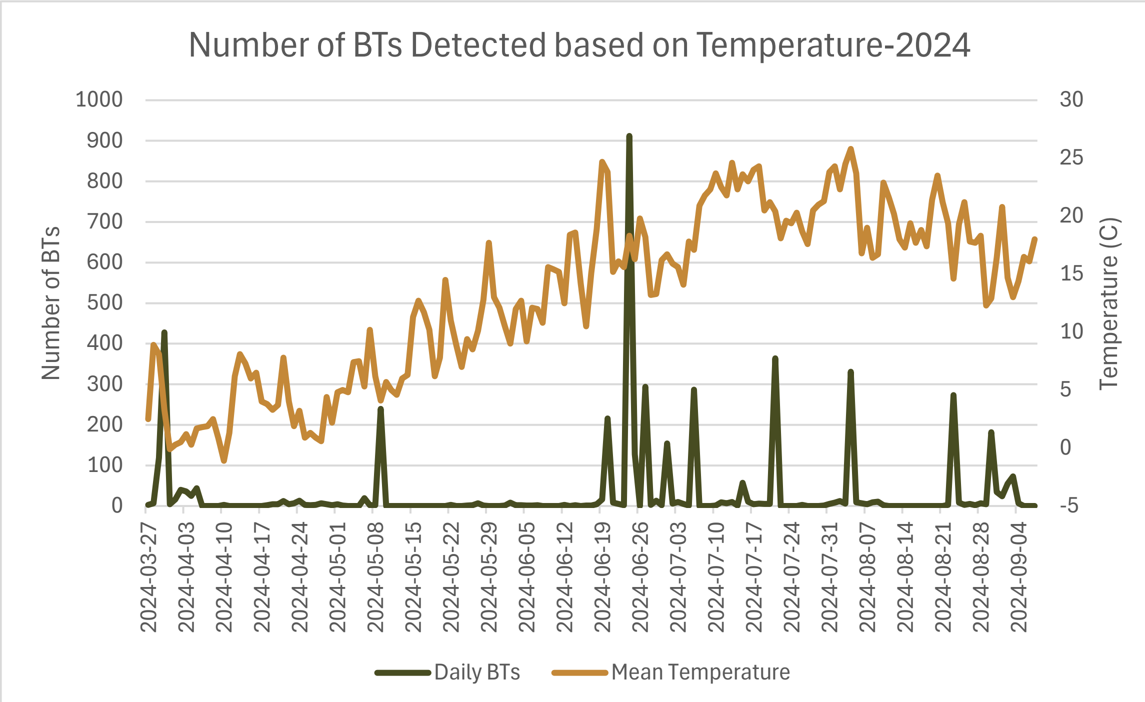

Figure 7.12: Number of biological targets detected during the 2024 ARS monitoring campaign compared to daily mean Figure 7.12: Number of biological targets detected during the 2024 ARS monitoring campaign compared to daily mean temperatures (°C)

Similar to the effects of wind direction on spring and fall migration movements, photoperiod may also pose as potential cues to peak migration events. Studies demonstrated that increased photoperiod resulted in birds displaying physiological preparations for migration, such as increases in hormonal secretions and fat depositions and signs of migratory restlessness (Jia et al., 2024; Robart et al., 2018). Birds may also demonstrate adaptations to changing photoperiod by anticipating migration based on experiences from previous years (Assadi & Fraser, 2021). Monitoring photoperiod over the seasons may provide insight into potential migration events into and out of Nova Scotia.

Figure 7.13 shows the highest spikes in BTs detection for fall 2023 occurred after daylight hours decreased below 12 hours and just before daylight hours were below nine hours. Similar, the 2024 monitoring period demonstrated high peaks of BTs when daily daylight hours were at a seasonal high, with multiple peaks during high daylight hours from June to early August (Figure 7.14). These results support expectations that birds use photoperiod as a predictive for migratory preparation and movement for both spring and fall migration (Assadi & Fraser, 2021; Robart et al., 2018). Longer daylight hours may also signify longer warm temperatures, which encourage both migration movements and increased breeding bird activity during peak breeding and migration months (Matysioková & Remeš, 2018; Robart et al., 2018).

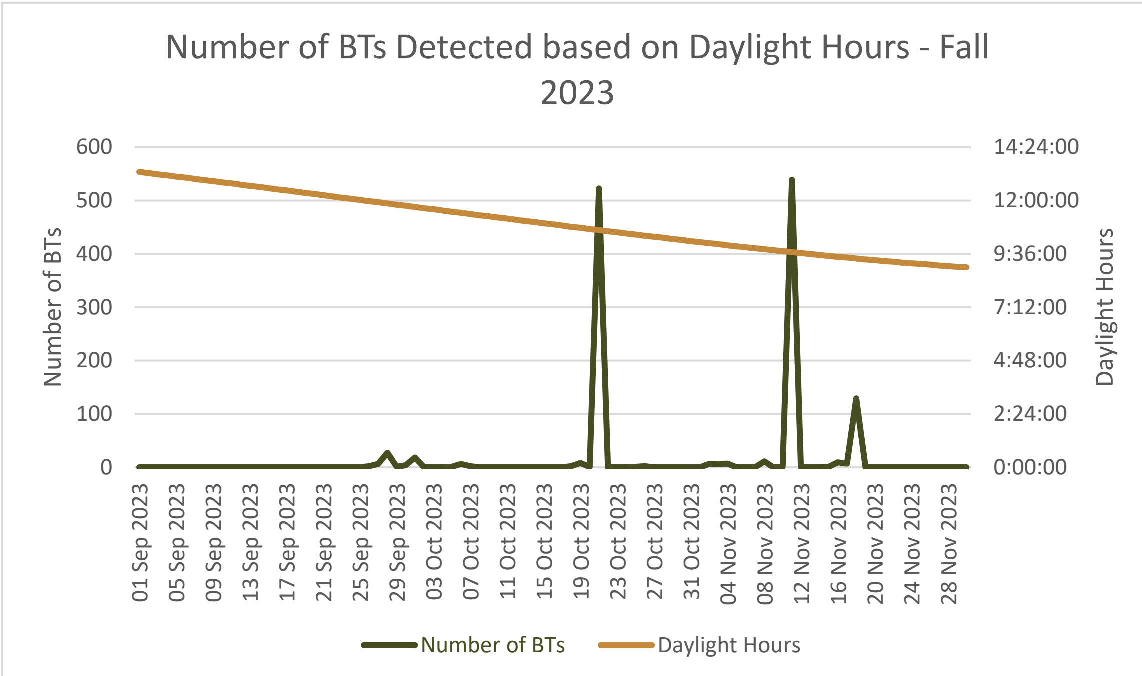

Figure 7.13: Number of biological targets detected during the 2023 ARS fall monitoring campaign compared to daily daylight hours

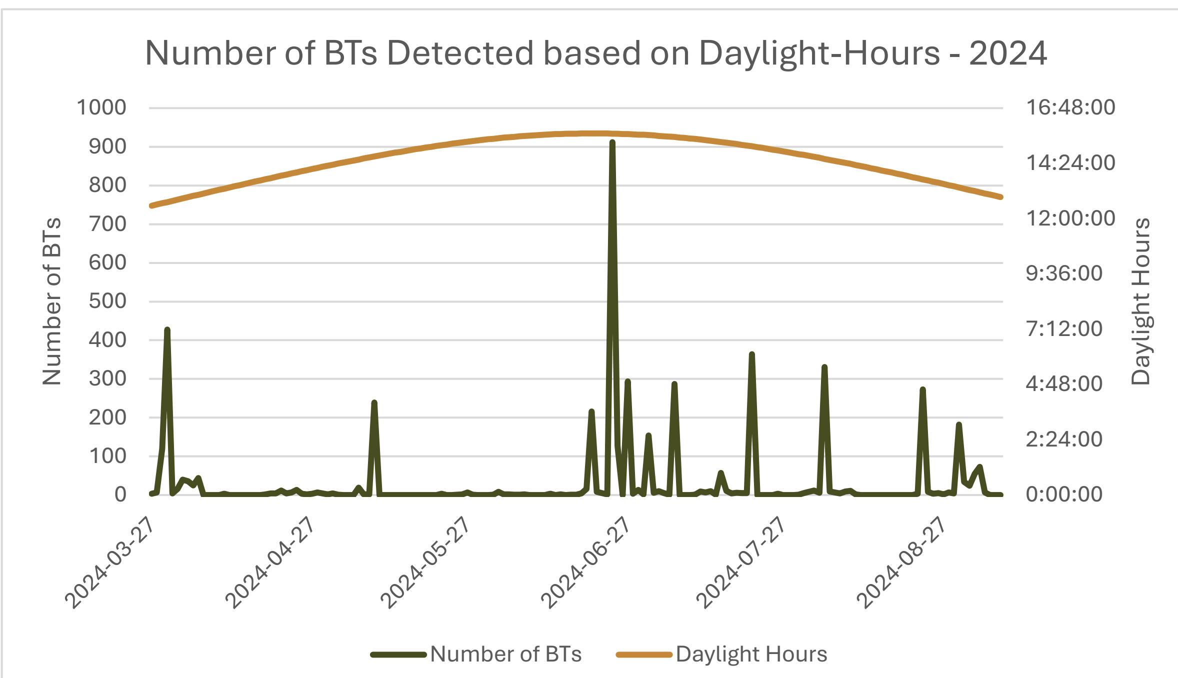

Figure 7.14: Number of biological targets detected during the 2024 ARS monitoring campaign compared to daily daylight hours

Migratory Bird Density

The Halo 20+ radar emits a beam that is angled 12.5° upward and downward from the radar's antenna. As the radar beam extends outward, the volume of airspace that the radar scans increase with range. Therefore, the number of BTs detected by the ARS generally increases with range, until such a point that the radar becomes limited by range and the number of BTs detected drops. To correct the distortions in BT detection counts at different ranges, it is necessary to correct the airspace volume scanned by the radar at each height bin.

Based on the geometry of the radar's beam angle, the volume of airspace scanned in each of the height bins was determined using CAD software. These volumes are shown for each height bin in Table 7.52, 7.53, and 7.54 along with the number of BTs detected in each height bin, and the target density (i.e., the number of targets detected per cubic kilometre of airspace) for all monitoring periods. Birds per cubic kilometre (km^3) have been used as a metric of bird migration in avifauna for other studies (Farnsworth, 2013). Target density is representative of, and likely proportional to, the migratory bird activity in the airspace above the Project for the cumulative monitoring period (in this case, for the 2023 and 2024 avian radar monitoring campaign).

Table 7.52: Target Density – Fall 2023

Range Bin	Number of Targets Detected	Airspace Scanned (km^3)	Target Density (BT/km^3)
0-25	0	0.1015	0
25-50	3	0.1016	29.528
50-100	4	0.2036	19.646
100-150	16	0.2043	78.316
150-200	38	0.2052	185.185
200-250	56	0.2063	271.449
250-500	175	1.052	166.350
500-1000	501	2.226	225.067
1000-1500	238	2.337	101.840
1500-2000	190	2.426	78.318
2000-3000	99	3.774	26.232
Total	**1320**	**12.8375**	102.824

Table 7.53: Target Density – Spring 2024

Range Bin	Number of Targets Detected	Airspace Scanned (km^3)	Target Density (BT/km^3)
0-25	0	0.1015	0.00
25-50	1	0.1016	9.843
50-100	27	0.2036	132.613
100-150	70	0.2043	342.633
150-200	89	0.2052	433.723

Range Bin	Number of Targets Detected	Airspace Scanned (km^3)	Target Density (BT/km^3)
200-250	90	0.2063	436.258
250-500	257	1.052	244.297
500-1000	155	2.226	69.632
1000-1500	63	2.337	26.958
1500-2000	68	2.426	28.030
2000-3000	253	3.774	67.038
Total	**724**	**12.8375**	**83.583**

Table 7.54: Target Density – Summer/Fall 2024

Range Bin	Number of Targets Detected	Airspace Scanned (km^3)	Target Density (BT/km^3)
0-25	0	0.1015	0.00
25-50	352	0.1016	3464.567
50-100	37	0.2036	181.729
100-150	78	0.2043	381.791
150-200	100	0.2052	487.329
200-250	103	0.2063	499.273
250-500	468	1.052	444.867
500-1000	860	2.226	386.343
1000-1500	633	2.337	270.860
1500-2000	471	2.426	194.147
2000-3000	555	3.774	147.059
Total	**3657**	**12.8375**	**284.869**

The number of BTs detected by the ARS was generally higher at higher ranges, where the radar scans a greater volume of airspace, before dropping to ranges where radar signal decay becomes limiting. The ARS did detect targets past the 3,000 m height bin, but the targets detected were less than 0.01% of total BTs detected throughout the monitoring periods.

During the fall 2023 monitoring period, the ARS detected the most targets in the 500 m to 1,000 m range bin. This is associated with two large migration events on October 21 (nBTs = 120) and November 11, 2023 (nBTs = 306). Approximately 38% of BTs (nBTs = 501) were in this range bin (Table 7.52). The target density shows more variation than target counts, with a high target density within the 200 m to 250 m height bin and a smaller peak in the 500 m to 1,000 m height bin before sharply decreasing (Figure 7.15).

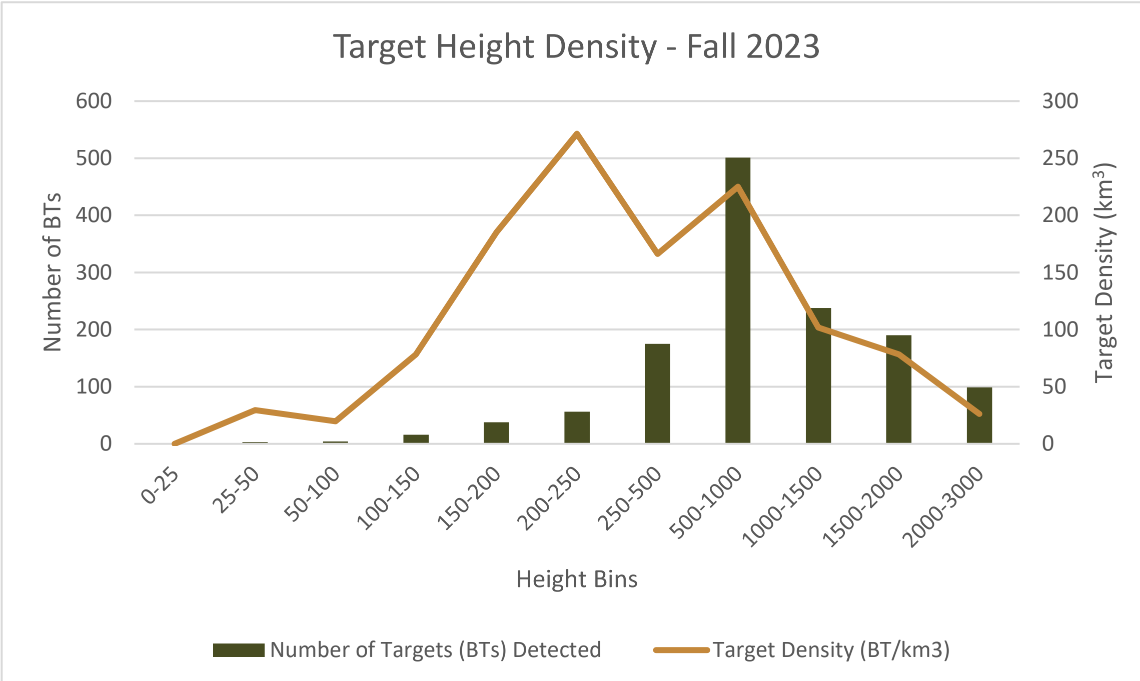

Figure 7.15: Target height and Target density – Fall 2023

During the 2024 spring monitoring period, the ARS detected the most targets in the 250 m to 500 m height bin (nBts= 257) (Figure 7.16). This is associated with the migration event on March 30, 2024 where approximately 54% of BTs (nBTs = 229) were detected in this range bin (Table 7.53). The target density shows more variation than target height, with increasing density to a peak within the 200 m to 250 m height bin and decreasing sharply after (Figure 7.16).

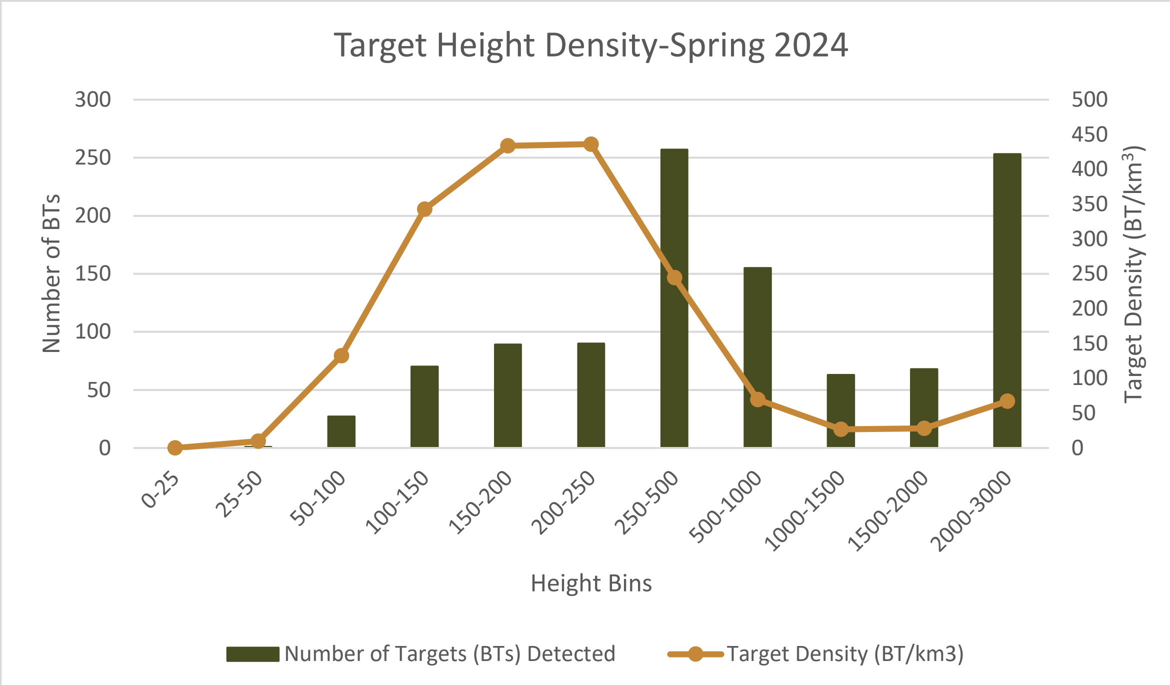

Figure 7.16: Targets Height and Target Density - Spring 2024

In contrast to the 2024 spring monitoring program, the 2024 summer/fall monitoring program saw the highest number of BTs detected in the 500 m to 1,000 m height bin (Figure 7.17). This is associated with the migration event on June 24, 2024, where 32% of BTs (nBTs = 290) were detected in this range bin (Table 7.54). Overall, approximately 24% of BTs were detected within this range bin during the summer and early fall monitoring period. Similar to the previous monitoring campaigns, target density for the 2024 summer/fall monitoring period also had more variation than target height. This is observed with a high spike within the 25 m to 50 m height bin, with other height bins having lower density despite higher BT detections.

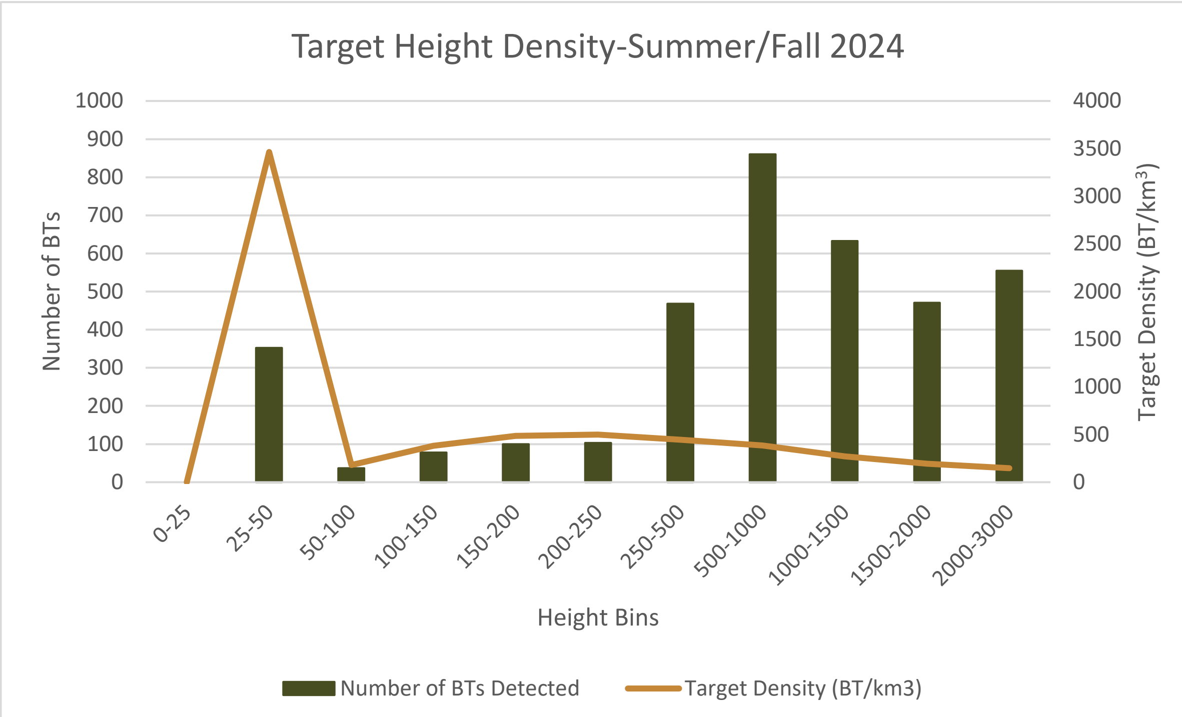

Figure 7.17: Targets Height and Target Density -Summer/Fall 2024

Across all monitoring periods, target density was observed to be highest at above 25 m and decreased after 250 m (Figure 7.15, 7.16, 7.17).

Acoustic Monitoring Results

Data collected by the Englands Lake and Melford Loop ARUs were analyzed and manually verified to produce a list of species present near the Project during the 2023 monitoring season.

Results include avian vocalizations detected as follows:

- BirdNET: Detected SAR and SOCI only (daytime songs and calls)
- Nighthawk: Detected all species capable of being identified by the model (nocturnal flight calls)

Englands Lake BirdNET Results (SAR and SOCI)

BirdNET made 742 detections from the Englands Lake audio data (Figure 7.18), primarily (77%) during the months of June and July. Small spikes in the number of detections were also observed in September and October.

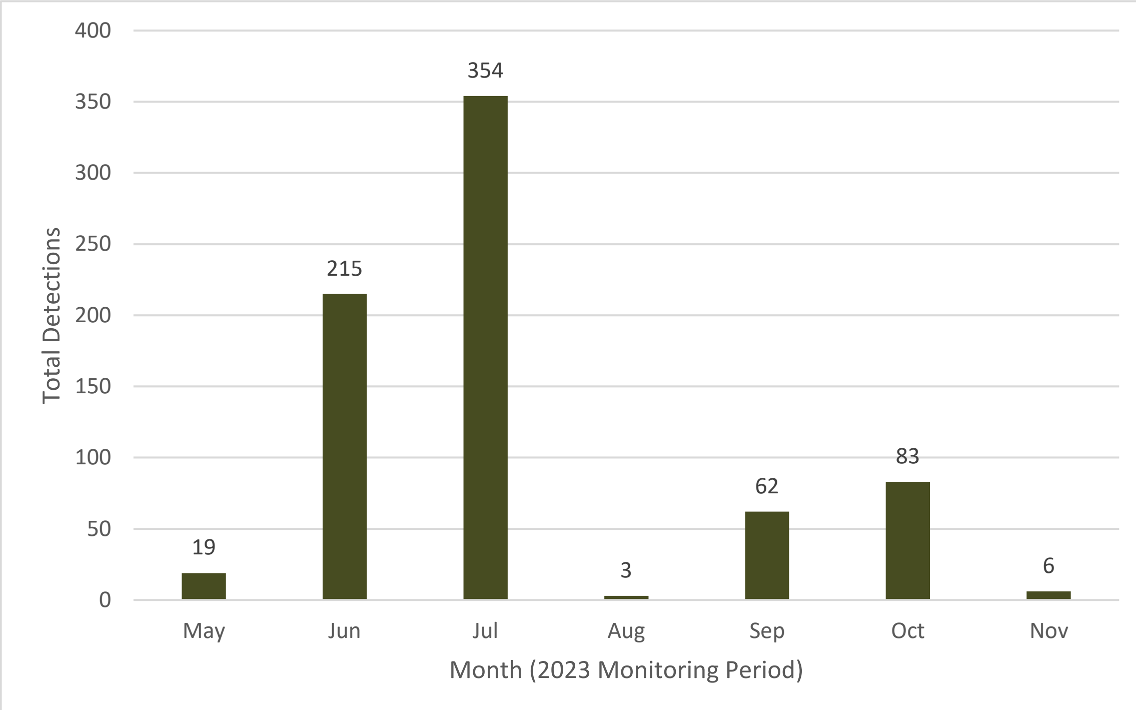

Figure 7.18: Total Number of Detections made by BirdNET during the 2023 Acoustic Monitoring Season at Englands Lake

A total of 660 detections were manually verified by Strum environmental scientists. Of the manually verified detections, 310 (47%) were found to be correct. False positive detections can be attributed to an oversensitivity of the model in conjunction with noise interference from wind, vegetation, frogs, insects, and other environmental factors. Table 7.55 provides an overview of the results for each species detected by BirdNET during the 2023 acoustic monitoring period at Englands Lake. The model was most successful at identifying American robin, common nighthawk, common tern, greater yellowlegs, pine siskin, and spotted sandpiper, all of which had accuracy rates of 80% or higher. Table 7.56 provides two different measurements of confidence, a probability generated using a custom-built logistic regression model, and a confidence value produced by the BirdNET model itself, which represents the model's confidence in its ability to positively identify a given species. It should be noted that in instances where all verified detections were correct (annotated 'Y') or all verified detections were incorrect (annotated 'N') the model was unable to run because it requires at least two correct and two incorrect verifications in order to generate a probability.

Table 7.55: Summary of 2023 Englands Lake BirdNET Results

Common Name	Total Detections	Number Manually Verified	Correct Detections (%)	Probability (LRM)[1]	Confidence (BirdNET)[2]
American Bittern	81	81	0.0%	-	0.48
American Robin	300	221	100.0%	-	0.51
Arctic Tern	1	1	0.0%	-	0.34
Atlantic Puffin	10	10	0.0%	-	0.38

Common Name	Total Detections	Number Manually Verified	Correct Detections (%)	Probability (LRM)[1]	Confidence (BirdNET)[2]
Black-backed Woodpecker	1	1	0.0%	-	0.40
Black-bellied Plover	8	8	0.0%	-	0.46
Black-crowned Night-Heron	1	1	0.0%	-	0.33
Black-headed Gull	1	1	0.0%	-	0.50
Boreal Owl	7	7	0.0%	-	0.46
Common Nighthawk	16	16	100.0%	-	0.76
Common Tern	19	19	94.7%	-	0.68
Eastern Bluebird	52	52	0.0%	-	0.53
Evening Grosbeak	3	3	0.0%	-	0.64
Greater Yellowlegs	18	18	83.3%	0.06	0.65
Lapland Longspur	1	1	0.0%	-	0.50
Lesser Yellowlegs	1	1	0.0%	-	0.81
Long-eared Owl	97	94	0.0%	-	0.43
Manx Shearwater	3	3	0.0%	-	0.36
Pine Grosbeak	1	1	0.0%	-	0.31
Pine Siskin	1	1	100.0%	-	0.79
Pine Warbler	1	1	0.0%	-	0.30
Purple Finch	1	1	0.0%	-	0.31
Red Crossbill	5	5	0.0%	-	0.44
Red-breasted Merganser	1	1	0.0%	-	0.44
Rose-breasted Grosbeak	1	1	0.0%	-	0.30
Semipalmated Plover	11	11	9.1%	-	0.43
Spotted Sandpiper	38	38	100.0%	-	0.64
Surf Scoter	43	43	0.0%	-	0.40
Vesper Sparrow	10	10	0.0%	-	0.50
Willet	1	1	0.0%	-	0.50
Wilson's Snipe	8	8	0.0%	-	0.46

[1] Represents the probability of the BirdNET model correctly identifying a given species. These values were generated using a logistic regression model (LRM).
[2] Represents the average “confidence value” generated by the BirdNET model for a given species. These values represent the model’s confidence in its predictions, but they are not true probabilities.

A majority (91%) of the confirmed positive detections occurred during the months of June and July (Figure 7.19), which represents the peak breeding season for many birds in Nova Scotia. The reduction in detections during spring and fall is not surprising, considering BirdNET was not designed to detect the nocturnal flight calls made by many species during spring and fall migration. Many of the detections made by BirdNET likely represent the summer movements of birds that breed in the area. In terms of seasonal species richness, July had the highest number of unique species detected in a given month, with one SAR (common nighthawk) and four SOCI (Figure 7.20).

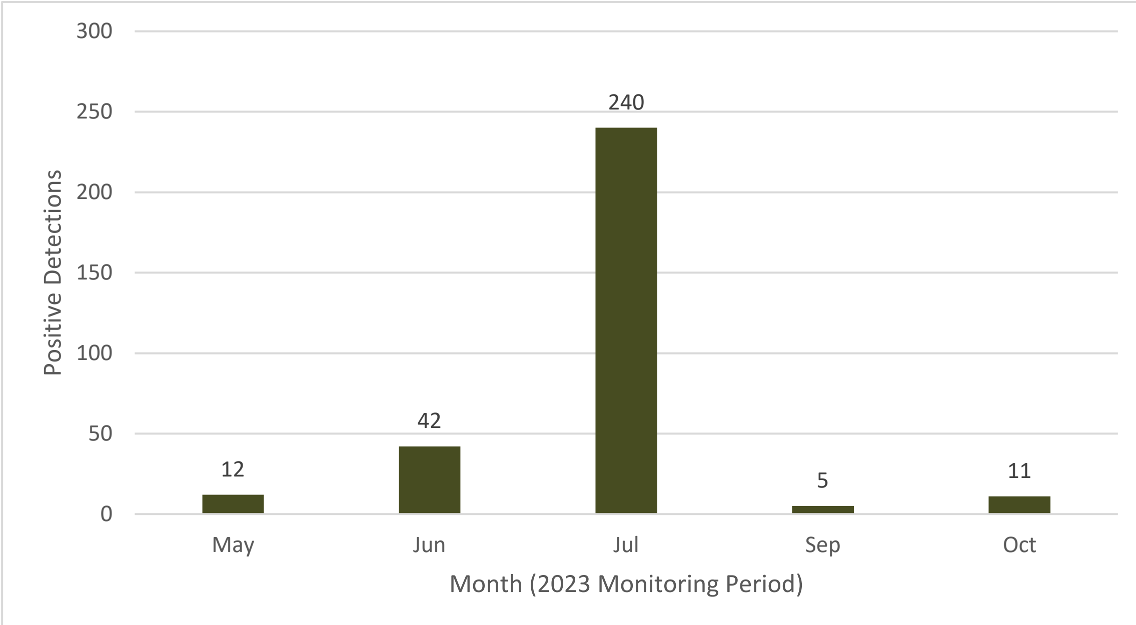

Figure 7.19: Confirmed BirdNET Detections from the 2023 Acoustic Monitoring Period at Englands Lake

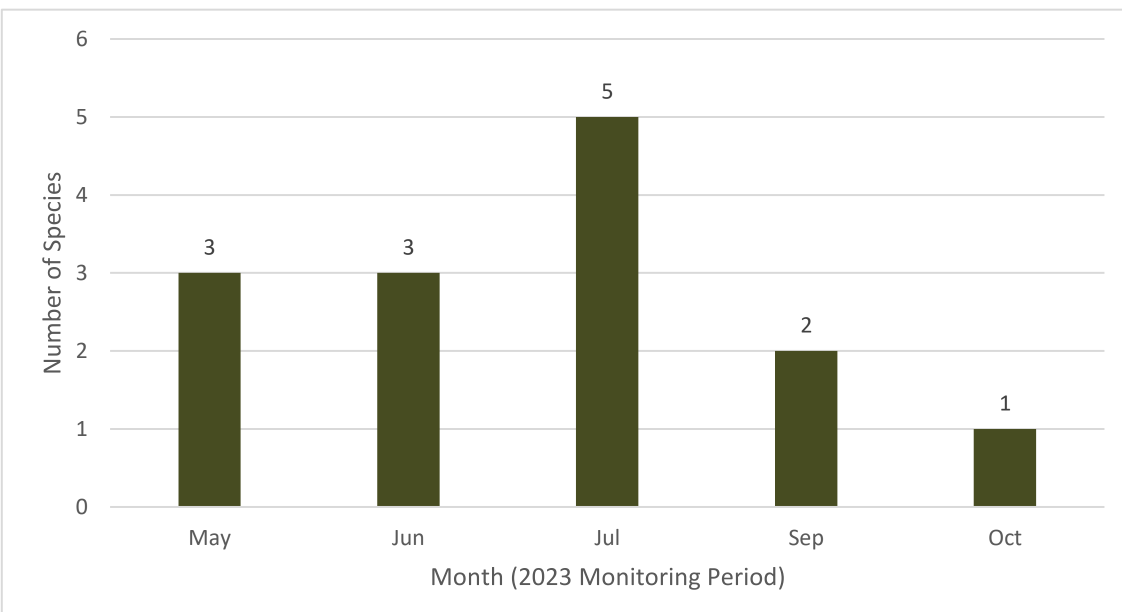

Figure 7.20: BirdNET Species Richness (SAR and SOCI only) During the 2023 Acoustic Monitoring Period at Englands Lake

Of the confirmed positive detections, seven different species were noted, consisting of one SAR and six SOCI. Common nighthawk was the only SAR detected, and they were primarily detected in July. This overlaps with the species' breeding season in Nova Scotia and may suggest breeding and/or foraging activity near the Project. American robin was the species with the highest number of positive detections (221), followed by spotted sandpiper (38), common tern (18), common nighthawk (16) and greater yellowlegs (15). One pine siskin and one semipalmated plover were also detected. American robin, spotted sandpiper and common tern were almost entirely detected during the summer months, suggesting possible breeding activity in the area. Greater yellowlegs and semipalmated plover were detected exclusively in the fall, suggesting that these species were migrating through the area (Table 7.56).

Table 7.56: Confirmed SAR and SOCI Vocalizations detected by BirdNET during the 2023 Acoustic Monitoring Period at Englands Lake

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
American Robin	*Turdus migratorius*	---	---	---	S5B, S3N
Common Nighthawk	*Chordeiles minor*	Special Concern	Special Concern	Threatened	S3B
Common Tern	*Sterna Hirundo*	Not at Risk	---	---	S3B
Greater Yellowlegs	*Tringa melanoleuca*	---	---	---	S3B, S4M
Pine Siskin	*Spinus pinus*	---	---	---	S3
Semipalmated Plover	*Charadrius semipalmatus*	---	---	---	S1B, S4M
Spotted Sandpiper	*Actitis macularius*	---	---	---	S3S4B, S5M

Source: (ACCDC, 2025); [1] (ECCC, 2024e); [2] (NSNR, n.d.-b); [3] (ACCDC, 2025)

Englands Lake Nighthawk Results

The Nighthawk model made a total of 24,766 detections from the Englands Lake acoustic data (Figure 7.21), most of which occurred in June (54%), followed by September (20%).

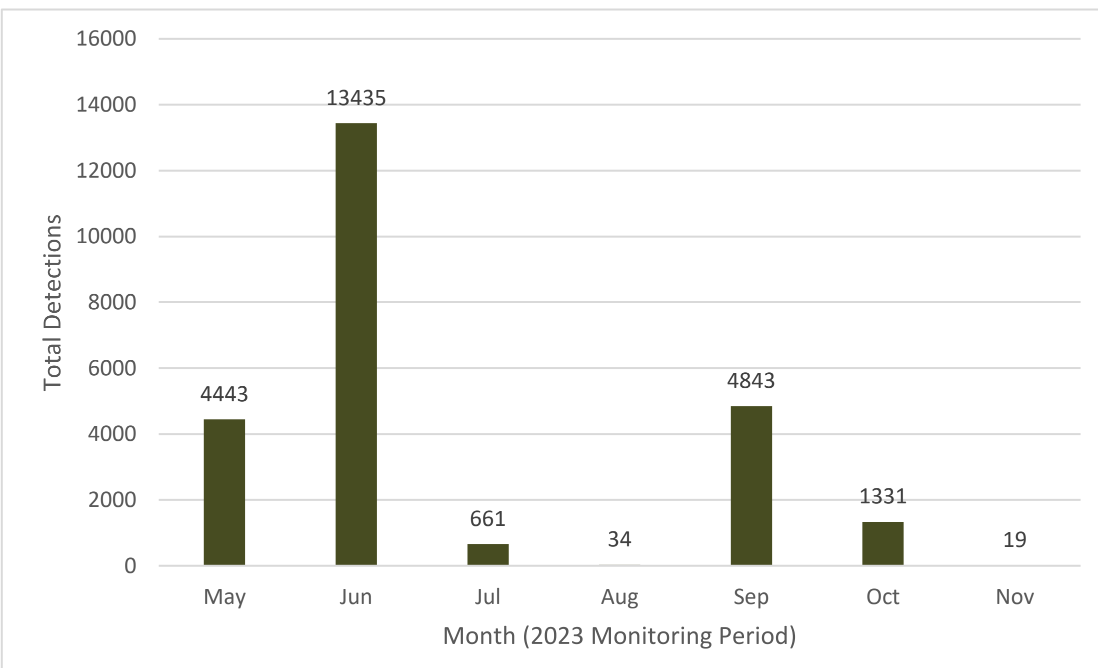

Figure 7.21: Total Number of Detections made by Nighthawk during the 2023 Acoustic Monitoring Period at Englands Lake

A total of 2,480 detections were manually verified by Strum environmental scientists, and of those, 480 (19%) were correct. Nighthawk was most successful at detecting American robin, Cape May warbler (*Setophaga tigrine*), Canada warbler, dark-eyed junco (*Junco hyemalis*), hermit thrush (*Catharus guttatus),* mourning warbler (*Geothlypis philadelphia*), and Wilson's warbler, all of which had a success rate of 90% or higher when a sample of detections were manually verified. While species-level detections were the focus of the manual verification process, Nighthawk also made 5,225 detections at the group level, 4,176 detections at the family level, and 11,203 detections at the order level, which are included in Table 7.57. Each detection was identified to the highest taxonomic level possible, and detections were not double counted (i.e., if a detection was identified to species level, it was not also counted in the group, family, or order level categories).

Table 7.57: Summary of 2023 Englands Lake Nighthawk Results

Species Common Name[1]	Total Detections	Number Manually Verified	Correct Detections (%)	Confidence
American Pipit	12	12	25.0%	0.94
American Redstart	103	41	12.2%	0.89
American Robin	20	20	95.0%	1.00
Black-and-white Warbler	18	18	50.0%	1.00
Black-billed Cuckoo	12	11	0.0%	0.98
Bobolink	1	1	0.0%	1.00
Black-throated Blue Warbler	3	3	0.0%	0.90
Cape May Warbler	1	1	100.0%	1.00
Canada Warbler	1	1	100.0%	0.94
Chipping Sparrow	4	3	33.3%	0.95
Chestnut-sided Warbler	9	9	11.1%	0.94
Comon Yellowthroat	23	23	65.2%	1.00
Dark-eyed Junco	14	13	100.0%	0.99
Grasshopper Sparrow	3	3	0.0%	0.99
Greater Yellowlegs	38	32	87.5%	0.99
Grey-cheeked Thrush	5	5	20.0%	1.00
Hermit Thrush	10	10	90.0%	1.00
Least Sandpiper	4	4	25.0%	1.00
Mourning Warbler	2	2	100.0%	0.99
Northern Parula	8	8	87.5%	0.99
Northern Waterthrush	20	18	44.4%	0.99
Ovenbird	22	22	63.6%	0.97
Palm Warbler	15	14	28.6%	1.00
Red-breasted Nuthatch	975	68	0.0%	0.99
Savannah Sparrow	166	57	80.7%	0.99
Scarlet Tanager	9	9	0.0%	1.00

Species Common Name[1]	Total Detections	Number Manually Verified	Correct Detections (%)	Confidence
Semipalmated Plover	5	5	40.0%	0.93
Short-billed Dowitcher	45	30	0.0%	1.00
Solitary Sandpiper	4	4	0.0%	0.95
Spotted Sandpiper	128	37	75.7%	0.99
Swainson's Thrush	2212	209	4.8%	0.86
Upland Sandpiper	6	6	0.0%	0.99
White-crowned Sparrow	4	4	0.0%	1.00
White-throated Sparrow	159	55	94.5%	0.99
Wilson's Warbler	2	2	100.0%	0.99
Yellow-billed Cuckoo	79	43	0.0%	0.99
Nighthawk Group Name[2]	**Total Detections**	**Number Manually Verified**	**Correct Detections (%)**	**Confidence**
BZWA	62	15	26.7%	0.96
CUPS	11	3	33.3%	0.97
DBUP	108	16	50.0%	0.92
DESP	28	7	57.1%	0.98
DEWA	3	0	N/A	N/A
HSSP	8	0	N/A	N/A
MWAR	7	0	N/A	N/A
SBUF	121	15	40.0%	0.91
SFHS	166	4	100.0%	0.95
SWLI	26	1	100.0%	1.00
THSH	3056	269	0.7%	0.90
ZEEP	1629	120	75.0%	0.95
Family Name	**Total Detections**	**Number Manually Verified**	**Correct Detections (%)**	**Confidence**
Ardeidae	17	1	0.0%	0.88
Bombycillidae	7	0	N/A	0.00
Calcariidae	9	2	0.0%	0.99
Charadriidae	104	1	100.0%	1.00
Cuculidae	67	17	5.9%	0.97
Haematopodidae	18	2	0.0%	0.89
Icteridae	3	4	0.0%	0.00
Laridae	2	0	N/A	0.00
Motacillidae	12	0	N/A	0.00
Parulidae	1487	81	23.5%	0.92
Passerellidae	178	14	71.4%	0.99

Family Name	Total Detections	Number Manually Verified	Correct Detections (%)	Confidence
Scolopacidae	263	3	66.7%	0.99
Sittidae	260	13	0.0%	0.95
Turdidae	1749	168	1.2%	0.89
Order Name	**Total Detections**	**Number Manually Verified**	**Correct Detections (%)**	**Confidence**
Charadriiformes	640	43	4.7%	0.95
Passeriformes	10563	875	4.7%	0.92

[1] Detections were identified to the highest taxonomic level possible using Nighthawk. Table 7.57 was organized so as to avoid counting any given detection in more than one category (i.e. if a detection was identified to species level, it was not also counted in the group, family, or order level categories).
[2] Groupings of birds with similar NFCs. See Appendix I for group definitions.

False positive detections can be attributed to an oversensitivity of the model in conjunction with noise interference from wind, vegetation, frogs, insects, and other environmental factors. Spring peeper frogs (*Pseudacris crucifer*) were noted as being a common source of error, since their calls closely resemble the nocturnal flight calls of avian species like the Swainson's thrush.

The majority (85%) of the confirmed positive vocalizations were detected in the months of September and October (Figure 7.22), which represent the peak fall migration season for many species that pass through Nova Scotia. This suggests that a large portion of the June detections were likely false positives. Another source of error was the tendency for the Nighthawk model to misinterpret a single bird singing around dusk or dawn as multiple NFCs, essentially chopping a song up into smaller segments that resemble NFCs. This may explain the unexpectedly high number of detections in June, since this is the most active time of year for birdsong. The reduction in detections in spring can be attributed to a delay in ARU deployment, resulting in a lack of audio data being captured during that time period. The reduction in detections during the summer months is expected, as many birds have arrived on their breeding grounds and there is a reduction in migratory activity during that time.

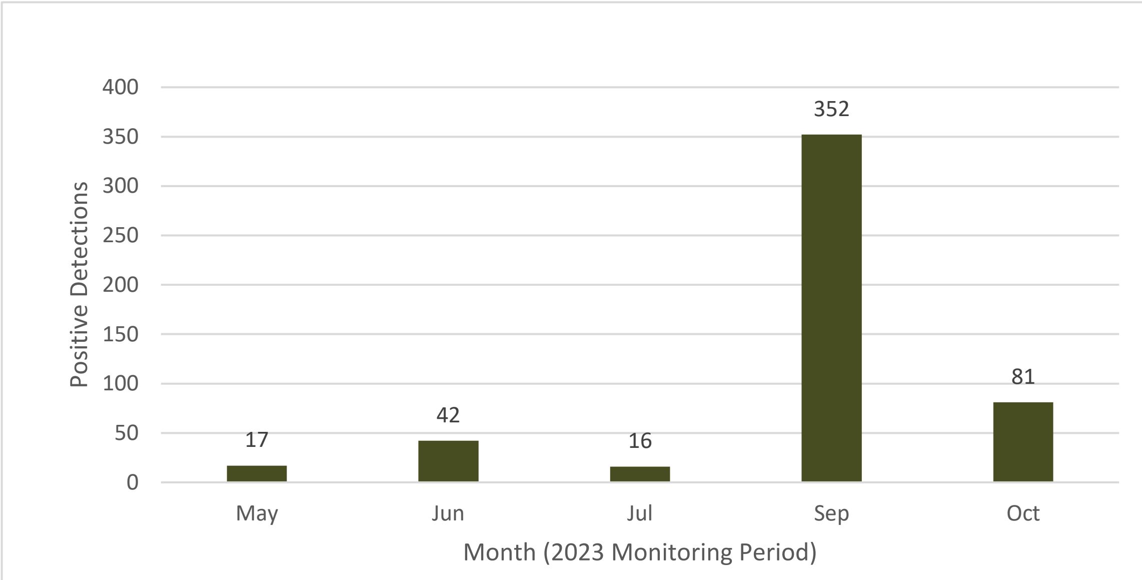

Figure 7.22: Confirmed Nighthawk Detections from the 2023 Acoustic Monitoring Period at Englands Lake

Across all seasons, 26 different species were confirmed to have been positively detected by the model (Table 7.58). Of those, the most commonly detected species were alder flycatcher (*Empidonax alnorum*) (184), savannah sparrow (*Passerculus sandwichensis*) (53), white-throated sparrow (*Zonotrichia albicollis*) (53), spotted sandpiper (30), and greater yellowlegs (28). One SAR, a Canada warbler, was detected in mid-September, suggesting the bird was likely migrating through the area. Eight SOCI were also detected, which consisted of spotted sandpiper (30), greater yellowlegs (28), American robin (19), gray-cheeked thrush (*Catharus minimus*) (2), semipalmated plover (2), Cape May warbler (1), least sandpiper (*Calidris minutilla*) (1), and Wilson's warbler (1). Least sandpiper, semipalmated plover, and greater yellowlegs were detected almost entirely in the fall, suggesting the movement of migrating shorebirds through the area at that time.

Table 7.58: Summary of Species Confirmed at Englands Lake During the 2023 Nighthawk Acoustic Analysis

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Alder Flycatcher	*Empidonax alnorum*	---	---	---	S5B
American Pipit	*Anthus rubescens*	---	---	---	S4M
American Redstart	*Setophaga ruticilla*	---	---	---	S5B
American Robin	*Turdus migratorius*	---	---	---	S5B, S3N
Black-and-White Warbler	*Mniotilta varia*	---	---	---	S5B
Cape May Warbler	*Setophaga tigrine*	---	---	---	S3B, SUM
Canada Warbler	*Cardellina canadensis*	Special Concern	Threatened	Endangered	S3B

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Chestnut-sided Warbler	*Setophaga pensylvanica*	---	---	---	S5B
Chipping Sparrow	*Spizella passerine*	---	---	---	S4B, S5M
Common Yellowthroat	*Geothlypis trichas*	---	---	---	S5B
Dark-eyed Junco	*Junco hyemalis*	---	---	---	S4S5
Greater Yellowlegs	*Tringa melanoleuca*	---	---	---	S3B, S4M
Gray-cheeked Thrush (minimus subspecies	*Catharus minimus minimus*	Threatened	---	---	S1?B
Hermit Thrush	*Catharus guttatus*	---	---	---	S5B
Least Sandpiper	*Calidris minutilla*	---	---	---	S1B, S4M
Mourning Warbler	*Geothlypis Philadelphia*	---	---	---	S4B, S5M
Nashville Warbler	*Leiothlypis ruficapilla*	---	---	---	S4B, S5M
Northern Parula	*Setophaga americana*	---	---	---	S5B
Northern Waterthrush	*Parkesia noveboracensis*	---	---	---	S4B, S5M
Ovenbird	*Seiurus aurocapilla*	---	---	---	S5B
Palm Warbler	*Setophaga palmarum*	---	---	---	S5B
Savannah Sparrow	*Passerculus sandwichensis*	---	---	---	S4S5B, S5M
Semipalmated Plover	*Charadrius semipalmatus*	---	---	---	S1B, S4M
Spotted Sandpiper	*Actitis macularius*	---	---	---	S3S4B, S5M
Swainson Thrush	*Catharus ustulatus*	---	---	---	S4B, S5M
White-throated Sparrow	*Zonotrichia albicollis*	---	---	---	S4S5B, S5M
Wilson's Warbler	*Cardellina pusilla*	---	---	---	S3B, S5M

Source: (ACCDC, 2025); [1] (ECCC, 2024e); [2] (NSNR, n.d.-b); [3] (ACCDC, 2025)

In terms of seasonal species richness at the Englands Lake location, September and October had the highest number of unique species detected, with 22 species detected in September and 14 detected in October (Figure 7.23).

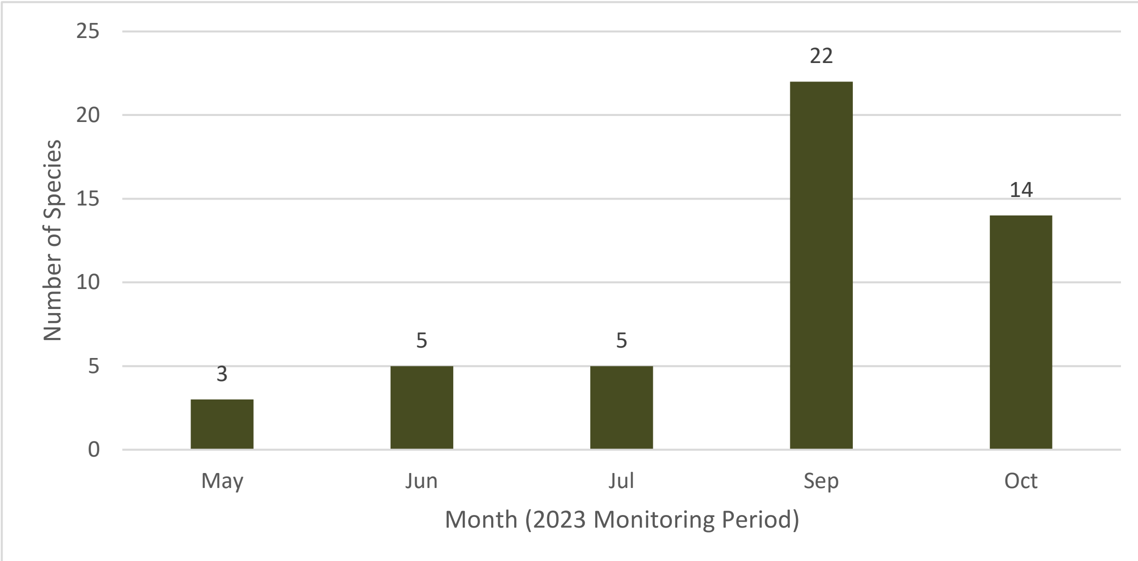

Figure 7.23: Nighthawk Species Richness During the 2023 Acoustic Monitoring Period for Englands Lake

Strait Crossing (Melford Loop) Acoustic Results

Supplemental fall data was collected by the Melford Loop ARU and was analyzed using the same methodology as the Englands Lake data.

Melford Loop BirdNET Results (SAR and SOCI)

BirdNET made 381 detections from the Melford Loop audio data (Figure 7.24). The detections were split almost equally between the months of September and October, with detections in September being marginally higher.

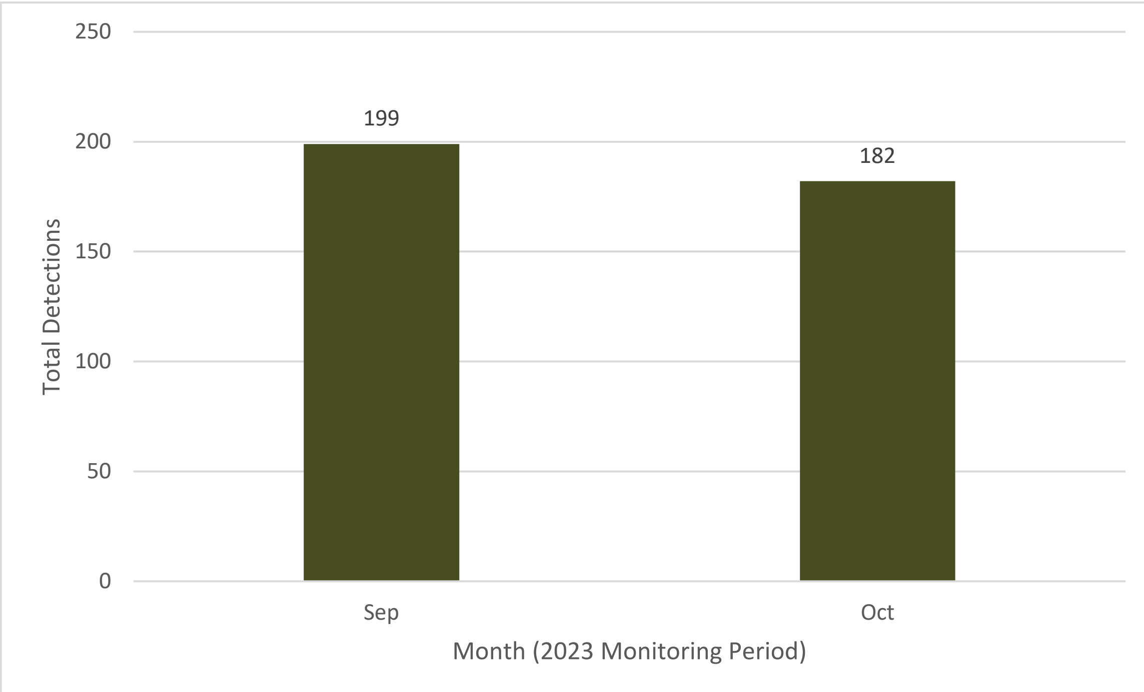

Figure 7.24: Total Number of SAR and SOCI Detections made by BirdNET during the 2023 Acoustic Monitoring Season at Melford Loop

A total of 361 detections were manually verified by Strum environmental scientists. Of the manually verified detections, 165 (46%) were found to be correct. False positive detections can be attributed to an oversensitivity of the model in conjunction with noise interference from wind, vegetation, frogs, insects, and other environmental factors. Table 7.59 provides an overview of the results for each species detected by BirdNET during the 2023 acoustic monitoring period at Melford Loop. The model was most successful at identifying gray-cheeked thrush, pine siskin, red crossbill, semipalmated plover, semipalmated sandpiper, and spotted sandpiper, all of which had an accuracy rate of 80% or more when a sample of detections were manually verified. Table 7.60 provides two different measurements of confidence, a probability score generated using a custom-built logistic regression model, and a confidence value produced by the BirdNET model itself, which represents the model's confidence in its ability to positively identify a given species. In instances where all verified detections were correct (annotated 'Y') or all verified detections were incorrect (annotated 'N') the model was unable to run because it requires at least two correct and two incorrect verifications to generate a probability.

Table 7.59: Summary of 2023 Melford Loop BirdNET Results

Common Name	Total Detections	Number Manually Verified	Correct Detections (%)	Probability (LRM)[1]	Confidence (BirdNET)[2]
American Bittern	9	8	0.0%	-	0.51
American Coot	1	1	0.0%	-	0.42
American Three-toed Woodpecker	1	1	0.0%	-	0.32
Arctic Tern	11	11	0.0%	-	0.45

Common Name	Total Detections	Number Manually Verified	Correct Detections (%)	Probability (LRM)[1]	Confidence (BirdNET)[2]
Black Tern	1	1	0.0%	-	0.84
Black-backed Woodpecker	2	2	0.0%	-	0.35
Black-bellied Plover	10	8	0.0%	-	0.56
Black-billed Cuckoo	1	1	0.0%	-	0.35
Black-crowned Night-Heron	8	8	0.0%	-	0.54
Black-headed Gull	10	10	0.0%	-	0.42
Blue-winged Teal	2	2	0.0%	-	0.39
Bobolink	3	3	0.0%	-	0.46
Cape May Warbler	2	2	0.0%	-	0.74
Chimney Swift	3	3	0.0%	-	0.41
Common Eider	1	1	0.0%	-	0.35
Common Tern	6	5	0.0%	-	0.44
Cooper's Hawk	4	3	0.0%	-	0.42
Eastern Bluebird	6	5	0.0%	-	0.49
Evening Grosbeak	8	8	37.5%	0.05 (N)	0.55
Fox Sparrow	4	4	0.0%	-	0.34
Gadwall	3	3	0.0%	-	0.43
Gray-cheeked Thrush	6	6	83.3%	-	0.56
Great Crested Flycatcher	1	1	0.0%	-	0.34
Greater Yellowlegs	22	22	77.3%	0.2 (Y)	0.76
Indigo Bunting	1	1	0.0%	-	0.48
Killdeer	7	7	0.0%	-	0.49
Lapland Longspur	16	15	20.0%	0.64 (Y)	0.46
Long-eared Owl	6	6	0.0%	-	0.46
Manx Shearwater	1	1	0.0%	-	0.38
Northern Pintail	4	4	0.0%	-	0.53
Peregrine Falcon	1	1	0.0%	-	0.42
Pine Grosbeak	1	1	0.0%	-	0.37
Pine Siskin	68	68	98.5%	-	0.66
Red Crossbill	1	1	100.0%	-	0.36
Red-headed Woodpecker	2	2	0.0%	-	0.77
Rusty Blackbird	6	6	0.0%	-	0.51
Semipalmated Plover	101	88	72.7%	0.22 (Y)	0.70
Semipalmated Sandpiper	1	1	100.0%	-	0.60
Short-eared Owl	2	2	0.0%	-	0.64
Solitary Sandpiper	8	8	25.0%	0.07 (N)	0.54
Spotted Sandpiper	2	2	100.0%	-	0.46
Surf Scoter	1	1	0.0%	-	0.49

Common Name	Total Detections	Number Manually Verified	Correct Detections (%)	Probability (LRM)[1]	Confidence (BirdNET)[2]
Vesper Sparrow	23	20	0.0%	-	0.43
Wilson's Snipe	2	2	0.0%	-	0.34
Wilson's Warbler	5	5	0.0%	-	0.38

[1] Represents the probability of the BirdNET model correctly identifying a given species. These values were generated using a logistic regression model (LRM).
[2] Represents the average "confidence value" generated by the BirdNET model for a given species. These values represent the model's confidence in its predictions, but they are not true probabilities.

Of the 165 positive detections, 57% were made in October and 43% were made in September (Figure 7.25), which represents the peak fall migration period for many birds that pass through Nova Scotia.

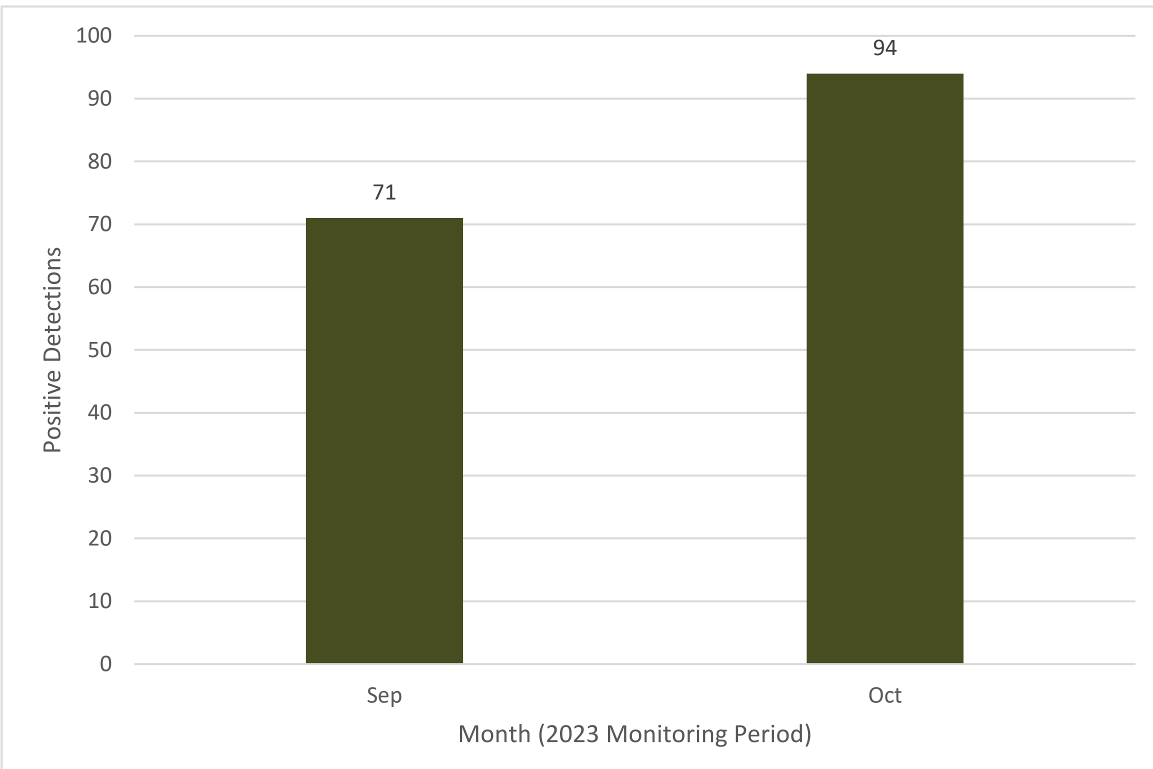

Figure 7.25: Confirmed BirdNET Detections from the 2023 Acoustic Monitoring Period at Melford Loop

In terms of species richness, 10 different species (SAR and SOCI only) were positively detected during the 2023 monitoring season. Species richness was the same in September and October, with seven different species detected each month. (Figure 7.26).

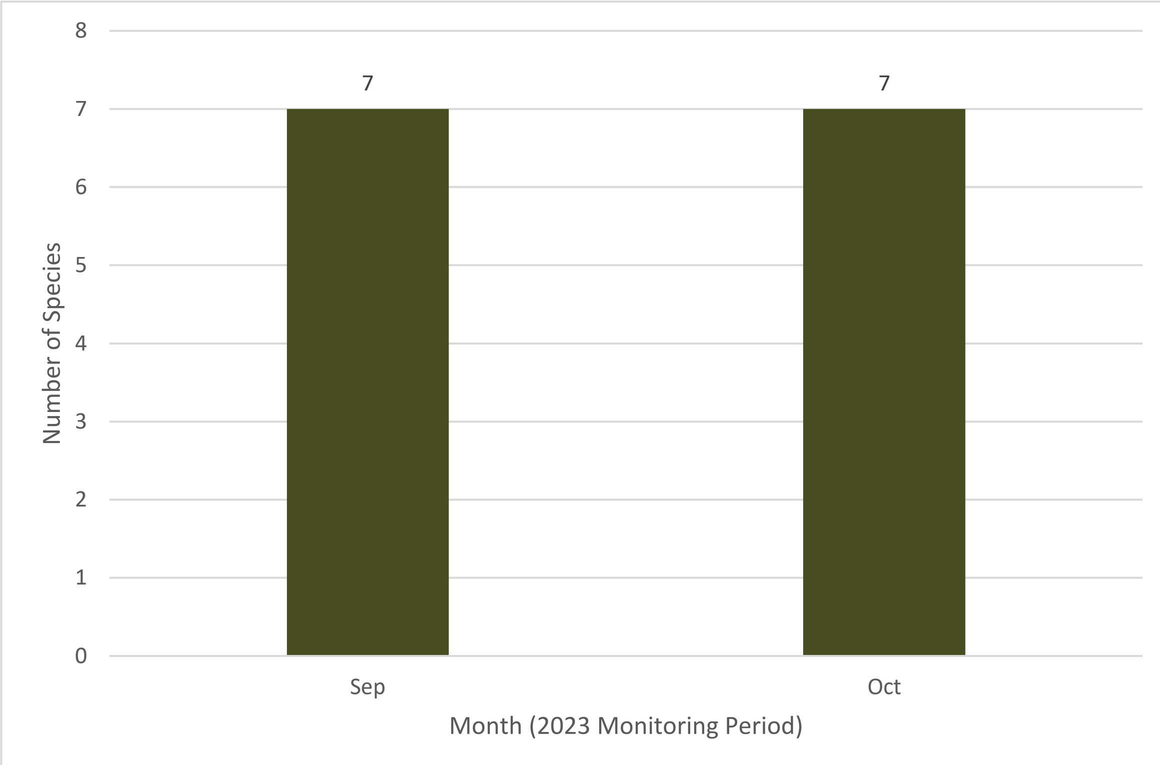

Figure 7.26: BirdNET Species Richness (SAR and SOCI only) during the 2023 Acoustic Monitoring Period for Melford Loop

Of the 10 SAR and SOCI that were detected, evening grosbeak was the only SAR. There were three confirmed evening grosbeak vocalizations, all detected between late September and early October, suggesting that the species may have been migrating through the area. The nine SOCI that were detected were gray-cheeked thrush (5), greater yellowlegs (17), Lapland longspur (3), pine siskin (67), red crossbill (1), semipalmated plover (64), semipalmated sandpiper (1), solitary sandpiper (2), and spotted sandpiper (2). Half of the species that were detected were shorebirds, which is expected due to the coastal positioning of the ARU (Table 7.60).

Table 7.60: Confirmed SAR and SOCI Vocalizations detected by BirdNET during the 2023 Acoustic Monitoring Period at Melford Loop

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Evening Grosbeak	*Coccothraustes vespertinus*	Special Concern	Special Concern	Vulnerable	S3B,S3N,S3M
Gray-cheeked Thrush (minimus subspecies)	*Catharus minimus minimus*	Threatened	---	---	S1?B
Greater Yellowlegs	*Tringa melanoleuca*	---	---	---	S3B, S4M
Lapland Longspur	*Calcarius lapponicus*	---	---	---	S3?N,SUM
Pine Siskin	*Spinus pinus*	---	---	---	S3

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Red Crossbill	*Loxia curvirostra*	---	---	---	S3S4
Semipalmated Plover	*Charadrius semipalmatus*	---	---	---	S1B, S4M
Semipalmated Sandpiper	*Calidris pusilla*	---	---	---	S3M
Solitary Sandpiper	*Tringa solitaria*	---	---	---	SUB,S3S4 M
Spotted Sandpiper	*Actitis macularius*	---	---	---	S3S4B, S5M

Source: (ACCDC, 2025); [1] (ECCC, 2024e); [2] (NSNR, n.d.-b); [3] (ACCDC, 2025)

Strait Crossing Nighthawk Results

The Nighthawk model made 85,883 detections from the Strait Crossing acoustic data (Figure 7.27), most (77%) of which occurred in September.

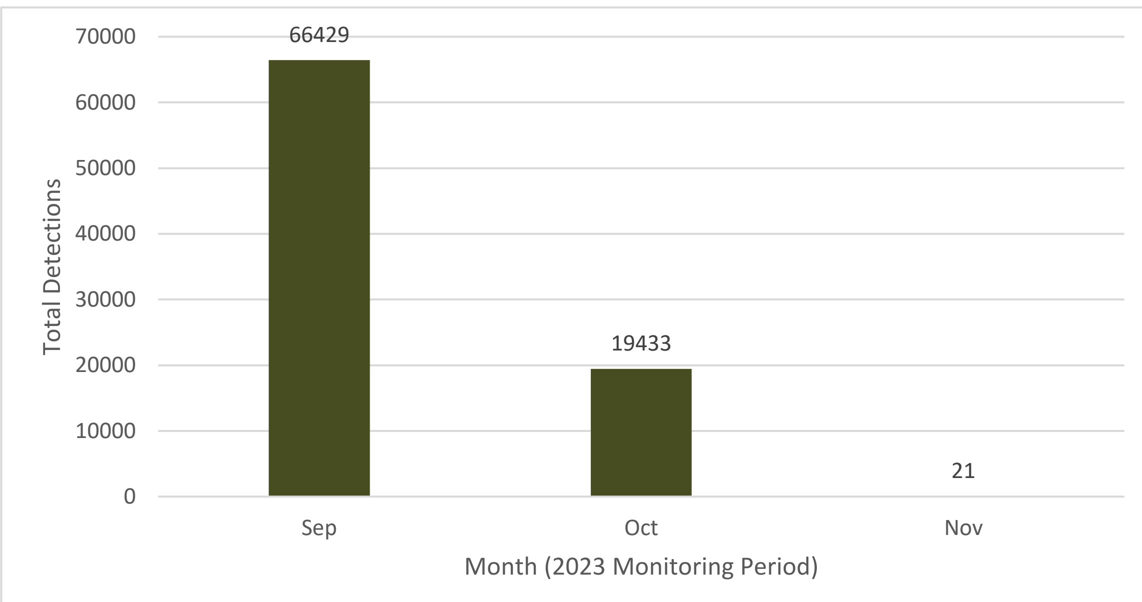

Figure 7.27: Total Number of Detections made by Nighthawk during the 2023 Acoustic Monitoring Season at Melford Loop

A total of 1,161 detections were manually verified by Strum environmental scientists, and of those, 604 (52%) were correct. Nighthawk was highly successful at correctly identifying black-and-white warbler, common yellowthroat, dickcissel, greater yellowlegs, indigo bunting, killdeer, mourning warbler, northern parula, ovenbird, and white-throated sparrow, all of which had a 100% success rate when a sample of detections were manually verified. While species-level detections were the focus of the manual verification process, Nighthawk also made 35,645 detections at the group level, 21,779 detections at the family level, and 15,302 detections at the order level (Table 7.61).

Table 7.61: Summary of 2023 Melford Loop Nighthawk Results

Species Common Name[1]	Total Detections	Number Manually Verified	Correct Detections (%)	Confidence
American Pipit	92	48	33.3%	0.95
American Redstart	1518	31	67.7%	0.90
American Robin	19	19	73.7%	1.00
American Tree Sparrow	33	32	0.0%	0.99
Black-and-White Warbler	444	37	100.0%	1.00
Black-billed Cuckoo	2	2	50.0%	1.00
Bobolink	24	24	8.3%	1.00
Black-throated Blue Warbler	35	25	24.0%	0.91
Cape May Warbler	142	34	38.2%	0.99
Canada Warbler	22	21	76.2%	1.00
Chipping Sparrow	31	26	7.7%	0.92
Chestnut-sided Warbler	145	43	48.8%	0.95
Common Yellowthroat	869	30	100.0%	1.00
Dark-eyed Junco	127	30	83.3%	1.00
Dickcissel	5	5	100.0%	1.00
Grasshopper Sparrow	22	21	0.0%	1.00
Greater Yellowlegs	23	21	100.0%	0.99
Green Heron	3	3	0.0%	1.00
Grey-cheeked Thrush	24	19	84.2%	1.00
Hermit Thrush	124	40	90.0%	1.00
Hooded Warbler	60	32	0.0%	0.90
Indigo Bunting	1	1	100.0%	0.97
Killdeer	57	28	100.0%	1.00
Lapland Longspur	10	9	22.2%	0.98
Least Sandpiper	10	9	55.6%	1.00
Lesser Yellowlegs	1	1	0.0%	0.98
Lincoln's Sparrow	45	29	13.8%	0.97
MacGillivray's Warbler	18	18	0.0%	0.99
Mourning Warbler	88	44	100.0%	0.99
Nashville Warbler	7	7	57.1%	0.90
Northern Parula	276	30	100.0%	0.99
Northern Waterthrush	442	29	93.1%	1.00
Ovenbird	442	30	100.0%	0.96
Palm Warbler	133	32	93.8%	1.00
Red-breasted Nuthatch	19	17	0.0%	0.99
Rose-breasted Grosbeak	16	15	33.3%	1.00

Species Common Name[1]	Total Detections	Number Manually Verified	Correct Detections (%)	Confidence
Savannah Sparrow	2891	31	96.8%	0.99
Scarlet Tanager	2	2	0.0%	1.00
Semipalmated Plover	105	31	96.8%	0.97
Short-billed Dowitcher	6	4	0.0%	0.99
Solitary Sandpiper	24	22	4.5%	0.97
Spotted Sandpiper	88	33	75.8%	0.99
Swainson's Thrush	1914	31	19.4%	0.87
Upland Sandpiper	7	7	14.3%	0.99
Veery	6	6	66.7%	0.96
Vesper Sparrow	22	22	4.5%	1.00
White-crowned Sparrow	40	31	0.0%	0.98
White-throated Sparrow	2576	32	100.0%	1.00
Wilson's Warbler	38	29	37.9%	0.98
Wood Thrush	4	4	0.0%	0.96
Yellow-billed Cuckoo	105	33	0.0%	0.99
Group Name[2]	**Total Detections**	**Number Manually Verified**	**Correct Detections (%)**	**Confidence**
BUNT	16	0	N/A	N/A
BZWA	1494	0	N/A	N/A
CCBRS	1	0	N/A	N/A
CUPS	76	0	N/A	N/A
DBUP	1708	0	N/A	N/A
DESP	604	0	N/A	N/A
DEWA	92	0	N/A	N/A
GCBI	1	0	N/A	N/A
HSSP	91	0	N/A	N/A
MWAR	118	0	N/A	N/A
SBUF	1591	0	N/A	N/A
SFHS	4967	0	N/A	N/A
SWLI	1255	0	N/A	N/A
THSH	894	0	N/A	N/A
ZEEP	22737	0	N/A	N/A
Family Name	**Total Detections**	**Number Manually Verified**	**Correct Detections (%)**	**Confidence**
Ardeidae	56	0	N/A	N/A
Bombycillidae	38	0	N/A	N/A

Family Name	Total Detections	Number Manually Verified	Correct Detections (%)	Confidence
Calcariidae	42	0	N/A	N/A
Cardinalidae	6	0	N/A	N/A
Charadriidae	139	0	N/A	N/A
Cuculidae	60	0	N/A	N/A
Cuculiformes	16	0	N/A	N/A
Haematopodidae	2	0	N/A	N/A
Icteridae	18	0	N/A	N/A
Laridae	11	0	N/A	N/A
Motacillidae	60	0	N/A	N/A
Parulidae	15190	0	N/A	N/A
Passerellidae	5604	0	N/A	N/A
Scolopacidae	170	0	N/A	N/A
Sittidae	9	0	N/A	N/A
Turdidae	358	0	N/A	N/A
Order Name	**Total Detections**	**Number Manually Verified**	**Correct Detections (%)**	**Confidence**
Charadriiformes	176	0	N/A	N/A
Passeriformes	15126	0	N/A	N/A

[1] Detections were identified to the highest taxonomic level possible using Nighthawk. Table 7.61 was organized so as to avoid counting any given detection in more than one category (i.e. if a detection was identified to species level, it was not also counted in the group, family, or order level categories).
[2] Groupings of birds with similar NFCs. See Appendix I for group definitions.

False positive detections can be attributed to an oversensitivity of the model in conjunction with noise interference from wind, vegetation, frogs, insects, and other environmental factors. Spring peeper frogs (*Pseudacris crucifer*) were noted as being a common source of error, since their calls closely resemble the nocturnal flight calls of avian species like the Swainson’s thrush. A majority (81%) of the confirmed positive vocalizations were detected in the month of September (Figure 7.28).

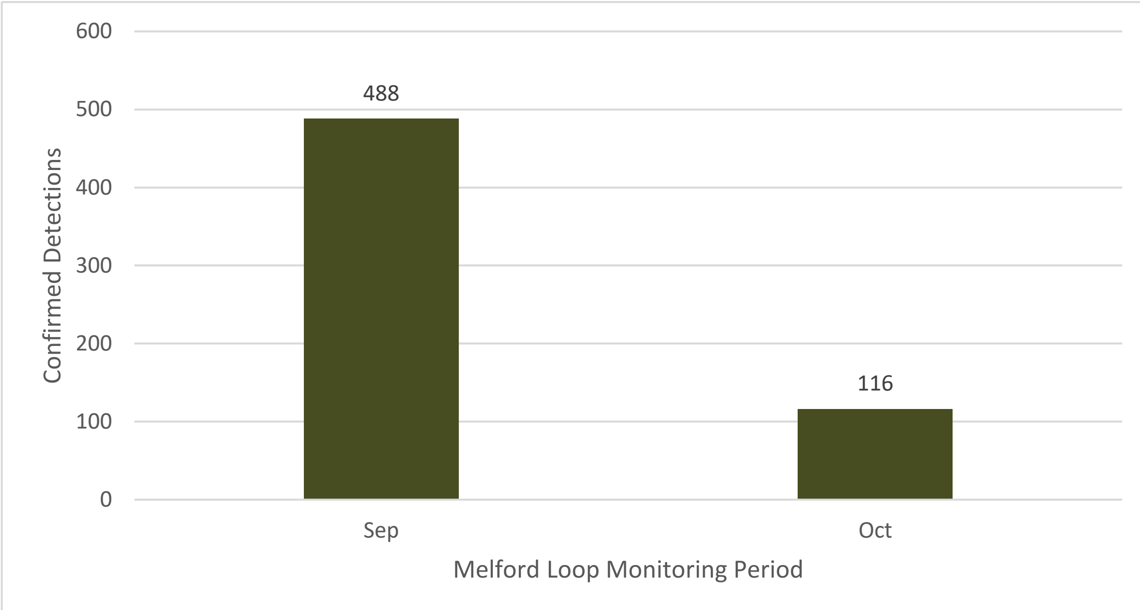

Figure 7.28: Confirmed Nighthawk Detections from the 2023 Acoustic Monitoring Period at Melford Loop

A total of 37 different species were confirmed to have been positively detected by the model (Table 7.62). Of those, the most common were mourning warbler (7%), black-and-white warbler (6%), hermit thrush (6%), and white-throated sparrow (5%). Two SAR, bobolink (2) and Canada warbler (16), were positively identified by Nighthawk. A total of 14 SOCI were also positively detected, consisting of American robin (14), black-billed cuckoo (1), Cape May warbler (13), greater yellowlegs (21), gray-cheeked thrush (16), Lapland longspur (2), least sandpiper (5), rose-breasted grosbeak (5), semipalmated plover (30), solitary sandpiper (1), spotted sandpiper (25), upland sandpiper (1), vesper sparrow (1), and Wilson's warbler (11).

Table 7.62: Summary of Species Confirmed During the 2023 Nighthawk Acoustic Analysis

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
American Pipit	*Anthus rubescens*	---	---	---	S4M
American Redstart	*Setophaga ruticilla*	---	---	---	S5B
American Robin	*Turdus migratorius*	---	---	---	S5B, S3N
Black-and-White Warbler	*Mniotilta varia*	---	---	---	S5B
Black-billed Cuckoo	*Coccyzus erythropthalmus*	---	---	---	S3B
Bobolink	*Dolichonyx oryzivorus*	Special Concern	Threatened	Vulnerable	S3B
Black-throated Blue Warbler	*Setophaga caerulescens*	---	---	---	S5B
Cape May Warbler	*Setophaga tigrine*	---	---	---	S3B, SUM
Canada Warbler	*Cardellina canadensis*	Special Concern	Threatened	Endangered	S3B

Common Name	Scientific Name	COSEWIC Status[1]	*SARA* Status[1]	*ESA* Status[2]	NS S-Rank[3]
Chestnut-sided Warbler	*Setophaga pensylvanica*	---	---	---	S5B
Chipping Sparrow	*Spizella passerine*	---	---	---	S4B, S5M
Common Yellowthroat	*Geothlypis trichas*	---	---	---	S5B
Dark-eyed Junco	*Junco hyemalis*	---	---	---	S4S5
Dickcissel	*Spiza americana*	---	---	---	SNA
Greater Yellowlegs	*Tringa melanoleuca*	---	---	---	S3B, S4M
Gray-cheeked Thrush (minimus subspecies)	*Catharus minimus minimus*	Threatened	---	---	S1?B
Hermit Thrush	*Catharus guttatus*	---	---	---	S5B
Lapland Longspur	*Calcarius lapponicus*				S3?N,SUM
Least Sandpiper	*Calidris minutilla*	---	---	---	S1B, S4M
Lincoln’s Sparrow	*Melospiza lincolnii*	---	---	---	S4B,S5M
Mourning Warbler	*Geothlypis Philadelphia*	---	---	---	S4B, S5M
Nashville Warbler	*Leiothlypis ruficapilla*	---	---	---	S4B, S5M
Northern Parula	*Setophaga americana*	---	---	---	S5B
Northern Waterthrush	*Parkesia noveboracensis*	---	---	---	S4B, S5M
Ovenbird	*Seiurus aurocapilla*	---	---	---	S5B
Palm Warbler	*Setophaga palmarum*	---	---	---	S5B
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	---	---	---	S3B
Savannah Sparrow	*Passerculus sandwichensis*	---	---	---	S4S5B, S5M
Semipalmated Plover	*Charadrius semipalmatus*	---	---	---	S1B, S4M
Solitary Sandpiper	*Tringa solitaria*	---	---	---	SUB,S3S4M
Spotted Sandpiper	*Actitis macularius*	---	---	---	S3S4B, S5M
Swainson Thrush	*Catharus ustulatus*	---	---	---	S4B, S5M
Upland Sandpiper	*Bartramia longicauda*	---	---	---	S1B
Veery	*Catharus fuscescens*	---	---	---	S4B
Vesper Sparrow	*Pooecetes gramineus*	---	---	---	S1S2B,SUM
White-throated Sparrow	*Zonotrichia albicollis*	---	---	---	S4S5B, S5M
Wilson’s Warbler	*Cardellina pusilla*	---	---	---	S3B, S5M

Source: (ACCDC, 2025); [1] (ECCC, 2024e); [2] (NSNR, n.d.-b); [3] (ACCDC, 2025)

In terms of seasonal species richness, September had the highest number (34) of unique species detected (Figure 7.29).

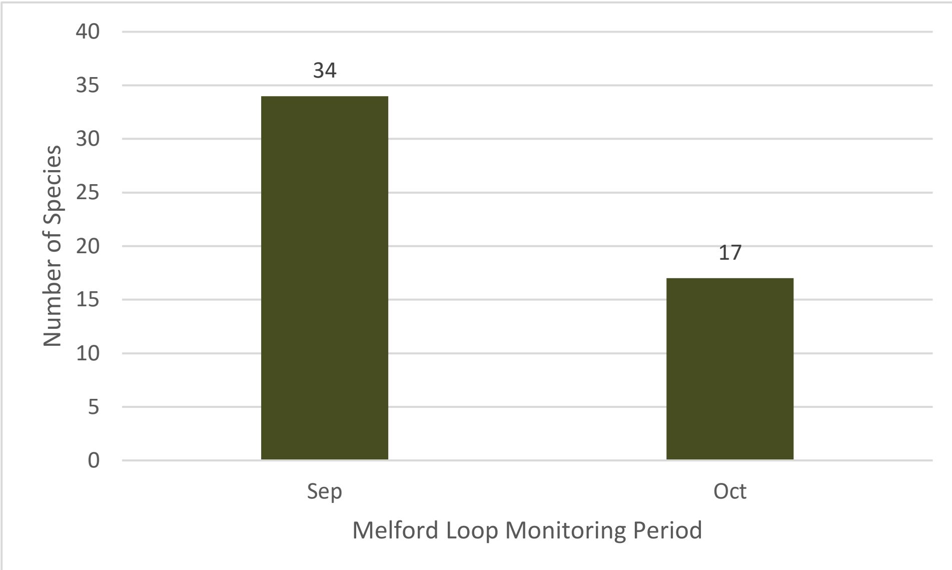

Figure 7.29: Nighthawk Species Richness During the 2023 Acoustic Monitoring Period at Melford Loop

7.4.5.12 SAR Detected Near the Study Area

No SAR were detected within the Study Area during the 2023 or 2024 field or acoustic programs; however, eight SAR were observed near the Study Area (Table 7.63). SAR abundance was highest near the Strait of Canso, where six of the eight SAR were detected either in or near the water. Two other SAR, Canada warbler and olive-sided flycatcher, were observed in more inland/terrestrial environments. Due to the sensitive nature of avian SAR observations, location data has been provided directly to regulatory bodies and not included in this report. Drawings 7.26 to 7.35 (habitat modelling) can be referred to as a representation of SAR habitat distribution in and around the Study Area.

Table 7.63: SAR Detected Near the Study Area During 2023 and 2024 Field and Acoustic Programs

Common Name	SAR Status	2023 Season	2024 Season
Barn Swallow	SARA: Threatened ESA: Endangered S-Rank: S3B	Summer	-
Barrow's Goldeneye	SARA: Special Concern ESA: Not Listed S-Rank: S1N, SUM	Fall	-
Bobolink	SARA: Threatened ESA: Vulnerable S-Rank: S3B	Fall	-
Canada Warbler	SARA: Threatened ESA: Endangered S-Rank: S3B	Fall	-

Common Name	SAR Status	2023 Season	2024 Season
Chimney Swift	SARA: Threatened ESA: Endangered S-Rank: S2S3B, S1M	Summer	-
Common Nighthawk	SARA: Special Concern ESA: Threatened S-Rank: S3B	Spring, Summer	Summer
Evening Grosbeak	SARA: Special Concern ESA: Vulnerable S-Rank: S3B, S3N,S3M	Fall	-
Harlequin Duck	SARA: Special Concern NSESA: Endangered SRank: S2N	Fall	-
Olive-sided Flycatcher	SARA: Special Concern ESA: Threatened S-Rank: S3B	-	Summer
Peregrine Falcon - anatum/tundrius	SARA: Not Listed ESA: Vulnerable S-Rank: S1B, SUM	-	Summer

Sources: (ACCDC, 2025; ECCC, 2024e; NSNR, n.d.-b)

A habitat suitability analysis was conducted for all SAR avifauna detected near the Study Area during field surveys and acoustic monitoring programs (Table 7.64). Although none of these SAR were detected within the Study Area, they were detected close enough to the Study Area that interaction with the Project is possible. For a more detailed description of the habitat preferences of each species, refer to Section 7.4.5.5.

The Strait of Canso provides foraging and overwintering opportunities for Barrow's goldeneye and harlequin duck, SAR waterfowl that were observed during fall diurnal movement surveys.

The Strait of Canso may provide foraging and migratory habitat for peregrine falcons, although suitable nesting habitat (primarily high cliffs with crevices) within the Strait of Canso appears to be minimal. The peregrine falcon that was observed near the Study Area was observed in July, which is within the species' expected nesting period, and it is likely that the individual was foraging in the area.

Nearby residential, industrial, and cleared areas in and around the Study Area may provide breeding, foraging, and/or migratory habitat for barn swallow, chimney swift, and common nighthawk, all of which were observed in or along the Strait of Canso during their respective breeding seasons. Chimney swifts also utilize large, natural tree cavities found in old-growth forests for nesting and roosting, although this habitat type has declined significantly and was not found to be present within or surrounding the Study Area.

While the olive-sided flycatcher observation was made in a treed swamp outside of the Study Area boundary, wetland habitat exists within the Study Area that could also provide breeding and/or foraging habitat. Cleared areas in and around the Study Area may also provide foraging habitat for this species, which often hunts for insects from treetop perches overlooking open areas.

Wetland habitats in and around the Study Area may also provide breeding habitat for Canada warbler, a species that prefers wet, mixed-wood forest with a shrubby understory. The Canada warbler that was detected by the Englands Lake ARU (approximately 3 km southwest of the Study Area) was detected during the species' fall migration period, suggesting that the individual was a migrant fly-over.

Bobolinks breed exclusively in grasslands, pastures, and agricultural fields, habitat types that are not known to occur in or near the Study Area. The bobolink that was detected by the Melford Loop ARU is assumed to be a fall migrant.

Evening grosbeaks breed in second growth to mature mixed or coniferous forest. They overwinter in Nova Scotia and make use of a wider variety of habitat types, including urban and suburban areas, during the winter months. The Study Area and surrounding areas may provide adequate foraging, migrating, and overwintering habitat for the species, although the high level of disturbance and presence of younger forest within the Study Area likely makes it unsuitable breeding habitat.

Table 7.64: Habitat Suitability Analysis for SAR Avifauna Detected Within and Near the Study Area

Common Name	Source of Observation	Observed Habitat	Preferred Habitat	Habitat Suitability in and near the Study Area
Barn Swallow	2023 Diurnal Movement Survey	Crossing the Strait of Canso	Open and semi-open habitat (e.g., lakes and open wetlands), including natural and anthropogenic habitats	Breeding, Foraging, Spring/Fall Migrant
Barrow's Goldeneye	2023 Diurnal Movement Survey	In the Strait of Canso	Wintering: open water areas, associated with flow-constricted areas (e.g. bridges, causeways)	Winter Resident, Foraging, Spring/Fall Migrant
Bobolink	2023 Acoustic Monitoring	Along the Strait of Canso (Melford Loop ARU)	Grasslands, fields, forage crops	Spring/Fall Migrant
Canada Warbler	2023 Acoustic Monitoring	Nocturnal flight call detected by Englands Lake ARU in fall; likely a passing migrant	Wet, mixed-wood forest with a well-developed shrub layer	Breeding, Foraging, Spring/Fall Migrant
Chimney Swift	2023 Diurnal Watch Survey	Eastern bank of the Strait of Canso, residential area	Breeding: urban areas with access to chimneys or other cavities, dead trees/forest and windthrow areas	Breeding, Foraging, Spring/Fall Migrant

Common Name	Source of Observation	Observed Habitat	Preferred Habitat	Habitat Suitability in and near the Study Area
Common Nighthawk	2023 Diurnal Movement Survey, 2023 Acoustic Monitoring, 2024 Incidental	Eastern bank of the Strait of Canso; Industrial area; foraging behaviour observed	Breeding/foraging: open and partially open habitats	Breeding, Foraging, Spring/Fall Migrant
Evening Grosbeak	2023 Acoustic Monitoring	Along the Strait of Canso (Melford Loop ARU)	Second growth to mature mixed wood or coniferous forest. Wintering habitat also includes urban and suburban areas	Foraging, Spring/Fall Migrant, Wintering
Harlequin Duck	2023 Diurnal Watch Survey	In the Strait of Canso	Wintering: rocky coastlines, exposed headlands	Wintering, Foraging, Spring/Fall Migrant
Olive-sided Flycatcher	2024 Breeding Bird Survey	Treed swamp just outside of the southern border of the Steep Creek side of the Study Area	Edges of coniferous or mixed forests with tall trees and snags alongside open areas	Breeding, Foraging, Spring/Fall Migrant
Peregrine Falcon - anatum/tundrius	2023 Incidental	Perched on a guardrail in Mulgrave, along the Strait of Canso	Coastal cliffs with an abundance of bird prey (often near seabird or shorebird colonies), urban areas	Breeding, Foraging, Spring/Fall Migrant

7.4.5.13 Effects Assessment

Project-Avifauna Interactions

Project activities, primarily those that involve earth moving, vegetation removal, or interactions with avifauna in the airspace, have the potential to impact avifauna (Table 7.65). These activities could result in habitat removal and fragmentation, reductions in food availability, and direct bird-transmission line interactions. Other Project related activities, including during construction and operation, may impact avifauna behaviours, such as increased traffic and noise.

Table 7.65: Potential Project-Avifauna Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Geophysical Environment		X		X	X	X		X	X			X	X		X

Assessment Boundaries

For the purposes of this assessment, the LAA for avifauna includes the Study Area as well as the airspace that is directly surrounding the towers and conductors. The RAA for avifauna includes the surrounding landscape, including Englands Lake, the Strait of Canso between Mulgrave and Middle Melford, and the airspace above these areas, up to approximately 1,500 m.

Assessment Criteria

Assessment criteria provided in Section 4.5 also apply for avifauna. The VC-specific definition for magnitude is as follows:

- Negligible – no loss of important avifauna habitat (e.g., breeding bird habitat) and no impacts to migratory avifauna are expected.
- Low – small loss of important habitat supporting avifauna and/or impacts to migratory avifauna are expected to be low.
- Moderate – moderate loss of important avifauna habitat and/or moderate impacts to migratory avifauna.
- High – high loss of important avifauna habitat and/or high impact to migratory that would be sufficient to impact species on a population scale.

Effects

Habitat Loss and Fragmentation

Habitat loss and fragmentation within the Study Area are anticipated to be modest, with only a limited area requiring clearing to accommodate the transmission line ROW and tower footings. The Project Area is 35.2 ha within the 183.1 ha Study Area. The Project design strategically minimizes the spatial footprint within sensitive avian habitats by prioritizing the use of existing access routes and previously disturbed areas wherever possible. This approach reduces the impact on undisturbed, high-quality habitat that is essential for various avian species, including those identified during the breeding bird surveys.

Micro-siting to avoid wetlands was completed during the Project planning phases. One wetland, WL 9, is expected to be partially altered (i.e., approximately 808 m^2 of wetland habitat). Five other wetlands will require clearing, which is not considered a wetland alteration as per NSECC policy.

Due to the limited footprint of infrastructure (i.e., two dead-end towers and two suspension towers) and the Project using an existing road network, habitat loss is limited to 5.0 ha. Additionally, trees will be cut along the transmission line ROW during the construction phase, and vegetation will be maintained throughout the Project's lifespan. Upon Project completion and reclamation, the habitat types are anticipated to return to conditions similar to those from baseline.

Although clearing has been reduced, habitat loss and fragmentation are unavoidable for the construction of the Project. Habitat loss, fragmentation, and degradation may render habitats unusable for certain species, and these factors are regarded as one of the main threats to birds in Canada (Birds Canada, 2020). Conversely, these cleared areas will create open spaces and edges within the forested environment, which may benefit certain bird species that favour edge or transitional habitats. Notably, some species identified in the breeding bird surveys are well-suited to edge habitats. For instance, species such as the American robin and common yellowthroat may increase their use of these altered habitats, as the newly created open areas within forested sections may support increased food availability and suitable nesting sites. Additionally, open edges may attract insect prey, enhancing foraging opportunities for insectivorous species. These changes could potentially create favorable microhabitats within the ROW, particularly for generalist bird species or those that readily adapt to disturbed environments.

As discussed in the desktop review section, the Project avoids coastal bird colonies in the area. Nearby colonies include common tern, great black-backed gull, herring gull, double-crested cormorant, great blue heron, and common eider. Of these species, the most observed during field surveys and remote sensing were double-crested cormorant, herring gull, great black-backed gull, and common tern, which were often observed flying through the Strait of Canso as it represents a flyway to different areas for foraging and refuge, as well as providing a connection to various colonies in the area (Drawing 7.23).

Based on the desktop review and incidental observations during field surveys, common nighthawk were identified in proximity to the Study Area. While common nighthawk are typically found in open habitats, the Project's limited clearing may introduce additional areas that align with the species' habitat preferences. For this species, the creation of suitable open habitat via clearing may provide increased foraging opportunities, particularly during evening hours when this species is active.

The olive-sided flycatcher was recorded near, but outside of, the Study Area boundary. This species typically requires large open areas interspersed with tall perches, and while the Project footprint is minimal, it is designed to maintain key forested areas with tall vegetation around the ROW, providing potential perching sites within proximity to open areas. This design approach could therefore retain habitat features that meet some of the foraging and roosting needs of evening grosbeak and olive-sided flycatchers, particularly during the breeding season.

Based on the SAR habitat modelling, the chimney swift (22.6%), common nighthawk (20.86%), evening grosbeak (29.84%), and olive-sided flycatcher (31.2%) had the highest abundance of predictive habitat within the Study Area. The Study Area may provide adequate foraging, migrating, and overwintering habitat for evening grosbeak, although the high level of disturbance and presence of younger forest within the Study Area likely makes it unsuitable breeding habitat. The disturbance level and presence of younger forest would also equate to the lack of mature trees and large snags for chimney swifts. Although potential breeding habitat may be lost, suitable habitat is available adjacent to the Project (see Drawings 7.26-7.35).

Habitat loss and fragmentation resulting from the Project is limited but is required for the ROW, tower areas, and along access roads. The Project has been designed to avoid impacts on large swathes of habitat. The small-scale clearing within the transmission line ROW will remove and fragment habitat but may introduce positive effects for edge-adapted species, potentially supporting foraging and nesting activities within these modified habitats. By maintaining adjacent forest structure where possible, the Project design accommodates the diverse habitat requirements of both common species and SAR documented within and in the area surrounding the Study Area, thereby supporting biodiversity while fulfilling project requirements.

Collision Risk Resulting in Injury

The diurnal movement surveys and radar monitoring program provide quantifiable insights into the volume, movement patterns, and flight heights of birds moving within the Study Area, enabling a more precise understanding of collision risk relative to the Project's infrastructure. Based on the height of the proposed airspace where the transmission lines will occupy, birds flying at heights estimated between 75 m and 225 m would be at potential risk of interacting with the Project infrastructure.

The diurnal movement surveys conducted between June 2023 and July 2024 indicate that 5,848 individual birds, representing 65 species, were observed in, near, or crossing the Strait of Canso. Most birds were observed at relatively low flight heights (90% of birds were documented flying below 100 m), and this movement was largely attributed to double-crested cormorants. Birds flying in the 100 m to 200 m height range accounted for about 6% of observations, while only 4% were observed flying above 200 meters. Therefore, the risk of direct collision with the transmission line infrastructure is limited to a minority of the observed bird movements.

Radar monitoring data, collected during the 2023 fall and 2024 spring migration periods, further supports a nuanced view of collision risk. The radar detected 1,322 BTs in fall 2023, with most detections occurring between 250 m to 1,000 m in altitude. In spring 2024, 1,073 BTs were observed, primarily between 250 m to 500 m and over 2000 m. Both data sets indicate that the majority of targets were recorded above the height of the transmission line, suggesting that many migratory birds traverse the Strait of Canso at altitudes that reduce collision potential with the proposed infrastructure.

There were differences noted in bird flying height between the diurnal movement data and the radar monitoring data. The differences could be attributed to the distance between the radar location and the eastern vantage point diurnal movement survey location. The radar unit has a scan radius up to 3 km and the eastern vantage point diurnal movement survey location is located approximately 10 km from the radar location. Therefore, the eastern vantage point diurnal movement survey location was covering a different area than the radar.

The radar data also highlight that only a small portion of bird movements were concentrated in the 100 m to 200 m range, where collision risk is more prominent. Fall migration activity was highly variable, with peaks occurring during specific migratory events, suggesting that while large numbers of birds may occasionally fly through the area, sustained high-risk periods are limited. Additionally, species composition within the 100 m to 200 m range was mixed, but seabirds and waterfowl, groups commonly documented at higher altitudes, represented a notable proportion of birds flying at these heights.

Based on the height of the proposed airspace where the transmission lines will occupy, birds flying at heights between 75 m and 210 m would be at potential risk of interacting with the Project infrastructure. Approximately 0.09% of birds were detected in this height range during the fall 2023 monitoring period, 26% during the 2024 spring monitoring period, and 9% during the summer/fall monitoring period.

Overall, collision risk due to the proposed transmission line appears limited, as a significant portion of bird movement occurs below or above the critical 100 m to 200 m height range of concern. The data from diurnal and radar surveys suggest that most birds likely to encounter the transmission line will do so at heights that are less likely to result in collisions. Furthermore, the Project will include mitigation measures such as line markers to improve line visibility, particularly during low-light conditions, thereby reducing collision risks further. Consequently, while there is a measurable risk, particularly for seabirds and waterfowl flying within the risk height range, the overall level of risk to bird populations moving through the Strait of Canso is expected to be low.

Based on studies, shield wires on transmission lines are the lines that are most associated with bird collisions as they are the highest wires and are less thick which makes them more difficult to see (APLIC, 2012). Potential collision increases when birds increase altitude to avoid more visible infrastructure (i.e., phase conductors), which can place them at the same elevation of shield wires (APLIC, 2012). Various studies of high collision rate transmission lines show that collision risk can reduce by 50% to 80% when these lines are marked, although this can vary based on location and environmental factors (Barrientos et al., 2011). Because of the length of the crossing, larger overhead shield wires will be used that will improve visibility for birds similar to the size of the conductors.

Another aerial concern is the creation of edge habitat and open areas attracting aerial insectivores (e.g., swallows, chimney swifts, common nighthawks, flycatchers, etc.). A site-specific post-construction monitoring plan will be developed in consultation with NSECC, NSNR, and all other relevant parties.

Overall, bird studies on transmission lines have showed varying results. Rioux et al. (2013) noted that estimating bird mortality from collisions with power lines is challenging due to a lack of studies and factors like carcass scavenging, which can limit survey efforts. The study notes that waterfowl, grebes, shorebirds, and cranes appear to be particularly vulnerable to collision.

Other studies have shown that individual bird losses from collisions are not biologically significant and are unlikely to impact species of birds that have large populations (APLIC, 2012). The Auld's Cove Transmission Project EA (NSPI, 2016), approximately 10 km northwest of the Project Study Area, involved surveys at existing NSPI transmission lines within the Strait of Canso and showed similar results with regards to species observed and flight behaviour.

The main findings from the Auld's Cove Transmission Project EA (NSPI, 2016) included:

- The vast majority (approximately 87%) of birds were observed to fly well below the transmission lines or skim the water. Double-crested cormorants were the most abundant species observed, which commonly skimmed the water underneath the lines.
- 10.1% of all species observed passed either just below or just above the lines and 1% passed through the lines. No mortality events or collisions were observed at Auld's Cove during the field assessment.
- Similar to daytime observations, avoidance behaviour was even observed during low light conditions at night for all birds (80% of which were gulls).
- Proportionately more birds flew closer to the lines (along with approximately 13 collisions) at the Canso Causeway than at Auld's Cove, which may be due to the presence of the causeway itself as a physical barrier as well as the lower height of the power lines. The physical barrier presented by the causeway along with vehicular traffic is likely the cause of birds flying closer to the lines to avoid collisions with vehicles and causeway infrastructure. The Auld's Cove transmission line would be more comparable to the proposed NSPI Strait Crossing transmission line.
- Gulls, gannets, and cormorants appeared to have the closest interactions with the lines, along with avoidance behaviour.
- The radar data indicates that several species were observed within the altitudinal bins of the wires upon approach and altered their flight paths as they approached the lines at Auld's Cove. These patterns were observed during the day and at night.
- No nesting on towers was observed.

- Although tide and food availability impact the number of birds in the area, tide did not correlate with increased potential interactions with the lines. Weather, wind, and fog reducing visibility increased risk for potential interaction.
- At Auld's Cove, terns, sea ducks and waterfowl, seabirds, shorebirds, and other species (passerines/raptors) were assigned a risk score of low while cormorants, gulls, and Northern gannets were assigned a risk score of moderate.

Migration Disruption

Birds moving through this area during migration seasons may encounter the transmission line as a new structural barrier, potentially leading to slight alterations in their natural flight paths, which could result in additional energy expenditure to avoid this obstacle. This is particularly relevant for species traveling at altitudes within the line's height range, as they may need to navigate around or above infrastructure. Diurnal movement surveys indicate that while a large portion of birds fly below the line's height, a notable minority travel within or above the conductor height, suggesting that these species may experience a low level of disruption to migration. The radar results also suggested that most targets were moving above the line height.

The transmission line may also influence migratory patterns indirectly by altering the landscape within a corridor. The modified airspace could lead to temporary disorientation for birds unfamiliar with the infrastructure, especially during low visibility conditions such as fog or heavy rain, which are common in the region. Additionally, radar surveys have shown peaks in migration during fall and spring, with high-altitude movements in certain periods, indicating that while some birds fly well above the line's range, there are episodic migration events where more birds could be affected. Thus, although overall disruption to migratory routes is likely minimal, specific conditions or migration events may increase the likelihood of navigational adjustments as birds cross this altered environment.

Sensory Disturbance

Construction activities for the Project including increased traffic, noise, and lighting have the potential to disturb bird species within the Study Area.

Increased vehicle traffic along access roads and construction sites adds another disturbance factor. The movement of vehicles could lead to short-term displacement of birds, particularly ground-nesting or low-flying species within proximity to access routes. Traffic disturbance can be particularly stressful for species with established territories within the area, potentially prompting them to abandon nests or avoid otherwise suitable habitat. Overall, while these construction-related disturbances are temporary, they may cause localized changes in bird distribution and behaviour during the active phases of the Project.

Noise from heavy machinery and equipment, most prevalent during the construction phase of the Project, can disrupt normal behaviours such as foraging, breeding, and resting, especially for sensitive species documented during breeding bird surveys. The sounds associated with construction, while temporary, may lead some birds to avoid areas near active construction zones, possibly altering their habitat use patterns during critical breeding or migration periods.

Noise and vibrations are provincially regulated under the Workplace Health and Safety Regulations, N.S. Reg. 52/2013 to protect the health and safety of site workers and the general public, which will help mitigate any negative impacts to bird species. Sensory disturbance from noise can impact birds in a number of ways. Birds can exhibit greater susceptibility to noise impacts as many species rely on vocal communication (Blickley & Patricelli, 2010). Avifauna may be displaced from areas adjacent to the Project from construction related noise. Impacts can also differ between acute and chronic noise sources. Chronic exposure may degrade auditory cues, feedback, and vocal development over time, important for predator/prey detection, communication, breeding, and orientation (Blickley & Patricelli, 2010; Marler et al., 1973; Shannon et al., 2016). A direct physiological impact causing a temporary decrease in auditory sensitivity can occur at acute noise levels above 93 dBA, while permanent damage to avian auditory systems is not recorded until 125 to 140 dBA (Blickley & Patricelli, 2010). Some bird species may not be impacted by sensory disturbances. A study of the impact of logging truck traffic on bird reports no observed effects on nesting at noise levels of 53 dBA (Grubb et al., 1998). It was also found that noise tolerant species had increased nesting success through decreasing nest predation (Francis et al., 2009). The median sound level produced by construction equipment at 15 m from point source is expected to be 95 dBA. Therefore, impacts to auditory sensitivity may occur from acute noise on a short term and intermittent frequency during the construction phase. The decibel limits of construction equipment required for the Project are not expected to be greater than 115 dBA, indicating permanent damage to avian auditory systems is not likely to occur.

A literature review conducted by Shannon et al. (2016) found that birds have the potential to exhibit changes in song characteristics, reproduction, abundance, stress levels, and species richness at levels greater than 45 dBA. Sensory disturbance from noise levels associated with construction activities during the avian breeding season could result in abandonment of nests. If adjacent suitable habitat is not available, birds that have been displaced are not likely to nest until habitat becomes available which may result in a higher non-breeding population. According to habitat modelling results, where breeding habitat may be impacted by the Project, adjacent breeding habitat will remain available for all SAR (Drawings 7.26 to 7.35).

Lighting used during construction, particularly if activities extend into early morning or late evening hours, could also impact birds within the vicinity. Artificial lighting may disorient nocturnally active birds, increasing the likelihood of attracting them closer to construction areas. For species sensitive to light, especially migratory and nocturnal species, this could temporarily alter natural behaviours or increase the risk of collisions with infrastructure. Given the frequency of foggy conditions in the region, light intensity may be amplified, further enhancing the potential for disturbance. Light sensory disturbance that can impact birds includes behavioural effects such as disorientation, avoidance, or attraction (Longcore & Rich, 2004). Disoriented migratory birds are prone to circling light sources, which increases the potential for death by exhaustion or predation when forced to land in high-risk areas. In turn, these behavioural changes can affect the success of foraging, reproduction, and communication of wildlife and can disrupt habitat connectivity (Bliss-Ketchum et al., 2016; Longcore & Rich, 2004). The Proponent intends to complete construction activities between 7:00 am and 7:00 pm.

Upon completion of construction and throughout the lifespan of the Project, the navigation hazard lights on the transmission towers, required by TC, are typically designed to flash only a few times per minute at night, are expected to have minimal sensory disturbance effects on birds due to their low intensity and infrequent flashes. At night, and especially during nights of cloudy skies and low ceiling, artificial lighting can attract birds during migration. Lights that are known to increase disorientation include consistent white or red lights. Strobe lights or intermittent/flashing lights have been shown to decrease avian mortality as it interrupts the zone of influence that lighting on birds can have (Longcore et al., 2008). While continuous lighting can attract or disorient birds, especially nocturnal migrants, the brief and low-frequency nature of these lights reduces the risk of such disruptions. This design minimizes the likelihood of interference with natural flight paths or nocturnal navigation, especially since most bird movements in the area, as shown in diurnal and radar surveys, occur during the daytime.

For nocturnally active species that may be more sensitive to artificial lighting, the risk of attraction or disorientation remains low due to the limited light exposure. In the event of foggy or low-visibility conditions, the short, infrequent flashes will also reduce the overall light presence, limiting the potential for enhanced attraction effects. Consequently, the sensory disturbance from these navigation lights is expected to be minimal, posing a low risk to bird populations within the Strait of Canso.

Mitigation Measures

The primary mitigation for avifauna is avoidance in the siting of infrastructure, including:

- Avoidance of impacts to the marine environment (e.g., limiting infrastructure impact to coastline as well as no underwater infrastructure).
- Avoidance, to the extent possible, of important bird habitats, such as wetlands, watercourses, old growth forest, etc. to reduce the impact of habitat changes. This includes siting Project infrastructure within areas with existing disturbances, such as existing roads and cutover areas of forest.

Mitigations to reduce effects on avifauna include:

- Install line markers on the powerlines as required by NAV Canada to increase visibility.
- Follow TC requirements for navigational hazard markings and lighting on transmission lines, including the installation of strobe or intermittent/flashing lighting.
- Use large conductors and overhead shield wire diameters to improve visibility and reduce avian mortality risk.
- Install perch guards on poles and bird diverters/deflectors on lines to limit interactions with birds.
- Adhere to ECCC guidelines on clearing windows for nesting migratory birds, where possible. Vegetation clearing activities will be conducted outside of the regional nesting period for the Study Area, which is April 15 to August 31 (ECCC, 2024c). Timing of clearing activities are generally dependent on seasonal conditions. If vegetation and tree clearing activities during the nesting/breeding season cannot be avoided, nest

sweeps will be conducted by a qualified avian biologist to search for any confirmed activity which must be avoided (i.e., active nests and recently fledged juveniles).
    - Regulatory bodies will be contacted, when necessary, to receive advice on construction buffers for any avian activity that must be avoided during the nesting/breeding season. When vegetation and tree clearing activities take place during the non-nesting/breeding season, crew must be aware and look out for nests protected year-round under the 2022 update to the Migratory Bird Regulations, which includes great blue heron and pileated woodpecker nests (i.e., inactive pileated woodpecker nests are protected for three years and inactive great blue heron nests are protected for two years).
- Avoid disturbance of any ground- or burrow-nesting species should they initiate breeding activities within stockpiles or exposed areas during construction or operations, until chicks can fly, and the nesting areas are no longer being used.
- Establish speed limits within construction areas for vehicles to mitigate the effect of vehicle-avifauna collisions.
- Require that construction equipment and vehicles have mufflers installed to limit noise.
- Minimize, as much as possible, removal of large diameter decaying trees (>40 cm diameter at breast height).
- Minimize lighting to the extent possible to limit impacts to wildlife (e.g., downward facing lights and motion-activated lighting). LED lights will be used where possible, as they are less prone to light trespass on the surrounding environment.
- Have designated garbage cans and pack out all waste to avoid attracting avifauna to the construction site. Maintain good housekeeping practices during construction to avoid indirectly feeding birds and potentially attracting nuisance wildlife.
- Develop a spill response plan, and an emergency response plan within the Contingency Plan to mitigate the impacts of spills, hazardous substances, and other emergencies. Equip site machinery with spill kits and instruct site personnel on their use.
- Minimize use of herbicides within the transmission line ROW.
- Maintain compatible vegetation within the transmission line ROW.
- Allow disturbed areas to naturally revegetate, where vegetation maintenance is not required during operations.
- Develop a site reclamation plan in accordance with engineering standards and in consultation with NSECC and NSNR.
- Minimize soil compaction along with the removal of hummocks, root masses, moss cover, ferns, and other ground vegetation that may provide good concealment of ground nests.

Monitoring

A site-specific post-construction monitoring plan will be developed in consultation with NSECC, NSNR, and all other relevant parties. Some preliminary monitoring activities related to avifauna may include post construction mortality monitoring.

Conclusion
Based on this assessment and through the implementation of proposed mitigation and monitoring activities, effects to avifauna are expected to be:

- **Magnitude** – Low magnitude.
- **Geographic extent** – Within the LAA.
- **Frequency** – Intermittent frequency during the construction and decommissioning phases, and continuous during operation.
- **Duration** – Medium duration, as some effects will extent throughout the operation of the Project.
- **Reversibility** – Reversible, as the effects will terminate at the end of the Project lifespan.
- **Significance** – Not significant.

8.0 SOCIO-ECONOMIC ENVIRONMENT

8.1 Economy

8.1.1 Overview and Assessment Methodology

The assessment of the economy includes consideration of local demographics, household income levels, and commercial businesses, as well as the contributions of the Project to the local economy through a review of the following resources:

- Census of Population (Statistics Canada, 2023)
- Taxation legislation
- Public mapping resources
- Economic data from the Proponent

8.1.2 Existing Environment

The Project is in Guysborough and Richmond counties. The largest nearby communities are Guysborough (22 km southwest) and the Town of Port Hawkesbury (approximately 4 km north within Inverness County), respectively.

Population statistics were summarized using the 2016 and 2021 Census of Population for the province, census divisions of Guysborough County and Richmond County, and the census subdivision of the Town of Port Hawkesbury (Table 8.1) (Statistics Canada, 2023). The two counties both experienced a population decline between 2016 and 2021, while the more densely populated Town of Port Hawkesbury had a nearly static population.

Table 8.1: Population Characteristics from 2016-2021 for Nova Scotia, Guysborough and Richmond Counties, and the Town of Port Hawkesbury

Population Statistics	Nova Scotia	Guysborough County	Richmond County	Town of Port Hawkesbury
Population in 2021	969,383	7,373	8,914	3,210
Population in 2016	923,598	7,625	8,964	3,214
Population change from 2016 to 2021	+5.0%	-3.3%	- 0.6%	- 0.1%
Total private dwellings in 2021	476,007	3,559	5,230	1,523
Land area	52,824.71 km^2	4,037.16 km^2	1,246.08 km^2	8.10 km^2
Population density	18.4/km^2	1.8/km^2	7.2/km^2	396.3/km^2

Source: (Statistics Canada, 2023)

The age distribution in Guysborough County reveals a median age of 58.0 years, over 10 years higher than the provincial median age of 45.6 (Statistics Canada, 2023). The age distribution in Richmond County reveals a median age of 54.4 years (Statistics Canada, 2023). Further statistics on age distribution in 2021 were compared for the province and Guysborough and Richmond counties (Table 8.2).

Table 8.2: Age Distribution in 2021 in Nova Scotia, Guysborough and Richmond Counties, and the Town of Port Hawkesbury

Age Statistics	Nova Scotia	Guysborough County	Richmond County	Town of Port Hawkesbury
Median age	45.6	58.0	54.4	46.8
0 to 14 years	136,710 (14.1%)	810 (11.0%)	1,025 (11.5%)	425 (13.2%)
15 to 64 years	617,345 (63.7%)	4,035 (54.7%)	5,090 (57.1%)	2,000 (62.3%)
65+ years	215,325 (22.2%)	2,525 (34.3%)	2,800 (31.4%)	780 (24.3%)
Total Population	969,380	7,370	8,915	3,210

Source: (Statistics Canada, 2023)
Note that due to rounding, total percentage may be ±100%.

Average housing and income statistics for Guysborough and Richmond counties and the Town of Port Hawkesbury were compared to the provincial and federal averages (Table 8.3).

Table 8.3: Housing Costs and Median Individual Income in 2020 for Canada, Nova Scotia, Guysborough and Richmond Counties, and the Town of Port Hawkesbury

Housing and Income Statistics	Canada	Nova Scotia	Guysborough County	Richmond County	Town of Port Hawkesbury
Median total income (2020)	$41,200	$38,000	$32,000	$33,200	$34,000
Median dwelling value	$618,500	$250,000	$164,400	$214,800	$186,400
Median monthly shelter costs for owned dwellings	$1,498	$870	$424	$524	$820

Housing and Income Statistics	Canada	Nova Scotia	Guysborough County	Richmond County	Town of Port Hawkesbury
% of owner households spending 30% or more of its income on shelter costs	14.8%	9.7%	6.7%	8.9%	11.6%
Median monthly shelter costs for rented dwellings	$1,209	$1,000	$556	$725	$810
% of tenant households spending 30% or more of its income on shelter costs	33.2%	34.7%	24.7%	28.1%	27.0%

Source: (Statistics Canada, 2023)

Most residents in Guysborough (98.7%) and Richmond (83.7%) counties and the Town of Port Hawkesbury (97.5%) use English as their first official language spoken (Statistics Canada, 2023). All public outreach and communication for the Project has been and will continue to be in English. There is some knowledge of other languages, though no communication has been requested in other languages.

The two closest fire stations to the Study Area in Guysborough and Richmond counties are the Mulgrave Fire Hall (6 km northwest of the Study Area) and Port Hawkesbury Fire Department (5.8 km north of the Study Area), respectively. Health and emergency services also exist in the area and are accessible to Project workers, if the need should arise. The closest location is the Strait Richmond Hospital, approximately 9.5 km northeast of the Study Area on Hospital Road in Cleveland, which also provides health services to the community of Richmond in Richmond County. The rural community of Guysborough receives healthcare services from the Guysborough Memorial hospital, approximately 21 km from the Project in Guysborough County.

As shown in Table 8.4, Statistics for Guysborough and Richmond counties indicate that the unemployment rate in 2021 was 18.6% and 16.4%, respectively, both higher than the provincial unemployment rate of 12.7% (Statistics Canada, 2023). Similarly, the employment rate for Guysborough and Richmond counties was 38.9% and 39.8%, respectively, which are both lower than the provincial employment rate of 51.9% (Statistics Canada, 2023). The Town of Port Hawkesbury has a higher employment rate (46.9%) than these counties, though a similar unemployment rate (18.4%). Overall, the Canadian employment rate (57.1%) is higher and unemployment rate is lower (10.3%) than Nova Scotia statistics (Statistics Canada, 2023).

Table 8.4: Employment Statistics for Canada, Nova Scotia, Guysborough and Richmond County, and Town of Port Hawkesbury

Unemployment Statistics	Canada	Nova Scotia	Guysborough County	Richmond County	Town of Port Hawkesbury
Employment rate	57.1%	51.9%	38.9%	39.8%	46.9%
Unemployment rate	10.3%	12.7%	18.6%	16.4%	18.4%

Source: (Statistics Canada, 2023)

The top eight industries in Guysborough County in 2017 were compared with the top industries in the province (Table 8.5). The highest proportion of workers in Guysborough County fall into the “agriculture, forestry, fishing and hunting” and “health care and social assistance” categories (19.4% and 13.4%). The highest proportion of workers in Richmond County were in “health care and social assistance” and “retail trade” (15.2% and 10.1%). Other significant industries in both counties include “construction”, “manufacturing”, “retail trade”, and “educational services”. The Town of Port Hawkesbury differs from its county, Richmond County, with a much higher proportion of people employed in its two top employment categories of “retail trade” and “accommodation and food services” (19.4% and 11.3%).

Table 8.5: Top Industries for the Employed Labour Force in 2017 – Nova Scotia, Guysborough and Richmond Counties, and the Town of Port Hawkesbury

Industry	Nova Scotia	Guysborough County	Richmond County	Town of Port Hawkesbury
Total employed labour force ≥ 15 years	487,260	3,095	3,695	1,550
Agriculture, forestry, fishing and hunting	17,880 (3.7%)	600 (19.4%)	310 (8.4%)	20 (1.3%)
Health care and social assistance	70,595 (14.5%)	415 (13.4%)	560 (15.2%)	150 (9.7%)
Retail trade	58,985 (12.1%)	250 (8.1%)	375 (10.1%)	300 (19.4%)
Construction	35,720 (7.3%)	230 (7.4%)	355 (9.6%)	80 (5.2%)
Manufacturing	31,210 (6.4%)	225 (7.3%)	360 (9.7%)	130 (8.4%)
Educational services	38,425 (7.9%)	225 (8.2%)	340 (9.2%)	140 (9.0%)
Public administration	42,070 (8.6%)	220 (7.1%)	210 (5.7%)	95 (6.1%)
Accommodation and Food Services	30,010 (6.2%)	130 (4.2%)	220 (6.0%)	175 (11.3%)

Source: (Statistics Canada, 2023)

Point Tupper is located immediately north of the Richmond County side of the Project and spans between the Study Area’s northern boundary and the southern boundary of Port Hawkesbury. Point Tupper hosts a variety of industrially focused businesses (Table 8.6). The Town of Port Hawkesbury is the closest economic and urban population center, located approximately 4 km north of the Project in Richmond County and offering a range of business services. Mulgrave and Richmond, in Guysborough and Richmond counties, are communities nearby the Project Area. A review of some of the businesses located near the Project, both within and around the above communities, was completed (Table 8.6).

Table 8.6: Local Businesses and Proximity to the Project

Business	Locale	Approximate Distance and Direction to the Project[1]
Point Tupper Marine Services Co.	Richmond	<1 km north, on Industrial Park Road
EverWind Terminals Canada Partnership	Richmond	<1 km north, on Industrial Park Road
SGS Canada Inc	Richmond	1 km north, on Industrial Park Road
Point Tupper Wind Farm	Richmond	1 km southeast, on Bear Island Road
Raw Steel Fabrication Limited	Richmond	2 km north, on Heavy Water Road
Point Tupper Generating Station	Richmond	2 km north, on Industrial Park Road
Port Hawkesbury Paper, LP	Richmond	2.5 km north, on Industrial Park Road
Cabot Gypsum ULC	Richmond	4 km northwest, on Henry Paint Street
Mulgrave Mansion (house rental)	Mulgrave	5 km northwest, on Hwy 344
Strait of Canso Superport	Mulgrave	5.5 km northwest, on Main Street
The Front Porch Café & Ice-cream Bar	Mulgrave	6.4 km northwest, on Loggie Street
DSM Nutritional Products	Mulgrave	6.5 km northwest, on England Avenue
Mulgrave Machine Works Limited	Mulgrave	6.5 km northwest, on England Avenue
Jamo's Auto and Wash	Town of Port Hawkesbury	4.75 km northwest, on Syndey Road
Shindigs Pub	Town of Port Hawkesbury	4.75 km northwest, on Granville Street

[1]All distances measured from centre of the Study Area within the same county, straight-line distance.

8.1.3 Effects Assessment

Project-Economy Interactions

Project activities have the potential to interact with the economy during all phases of the Project (Table 8.7).

Table 8.7: Potential Project-Economy Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Tower Components	Tower Assembly	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Economy	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Assessment Boundaries

The LAA for economy is Guysborough and Richmond counties. The RAA for economy includes the entire province.

Assessment Criteria

Assessment criteria provided in Section 4.5 apply for the economy as well. The VC-specific definition for magnitude is as follows:

- Positive – Project is expected to have a positive effect on the economy.
- Negative – Project is expected to have a negative effect on the economy.

Effects

It is estimated that the Project will result in approximately $40 million in investments to the province of Nova Scotia throughout all phases of the Project (including decommissioning). The Project will enable the development of Phase 2 where EverWind plans to spend $10.3 billion in capital investments across the projects (Deloitte LLP, 2024). More than two-thirds of all capital investments will be sourced from suppliers located in Canada. Furthermore, nearly 50% of capital investments will be sourced from suppliers within Nova Scotia, which demonstrates an important impact that the projects will have on the local communities (Deloitte LLP, 2024).

The Proponent is committed to sharing economic opportunities with the local community throughout the development and lifespan of the Project via the use of local skills and labour where possible, municipal tax revenue, and on-going energy literacy/education (such as presentations about renewable energy at local schools, participation in job fairs, community meetings or for municipal councils, windfarm tours and visits, etc.). The Project Team has and will continue to engage the community, local businesses, and municipal staff and leaders to help identify Project-related opportunities and benefits for the local community.

The Proponent understands the importance of supporting local communities and is committed to using as many local skills as possible. Potential work includes environmental studies, geotechnical investigation, engineering, land and snow clearing, surveying, worksite security, road construction and maintenance, transportation, tower foundation construction, tower installation, collector system construction, and substation construction. Specifically, elements of job creation throughout the lifespan of the Project may include:

- Project Development – During the development phase of the Project, Nova Scotian professionals have and will continue to deliver services in a variety of areas, including civil and electrical engineering, geotechnical engineering, legal, environmental and biological surveys, archaeological, land and community relations, and many others. Dozens of professionals within Nova Scotia will render their services as part of the development of the Project.
- Construction – Though the construction phase of the Project is relatively short (six months), it will require a large workforce that will fluctuate throughout the construction period. Much of the construction employment will come through contracting and

subcontracting of Canadian, and where possible, Nova Scotian construction firms and specialized service providers. It is estimated that the Project will require approximately 50 jobs for varying scope and duration throughout the approximately six-month construction period. The largest construction scopes of work are anticipated to be:

  - Civil installation, that is, land clearing, grubbing, road construction, and foundation installation, which includes:
    - Excavating
    - Rebar supply and installation
    - Anchor bolt supply and installation
    - Forming
    - Concrete supply and pouring
    - Grouting
  - Tower assembly and erection, that is, offloading and assembling tower components, and stacking the tower components, which includes:
    - Tower delivery to site
    - Crane supply or helicopter
    - Tower offload and erection
  - Electrical installation, that is, transmission line, collector line and other infrastructure installation and commissioning, which includes:
    - Underground and overhead installation
    - Cable terminations
    - Electrical testing
    - Instrument installation and testing

- The Proponent will look to maximize local content where appropriate. To this end, the Proponent will hold a job fair prior to the start of construction to engage with local community members and service providers and identify suitable candidates and/or businesses to support the construction phase employment and service providers. It is anticipated that the construction phase of the Project will overlap with the construction phase of the adjacent Phase 2 wind development site and the construction scope of work will be extended to enhance opportunities for the community for a longer period.
- Operations and Maintenance – Operational transmission projects require long-term operations and maintenance professionals to be located either on-site or within short driving distance of the Project. A nearby operations manager will be required to oversee routine maintenance and respond to unplanned incidents. This individual will work closely with local service providers who will carry out high-voltage maintenance work, collection maintenance work, snow removal, ice removal from the powerlines, road maintenance and vegetation maintenance. In all, it is anticipated that there will be up to four part-time jobs associated with the Project. The employment associated with operations and maintenance is long-term, local, stable, and well-paying jobs requiring skillsets such as experience managing facilities and working with or around high-voltage systems.
- As part of the EverWind's Phase 2 projects (in Guysborough County), the Proponent will make available a Bursary Fund prior to commercial operations for community members who want to train in the renewables industry. This will support the additional

use of local labour and skills both during the construction phase and operations phase of the Project. The Proponent has been working directly with the Strait Area Campus of the Nova Scotia Community College to support the development of renewable energy programs to support the projects and communities in the Strait Area.

In addition to the direct investments that the Project would bring to Nova Scotia's economy, the Project will result in indirect and induced economic benefits that will be realized by governments, local businesses, communities, and residents. Workers that are directly involved with the development, construction and operations would contribute to the local economy through payments for a variety of goods and services such as hotels, restaurants, and grocery stores (NREL, n.d.).

The Project and its associated 75 m midspan clearance was designed to take into consideration potential future economic drivers within the Strait of Canso, including research conducted by Waterford Energy Services Inc. to develop a Strait of Canso Sustainable Infrastructure Strategy (WESI, 2025). Siting of the Project was done in-land of the major proposed and viable offshore wind ports, as determined by the study, including Melford, while enabling large industrial vessels to continue operating in the Strait for future uses such as offshore wind operations and maintenance vessels.

Mitigation Measures
The economic impact to the LAA and RAA is positive; therefore, no mitigation is proposed.

Monitoring
No monitoring is for economy is recommended.

Conclusion
The impacts to the economy are characterized as follows:

- **Magnitude** – Have a positive impact on the economy.
- **Geographic extent** – Extend to the RAA.
- **Frequency** – Occur continuously during the Project lifespan.
- **Duration** – Be of long duration as the effects will last through the decommissioning phase.
- **Reversibility** – Irreversible as the effects are unlikely to be reversed.
- **Significance** – No significant negative impacts. Positive impacts expected (significance not evaluated) due to economic stimulus.

8.2 Land Use and Value

8.2.1 Overview and Assessment Methodology

An assessment of land use and value was completed through a review of desktop resources and in consideration of feedback from public engagement to evaluate how the Project may interact with this VC. The following resources and regulatory instruments were reviewed:

- Nova Scotia property records
- Public mapping resources
- Literature review of property values and high-voltage transmission infrastructure
- Visual renderings of the Project supplied to Strum, prepared by WSP

8.2.2 Existing Environment

The Project includes infrastructure on both side of the Strait of Canso, which separates Cape Breton Island from mainland Nova Scotia. Therefore, the Study Area is in both Guysborough (mainland NS) and Richmond (Cape Breton Island) counties. All of the Study Area is on private land. Land around the Steep Creek side of the Study Area is primarily used for forestry, both on Crown and private land. Land around the Point Tupper side of the Study Area is used for a mix of forestry, industrial applications, and renewable energy generation including wind turbines. Strum staff have observed ATV use of roads within the Steep Creek side of the Study Area, but there are no dedicated ATV or hiking trails within this portion of the Study Area based on a scan of publicly available recreational websites and on-site observations during field studies. Additionally, the proximity of the Study Area to buildings and workplaces in both Steep Creek and Point Tupper means that hunting is not permitted within most of the Study Area, based on provincial hunting regulations.

There are several proposed developments within the vicinity of this Project, including the Goose Harbour Lake Wind Farm Project, the future EverWind Phase 2 wind farms, the Melford International Terminal, the EverWind Fuels Point Tupper Green Hydrogen/Ammonia Project, and the Bear Head Energy Green Hydrogen and Ammonia Project. The Goose Harbour Lake Wind Farm Project is a wind development of 29 wind turbines that received EA Approval in 2023 (Strum Consulting, 2023) and for which construction has begun. The Melford International Terminal is a marine shipping terminal and rail line that received EA Approval in 2008 (AMEC, 2008). The EverWind Fuels Point Tupper Green Hydrogen/Ammonia Project is a Certified Green energy hydrogen and ammonia production facility that received EA Approval in 2023 (Strum Consulting, 2022), located partially within the Project's Study Area. The Bear Head Energy Project is a green hydrogen and ammonia production, storage and loading facility that received EA Approval in 2023, located approximately 2 km southeast of the Project (Stantec, 2023).

The Port Hawkesbury Municipal Water Supply watershed overlaps with and continues to the north of the Study Area in Richmond and Inverness counties. Other nearby protected areas include the River Inhabitants Nature Reserve, approximately 10 km northeast of the Project in Inverness County, and MacLeod Brook Nature Reserve, approximately 16 km west in Guysborough County.
There are no Mi'kmaq reserve lands within 10 km of the Study Area. Further consideration of Mi'kmaq resources and the results of the MEKS is included in Section 5.0, and further consideration of the Project's geophysical environment is included in Section 7.2.

The main commercial fishing activities in the Strait of Canso include lobster, mackerel, scallop, and shrimp. The majority of the catch weight landings from 2010 to 2014 are at the southern mouth of the Strait of Canso, north of Chedabucto Bay (Butler & Coffen-Smout, 2017). The following are a list of the main commercial fishing zones that overlap with the Project Area:

- Lobster fishing areas (LFA) 29
- Mackerel Zone 4W
- Scallop fishing area (SFA) 29E
- Shrimp fishing area (SFA) 15

The Strait of Canso is host to a variety of shipping traffic as part of import and export of a variety of resources including coal, wood fibre, and soon, green hydrogen and ammonia. Port facilities for loading and unloading ships are found at several points north of the Project including at EverWind Terminals, Point Tupper Generating Station, Port Hawkesbury Paper, Cabot Gypsum, the Strait of Canso Superport, and the Martin Marietta Porcupine Mountain Quarry. Additional port facilities are planned south of Project as part of the Bear Head Energy Project, south of the Proponent's Facility at Point Tupper.

There are no provincial or federal guidelines related to viewscapes in the vicinity of the Project. At the municipal level, visual impacts are typically considered during the review and approval of development permits, though utility infrastructure is often not subject to restrictive provisions. The Municipality of the District of Guysborough permits public and private utilities on any land use type where their installation does not contravene other lot standards (MODG, 2022). The Municipality of the County of Richmond explicitly acknowledges the importance of utilities to economic development and thus permits utility uses throughout the West Richmond planning area with no consideration of potential visual impacts (MCR, 2000).

Obstruction marking and lighting for operational transmission lines lighting is regulated by NAV Canada and TC (2021).

The Steep Creek side of the Study Area has minimal presence of overhead infrastructure or human-made structures that affect the viewscape of the Strait area, especially near the Project Area. The area has a sloped topography towards the Strait of Canso and a series of coves that restrict visibility of elevated infrastructure while travelling Highway 344. The highway also has adjacent distribution power lines, bringing utilities to the communities along its length. Viewpoints from the Steep Creek side of the Study Area offer a clear view of industrial development on the Point Tupper side of the Study Area including petrochemical storage tanks, wind turbines, industrial plants, stockpiles, and more.

Point Tupper has gentler topography sloping towards the Strait of Canso, with a greater presence of elevated infrastructure and industrial facilities near the Project Area due to industrial development within the Point Tupper Industrial Park. Viewpoints from the Point Tupper side of the Study Area offer better views of industrial activities on the Steep Creek side than one can observe from the Steep Creek side, such as the linear forest clearing for the MANE pipeline.

View planes looking out over the Strait of Canso from Point Tupper are relatively less impacted by human development than from Steep Creek, but users of Point Tupper are likely to be associated with industrial and not recreational or leisure activities. See section 8.4 for further discussion of existing recreational uses of the areas surrounding the Study Area.

8.2.3 Effects Assessment

Project-Land Use and Value Interactions

Project activities have the potential to interact with land use and value during all phases of the Project (Table 8.8).

Table 8.8: Potential Project-Land Use and Value Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Tower Components	Tower Assembly	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Land Use and Value				X	X	X	X	X	X		X	X	X	X	X

Assessment Boundaries

The LAA for land use and value is a 200 m buffer around the Project towers and associated transmission lines, based on research on the maximum area of impact to property values associated with HVTLs. Researchers frequently use this distance as a mid-range distance from transmission infrastructure, beyond which no significant effects on property value are expected (Brinkley & Leach, 2019; Hamilton & Schwann, 1995) (Drawing 8.1). The RAA is not applicable.

Assessment Criteria

Assessment criteria provided in Section 4.5 apply for land use and value as well. The VC-specific definition for magnitude is as follows:

- Negligible – no change in land value expected and surrounding land use can largely continue.
- Low – small change in land value expected and/or minor limitations to surrounding land use.
- Moderate – moderate change in land value and/or moderate limitations to surrounding land use.
- High – high change in land value and/or widespread limitation to surrounding land use.

Effects
Transmission towers have a relatively small footprint compared to the extent of the transmission lines that they support. This makes them compatible with a variety of other land uses as they are found throughout human-inhabited areas. The Point Tupper side of the Study Area is in a primarily industrialized area that hosts a variety of commercial and industrial uses. The presence of HVTLs is highly compatible with this type of land-use, as such infrastructure is often required to support industrial activities. Within Guysborough County, desktop review and field visits revealed no current land uses such as recreation within the Study Area that would be affected by the Project. Similarly, there are no Crown land parcels within the Study Area for which access would be affected by the Project.

The transmission line has been designed and located to minimize its visual impact while crossing the Strait of Canso. The tower height is necessary due to the long span required to cross the Strait of Canso and the need for significant clearance above the waterway. The dead-end-tower height is approximately 43 m and the suspension tower height is approximately 210 m (Figure 2.2)

The steep terrain on the Steep Creek side of the Study Area means that, according to the engineering designs, the dead-end tower foundations will be placed at 90 masl and the suspension tower foundations will be placed at 15 masl (Figure 2.2). The transmission line infrastructure and the cable span will be visible from many viewpoints along Highway 344 (Appendix J) but will also be partially or fully obscured by landforms and/or vegetation at many points, resulting in limited visibility. Where the transmission line ROW intersects with or runs parallel to roadways, the towers, conductors, and transmission line ROW clearing will likely be visible. Additionally, these Project components will be more visible from the Point Tupper side of the Study Area.

The nearest town in Guysborough County is Mulgrave, a small community along Highway 344 with a population of 627 (Statistics Canada, 2023), located approximately 4.5 km northwest. Additionally, the community of Pirate Harbour is approximately 2.5 km northwest, (no census information available). Minimal visual impact is expected to these communities due to the landforms and vegetation, resulting in limited visibility from many points.

The flatter topography on the Point Tupper side of the Study Area means that the dead-end tower foundations will be located at 45 masl adjacent to Port Malcolm Road, and the suspension tower foundations will be constructed at 20 masl adjacent to Bear Island Road. The transmission line infrastructure is expected to be more noticeable due to the absence of vegetation and/or natural landforms (Appendix J). However, this area is already visually impacted by existing surrounding industrial infrastructure including the Point Tupper Terminal, Port Hawkesbury Paper, Cabot Gypsum, Nova Scotia Power's Point Tupper generating station, and more.

Port Hawkesbury is the closest residential community in Richmond County, with a population of 3,210 (Statistics Canada, 2023) and located approximately 4 km north. Due to the ongoing industrial development at the Point Tupper area, the visual impact associated with the Project is expected to be low.

The nearest residential property on the Point Tupper side of the Study Area is 3.9 km to the north, towards Port Hawkesbury, whereas lands within the Point Tupper Industrial Park portion of the LAA are associated with industrial activity. Visual renderings of Project from Point Tupper, looking south towards the Steep Creek side of the Study Area (Appendix J), shows that when viewed from this location in Point Tupper, the Project's components are observed in the context of a variety of other industrial uses including other electricity production, transmission, and distribution infrastructure. This viewpoint is approximately 3 km south of Port Hawkesbury and closer to the Project than non-industrial parties likely frequent.

Visual renderings of the Project from a southern viewpoint on the Steep Creek side of the Study Area looking north towards Point Tupper (Appendix J) show that the Project, while prominent on the viewscape, is seen on a background of industrial shipping terminals and a nearby wind farm. Thus, while the Project's components are clearly visible, they are not out of place in this context and they do not affect otherwise unimpacted, important viewscapes.

Though transmission towers and associated HVTLs may be visible from nearby properties, they are positioned on the Strait of Canso directly opposite an industrial and commercial centre which is currently experiencing an increase in development interest from potential industrial users. Additionally, local government is seeking to change zoning within parts of the Point Tupper area to allow for heavier industrial uses to support a growing green economy (EDPC, 2023). Infrastructure such as HVTLs is required to support the growing range of uses for this area.

A review of literature on the effects of HVTLs on property values found a variable relationship (Jackson & Pitts, 2010). Residential landowners do generally regard transmission lines negatively and often suspect HVTLs of negative impacts on health and safety and property values (Priestley & Evans, 1996). Evidence does not support a causal link between HVTLs and health and safety concerns (see section 7.1.4 EMF). While some research indicates that these perceptions do have a negative influence on residential property values, especially for those close to HVTL towers, other research has found a wide range of effects to property value or outright failed to validate this relationship (Brinkley & Leach, 2019). Where observed, this negative influence is found to decrease rapidly with distance, reducing to as little as 2% reduction in property value or less at a distance of 60 m or greater, also diminishing with time following initial infrastructure construction (Wyman & Mothorpe, 2018). Research that focused on rural areas with large tracts of land found no relationship between infrastructure and property value or price (Jackson & Pitts, 2010). This Project is an area with very few residential properties, that are mainly confined to the Steep Creek side of the Strait of Canso. The residential property adjacent to the Project on the Steep Creek side is 280 m from transmission towers and is separated by a vegetated buffer.

Under all thermal and typical ice load conditions and high tide, the minimum clearance from the waterline to the transmission line would be 75 m at midspan. Therefore, no impacts are expected to the local fisheries industry.

Mitigation Measures

- Maintain the design and siting considerations to minimize potential effects to land use and value.
  - Based on engagement with the nearest residential receptor on the Steep Creek side of the Study Area, the transmission line alignment was adjusted to allow for a greater setback to their residence.
  - To further increase the distance between the Project and residences, the Proponent purchased several residential lots immediately adjacent to the Project (within the Study Area) at fair market value prior to the initiation of the EA.
- Minimize the effect of Project lighting on nearby residences by limit lighting to what is required by NAV Canada and TC.
- Implement transmission line sag monitoring systems and if, under extreme circumstances, sag reduces the clearance between the Strait of Canso and the conductor below 75 m, implement additional mitigations (e.g., mechanical removal of ice from conductors) to maintain the minimum 75 m midspan clearance.

Monitoring

No land use specific monitoring is recommended.

Conclusion

The impacts to land use and value are characterized as follows:

- **Magnitude** – Negligible in magnitude as no change in land value expected and surrounding land use can largely continue.
- **Geographic extent** – Within the LAA.
- **Frequency** – Occur continuously during the Project lifespan.
- **Duration** – Be of medium duration as the effects will last through the operation and maintenance phase.
- **Reversibility** – Reversible as the residual effects are likely to be reversed after the Project is completed.
- **Significance** – Not significant.

8.3 Recreation and Tourism

8.3.1 Overview and Assessment Methodology

The assessment of recreation and tourism was completed through a review of desktop resources to evaluate how the Project may interact with this VC. The following resources were reviewed:

- Nova Scotia Visitor Exit Survey (TNS, 2024)
- Review of local governments' tourism and recreation websites:
  - Guysborough County (TGS, 2024)
  - Municipality of the District of Guysborough (MODG, n.d.)
  - Richmond County (MCR, n.d.)
  - Port Hawkesbury (TPH, n.d.)

8.3.2 Existing Environment

The Project is in both Guysborough and Richmond counties.

Guysborough County, including the communities near the Study Area, is home to a variety of outdoor recreational activities. Trails throughout the county are used in the summer by ATVs and in the winter by snowmobiles. Crown land throughout the county may be accessed by hunters, including adjacent to the Study Area. Port Shoreham Beach Provincial Park, a sand and cobble beach, is located approximately 16 km south of the Project and is often frequented in the summer for picnics and swimming. Boylston Provincial Park is also nearby, approximately 18 km southwest, and is often frequented for camping, picnics, hiking, fishing, and kayaking.

Guysborough County has a rich history, dating back to over 400 years, and contains many historical sites and community museums including the Old Courthouse Museum in Guysborough. Music and theatre are also popular in the area, with Mulgrave Road Theatre, a professional theatre company focused on the Atlantic Canadian experience located in Guysborough, as well as the Chedabucto Place Performance Centre for live performances of all types, also located in Guysborough (MODG, n.d.).

In Richmond County, the Project is in the county's western-most point on industrial roads south of Point Tupper. This area has a high concentration of industrial uses and while hunting may occur throughout much of the county, industrial land uses and a lack of adjacent Crown land means that legal practice of this activity is unlikely near the Study Area. Richmond County tourism destinations tend to be concentrated in the region's central to eastern areas. Visitors to Richmond County would likely access the region's tourism destinations via Highway 104 towards Isle Madame, passing by several points of interest in Louisdale and Grand Anse along the way.

The nearby Town of Port Hawkesbury within Richmond County is a major commercial and recreation centre, serving as a community hub for a variety of industrial and commercial activities. The town has a variety of outdoor recreation opportunities as well as cultural attractions within the town itself. The town's connection with shipping, industry, and commercial ventures is important to its residents for income and bringing people to the region both for work and recreation (TPH, n.d.).

Desktop and field assessments observed no records or signs of recreational activities making direct use of the Study Area.

8.3.3 Effects Assessment

Project-Recreation and Tourism Interactions

Project activities have the potential to interact with recreation and tourism during all phases if access is changed, is temporarily limited to facilitate work, or if changes to the visual environment impact the user's experience (Table 8.9).

Table 8.9: Potential Project-Recreation and Tourism Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Tower Components	Tower Assembly	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Recreation and Tourism		X		X	X	X	X	X	X	X	X	X	X	X	X

Assessment Boundaries

The LAA for recreation and tourism is the areas of Steep Creek and Pirate Harbour in Guysborough County and Point Tupper in Richmond County (Drawing 8.2). The RAA is not applicable.

Assessment Criteria

Assessment criteria provided in Section 4.5 apply for recreation and tourism as well. The VC-specific definition for magnitude is as follows:

- Negligible – no expected changes to recreation and tourism.
- Low – small change to tourism expected and/or minor limitations to recreation use.
- Moderate – moderate change to tourism and/or moderate limitations to recreation use.
- High – high change to tourism and/or widespread limitation to recreation use.

Effects

The 2022 Atlantic Canada Travel Study, administered by Tourism Nova Scotia from March 29 to May 3, 2022, provides information about pleasure visitors to Nova Scotia from Atlantic Canada, Ontario, Quebec, Alberta, and BC (TNS, 2024). No spatial data are available from this or other research products of Tourism Nova Scotia regarding the places visited within province, limiting the understanding of the impact that tourism has on the communities that surround the Project.

The top five most selected planned activities from survey respondents were “coastal sightseeing”, “restaurants serving local dishes”, “visiting parks”, “observing nature”, and “hiking or walking”. The preponderance of nature-based activities is striking, highlighting Nova Scotia’s rich and diverse scenic landscapes. Neither Guysborough nor Richmond counties list attractions or businesses of tourism interest in the portion of the Strait of Canso between Pirate Harbour or Sand Point, or along the western shore of the Richmond County south of Port Hawkesbury (MCR, n.d.; TGS, 2024). This area has seen substantial industrial growth in recent decades and is a logical home for future industrial development.

The construction phase of the Project will increase vehicle traffic, especially in the immediate vicinity of the Project Area within both counties as vehicles travel to, enter, and exit from the worksite. In Guysborough County, this is along Highway 344 which is a less-likely avenue of approach for most traffic travelling to the Canso Causeway, meaning it is less likely to affect tourism traffic travelling through to Cape Breton Island. Vehicular traffic within Point Tupper is not expected to affect tourism and recreation due to its industrial setting. The influx of workers during construction, however, will require hotel rooms (likely in Port Hawkesbury and Mulgrave) for extended periods. This may temporarily reduce the availability of rooms for tourists to the area.

Most tourists are likely to approach the Canso Causeway via Highway 104 and follow either Highway 104, 105, or 19 once in Cape Breton. Along this path, tourists travel under and then alongside a 12-wire HVTL that crosses the Strait of Canos parallel to and approximately 1.5 km to the northwest of the Canso Causeway. Neither of the highways likely to be used by tourists go south of Port Hawkesbury towards the Strait and Highway 104 east of Port Hawkesbury is approximately 4 km away from the suspension tower on the Point Tupper side. If visible at all from this highway, it is not likely to have a noticeable a visual impact. For tourists travelling north on Highway 344 through the communities of Sand Point to Pirate Harbour, the overhead infrastructure will be visible alongside of the industrialized Richmond County shoreline, where petrochemical storage tanks, shipping terminals, refinery, a coal-powered power generating station, and a wind farm are also visible. Although research has indicated a link between HVTLs and decreased tourism interest in natural areas, this is in the context of pristine natural conditions which are not representative of the Strait of Canso area (Stefánsson et al., 2017).

As mentioned in Section 8.2, there are no known public trails within the Study Area and hunting is not permitted due to proximity to occupied buildings and worksites. In addition, desktop and field assessments observed no records or signs of recreational activities within the Study Area. The Proponent is considering the installation of gates on private roads leading to the transmission infrastructure to restrict unauthorized access but since the properties are currently private, there is no impact on recreation or tourism if gates are erected. Though the Project may be visible by nearby recreationalists, it will not interfere with their ability to practice established recreational activities in the broader region. The presence of the transmission line is unlikely to negatively impact tourism to or recreation within the area, especially whereas it is part of a suite of industrial developments that serve to bolster the economic prosperity of the region.

Mitigation Measures
No specific tourism and recreation mitigation measures are recommended.

Monitoring
A specific tourism and recreation monitoring program is not recommended.

Conclusion
The impact to tourism and recreation are characterized as follows:

- **Magnitude** – Magnitude is negligible due to low direct impact on recreation and tourism activities.
- **Geographic extent** – Within the LAA.
- **Frequency** – Continuous as some effects due to the visual presence will persist until decommissioning; however, other effects related to construction and decommissioning will be intermittent and temporary during their respective phases.
- **Duration** – Medium-term duration as the effects will continue until decommissioning.
- **Reversibility** – Reversible, as effects will terminate at the end of the construction phase.
- **Significance** – Not significant.

9.0 ARCHAEOLOGICAL RESOURCES

9.1 Overview

The purpose of the ARIA is to identify areas of high archaeological potential within the Study Area. Cultural Resource Management Group Ltd. (CRM Group) was contracted to conduct the ARIA, which was directed by Kiersten Green. This assessment is in addition to previous work completed by Boreas Heritage Consulting Inc. (Boreas Heritage) under HRP A2022NS188 in association with the EverWind Fuels Point Tupper Green Hydrogen/Ammonia Project, which received an EA approval (with conditions) in February 2023. The prior work conducted by Boreas Heritage will also be discussed when relevant to the Study Area of the current Project.

9.2 Regulatory Context

The *Special Places Protection Act* (Nova Scotia, 1989a) provides the province of Nova Scotia with a mandate to protect important archaeological, historical, and paleontological sites and remains, including those underwater. A permit is required for any archaeological or paleontological exploration or excavation in Nova Scotia. The permit system ensures that work is completed based on established standards by qualified applicants.

This ARIA was conducted in accordance with the terms of HRP A2024NS173, issued by the NSCCTH – Special Places Program.

As archaeological work can often result in findings or information that is confidential or sensitive, a summary of the results of the ARIA is provided in the EA. The ARIA report itself has been provided directly to NSCCTH for review. It is understood that the findings and recommendations of the ARIA are considered “draft” until the report is accepted by NSCCTH.

9.3 Assessment Methodology

The objectives of the ARIA were to:

- Evaluate the potential for archaeological resources within the Study Area.
- Identify, delineate, and investigate (where recommended) areas considered to exhibit high potential for encountering archaeological resources.
- Provide detailed and accurate information on the results of the survey.
- Provide comprehensive recommendations so that appropriate archaeological resource management strategies can be devised.

To achieve these objectives, CRM Group designed an assessment strategy consisting of Mi’kmaw engagement, a desktop component (background study), and a field component (archaeological reconnaissance).

Mi’kmaw engagement involved an information request to Mwilmu’kw Maw-klusuakn’s Archaeological Research Division (KMK-ARD). Details gained from this engagement provided a better understanding of the cultural and archaeological importance of the Study Area.

The desktop component examined records from a variety of institutions to explore the land use history of the Study Area and evaluate the area’s archaeological resource potential. This included documentation and datasets about the topographical, geophysical, environmental, sociocultural, and ownership history of the Study Area from different public institutions. Additionally, a general review of topographic maps, coastal charts, and aerial photographs was carried out to identify topographical and hydrological attributes that correlate with high archaeological potential (e.g., waterfalls/rapids as focal points for fishing or requiring portage, submerged marine terraces representing former coastline). Modelling was conducted using much of the available data to determine archaeological potential to inform both recommendations and archaeological fieldwork.

In Nova Scotia, the Maritime Archaeological Resource Inventory (MARI) is maintained by the Nova Scotia Museum on behalf of NSCCTH. Reports from past archaeological assessments and academic research conducted near the Project provide archaeological context, which informs the interpretation and evaluation of any potential archaeological resources identified during the field component of the ARIA.

The field component involved on-site examination of the Study Area. Parallel, walked transects were completed at intervals of 30 to 40 m, based on topographic conditions, to visually assess archaeological potential. Structured transects assist in the recognition of signs of historic land use such as topographical and/or vegetative anomalies that may inform the extent and nature of previous disturbances in the Study Area (e.g., clear-cutting, ploughing, construction earthworks), or suggest an elevation in archaeological potential, including evidence of buried archaeological resources (e.g., small knolls, apple trees in the forest, overgrown depressions, or abandoned roads).

The field study also included one shovel test pit in both the Steep Creek and Point Tupper sides of the Study Area. The objective of the subsurface survey was to determine sediment depth, composition, and stratigraphy within the proposed impact area, and evaluate archaeological potential in areas with historical records of habitation. All soil removed from the test pits was screened through 6 mm wire mesh to facilitate the recovery of artifacts that may be contained within the excavated soil.

Details of the field reconnaissance and testing program were documented in field notes, georeferenced photos, and field sketches. A hand-held GPS unit was used to record coordinates throughout field work. Any archaeological resources encountered during the shovel testing program would be evaluated and sufficiently documented for registration within the MARI database. Any artifacts recovered would be processed and catalogued in accordance with standards set by the Special Places Program of NSCCTH.

Upon completion of field activities, analysis, and interpretation, the results of the assessment were summarized in the report (submitted under separate cover), including recommendations for appropriate resource management strategies. Photos, detailed plans, and GIS-based mapping of the testing area and specific find locations (if applicable) were also incorporated.

9.4 Assessment Results

The field component of the ARIA was carried out in October 2024. This work resulted in the identification of four MARI-registered archaeological sites within proximity to the Study Area and eight areas considered to exhibit high potential for encountering archaeological resources. Seven of these sites (HPA-01 through HPA-07) were found on the Point Tupper side of the Study Area, and one (HPA-08) on the Steep Creek side of the Study Area. Preliminary shovel testing to characterize the subsurface was undertaken at one HPA on the Point Tupper side and near an abandoned residence on the Steep Creek side of the Study Area. No artefacts or traces of cultural features were identified in either testing location.

All remaining portions of the Study Area are considered to exhibit low potential for encountering archaeological resources. As a result, CRM Group recommends that these areas be cleared by NSCCTH of any further requirement for future archaeological investigation.

9.5 Effects Assessment

Project-Archaeological Resources Interactions

Project activities could interact with archaeological resources during phases of the Project that involve ground disturbance during the construction phase (Table 9.1).

Table 9.1: Potential Project-Archaeological Resources Interactions

Valued Component	Site Preparation and Construction											Operations and Maintenance		Decommissioning	
	Land Surveys	Geotechnical Investigations	Placement of Sedimentation and Erosion Control Measures	Clearing and Grubbing	Access Road Upgrading and Construction	Laydown Area and Tower Foundation Construction	Transportation of Transmission Line Components	Transmission Line Assembly and Erection	Conductor Stringing	Removal of Temporary Works and Site Restoration	Commissioning	General Operation and Maintenance	Vegetation Management	Infrastructure Removal	Site Reclamation
Archaeological Resources		X		X	X	X							X		

Assessment Boundaries

The LAA for archaeological resources is the Study Area. The RAA is not applicable.

Assessment Criteria

Assessment criteria provided in Section 4.5 apply for archaeological resources. The VC-specific definition for magnitude is as follows:

- Low – activities have a low potential for encountering archaeological resources during ground disturbance.
- Moderate – activities have a moderate to high potential for encountering archaeological resources during ground disturbance, but risk of harm to potential archaeological resources can be mitigated through appropriate actions and procedures.
- High – activities have a moderate to high potential for encountering archaeological resources during ground disturbance, and ARIA indicates a high potential for accidental and irrevocable loss of archaeological resources regardless of mitigative measures.

Effects

There is low potential for effects to archaeological resources across most of the Study Area. Registered archaeological sites have been avoided in the Project's design. All but three areas exhibiting high potential for archaeological resources have been completely avoided in the Project's design. HPA-01, HPA-05, and HPA-07 are within the transmission line ROW. HPA-01 was identified by CRM Group and is the continuation of an HPA identified by Boreas Heritage in 2022. Vegetation clearing is necessary during construction to facilitate line installation and continually throughout operations and maintenance to prevent conflict between vegetation and the transmission lines. These activities will proceed in a manner that avoids ground disturbance in HPA-01, HPA-05, and HPA-07. Additionally, HPA-08 is within the transmission line ROW and pulling area, and the HPA-08 buffer has a very small overlap with the tower footprint. The same mitigative actions will be applied here to avoid ground disturbance to the extent possible. Where ground disturbance is unavoidable, an archaeologist will be engaged to perform shovel testing in advance of ground disturbance to ensure archaeological resources are not impacted.

Mitigation

The following mitigation measures are recommended:

- Maintain avoidance of sites of high potential for archaeological resources, where possible, in the detail design.
- Conduct shovel testing in accordance with the recommendations of CRM Group and requirements of NSCCTH in any areas with high potential for archaeological resources that cannot be avoided.
- Conduct vegetation removal within areas of high potential for archaeological resources (especially within the transmission corridors) by hand-clearing and make use of swamp mats where heavy machinery must transit these areas to avoid ground disturbance. If ground disturbance cannot be avoided, shovel testing will be completed prior to any disturbance.
- Develop a chance-find procedure in the Contingency Plan related to the potential unexpected discovery of archaeological items or sites, or human remains, during construction. This would include halting any work immediately upon discovery of suspected resources and contacting NSCCTH. If the resources are suspected to be of Mi’kmaq origin, KMK-ARD would also be contacted.
- Conduct additional archaeological assessment if, during the detail design phase, it is determined that ground disturbance is required in areas not previously assessed. The EA Branch will be provided with the acceptance letter from NSCCTH prior to completion of any disturbance in newly proposed areas.

Monitoring

No monitoring is recommended at this time. Should shovel testing be completed and monitoring is recommended, the Proponent will follow the advice of the archaeologist and NSCCTH.

Conclusion

With the implementation of the above mitigation measures, the residual effects on archaeological resources are characterized as follows:

- **Magnitude** – The potential magnitude of effect on archaeological resources is moderate, whereas clearing will be required in areas of elevated archaeological potential, but impacts are mitigatable with appropriate actions per the recommendations of qualified archaeologists.
- **Geographic extent** – Within the LAA.

- **Frequency** – Occur once, single event.
- **Duration** – Short-term duration, during the construction phase when clearing and/or disturbances to the ground occur.
- **Reversibility** – Irreversible, should unlikely impacts to archaeological resources occur.
- **Significance** – Not significant.

10.0 RESIDUAL EFFECTS AND MITIGATION SUMMARY

Table 10.1 summarizes the results of the effects assessment for each VC.

Table 10.1: Effects of the Undertaking on the Environment Summary

VC	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level	Mitigation and/or Monitoring Required?
Atmosphere and Air Quality	Low– Air quality is expected to comply with Air Quality Regulations.	Within the LAA	Intermittent	Short, during construction and decommissioning phases	Reversible	Not significant	Mitigation required; no monitoring required
Climate Change	Low – Construction phase emissions are low and operational phase will contribute to GHG mitigation.	Beyond the LAA	Continuous during construction and decommissioning phases, and intermittent during operation.	Short duration, with effects declining after construction phase.	Irreversible	No significant	Mitigation required; no monitoring required
Sound	Low – operational sound compliant with municipal by-laws at non-participating receptors.	Within the LAA	Continuous and intermittent, depending on source.	Medium-term duration	Reversible	Not significant	Mitigation required; no monitoring required
Electric and Magnetic Fields	Negligible – No residential or non-participating receptors within LAA	Within the LAA	Continuous during operating lifespan of the Project	Medium-term duration	Reversible upon decommissioning	Not significant	Mitigation required; no monitoring required
Geophysical Environment	Moderate – there is one privately-owned water well within 800 m of the Project Area.	Within the LAA	Intermittent	Short-term duration, limited to construction phase.	Partially reversible upon decommissioning	Not significant	Mitigation required; monitoring may be required
Surface water, fish, and fish habitat	Low – Small loss of aquatic habitat, with minimal potential for altered hydrology	Within the LAA	Single event	Short-term duration, limited to construction phase.	Reversible	Not significant	Mitigation and monitoring required

VC	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level	Mitigation and/or Monitoring Required?
Wetlands	Low – Direct loss of wetland habitat, but overall wetland functions remain intact.	Within the LAA	Single event	Short-term duration, limited to construction phase.	Partially reversible, as any loss will be compensated for through the permitting process.	Not significant	Mitigation and monitoring required
Terrestrial Habitat	Low – Some loss of terrestrial habitat, but overall habitat functions remain intact.	Within the LAA	Both single event (construction phase) and intermittent (operational impacts from vegetation management)	Medium-term duration	Partially reversible, vegetative communities may be altered	Not significant	Mitigation required; no monitoring required
Terrestrial Flora	Negligible – No loss of SAR/SOCI individuals or of habitat supporting terrestrial flora SAR/SOCI.	Within the LAA	Intermittent (for vegetation management, N/A for individual SOCI)	Long-term duration	Partially reversible, as the cleared areas will be allowed to revegetate following decommissioning though communities may have changed.	Not significant	Mitigation required; no monitoring required
Terrestrial Fauna	Low – Small loss of habitat supporting fauna, but no impacts to fauna behaviours expected	Within the LAA	Continuous during construction and decommissioning, intermittent during operation.	Long-term duration for habitat, short-term for traffic	Partially reversible	Not significant	Mitigation required; no monitoring required
Bats	Low – Small loss of habitat may occur, but loss of individuals is not expected	Within the LAA	Single event during construction, continuous during operation.	Medium-term duration	Reversible	Not significant	Mitigation required; no monitoring required

VC	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level	Mitigation and/or Monitoring Required?
Avifauna	Low – Small loss of habitat supporting avifauna and impacts to migratory avifauna are expected to be low	Within the LAA	Intermittent during construction and decommissioning, continuous during operation.	Medium-term duration	Reversible	Not significant	Mitigation and monitoring required
Economy	Positive – A positive effect on the economy is expected	Within the RAA	Continuous	Medium-term duration	Irreversible	No significant adverse impacts; additional positive impacts	No mitigation or monitoring required
Land Use and Value	Negligible - no change in land value expected and surrounding land use can largely continue	Within the LAA	Continuous	Medium-term duration	Reversible	Not significant	Mitigation required; no monitoring required
Recreation and Tourism	Negligible – no change to tourism expected and no changes to recreational use	Within the LAA	Continuous as some effects due to the visual presence will persist until decommissioning; however, other effects related to construction and decommissioning will be intermittent and temporary during their respective phases.	Medium-term duration, continuing until decommissioning	Reversible	Not significant	No mitigation or monitoring required

VC	Magnitude of Effects	Geographic Extent of Effects	Frequency of Effects	Duration of Effects	Reversibility of Effects	Significance Level	Mitigation and/or Monitoring Required?
Archaeological Resources	Moderate – clearing will be required in areas of elevated archaeological potential, but impacts are mitigatable with appropriate actions per the recommendations of qualified archaeologists.	Within the LAA	Single event	Short-term duration	Irreversible should unlikely impacts to archaeological resources occur	Not significant	Mitigation required; no monitoring required

11.0 EFFECTS OF THE ENVIRONMENT ON THE UNDERTAKING

The following section discusses potential effects of the natural environment, including natural hazards and weather events, on the infrastructure and operation of the Project. Potential sources of effects from the environment are described below, including mitigation and design strategies for reducing effects.

The primary mitigative measure employed during the construction and operation of the Project will be to educate and train site personnel. Environmental and safety orientations will be conducted prior to the start of construction and all staff will be informed of the potential effects of the environment on the Project. Staff responsible for the maintenance of the Project during the operational phase will be trained, including applicable equipment operational procedures, safety protocols, and evacuation plans. To further mitigate damage that cannot be controlled by education and training alone, infrastructure will all be engineered to survive extreme weather events (150-year return period weather events) to avoid failures, damage, or safety related hazards over the life of the Project.

11.1 Climate Change

Climate change is the persistent change in the state of the climate which lasts for decades or longer (IPCC, 2018). Climate change may impact the Project through increased occurrences of extreme weather, precipitation, and subsequent flooding. In addition, increased weather extremes due to climate change may impact the powerline and/or ROWs, causing potential damage and/or collapse to the infrastructure.

11.1.1 Temperature

One major change associated with climate change is global warming, which is defined as an increase in global mean surface temperature averaged over a 30-year period, relative to pre-industrial temperatures (IPCC, 2018). Projected rising temperatures associated with global warming may impact many phases of the Project and on-site personnel. For example, hotter and drier conditions increase the risk of droughts and wildfires during construction and operation activities (ECCC, 2019b). Staff will be trained to understand the importance of regular breaks, proper hydration, and unsafe conditions to protect Project personnel.

Warmer temperatures can also spread forest and agricultural pests and disease vectors (i.e., ticks) to the Project location. Invasive plant species are discussed in greater detail in Section 7.4.2.

11.1.2 Sea Level Rise

The majority of the Study Area is between approximately 10 masl to 130 masl, based on a projected coordinate system with CGVD 2013 (NRCan, 2020), and the closest infrastructure will be placed approximately 50 m from the shoreline. The tower foundations will be placed approximately 15 masl, far exceeding expected sea level rise in the area during the lifespan of the Project. The integrity of public roads could potentially be a concern during required construction and operational maintenance activities. However, detailed engineering design will consider sea level rise to ensure the sound operation of all Project roads and infrastructure.

11.1.3 Flooding

Flooding in the Study Area may increase due to more frequent severe precipitation associated with climate change. Due to the effects of ocean warming, climate change is predicted to produce more intense precipitation, which may result in increased flood risk (US EPA, 2024c). Flooding may impact both terrestrial and aquatic habitat, damage Project infrastructure, and limit site access. The Project will mitigate the risks of flooding by maintaining regular upkeep and grading of roads to reduce formation of ruts, minimizing wetland impacts, designing roadside ditches and water off-take infrastructure next to all roads to encourage drainage of rainwater off the roads, and revegetating roadsides to absorb excess water.

11.2 Natural Hazards

11.2.1 Severe Weather Events

Nova Scotia is subject to severe weather events, including heavy rainfall, blizzards, hurricanes, freezing rain, and lighting strikes, all of which may lead to negative outcomes including power outages, health related emergencies, infrastructure damage, and road damage, and therefore may pose direct risks to the transmission line infrastructure (PSC, 2024). Heavy rainfall is a common, highly probable natural hazard in Nova Scotia. Short duration heavy rainfall is defined as 25 mm or more of rain within one hour, while long duration heavy rainfall can range from 25 mm of rain or more within 24 hours during winter, or 50 mm of rain or more within 24 hours during summer (ECCC, 2024d). Heavy rain or snow melt has the potential to deposit high quantities of water and/or sediment within the Project Area in a short period of time. Project design features noted in Section 11.1.3 will also mitigate the effects of heavy rainfall and snow melt to maintain road access during severe precipitation events.

There are several ways in which climate, extreme weather events, and climate change can interact with the Project. The hurricane season officially runs from June 1 to November 30 (ECCC, 2024a), with the most active months being August, September, and October. Winter storms tend to be more common in Nova Scotia and they can consist of high winds and a mix of snow, rain, and ice. Over the last several decades, hurricanes and other severe weather events have caused significant damage to electrical infrastructure in Nova Scotia, leading to increased consideration of these natural disasters in the design of new infrastructure, including the Project.

During the construction and maintenance phases, extreme weather events may lead to reduced visibility, making it difficult to maneuver equipment. Work stoppages may occur due to operational or safety reasons, and access may be limited. Airborne debris could come into contact with the cables, causing damage and potential power outages.

During the operational phase, weather events may increase the risk of electrical fires, audible sound, or infrastructure damage. While high winds and ice could exert sufficient force on transmission towers and wires to cause structural damage, the engineering and design has considered a 150-year return period weather event, which exceeds typical high voltage transmission line design criteria to ensure the proposed towers, hardware and conductors crossing over the Strait of Canso can withstand extreme weather. The Proponent will ensure that the transmission line ROW is maintained to mitigate electrical fires or infrastructure damage.

11.2.2 Wildfire

The Forest Fire Protection Regulations (Nova Scotia, 2019a) outline restrictions for burning and operating power saws during the fire season (March 15 to October 15). Burning restrictions are determined daily, depending on the Fire Weather Index (FWI). The Nova Scotia government employs an FWI during the fire season to determine fire danger across the forested areas in Nova Scotia (NSNR, 2021b). A higher FWI score indicates that if a fire were to start it would be of high intensity and pose greater danger than a lower FWI score. Operation of power saws and/or clearing saws in forested areas within the Project Area will only occur when and as permitted under the Forest Fire Protection Regulations. Any activities requiring burning during the Project lifetime will be timed according to local burning restrictions.

As a best practice, the FWI can be used to determine fire danger associated with activities that may result in burning. The FWI during the summer months across the Study Area ranges from low (0 to 5) to high (10 to 20) (NRCan, 2024). Federal and provincial FWI data is updated daily, with the closest provincial weather stations Study Area being ‘Meaghers Hill’ and ‘MacLeod Settlement’ (NSNR, 2024g).

Although most days in the wildfire season tend to show a low FWI score, to mitigate potential risk of wildfire, safety protocols will be put into place, such as implementing a fire prevention and site evacuation plan. Furthermore, the FWI will be checked regularly at nearby weather stations during summer months to determine the potential for highly dangerous wildfires. Precautions should be taken when undergoing construction or maintenance activities that could result in fires on days when FWI scores are >5, such as mechanical brushing/land clearing, using spark-producing tools, or piling of woody debris (British Columbia, 2005). Should the risk of fires increase throughout the lifetime of the Project, mitigation strategies to protect Project infrastructure and relevant VCs will be adapted accordingly.

11.2.3 Ice and Snow Accumulation

Ice accumulation may create hazards for transmission lines. When high winds are involved, the risks increase. Crews and the public can be injured by falling ice or collapsing vegetation. Additionally, strong winds may cause ice-covered lines to gallop and collide, leading to faults, downed lines, equipment damage, and power outages (Indij Systems, 2024). The design of these transmission lines will incorporate mitigation to prevent galloping and avoid conductor collisions and faults.

For snowfall events, the proximity of the Project to the Atlantic Ocean can lead to temperatures hovering close to 0°C, contributing to higher chances of heavy, wet snow compared to dry snowfall at colder temperatures. This wet snow is more likely to accumulate on trees and equipment, creating a more severe impact by weighing down tree branches into power lines (NSPI, 2022).

In general, any form of water freezing either in the atmosphere and sticking to objects or freezing directly upon hitting objects is called atmospheric icing. Atmospheric icing is commonly accompanied by the subsequent phenomenon of ice shedding. In specific cases, ice shedding might pose a risk to human safety and the integrity of infrastructure. Mechanical ice breaking is the most frequent cause of ice shedding from power lines. Due to their low torsional stiffness that causes them to rotate under eccentric loads, power lines are susceptible to cylindrical accretion of increased weight. The shedding of such heavy accretions can cause vibrations, short circuits or even tower failures due to high dynamic loads (INMR, 2024).

Wind speed plays a critical role in the ice accumulation process. Wind speeds of 10 mph (16 kph) or higher lead to increased ice accretion by dispersing surface heat and ultraviolet radiation, which promotes ice formation. While low wind speeds can still result in ice accumulation, the amount is significantly reduced (King-Homan, 2023). Moreover, the orientation of power lines in relation to wind direction affects the shape of the ice buildup. In calm conditions, ice forms in a teardrop shape, but at higher wind speeds, ice can accumulate in a teardrop shape that coincides with the direction of the wind, which may cause the power lines to gallop.

The Proponent uses guidelines in the Canadian Electrical Code and CSA Standard 22.3 No. 60826 and various weather condition scenarios to determine the design criteria for ice load on overhead power lines. Due to the desired reliability and longevity of the infrastructure, a high level of reliability and resilience to environmental factors was prioritized in the design criteria for the Project. With a 150-year return period heavy icing event considered, the radial ice thickness that the line is designed for is 60 mm.

12.0 ACCIDENTS AND MALFUNCTIONS

Without proper mitigation, accidents and malfunctions can interact with many VCs and potentially result in adverse effects. However, implementing preventative measures limits the probability of occurrence, and having appropriate response procedures in place reduces the magnitude of residual effects.

Accidents, malfunctions, and unplanned events considered for this Project include:

- Erosion and Sediment Control Failure
- Electrical hazards
- Fire
- General Hazardous Material Spill
- Infrastructure Failure
- Vehicle/Aircraft Incident

The safety of on-site personnel is a vital Project component; however, it is not specifically considered in the EA, as workplace occupational health and safety is regulated by the policies, procedures, plans, and codes of practice set in the *Occupational Health and Safety Act* (Nova Scotia, 1996).

EverWind uses the principles of Safety in Design, a proactive engineering approach that considers all potential hazards and designs systems to eliminate or minimize the likelihood of accidents or injuries. The Project will be designed and constructed in strict compliance with the principles of Safety in Design.

EverWind has a long history of safely operating the Point Tupper Terminal, located immediately west of the Project on the Point Tupper side of the Study Area, and recognizes the importance of ensuring the safety of workers, the public, and the environment. At the Point Tupper Terminal, EverWind has created a world class Emergency Response Team (ERT). The EverWind ERT is comprised of 40 members that are NFPA 1081 Advanced Industrial Firefighter certified, NFPA 470/472 Haz Mat certified, NFPA 1006 Technical Rescue (High Angle Rescue and Confined Space Rescue), and St. John Ambulance Advance First Aid certified. In addition, one of EverWind's ERT members is a certified Paramedic with 12 years' experience with Wood Buffalo Fire & Emergency Services.

EverWind also operates a NSECC approved fire training facility at its Point Tupper Terminal and hosts bi-annual live fire training exercises for regional volunteer fire departments and other local industrial ERTs.

In addition, Point Tupper Marine Services Co. (PTMS), an EverWind affiliated company is the Transport Canada Certified Response Organization pursuant to section 169.(1) of the Canada Shipping Act, 2001 for the Geographical Area of Response for all waters between an arc having a 50 nautical mile radius about Bear Head light (Strait of Canso). PTMS operates from a marine facility located at Mulgrave with additional warehouse facilities within the EverWind Point Tupper Terminal.

12.1 Erosion and Sediment Control Failures

Failure of erosion and sedimentation controls may result in potential adverse effects on VCs (primarily during construction), most notably to watercourses, wetlands, and fish and fish habitat. Erosion and sedimentation controls may fail due to extreme weather conditions (e.g., flooding), improper installation, improper maintenance, and unforeseen accidents (e.g., collisions). Failure of these control measures may release sediment into the environment, impacting water quality and aquatic and terrestrial habitats.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include:

- Implement all mitigation related to erosion and sediment control provided in Sections 7.3.1 and 7.3.2.
- Heed ECCC's special weather warnings to ensure proper care is given to stabilize erosion and sediment controls in advance of, and following, extreme weather events.
- Conduct regular monitoring of all the erosion and sediment controls and repair or replace them promptly and as necessary.

- Ensure workers are trained to properly install and repair erosion and sediment controls.
- Develop and implement a Project-specific Contingency Plan that includes information on sediment and erosion control.

12.2 Electrical Hazards

Electrical hazards may occur during the operation and maintenance phase of the Project, primarily due to unauthorized access to restricted electrified areas. It is unlikely that an electrical hazard will occur by way of a downed conductor or other infrastructure failure.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include:

- Construct all components to applicable CSA Standards (as described in section 3.2.1)
- Develop and implement an emergency response plan which stipulates procedures for responding to electrical incidents, including rescue operations and first aid for electrical shock.
- Mark and enforce safe approach limits around electrical equipment.
- Install appropriate signage and public warnings around Project infrastructure (e.g., “High Voltage”, “No Anchoring”).
- The Proponent may install gates on private roads leading to the transmission structures to restrict unauthorized access.
- Size the conductor and overhead shield wires to reduce the potential for avifauna strikes.
- Install high-security fencing and gates around high voltage areas to prevent unauthorized access.
- Conduct regular inspections of electrical infrastructure, including cables and access points to identify and address potential hazards before they result in an incident.
- Equip personnel with appropriate electrical PPE when working near high voltage areas.
- Train workers on electrical hazards, safe approach distances, and the proper use of protective equipment.

12.3 Fires

An accidental fire has the potential to adversely affect the atmospheric environment (emissions), the terrestrial environment (vegetation and wildlife), and the socio-economic environment (land use and value) during all Project phases.

Wildfire season in Nova Scotia runs from March 15 to October 15 (NSNR, n.d.-c).

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects from an accidental fire include:

- Prohibit the use of campfires or burning within the Project Area by staff and contractors.
- Dispose of all flammable waste regularly at an approved facility.
- Implement mitigation related to chemical and fuel storage (Section 12.3).
- Allow smoking in designated areas only.
- Equip heavy machinery and vehicles with fire suppressant equipment, ensure response materials are available, and that site personnel are trained.
- Maintain vegetation clearing at the transmission line ROW throughout the Project's operation to act as a firebreak and remove cleared vegetation from the Project Area to reduce fuel build-up.
- Develop and implement a Project-specific Contingency Plan that includes fire safety and response procedures.

12.4 General Hazardous Material Spills

Hazardous spills resulting from fuel (i.e., storage, refueling, operation of combustion vehicles) and other on-site chemicals may occur during the Project's construction and operations activities. Hazardous spills can adversely impact air, soil, surface water, groundwater quality, human health, and safety. In addition, hazardous spills may risk the health of aquatic, avian, and terrestrial wildlife. The severity of the impacts will depend on the nature of the hazardous material and the quantity spilled.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include:

- Develop spill prevention and response procedures as part of the Project's Contingency Plan, which will set out spill prevention and response procedures.
- Store all fuels, lubricants, and hazardous material in designated containers and areas.
- Provide secondary containment in storage areas (where possible).
- Inspect equipment for fluid leaks.
- Locate fuel storage areas, refueling, and/or equipment lubrication a minimum of 30 m from surface water (i.e., watercourse) and groundwater feature (i.e., well).
- Refuel machinery and equipment on an impervious surface, where possible. If this is not possible, require that the work is completed in a designated area, greater than 30 m from a watercourse/water body/wetland.
- Ensure site workers remain with equipment during refuelling.
- Complete equipment servicing off-site, where possible. If this is not possible, require that the work is completed in a designated area, greater than 30 m from a watercourse/water body/wetland.
- Store all dangerous goods in compliance with the Workplace Hazardous Material Information System.
- Equip mobile equipment with spill kits stocked with appropriate spill containment materials for the activities taking place, such as soaker pads, oil-absorbing materials, and containment booms.

- Locate stationary spill kits or spill drums at work areas utilizing mobile equipment, hazardous fluids and/or in proximity to environmentally sensitive areas (i.e., wetlands or watercourses).
- Stock spill kits with the appropriate quantity and type of material for the anticipated product type(s) and volume(s) in use.
- Train site workers on site specific spill response requirements and equipment.
- Develop and implement a Project-specific Contingency Plan that includes spill response procedures.

With the implementation of the above preventative measures, the likelihood of an accident or a malfunction is low. Appropriate response plans will be put in place to ensure any interactions with VCs from an accident or malfunction are limited and the effects can be quickly contained.

12.5 Infrastructure Failure

The potential for infrastructure (e.g., transmission towers, their supports or foundations) failure is considered unlikely given the design standards (Section 3.2.1), the pre-construction investigations (e.g., geotechnical investigations to support foundation design), and the regular inspections to identify areas requiring maintenance.

In the unlikely event of an infrastructure failure, the Proponent will follow the procedures outlined in the Contingency Plan, which will be developed in advance of construction.

12.6 Transportation-related Incidents

Operator error or techno-mechanical malfunctions may occur during all stages of the Project's lifespan, although the type and intensity of vehicular traffic will vary depending on the Project phase. The construction and decommissioning phases will see the highest volume of traffic and largest vehicles both travelling to and within the Project Area. On the site especially, where workers may be near light to heavy-duty traffic, there is a higher risk of incidents affecting human health (HSE, n.d.).

During the installation of transmission towers and lines, helicopters will be used to transport materials, erect towers, install components, and inspect structures. There is potential for incidents to occur during these operations, including rotor strikes and load drops.

During operation, vehicular access by technicians also presents collision risks. In addition, the transmission line will span the Strait of Canso, a shipping route that has commercial traffic on a regular basis. If ships that are not able to pass under the lines attempt to do so, injury or damage may occur.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include the following:

- Conduct thorough inspections of vehicles and helicopters to ensure all equipment is in good working order.

- Verify weather conditions to assess risks for aerial and ground operations.
- Develop and implement a Traffic Management Plan, outlining traffic management procedures.
- Assess site access routes, including structural integrity of bridges and culverts, baseline traffic levels, and high-risk areas prior to construction.
- Install appropriate traffic signage and road markings to identify high-risk areas and communicate traffic rules and safety information.
- Establish reliable communication methods between ground teams, pilots, and control centres during helicopter operations.
- Implement speed limits and enforce traffic regulations on access roads with heavy vehicle use.
- Develop and implement an aviation safety plan specifically for helicopter operations or require that operators have one.
- Conduct pre-flight and pre-operation safety checks.
- Include transportation-related incidents within the Project's Contingency Plan.
- Ensure only licensed individuals operate equipment.
- Develop a communication plan to engage communities impacted by traffic.
- Designate specific landing and movement areas to limit impacts on local ecosystems.
- Implement transmission line sag monitoring systems and if, under extreme circumstances, sag reduces the clearance between the Strait of Canso and the conductor below 75 m, implement additional mitigations (e.g., mechanical removal of ice from conductors) to maintain the minimum 75 m midspan clearance.

With the implementation of the above preventative measures, the likelihood of an accident or a malfunction is low. Appropriate response plans will be put in place to ensure any interactions with VCs from an accident or malfunction are limited and the effects can be quickly contained.

13.0 CUMULATIVE EFFECTS

13.1 Overview

Cumulative effects are changes to environmental, social, and economic values caused by the combined effect of past, present, and potential future human activities and natural processes (British Columbia, 2024). Concerns are often raised about long-term changes that may occur not only as a result of a single action but of the combined effects of each successive action on the environment (Hegmann et al., 1999). While a single undertaking might not cause significant adverse effects, multiple undertakings may result in incremental impacts, referred to as cumulative effects. These cumulative effects may potentially result in an overall impact to a VC of interest.

13.2 Cumulative Effects Assessment Methods

The goal of a Cumulative Effects Assessment (CEA) is to assess changes to an environmental condition (VC) that could occur based on a combination of the proposed Project with other past, present, or reasonably foreseeable future projects. The CEA is completed using publicly available data, with uncertainties clearly identified, following guidance outlined in the Cumulative Effects Assessment Practitioners Guide (Hegmann et al., 1999).

As outlined by Hegmann et al. (1999), a CEA scoping exercise is completed using the following steps:

- Identification of the VCs that will enter the CEA process
- Determination of spatial and temporal boundaries for the CEA
- Identification and description of other projects or activities in the spatial boundary (or boundaries)
- Confirmation of which VCs will be carried through the CEA process

For those VCs selected for the CEA process, an analysis was conducted considering the residual effects of the Project on that VC, the effect of other activities or projects on that VC, and potential cumulative effect. Mitigation measures and proposed monitoring programs and follow up are described, if cumulative effects are predicted. At this stage, the certainty in effects predictions was considered. It is not uncommon for data on effects of other projects or activities to be limited, increasing the uncertainty of the CEA predictions.

13.2.1 Selection of Boundaries

To identify other Projects for inclusion in the CEA, a 15 km buffer on the Study Area was selected as a conservatively inclusive boundary (Drawing 13.1).

The temporal boundary for the Project is based on three Project phases: construction (6 months), operations and maintenance (80 years), and decommissioning and reclamation (6 months). For the CEA, Strum considered past Projects as those registered, approved, and constructed within the past 10 years and those projects that are visible via aerial imagery. Reasonably foreseeable future projects are those which have been registered with EA document through NSECC but have not been approved or constructed.

13.2.2 Selection of VCs for Evaluation in the CEA

The primary pathways of effects to the environment from the Project include habitat loss in forest habitats, potential bird and bat mortality through strikes and electrocution with the transmission lines. Through the effects assessment, no significant adverse residual effects were identified to the VCs evaluated. Details of the effects assessment for each VC evaluated can be found in Sections 7, 8, and 9.

Through the Project design phase, the Proponent was able to avoid impacts to most wetlands and all watercourses and ensure compliance with all regulatory guidelines through infrastructure layout and operational considerations. The Project is expected to have an overall positive residual effect on climate through its purpose in transporting renewable energy, and to the socioeconomic environment through provision of jobs and economic opportunities.

Table 13.1 summarizes the potential for VCs to have cumulative impacts with other undertakings in the area.

Table 13.1: Potential for Cumulative Effects on Identified VCs

VC	Cumulative Effects Assessed	Reasoning
Atmosphere	No	Residual positive impacts regarding GHG emissions from the use of renewable energy resources.
Climate Change	No	Effects to Climate Change will be positive.
Sound	No	The Project will not impact nearby receptors above baseline levels.
EMF	No	Project source EMFs will not impact any nearby receptors.
Geophysical Environment	No	The Project will not impact the geologic environment outside the Project Area or interact with nearby industrial activities.
Waterbodies & Watercourses	No	The Project is maximizing the use of existing disturbed areas to minimize impacts to watercourses. In accordance with provincial permitting requirements, appropriate mitigations will be incorporated into the design of new watercourse crossings, such that there is no residual effect.
Fish & Fish Habitat	No	The Project is maximizing the use of existing disturbed areas to minimize impacts to watercourses. In accordance with provincial and federal permitting requirements, appropriate mitigations will be incorporated into the design of new watercourse crossings, such that there is no residual effect to fish and fish habitat.
Wetlands	No	The Project is maximizing the use of existing disturbed areas to minimize impacts to wetlands. In accordance with provincial permitting requirements, all impacted wetlands will be compensated for, such that there is no residual effect.
Terrestrial Habitat	No	The Project Area is maximizing the use of existing roads, clearings, and infrastructure to minimize habitat loss. Further, in the absence of the Project, it is likely that the Project Area would still be subject to future clearing/disturbance from forestry or industrial activities.
Terrestrial Flora	No	Avoidance of flora SOCI.
Terrestrial Fauna	No	The Project Area is maximizing the use of existing roads, clearings, and infrastructure to minimize potential impacts to fauna SOCI and associated habitat. Further, in the absence of the Project, it is likely that the Project Area would still be subject to future clearing/disturbance from forestry or industrial activities.
Bats	No	The anticipated mortality risk to bats is expected to be low, with only minor habitat loss.
Avifauna	Yes	The Project is predicted to have low and non-significant impacts to birds through habitat loss and potential mortality. Given proximity to the Auld's Cove Transmission line and nearby wind projects, there is potential for cumulative effects to avian mortality. Habitat loss represents only 2.7% of the Study Area, and is not considered in the assessment of cumulative effects.

VC	Cumulative Effects Assessed	Reasoning
Economy, Land Use, & Recreation/Tourism	No	Residual impacts are anticipated to be low to negligible, or positive.
Archeology, Culture, & Heritage	No	Avoidance of archaeological, historical, or culturally significant areas.

The following VCs are assessed for cumulative effects:

- Avifauna

13.2.3 Other Undertakings in the Area

General land use is not accounted for as "other activities or Projects" in the CEA. Nova Scotia's landscape is a mosaic of intensive agricultural land, intact forests, communities, and residential development. While these activities all affect the landscape and usage of the lands by humans and other species, there is not a meaningful way to determine the effect of these activities on various VCs. No meaningful data is available to support an assessment of cumulative effects. Furthermore, the existing land use was considered in the determination of residual environmental effects within each VC within the Projects EARD, so no additional conclusions can be made through the lens of a CEA.

There are a number of industrial facilities, planned developments, and resource extraction operations in the immediate vicinity of the Project, many of which are terrestrial in nature, but are dependent on marine services for their operations.

The nearest project of similar size and scale is the Auld's Cove Transmission Line, owned and operated by NSPI. It is a 345 kV overhead transmission line that is a key component of the NSPI grid, connecting the grid on Cape Breton Island to the main grid on the Nova Scotia mainland.

Table 13.2 summarizes industrial activities/developments within approximately 15 km of the Project. As described above, this includes Projects with EARD's registered within the past 10 years, and major nearby existing (ongoing) projects (Drawing 13.1).

Table 13.2: Nearby Industrial Activities and Developments

Development	Development Activity	Status of Activity	Activity Location	Distance to Study Area[1]	Avian Mortality pathway
EverWind Terminals	Fuels terminal	Active	Point Tupper, NS	Within and adjacent to Study Area	No
EverWind Fuels Facility	Hydrogen and Ammonia Production Facility	Under development	Point Tupper, NS	Within and adjacent to Study Area	No

Development	Development Activity	Status of Activity	Activity Location	Distance to Study Area[1]	Avian Mortality pathway
Point Tupper Wind Farm	Wind development	Active	Point Tupper, NS	Directly adjacent to the Study Area	Yes
Proposed Melford International Terminal	Marine terminal and railway	Under development	Middle Melford, NS	5 km south	No
Goose Harbour Lake Wind Farm Project	Wind development	Under development	West of the Study Area near Goose Harbour Lake, NS	6 km west	Yes
Port Hawkesbury Paper	Paper Mill	Active	Point Tupper, NS	3 km north	No
Martin Marietta Porcupine Mountain Quarry	Aggregate Quarry and Bulk Coal Handling Facility	Active	Auld's Cove, NS	10 km northwest	No
Aulds Cove Transmission Line	Power Transmission	Active	Aulds Cove, NS	13 km northwest	Yes
Mulgrave Wind Project (COMFIT)	Wind development (single turbine)	Active	Aulds Cove, NS	10 km northwest	Yes
Bearpaw Pipeline	Pipeline	Proposed	Aulds Cove, NS	Within Study Area	No
Bear Head	LNG Terminal, Green Ammonia facility	Proposed	Point Tupper, NS	Southeast of Study Area	No

[1]Distance to nearest point of the Study Area

13.3 Cumulative Effects Assessment

Cumulative effects were assessed for the Project by taking into consideration the potential residual effects (as identified in VC sections) in relation to the activities that have taken place in the past, those that currently exist, and those that can be reasonably expected to be developed within the area surrounding the Project (i.e., undergoing regulatory approval/under construction).

Avifauna

Avifauna are discussed in terms of cumulative effects based on the Project's proximity to other transmission lines (Auld's Cove Transmission Line) and wind projects (Point Tupper Wind Project, Mulgrave COMFIT Wind Project, and the Goose Harbour Lake Wind Project), and the cumulative potential for injury/mortality of SAR. Each of the projects assessed has temporal overlap with the Project, given its operational timeframe and long-term nature of approved transmission lines and wind projects. As avifauna are mobile and migrate across the landscape, projects located within the 15 km buffer can be viewed as having a spatial overlap with avifauna which may migrate though each of the respective project boundaries. Therefore, all four projects evaluated herein have effects with spatial and temporal overlap. The goal of this evaluation is to determine whether each project's non-significant impacts result in a cumulative effect (additive) using publicly available data and stated thresholds of significance, if possible.

The Auld's Cove Transmission Line is a similarly sized energy transmission project that spans the same body of water as the Project, though it is not directly adjacent, but sits approximately 13 km northwest. The suspension towers for that line are shorter (approximately 165 m total height), and the line sags closer to water level (49 m) above the Strait of Canso. Based on the similar scale and respective EA conclusions for the Auld's Cove Transmission Line Project, the anticipated cumulative effects on avifauna from the operation of the combined transmission lines are anticipated to be not significant. The expected residual effects of the Project with the Auld's Cove Transmission Line are not expected to be additive given the locations of the projects, as well as the mechanism of interaction for both projects.

Three wind projects are present or in under development within 15 km of the Study Area.

The Point Tupper Wind Project consists of 11 wind turbines installed directly adjacent to the eastern side of the Point Supper side of the Study Area. The Project was approved in 2008, and construction was complete by 2011. No estimates of avian mortality were provided in the EARD, and post-construction mortality surveys are not publicly available.

The Mulgrave COMFIT Wind Project consists of one wind turbine, installed in 2014 approximately 10 km west of the Study Area. While the project's EARD did not provide an estimate of avian mortality, it was predicted that mortality would be low and not significant based on the project's geographic setting and avian usage of the Study Area. Post-construction mortality survey data is not publicly available.

The Goose Harbour Lake Wind Project's EARD was registered in January 2023, receiving EA Approval in March 2023. The Project, currently under construction, includes 29 wind turbines and ancillary infrastructure. While the EARD did present a summary of migratory bird interaction index, (likely activity based on the fall 2022 migratory period which may correlate to increased mortality), no estimate of mortality was presented. Post-construction mortality monitoring is required but has not yet been completed as turbines are not yet in operation.

Given the proximity of nearby wind projects and a transmission line, there is potential for additive effects to avian mortality. With the lack of available post-construction mortality data, it is not possible to quantify whether any additive cumulative effects would result in a significant impact to avian mortality. Each Project indicated that there is potential for avian mortality, though each deemed the effect to be not significant within the spatial boundaries of each respective EARD. With a not significant effects determination for each Project, it is not anticipated that a significant cumulative effect to avian mortality will occur. Beyond standard post-construction avian mortality monitoring, no additional mitigations or monitoring is recommended based on cumulative effects.

14.0 CONCLUSION

In accordance with A Proponent's Guide to Environmental Assessment (NSECC, 2017), the studies, regulatory assessments, and VC evaluations described within this EA report have been considered both singularly and cumulatively, for all phases of the Project. The results of this assessment indicate that in consideration of the Project's mitigative and protection measures, adverse residual effects for all VCs are not anticipated to be significant.

15.0 CLOSURE

This EA Report was completed by Strum Consulting, an independent, multi-disciplinary team of consultants with extensive experience with submission of EARDs for undertakings within Atlantic Canada. Curriculum vitae for EARD contributors and Project Team members are provided in Appendix K. A list of the Project Team and their associated roles is provided below.

Senior Review and Oversight
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APPENDIX A
ENGAGEMENT

BAYSide
CORPORATE

Re: Support for Strait Crossing and the Opportunity for Economic Reconciliation

As the Chief Executive Officer of the Bayside Development Corporation of the Paqtnkek Mi'kmaw Nation it is my pleasure to bring forth this letter as an acceptance, that our NATION has full support for EverWind's Strait Crossing Project.

Aligned in value with EverWind, Paqtnkek Mi'kmaw Nation and Bayside Development Corporation is fully apprised of the scope of the Project. Our equity partnership between EverWind and Bayside Development Corporation allows us to meet our goals of securing our long-term economic independence and energy sovereignty and supporting the provincial climate change objectives.

Our community is looking at further opportunities to support EverWind to ensure a strong transition to clean energy. As stewards of this land, we are pleased to see this exciting project so close to home. EverWind has committed to continue to actively engage with Paqtnkek Mi'kmaw Nation regarding environmental matters and any potential impacts on Mi'kmaq Rights.

This Project shows the power of bringing together Mi'kmaq traditional knowledge with the world's leading companies like EverWind. As Mi'kmaw, we understand the importance of helping lead the way in the green hydrogen industry given its importance to the environment. Our involvement aligns with our priorities to actively participate in the sustainable development of our natural resources and the decarbonization of our energy systems and supply. Since the inception of the Project, EverWind has included Mi'kmaq in development, ensuring alignment with two-eyed seeing approaches, and the project economics.

We support EverWind's approach. True partnerships like this are embodiment of moving together into reconciliation.

Sincerely yours In Friendship and Economic Reconciliation;

Cory Julian, Chief
Paqtnkek Mi'kmaw Nation

RPaul

Rose Paul, MBA, CEO
Bayside Development Corporation

Membertou

Re: Letter of Support, EverWind Strait Crossing

Please accept this letter with full support for EverWind's Strait Crossing Project. Aligned in value with EverWind, Membertou is fully apprised of the scope of the Project.

In Membertou, we care deeply about the future of energy consumption and a smooth transition to greener, more sustainable energy sources. Our community is currently looking at further opportunities to support EverWind to ensure a strong transition to clean energy.

In Mi'kmaq culture, there is a guiding principle that trusts each person to consider their actions for the next seven generations. As historical and modern stewards of the land, we are pleased to see this exciting project so close to home.

We believe that EverWind's potential to change the landscape of how we view and access energy for the next seven generations is crucial. In Membertou, we want to be part of the solution. Securing clean energy for generations to come is both a strong moral decision, and one that supports economic reconciliation through a meaningful partnership with EverWind Fuels.

This Project shows the power of bringing together Mi'kmaq traditional knowledge with the world's leading companies like EverWind. As Mi'kmaw, we understand the importance of helping lead the way in the green hydrogen industry given its importance to the environment. Our involvement aligns with our priorities to actively participate in the sustainable development of our natural resources and the decarbonization of our energy systems and supply.

Sincerely yours,

Terrance J. Paul

Chief Terry Paul, O.C
Chief & CEO, Membertou

POTLOTEK FIRST NATION

Re: Support for Strait Crossing and the Opportunity for Economic Reconciliation

Please accept this letter with full support for EverWind's Strait Crossing Project.

We support the transition to green energy. Potlotek are equity partners in EverWind's production facility. For generations, Mi'kmaw were prevented from participating in and benefitting from the economic development of our natural resources. This project provides an opportunity to make the dreams of our grandparents a reality.

Aligned in value with EverWind, Potlotek Mi'kmaw Nation and Potlotek Development Corporation is fully apprised of the scope of the Project.

Potlotek leadership understand the need to move to green renewable energy and this agreement allows us to be a part of that change. Having EverWind's green fuels production and Strait Crossing project in our County and in our backyard allows us to see and be a part of working towards a greener future through the development of alternative energy sources. Green hydrogen will help pave the way forward for a greener future for generations to come.

Having an opportunity to partner with a company who understands the importance of the relationship that we, the Mi'kmaw, have with our environment is vital to the development of a successful project. Creating meaningful partnerships such as this will enable the Mi'kmaw to not only sustain economic independence but will also provide employment and training opportunities for future generations to come.

This Project shows the power of bringing together Mi'kmaq traditional knowledge with the world's leading companies like EverWind. As Mi'kmaw, we understand the importance of helping lead the way in the green hydrogen industry given its importance to the environment. Our involvement aligns with our priorities to actively participate in the sustainable development of our natural resources and the decarbonization of our energy systems and supply.

Sincerely yours,

Wilbert Marshall, Chief

Potlotek Mi'kmaw Nation

Wind Farm 1 Community Liaison Committee

Meeting Minutes: November 12, 2024

1 In Attendance

Mark Stewart	Andrew Woods
Rudee Gaudet	Sean Reid
Gordon MacDonald	Mary Desmond
Lance Peters	Dough Halfpenny
Shaunna Scott	Dawn Grant
Blair Brymer	Alonzo Reddick
Tori Evans	

2 Items Discussed

2.1 Introductions

- CLC representatives introduced themselves, sharing professional and community backgrounds.
- Emphasis on the diverse expertise and perspectives contributing to the committee's goals.

2.2 Updates / Reports

- **Project Overview**: Explained the purpose of the CLC as an advisory group for enhancing community engagement and feedback.
- **Environmental Assessment (EA)**: Discussed ongoing and completed studies, including wildlife, wetlands, sound, and visual assessments. Updates to layouts are informed by field findings.
- **Site Tour Feedback**: Positive reviews from attendees who noted the scale and insights gained. Encouraged others to arrange a visit if possible.
- **Funding Commitments**: Reviewed the financial benefits, including municipal taxes, community benefit funds, and proximity payments.

2.3 Unfinished Business

- Finalizing the CLC's terms of reference for circulation at the next meeting.
- Strategies to improve meeting accessibility and inclusivity for broader community participation.

2.4 New Business

- **Naming Wind Farms**: Suggestions for involving local schools in a naming competition, including prizes and possible representation on the CLC for winners.
- **Community Engagement**: Plans for community consultation events in December 2024 for updates on the wind farm layout and straight crossing.
- **Public Communication**: Proposed multiple approaches, such as newsletters, FAQs, and social media updates, to address misconceptions and provide accurate project information.
- **Decommissioning Plans**: Highlighted the importance of community understanding of end-of-life project plans, including recycling and repowering options.

2.5 Announcements

- Community open houses tentatively planned for December 11-12, 2024, focusing on the straight crossing and wind farm 1 updates.

Round Table

Community Concerns

- Discussions highlighted key community concerns, including environmental impacts, employment opportunities, and the allocation of community benefit funds.
- Members stressed the importance of transparent communication and inclusive consultation processes.

Localized Meetings

- Suggestions were made to hold meetings in community halls to increase visibility and participation.
    - Some of the community halls are not equipped with internet services however alternative options such as hot spotting from a phone or Starlink could be used.
    - **Action Item:** Book Boylston Community Centre for next meeting

Community Engagement and Student Involvement

- **Broadening Representation**: Encourage student involvement to diversify CLC representation.
    - **Action Item**: Meet with school representatives to discuss site tours and youth participation opportunities.
- **Naming Competition**: Organize a contest for local students to name the wind farm. The winning name will be selected by the CLC, with the winner receiving a prize (e.g., an iPad) and a potential position on the CLC.

Information Dissemination to the Community

- **Key Strategies**:
    - **Guysborough Wind Email**: Actively promote this as a feedback and engagement channel.
    - **Guysborough Office Hours**: Increase visibility to encourage community interaction.
    - **Mailbox Drops**: Share project details, including open house dates and locations, directly with residents.
    - **FAQs**: Maintain a comprehensive FAQ section on the project webpage and in the office.
        - **Action Item**: Share the FAQ link with CLC members for broader community distribution.
    - **One-on-One Meetings**: Facilitate direct discussions with local community members and associations.
    - **Maps**: Provide CLC members with detailed maps to share with the community for better project understanding, noting that layouts may evolve.

Communication and Outreach Tools

- **Quarterly Newsletter**:
    - **Content**: Include updates on job and training opportunities, Q&A sections, project progress, and links for community feedback.
    - **Distribution**: Available in both electronic and hardcopy formats.
- **Local Media Engagement**: Collaborate with the Guysborough Journal for regular updates and use municipal mailouts to inform residents about the project and provide contact points for questions or concerns.

Addressing Misinformation

- **Community Feedback Collection**: CLC members will gather common questions and misconceptions for clarification and updates to the FAQ database.
- **Educational Outreach**: Work with mainstream media to explain the connection between wind projects and hydrogen/ammonia production facilities, emphasizing the purpose and benefits of the projects.

3 Next Meeting

The next scheduled meeting of the CLC will be held on Tuesday February 11th, 2025. There will be no CLC meeting in December.

You're Invited!

Transmission Crossing of the Strait of Canso Open Houses

EverWind Fuels would like to invite you to our upcoming Open Houses to learn more about the proposed Strait Crossing transmission line that is related to the renewable energy initiatives being developed in the community.

We invite you to join us at one of our open house information sessions this February to learn more about the project and share your feedback. These informal sessions, featuring poster boards, are designed to encourage open dialogue and provide a relaxed setting for engagement.

February 5, 2025	3-6 pm	**Mulgrave Fire Hall** 385 Murray St, Mulgrave
February 6, 2025	10-1 pm	**Port Hawkesbury Civic Centre** ***(Shannon Studio)*** 606 Reeves Street, Port Hawkesbury
February 6, 2025	3-6 pm	**Acadiaville Community Centre** 1436 Route 206, Arichat

Questions on your mind? Feel free to email us at:
guysboroughwind@everwind.ca

We're eager to connect and provide you with the information you need.

ns.everwind.ca EVERWIND

Send your news to news@guysboroughjournal.ca

delivers keynote at Indian Philosophical Congress

Photo courtesy StFX University.
Local conference organizer J. Thirumal (left) presents StFX philosophy professor Will Sweet with the IPC Guest of Honour award. Sweet was the keynote speaker at the opening session of the Indian Philosophical Congress, held at Annamalai University, Chidambaram, India, in December.

Author reflects on love, loss at launch

Author Jude Avery (top photo, standing) hosted a Guysborough launch for “Sorrow to Strength: A father’s story of loss” at the Cyril Ward Memorial Library Saturday morning (Jan. 25). The book not only celebrates the life of his beloved son, Justin, who died tragically in 2004 at the age of 18, but also the elder Avery’s journey as a parent who lost a child from the depths of sorrow. Avery (left photo) holds a portrait of Justin, which he also displayed during the celebration. The proud father also showed visitors a collection of more than 1,200 messages the family received over a two-week period while Justin was in a coma in Halifax before he passed away. Avery’s nephew, Blaise MacPhee, who established a website that received those notes of comfort and encouragement, catalogued and presented them to the family in a binder. Avery noted that the compilation reflects how Justin “touched others with his warmth and openness.” As for the painting, Isaac Mills of Antigonish - who was a friend and StFX classmate of Justin’s - completed the piece after his death. Mills gave it to his friend, Beulah MacPhee, Justin’s aunt, for the Avery family. Hilary Hendsbee

Community rallies together to build resident new home after L'Ardoise house fire

Continued from page 1

"Whether it's donations to the GoFundMe page, materials, labour, or meals – it's just everybody supporting everybody, and it's great," he said.

The outpouring of support wasn't limited to the immediate community. Business owners and residents from surrounding areas, including St. Peter's, Louisdale, and Isle Madame, also contributed.

Construction on the house began on Jan. 17, and Martell anticipates that Taylor will be able to move in by mid-February. The team recently completed electrical and plumbing inspections and is now preparing to finish the interior.

"There's no better feeling than helping somebody in need. It makes a guy proud about where he comes from, to see everyone step up and do this for someone," Martell reflected.

Ultimately, Martell said the project underscores the strength of small communities and how "everybody helps each other when they can." He also shared an important lesson: "Don't take anything for granted."

"Some things can be here today and gone tomorrow. You have a house one night, and the next day, nothing. And that can happen to anybody, whether you have money or not," he said. "So, it's good to appreciate what you have and count your blessings."

Photos contributed.
Construction for Sheldon Taylor's new house began on Jan. 17. Pictured is a crew of volunteers putting in a new water line for the house.

Charlie Martell, who spearheaded the fundraiser, explained it wasn't just the immediate community who helped, with business owners and residents from all over the St. Peter's area, Louisdale and also Isle Madame helping out.

EVERWIND

Welcome to our Community Information Session

ns.everwind.ca

Land Acknowledgement

We acknowledge the ancestral and unceded territory of the Mi'kmaq people. We also acknowledge the Mi'kmaq as the past, present, and future caretakers of this land, Mi'kma’ki.

We are committed to working with the Mi'kmaq and delivering a comprehensive partnership on all aspects of the project. EverWind's Nova Scotia Projects include three Mi'kmaq equity partners and champion meaningful engagement with Rightsholders and the advancement of social and economic reconciliation.

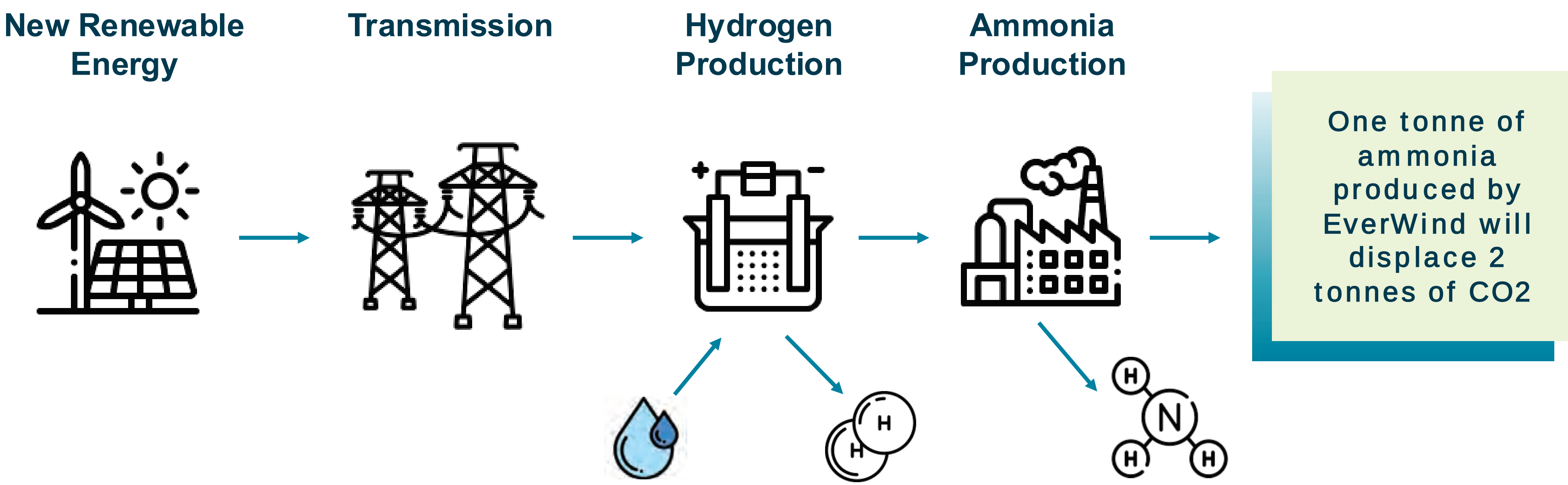
We also recognize that African Nova Scotians are a distinct people whose histories, legacies, and contributions have enriched that part of Mi'kma'ki known as Nova Scotia for over 400 years.

About EverWind

EverWind Fuels LLC (EverWind) is a developer of green hydrogen and ammonia production, storage facilities, and associated transportation assets. The EverWind team is comprised of over 120 employees, mostly from the local community, who are further supported by full time contractors and consultants.

We are developers, owners, and managers with experience in almost every infrastructure sub-category in North America, and a track record of success and delivering socially and environmentally responsible developments for all of our stakeholders.

Green Hydrogen & Ammonia Production



Green Hydrogen & Ammonia Uses

Hydrogen

- **Transportation:** Passenger cars, Transport trucks, Trains, Shipping Vessels, Planes
- **Electricity generation (fuel for power plants)**
- **Chemicals for Industrial Processes**

Ammonia

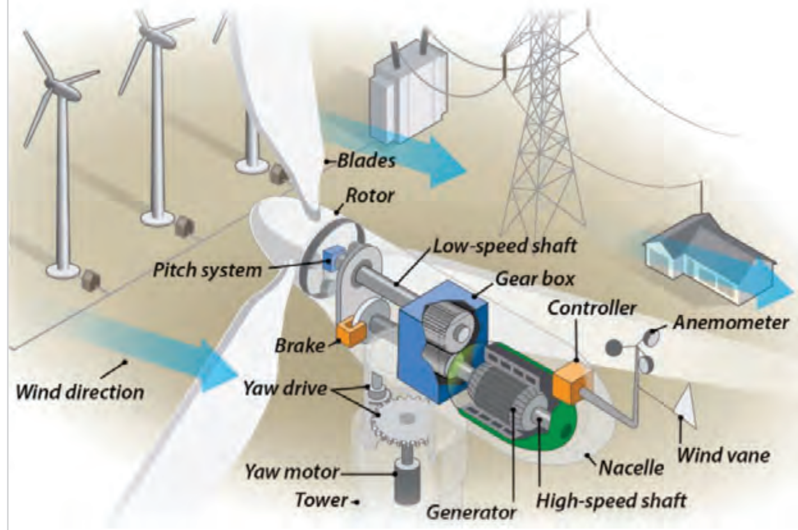
- **Industrial Refrigerant** (i.e. cold storage facilities, ice rinks, etc.)
- **Shipping Vessels** (requires significant venting so not suitable for other transportation applications)
- **Electricity Generation** (fuel for power plants)
- **Chemical for Industrial Processes**
- **Agricultural Fertilizer**

How Wind Power Works

Modern turbines have three main components: the tower, the nacelle (or generator) and the blades.

The blades rotate when the wind blows and are attached to a gearbox in the nacelle, which turns the generator and produces electricity.

Electricity is then converted to a medium voltage AC current, transmitted via cables and is collected at a substation before being transmitted by overhead lines to the main electrical grid.



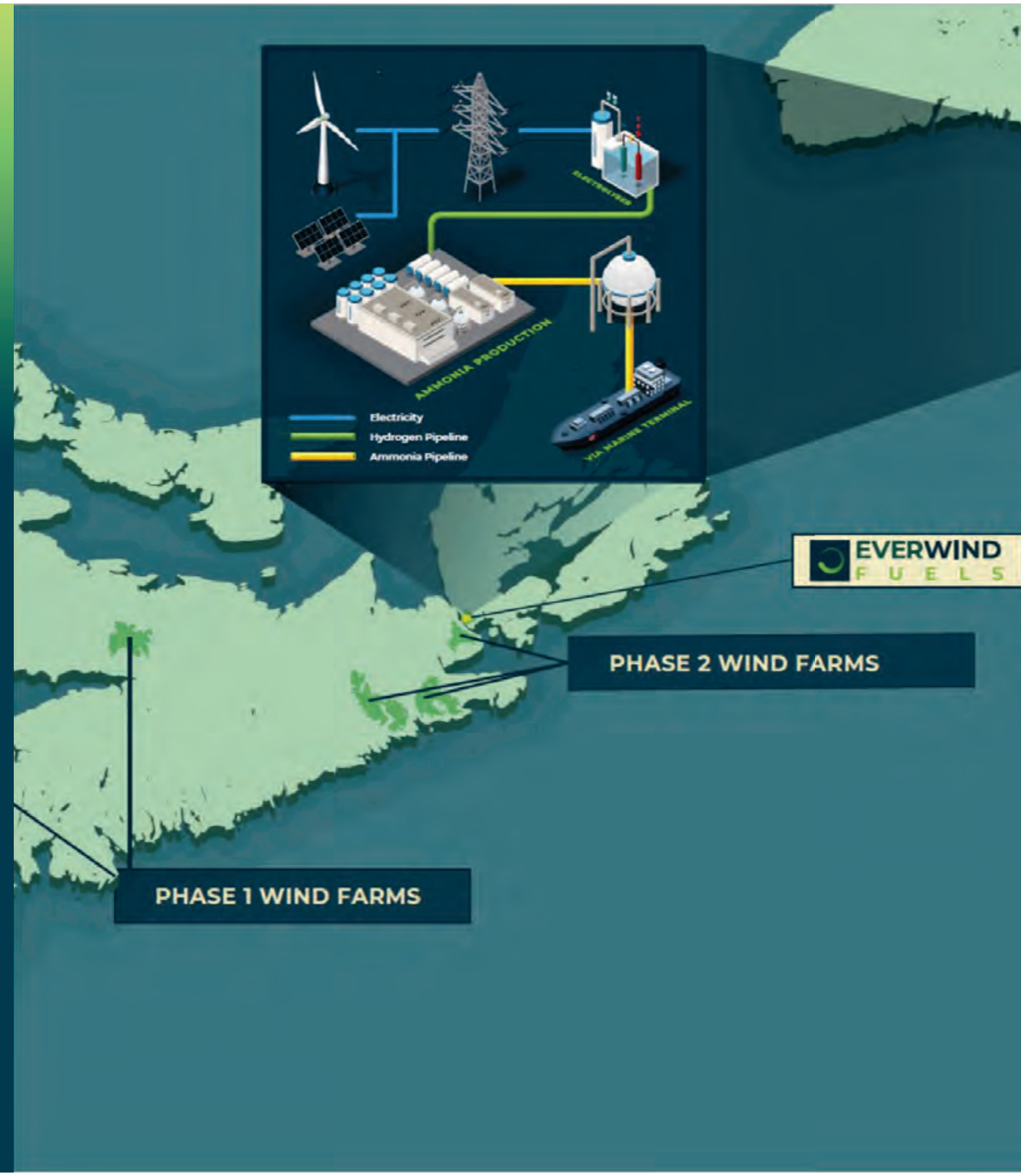
EverWind – Phased Green Hydrogen

1) Nova Scotia Phase 1

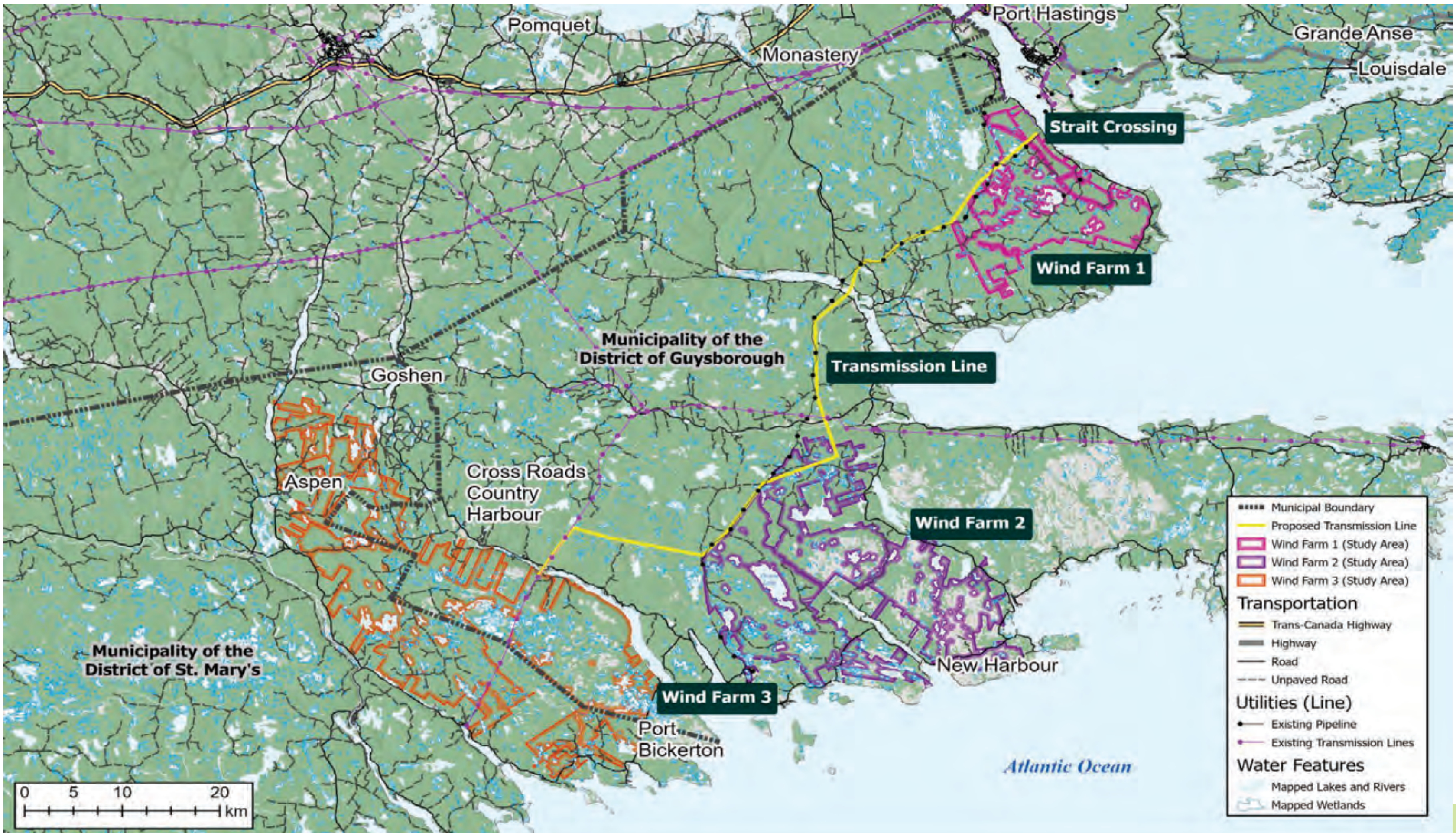
- 650 MW onshore wind
- 240 ktpa of green ammonia
- EAs approved for facility and two wind projects

2) Nova Scotia Phase 2

- ~2 GW onshore wind & solar
- >1 mtpa of green ammonia



Project Map



Port Hastings
Pomquet
Monastery
Grande Anse
Louisdale
Strait Crossing
Wind Farm 1
Municipality of the District of Guysborough
Transmission Line
Goshen
Aspen
Cross Roads Country Harbour
Wind Farm 2
New Harbour
Municipality of the District of St. Mary's
Wind Farm 3
Port Bickerton
Atlantic Ocean
0 5 10 20 km
Municipal Boundary
Proposed Transmission Line
Wind Farm 1 (Study Area)
Wind Farm 2 (Study Area)
Wind Farm 3 (Study Area)
Transportation
Trans-Canada Highway
Highway
Road
Unpaved Road
Utilities (Line)
Existing Pipeline
Existing Transmission Lines
Water Features
Mapped Lakes and Rivers
Mapped Wetlands

Siting Wind Projects

Since the last round of community engagement activities, we took the following actions:

- **Implementing feedback:** community comments and feedback has been incorporated in initial layout design work, however further engagement is required to progress the design and development work
- **Met towers installed across Wind Farm 1:** Six months of onsite meteorological data has been collected to inform site design
- **Initial modelling of sound and shadow flicker is ongoing with design work:** project design will be compliant with relevant provincial and municipal regulations at all receptors
- **Turbine selection process is ongoing**: higher capacity model enables a reduction in total number of turbine locations

In Conclusion:

- **Ongoing layout work:** Extensive studies are occurring to collect wind data and identify environmental constraints to reduce environmental and human impacts
- **Removed Roads:** Directly reduced impact on environment and recreational trail system
- **Committed to Working with the Community:** Actively listening to community concerns and implementing changes

Improved design reflects input from the community and work conducted on the ground.

Minimizing Environmental Impacts

Much of the Project site is previously disturbed from historical and current forestry activity, recreational activities, and mineral excavation.

EWF is aiming to further minimize the environmental impact of the Project by:

- Prioritizing existing logging roads: existing roads are being used to the extent possible
- Maintaining large setbacks from residences and protected areas
- Minimizing impact to Old Growth Forest
- Minimizing impact to Wetlands and Watercourses
- Minimizing tree clearing

Minimizing Environmental Impacts

EWF is making efforts to minimize impacts to Mainland Moose by:

- Minimizing landscape fragmentation by utilizing existing forestry roads to the extent possible
- Installing light mitigation technology to reduce impact of nighttime lighting
- Spearheading a provincial working group to establish practical methods to protect Mainland Moose

Environmental Monitoring

As part of the survey process, specialized equipment is used to help ensure we have comprehensive environmental information.

Avian Radar

Bird movement data is logged by an avian radar system, providing information for trend assessments and identification. Bat acoustic monitors are used to analyze bat presence.

Environmental Monitoring

Meteorological (MET) Tower

- MET Towers are temporary structures designed to collect weather-related information, such as wind speed, wind direction, and temperature.
- MET Towers are unassuming in the landscape. Each METBTower requires just a 100m buffer. Any impact on the surrounding area is minimal.
- MET Towers have a concrete base with guy-wires for support. The wires typically extend 60 metres in 3-4 directions from the tower.
- Each MET Tower has a permit application approved by the Government of Nova Scotia.

Community Benefits

We believe our projects are net positives for the local communities in which we work.

Benefits include:

- Billion-dollar Investment in Municipality of the District of Guysborough and St. Mary's
- $800 million in project lifetime municipal tax & benefits paid to municipalities, community groups and nearby residents
- Contracting opportunities for First Nations & local businesses
- Community Benefits Funds paid out annually directly to the community through a combination of Proximity Payments, Vibrancy Fund and Bursaries.
- Increased local spending on goods and services during the project's development, construction and operational phases

Local Job Creation

These projects are currently employing dozens of local Nova Scotians and will generate considerable direct opportunities for both local companies & individuals during construction and operations.

- 350-400 Direct Jobs During Construction*:
- Civil installation: land clearing, forming, concrete supply, grouting, forming
- Electrical installation: overground installation, electrical testing, instrument installation
- Turbine installation: crane supply, turbine offload, mechanical and electrical work
- Local businesses: to benefit from increased local spending with larger local workforce

*Numbers are for each Wind Farm.
A job fair will be held one month prior to start of construction. On-the-job training will be available for some positions.

Local Job Creation

Up to 20-40 Part-Time and Full-Time Jobs during Operations and Maintenance*:

- HV Technicians / Electricians
- Wind Technicians
- Road Maintenance Workers
- Vegetation Management Service Providers
- Snow & Surface Removal
- Administrative Support
- Inventory / Materials Management

*Numbers are for each Wind Farm.
A job fair will be held one month prior to start of construction. On-the-job training will be available for some positions.

Decommissioning Or Repowering

Why and When are Wind Farms Decommissioned?

At the end of their useful life, wind projects may be decommissioned for the following reasons:

- Components become too expensive to maintain
- The Project has reached the end of its business case
- The power purchase agreement has terminated
- Generally, the decommissioning phase will follow the same steps as the construction phase:

- Dismantling and removal of the turbines
- Removal of the turbine foundations down to 1 m below grade
- Removal, recycling (where possible), and disposal of power collection system, conductor, and poles
- Removal of all other equipment
- Reclamation of the land

Decommissioning Or Repowering

What guarantee is there that the Wind Farm will not be abandoned?

- We will post a form of security to ensure funds are available for decommissioning at the Project's end of life.

Why and When are Wind Farms Repowered?

- Global trends favour repowering due to renewable wind resources. Repowering leverages existing investments, relationships, and data, making it less risky than initial projects. Technological advances enable efficient turbine replacements, often doubling power output with fewer turbines.

Turning Wind Power Into Zero Carbon Fuel

Makes Renewable Power Cheaper:
Without hydrogen, Nova Scotia would be forced to import green fuels over time

Provides Domestic Source:
Local supply & green fuels needed to avoid Carbon Tax

WHAT IS GREEN HYDROGEN?

Brings Nova Scotians Home:
Skilled labour can stay home with their families

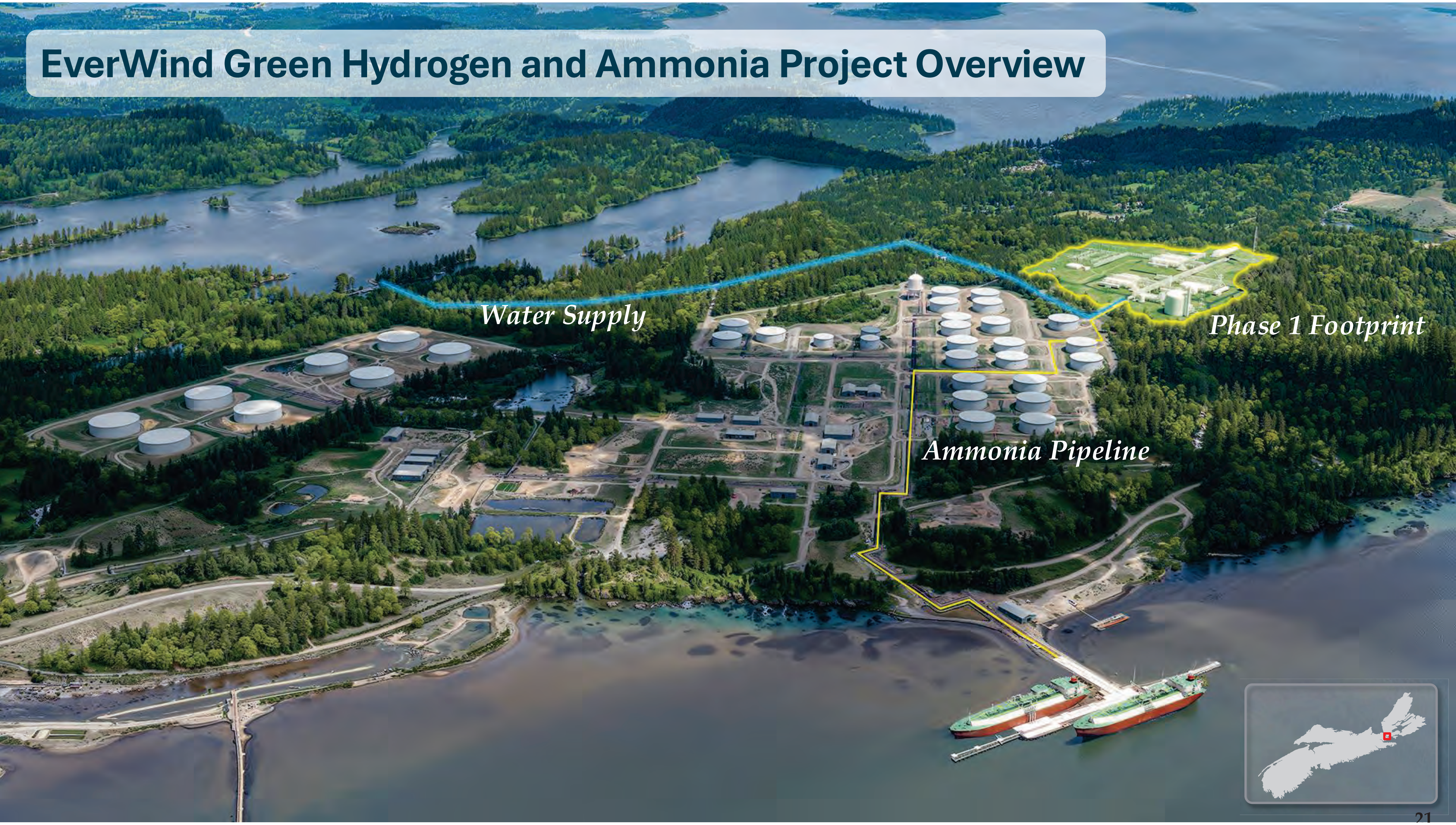
Strong Economy Supports Investment In Healthcare

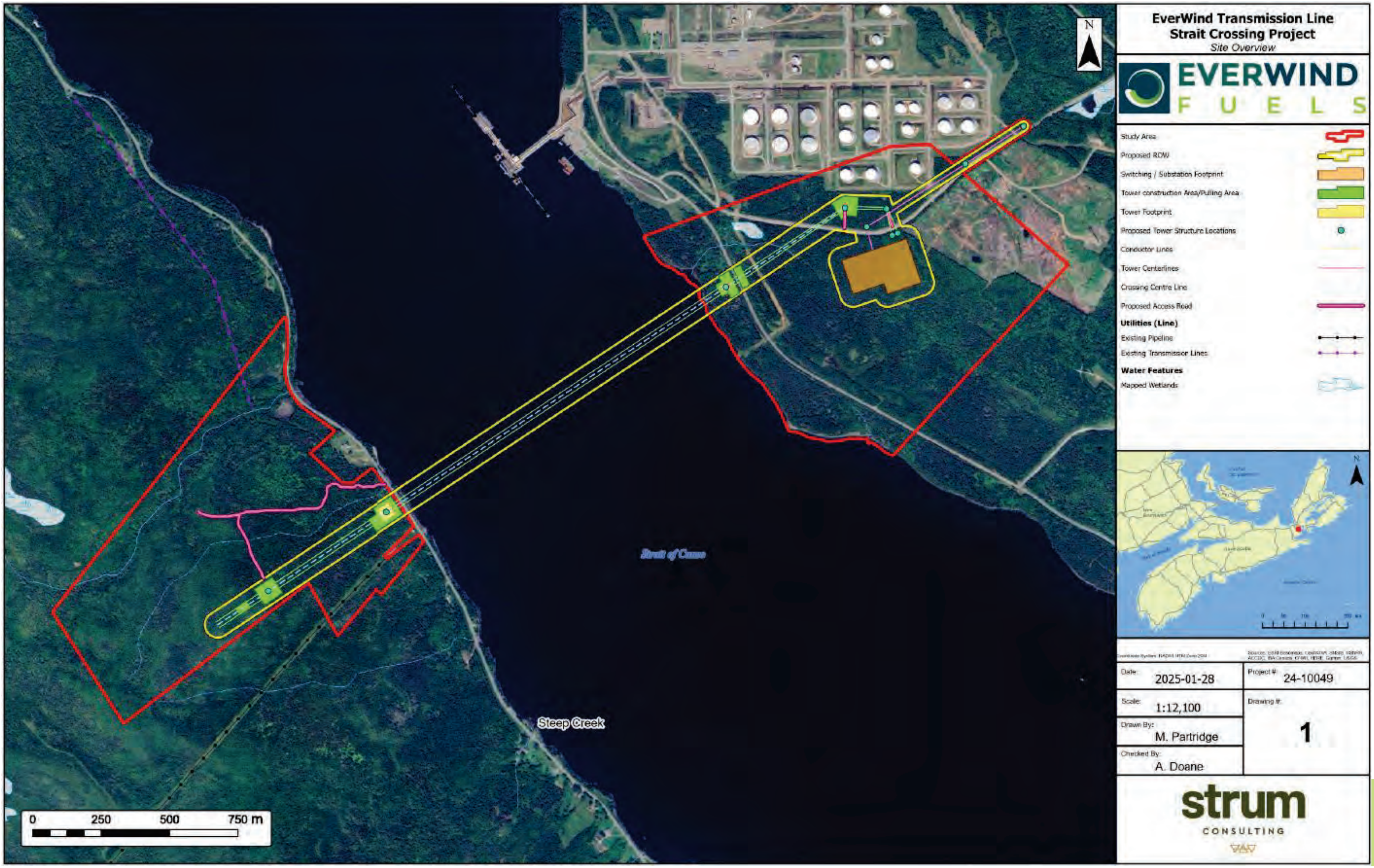
HYDROGEN SUPPORTS A GREEN GRID

Creates Green Economy for our Kids

Green hydrogen is needed to meet provincial green requirements!

EverWind Green Hydrogen and Ammonia Project Overview




EverWind Transmission Line
Strait Crossing Project
Site Overview
EVERWIND
FUELS
Study Area
Proposed ROW
Switching / Substation Footprint
Tower construction Area/Pulling Area
Tower Footprint
Proposed Tower Structure Locations
Conductor Lines
Tower Centerlines
Crossing Centre Line
Proposed Access Road
Utilities (Line)
Existing Pipeline
Existing Transmission Lines
Water Features
Mapped Wetlands
Date: 2025-01-28
Project #: 24-10049
Scale: 1:12,100
Drawing #: 1
Drawn By: M. Partridge
Checked By: A. Doane
strum
CONSULTING
Strait of Canso
Steep Creek
0
250
500
750 m
N

Siting the Strait Crossing Transmission Line

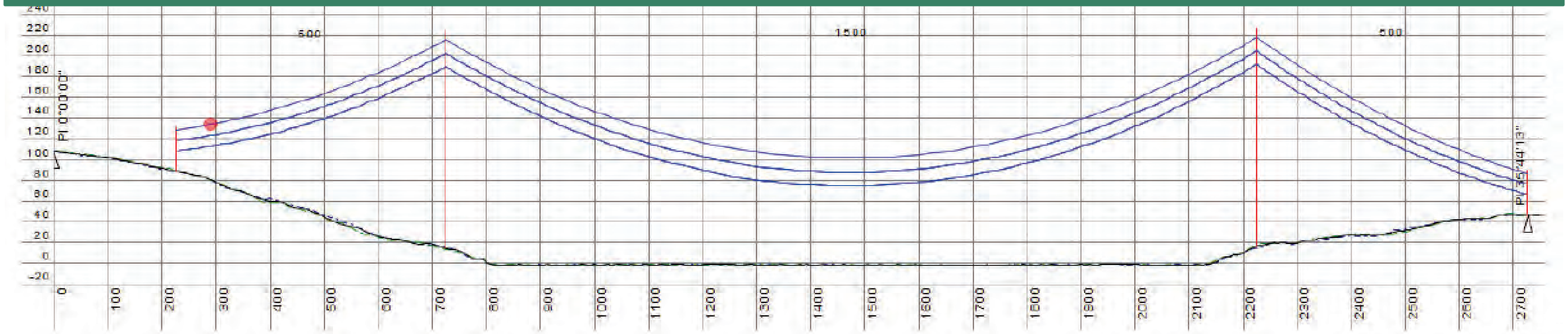
- **Meeting with Strait Area Industrial Users:** EverWind has set out to meet with the many industrial users of the Strait of Canso to ensure continued access and functionality is not impacted by the construction and operation of the Strait Crossing transmission line
- **Micrositing to avoid sensitive features**: The placement of the suspension and Dead-End Towers have been selected to minimize environmental impacts.
- **Span Distance:** Minimizing the span distance and allow for a clear span
- **Proximity to the Hydrogen and Ammonia facility and Wind Farm 1:** The chosen location offers close proximity to the source and end user of energy
- **Land availability**: Tower infrastructure is sited on private lands

Project Details

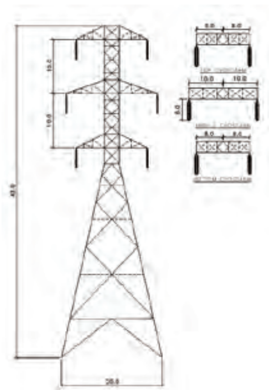
	Strait Crossing Transmission Line
Ownership Structure	EverWind & Partners – To Be Determined
Location	Steep Creek, MODG and Point Tupper, Richmond County
Tower Height*	Suspension – 210 m, Dead-End – 43 m
Height of lines above the Strait*	75 m
Number of circuits	2 circuits – 3 phases each
Voltage	345 kV
Power Capacity	2000 MW
Tower Footprint(s)	Suspension – 35 m x 35 m, Dead-End – 20 m x 20 m
Span Distance	1500 m
Targeted Start of Construction	Q1 2026
Commercial Operation Date (COD)	Q4 2027
Target EA Registration Date	Q1 2025

Project Details

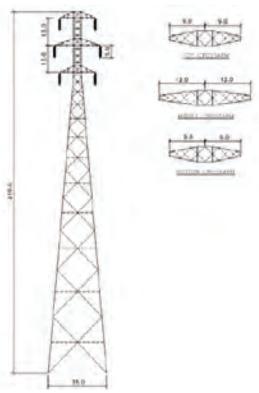
Strait Crossing - Profile View



Dead-End Tower



Suspension Tower



Parameter	Value
Approximate Sag	125 m*
Span Distance	1,500 m
Ground Clearance	12 m
Water Clearance	75 m
*Under ice load conditions	

Visual Simulation: South-facing

Visual Simulation: North-facing

Environmental Assessment

The Strait Crossing project will be submitting an application into the province's rigorous Environmental Assessment (EA) process, which includes an analysis of the potential environmental impacts of the project. As part of the EA, the following detailed field studies have been completed within the Study Area:

- Wildlife: Bird Field Studies, Bird Radar and Acoustic Studies (Fall 2023, Spring/Summer 2024)
- Watercourses: Fish and Fish Habitat Assessments (Summer 2024)
- Wetlands: Delineations and Functional Assessments (Summer 2024)
- Vegetation and Lichen Surveys (Summer 2024)
- Archaeological Resource Impact Assessment (ARIA) (2024)
- Mi'kmaq Ecological Knowledge Study (MEKS) (2024)

Environmental Monitoring

As part of the EA Survey process, specialized equipment is used to help ensure we have comprehensive environmental information.

Avian Radar

Bird movement data was logged by an avian radar system during the Fall 2023 and Spring 2024 migratory periods, gathering data for trend assessments and the identification of migratory patterns.

Minimizing Environmental Impacts

Much of the Project site is previously disturbed from historical and current forestry activity, as well as industrial and recreational activities.

The Environmental Assessment has concluded the following:

- No Wetlands will be impacted by the construction of the tower foundations
- Appropriate setback distances will be maintained between tower foundations and Watercourses
- No Species at Risk (SAR) plants or lichens will be impacted by the Project

Lifespan and Decommissioning

To complement the highest level of reliability, the Project is being designed to withstand a 150-year life, pursuant to the appropriate maintenance and upkeep during that time.

- The Project is planned to serve as the "bridge" for power from EverWind's Phase 2 wind projects to the Point Tupper Hydrogen/Ammonia Facility. Once wind energy is no longer being generated, the Transmission line will be re-evaluated
- Impacts to the environment during the decommissioning phase will be similar to those during construction
- Removal, recycling (where possible), and disposal of transmission system, conductors, and towers will occur
- Removal of all other equipment
- Reclamation of the land

Benefits for Nova Scotians

Deloitte. completed an Economic Impact Study of EverWind Phase 1, which found:

+5,190
Full Time Jobs
Construction

+820
Full Time Jobs
Permanent, Operations

+$311 Million
Government Revenue
Construction

+$29 Million
Government Revenue
Annual, Operations

+$1.3 Billion
Increase in GDP
Construction

+$322 Million
Increase in GDP
Annual, Operations

+$670 Million
Labour Income
Construction

A Next-Gen Industry
This is just the beginning!

THANK YOU

Thank you!

We appreciate you taking the time to join us.
We would be happy to follow-up with you
if you have any other questions about the Projects.

Please fill out a feedback and site naming form.

EVERWIND FUELS

EVERWIND FUELS

Strait Crossing Transmission Line Open House - Exit Survey
February 5/6, 2025

1) How did you hear about this event? (i.e. got an email about this, heard from neighbour, municipal councillor, CLC member, newspaper):

on the news local Paper and on the internet

2) How helpful was the information you received? Please indicate by circling a number below:

(Not at all helpful) 1 2 3 4 5 (Very helpful)

3) Please provide your comments or feedback on the Project and/or today's event:

It looks to be an exciting Project and will be good for the strait area and the province, look forward to seeing it completed

Please return this sheet to a Project team member before departing the event

EVERWIND FUELS

Strait Crossing Transmission Line Open House - Exit Survey
February 5/6, 2025

1) How did you hear about this event? (i.e. got an email about this, heard from neighbour, municipal councillor, CLC member, newspaper):

word of mouth.

2) How helpful was the information you received? Please indicate by circling a number below:

(Not at all helpful) 1 2 3 4 5 (Very helpful)

3) Please provide your comments or feedback on the Project and/or today's event:

Very exciting + well thought out

Please return this sheet to a Project team member before departing the event

Strait Crossing Transmission Line Open House - Exit Survey
February 5/6, 2025

1) How did you hear about this event? (i.e. got an email about this, heard from neighbour, municipal councillor, CLC member, newspaper):

Guysborough Journal

2) How helpful was the information you received? Please indicate by circling a number below:

(Not at all helpful) 1 2 3 4 5 (Very helpful)

3) Please provide your comments or feedback on the Project and/or today's event:

Very informative good luck in the future.

Please return this sheet to a Project team member before departing the event

EVERWIND FUELS

Strait Crossing Transmission Line Open House - Exit Survey
February 5/6, 2025

1) How did you hear about this event? (i.e. got an email about this, heard from neighbour, municipal councillor, CLC member, newspaper):

Heard from Neighbour

2) How helpful was the information you received? Please indicate by circling a number below:

(Not at all helpful) 1 2 3 4 5 (Very helpful)

3) Please provide your comments or feedback on the Project and/or today's event:

I found talking to the people involved with the project very informative
Thank-You

Please return this sheet to a Project team member before departing the event

EVERWIND FUELS

Strait Crossing Transmission Line Open House - Exit Survey
February 5/6, 2025

1) How did you hear about this event? (i.e. got an email about this, heard from neighbour, municipal councillor, CLC member, newspaper):

NEWSPAPER -

2) How helpful was the information you received? Please indicate by circling a number below:

(Not at all helpful) 1 2 3 4 5 (Very helpful)

3) Please provide your comments or feedback on the Project and/or today's event:

GREAT INFORMATION WITH AVAILABLE PEOPLE TO PRESENT IT.

Please return this sheet to a Project team member before departing the event

Agenda for Wind Farm 1 Community Liaison Committee Meeting

Meeting #: 2

Date: Tuesday, February 11, 2025

Time: 6-8pm

Location: Boylston Community Centre

Overview of Agenda:

1. Welcome and Introductions
2. Review and Approval of Previous Minutes
3. Project Updates
4. Discussion on Unfinished Business
5. New Business
6. Communication and Outreach Updates
7. Round Table Discussion
8. Action Items and Next Steps
9. Next Meeting Details

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1. Welcome and Introductions

- Reintroduction of members and any new participants

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2. Review and Approval of Previous Minutes

- Confirmation of the November 12, 2024, meeting minutes
- Discussion and approval of action items carried forward

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3. Project Updates

- Status of environmental assessments, including any updates on wildlife, sound, and visual studies
- Adjustments to wind farm layout based on field data
- Strait of Canso Transmission Line Crossing – update following open houses
- Community Engagement Activities:
  - Strait of Canso Transmission Line Crossing
    - Door knocking
    - Community Bulletins
    - Newspaper Ads (Journal & Reporter)
  - Feedback and outcomes from the open houses on February 5-6, 2025
    - Mulgrave Fire Hall – 31+ *(some opted to not sign-in)*
    - Port Hawkesbury Civic Centre – 21
    - Acadiaville Community Centre - 10
- Funding Updates
  - Progress on community benefit fund allocation
  - Updates on municipal taxes and proximity payments

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4. Discussion on Unfinished Business

- Finalization and circulation of the CLC Terms of Reference
- Discuss and elect CLC Chair
- Updates on accessibility and inclusivity strategies for broader participation

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5. New Business

- Naming Competition for Wind Farm:
  - Review of contest details and proposed timeline
  - Selection of judging panel and criteria for choosing the winning name
- Decommissioning Plans:
  - Initial steps to enhance community understanding of recycling and repowering options

- Youth Involvement:
  - Report on school representative discussions regarding student participation and site tours
- Community Feedback:
  - Review of frequently asked questions and proposed additions to the FAQ section
  - Keith Towse – discuss concerns expressed to MODG's planning authority
  - Coordination of one-on-one meetings and other outreach strategies

6. Communication and Outreach Updates

- Quarterly newsletter content planning and distribution strategy
- Collaboration with the Guysborough Journal and other local media
- Updates on email, office hours, and mailbox drop campaigns

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7. Round Table Discussion

- Open forum for CLC members to discuss community concerns
- Suggestions for enhancing community engagement

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8. Action Items and Next Steps

- Review and assignment of tasks for the next meeting
- Confirmation of any follow-ups or deliverables

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9. Next Meeting Details

- Date: May 11th, 2025
- Time: 6-8pm
- Location: TBD