Burin Peninsula Green Fuels Project
Environmental Assessment Registration Document

Prepared for: EverWind Fuels

strum CONSULTING

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EXECUTIVE SUMMARY

EverWind Fuels ("EverWind") is proposing the Burin Peninsula Green Fuels Project (the "Project") on the Burin Peninsula, Newfoundland and Labrador (NL). The Project will involve development, construction, operations, and decommissioning and reclamation of Wind Farms, Solar Farms, and an Industrial Facility for green hydrogen production and ammonia synthesis.

The Project will consist of:

- Three wind farms with a total capacity of 10 Gigawatts (GW)
- Three solar farms with a total capacity of 2.5 GW
- Industrial facility with a total ammonia production capacity of 14,000 tonnes per day
- Associated electrical and logistics infrastructure, including access roads, laydown yards, collection and transmission lines, a battery energy storage system (BESS), and substations
- Water supply infrastructure for freshwater intake to supply the green hydrogen production process
- Water supply infrastructure for seawater intake to support cooling water for ammonia synthesis
- A marine loading pipeline for liquid ammonia product distribution to marine terminal

Purpose of Environmental Assessment Registration Document

The Project is required to be registered with the Newfoundland and Labrador Department of Environment and Climate Change pursuant with the Newfoundland and Labrador *Environmental Protection Act*, 2002 (NL *EPA*) and its associated EA Regulations (2003). Part 34 of the NL EA Regulations indicates a requirement for electrical power generation greater than 1 MW to be registered. Registration is done through the submission of a formal Environmental Assessment Registration Document (EARD).

An EARD is a formal record required to initiate an environmental review process for a proposed project. It typically serves as the first step in assessing potential environmental impacts and ensuring that they are properly considered before a project proceeds.

Valued Components

Several Valued Components (VCs) were identified and evaluated as part of this assessment. Based on provincial guidance, desktop analysis, and field studies, VCs determined for assessment are as follows:

- Atmospheric Environment
- Geophysical Environment
- Aquatic Environment
- Terrestrial Environment
- Technical Studies

- Land and Resource Use
- Heritage and Cultural Resources
- Communities (Socio-economic)
- Economy, Employment, and Business

Next Steps: EverWind's Engagement & Assessment Plans

Preliminary desktop analyses and field surveys have been initiated to assess impacts to VCs. Following the submission of the EARD and due to the nature and scope of the Project, EverWind anticipates submitting an Environmental Impact Statement (EIS). Future planned baseline studies to support the EIS will improve understanding of interactions between the Project and VCs and potential cumulative impacts while fulfilling commitments of the regulatory process. Identification of environmental constraints and the continued collection of wind data will allow EverWind to develop a buildable Project layout that will be presented within the EIS. EverWind will implement a mitigation sequence to first avoid impacts and minimize and mitigate unavoidable impacts.

Over the last three years, EverWind has conducted extensive public engagement and is committed to continuing this engagement for the life of the Project. EverWind has also made substantial progress on the development of its projects in Atlantic Canada, notably the first completion of Front-End Engineering Design (FEED) for an industrial scale green hydrogen and ammonia project in the Western Hemisphere, gaining experience and best practices along the way which EverWind is implementing in its execution of this Project. Pre-FEED engineering of the Project has been completed while EverWind continues to collect environmental, wind resource and local community data necessary to support detailed engineering of the Project.

EverWind is committed to developing management plans to ensure impacts are minimized, and monitoring plans to confirm EIS findings. EverWind is also committed to continue working with provincial and federal regulators, Indigenous communities, organizations, and local residents on the Burin Peninsula.

TABLE OF CONTENTS

page

LIST OF FIGURES

LIST OF TABLES

LIST OF APENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

ACCDC	Atlantic Canada Conservation Data Centre
AHJ	Authority Having Jurisdiction
ANC	Association for New Canadians
ARU	Autonomous Recording Unit
ASME	American Society of Mechanical Engineers
ASU	Air Separation Unit
ATV	All Terrain Vehicle
AWE	Alkaline Water Electrolysis
BESS	battery energy storage system
BOP	balance of plant
BT	biological target
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
CEO	Chief Executive Officer
CEPA	Canadian Environmental Protection Act
CNA	College of North Atlantic
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSA	Canadian Standards Association
CWA	Canadian Wildlife Act
CWS	Canadian Wildlife Service
DC	Direct Current
DEI	Diversity, Equity and Inclusion
DEM	digital elevation model
DFO	Fisheries and Oceans Canada
DGSNL	Newfoundland and Labrador Department of Digital Government and Service NL
DND	Department of National Defence
DWCP	Domestic Wood Cutting Consultation Plan
EA	Environmental Assessment
EARD	Environmental Assessment Registration Document
ECCC	Environment and Climate Change Canada
EEMP	Environmental Effects Follow Up Monitoring Program
EIS	Environmental Impact Statement
ELC	Ecological Land Classification
EMI	Electromagnetic Interference
EPP	Environmental Protection Plan
EQS	Environmental Quality Standards
ERPG	Emergency Response Planning Guidelines
ERT	Emergency Response Team
FEED	Front-End Engineering Design
FID	Final Investment Decision

FTE	Full Time Equivalent
FWI	Fire Weather Index
GHG	Greenhouse Gas
GIS	Geographic Information Systems
HAZOP	Hazard and Operability Study
HMRTP	Hazardous Materials Response and Training Plan
HSC	Hydrogen Strategy of Canada
HSE	Health, Safety, and Environment
HSSE	Health, Safety, Security, and Environmental
IAA	Impact Assessment Act
ICS	Incident Command System
ID	Identification
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
LBP	Lower Burin Peninsula
LiDAR	Light Detection and Ranging
MBP	Mid-Burin Peninsula
MET	Meteorological
MHA	Members of the House of Assembly
MHTV	Multipurpose Heavy Transport Vessel
MMF	multimedia filters
MUN	Memorial University of Newfoundland and Labrador
NAFO	Northwest Atlantic Fisheries Organization
NFPA	National Fire Protection Agency
NL	Newfoundland and Labrador
NL APCR	Newfoundland and Labrador Air Pollution Control Regulations
NL ESA	Newfoundland and Labrador Endangered Species Act
NLECC	Newfoundland and Labrador Department of Environment and Climate Change
NL EPA	Newfoundland and Labrador Environmental Protection Act
NLFFA	Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture
NL FRI	Newfoundland and Labrador Forest Resource Inventory
NLIET	Newfoundland and Labrador Department of Industry, Energy and Technology
NL OHS	Newfoundland and Labrador Occupational Health and Safety Act & Regulations
NLOWE	Newfoundland and Labrador Organization Women Entrepreneurs
NLTI	Newfoundland and Labrador Department of Transportation and Infrastructure
NL WLA	Newfoundland and Labrador Wild Life Act
NL WRA	Newfoundland and Labrador Water Resources Act
NOAA	National Oceanic Atmospheric Administration
NRCan	Natural Resources Canada
NS	Nova Scotia
NWWG	National Wetland Working Group
OMNR	Ontario Ministry of Natural Resources

OSRO	Oil Spill Response Organization
PAH	Polycyclic Aromatic Hydrocarbons
PAO	Provincial Archaeology Office
PCB	Polychlorinated Biphenyls
PDF	Probability Density Function
PEM	Proton Exchange Membrane
PM	particulate matter
PPE	personal protective equipment
PPWSA	Public Protected Water Supply Areas
PTMS	Point Tupper Marine Services
PV	Photovoltaic
QA/QC	Quality Assurance/Quality Control
QENR	Qalipu Environment and Natural Resources
RABC	Radio Advisory Board of Canada
RBA	Regional Benefits Agreement
RBCA	Risk-Based Corrective Action
RCMP	Royal Canadian Mounted Police
RFWTP	Raw Freshwater Treatment Plant
ROW	right of way
SAF	sustainable aviation fuels
SAR	Species at risk
SARA	Species at Risk Act
SD	Standard Deviation
SFA	Salmon Fishing Areas
SIA	Solar Investigation Area
SOCC	Species of conservation concern
SOEC	Solid Oxide Electrolyzer Cells
SWWTP	sanitary wastewater treatment plant
TDS	Total Dissolved Solids
TIS	Transportation Impact Study
TMP	Traffic Management Plan
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TV	television
UBP	Upper Burin Peninsula
VC	Valued Component
VFD	volunteer fire department
VHF	Very High Frequency
WD	Wildlife Division
WERP	Wildlife Emergency Response Plan
WISE	Women in Science and Engineering
WMP	Waste Management Plan
WRDC	Women in Resource Development Committee

WRMD	Water Resources Management Division
WTG	Wind Turbine Generator
WWTP	Wastewater Treatment Plan

1.0 INTRODUCTION

EverWind Fuels ("EverWind") is proposing the Burin Peninsula Green Fuels Project (the "Project") on the Burin Peninsula, Newfoundland and Labrador (NL). The Project will involve development, construction, operations, and decommissioning and reclamation of Wind Farms, Solar Farms, and an Industrial Facility for green hydrogen production and ammonia synthesis, including air separation, water treatment and ammonia storage. A multi-purpose marine terminal will support the Project, as well as other local industry needs, but will be registered under a separate Environmental Assessment (EA) (See Section 3.2.1 for further detail).

The Burin Peninsula is located on the south coast of the island of Newfoundland in the province of Newfoundland and Labrador (NL). Marystown is the largest population centre on the peninsula with 5,204 residents (2021). The Burin Peninsula extends to the southwest from the main island of Newfoundland, separating Fortune Bay to the west from Placentia Bay to the east. It measures approximately 130 kilometers (km) in length (north to south) and between 15 to 30 km in width (east to west). It is connected by a 30 km wide isthmus between Terrenceville and Monkstown (Drawing 1.1, Appendix A).

Newfoundland and Labrador's Department of Industry, Energy and Technology (NLIET) is responsible for leading innovation, economic development and diversification of industry in the province including for Wind Hydrogen projects (NLEIT 2021). In August 2023, NLIET announced that four companies, including EverWind, were successful in their bids to obtain wind application recommendation letters granting these companies exclusive rights to begin the Newfoundland and Labrador Crown land application and approval process to develop the land for wind power generation and green ammonia production (NLEIT 2023).

The Project is required to be registered with the Newfoundland and Labrador Department of Environment and Climate Change (NLECC) pursuant with the Newfoundland and Labrador Environmental Protection Act (NL EPA) (2002) and its associated EA Regulations (2003). Part 34 of the EA Regulations (2003) indicates a requirement for electrical power generation greater than 1 megawatt (MW) to be registered for EA.

EverWind has retained Strum Consulting (Strum, the "Consultant") to support the development and submission of an Environmental Assessment Registration Document (EARD) under the NL *EPA* (S.N.L 2002, c.14.2). Strum is an independent multi-disciplinary team with extensive experience with submission of EARDs within Atlantic Canada. The EARD is being led by Strum's team based in St. John's, Newfoundland and Labrador.

1.1 Proponent Overview

EverWind is an Atlantic Canadian based private developer of green hydrogen and ammonia production and storage facilities, and associated transportation assets. EverWind is concurrently developing world-scale projects on the Burin Peninsula in Newfoundland and Labrador and at Point Tupper in Nova Scotia.

EverWind's projects will harness Atlantic Canada's preeminent natural renewable resources and convert them into clean green fuel. EverWind has a world-class team with expertise in all critical areas required to execute infrastructure mega projects, including technical engineering, environmental, operations, health and safety (including industrial emergency response and marine spill response), commercial, legal, community relations, and financial. In total, EverWind has a team of over 216 people committed to the development and operations of green fuel projects and energy logistics infrastructure in Atlantic Canada.

Over the last three years, EverWind has made substantial progress on the development of its green fuels projects in Atlantic Canada, notably the first completion of Front-End Engineering Design (FEED) for an industrial scale green hydrogen and ammonia project in Point Tupper, Nova Scotia. This major milestone provides the EverWind team with industry leading technical insights into the development, design, construction, and operations of these first-of-kind green fuels projects. EverWind will be leveraging these learnings and expertise in the engineering of this Project. Pre-FEED of the Project has been completed and EverWind continues to collect environmental and wind resource data required to support detailed engineering. To date, EverWind has invested over $240 million in the development of its green fuels projects in Atlantic Canada, representing one of the largest investments in the industry to date.

Proponent and Consultant contact information is provided in Table 1.1.

Table 1.1: Applicant and Consultant Information Summary

Applicant	
Name	EverWind Fuels
Chief Executive Officer (CEO)	Trent Vichie
Address	18 Argyle Street, 2nd Floor, St. John's, NL, A1A 1V4
Website	https://www.everwindfuels.com/
Applicant Contact	
Name	Matthew Borys
Official Title	Vice President (VP) of Corporate Development
Email	Matthew.Borys@everwindfuels.com
Consultant Contact	
Name	Casidhe Dyke – Strum Consulting
Title	Project Manager, Senior Environmental Scientist
Address	#E120-120 Torbay Road, St. John's, NL, A1A 2G8
Telephone	709.738.8478
Fax	709.738.8494
Email	cdyke@strum.ca

1.2 Overview of Undertaking

The Project is proposing to generate green electricity from renewable wind and solar resources to produce green hydrogen and ammonia. Hydrogen (H_2) will be generated from electrolysis, a process which separates raw water into its molecular components, hydrogen and oxygen (O_2)

due to the introduction of direct electrical current to water. The hydrogen will then be combined with nitrogen (N_2) from the air to create ammonia (NH_3).

The Project will be located within 268,319 hectares (ha) of Crown Land throughout the Burin Peninsula (47.248N, -55.085W) (defined hereafter as the Project Area; Section 3.1) and has been issued a Wind Application Recommendation Letter by the NLIET. Within the Project Area, siting of wind turbine generators (WTGs) will be restricted to three areas (totals 129,069 ha); the Lower-Burin Peninsula (LBP) Wind Farm, Mid-Burin Peninsula (MBP) Wind Farm, and Upper-Burin Peninsula (UBP) Wind Farm (Section 3.2.1). Solar Farms will be developed in the Solar Investigation Area (SIA) (33,030 ha), which overlaps the LBP, and MBP, Wind Farms (Section 3.2.1; Drawing 1.1, Appendix A).

For the purposes of this EA, the Project consists of four components: (i) wind farm(s), (ii) solar farm, (iii) green hydrogen and ammonia production facilities (defined hereafter as the Industrial Facility), and (iv) water supply. The Project components that are registered under this EA are:

- **Wind Farms**
    - LBP Wind Farm:
        - 350-450 WTGs (3 gigawatt [GW]), principally located south of Marystown, collector lines, substations, access roads, and a transmission network.
    - MBP Wind Farm:
        - 600-750 WTGs (5 GW), principally located north of Marystown, as well as collector lines, substations, access roads, and a transmission network.
    - UBP Wind Farm:
        - 225-300 WTGs (2 GW), located north of Marystown and south of Swift Current as well as collector lines, substations, access roads, and a transmission line.

- **Solar Farms**
    - Three solar farms (Solar Farm I, II, and III) will be developed within the SIA.
        - Solar Farm I
            - 750 MW solar farm intended to complement the seasonal power generation of the LBP Wind Farm.
        - Solar Farms II & III
            - 1,250 MW and 500 MW solar farms respectively, intended to complement the seasonal power generation of the MBP and UBP Wind Farms.

- **Industrial Facility**
    - The Industrial Facility will be located northeast of Marystown and will consist of electrolyzers and an ammonia plant as well as other supporting infrastructure (e.g., air separation unit, ammonia pipeline).
    - The Industrial Facility will be expanded to include additional production capacity

from MBP and UBP Wind Farms for additional green hydrogen derived green fuels.

- **Water Supply**
  - Water supply infrastructure for freshwater intake (initially from Linton Lake) to be used in hydrogen production and seawater to be used for cooling. Additional fresh and seawater supplies to be evaluated to support capacity expansions.

The Industrial Facility will be located approximately 7 km northeast of the Town of Marystown and will be accessible by Highway 210 (Drawing 1.1, Appendix A). WTGs associated with the LBP, MBP, and UBP Wind Farms will be accessed by both new and existing access roads. The marine terminal is still being evaluated in partnership with external stakeholders, therefore a detailed description of this component of the Project is not included herein. The marine terminal will be included in a separate EA, submitted by EverWind.

Table 1.2 outlines the estimated annual production volumes, nameplate capacity, capital cost estimates and estimate job creation associated with each component of this Project

Table 1.2: Estimates of the proposed undertaking

	LBP Wind Farm & Solar Farm I	MBP Wind Farm & Solar Farm II	UBP Wind Farm & Solar Farm III	Total
Onshore Wind (GW)	3.0	5.0	2.0	10.0
Solar (GW)	0.75	1.25	0.5	2.5
Electrolysis (GW)	1.65	2.75	1.1	5.5
Annual gH_2 (ktpa)	180	310	120	610
Annual gNH_3 (ktpa)	1,000	1,700	700	2,400
NH_3 Nameplate (tdp)	4,000	7,000	3,000	14,000
Investment	C$16 billion	To be determined		
Construction Jobs*	5,500	10,000	4,500	20,000
Operation Jobs*	500-750	600	250	1,350-1,600

Notes:
gH_2 = green hydrogen
gNH_3 = green ammonia
ktpa = kilo tonnes per annum
tpd = tonnes per day
* = direct and indirect (preliminary estimates subject to facility design and Project timelines)

For additional clarity, this EARD encompasses the LBP, MBP and UBP Wind Farms, Solar Farms I, II, and III, and the downstream Industrial Facilities (including freshwater and seawater withdrawal). All downstream Industrial Facilities will include electrolyzer plants to produce green hydrogen, which is the foundational feedstock for a variety of globally critical green fuel products.

EverWind has designated the green hydrogen produced from the electricity generated by the LBP Wind Farm and Solar Farm I to be further processed into green ammonia, which is the case-example for this EARD.

Given the rapidly evolving green fuels market and the accelerating demand for lower carbon fuel sources, EverWind anticipates evaluating alternative downstream uses for the green hydrogen produced from the electricity generated by the MBP and UBP Wind Farms as well as Solar Farm II and III. The expansion of the Industrial Facility could include additional green ammonia capacity, production of sustainable aviation fuels (SAF), green steel, or other such marketable commodities.

2.0 REGULATORY FRAMEWORK

Three distinct but overlapping approval processes may apply to the Project, the federal EA process, the provincial EA process, and federal/provincial regulatory permits/authorizations that will be required prior to commencement of construction.

The federal *Impact Assessment Act* 2019 *(IAA*) includes The Physical Activities Regulations (2019) known as the “Project List”, which define projects and activities subject to the *IAA*. Certain industries such as mining, nuclear, offshore wind development, and oil and gas are included on the Project List, while land-based wind energy developments, like this proposed Project, have been excluded and are not listed. The Project List does include a Transport section which defines new marine terminals larger than 25,000 deadweight tonnage (DWT) or the expansion of an existing marine terminal to create a berth for vessels larger than 25,000 DWT as physical activities - designated projects. As previously mentioned, additional details related to the marine terminal will be included in a separate EA.

The Project is required to be registered with the NLECC pursuant with the NL *EPA* (2002) and its associated EA Regulations (2003). Part 34 of the EA Regulations indicates a requirement for electrical power generation greater than 1 MW and engaged in green hydrogen/ammonia production to be registered. Registration is done through the submission of a formal EARD.

An EARD is a formal record required to initiate an environmental review process for a proposed project. It typically serves as the first step in assessing potential environmental impacts and ensuring that they are properly considered before a project proceeds. For this Project, EverWind is registering the full Project scope with the described Project Area as outline in Section 1.2.1.2.

In addition to the EA, there are several other federal and provincial environmental legislative requirements that include but may not be limited to those listed in Table 2.1. All regulatory requirements will be adhered to for the execution of the Project.

Table 2.1: Selection of Permits/Authorizations that may be required for development of the Project

Permit, Authorization, Approval	Agency
Federal	
IAA discussion	Impact Assessment Agency of Canada (IAAC)
Transportation of Dangerous Goods	Transport Canada
Notification to Handle or Transport Dangerous Goods	Transport Canada
Authorization for Works or Undertakings Affecting Fish Habitat	Fisheries and Oceans Canada (DFO)
Permit for Construction within Navigable Waters	Canadian Coast Guard, DFO
Application for a Water Lease	Transport Canada
Approval for Vessel Admission	Canada Customs & National Revenue
Temporary Magazine License	Natural Resources Canada
Radio Station License	Industry Canada Communications
Provincial	
Release from the Environmental Assessment process	NLECC - Environmental Assessment Division
Certificate of Approval for any Industrial Processing Facility	NLECC - Industrial Engineering Division
Certificate of Environmental Approval for any alteration to a body of water	NLECC - Water Resources Management Division (WRMD)
Water Use Authorization	NLECC - WRMD
Letter of Advice of New Construction Project or Industrial Enterprise	NLECC - Occupational Health & Safety Services
Certificate of Approval for Water Distribution System	NLECC - Environmental Management Division
Certificate of Approval for Sewer Works off site	NLECC - Environmental Management Division
Permit for Access off any Highway	Newfoundland and Labrador Department. of Transportation and Infrastructure (NLTI) -)- Transportation Regulation Enforcement
Authorization to Handle or Transport Dangerous Goods	NLTI - Transportation Regulation Enforcement
Borrow & Quarry Permit	NLIET - Mineral Lands Division
Authorization to Control Nuisance Animals	Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture (NLFFA) – Wildlife Division (WD)
Permit to Burn	NLFFA - Forest Fire Protection

Permit, Authorization, Approval	Agency
Commercial Cutting Permit	NLFFA - Newfoundland Forest Service
Operating Permit	NLFFA - Newfoundland Forest Service
Certificate of Approval for Storage & Handling of Gasoline & Associated Products	Newfoundland and Labrador Department. of Digital Government and Service NL (DGSNL)
Food Establishment	DGSNL
Certificate of Environmental Approval to establish, alter, enlarge or extend a waste management or a waste disposal site or incinerate	DGSNL
Approval for Water Supply System	DGSNL
Letter of Approval – Septic System	DGSNL
Approval for Sewage Disposal System	DGSNL
Approval to Inhabit Bunkhouse	DGSNL
Approval for Living Accommodations	DGSNL
Certificate of Approval for Commercial Septic System in an unserviced area	DGSNL
Review of Building/Fire/Life Safety	DGSNL
Permit for Pressure Piping System	DGSNL
Permit for Flammable & Combustible Liquid Storage & Dispensing & for Bulk Storage	DGSNL
Building Accessibility	DGSNL
License of Occupation to Occupy Crown Land	DGSNL
Permit for Archaeological Investigations	Newfoundland and Labrador Department of Tourism, Culture, Arts and Recreation
Municipal	
Approval for Waste Disposal	Town/Community Council

2.1 Proposed Approach to Environmental Assessment Process

Following the submission of the EARD and due to the nature and scope of the Project, a decision calling for an Environmental Impact Statement (EIS) is anticipated. The EIS submission will include a detailed project description, and associated field and desktop studies for the LBP Wind Farm, Solar Farm I, and the Industrial Facility and associated water supplies.

The EIS will also include a description and desktop studies for the MBP and UBP Wind Farms, and Solar Farms II and III, with commitments to complete the required field studies as per government guidelines ahead of proceeding to construction.

Finally, the EIS submission will also reference the expansion of the downstream Industrial Facilities, with commitments to providing a detailed project description and completion of field and desktop studies prior to proceeding to construction.

The marine terminal will not be included within this EA process, however, at such a time that a decision is made regarding this facility, the appropriate documentation will be filed as per the applicable regulatory pathways.

The rationale for EverWind's overall approach to the EIS submission is reflective of the scale of the Project, which will require the better part of a decade to see through to completion. Given the expansive size of the areas under evaluation, it would not be feasible to complete the various field studies for each area concurrently. By focusing the efforts of the EA on specific areas of the Project over time, and completing all required studies prior to construction, EverWind will be able to provide more comprehensive, relevant and recent data and analysis to the NLECC for review. Furthermore, this approach allows Newfoundland and Labrador to grow into the green energy industry, ultimately maximizing domestic benefits associated with education, skills development, labour force, supply chain, and the Provincial fiscal framework.

Finally, EverWind's proposed approach also addresses the urgent global need for green fuel supply. With only 25 years remaining before the global, Canadian, and Newfoundland and Labrador 2050 net zero targets, it is critical that scalable green fuel supplies are brought to market in the near-term to catalyze end-use adoption and spur investment in broader green fuel applications.

This is truly a critical moment in time in terms of energy transition. Implementation of techno-economically and environmentally feasible solutions today, will help ensure that innovations of tomorrow do not go to waste on an environment damaged beyond repair. EverWind's sequenced approach to its EA ensures that the Project is developed responsibly at the local level, while also answering the call to action and having a positive impact on the environment globally.

2.2 Structure of the EA Registration Document

An outline of the content of each section of the EARD is provided in Table 2.2.

Table 2.2: EA Registration Document Structure

Section	Content
Section 1	Introduction
Section 2	Regulatory Framework
Section 3	Proposed Undertaking
Section 4	Existing Environment
Section 5	Environmental Effects
Section 6	Residual Effects
Section 7	Cumulative Effects
Section 8	Public and Indigenous Consultation
Section 9	Environment Protection Plan
Section 10	Assessment Summary and Conditions
Section 11	Personnel
Section 12	Commitments made in the EA Registration Document

Section	Content
Section 13	References
Appendix A	Drawings
Appendix B	Watercourse and Waterbody Names
Appendix C	ACCDC Report
Appendix D	Archaeological and Paleontological Desktop Summary
Appendix E	Public Engagement Summary
Appendix F	Environmental Protection Plan (EPP) Table of Contents

3.0 PROPOSED UNDERTAKING

The following subsections provide details on the Project Area, the Project description, Project components, Project schedule, Project activities, and an assessment of alternatives.

3.1 Project Area

The Project Area (Drawing 1.1, Appendix A) is the broad geographic area where all Project components (Wind Farms, Solar Farms, Industrial Facility, water supply and all associated infrastructure) will be situated. The Project Area is located on the Burin Peninsula, on the south coast of the island of Newfoundland in the province of Newfoundland and Labrador. The Project Area will encompass all direct environmental impacts associated with the construction, operation, decommissioning and reclamation of the Project. The Project Area totals 268,319 ha under evaluation as part of this EA. The Project Area currently aligns with the Crown Land Wind Reserve that EverWind was granted exclusive development rights to by the NLIET from the Crown Land Call for Bids for Wind-Hydrogen Development. Ultimately, only a small portion of the Project Area will be occupied by components of the Project ("Project Footprint").

Although the Project Footprint is subject to further analysis (i.e. environmental and socioeconomic impact studies, wind and solar resource campaigns, site constructability assessments and engineering layout designs). EverWind has conducted constraint and site suitability analysis to identify Crown Lands inside the Project Area that are potentially viable for the wind and solar farms, which are the primary economic drivers of the Project. These locations, identified as the LBP, MBP, and UBP Wind Farms and the SIA (Drawings 3.1a, 3.1b, and 3.1, Appendix A) (as per Section 1.2) are located within the Project Area. The LBP, MBP, and UBP total 129,069 ha and include all unconstrained land[1] within the Project Area. These areas also overlap with the SIA. For further details on land constraints please refer to Section 3.1.2. The Project Area also includes the Industrial Facility and associated water supply.

Additional spatial boundaries (regional or Valued Component (VC) specific) may be included within the EIS.

[1] Land area excluding identified desktop constraints (e.g., salmon rivers) that are available for siting WTGs.

3.1.1 Siting Considerations

From 2019 to 2021, EverWind's team completed a global geographic suitability review for the development of a green fuels hub. This review considered a variety of factors, including natural resources, jurisdictional support for green energy, overall geopolitical stability, proximity to critical export markets, and skill and capacity of the regional industrial labour force. In 2021, Atlantic Canada was identified as the preferred location for development. Shortly thereafter, EverWind acquired the Point Tupper Terminal in Nova Scotia and became one of the first green hydrogen and ammonia developers in the world.

During this review, Newfoundland and Labrador was identified as a world-class region for development, but at the time, development of wind energy projects was restricted by legislation. Nevertheless, convinced of the Province's potential to become a world leader in green fuels, EverWind initiated a comprehensive review of suitable locations throughout the Province. This included a manual desktop review of the coastline on the island of Newfoundland, as well as Labrador, to identify opportunities to leverage existing marine infrastructure, or alternatively, sites with natural harbours suitable for development. During this exercise, over 20 potential sites were identified throughout the province, of which several were evaluated in detail to better understand the renewable resources and site constructability specific to the location.

Ultimately, the Burin Peninsula was deemed to be ideally suited for the Project for the following reasons:

- World-class wind resource
- Abundance of available Crown Land
- Renewable fresh water sources, including Linton Lake, with proven historical industrial use and capacity to support green hydrogen production
- Mortier Bay - a large, natural sheltered and ice-free deepwater harbour having supported a variety of industries including ship building, offshore oil & gas, fisheries, and aquaculture over many decades. The harbour also presented several brownfield and greenfield marine terminal opportunities that could be suitable for the Project
- Overall constructability of the proposed sites
- Ability to minimize impact on environment and local communities
- Local force with a long and proud industrial heritage – with continued support from local institutions including the Burin campus of the College of the North Atlantic (CNA)

Prior to making a final equity investment decision to select the Burin Peninsula, EverWind's senior management team made several visits to the peninsula in early 2022 to meet with local community leaders and residents to gauge early interest in considering a green fuels project. Feedback received during those visits was very positive. The open dialogue, commitment to responsible development and support from local communities is ultimately what galvanized EverWind's conviction in selecting the Burin Peninsula as the location for one of the most important green energy infrastructure developments in North America. Since then, EverWind has conducted an unprecedented level of community engagement in parallel to its Project development activities (Section 8.0)

In July 2022, EverWind participated in NLIET's Call for Submission of Nominations of Areas of Interest for Wind Energy Projects. At this stage, the Department received 31 land nomination submissions from potential wind energy projects. In December of 2022, the Province announced the launch of a Crown land call for bids for wind energy projects. This process was two staged, with the first stage receiving 24 bids from 19 companies. Of those 24 bids, nine bids from nine companies were approved to proceed to phase two based on criteria such as bidder's experience and financial capacity to plan, construct and operate the proposed project. Evaluation criteria for the second stage included a more detailed review of bidder experience, information on the proposed project, a project financing plan, electricity gird connection requirements, community and Indigenous engagement and details related to the Project's benefits to the province.

In 2023, EverWind was selected to receive a Wind Application Recommendation Letter granting EverWind the exclusive right to pursue the development of its Project on the Burin Peninsula as outlined in its submission document.

3.1.2 Setbacks & Separation Distances

The wind farms, solar farms, transmission interconnection line and Industrial Facility will be constructed within the Project Area (Drawing 1.1, Appendix A). This Project Area excludes protected water supplies, Fortune Head Ecological Reserve, Frenchman's Cove Provincial Park, Lawn Bay Ecological Reserve, three experimental wildlife areas, two wetland stewardship areas (one west of Marystown and one in proximity to Frenchman's Cove Park), a large sensitive wildlife area, and identified sites of likely sensitive raptor and rare plant habitats (Drawing 3.2, Appendix A).

In selecting areas to be developed, current data on Newfoundland's forests, wildlife, water resources, wetlands, Crown lands, and protected areas was reviewed to ensure the Project Area avoids and/or minimally impacts environmentally sensitive areas. Several areas were excluded by EverWind during the early stage of the Crown land nomination process (Table 3.1).

EverWind is proposing to apply additional setbacks to known residences[2], landscape features, and public use areas to further limit potential interactions of the Project with the environment and residents of the Burin Peninsula. Table 3.1 outlines the sensitive areas previously excluded from the Project Area and proposed setbacks for additional landscape features.

[2] Residence includes a permanent residence, institutional residence, or a seasonal residence (seasonal cottage, tourist lodge, hotel, motel, or hostel)

Table 3.1: Excluded Sensitive Areas and Proposed Setbacks

Sensitive Areas	Existing Land Use
Zoned Municipal Land	Excluded
Protected Water Supply	Excluded
Designated Provincial Parks and Park Reserves	Excluded
Designated and Provisional Ecological Reserves	Excluded
Biologically Sensitive Lands	Excluded
Reserved Crown Lands	Excluded
Features	**Proposed Setbacks**
Residences (Green Fuels Production Facilities)	2,000 m
Residences (WTG)	1,000 m
All-Terrain Vehicle (ATV) Trails (WTGs)	250 m
Salmon Rivers	200 m
Roadways (WTGs)	200 m

The above noted setbacks are in line with industry best practice and are congruent with similar projects previously approved in the Province.

Other areas of conservation, cultural, or socio-economic concern have yet to be identified and will be included in the EIS with proposed setbacks, based on regulatory consultation. In total, 139,250 ha or 51.9 precent (%) of the Crown land Wind Reserve Area on the Burin Peninsula has been removed from the Project Area to support the development of the wind farms (LBP, MBP, and UBP) based on the identification of environmental constraints and EverWind's commitment to meeting the setback and separation distances outlined in Table 3.1.

Additionally, WTGs will be appropriately setback from residences to ensure EverWind does not exceed 30 mins per day or 30 hours per year of shadow flicker and 40 decibels (dBA) at a residence from WTG derived noise.

3.1.3 Rationale for the Undertaking

Demand for green hydrogen and ammonia is expected to grow substantially within the next few years, with a global drive towards decarbonization, energy independence and security. Hydrogen demand is expected to grow from 95 million tonnes in 2022 to 150 million tonnes in 2030 (International Energy Agency (IEA) 2023). With the need to decarbonize and current fossil-fuels based hydrogen production generation making up approximately 99% of hydrogen production today, there is a need to transition this production to renewables-based, green hydrogen. Demand for low-emissions hydrogen for a net-zero emissions world is expected to grow from nearly zero demand in 2022 to approximately 70 million tonnes of low-emissions hydrogen in 2030 (IEA 2023). Being at the forefront of these developments will position Newfoundland and Labrador, and Canada, as global leaders in producing green hydrogen based clean fuels. End-use applications of hydrogen include industrial feed stocks (e.g. energy refineries, steel production), electricity generation and a variety transportation fuels (e.g. SAF, e-methanol, etc.) among others. Similarly, end-use applications of green ammonia include maritime fuel, electricity generation, agricultural fertilizer, industrial uses, and as a hydrogen carrier for more efficient transportation and storage.

Canada has introduced a hydrogen strategy that would see 30% of the country's end-use energy coming from hydrogen by 2050, allowing the government to reach zero carbon emissions by 2050. In December 2020, Canada released the Hydrogen Strategy of Canada (HSC 2020), signaling a commitment to developing green ammonia. Canada is already established as a significant ammonia producer (4.7 million metric tonnes in 2021) and the world's fourth-largest natural gas producer, a key input into the grey ammonia[3] which represents the largest portion of the market today (HSC 2020).

The federal and provincial governments have announced several clean technologies and clean hydrogen investment tax credits to support sustainable energy transition projects. A key driver of the increased demand for the green ammonia energy market in Europe is the Repower EU plan (2022), which targets 10 million tonnes of green hydrogen imports by 2030. EverWind's proposed Project on the Burin Peninsula could supply nearly ~25% of this demand. The European Union Renewable Energy Directive specifies that electrolysis-derived hydrogen must be based on new renewable electricity sources that provide energy above grid needs. Canada has recently signed a Memorandum of Understanding with Germany to establish transatlantic supply corridors for green hydrogen and ammonia, with Newfoundland's geographic location providing the advantage to meet this target. This initiative was recently solidified by both the Canadian and German Governments, when they announced, in August 2024, the joint $600 million funding of the Canada-Germany Bilateral Window, designed to catalyze green hydrogen trade between both countries.

Newfoundland and Labrador contains a wealth of developed and undeveloped renewable energy resources including undeveloped wind, solar, and forestry resources (Gov NL 2021). The provincial government has outlined several initiatives supporting green hydrogen projects in the Renewable Energy Plan (Gov NL 2021) and the Way Forward on Climate Change in Newfoundland and Labrador (Gov NL 2019), including actions to build opportunities for green fuels such as green hydrogen and ammonia for export.

The Project will stimulate the local economy and return economic and social benefits to the Burin Peninsula and the Province of Newfoundland and Labrador. The benefits of the Project are expected to be long-lasting on both the local and provincial economies as EverWind is committed to entering into benefits agreements with various stakeholders. The Project is also poised to increase benefits to the province through the fiscal framework, corporate and municipal taxes, employment, innovation and skills development, and through direct and contracting opportunities within all Project phases.

The Project's objective is to produce globally competitive, Newfoundland-made, green ammonia using 100% renewable energy for production while supporting global carbon emission reduction and long term social and economic benefits for all stakeholders.

[3] Ammonia produced from methane-derived hydrogen.

3.2 Project Description

For the purposes of this EA, the Project consists of four components: (i) wind farms, (ii) solar farms, (iii) Industrial Facility, and (iv) water supply. The Project will be developed within the established Project Area (Drawing 1.1, Appendix A).

No specific WTG model or WTG locations are considered in this EARD as the final layout and WTG model are dependent on the wind resource assessments (meteorological campaign currently underway), environmental constraints (field surveys ongoing), and public and Indigenous engagement (ongoing). EverWind continues to incorporate this data into its ongoing development and design process to ensure the eventual wind farm layout avoids and/or minimizes potential impacts on the environment and local communities. Premature determination of a layout or WTG selection could also jeopardize the techno-economic viability of the Project; therefore, it is critical these decisions are informed using complete and accurate data. WTG model(s) and wind farm layouts will be provided and discussed in more detail within the EIS. Similarly, no specific decisions have been made regarding solar infrastructure or placement. While Solar Farm placement is anticipated to remain within the SIA, further detail will be included in the EIS.

3.2.1 Project Components

Project components include the wind farms, solar farm, electrical collector lines, substations, transmission lines, water supply, and the Industrial Facility.

Wind Farms

The Project will involve construction and installation of 3-bladed horizontal axis WTGs (refer to Section 1.2 for approximate number of WTGs per Wind Farm). Each WTG will require an approximately 100 metre (m) radius area around the base during the construction and erection phase, however the final footprint of the WTG itself is only approximately 20 m, allowing for the tower base and a turnaround area. Additional land will be required for construction/maintenance of access roads, substations, and interconnecting transmission lines. The total area required for WTG operation, the substations, transmission lines, and road access will be dependent on the final wind farm layout.

While the specific WTG model has not yet been selected, general, conservative ranges of WTG characteristics being considered are as follows:

- Hub height: 100-135 m
- Blade length: 64-95 m
- Rotor diameter: 135-200 m
- Maximum WTG height (including tip of the blade at highest vertical position): 165-225 m

The WTGs will be located to obtain maximum wind resource and minimize losses from wake and blocking. In addition, the design will be optimized based on constructability, accessibility, minimizing impact to the environment and interference with local communities. The topography and site conditions of the Project Area, with hills, bogs, and water bodies, does not allow for standardized spacing based on typical spacing distances, and will require additional site by site analysis during detailed design. Constructability of each location will be reviewed during the detailed design stage of each respective wind farm. Site selection will also consider laydown areas for equipment storage and structure assembly, and road access for transportation of material and construction equipment. All sites will require sufficient access for installation of collector lines and crane access for setup for installation of WTGs. Proposed WTG locations will be subject to further discussions, consultation, field verification, and detailed design, as well as environmental considerations.

Towers will sit on one of several types of foundations designs: a gravity-based foundation consisting of reinforced concrete footing; a rock anchor foundation, used when competent bedrock is available, or a pile foundation in areas with poor supportive soil conditions. Rock anchor foundations use anchor bolts drilled into the bedrock, with the tower sitting on a concrete pad socketed into the rock. Pile foundations may also be necessary and will be investigated following completion of field assessments. Pile foundations are designed based on actual site conditions. The above ground portion of the foundation types will be approximately 6 to 8 m in diameter.

The access road to each WTG site must be of sufficient design and capacity to allow for transportation of the WTG components, crane installation equipment, and any additional equipment required in the field. These roads will be typically 6-12 m wide (road surface), have an adequate turning radius for WTG blade delivery, and have sufficient structural strength to carry heavy equipment. Final access road design will depend on the wind farm layout, WTG technology selection and the location of the substations. Turning radius is highly dependent on blade length, and WTG equipment is very heavy and cannot be transported up steep grades. Existing access for construction and operation will be from provincial roads, and Newfoundland Power's and Newfoundland and Labrador Hydro's current system of access trails, to minimize the need for additional road construction and ecological disturbance to the extent possible. However, any potential use of existing access will be discussed and approved by the owners prior to making changes to existing infrastructure. A concerted effort will be made to minimize impacts on local ATV trails and if trail use is required, the local trails association and users will be engaged to ensure minimal impact on traditional resource use. EverWind has demonstrated these efforts during its 2023 and 2024 meteorological (MET) tower campaigns. Where existing access is not available, alternate access will need to be developed. It is also possible that existing electrical infrastructure may have to be modified (raised or rerouted) to allow for construction activities. The rules and regulations governing modifications to electrical infrastructure will be adhered to and sufficient lead time will be allocated in the Project schedule to accomplish any required modifications.

The basis of design assumes that there will be limited interconnection with the provincial grid during construction and operation of the wind farm. Construction power for WTGs, substations, and other remote facilities will be provided by on-site diesel generation, as required, or using the installed transmission and distribution system as it becomes available to minimize fuel usage. Black start capability will be required and alternatives, including utilizing a low power interconnection to Newfoundland Power’s system for emergency backup, are being examined. This interconnection, if incorporated, will be for maintaining backup systems, and will not draw enough load to materially impact the provincial grid.

Wind and Solar Resource Measurement Campaign

EverWind is currently in the process of executing one of the largest wind and solar resource measurement campaigns in North America to collect critical data needed to inform wind and solar farm layout designs and final technology selections. EverWind currently has four 89 m MET towers installed on the Burin Peninsula and is approaching the first full year of data collection on the first of these towers. In addition, EverWind is in the process of installing another two 89 m MET towers, one 60 m MET tower, and three Light Detection and Ranging (LiDAR) systems expected to be completed in the fall of 2024, bringing the total to 10 measurement locations across the LBP Wind Farm (Drawing 3.3, Appendix A). The location selected for the measurement site, and combination of measurement equipment was developed together with third party experts. EverWind ensured that it engaged with local communities near the proposed locations and provided detailed information on the overall campaign. Feedback was collected and incorporated into the campaign, for example EverWind substituted one of the proposed tower locations with a LiDAR unit due to trail access concerns and EverWind also timed MET tower installation at another location to avoid hunting season. EverWind will continue to engage with local communities/trails associations for the additional measurement locations proposed.

Additionally, EverWind has purchased 15 years of wind data (from WTGs) and five years of MET data from the St. Lawrence Wind Farm, the only operational wind farm on the Burin Peninsula and one of the two operational wind farms in Newfoundland and Labrador.

For further detailed MET tower data, refer to Section 4.1.1.

Solar Farm

In addition to wind power generation, EverWind is proposing solar farms (Solar Farm I, II, and III) to be developed within the SIA as part of the Project (Drawing 1.1, Appendix A). Solar power generation will complement wind power generation to power electrolysis at the Industrial Facility. Production from a solar farm would be strongest in April through October, which is the opposite of the seasonal peak production from the proposed wind farms. Resource diversification and resulting renewable power stability will help smooth hydrogen production and avoid shutdowns which are both operationally disruptive and can stress equipment and negatively impact project economics.

The following criteria were used to evaluate land areas for the SIA:

- High solar potential
- Mean annual wind speed of less than 7 m per second

- Terrain with less than 5% slope
- Distance to waterbodies or streams/rivers of 50 m or greater
- Municipal land use zones of Rural, Industrial and Commercial

The proposed solar farms are still subject to detailed design, therefore, the number of arrays and their distribution, as well as mounting details, have not yet been finalized. Solar Farms I, II, and III will be developed within the SIA , in conjunction with the LBP, MBP, and UBP Wind Farms, respectively, however their physical locations will not necessarily overlap (i.e., Solar Farm I will not necessarily be within the LBP Wind Farm although they will be developed together).

Electrical Collector Lines

New 34.5 kilovolt (kV) electrical collection will be installed, using a mix of above (i.e., overhead) and below ground methods. From the foundation of each WTG, 70 m to 150 m of underground cable will be run to a riser pole adjacent to the access road and crane pads. The underground cables can be direct buried or contained in conduits that are buried in sand trenches and marked with warning tape according to specification. The remainder of the collector system (i.e., from the riser poles to the substation) will remain above ground. The above ground section will consist of standard wood utility poles spaced approximately 50 to 70 m apart, with appropriate guying as required. Pole mounted disconnect switches and additional safety and regulating equipment will be installed as required. A fibre-optic communication system will be underbuilt on the overhead collector system and installed underground from each WTG to the riser pole. This system will be used to monitor and control the Project remotely to ensure safe and efficient operations. Collector lines independent of access roads will be cleared to a width of approximately 12 m.

The solar farm will have inverter skids responsible to invert and step up the generated electricity to 34.5 kV. These circuits will be consolidated, and run across the solar farm to a substation, responsible to step the 34.5 kV to high-voltage and join the transmission system to the Industrial Facility.

Substations

Electricity generated by the Project will be transmitted through the electrical collection system to substations located within the Project Area. The substations are required to step up the power generated by the WTGs and solar farm(s) from a voltage of 34.5 kV to high-voltage, which is then supplied to the transmission lines. The substations will be fenced and contain a security perimeter as a safety precaution.

Transmission Lines

One of the critical design features and primary differentiators of the Project is that it will not rely on a major interconnection to the provincial power grid. EverWind is currently working on the development of “islanded grid” solution, incorporating a number of innovative technical design features allowing the Project to operate independently from the provincial grid. Although this represents a significant technoeconomic engineering challenge, the resulting solution will significantly benefit the entire green hydrogen and ammonia industry in Newfoundland and

Labrador by enabling it to scale over time without requiring major investments and upgrades to the provincial power grid.

Although EverWind is not looking to draw power from the provincial grid, it is open to discussions with Newfoundland and Labrador Hydro and Newfoundland Power regarding sale of its low-cost excess wind and solar power which would deliver benefits to rate payers.

The transmission lines are high voltage lines responsible for delivering power from the substations to the Industrial Facility. Structures will be installed to support the lines. The pole structures will be approximately 20 to 35 m tall and spaced approximately 160 m apart. The transmission line conductor specifications are as follows:

- Conductor name: Beaumont or equivalent
- Conductor type: ACSR, steel-reinforced aluminum conductor
- Conductor construction: 42 strands of aluminum, 7 strands of steel [1,113 thousand circular mils (kcmil)]
- Conductor diameter: 3.175 centimetres (cm) {1.25 inches (in)}

On-site Terminal Substation

The Industrial Facility terminal substation will consist of a transformer yard and accessory building. The transmission line will enter the substation yard and pass through a single circuit. The on-site substation will be equipped with high-voltage line metering and protection-related equipment. In addition, several power transformers will be stepping the voltage down from incoming high voltage to 34.5 kV. These transformers will be located within separate containment structures capable of holding the total amount of transformer oil contained in each unit. Each transformer will have a circuit breaker on both the high voltage and 34.5 kV sides.

There will also be a small transformer on-site to supply the ongoing electrical requirements of the substation equipment and other local auxiliary services. In addition, 34.5 kV capacitor banks will be located on-site. These are commonly used in the electrical industry as power factor correction devices and harmonic filters to ensure the quality of the supplied electrical energy remains within the regulated industrial standards.

The on-site substation will contain an accessory building, which will house the breaker/transformer control equipment, as well as the protection/metering-related relays/equipment. A typical sub-station battery bank will be installed for backup supply to the breakers and relay equipment.

From each of the 34.5 kV transformer circuit breakers, power bus networks will extend to the hydrogen and ammonia plants. At the plant buildings, there will be multiple combinations of 34.5 kV circuit breakers and 34.5 kV to low voltage transformers to supply the primary hydrogen process equipment. Additional transformers, having a 34.5 kV primary voltage, will supply the ammonia plant and other balance of plant (BOP) auxiliary equipment. This equipment is associated with supplying power to the hydrogen electrolysis and ammonia production processes.

On-Site Terminal Battery Energy Storage

Adjacent to the sub-station, a battery energy storage system (BESS) will be installed. This system will be providing backup power supply, demand response, and black start capability to the entire Project's power system.

It is expected the system associated with the LBP Wind Farm will have footprint of 12 to 30 ha, with an associated substation to step up from 34.5 kV collector circuits to a high voltage transmission level. This will interconnect at the same high voltage landing point as the wind and solar farm transmission lines, allowing for charge and discharge as required by operations.

Water Supply

The Project requires freshwater for potable use, and for the electrolyzers that convert water into green hydrogen. The Project also requires seawater for cooling throughout the process of converting green hydrogen to green ammonia. Seawater used for cooling in industrial processes is common practice and is a well-known and permittable activity in Newfoundland and Labrador. Mitigation measures to manage for the thermal factor of seawater returned to the ocean will be applied to minimize any adverse effects on the receiving environment.

Freshwater Supply

Linton Lake is located approximately 3.5 km southwest of the proposed Industrial Facility (Drawing 1.1, Appendix A) and was identified as the preferred freshwater water supply for the facilities producing green hydrogen and ammonia from the electricity generated by the LBP Wind Farm and Solar Farm I. Linton Lake had been the industrial and community water supply for the town of Marystown and surrounding areas for several decades but is no longer in active use. Based on its historical use from municipal records, Linton Lake has proven capacity to support the withdrawal of up to 14,000 cubic metres (m^3) per day. This capacity is large enough to supply the Project with all the required freshwater and is ideally situated for water transportation to the Industrial Facility. Linton Lake has an area that is approximately 495,000 square metres (m^2). In February 2023, a preliminary bathymetry mapping exercise of the lake was completed (Figure 3.1). This exercise estimated that Linton Lake has a maximum depth of 17 m and an estimated storage capacity, at normal water levels, of 1,895,000 m^3. The Linton Lake watershed is estimated to have an area of 5,040,350 m^2. The Linton Lake watershed is within the boundaries of the Town of Marystown and is available for industrial use, with approval from both the Town of Marystown and the Water Resources Division of the NLECC.

Water levels in Linton Lake can be raised further via a weir structure at the lake's outlet (southern extent of the lake), allowing for an increase in the water storage volume of the lake beyond the levels identified in the bathymetric survey. The Town of Marystown indicated that the weir structure was typically kept at 60 cm height. Linton Lake has a mean annual runoff of approximately 24,000 m^3 per day exceeding the Project's requirement of approximately 10,000 m^3 per day for processing.

In subsequent development phases of the Project a safe yield analysis will be conducted on Linton Lake.

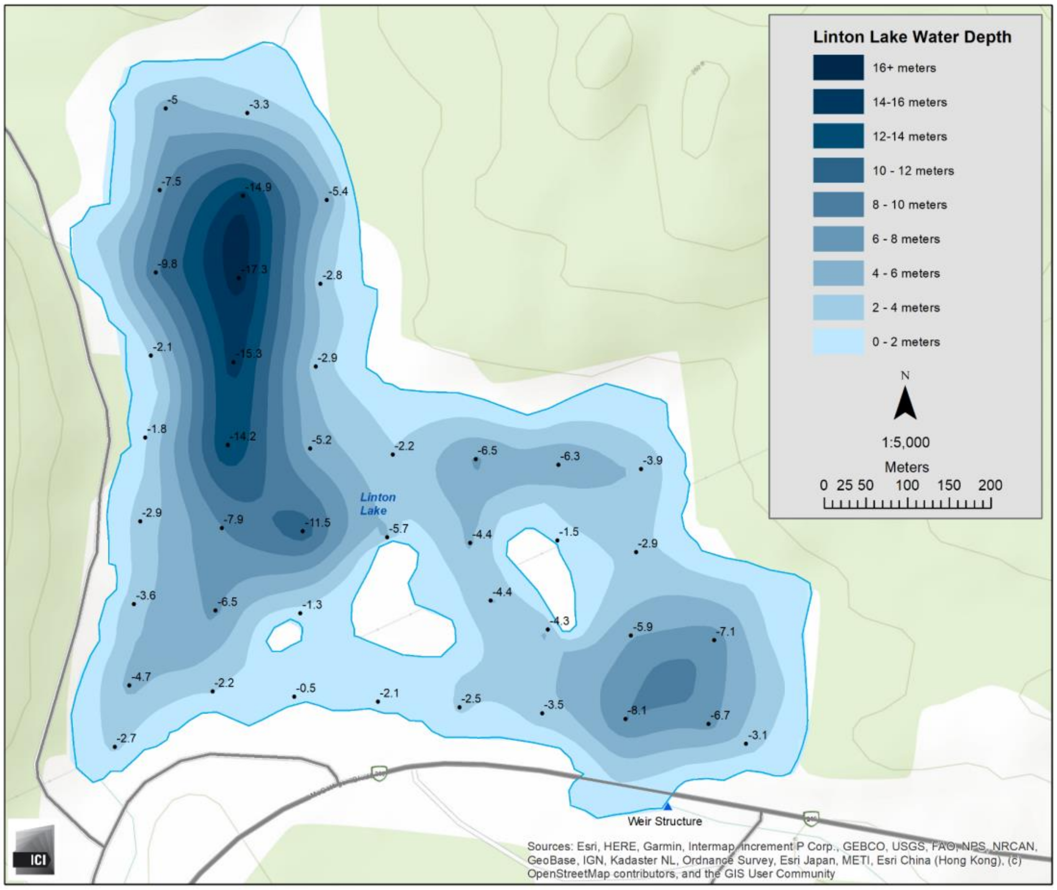

Figure 3.1: Linton Lake Bathymetry

Seawater Supply

Mortier Bay has been identified as the ideal location to obtain seawater to be used as coolant throughout the various processes associated with green hydrogen and ammonia production. Seawater has been used for cooling purposes in industrial processes for decades, and the practice has well-established guidelines and mitigation measures. Mortier Bay was selected due to the proximity to the Industrial Facility location and the quantities of seawater in the bay. The intake of seawater will occur at the proposed Marine Terminal location (case example), cycled through the entire industrial system, discharged into the facilities storm water retention ponds as a mitigation measure to manage for the thermal factor before being discharged back into the bay. In addition, with an estimated 1,506,500,000 m^3 of water in the bay, this temperature difference will quickly dissipate as the seawater is reintroduced and undergoes mixing (i.e., the heat transfers from the warmer discharged seawater to the cooler water through convection). The warmer discharged seawater will gradually cool until it reaches the temperature of the surrounding seawater. Marine surveys and studies will be conducted to ensure that the discharging of warmer seawater does not adversely impact the local marine environment and to further direct the design of the intake (e.g., measures to protect fish and fish habitat) and discharge.

Industrial Facility for Hydrogen, Ammonia, and Water Use

The Industrial Facility requires a land area of approximately 100 to 150 ha. Engineering analysis has led to the selection of a site north of Marystown, west of Route 210, >2 km from the nearest residence (Figure 3.2). The area has been sized to allow for a sufficient safety setback distance and allow for facility expansion associated with the MBP and UBP Wind Farms and Solar Farms II and III. This land size will also allow for adequate laydown, material, and equipment storage and staging requirements during the construction and commissioning of the plant and also allow for similar needs during future expansion and maintenance activities.

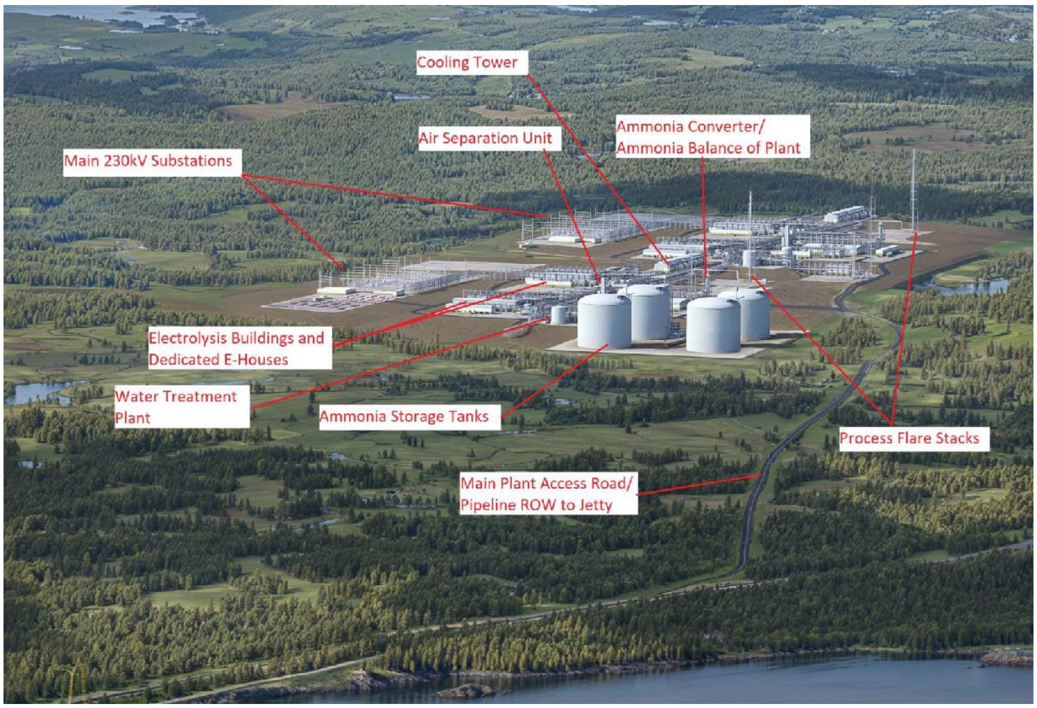

Figure 3.2: Conceptual drawing of Industrial Facility

The Industrial Facility is sized to convert green energy received from the 3 GW LBP Wind Farm and 0.75 GW from Solar Farm I to hydrogen through approximately 1.65 GW of electrolysis equipment to annually produce 180 ktpa of green hydrogen that will be converted to 1,000 ktpa of green ammonia.

Process Overview

The Project will be creating green ammonia for export to Europe using three primary feedstocks: renewable power generated by EverWind's power generation assets (wind and solar), hydrogen created by the breakdown of water into hydrogen and oxygen in the electrolyzer, and nitrogen separated from atmospheric air. This section will focus on hydrogen, nitrogen, and ammonia synthesis.

Hydrogen (H_2) will be generated from electrolysis, a process which separates raw water into its molecular components, hydrogen and oxygen (O_2) due to the introduction of direct electrical current to water. The hydrogen is separated, collected, and sent to purification processes prior to use in the ammonia plant, while the oxygen is vented. Since the hydrogen and ammonia production method utilizes carbon-free electricity generated from renewable resources (wind and solar), the hydrogen and ammonia produced from this Project are considered ‘green' hydrogen and will be certified by a third party to meet the strict European Commission requirements for Renewable Fuels of Non-Biological Origin. (RFNBO).

Green ammonia synthesis is the process of creating ammonia by combining green hydrogen with nitrogen (N_2) from the air using a cryogenic distillation process in an Air Separation Unit (ASU) which is also powered exclusively by renewable energy. The cryogenic distillation process cools and liquifies atmospheric air into its constituents and then separates them to obtain pure nitrogen required for the ammonia synthesis process.

In the ammonia unit, The Haber-Bosch process will be used by the Project to combine molecular hydrogen gas (H_2) with nitrogen gas (N_2) under high temperature and pressure, and in its stoichiometric ratio of 3 molecules of hydrogen to 1 molecule of nitrogen to synthesize two molecules of production of ammonia (NH_3). This process is also powered by renewable energy and therefore is also considered green.

The Haber-Bosch process is a process that is well understood as it has been in use for over 100 years. However, in grey ammonia plants, the hydrogen generated is typically derived from fossil fuels with carbon monoxide (CO) or carbon dioxide (CO^2) as a by-product. By utilizing hydrogen derived from fresh water and renewable electricity, in conjunction with an ammonia plant and ASU that use electricity from the same renewable sources, carbon dioxide emissions are significantly lowered compared to other ammonia production methods that rely on fossil fuels or hydrocarbons to generate the hydrogen.

The following process flow diagram details the inputs and outputs of the ammonia generation train.

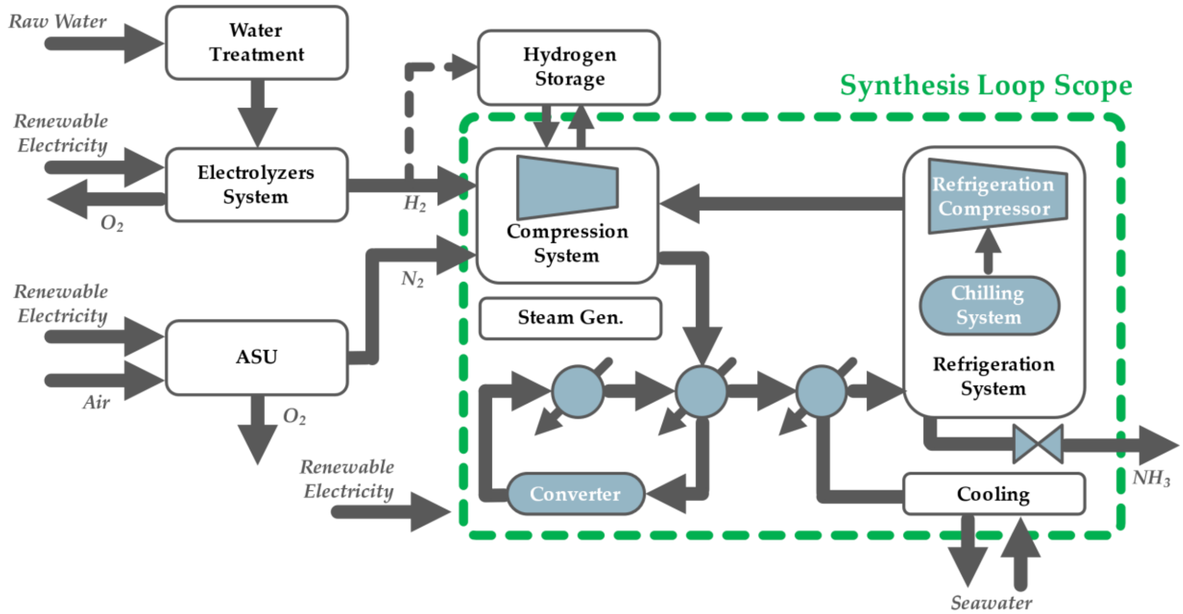

Figure 3.3: Ammonia production block flow diagram

The required infrastructure to produce and store green hydrogen and ammonia produced from the electricity generated by the LBP Wind Farm and Solar Farm I includes the following:

1. A 230 kV substation where the wind farm electricity will be received.
2. A backup power thermal generation station, using on-site green hydrogen or ammonia, or biodiesel as an energy source, near the substation for system power when wind and solar energy is not available.
3. BESS equipment for 150 MW of capacity and 1.5 gigawatt hours (GWh) of energy storage.
4. Substations for distribution of electrical power at 34.5 kV throughout the facilities.
5. A combination of overhead and underground on-site power distribution lines.
6. Water processing and treatment facilities including pipelines to and from the fresh water and seawater sources.
7. Proton Exchange Membrane (PEM) electrolyzers to produce hydrogen, plus de-oxygenation and drying vessels to purify the hydrogen.
8. Nitrogen from ASU and storage tanks.
9. Hydrogen storage tubes (approximately 100 tonnes of storage capacity) required for the production process and backup power system.
10. Ammonia synthesis loop, consisting of Ammonia Converter vessel, compression, heat exchangers, and other associated balance of plant equipment to produce ammonia.
11. Pipelines and forwarding pumps for ammonia transport within the Industrial Facility and to the marine terminal.
12. Refrigerated double walled storage tanks for the final ammonia product.
13. Cooling infrastructure to provide cooled process working medium throughout the Industrial Facility.

14. A flare stack to provide means to safely depressurize during process upsets.
15. Storm water retention and impounding pond(s).
16. Necessary ancillary equipment for remaining system processes.
17. All required buildings, including offices, warehouses, security, and maintenance facilities.

Hydrogen and Ammonia Plant Components

The Industrial Facility consists of the components required to produce green hydrogen and ammonia and all associated works.

Environmental field surveys and detailed engineering will finalize the layout that will be presented within the EIS. The layout will be reviewed, and adjustments will be completed (as necessary) to confirm building locations, hydrogen and ammonia setback/safety considerations, building code requirements, roadway access, earthworks optimization, and other layout considerations and/or requirements determined during the final design stage.

Hydrogen Plant

The Project's hydrogen plant comprises a 1.65 GW electrolyzer facility (for LBP Wind Farm and Solar Farm I) which will be divided into several trains or blocks. The Project is contemplating electrolyzers from several leading manufacturers, which will vary the associated footprint, number of blocks, and actual capacity per electrolyzer.

The hydrogen plant design parameters are stated in the following table.

Table 3.2: Hydrogen Production Plant Design Basis Parameters

Parameter	Value
Product	Hydrogen (H_2)
Design Production Rate	767 tH_2/day
Operating Production Rate	493 tH_2/day
Product purity	Hydrogen - 99.99 % vol Water (H_2O) - 5 ppm(v) H_2O Oxygen - 2 ppm(v) O_2 Nitrogen - remainder N_2
Delivery pressure	30.0 bar(g)
Delivery temperature	30°C

Notes:
*These conditions correspond to Point 6, shown below in Figure 7 (Hydrogen Plant Process Flow Diagram)
tH_2/day = metric tonnes of hydrogen per day
%vol = percent by volume
ppm (v) = parts per million (volume)
bar (g) = gauge pressure
°C = degrees Celsius

Ammonia Plant

The Project's ammonia plant consists of a 4,000 tpd production plant (for LBP Wind Farm and Solar Farm I). The ammonia plant will accept the produced hydrogen from the hydrogen plant and the nitrogen produced from the ASU. The ammonia plant will then compress the hydrogen and nitrogen to required pressure for the Haber-Bosch conversion process inside the ammonia reactor. Any unreacted gases will be recycled back to compressor and combined with the make-up hydrogen and nitrogen. The ammonia plant design parameters are stated in the following table.

Table 3.3: Ammonia Plant Production Properties

Parameter	Value
Product	Ammonia (NH_3)
Plant Design Production Rate	4,000 (metric) tNH_3/day
Product quality	Ammonia -– 99.9 %wt Water -– 0.1 %wt Oil - 5 ppm (w)
Synthesis design pressure	135-140 bar(g)
Synthesis design temperature	400°C

Notes:
tNH3/day = metric tonnes of ammonia per day
%wt = percent by weight
ppm (w) = parts per million (weight)

Flare Stacks

Flare stacks will be required to mitigate/prevent/disperse releases of hazardous off-gases from the ammonia production and storage areas. There will be two flare stacks in the plant design: a flare for the production plant that would be sized for all production areas and one associated with the ammonia storage tank and marine loading system.

The process and storage flare stacks will have a pilot flame using hydrogen as the fuel source.

Ammonia Process Flare

The production plant process flare stack will be in an area of the plant with low equipment installation density and away from any occupied buildings. There will also be an appropriately sized flare exclusion zone to ensure that heat radiation effects from an upset event do not cause any unsafe conditions in the plant.

Ammonia Storage Flare

Similar to the process flare stack, the storage flare will be located in an area of the plant with low equipment installation density and away from any occupied buildings, but will be near, or adjacent to, the ammonia storage area. The primary purpose of the storage flare is to protect the ammonia storage tank in the event of a storage refrigeration compressor failure. As the refrigeration of the ammonia storage tank is accomplished by capturing boil off vapors in the tank and refrigerating and reinjecting, if the compressor fails the boil-off vapors would need to be combusted to prevent over-pressurization of the storage tank.

Ammonia Pipeline to Loading Arms from Ammonia Storage

Adjacent to the ammonia storage tanks, liquid ammonia forwarding pumps will transport the liquid ammonia through a loadout pipeline to the marine terminal, where ammonia will be loaded out to a shipping vessel.

The ammonia loadout pipeline from the forwarding pumps to the loading arms will be sized to accommodate the adequate ammonia flow rate, plus a margin. The pipeline routing will also be sized to allow future ammonia loadout lines to be installed.

A vapour return pipeline from the loadout point will also be required and must be sized appropriately to maintain pressure equalization between the ammonia storage tanks and the shipping vessel's cargo tanks. This vapor pipeline will route back to the plant and the vapors will be refrigerated and liquified in the same manner as the ammonia storage boil off vapors.

It is anticipated that one ammonia carrier will be loaded every 5-day cycle, with 1-day for loading ammonia in this 5-day cycle, therefore, the marine transfer pipeline will not be in use for four of five days. When loading is not taking place, EverWind will implement operational procedures to minimize corrosion effects and any potential releases.

Marine Terminal

EverWind has evaluated several potential marine terminal locations over the last 24 months, including brownfield locations near St. Lawrence and Fortune, but has determined that Mortier Bay in the Town of Marystown is the most suitable location for a multi-use site (Drawing 1.1, Appendix A). Mortier Bay is effectively sheltered from the open ocean, has a wide and deep entrance, a large basin suitable for standby anchorage, and is ice-free under normal winter conditions, which together provides ideal safe navigation for the vessels that will call at the marine terminal. Mortier Bay is not a compulsory pilotage area. Mortier Bay has also supported a number of industrial projects over the years and offers a variety of brownfield and greenfield opportunities that have been considered and are summarized below.

Brownfield Sites

- Former site of Marystown shipyard – site currently being proposed in the development of an aquaculture industry service hub.
- Former site of Marystown fish processing plant – facility formally closed in 2011 and now is currently used for aquaculture industry services.
- Industrial fabrication facility – large industrial site, originally designed to support offshore oil and gas industry.
- Municipal marine industrial park – the Town of Marystown has been actively developing its marine industrial park for many years. The ultimate vision for the park included a marginal wharf, offering local commercial and industrial businesses a marine logistics option to support their operations. This element of the marine industrial park has not been able to proceed due to lack of capital.

Greenfield Site

Additionally, under consideration is the construction of a greenfield marine terminal in Mortier Bay (in proximity to the Industrial Facility near Cashel Lookout (Figure 3.4) This facility would be designed as a multi-use marine terminal to support the Project's various needs during construction and operations.

In addition to its own intended uses, EverWind has been in active conversations with the Town of Marystown, local business owners, industry and economic development associations to make the facility open access to other potential users in the community. This concept surfaced through community engagement efforts and has garnered local interest. EverWind is currently in the process of soliciting feedback on use cases and specifications that can be incorporated into the facility's proposed design. In the event EverWind proceeds with the greenfield marine terminal, it will do so in partnership with local stakeholders including the Town of Marystown and the Mortier Bay Harbour Authority (the Authority is currently undergoing finalization).

For the purposes of this EARD, the greenfield marine terminal will be used as the case example for the Project. If the greenfield terminal in Mortier Bay is selected, the required regulatory pathway for a new marine terminal will be followed. Once the proposed marine terminal approach is confirmed, an EA registration will be prepared by Project stakeholders and submitted to NLECC.

Regardless of the option selected, the marine terminal will provide facilities to unload Project equipment and components from Multipurpose Heavy Transport Vessels (MHTVs) during construction, and it will provide facilities to load produced ammonia via a pipeline to ammonia carriers during operations.

The location of the greenfield marine terminal relative to the Industrial Facility site is illustrated in Figure 3.4

The main features of the greenfield marine terminal are:

- Marginal wharf-type structure consisting of sheet pile and infill construction, with a total area of approximately 3 ha, quay length of 225 m, minimum water depth of 15 m at the quay face, and mooring dolphins extending from the main wharf.
- Sufficient laydown area to fully discharge the largest expected Project cargo vessel, with surface strength suitable for the discharge of the heaviest expected cargos.
- Two or more mobile crawler cranes for handling cargo on shore, and for assisting in the discharge of vessels as required.
- Roads suitable for moving heavy and oversized equipment out of the marine terminal area.
- Ammonia pipeline from the Industrial Facility to the ammonia loading arm facility on the wharf.
- Seawater pumping and piping infrastructure for processing plant cooling water supply.
- Site services, including electrical & water supply, marine facility fire water supply, , flood lighting, shore power for ships, offices, workshops, security, etc.

Figure 3.4: Rendering of marine terminal (case example) in proximity to the Industrial Facility

The Newfoundland and Labrador Land Use Atlas (Gov NL 2023a) indicates the present shoreline at the greenfield marine terminal location is part of the municipal planning area for Marystown. This land was included in the areas identified in the Wind Application Recommendation Letter provided to EverWind and EverWind has also received a support letter from Marystown's municipal council for development of a transshipment and offloading marine terminal.

The federal *IAA* (2019) requires an environmental assessment for new marine terminals serving vessels with a greater than 25,000 DWT. Production volumes from this Project will be shipped directly to the Point Tupper Transshipment Terminal in Nova Scotia. Therefore, smaller ammonia carriers, of approximately 15,000 DWT, can be used and no federal impact assessment is anticipated for the marine terminal.

Since the marine terminal will be registered under a seprate EA, it will not be discussed further in this EARD.

3.2.2 Project Schedule

Table 3.4 summarizes the Project schedule from the EA Registration through to decommissioning activities.

Table 3.4: Proposed project schedule

Project Activity	Timeline
EA Registration	Q3 2024
EIS Studies	Q4 2024 – Q3 2025
EIS Submission	Q4 2025
Final Investment Decision	Q1 2026
Site Preparation/Construction Phase	Q1 2026
Commissioning	Q4 2028
Operations/Maintenance	2029 - 2059
Repowering or Decommissioning	2060 onward

3.2.3 Construction Activities

Initial construction activities are expected to take approximately three years, including pre-construction, and include the development of the LBP Wind Farm, Solar Farm I and Industrial Facility. The Project is estimated to operate for approximately 30 years, with one to two years for repowering, or decommissioning and reclamation (refer to Section 3.2.5 for more details on repowering and decommissioning). Details regarding any additional wind, solar or Industrial Facility, in addition to those outlined, will be provided to NLECC as required by the conditions of release.

The construction phase of the Project will entail the buildout of the wind farms, solar farms, road and transmission infrastructure, Industrial Facility, and other supporting infrastructure. The construction phase will include site preparation and construction. Main activities include the following:

- Civil works, including temporary accommodation facilities, site preparation, site clearing and grading and access road construction (upgrades to existing access roads and establishment of new access roads)
- Wind and solar farm construction, including WTG and solar array transportation and installation
- Electrical infrastructure, including collector systems, substations, transmissions lines, and Industrial Facility substation
- Industrial Facility construction, including associated infrastructure (e.g., ammonia pipelines) and water treatment facility

The Project will have numerous Engineering, Procurement, and Construction teams allocated to various scopes.

Table 3.5 outlines the anticipated timelines associated with the development of the Project.

Table 3.5: Anticipated Start Time for Project Phases

Phase	Approximate Start Timings
Preconstruction	Q1 2026
Construction – General	Q1 2026
Construction – Civil – WTGs	2026-2027
Construction – WTGs	2026-2028
Construction – Solar Farm(s)	2026-2028
Construction – Collection and transmission systems	2026-2028
Construction – Collector substations	2026-2028
Construction – Industrial Facility and ammonia pipeline	2026-2028
Operations and Maintenance	Q4 2028
Repowering, or Decommissioning and Reclamation	2060/2061

A list of anticipated equipment required for construction is provided in Table 3.6. Additional equipment or substitutions may be made based on on-site requirements and equipment availability

Table 3.6: Expected Equipment Required for Site Preparation Activities

Equipment	Task
Semi-trailer and float	Moving equipment to and from the site
Rubber-tired mechanical harvester	Felling of trees and delimbing
Rubber-tired skidder	Yarding of felled merchantable timber
Shredder/Mulcher	Shredding and mulching of non-merchantable timber
Tractor and trailer with grappler	Transport of trees off-site
Bulldozer with root rake	Removal of stumps and roots and material movement
Tracked excavator	Loading and movement of material, excavation for footings, foundations, trenches
Back-hoe	Removal of stumps and roots
Dump truck	Material movement (e.g. granular material)
Support/service trucks (pick-up or all terrain vehicle (ATV)))	Transport of equipment and personnel, electrical service
Bobcat fitted with post hole driller	Drilling holes for fence posts
Compactor/roller	Fill compaction (e.g. roadways)
Forklift/Loader	Material movement (e.g. anchors, rebars, gravel, etc.)
Pumper truck	Cleaning of portable washroom
Welding truck	Base-station for welding equipment
Concrete truck	Hauling concrete to site
Concrete pumper truck	Movement of concrete on site
Mobile Aerial Work Platforms (AWP)	For safely positioning personnel in above-ground areas
Truck crane (40 t to 220t)	Movement and placement of equipment on site
Drilling rig and blasting mats	For removal of rock outcrops and geotechnical study
All-terrain cherry picker pole drilling	Installing utility poles and stringing wires

Equipment	Task
Water truck	Moving water
Fuel truck	Refuelling in remote locations
Safety equipment	Fire protection, erosion and sediment controls, and spill prevention equipment

3.2.3.1 Site Preparation (for all components)

Micrositing of Project infrastructure will occur during the detailed design of the Project (i.e., prior to site preparation activities) to ensure impacts to the environment are minimized to the extent possible.

Site preparation includes geotechnical surveys, site clearing (vegetation removal and grubbing), excavation, grading and compaction, installation of temporary drainage systems, stabilization, preparation, and implementation of erosion and sediment control measures prior to the commencement of construction activities. Prior to site preparation and construction activities, surveyors will clearly mark the perimeter of all areas to be developed, including WTG pads, laydown areas, limits of road construction or upgrades, transmission line right of ways, solar farm development area, as well as the Industrial Facility areas. A site assessment will be performed to determine the type, extent, depth, location, and quality of soils on the site and a comprehensive site preparation plan will be developed. Adequate vegetated buffers will be maintained between the footprint of all project components and wetlands, watercourses, or other sensitive features/areas, as required. All vegetation clearing activities will be conducted outside the bird nesting season (i.e., annually from April 15th to August 15th) where possible and adhere to all mitigation measures. If it is necessary for clearing to occur within the bird nesting season, nest sweeps will be conducted by qualified personnel no more than five days before clearing.

Activities for site preparation include:

- Removing or securing boulders and similar objects near excavation sites for the safety of workers and/or machinery
- Substituting suitable construction material for existing unsuitable soils (i.e., overburden)
- Placing and compacting fill materials over the proof-rolled subgrade to achieve adequate bearing capabilities
- Implementing dust control measures
- Encouraging sound soil conservation throughout the process for use in restoration activities

Should blasting be required as part of site preparation for the WTG foundations or other facilities infrastructure, a certified blasting contractor (holding a valid blasters certificate issued by the NLECC), will be contracted to develop a blast design for review and approval prior to conducting the work. The blast design will be required to meet vibrational limits at appropriate distances from existing infrastructure and buildings and fish habitat. Should a temporary explosives storage facility be required, it will meet government regulations including required separation distances as regulated by the Explosives Regulatory Division of Natural Resources Canada, with explosives and accessories stored at the approved explosive storage facility. If blasting is required, an Explosives and Blasting Management Plan will be developed by the licensed blasting contractor to provide direction for the safe storage, handling, and use of explosives and explosive components, to address the safety of the public and Project personnel, and protection of the environment.

3.2.3.2 Road Network, Temporary Laydown, and Workforce Areas

Some existing roads will require upgrading and new roads will need to be constructed. Existing roads will be used to the extent practicable to minimize the construction of new roads (minimizing habitat loss and fragmentation). Both new access roads and upgrades to existing access roads will be designed and constructed to meet the required standard (e.g., WTG manufacturer requirements for roads used to deliver WTG components).

EverWind will use locally available aggregate from quarries in proximity to the Project, where possible. EverWind will also explore the development of quarries within the Project Area. The locations of such quarries have not yet been identified but if new quarries are required, the provincial quarry permitting process will be adhered to.

Upgrades to Existing Roads

The requirements for upgrades to existing access roads is dependent on the current quality and integrity of the roads. Activities to upgrade existing access roads could include resurfacing, grading, widening, ditching, brush clearing, and water crossing (e.g., culvert and bridge) replacements.

New Roads and Laydown Areas

The cleared corridor required to support access roads varies from 20 m to 30 m in width. The width of clearing is required to have an adequate turning radius for WTG blade transportation, and have sufficient structural strength to carry heavy equipment, such as WTG components and main power transformers.

Additionally, these corridors create a safe work area, allow for enough material to be gathered within the cleared areas to use for road and pad construction, to maintain setbacks (in the case of collector lines), and to allow sunlight to penetrate and promote drying of travelling surfaces. The roads are designed to be as short as possible to reduce material demand, costs, and environmental impacts.

Access roads will have a 6 to 12 m wide road surface and including ditching and grading will be 17 to 20 m wide. Wider roads (12 m road surface) are required for the crane to crawl from WTG to WTG and narrower roads (6 m road surface) will be used if the crane is mobilized via a float truck. Access roads will be constructed as all-weather, all-season roads. Access roads will be built to accommodate the oversized loads and large weights of the WTG components.

The following construction activities will take place for new roads:

- Road areas will be clear cut and grubbed.
- Excess organic material will be stockpiled temporarily and used for reclamation / revegetation as needed.
- A cut and fill technique will be used where suitable road building materials exist. The road surface will be graded and levelled to the engineering specification.
- Positive drainage will be established by following the natural ground slope to the extent possible, with required ditching designed to reduce disturbance to the natural drainage pattern.
- Ditches will be lined to reduce erosion in the areas where flow velocity is high.
- Fill requirements and right of way (ROW) widths will be included in the selection of road gradients, to maximize road use and meet design parameters.
- Clean fill will be sourced from existing quarries and borrow pits where possible.
- If new quarries are required, the quarry permitting process will be adhered to.
- Shou be required, activities will be permitted under the Section – 48 Permit to Alter Bodies of Water. (Newfoundland ld any fording and Labrador Water Resources Act (NL *WRA*) 2002).
- The duration of in-water works will be reduced to the extent practically feasible and conform to timelines established by regulators.
- Removal of stream side vegetation will be limited to the footprint of crossing abutments, and re-vegetated to the extent possible.
- Water crossings associated with potentially fish-bearing waters will be identified through a desktop analysis of existing satellite imagery, the 1:50,000 topographic mapping, and the location of the proposed access road, transmission line ROWs, collector line ROWs, and substations.
- Culvert sizing will be determined during detailed design, along with consideration of embedded or bottomless arch culverts for fish-bearing watercourses.
- Detailed design assessments of culverts will be performed to specify appropriate use of materials, aggregates, slope armoring and vegetative cover, along with spatial requirements for exact location, length, diameter, and slope.
- Culverts will be installed during appropriate seasonal windows, adhere to all crossing permit conditions, and follow best management practices. (BMPs).

3.2.3.3 Temporary Components

Construction of the roadways and temporary lay down areas will involve the removal of topsoil, grading, and placement of granular materials. Laydown areas for construction materials will also serve as parking areas during construction. Any security fence, roadways, and laydown areas for the wind and solar farms, and Industrial Facility will likely be constructed concurrent with site levelling activities. Contractor trailers will be brought on site to serve as offices/ lunchrooms/ equipment storage throughout construction. Temporary washroom facilities, serviced by a licensed third-party contractor, will be required on site. Once the permanent facilities have been commissioned, temporary facilities will be removed.

Given the size of the Project and the construction activities forecasted, temporary workforce accommodations will likely be required. The temporary workforce accommodations will make use of the available lands and will be sized to meet the needs of the current construction activities. The accommodations are envisioned to utilize multi-story modular construction which would include living areas, common facilities such as a dining hall, recreational/exercise facilities, support buildings, parking, and laydown areas. The number and location of temporary workforce accommodations is not known at this time.

During the construction phases of the Project, the following temporary Project components will be required:

- Construction laydown areas will be required to store construction equipment, WTGs, Solar Farm equipment, Industrial Facility major equipment such as electrolyzers, BESS, process components, cranes, shacks, offices, parking and other necessary components. During the construction period, trailers or other temporary structures will be brought in for construction support and management.
- Temporary workspace may be required along access roads and at crane pad sites. These temporary workspaces will be used as required (for example as truck turn around areas) and will be reclaimed/restored following WTG erection and Solar Farm installation.
- Borrow pits and quarries may be required to provide necessary material for access roads, crane pad site creation, or equipment foundations. All pits and quarries will be permitted, as required.

3.2.3.4 WTG Pads and Foundations

WTGs will be installed at each of the selected locations following site preparation. Each WTG consists of a tower, nacelle, three rotor blades, and hub assembly. The towers are supported by the generator step up transformer, electrical and grounding wires, and buried grounding grid at the perimeter of the foundation.

Foundation installation involves the transport and fixing of the foundation in position. Ground investigations and site preparation works can include geotechnical calculations, boreholes, and laboratory sample testing prior to the removal of soils and foundation build. WTG foundations are generally divided into three types:

1. Gravity foundations, which rely on the mass of foundation concrete, steel reinforcing, and larger bearing area to provide a solid foundation for the WTG.
2. Rock anchor foundations, which use a combination of concrete mass, steel reinforcement, and anchor rods drilled and grouted into the rock.
3. Pile foundations, which rely on foundation piles transfer loads from the WTG foundation to lower-lying ground, thereby providing overall support to the structure.

As local geotechnical conditions dictate the optimal foundation style, it is anticipated that multiple types will be required for the Project. WTG foundations will include an envelope of engineered gravel to provide positive drainage away from the foundation. Surface grading will provide positive runoff and avoid ponding of rainfall. Construction activities will seek to reduce the excavation of materials and focus on minimizing the potential environmental impacts such as effects on water resources and effects of drainage on vegetation.

WTG components will be transported to the site using a variety of heavy transport vehicles. The WTG will be constructed using a crane to lift the tower sections, hub, nacelle, and blades into place.

Each WTG will have a buried grounding grid around the perimeter of the foundation, which will be interconnected to the collector neutral wire. The ground wire will be at the base and perimeter of the foundation within the foundation excavation limits. Grounding protection and final ground wire configuration for each WTG will be determined by a detailed grounding study. Typically, the ground wire is located 30 cm outside of the foundation and within the foundation excavation. This ground wire will be connected to the ground conductor in the buried collector system cables and connected to the generator tie line ground wire.

The proposed methods for WTG pads and foundation installation include:

- Remove all timber and grubbings.
- Strip surface and subsoils in areas to be constructed. Separate and stockpile organic soils for later use with reclamation and revegetation.
- Contour and level working areas.
- WTG bases will be excavated to appropriate dimensions (determined by engineering requirements).
- Excavated subsoil will be piled on location for use in padding of the tower base or for eventual removal.
- It is assumed that each WTG base will require installation of a support structure using over 500 to -1,000 m^3 of concrete and re-bar. As a result, 1,000+ m^3 of subsoil will require excavation and relocation.
- A portion of this soil will be used to backfill and level the crane pad area.
- Pouring of concrete slab.
- Installation of internal formwork.
- Installation of rebar followed by external formwork and other required infrastructure.
- Transport of concrete (the supplier location is to be determined).
- Pouring of concrete.
- Curing and testing (tests taken throughout pouring process).
- Backfilling.
- Recontouring.
- Interim reclamation of surface soils and revegetation of disturbance areas not needed to support operations and maintenance activities.

Mobile Concrete Batch Plant

On average, a spread footing designed WTG base requires approximately 500 to 1,000 m^3 of concrete. The volume of a concrete truck is approximately 10 m^3. Therefore, 50 to 100 trucks may be required for pouring a single WTG foundation. A mobile concrete batch plant allows consistent high output and quality concrete to be produced at the Project site and reduces trucking costs and local impacts to communities. The batch plant is fully mobile making it ideal for projects in remote areas. Short mixing times allow for increased production, up to 120 m^3 of concrete per hour. These typically have a compact modular arrangement that can be fully erected in one day. Multiple concrete batch plants are anticipated to be required during the construction of the LBP Wind Farm.

WTG Construction Pads

The erection of a WTG requires a large level work area for storage of WTG components and safe operation. Three construction pads will be associated with each WTG. Refer to Table 3.7 for details and approximate dimensions of each construction pads.

Table 3.7: Infrastructure dimensions and workspace

Infrastructure	Approximate Dimensions of Workspace Required	Permanent or Temporary
WTG base with underground power cables	15 m diameter	Permanent
Blades laydown pad	30 m x 100 m	Temporary
Crane pad	30 m x 50 m	Permanent
Remaining WTG equipment laydown pad	25 m x 60 m	Temporary

WTG Assembly and Erection

WTG components will be delivered to site and the erection of WTGs is based upon specific site conditions found at each WTG pad. Tower sections will be positioned on WTG pads and lifted via crane. The base section will be positioned onto the foundation and the remaining tower sections will be stacked on top. The hub will be installed on the nacelle prior to being set in place on the tower. Lastly, the three blades will be attached individually to the hub.

Crane lifts require detailed engineering and safety protocols, and those details are outside the scope of the EARD.

3.2.3.5 Electrical Collector and Transmission Line Construction

Surveying and staking of the structure locations and other key points along the Collection/Transmission Line route will be conducted prior to construction. The survey data will be returned to the engineer to confirm final elevations and structure locations. The survey crew will work intermittently in sections following the tree clearing contractors.

For probing, excavation, and rock anchor installation presence or rock will be confirmed using a tracked drill or excavator. If suitable rock is present, it will be excavated to depth and backfilled with native materials and any rock anchors will be installed. If suitable rock is not present an alternate location will be selected.

Pole setting crews will work in a linear fashion following the rock excavation crews. The crews will excavate the pole holes to depth, install the poles, and backfill using native materials. Structure framing crews will work in a linear fashion following the pole-setting crews. The crews will install cross arms and braces, install hardware, and hang insulators and travellers.

It is assumed that new overhead transmission lines will follow existing transmission line ROWs for a common utility corridor, where feasible. New transmission line corridors will also be developed. Once poles have been erected and the necessary framing (i.e., insulators, cross arms, and bracing) has been installed, conductors will be strung by pulling conductor off a stationary wire spool located at the start of each line segment and connecting the connector to insulators. Appropriate tension is applied to adjust the line sag and to bring the conductor to the design specifications once conductors are in place.

All transmission lines will terminate at the Industrial Facility main substation. To maintain stable operation, a BESS may be located at some wind farm substations. In addition, it is expected that many, if not all, of the substations will have reactive compensation equipment (synchronous condensers, capacitor banks, or dynamic reactive power systems) and fault current sources (synchronous condensers) to increase fault current levels to reliably detect and clear power system faults and meet the short circuit ratio requirements and stability considerations of WTG vendors.

Underground electrical system collector lines will be constructed by:

- Stripping surface soils along the route.
- Excavation of a trench to approximately 1.5 m to 2 m deep.
- Installation of a sand or gravel bed along the base of the trench.
- Laying and interconnection of below ground cables and conduits.
- Backfilling of trench with excavated material (parent materials). Excess soils that will result in a ridge along the trench will be removed and disposed of at an approved location.
- Replacement of subsoils.
- Replacement of topsoil.
- Re-seeding as per and erosion control requirements.

Overhead electrical system collector lines will be constructed by:

- Surveying of pole locations
- Drilling to a specified depth
- Installing wood poles

- Installing cross-arm supports and pole mounted infrastructure
- Unspooling and stringing of power lines and fiber optic cable
- Guying
- Interconnection with substation and underground sections
- Testing & commissioning

3.2.3.6 Solar Farm Construction

Following site preparation activities, construction of Solar Farms I, II and III within the SIA will involve installation of solar arrays and supporting infrastructure. Anchor or foundation types could include steel piles or screw piles/helical anchors, (methods and depths depending on site/ground conditions, orientation, weight, wind load, snow load, etc.).

The units will be wired in series and run to the end of each string, combining into larger circuits feeding central inverters. Electrical cables running between the panels and inverters may be buried or above ground strung. A right-of-way for the feeder line, extending from the solar farm to the transmission line, will be cleared and utility poles will be installed.

A perimeter maintenance road will be constructed around and between array blocks. Topsoil will be removed along those pathways and crushed rocks/pit run gravel with possibly vegetation control (e.g. geotextile) will be placed on the subsoil. The roadway network will allow vehicle access directly to electrical equipment (i.e., inverters, arrays) and for general maintenance of the solar farm. During construction, and within the Project boundaries, a temporary storage/laydown area and temporary parking area will be designated for materials, equipment and construction trailers.

3.2.3.7 Hydrogen and Ammonia Production Facility Construction

The final Industrial Facility layout will depend on the exact technology selection and will be optimized for production and storage processes considering safety policies and requirements.

Following site preparation, a survey team will locate and mark the Industrial Facility's component locations. The data collected will be provided to the design engineer to confirm final elevations and infrastructure/building locations. Contractors will then install the necessary footings and foundations, constructed of concrete and reinforcing rebar.

The components that need to be constructed include:

- Construction of buildings and foundations for hydrogen and ammonia plant components
- Construction of BOP (electrical infrastructure, piping, compressors, storage tanks, pipe racks etc.)
- Connection of the Linton Lake water supply to the Industrial Facility
- Connection of seawater intake/discharge to the Industrial Facility
- Installation of electrolyzers
- Installation of the ammonia synthesis and associated process equipment

Prior to construction of these components, construction laydowns and storage areas will be established for the temporary placement of equipment and construction materials.

The path of construction for the Industrial Facility will be based on the forecasted delivery schedule for the major long lead equipment. This will be determined during the Project's detailed design phase. The Industrial Facility will be laid out such that several workfaces will be available concurrently to minimize construction schedule. In general, the erection of the substation and associated infrastructure will be prioritized, as electricity will be required during the early phases of pre-commissioning and commissioning given the electricity demand of the electrolyzers. Until power is available from the wind farms, temporary construction power will be utilized, which would be either connected to the local utility grid or supplied by on-site generation. Freshwater, from Linton Lake, and seawater, from Mortier Bay, will be supplied to the Industrial Facility through a series of water supply pipelines. The supply lines will be installed following standard practices for supply line distribution and ensuring best practices for minimizing environmental impacts. These lines will feed into the treatment facilities that will be constructed on site. For further detail please refer to Section 3.2.4.6.

Site drainage during construction will be managed through grading and a system of diversion ditches and open channels. Drainage diversion ditches will be designed for a 100-year storm return period. Surface water management structure design will be engineered and finalized prior to Project construction.

3.2.3.8 Marine Project Cargo

All Project equipment that cannot be delivered by standard containerized and standard overland transport methods will be delivered by marine vessels to the marine terminal, with most of the heavy equipment being delivered by MHTVs. These vessels are a special type of break bulk carrier where the project cargo includes extra-large, heavy-duty, high-value, and complex items. Generally, a MHTV has two or more cranes for loading/discharging cargo, an open hold with configurable between decks, and watertight hatch covers that are strengthened for the placement of cargo on top. Although most of the Project cargo will be transported by MHTVs, in some situations a module carrier may be preferred. This type of vessel has a large open deck that is suitable for carrying large cargo such as modules for onshore facilities, or transport of marine vessels such as drilling rigs. Module carriers typically do not have cranes and cargo is rolled off or lifted off by shore cranes.

3.2.4 Operation and Maintenance Activities

The operation phase of the Project will involve maximizing renewable energy generation for use in the production of green hydrogen and green ammonia in a safe and environmentally friendly manner. A detailed operation and maintenance strategy and guidelines will be defined as per manufacturers' specifications and maintenance requirements. Factors that will determine the operation and maintenance strategy will include the length and requirements of the performance warranties of the equipment / components, lender requirements, sponsor preferences, and location specifics.

3.2.4.1 Wind Farms & Associated Infrastructure

The WTGs will operate under typical WTG operational criteria, with low wind speed cut-in at approximately 3 metres per second (m/s) and high wind speed cut-out at 25 m/s or above, with maximum power delivery at wind speeds greater than 10 to 12 m/s. The overall output from the wind farms does not follow similarly strict production profiles as single WTGs. While some WTGs may not be in operation at wind speeds below 3 m/s, other areas may be experiencing adequate wind speeds for production. There will also be cases when wind speeds are around the maximum permitted levels, with some WTGs having lower wind speeds and being able to maintain maximum production while others will come out of service.

The wind farms will be remotely monitored via trained and qualified personnel, who will monitor plant control software including alarm call-outs. Regular activities will include road maintenance (e.g., snow clearing, road maintenance and repair) to enable access to each WTG site by maintenance personnel for inspections, as required. Servicing of WTGs (e.g., replacement of worn components, lubricants, and drone inspection of WTG blades) and electrical systems (e.g., inspection of components, transformer oil, periodic replacement of minor components, and testing) will be conducted at manufacturer recommended intervals and as determined by monitoring equipment.

Substations will be remotely monitored using dedicated supervisory control and data acquisition and video surveillance systems. Trained and qualified operators are notified and dispatched when required to address issues such as protection trips, equipment operating parameters exceeded, and unauthorized substation entry. The transmission lines (high-voltage) and collector system (34.5 kV) will require both scheduled and emergency maintenance and inspections. Maintenance activities will be carried out by qualified specialists. Typical preventative maintenance would include earth wire integrity, guying integrity, checking for missing or broken hardware, proper operation of isolation switches, and ROW clearing of encroaching vegetation. Vegetation management activities (through application of herbicides and manual cutting of brush) will be conducted in accordance with the Pesticide Control Regulations under the NL *EPA* and are subject to approval from the NLECC Pesticide Control Section. In the event of equipment failure, emergency repairs may be required. Emergency and preventative maintenance will follow detailed protocols and maintenance plans will consider equipment manufacturer recommendations and International Electrical Testing Association standards.

3.2.4.2 Hydrogen and Ammonia Plants & Infrastructure

Operations at the Industrial Facility is anticipated to occur 24 hours/day, 7 days/week, except for scheduled shutdowns and unscheduled outages (loss of power).

Hydrogen Process Overview

The hydrogen plant includes hydrogen production via electrolysis, cooling, and compression equipment, and other BOP systems such as de-oxygenation and drying vessels. The input water source for the Industrial Facilities is demineralized, deionized water. Electrolysis is defined as the “breakdown (lysis) via electricity,” and the process uses direct current (DC) to drive a chemical reaction whereby water (H_2O) is converted to hydrogen and oxygen. When the power used to drive the process utilizes a renewable power source such as sun or wind, this process produces zero-carbon hydrogen and oxygen and is therefore considered green.

A typical scope of supply from leading PEM electrolyzer original equipment manufacturers (OEM) includes:

- DC power supply (including transformer, rectifier and electrical interconnection)
- PEM modules (each composed of several electrolysis stacks)
- Water refinement loop to further purify treated water prior to introduction to the electrolyzer
- Gas separators
- Gas coolers
- System Controls

Additional hydrogen plant components supplied as part of the BOP include the:

- Gas management system (including hydrogen buffer [gasometer], compressor, catalyst for the removal of oxygen [DeOxo] and Dryer)
- Fire Suppression System

The PEM process allows for flexible hydrogen production with very rapid load changes and ramp rates to match the transient nature of renewable energy. This allows for ramping, shut down, start up, and lower (more favorable) turndown capabilities.

PEM Modules

PEM electrolyzer modules are comprised of several electrolysis cells, where the electrolytic production of hydrogen and oxygen occurs. These cells are stacked together, and collectively form a PEM stack.

Each electrolysis cell is equipped with an impermeable proton-conductive membrane and two electrodes: a cathode (positive) and an anode (negative) (Figure 3.5). The positive and negative electrodes are submerged in demineralized water, and when an electrical current is applied, the hydroxide ions move from the cathode to the anode. During this transfer, hydrogen gas bubbles are generated on the cathode side, and oxygen gas bubbles are generated on the anode side. The generated hydrogen and oxygen gas rise and are collected through flow piping.

The membrane's impermeability ensures that the raw hydrogen produced through the cell is very clean, with only trace amounts of oxygen. Through the electrolysis process, approximately 20,500 kilograms of hydrogen per hour (kgH_2/hr) is produced on average; this number will be confirmed during the design phase when the final electrolysis vendor is determined.

The majority of leading PEM manufacturers operate a pressurized system which would deliver hydrogen at a30 bar(g) pressure of 30 bar(g). It is assumed that the hydrogen pressure leaving the hydrogen plant is therefore delivered at 30 bar(g) and that no post-electrolysis compression is required.

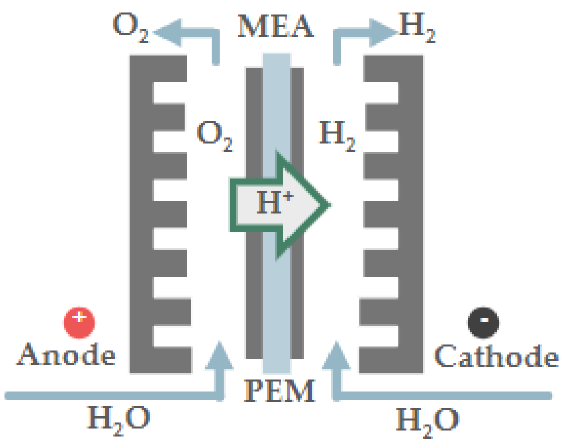

Figure 3.5: Generic layout of a PEM electrolysis cell

The hydrogen electrolyzer plant can follow the wind production profile from a very low load to full production, with a dynamic yield rate varied by the load of the electrolyzer. The hydrogen output stream from the electrolyzer has water and oxygen contamination and is therefore deoxygenated and dried to required purity specifications prior to supplying the ammonia production plant or stored. Hydrogen for storage is captured when hydrogen production exceeds ammonia production requirements. Excess hydrogen gas is fed to hydrogen storage “tubes”, which are manifolded and easily expandable. The gas is stored to feed the ammonia production, when required, and could be used to provide fuel for backup power generation. Hydrogen production output is prioritized to the ammonia plant.

Gas Separators

The collected gas-water mixtures from the hydrogen and oxygen sides of the electrolysis cells will rise to the respective gas-water phase separators, which will be installed near the stack modules. This rising occurs naturally and does not require any mechanical pumping. Once in the separator, gravity separation will occur and the gases are collected into separate hydrogen and oxygen header pipes (+ compensators), which connect to the gas coolers and gas management plant.

Gas Cooling

The cooling system provides cooling water for the internal cooling circuit of the electrolyzer, transformers, rectifiers, and gas management.

Once the gas-water mixtures are separated, the gases are collected in the header pipes, which connect to the gas coolers and gas management plant. Hydrogen and oxygen flows collected in their respective header pipes are cooled down from the electrolysis operating temperature using gas coolers which are cooled by water and integrated into the electrolyzer cooling medium circuit. Condensate recovered from the gas cooler is directly recycled into the process water circuits.

Any remaining moisture in the hydrogen stream is recovered in the downstream compressor interstage coolers and cooling system for the DeOxo/Dryer (see Section 3.2.1) oxygen is vented to the atmosphere.

Water Refinement Loop

Since the electrolysis process consumes water, de-ionized process water needs to be added according to consumption; this water is fed into the oxygen gas-water separator.

A certain percentage of the process water is constantly supplied to a small water treatment package to maintain the process water inventory at the required water quality specifications. This stream is circulated back to the hydrogen gas-water separator and the process is referred to as the *Water Refinement Loop.*

Gas Management System

The gas management system transports the product gas (hydrogen) directly from the electrolyzer and prepares it to the required specifications for uptake (within the ammonia plant) and/or directs it to the hydrogen buffer tank. The gas management system will be engineered to meet the Project’s specifications.

DeOxo and Dryer

The produced hydrogen may contain trace amounts of oxygen and moisture; therefore, the hydrogen will require cleaning and drying to achieve a high purity level of hydrogen (99.99%). The hydrogen cleaning and drying (DeOxo/Dryer) process is divided into a catalytic (cleaning) and adsorption (drying) reaction which takes place in the DeOxo/Dryer process unit.

System Controls

Typical process control and instrumentation systems on PEM electrolyzers consist of process monitoring and automation controls, as well as the necessary safety components required, such as:

- Setpoint control and adjustment
- Current, voltage, and power control at the rectifier output
- Cell voltage
- Process temperature
- Gas monitoring
- Water level monitoring in the gas separators

- Gas pressure (hydrogen and oxygen)
- Process value monitoring of the cooling circuit

Fire Suppression System

Firewater design will adhere to all National Fire Protection Agency (NFPA) and local codes and requirements to ensure adequacy of the design and suitability for service. The main firewater supply will be taken from the facility storm water pond system and will be supplemented by interconnection with the main raw freshwater supply in the event of reduced pond levels for response to a prolonged fire event.

3.2.4.3 Ammonia Process Overview

The purified and dried hydrogen is supplied at an uncompressed, steady rate to the ammonia production equipment. The ammonia plant takes a direct feed at steady rate from the electrolyzer or draws from the hydrogen storage tubes. The ammonia production process is complex, and plant wide shutdowns are to be avoided whenever possible for smooth operation of the Industrial Facility. The operating philosophy will be to run the ammonia plant at steady throughput, with the hydrogen electrolysis equipment load following the wind farm's energy production. Hydrogen storage and microgrid components are critical to the process by smoothing and regulating inputs to the ammonia production system.

The Industrial Facility will use the Haber-Bosch process, where hydrogen and air-derived nitrogen are blended at an approximate 3:1 ratio, compressed to 135-140 bar, and reacted in an ammonia converter. The ammonia converter consists of multiple reactor "trains", each consisting of several catalyst beds with heat exchangers between the beds. The heat exchanger cools the output gas from each bed by transferring the heat energy to the incoming feed. The catalyst beds and heat exchangers are contained within a pressure vessel. The gas exiting the converter is approximately 400-425°C, with a concentration of 20 to 22 mol percent ammonia. The gas is fed through a waste heat boiler, which produces steam, and through a feed/effluent exchanger where the gas is further cooled, and the ammonia will be separated from the remaining unreacted gases. Ammonia will be further cooled to -33°C for storage, and the unreacted gasses are returned to the ammonia converter via the compressor.

The main process control system will control both the ammonia and hydrogen set points. At times when less than 100% power is available to the plant, both the hydrogen and ammonia plants will need to be ramped down to appropriate levels to match the power input to the plant. As the electrolyzers are able to ramp up and down much faster than ammonia, it is envisioned that the ammonia plant will dictate the overall plant ramp rate, with intermediate hydrogen storage to act as a buffer to decouple the two plants to prevent any process upset due to the differing ramp rates. The hydrogen storage is planned to be in high pressure, manifolded tubes, with final sizing to be determined during engineering design.

The following figure describes the Ammonia plant process flow.

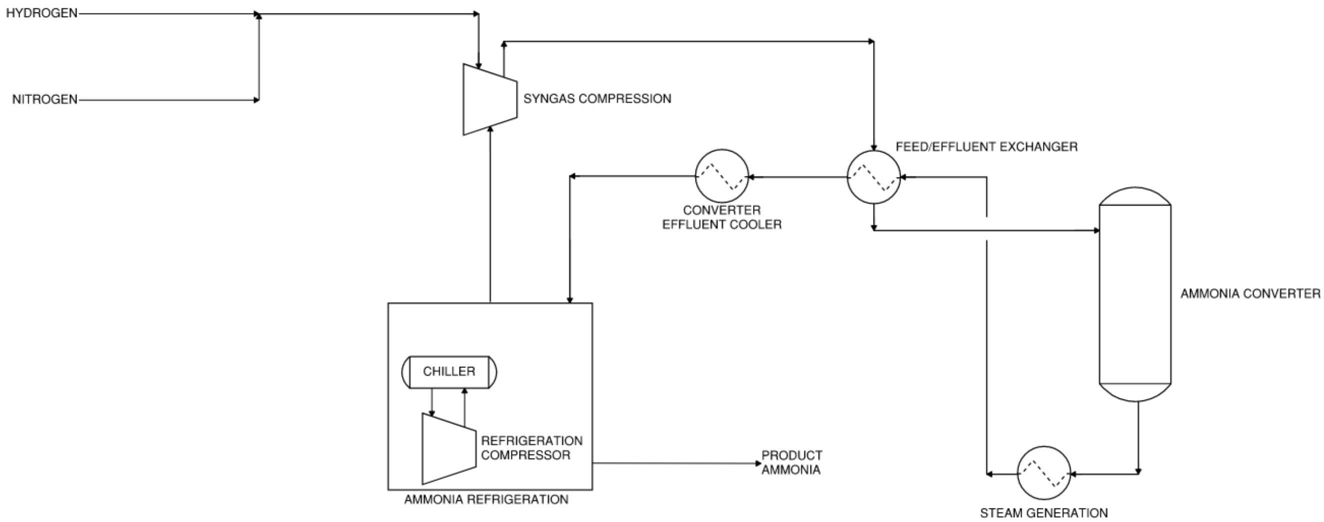

Figure 3.6: Simplified ammonia plant process flow diagram

Nitrogen Production (Air Separation Unit)

Nitrogen is produced in the ASU by purifying atmospheric air via standard cryogenic distillation technology which facilitates the separation of air molecules using very low temperatures.

The ASU separates the air into pure nitrogen and “waste gases”. The pure nitrogen is compressed and sent to be used in the downstream process, whereas, the waste gases (comprised primarily of nitrogen that was not separated, oxygen, and argon (Ar) are used to regenerate the ASU before eventually being vented to the atmosphere.

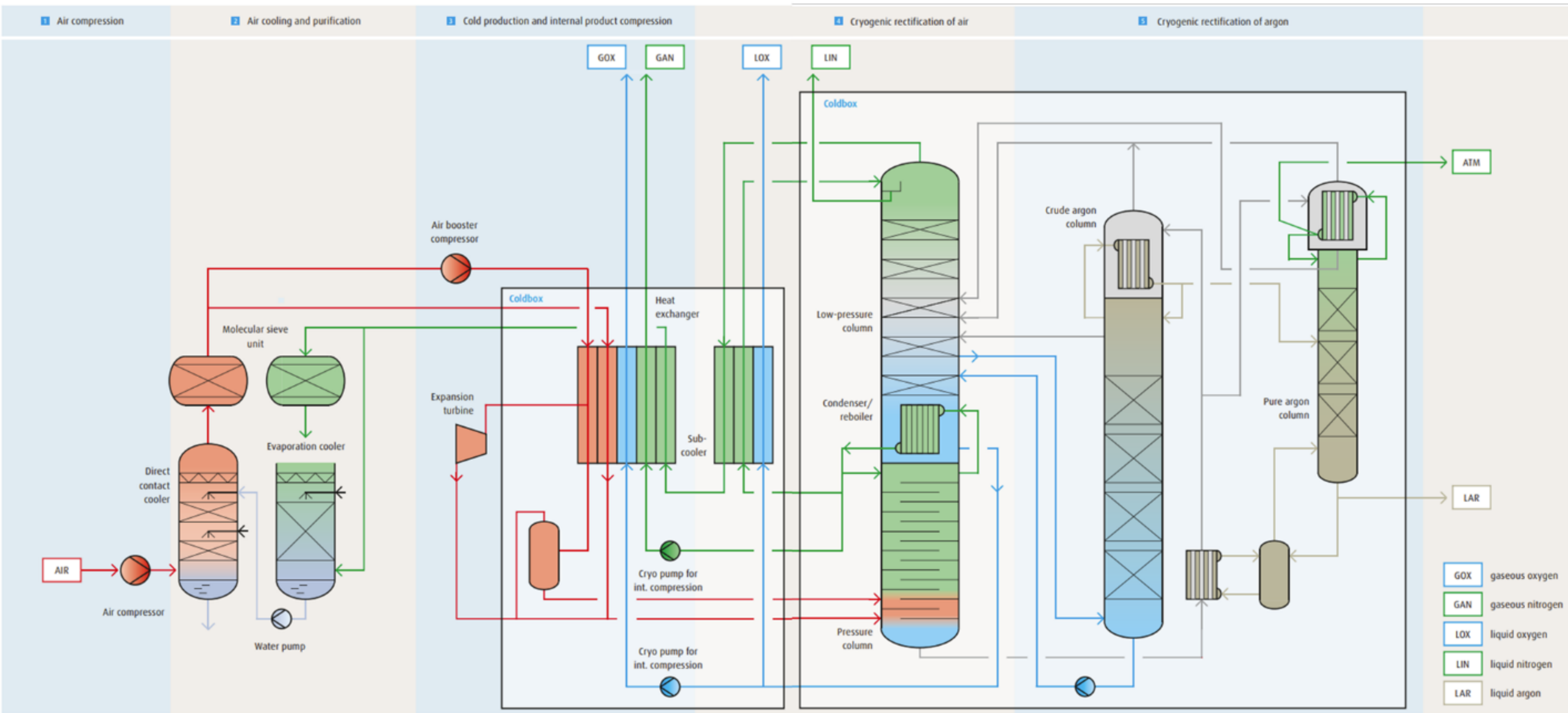

Figure 3.7: Air Separation Unit Overview

Note that the ASU is capable of producing both liquid and gaseous nitrogen states. The gaseous nitrogen will be used as a component of the Haber-Bosch process and the liquid nitrogen will be stored and used as a backup nitrogen supply during heavy ramp rate transient periods.

Table 3.8: Nitrogen Demands

Demand/Consumer	Nominal Flow Rate (Metric TPD)	Design Flow Rate (Metric TPD)
Hydrogen plant (utility)	5	50
Ammonia plant (process)	2,780	4,320
Ammonia plant (utility)	5	50
Total	**2,790**	**4,420**

[1]Design flow rate shown for ammonia plant considers 100% power availability to the plant. Nominal flow rate refers to the forecasted average based on renewable power capacity factors.

Ammonia Synthesis

The ammonia plant will accept the purified hydrogen from the hydrogen plant and the purified nitrogen from the ASU. To ensure proper operational conditions, the purified hydrogen and nitrogen must be delivered at 30 bar and approximately 25-30°C.

The nitrogen and hydrogen are inputs to the ammonia plant synthesis loop ("synloop"), where the nitrogen and hydrogen are first compressed, then heated, and fed into the converter. The hydrogen and nitrogen are partially converted to ammonia via the exothermic Haber-Bosch reaction at high temperature (236°C – 453°C) and pressure (135-140 bar(g)):

$$3H_2 + N_2 = 2NH_3 + heat$$

The Haber-Bosch process is equilibrium limited in that not all hydrogen and nitrogen fed into the reactor will react to produce ammonia; as such, the discharge stream from the converter contains ammonia, and unreacted hydrogen and nitrogen. The hot discharge enters steam producing boilers, and then through a refrigeration system, where the unreacted hydrogen and nitrogen are recycled and sent back to the compression system. The steam produced by the boilers downstream of the converter, will be recovered and used to produce electricity via a small steam turbine generator. The steam turbine outlet will discharge to a condenser cooled with cooling water (supplied by Mortier Bay, per Section 3.2.1). The condensate discharge from the condenser will be routed to a condensate polisher prior to pumping back into the steam generation system.

Ammonia Refrigeration

A three-stage ammonia refrigeration system is provided for condensation of the gaseous ammonia produced in the converter.

The effluent from the converter system is chilled and condensed in a unitized chiller by using two levels of ammonia refrigerant. Ammonia liquid from the first level of the unitized chiller is cooled to -33°C in an ammonia atmospheric flash drum and is then pumped to the ammonia storage tank.

In this closed-loop system, the flashed vapour created as a result of the flash drum process is sent to the ammonia refrigerant compressor, to be converted to a liquid, and held in a receiver. Liquid ammonia from the bottom of the receiver is routed to the second level of the unitized chiller to be used as refrigerant.

Ammonia Boil-Off Management and Venting

Ammonia at atmospheric pressure has a saturation temperature of -33.5°C. At 25°C, the saturation pressure of ammonia is 10 bar. Since the ammonia temperature must be held below -33°C to remain in liquid form at atmospheric pressure, the ammonia storage tanks must be insulated and fitted with an actively refrigerated boil-off management system. Although the storage tanks are insulated, a small amount of warming occurs, causing some liquid ammonia to evaporate while the balance of the liquid remains at -33°C. During normal operations, any ammonia vapour boiled-off (evaporated) within the tank is routed back to the ammonia refrigerant compressor system. During overpressure scenarios, or if the compressor system is down, during power outage, or downtime the ammonia vapor handling system will process boil-off to a process flare stack to combust (burn) off-gassed ammonia with oxygen, which will produce nitrogen and water (see Section 3.2.1 for more details).

Ammonia Storage

The developed liquid ammonia product will be stored in refrigerated ammonia storage tanks at near-atmospheric pressure. Generally, the tanks will be double-walled, with a dome roof and operate at a positive pressure. Relief valves will protect the ammonia tanks from overpressure or vacuum conditions. Double-walled tanks are a widely accepted method of ammonia storage and provide minimum risk of leakage.

Adjacent to the ammonia storage tanks, liquid ammonia forwarding pumps will be included to transport the liquid ammonia through the ammonia pipeline to the loading arms, where ammonia will be loaded out to the shipping vessel(s).

While stored in the tanks, ammonia vapours may be generated due to:

- Heat introduced in the refrigerated tanks and/or cold ammonia piping via normal heat transfer under atmospheric conditions
- Vapour displacement in tanks
- Flash during the transfer of ammonia from tank to piping

During normal operations, any ammonia vapour generated will be directed to the ammonia refrigeration system to be re-compressed and re-condensed. The condensed ammonia will be returned to the ammonia storage tanks.

During shut-downs (planned and unplanned), any ammonia vapour generated will be directed to the ammonia storage flare stack (discussed in Section 3.2.1). The ammonia storage flare stack will provide a safe method of incinerating ammonia vapours when redirection to the ammonia refrigeration system is not available.

Based on the current design basis and wind/solar resource estimates, the energy from LBP Wind Farm and Solar Farm I are expected to annually produce 180 ktpa of green hydrogen for conversion to 1,000 ktpa of ammonia. The ammonia will be maintained in a storage facility for regularly scheduled transport by specialized carriers to the Point Tupper Transshipment Terminal where it will be aggregated with ammonia volumes from the Nova Scotia project, for more cost effective and efficient transportation to export markets.

3.2.4.4 Air Systems (Facility-wide)

Throughout the Industrial Facility, compressed air systems are required primarily for the purposes of valve actuation, or general utility use (e.g., for maintenance). The instrument air system will provide high quality dry air (-40°C pressure dew point) at 7.0 bar(g) for the various industrial uses, as required. In addition, compressed air will provide saturated air at 7.0 bar(g) for utility/maintenance purposes only.

The air compressors included on the ASU shall simultaneously supply and satisfy both the air required for nitrogen production, and the instrument and plant air demands for the entire process plant, including water treatment.

Plant and instrument air demands will be provided in the EIS.

3.2.4.5 Thermal Management (Facility-wide)

To cool the equipment within the Industrial Facility, an evaporative seawater cooling tower will be implemented.

The hydrogen plant requires a steady supply of cooling water for the electrolyzers, the hydrogen and oxygen gas coolers, and the high-pressure hydrogen compressors.

The ammonia plant requires cooling water to cool the ammonia converter effluent and condense ammonia vapour, as well as for the cooling of ammonia during storage.

Cooling loads required for the ammonia production process will be provided in the EIS.

3.2.4.6 Water Supply

Freshwater and seawater are required during Project operations as outlined in the following subsections.

Freshwater Requirements

The current Project design requires an estimated 10,000 m^3 of freshwater per day from Linton Lake. The expected water use is consistent with water usage from communities and fish plants in the region. Linton Lake has been historically used for municipal and commercial purposes and has the capacity to support the withdrawal of up to 14,000 m^3; with an estimated storage capacity, at normal water levels, of 1,895,000 m^3. Compared to other industrial facilities in the area, the Project's water use is approximately 50% more than the water use volumes reported for the St Lawrence Fluorspar mine and approximately 55% lower than the nearby Long Harbour processing plant. Water flow and supply lines for both freshwater and seawater used for cooling, will be monitored regularly to ensure uninterrupted supply to the Industrial Facility. Seawater intake/discharge and treatment will be further defined in the design stage, following regulatory consultation and environmental studies.

Raw Freshwater Intake

The Project is expected to require an approximate daily average of 10,000 m^3 per day of raw freshwater, which includes water consumption demands for hydrogen production via electrolysis, , and for potable water. The freshwater supply may also be used to supplement the requirements of fire suppression systems in the event of a prolonged fire response event.

EverWind may use existing infrastructure or construct a new pumphouse at Linton Lake. The installation of a new raw freshwater supply pipeline is proposed from this pumphouse, to the on-site raw freshwater treatment plant (RFWTP); the raw freshwater pipeline is expected to be approximately 3.2 km in length. The pipeline will be sized for peak flow rates and likely constructed of high-density polyethylene (HDPE) piping, consistent with current municipal water supply design standards.

Raw Freshwater Treatment

Water is a primary feedstock for the plant as it is used in the production of hydrogen through electrolysis, for steam in the production of ammonia via heat rejection from the ammonia reaction, and as utility water throughout the plant.

The water treatment system will receive raw water from Linton Lake via the raw water pipeline described in Section 3.2.1. Water will be treated to various levels of purification dependent on its use within the process. The water treatment equipment will be in the Water Treatment Building except for a few large water storage tanks and chemical storage tanks.

Raw water is treated on site via Greensand filtration to reduce the concentration of iron, manganese, suspended solids, turbidity, and total organic carbon. These specific contaminants are targeted in the raw water treatment to protect downstream demineralization equipment.

Chemical injection pumps, such as sodium hypochlorite feed pumps and sodium permanganate feed pumps will supply the respective chemicals to the raw water upstream of the greensand filters to ensure oxidation and precipitation of the iron and manganese on the greensand. The filtration system provides a n + 1 redundancy, and the filters will be located in the water treatment building. The filtered water will be stored in a filtered water tank and supplied to the utility water system, potable water system, and the demineralized water system. The filtered water will also provide backwash to the greensand filters.

Demineralized Water Treatment

Filtered water will be demineralized using ion exchange technology. The water will be treated to achieve the required total organic carbon, conductivity, dissolved solids, silica, sodium, chloride, iron, and copper concentrations for hydrogen electrolysis and steam production. Filtered water will be supplied to the Mixed Bed Demineralizers via the Mixed Bed Feed Pumps to produce demineralized water. Demineralized water will be stored in a Demineralized Water Tank before it is sent to the electrolyzers and ammonia synthesis area.

The mixed beds will be regenerated onsite with sulfuric acid and caustic soda providing the respective chemicals to the beds is correct dosages via the dosage feed pumps. The regeneration waste will be collected in a sump and pumped using the neutralization sump pump to the wastewater neutralization tank. The water will circulate using the wastewater neutralization recirculation pump until water is pH is neutral, and then it is pumped into the common wastewater sump. The demineralized water treatment system, excluding the sulfuric acid storage tank, will be located within the water treatment building.

Seawater Requirements

Seawater will be used to provide process cooling to the various units within the Industrial Facility, primarily for the electrolysis and ammonia units. Seawater will be pumped from Mortier Bay to the plant site, where it will be used in a heat exchanger to remove the process waste heat. The warmed seawater will be channeled through the facility storm water retention pond system for cooling prior to controlled discharge into Mortier Bay with temperature rise in the water less than the maximum allowable limits. Seawater was selected as the cooling medium to minimize the amount of freshwater consumption.

Wastewater Treatment

Effluent streams from the various Industrial Facility components will be collected and treated (as necessary) to achieve regulatory discharge standards. The potential effluent sources are:

- Demineralized/potable water system waste
- Hydrogen Plant Blowdown
- Ammonia Plant Blowdown
- Service Water Drains
- Sanitary Wastewater

Wastewater Treatment Plant

Any process effluents requiring treatment will be conveyed to an on-site sanitary wastewater treatment plant (SWWTP) which is expected to consist primarily of neutralization, clarification, and filtration processes. The anticipated sources of wastewater which will be treated in the SWWTP include the following:

- **Demineralized/potable water system wastewater:** Wastewater generated from the demineralized/potable water treatment system will consist of greensand filtration backwash and dilute acid/caustic from deionization backwash.

- **Hydrogen plant blowdown:** Process effluents from the hydrogen plant include water that will be discharged intermittently. This wastewater will be collected in a dedicated drainage system and sent to the SWWTP for processing.
- **Ammonia plant blowdown:** The ammonia plant will discharge a boiler feedwater blowdown from the medium pressure steam blowdown drum, which will be recovered to the cooling tower system (if feasible). The provision to treat this blowdown in the SWWTP is included in the event that the blowdown cannot be sent to the cooling towers.
- **Service water drains:** Drainage from the process areas will be conveyed to the SWWTP, which is expected to consist primarily of intermittent washdown water and seal water (water used to cool and lubricate seals) from pump and compressors.

The above wastewater sources will be conveyed to the SWWTP, where the streams will be combined in a neutralization tank. Acid and caustic feed systems will supply the necessary reagents to the neutralization tank. The ability to add additional chemicals, such as coagulants and metal precipitants, will be available if required to meet effluent discharge standards.

The overflow from the neutralization tank will flow to an inclined plate (Lamella) clarifier, where suspended solids will settle by gravity. To improve sedimentation, a polymeric flocculant will be added to an integral mix tank on the clarifier inlet. The clarifier overflow will be collected in a tank where additional pH adjustment will be accomplished if necessary. The treated water will then be pumped through multimedia filters (MMF) to remove fine particulates prior to discharge to the on-site stormwater pond (discussed further in Section 5.9.3).

Solids removed in the clarifier will accumulate as sludge and be pumped to a sludge thickening tank along with MMF backwash waste. The settled and concentrated sludge in the thickener will be pumped into a plate-and-frame filter press to be dewatered. The filter press sludge cake will be collected in a designated container for off-site disposal at an approved facility, while the clarified effluent will discharge to the on-site stormwater pond (see Section 5.9.3).

Sanitary Wastewater Treatment

After aeration, the mixture of microorganisms and water (mixed liquor) flows to a clarifier where the solid organic contaminates, and microorganisms settle. A portion of the sludge is returned to the aeration tank, and excess waste sludge is sent to an aerobic digester to reduce the sludge volume. The waste sludge is anticipated to be periodically hauled for disposal at an approved sewage facility. The clarified effluent will flow through a disinfection tank where chlorine will be added to disinfect the treated water prior to discharge to the SWWTP (see Section 5.9.1).

Stormwater

Drainage from the Project boundary and/or upgradient areas will be intercepted and diverted away from the Project facilities, infrastructure, and equipment via diversion ditches, berms, and swales. Two categories of drainage management systems will be considered for the Industrial Facility: external and internal drainage.

External Stormwater Drainage

External drainage refers to the drainage from upgradient external areas that naturally drain onto the Industrial Facility property due to the existing topography. To minimize the risk of flooding the new infrastructure and the quantity of water potentially requiring treatment, external drainage will be intercepted and diverted away from the Industrial Facility and back to the natural environment via diversion ditches.

Internal Stormwater Drainage

Internal site drainage will be achieved through surface collection via finished surface grading and open channels (ditches). The Industrial Facility will be graded to drain towards the stormwater collection ditches and will be divided into catchment areas to pass the runoff efficiently. Each catchment area will have a network of drainage ditches and swales to collect runoff and will be diverted or pumped to the on-site stormwater pond. The stormwater pond will also accept treated discharge from the SWWTP and blowdown from the cooling water systems. From here, the collected stormwater drainage, SWWTP discharge and blowdown from the cooling water systems may be used for fire water, and/or pumped over to the effluent treatment system for further treatment (see Section 3.3.3).

3.2.4.7 Process Inputs & Outputs

The process inputs and outputs will be provided in the EIS. These inputs and outputs will be based on FEL1 engineering, to be conducted in 2025.

3.2.4.8 Ammonia Transshipment

Ammonia produced during operations will be shipped from the Project to EverWind's Point Tupper Transshipment Terminal in Nova Scotia. The transshipment methodology is based on using handy-sized ammonia carriers, which typically have an ammonia cargo capacity of 15,000 DWT. For an annual ammonia production of 1,000,000 metric tonnes, approximately 70-75 transshipments will be required per year. This equates to approximately one shipment every five days.

Loading and unloading from terminals to ammonia-carrying vessels is currently handled safely with proper procedures and specialized training. Ammonia is less flammable than other fuels, carries a lower fire risk, and cryogenic burns risks are lower than liquid hydrogen or liquefied natural gas. Ammonia gas is, however, toxic and corrosive, and as such there are existing safety principles and systems used throughout the global ammonia industry, including the maritime transport of ammonia.

Loading of the Ammonia to Ship Carrier

Ammonia will be pumped from the plant to the marine terminal for transshipment. The active transfer will occur within a 20-hour period, but a total of 30-hours of docking time will be anticipated to allow for approximately 10 hours of buffer for pre-cooling, mooring, etc.

It is anticipated that two marine loading arms will satisfy the preliminary liquid design flow rate. The loading arms will be designed specifically for anhydrous ammonia with a design temperature of -37°C (-35 degrees Fahrenheit [°F]), a design pressure of 25 bar(g), and will be designed in accordance with the American Society of Mechanical Engineers (ASME) B31.3 (2022) and applicable Oil Companies International Marine Forum (OCIMF) standards.

Any residual ammonia liquid and/or vapour in the loading arm will be drained of liquid and the lines will be purged with inert gas (i.e., nitrogen) to prevent any ammonia from being released to the environment. The loading arms will be designed with purge and drain connections for this purpose. The source of inert gas may be supplied by the ASU or potentially supplied from an onboard nitrogen generator on the shipping vessel.

3.2.5 Repowering or Decommissioning and Rehabilitation

The Project lifespan is anticipated to be at least 30 years. Given the significant capital investment committed to the Project infrastructure, the fact that the wind, solar and water resources underpinning the Project are renewable, and that demand for non-carbon emitting green fuels is anticipated to accelerate over time, it is highly likely that the Project will be repowered, to extend the Project life for another 30+ years. This is a particularly unique feature of green hydrogen and ammonia projects, compared to traditional oil and gas or mining projects, whereby the life of the project is finite due to the depletion of the underlying resource over time. In the unforeseen event that the Project is not repowered, decommissioning activities would comply with environmental regulations and requirements in place at the time of decommissioning. A decommissioning plan will be approved prior to the construction of the Project. Generally, the decommissioning phase will follow the same steps as the construction phase of the Project and include dismantling and removal of all equipment facilities, and associated infrastructure, followed by site grading and reclamation through revegetation.

The Project's decommissioning and rehabilitation activities typically include:

- Removal and appropriate disposal of equipment, materials, and supplies, including recyclables and non-recyclables
- Demolition and removal of infrastructure
- Removal and appropriate disposal of non-hazardous demolition debris
- Re-contouring
- Overburden and topsoil replacement
- Natural re-vegetation

Personnel and equipment will be demobilized when no longer required for the Project. Equipment will be carefully removed, and offices will be taken down in reverse order of setup and transported off site. Existing materials, equipment, and spare parts at the laydown or storage facilities will be removed from the site. Once the overall scope has been completed, the contractor will fully demobilize from the site. WTGs will be dismantled. Blades, hubs, towers, and gear assemblies will be removed from the site, and recycled wherever possible. The underground electrical cable collectors will be cut off and removed to 1 m depth and the overhead collector poles and conductors will be removed. Access roads will be decommissioned wherever appropriate.

Prior to any decommissioning of electrical infrastructure, key stakeholders including government, Newfoundland and Labrador Hydro and Newfoundland Power will be consulted to determine if electrical infrastructure can be repurposed to support the provincial grid. Decommissioning of electrical infrastructure will include removal of the conductors, dropping poles to ground level and disassembling the framing / hardware for removal from the ROW for reuse, recycling or sent for appropriate disposal. The equipment within the substations and primary substation in (e.g., circuit breaker, disconnect switches, conductors, oil-filled equipment), will be removed and either reused or disposed of via licensed contractors. The substation structures will also be decommissioned and removed.

The components of the hydrogen unit, including electrolyzers, water purification systems, and hydrogen handling systems will be disassembled and removed from site. The components will be recycled or refurbished for continued use. The buildings housing the electrolyzers can be demolished or left in place to facilitate redevelopment of the site by other industries. It is assumed that the pond water level control systems will remain in place, however the pipes and intake structures will be removed. The ammonia unit will be purged and cleared of ammonia and hydrogen. Following purge, the system will be systematically dismantled and removed from site. It is not unusual for ammonia plants to be re-assembled in a new location and returned to service. The ammonia tank and water tanks will be purged, cleaned, disassembled, and removed from site for recycling.

Final grading will be completed once infrastructure has been removed. These areas will have organic materials re-spread and seeded. At the wind farms, surplus excavated material will be spread in the immediate vicinity of the tower foundation to provide positive drainage. The area immediately surrounding the WTG foundation will be re-graded, and soil that was removed will be replaced. Excavated organics will be stored and reapplied during decommissioning and revegetation will be allowed to occur naturally.

3.3 Alternative Methods for Carrying Out the Undertaking.

The “no Project alternative” assumes no development of the Project. If the Project were not to advance it would potentially delay the province meeting its plan for the development of the renewable energy industry in Newfoundland and Labrador, and the global contribution to the 2050 net zero target. Additionally, the Project’s benefits to the provincial and regional economy would not be realized. EverWind is committed to developing a Regional Benefits Agreement and the Project is anticipated to generate thousands of jobs (Table 1.2) and provide a stimulus for the local economy (e.g., restaurants, hotels etc.).

Alternatives were considered for site locations, layouts, production technologies, and water use, as well as the decisions made concerning feasibility and sustainability.

3.3.1 Project Location

As described in Section 3.1.1, EverWind completed a comprehensive review of suitable locations throughout the Province which identified over 20 potential sites. Several of these locations were evaluated in detail to better understand the renewable resources and site constructability specific to the location.

Alternative Project locations were later considered during the NLIET feel "Crown Land Call for Bids for Wind-Hydrogen Development" process. The Burin Peninsula was deemed an excellent location for the Project. The Burin Peninsula has a low population density, strong wind resource, renewable fresh water sources and a natural sheltered ice-free deep-water harbour. The available, unconstrained lands provide ample space for the wind farms and associated infrastructure for economical, green hydrogen and ammonia production.

The location for the Industrial Facility was constrained by requirements for proximity to a sufficient freshwater supply and to a suitable location for the marine transshipment terminal, as well as sufficient distance from residences. The selected site, north of Marystown, on the west side of Route 210, met all the requirements. The site is approximately 2.5 km from the proposed marine terminal at Mortier Bay, approximately 3.5 km from the Linton Lake water supply and >2 km from the nearest residences. The area is large enough to allow for sufficient safety buffer, and still provide for facility expansion associated with MBP and UBP Wind Farms and Solar Farms II and III.

Alternative project locations were considered; including two areas in Western Newfoundland and one in Central Newfoundland. Both alternative locations offered strong renewable resources and existing brownfield marine terminal infrastructure and represented viable areas for Project development. Ultimately the Burin Peninsula was selected for the overall scalability of the Project, but also due to the support and interest expressed by local communities during initial exploratory engagement sessions. EverWind is pleased to see that other developers also identified these regions and are also working on green energy project opportunities with these communities.

3.3.2 Water Withdrawal

Water is required for project processes, cooling, potable water use, and fire suppression activities. Several options were considered for the water supply. Both seawater and freshwater were considered for the Project. Given technoeconomic constraints, seawater is not a currently viable option for process water used to produce green hydrogen. Groundwater and surface water were determined to be the most reliable and realistic sources of freshwater. Other sources of ground and surface water that were considered, such as Clam Pond, had additional constraints including distance to infrastructure, competing uses, and sufficient water availability year-round. Linton Lake was selected as the best option as a fresh water supply for the Project because:

- Linton Lake is entirely outside of both the Clam Pond protected water supply and the Clam Pond watershed and therefore, does not conflict with the Clam Pond protected water supply

- Linton Lake previously provided water to the town and commercial/industrial operations with over 14,000 m^3 per day of proven safe yield capacity
- Linton Lake can easily meet the water usage requirements of 10,000 m^3. Linton Lake's estimated storage capacity of 1,895,000 m^3 is 2.5 times higher than the 750,000 m^3 of water storage required by the NL ECC storage yield analysis tool
- With the added storage capacity provided by the weir structure (2,192,000 m^3), Linton Lake is 2.9 times greater than that required of the Project.

Both fresh water and seawater supplies were evaluated for cooling purposes. Given that fresh water sources are better used for process water needs, seawater was identified as the preferred source of water for cooling purposes. Many suitable locations exist along the Burin peninsula for seawater withdrawal, however Mortier Bay was selected as the proposed location for seawater withdrawal as it is in close proximity to the plant.

3.3.3 Solar Farm

Solar resources on the Burin Peninsula are not abundant but their availability is complementary to the wind resource. The solar farm would not generate sufficient energy to power the hydrogen and ammonia plants but could provide an excellent source for back-up green energy when energy production from the wind farms is low.

Initially, EverWind contemplated an area immediately north of the Industrial Facility but has since determined that the Project design would benefit from added solar capacity due to the seasonal variability observed in the wind data collected to date. As a result, EverWind is in the process of evaluating a number of suitable locations within the SIA. Site selection for solar farms is generally easier than wind farms, as it is mostly driven by constructability. Generally speaking, prime solar locations often coincide with areas that would otherwise not be ideal for wind farm locations (e.g. lower lying areas that are sheltered from the wind). For further detail regarding the SIA refer to Section 3.2.1.

3.3.4 Wind Farms

EverWind participated in the Crown Land Call for Bids for Wind-Hydrogen Development and , was selected to receive a Wind Application Recommendation Letter granting EverWind the exclusive right to pursue the development within the Project Area by NLIET, which is the land area where the LBP, MBP, and UBP Wind Farms are proposed. EverWind is in the process of evaluating suitable lands within this area based on its environmental / socioeconomic constraints analysis and wind resource campaign and as a result specific WTG locations have not yet been identified. Additional information will be provided in the EIS.

3.3.5 Wind Turbine Generators

The selection of the WTG is based on several factors including the WTG's power rating, height of tower, energy output, rotor diameter, cut-in wind speed, and rated wind speed. Final WTG capacity, physical size, and class type will depend on detailed design, considering WTG manufacturer capacity, energy production, purchase price, long-term service agreements and costs, etc. EverWind is conducting a large wind resource measurement campaign to collect the wind data necessary to make an informed WTG technology selection (Section 3.2.1)

A number of WTG models are still being considered and the preferred model (or a conservative model) will be included within the EIS. Within this EARD, the maximum specifications noted in Section3.2.1 are being conservatively considered as the example WTG.

3.3.6 Hydrogen Process Technology

Various types of hydrogen production technologies exist, the most common of which are as follows (United States Department of Energy, n.d.):

- Natural Gas Reforming/Gasification
- Electrolysis
- Renewable Liquid Reforming
- Fermentation

3.3.6.1 Natural Gas Reforming/Gasification

Hydrogen can be produced through thermal processes such as steam methane reformation and partial oxidation of natural gases (such as methane). The steam methane reformation process typically employs two approaches: gas reformation and gasification. During gas reformation, methane reacts with steam under pressure in the presence of a catalyst producing a mixture of hydrogen, carbon monoxide, and carbon dioxide. Once produced, carbon monoxide and steam are further reacted to produce carbon dioxide and additional hydrogen. This process is one of the most common methods for producing hydrogen (United States Department of Energy n.d.).

Synthesis gas(es) can also be created by reacting coal or biomass products with high-temperature steam and oxygen using a pressurizer gasifier (partial oxidation). The resulting synthesis gas contains hydrogen, as well as carbon monoxide, which is further reacted with steam to separate the hydrogen and increase production. This method is common but produces less hydrogen per unit of the input fuel than is obtained by using the steam reformation process (on the same fuel) (Energy Efficiency and Renewable Energy n.d.-a).

3.3.6.2 Electrolysis

Electrolysis produces hydrogen from renewable or nuclear resources by using electricity to split water into its hydrogen and oxygen components through an electrolyzer. If renewable sources produce the electricity used to facilitate the reaction, the resulting hydrogen is also considered renewable, and the emissions produced during the process are limited. Various technologies exist, including polymer electrolyte membrane or proton membrane exchange electrolyzers, alkaline electrolyzers, and solid oxide electrolyzers (Energy Efficiency and Renewable Energy, n.d.- b).

3.3.6.3 Renewable Liquid Reforming

Similar to the process of natural gas reformation, renewable liquid fuels (i.e., ethanol, bio-oils) are reacted with high-temperature steam to produce hydrogen near the point of end-use and are therefore referred to as a mid-term technology pathways (Efficiency and Renewable Energy, n.d.-., c).

3.3.6.4 Fermentation

Through the process of biomass conversion, microorganisms consume and digest biomass by converting it into a sugar-rich feedstock that can be fermented to produce hydrogen; this is still a relatively new technology and is presently under development and not widely utilized (Efficiency and Renewable Energy, n.d.-d).

In designing the Project, the various hydrogen production technologies available were considered however hydrogen electrolysis technology was the selected production method. This technology was favoured by the Project as a result of the Proponent's commitment to reducing emissions and eliminating the need for hydrocarbons; as well as the abundant water, wind, and solar resources available in the Project Area.

With electrolysis, there are several competing technologies, including Alkaline Water Electrolysis (AWE), PEM, and Solid Oxide Electrolyzer Cells (SOEC). While each technology has individual merits, EverWind's case example for the EARD is PEM. This is due to:

- Higher performance characteristics compared to AWE: ability to react (dynamic response/ramp rate) to fluctuating supply power levels faster, and ability to operate at lower rates (higher turndown)
- Pressurized output (typically 30 bar(g) is more common with PEM and reduces the need to compress prior to Deoxo and drying (newest PEM offerings do not require Deoxo)
- Lifetime / degradation rates and efficiencies similar to AWE
- Lower footprint requiring less plot space, critical for a project of this magnitude
- No need to store potentially harmful electrolyte at scale on site
- Higher current densities allow for further reduced plot space and less infrastructure to achieve the same hydrogen production
- Significant development in PEM technology will lead to increased efficiencies and reduced costs

SOEC was not seen as a viable alternative due to the low Technical Readiness Level (TRL) of the technology, however SOEC is seen as a long-term potential solution due to the increased efficiency.

EverWind is currently in active discussions with multiple electrolyzer vendors.

3.3.7 Ammonia Production Technology

The Haber-Bosch process is the most widely used process technology for the synthesis of ammonia and no alternatives have been assessed for this Project. The Haber-Bosch process has been used in industrial plants for well over 100 years and is a very well understood, safe, and reliable process.

EverWind is currently evaluating a number of different ammonia conversion technology providers who would all use the Haber-Bosch process. The evaluation is based on a number of different factors including cost, efficiency, design, technological readiness and bankability.

4.0 EXISTING ENVIRONMENT

The following section describes the existing environment prior to the implementation of the proposed Project (i.e., baseline conditions). Specific environmental components, referred to as a VC, were selected for evaluation (Table 4.1). VCs are specific components of the atmospheric, geophysical, biophysical, and socioeconomic environments.

Table 4.1: Valued Components Selected for Evaluation

Group	Valued Component
Atmospheric	Weather and Climate
	Air Quality
	Climate Change
Geophysical	Surficial Geology
	Bedrock Geology
	General Hydrological Condition
Aquatic Environment	Fish and Fish Habitat
	Aquatic Resource Use
Terrestrial Environment	Terrestrial Habitat
	Terrestrial Flora
	Avifauna
	Bats
	Terrestrial Fauna
Socioeconomic	Land & Resource Use
	Heritage & Cultural Resources
	Communities
	Economy Employment and Business

Baseline conditions of each VC were determined from a desktop review. Additionally, field surveys were completed to describe some components of the biophysical environment. This chapter describes the methods and sources reviewed to provide a comprehensive description of baseline conditions per VC and the associated description of each VC.

4.1 Atmospheric Environment

An assessment of weather and climate, and air quality was completed for the Burin Peninsula. Information was obtained from the following sources:

- Environment and Climate Change Canada (ECCC) Weather and Climate (ECCC 2024a)
- NLECC Climate Data (NLECC 2024a)
- NLECC Air Quality Data (NLECC 2024b)
- EverWind MET Tower Data
- EverWind Vortex Data

4.1.1 Weather and Climate

The Burin Peninsula is described as having some of the wettest climates in Newfoundland, with cool summers, mild winters, and frequent fog (ECCC 2024; NLECC 2024a).

Local temperature and precipitation data were obtained from the St Lawrence (Climate Identification (ID): 8403619) and Winterland Branch Hill (Climate ID: 8404241 and 8404242; NLECC 2024a) meteorological stations (Drawing 4.1, Appendix A) which are located in the southern region of the Project Area and are the only stations on the Burin Peninsula with at least 10 years of relatively complete and recent climate data (Table 4.2 and Table 4.3; NLECC 2024a).

From 2014 to 2023, the mean annual temperature at the St. Lawrence weather station was 5.7°C, with a mean daily maximum of 18.9°C and a mean minimum of -8.8°C. January and February were the coldest months, while July and August were the warmest. Most precipitation occurred in November and December, with an accumulation of 161.3 millimetre (mm) and 156.7 mm, respectively (Table 3.1; NLECC 2024a).

Table 4.2: Climate Data from the St. Lawrence Meteorological Station (2014 - 2023). Data reproduced from NLECC (2024a).

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Year
Avg Temp (°C)	-2.5	-3.7	-2.2	2.4	6.2	10.6	14.9	16.8	13.4	8.9	4.2	-0.2	5.7
Max Temp (°C)	11.4	9.8	14.8	16.1	20.3	24.1	27.0	28.5	24.8	21.3	16.6	12.2	18.9
Min Temp (°C)	-17.8	-18.9	-17.4	-13.5	-4.7	-10.7	3.1	3.2	-1.7	-2.7	-10.6	-13.3	-8.8
Precipitation (mm)	142.6	133.5	136.8	120.1	111.2	105.7	109.1	131.7	98.3	111.0	161.3	156.7	1517.9

From 2014 to 2023, the mean annual temperature at the Winterland weather station was 6.3°C, with a mean daily maximum of 19.8°C and a mean minimum of -7.6°C. January and February were the coldest months, while July and August were the warmest. Most precipitation occurred in November and December, amounting to 134.1 mm and 131.3 mm, respectively (Table 4.3).

Table 4.3: Climate Data from the Winterland Meteorological Station (2014 - 2023). Data reproduced from NLECC (2024a).

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Year
Avg Temp (°C)	-1.9	-3.9	-1.9	3.1	6.9	11.9	16.4	17.5	13.6	9.0	4.6	0.3	6.3
Max Temp (°C)	12.5	9.7	13.4	15.3	23.8	25.8	28.7	28.5	25.7	20.6	18.5	15.0	19.8
Min Temp (°C)	-19.6	-19.8	-18.9	-10.0	-3.0	-0.6	3.7	2.3	-1.1	-3.0	-8.5	-13.1	-7.6
Precipitation (mm)	101.8	77.0	100.6	96.4	72.4	65.0	76.5	82.9	85.2	54.8	134.1	131.3	1078.0

Wind speed and direction data were also obtained from the St. Lawrence and Winterland Meteorological Stations (Table 4.4and Table 4.5).

Between 2014 and 2023, the maximum average hourly wind speeds at the St. Lawrence station ranged from 78 km/h in July to 148 kilometre per hour (km/h) in March. Wind direction at the meteorological station was predominantly recorded as originating from the west, though wind directions occur in all directions (Figure 4.1; NLECC 2024a).

Table 4.4: Wind Data from the St. Lawrence Meteorological Station (2014 - 2023). Data reproduced from NLECC (2024a).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Hourly Speed (km/h)	126	117	148	122	101	95	78	78	96	109	117	117
Maximum Hourly Speed (m/s)	35.0	32.5	41.1	33.9	28.1	26.4	21.7	21.7	26.7	30.3	32.5	32.5
Most Frequent Direction	W	W	W	W	W	W	W	W	W	W	W	W

The maximum average hourly wind speeds at the Winterland station recorded from 2014 to 2023 ranged from 74 km/h in July to 119 km/h in April. The wind direction most observed at the meteorological station was from the west, though wind directions occur in all directions (Figure 4.1).

Table 4.5: Wind Data from the Winterland Meteorological Station (2014 - 2023). Data acquired from NLECC (2024a).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Hourly Speed (km/h)	106	117	112	119	98	95	74	78	96	93	107	113
Maximum Hourly Speed (m/s)	29.4	32.5	31.1	33.1	27.2	26.4	20.6	21.7	26.7	25.8	29.7	31.4
Most Frequent Direction	W	W	W	W	W	W	W	W	W	N	W	W

A wind rose plot (Figure 4.1; NLECC 2024a) is provided for the St. Lawrence and Winterland meteorological stations. The plots demonstrate that between 2014 and 2023, wind directions above 60 km/h occurred most frequently from the west, with October winds being generally lighter and originating from the North.

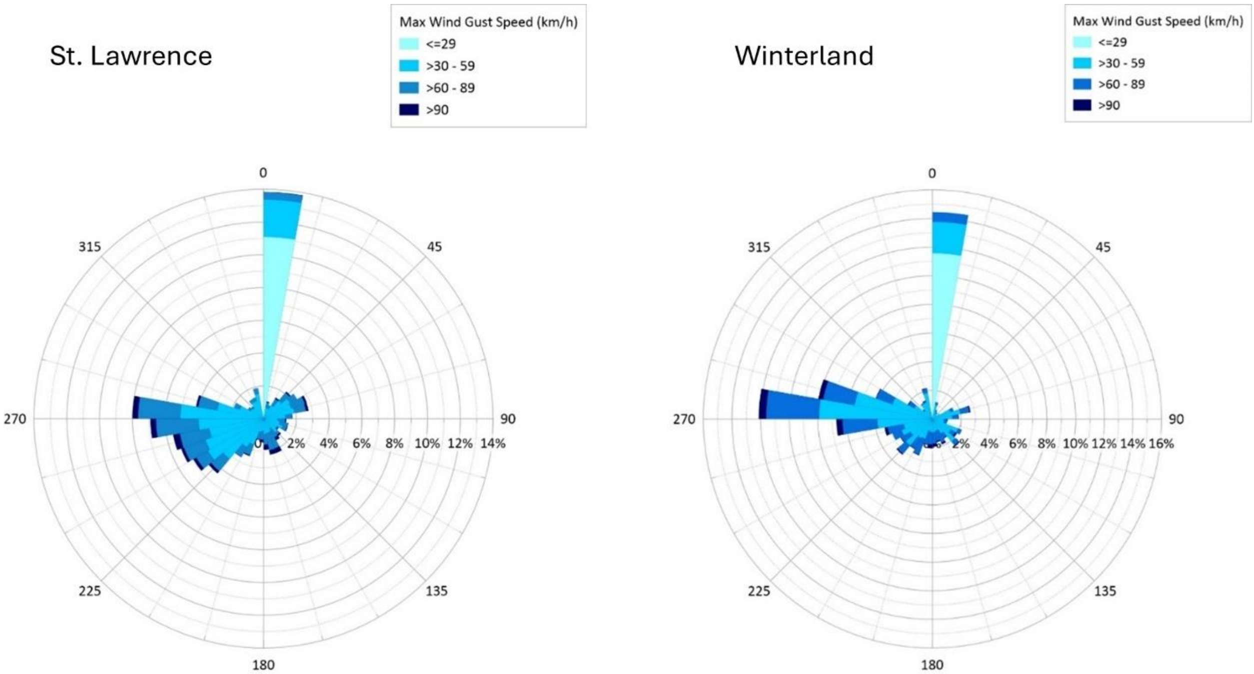

Figure 4.1: Wind rose of St. Lawrence and Winterland meteorological station wind data between 2014 to 2023. (NLECC 2024a).

Refer to Figure 4.2 for Vortex wind speed data across the Burin Peninsula. Areas indicated in yellow identify areas with Vortex wind speed <7.0 m/s and areas in red have wind speeds >10 m/s.

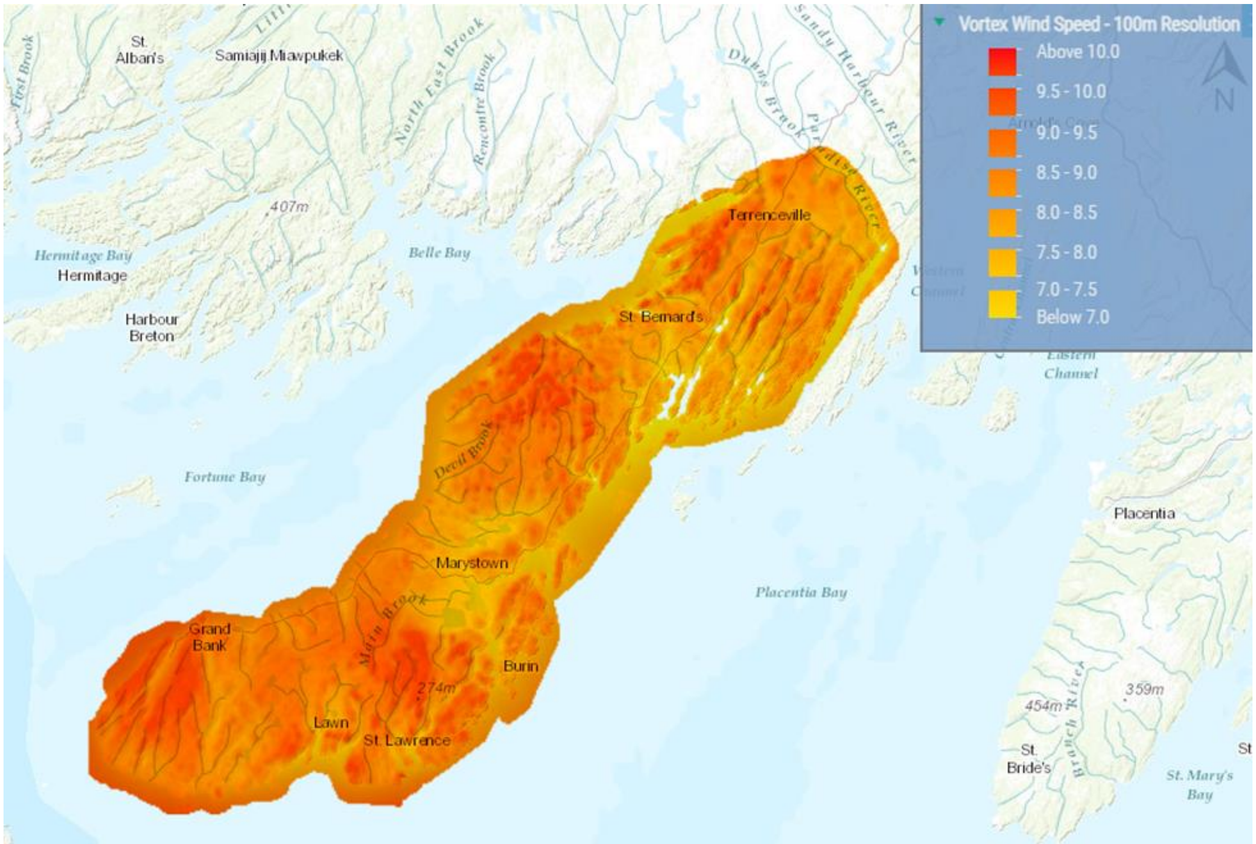

Figure 4.2: Vortex wind speed data at 100 m resolution for the Burin Peninsula

As noted in Section 3.2.1, EverWind currently has four 89 m MET towers installed in the Project Area and is approaching the first full year of data collection on the first of these towers. In addition, EverWind is in the process of installing another two 89 m MET towers, one 60 m MET tower, and three LiDAR systems expected to be completed in the fall of 2024, bringing the total to 10 measurement locations across the southern peninsula.

- St. Lawerence (M949) – 80 m lattice tower – commissioned October 2023
- Grouse (M952) – 89 m lattice tower – commissioned February 2024
- Frenchman's Cove – 89 m lattice tower – commissioned February 2024
- Lamaline – 89 m lattice tower – commissioned February 2024

Table 4.6 provides a summary of mean monthly wind speeds (meters/second) from the anemometer at the top of each tower ~86 m: Figure 4.3 shows an example of a time series for one of the MET towers.

Table 4.6: MET Tower Mean Monthly Wind Speeds (m/s)

Site	ID	2023			2024							
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
St. Lawrence	M949	9.66	9.28	11.17	10.98	11.34	8.49	10.34	7.45	8.59	7.35	8.20
Grouse	M952	-	-	-	-	11.26	9.57	10.41	7.31	8.34	7.15	8.24
Frenchman's Cove	M963	-	-	-	-	11.79	8.76	9.74	6.59	6.61	6.81	6.34
Lamaline	M954	-	-	-	-	12.54	12.10	-	-	9.06	8.22	8.96

4.1.2 Air Quality

The Canadian Council of Ministers of the Environment (CCME) has established Canadian Ambient Air Quality Standards (CAAQS) for fine particulate matter (PM) [<2.5 micrometres (µm) ($PM_{2.5}$)], ozone (O_3), sulphur dioxide (SO_2), and nitrogen dioxide (NO_2) over select averaging periods (CCME n.d.). The Government of Newfoundland and Labrador has legislated Air Pollution Control Regulations (NL APCR), N.L. Reg. 11/2022 under the NL *EPA*. The province has adopted the CAAQS for SO_2 and NO_2 under the NL APCR (2022). The province has not adopted the CAAQS for $PM_{2.5}$ and O_3 as they are not as stringent as the current legislation. The NL APCR is divided into existing and proposed thresholds as provincial standards are proposed to be heightened in 2025 (NLECC 2024c) (Table 4.8).

Table 4.7: Summary of Regulations Pertaining to Ambient Air Quality in Newfoundland and Labrador

Contaminant	Averaging Period	Regulatory Threshold (ppb except for $PM_{2.5}$)	
		Existing Provincial[1]	Proposed Provincial[2]
Carbon Monoxide	1-hour	-	-
	8-hour	-	-
Nitrogen Dioxide	1-hour	60	42
	24-hour	-	-
	Annual	17	12
Ozone	1-hour	82	-
	8-hour	44	-
$PM_{2.5}$	24-hour	25 µg/m³	
	Annual	8.8 µg/m³	
PM_{10}	24-hour	-	-
	Annual	-	-
Sulphur Dioxide	1-hour	70	65
	24-hour	-	-
	Annual	5	4
Total Suspended Particulate	24-hour	-	-
	Annual	-	-

[1] Current Canadian Ambient Air Quality Standards (CAAQS) [Air Pollution Control Regulations, N.L. Reg.11 /2022].
[2] Proposed Ambient Air Quality Standards (subject to change in 2025) (NLECC, 2024c).
Ppb = parts per billion
µg/m3 = microgram per cubic metre

Newfoundland and Labrador monitors air quality at seven ambient air quality monitoring stations throughout the province (NLECC 2024b). The Burin air quality monitoring station (47.098988° N, 55.198521° W; Station ID 010901) is in the town of Burin, adjacent to the LBP Wind Farm. Measured air quality parameters at this location include:

- Nitrogen oxides (NO_x)
- Nitric oxide (NO)
- NO_2
- O_3
- $PM_{2.5}$ and particulate matter ≤10 µm (PM_{10})
- SO_2

Existing air quality conditions indicate the measured contaminants are well below their respective Newfoundland Ambient Air Quality Standards, apart from $PM_{2.5}$, which has exceeded the 24-hour CAAQS in the past five years (Table 4.9).

Table 4.8: Current (baseline) Maximum Ambient Air Quality Conditions at the Burin Air Quality Monitoring Station (January 1, 2019 to December 31, 2023). Data reproduced from NLECC (2024b).

Parameter	Averaging Period	O_3 (ppb)	SO_2 (ppb)	NO_X (ppb)	NO (ppb)	NO_2 (ppb)	$PM_{2.5}$ (µg/m³)
Burin Ambient Monitoring	1 hour	55.5	1.5	55.1	49.2	27.2	58.8
	24 hours[1]	48.5	0.50	36.4	29.7	10.6	**<u>43.2</u>**
	Annual[2]	32.5	0.07	4.8	3.4	1.6	5.9
CAAQS	1 hour	82	70	-	-	60	-
	24 hours[1]	-	-	-	-	-	25
	Annual[2]	-	-	-	-	-	8.8
Fraction of CAAQS	1 hour	67.7%	2.1%	-	-	45.3%	-
	24 hours[1]	-	-	-	-	-	172.7%
	Annual[2]	-	-	-	-	-	-

[1] 24-hour averaging period is calculated using a rolling average of hourly maximums.
[2] Annual averaging period is calculated using the yearly average of hourly maximums.
<u>Bold and underlined</u> data indicates exceedances

4.2 Geophysical Environment

The assessment of the geophysical environment included a review of surficial geology, bedrock geology, and hydrogeology (i.e., groundwater). The assessment was completed through a review of the following resources:

- Aerial imagery and topography
- Newfoundland and Labrador Geoscience Atlas (NLIET 2023)
- Newfoundland and Labrador Water Resources Atlas Portal (NLECC 2024)

4.2.1 <u>Surficial Geology</u>

Surficial geology in the Project Area is largely a mix of glacial till, organic material and bedrock which is either exposed at surface or concealed by vegetation, as presented in Drawings 4.2a, 4.2b, and 4.2c (Appendix A). The UBP and MBP Wind Farms are primarily exposed and concealed bedrock, whereas the LBP Wind Farm is mostly glacial till. Several bog areas (i.e., poorly drained accumulations of peat, peat moss and other organic matter) are present in the UBP and LBP Wind Farms but have less of a presence in the MBP Wind Farms.

Glacial till in the Project Area consists of unsorted to poorly sorted sediment ranging from clay to boulders. Glacial till, deposited by, or from, glacier ice with no significant sorting by water, exists as blankets, gullies and channels, knobs, mounds, and ridges at various thicknesses throughout the Project Area. Glaciofluvial deposits of fine-grained sand to coarse-grained cobbly gravel are present in small areas throughout the Burin Peninsula. Fluvial (i.e., silt and clay to bouldery gravel deposited by fluvial action), colluvial (i.e., coarse-grained bedrock derived materials at the base of steep rock faces transported by gravity) and marine (i.e., clay, silt, sand, gravel and diamicton deposited in marine environments) sediments have a minor presence in the Project Area.

4.2.2 Bedrock Geology

The Burin Peninsula is part of the Avalon Zone which is generally characterized by Late Proterozoic submarine and non-marine volcanic rocks and turbiditic, deltaic and fluviatile sedimentary rocks, overlain unconformably by a Late Proterozoic and Early Paleozoic shallow marine succession (Coleman-Sadd, and Dec., 1990).

The Burin Peninsula is largely submarine to subaerial mafic and felsic volcanic rocks of Late Proterozoic age, with granitoid volcanic intrusions of Late Proterozoic to Cambrian age and fluviatile and shallow marine siliciclastic sediments of Late Proterozoic to Early Ordivician age, as presented in Drawings 4.3a, 4.3b, and 4.3c (Appendix A). The LBP Wind Farm also consists of post-Ordovician granitoid volcanic intrusions, as well as subaerial volcanic and non-marine siliciclastic sedimentary overlap sequences of Devonian to Carboniferous age.

4.2.3 General Hydrogeologic Conditions

The hydrogeology of the Project Area on the Burin Peninsula has been described in a report by AMEC Earth and Environment entitled “The Hydrogeology of Eastern Newfoundland” (AMEC 2013). The report summarizes the results of a desktop study carried out to determine the physical characteristics of the major geological units in relation to the occurrence, availability, and quality of the constituent groundwater.

Provincial water well records for 11,665 drilled wells were used in the regional study to categorize areas into hydro-stratigraphic units. Overall, groundwater yields vary from low (<1 lire per minute (L/min)) to high (>550 L/min). According to reported well data from 1950 to 2005, there are 22 wells in Marystown, with an average depth of 64.70 m and an average yield of 25.95 L/min. The town of Burin has 7 wells with an average depth of 90.99 m and a yield of 10.36 L/min. Grand Bank has 22 wells at an average depth of 64.41 m and 24.83 L/min. The variance in yields shows correlation with the various overburden deposits and bedrock types encountered. Most of the wells within the Project Area (>95%) are drilled into bedrock at an average depth of approximately 65 m and generally provide potential to meet any domestic groundwater needs. The highest well yields within the Project Area are associated with overburden deposits of outwash sands and gravels.

Most of the Burin Peninsula (≈70% of the Project Area) consists of hydro-stratigraphic units 3 and 4. Unit 3 is composed of low to moderate yield (median yield of 9 L/min) volcanic rock consisting of basic pillow lava, flows, breccia and tuff with minor sedimentary rocks. Unit 4 is composed of moderate yield (median yield of 14 L/min) plutonic rocks consisting of granite, granodiorite and gabbro.

4.2.4 Groundwater Flow System

A topography driven flow system is one in which groundwater flows from higher-elevation recharge areas, where hydraulic head is higher, to lower-elevation discharge areas, where hydraulic head is lower such as wetlands, ponds, rivers and lake. Based on a review of topographic maps for the area the direction of regional groundwater flow within the Project Area is assumed to follow topography, which is generally from topographic highs along the interior portion of the Burin Peninsula toward coastal areas (i.e., both to the east and the west from the interior). It is expected that the shallow groundwater system in the area will be largely controlled by surface runoff and local recharge. Lakes and ponds serve as both local and regional discharge points. The implication of the close surface water/groundwater connection is that groundwater levels are very sensitive to dry periods, unless substantial storage is available. Based on multiple streams and standing water present in the area, groundwater levels are generally assumed to be within approximately 2 m of ground surface and to be a subdued reflection of the topography.

4.2.5 Groundwater Quality

A review of groundwater quality records of source waters within communities located in the region indicate that the chemical composition of the groundwater reflects the geochemistry of the adjacent bedrock or unconsolidated sediments. These source waters are from municipal wells that are collected as part of a public water supply testing program. The chemical quality of the groundwater from wells is generally quite acceptable, and in most cases falls within the criteria /established for drinking water purposes. A summary of groundwater quality data for Eastern Newfoundland is provided in Table 4.10 below (NLECC 2024).

Table 4.9: Summary of groundwater quality data for Eastern Newfoundland

Parameter	Units	Number of Samples	Minimum	Maximum	Average	Median	GCDWQ[1]
Alkalinity	mg/L CaCO3	1,205	0	220	84.7	88	na
Color	TCU	1,206	0	119	3.34	1	15 (A)
Conductivity	µS/cm	1,205	43	1580	284.71	270	na
Hardness	mg/L CaCO3	1,205	0	282	75.47	75	na
pH	N/A	1,205	5.47	9.71	7.66	7.78	7.0-10.5 (A)
Total Dissolved Solids (TDS)	mg/L	1,206	0	1030	181.21	171	500 (A)
Turbidity	NTU	1,206	0	205	0.74	0.2	1 (C)
Boron	mg/L	1,209	0	0.2	0.02	0.02	5 (C)
Bromide	mg/L	1,206	0	1.03	0.02	0	na
Calcium	mg/L	1,209	0	103	23.61	23	na
Chloride	mg/L	1,206	3	405	31.51	22	250 (A)
Fluoride	mg/L	1,205	0	1.25	0.15	0.12	1.50 (C)
Potassium	mg/L	1,209	0	4	0.68	1	na
Sodium	mg/L	1,209	2	195	28.21	20	200 (A)
Sulphate	mg/L	1,206	0	116	11.87	10	500 (A)
Ammonia	mg/L	1,206	0	0.58	0.02	0	na
Dissolved Organic Carbon	mg/L	1,206	0	11.3	1.18	0.7	na
Nitrate +Nitrite	mg/L	1,206	0	3.37	0.29	0.06	10 (C)
Kjeldahl Nitrogen	mg/L	1,206	0	3.39	0.075	0.025	na
Total Phosphorus	mg/L	1,206	0	1.31	0.026	0.01	na
Aluminium	mg/L	1,209	0	0.86	0.03	0	2.9 (C)
Antimony	mg/L	1,123	0	0.004	0.0002	0	0.0060 (C)
Arsenic	mg/L	1,225	0	0.044	0.003	0.001	0.01 (C)
Barium	mg/L	1,210	0	1.66	0.05	0.02	2.0 (C)
Cadmium	mg/L	1,210	0	0.006	0	0	0.0070 (C)
Chromium	mg/L	1,209	0	0.1	0.001	0	0.05 (C)
Copper	mg/L	1,209	0	0.122	0.004	0.001	2.0 (C)
Iron	mg/L	1,209	0	6.35	0.08	0	0.30 (A)
Lead	mg/L	1,229	0	0.128	0.001	0	0.0050 (C)
Magnesium	mg/L	1,209	0	19	4.06	3	na
Manganese	mg/L	1,209	0	35.4	0.099	0.005	0.12 (C)
Mercury	mg/L	1,209	0	0.0021	0.00002	0	0.0010 (C)
Nickel	mg/L	1,209	0	0.006	0.0008	0	na
Selenium	mg/L	1,210	0	0.023	0.0004	0	0.05 (C)
Uranium	mg/L	1,122	0	0.02	0.0009	0	0.02 (C)
Zinc	mg/L	1,209	0	5.53	0.009	0	5 (A)

Notes:

1 = Guidelines for Canadian Drinking Water Quality Summary Table (Health Canada, 2024)
na = No applicable criteria
mg/L = milligram per litre

(A) – Aesthetic

(C) – Contaminant

4.3 Aquatic Environment

4.3.1 Legislation

Fish and fish habitat are protected under the federal Fisheries Act (1985), which is overseen by DFO. 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) prohibits any work, undertaking, or activity that results in the Harmful Alteration, Disruption or Destruction of fish or fish habitat. The Fisheries Act provides protection to fish and fish habitat through means such as permitting, licensing, regulations, habitat restoration, marine refuge, and fish stocks.

Species at Risk (SAR) are listed under the federal Species at Risk Act (*SARA*) and provincially under the Newfoundland and Labrador Endangered Species Act (NL *ESA*). Throughout this EARD, SAR are defined as:

- Species listed under *SARA* as "Endangered", "Threatened", or "Special Concern" (SARA 2002).
- Species listed under NL *ESA* as "Endangered", "Threatened" or "Vulnerable" (NL ESA 2004).

Species of conservation concern (SOCC) are not listed as SAR but listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as either "Endangered", "Threatened", or "Special Concern" (Government of Canada 2022), or are species that have a subnational (provincial) rank (S-Rank) of "S1", "S2", or "S3" (Atlantic Canada Conservation Data Centre (ACCDC) 2023; Table 4.11).

Table 4.10: Provincial S-Rank Definitions

S-Rank	Status	Definition
S1	Critically Imperiled	Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or steep or long-term population decline rendering the species especially vulnerable to extirpation.
S2	Imperiled	Imperiled in the province because of rarity due to very restricted range, few populations (often 20 or fewer), steep declines, or other factors making the species vulnerable to extirpation.
S3	Vulnerable	Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making the species vulnerable to extirpation.

* The letter 'B' after an S-rank indicates the status refers to the breeding population of the species.

Other provincial legislations protecting fish and fish habitat include the Newfoundland and Labrador Wild Life Regulations under the *Wild Life Act* (NL *WLA* 1996) and the NL *WRA* (The NL *WRA* (2002), overseen by NLECC within the Water Resource Management Division, regulates any activities that may alter a body of water, including installing infrastructure, altering water flow, and water and sewage discharge. The potential for alterations and activities to impact fish and fish habitat is considered through the Permit for Alterations to a Water Body application process, as appropriate.

4.3.2 Fish and Fish Habitat

A desktop study was conducted to characterize fish habitat and to identify potential fish species known to reside in the Project Area or frequent it at some point during their life history. The desktop review included the following resources and databases:

- Aquatic Species at Risk Map (DFO 2024b)
- CanVec Database – Hydrographic Features (Natural Resources Canada (NRCan) 2023)
- Newfoundland and Labrador Land Use Atlas (Government of NL 2023b)
- NLFFA GeoHub Aquaculture Licenses dataset (NLFFA 2023)
- ACCDC Data Report (ACCDC 2023b)
- Scientific literature and government documents (cited in text below)

4.3.3 Fish Community

There is no publicly available database outlining fish species presence in the Project Area. Therefore, government research, and past EA documentation were reviewed for records of species presence in the Project Area as well as the Burin Peninsula and adjacent coastal habitats. The review identified 25 finfish species (Table 4-12), including socio-economically valuable species, namely Atlantic salmon (*Salmo salar*) and Atlantic cod (*Gadus morhua*) that use coastal habitats in Placentia Bay as nursery grounds before migrating offshore (Robichaud and Rose 2006). The DFO database only included data for two ponds, Big Salmonier Pond and Tides Brook, both surveyed in 1983 (Table 4-12). The database included records of 50 Atlantic salmon, 4 banded killifish (*Fundulus diaphanus*), 94 brook trout (*Salvelinus fontinalis*), 12 threespine stickleback (*Gasterosteus aculeatus*), 12 fourspine stickleback (*Fourspine stickleback*), 2 ninespine stickleback (*Pungitius pungitius*), and 1 blackspotted stickleback (*Gasterosteus wheatlandi*) in Tides Brook, and 29 Atlantic salmon and 8 brook trout in Big Salmonier Pond.

Table 4.11: List of Aquatic Fish Species within the Project Area

Habitat	Scientific Name	Common Name	Observation records	Species Status			
				SARA	NL *ESA*	COSEWIC	S-Rank
Freshwater	*Fundulus diaphanus*	Banded killifish	Chippett 2004; Sargent et al. 2021; Government of Newfoundland and Labrador n.d.; DFO database (1983)	Special Concern (2005)	Vulnerable (2003)	Special Concern (2014)	S3 (2015)
Freshwater/ Coastal	*Anguilla rostrata*	American eel	Chaput et al. 2013; Government of Newfoundland and Labrador n.d.	-	Vulnerable (2006)	Threatened (2012)	-
	Gasterosteus wheatlandi	Blackspotted stickleback	Government of Newfoundland and Labrador n.d.; Prystay 2023a; DFO database (1983)	-	-	-	-
	Apeltes quadracus	Fourspine stickleback	Government of Newfoundland and Labrador n.d.; Prystay 2023a; DFO database (1983))	-	-	-	-
	Gasterosteus aculeatus	Threespine stickleback	Government of Newfoundland and Labrador n.d.; Prystay 2023a; DFO database (1983)	-	-	-	-
	Pungitius pungitius	Ninespine Stickleback	DFO database (1983)	-	-	-	-
	Salmo salar	Atlantic salmon	Government of Newfoundland and Labrador n.d.; Prystay 2023a; Robichaud and Rose 2006; DFO 2022a; DFO database (1983)	-	-	Threatened (2010)‡	-
	Salvelinus fontinalis	Brook trout	Government of Newfoundland and Labrador n.d.; Prystay 2023a; DFO database (1983)	-	-	-	-
	Salmo trutta	Brown trout	Bradbury et al. 1999; Government of Newfoundland and Labrador n.d.	-	-	-	-
	Osmerus mordax	Rainbow smelt	Government of Newfoundland and Labrador n.d.; Prystay 2023a	-	-	-	-
	Acipenser oxyrinchus	Atlantic sturgeon	DFO 2014	-	-	Threatened (2011)	-
Coastal	*Ammodytidae*	Sand lance	Prystay 2023a	-	-	-	-
	Gadus morhua	Atlantic cod	Prystay 2023a; Robichaud and Rose 2006; DFO 2021a	-	-	-	-

Habitat	Scientific Name	Common Name	Observation records	Species Status			
				SARA	NL *ESA*	COSEWIC	S-Rank
	Mallotus villosus	Capelin	Prystay 2023a; DFO 2022a	-	-	-	-
	Tautogolabrus adspersus	Cunner	Prystay 2023a	-	-	-	-
	Clupea harengus	Atlantic herring	DFO 2024a; Prystay 2023a	-	-	-	-
	Menidia menidia	Atlantic silversides	Prystay 2023a	-	-	-	-
	Gadus ogac	Greenland cod	Prystay 2023a	-	-	-	-
	Myoxocephalus aenaeus	Grubby sculpin	Prystay 2023a	-	-	-	-
	Myoxocephalus octodecemspinosus	Longhorn sculpin	Prystay 2023a	-	-	-	-
	Osmerus mordax	Rainbow smelt	Prystay 2023a	-	-	-	-
	Pholis gunnellus	Rock gunnel	Prystay 2023a	-	-	-	-
	Myoxocephalus scorpius	Shorthorn sculpin	Prystay 2023a	-	-	-	-
	Pleuronectes putnami	Smooth flounder	Prystay 2023a	-	-	-	-
	Urophycis tenuis	White hake	Prystay 2023a	-	-	-	-
	Pseudopleuronectes americanus	Winter flounder	Prystay 2023a	-	-	-	-
Incidental occurrence†	*Ursus maritimus*	Polar bear	ACCDC (2023)	Special Concern (2011)	-	-	-
Marine	*Balaenoptera musculus*	Blue whale		Endangered (2012)	-	-	-
	Eubalaena glacialis	North Atlantic right whale		Endangered (2013)	-	-	-
	Dermochelys coriacea	Leatherback sea turtle		Endangered (2022)	-	-	-
	Carcharodon carcharias	White shark		Endangered (2021)	-	-	-
	Anarhichas denticulatus	Northern wolffish		Threatened (2012)	-	-	-

Habitat	Scientific Name	Common Name	Observation records	Species Status			
				SARA	NL *ESA*	COSEWIC	S-Rank
	Balaenoptera physalus	Fin whale		-	-	Special Concern (2019)	-
	Anarhichas minor	Spotted wolffish		-	-	Threatened (2012)	-

‡ South Newfoundland population

†Incidental record, Burin Peninsula does not fall in the habitat range

Other socio-economically valuable marine invertebrates and marine mammals also occur within or near the Project Area. Examples of known marine invertebrates include American lobster (*Homarus americanus*) and sea scallops (*Pectinidae*). Marine mammals include the harbour porpoise (*Phocoena phocoena*), harbour seal (*Phoca vitulina*), and grey seal (*Halichoerus grypus*) (Hamilton et al. 2023). A more detailed description of the marine coastal environment and species will be provided in an additional EA registration related to the proposed marine terminal.

Six additional fish species (not listed in Table 4-12) are common in Newfoundland and may occur in the Project Area but do not have observation records specific to the Burin Peninsula or its coastal habitats. These species include lake whitefish (*Coregonus clupeaformis*), alewife (*Alosa pseudoharengus*), American shad (*Alosa sapidissima*), mummichog (*Fundulus heteroclitus*), rainbow trout (*Oncorhynchus myksis),* and sea lamprey (*Petromyzon marinus*). Of these six additional species, mummichog is the only SAR, listed as 'vulnerable' by the NL *ESA* (2023).

4.3.3.1 Species at Risk (SAR)

The Aquatic Species at Risk Map (DFO 2024b) is a federal database showing the distribution of SAR and their associated critical habitat within Canadian waters. A review of this database and the NL *ESA* list determined that the Project Area includes habitat for two inland SAR: banded killifish (*Fundulus diaphanous*) and American eel (*Anguilla rostrata*) (Table 4-12; NL FFA n.d.). The entire Project Area is located within critical habitat for banded killifish, which is listed as a species of Special Concern under *SARA* and COSEWIC, and Vulnerable under the NL *ESA* (Government of Newfoundland and Labrador n.d.; Table 4-12). American eel is listed as Vulnerable under the NL *ESA* (2023) All other aquatic SAR are marine species (Table 4-12).

The ACCDC Data Report (2023) identified three records of SAR within 5 km of the Project Area, two of which were records of Banded killifish (2015 S-Rank: S3) and third was the incidental record of a polar bear (*Ursus maritimus*) in 2017 (Special Concern under SARA in 2011).

Banded Killifish

Banded killifish are a euryhaline species that inhabit freshwater streams and lakes but can tolerate more saline environments. Their habitat preferences include clear, shallow slow-moving water with mud, sand, or gravel substrate and aquatic vegetation (DFO 2022c) Banded killifish live for 3–4 years, reaching 7–9 cm in length at maturity and contribute as an important prey for other fish species, including Atlantic salmon (*Salmo salar*), brook trout (*Salvelinus fontinalis*), and American eel (DFO 2022c; Government of Newfoundland and Labrador n.d.) Banded killifish distribution in Newfoundland extends along the west and northeast coasts of the Burin Peninsula. Spawning occurs in the summer (July–August) when water temperatures are between 19–24°C (Chippett 2004) Currently there are only 10 known populations of Banded killifish in Newfoundland, three of which occur on the southern section of the Burin Peninsula, namely Freshwater Pond, Garnish Pond, and Winterland (DFO 2022c).

American Eel

American eel is a catadromous species, meaning individuals spawn in the ocean and mature in salt water bays, estuaries, or freshwater rivers and lakes (NLFFA 2011). Juvenile American eels, referred to as "glass eels", are long, slender, and clear in appearance. As glass eels grow, they become pigmented and mature into elvers for 3–12 months, then develop into yellow eels for up to 30 years, and fully mature (i.e., silver eels) for 9–18 years. American eels are panmictic, meaning all spawners are from a single breeding population in the south Atlantic. Furthermore, individuals only spawn once and fast during their spawning migration, leaving individuals with a finite energy reserve to migrate and reproduce.

American eels are a socio-economically valuable species, targeted by commercial, recreational, and Indigenous' fisheries (NLFFA 2011; Blakeslee et al. 2018). Marine habitat preferences include protected shallow waters containing submerged vegetation (e.g., eelgrass) and woody debris (COSEWIC 2012). Freshwater habitat preferences include rivers and lakes with mud, sand, fine gravel, or cobble substrate for burrowing and woody debris. A recent laboratory experiment determined that American eels have a 26˚C upper thermal tolerance limit—indicated by heightened mortality rates—and the optimal temperatures for rearing ranged between 18–22˚C (Blakeslee et al. 2018). American eels are known to move over obstacles, through small creeks, or through wet grass (NLFFA 2011).

4.3.3.2 Species of Conservation Concern (SOCC)

The south Newfoundland population of Atlantic salmon (*salmo salar*) and maritime population of Atlantic sturgeon were identified as SOCC, listed as "Threatened" under COSEWIC but have no status under *SARA* (DFO 2022d) or the NL *ESA*.

Atlantic Salmon

There are 15 Atlantic salmon (Salmo salar) management areas in Newfoundland and Labrador, two of which boarder the Burin Peninsula: Salmon Fishing Areas (SFA) 10 and 11. In 2017, over 27,000 recreational Atlantic salmon licenses were sold. Most fishing effort for Atlantic salmon occurs in Newfoundland rivers.

Garnish River Atlantic salmon homing migration runs through the Project Area. The Garnish River population is estimated to have declined by >60% between 2015 and 2020 (assessments began in 2015) and have a low adult survival (<1%) (DFO 2022a). Refer to Section 4.3.4.2 for a list of the 13 scheduled salmon rivers within the Project Area.

Atlantic salmon are an anadromous species, meaning individuals reside in salt water but spawn in freshwater. Atlantic salmon undergo their homing migration from May to September and spawn in the Fall (October–November) (Porter 1975; Scott and Scott 1988). There are, however, some landlocked populations as well—locally known as ouananiche. Atlantic salmon spawning typically occurs in tributaries or main river headwaters, where there are riffles, and the stream bed is composed of gravel substrate (2–8 cm) with limited silt. Parr reside in freshwater for 2–4 years before migrating offshore. While in freshwater, parr feed on insects and insect larvae.

Salmonids (i.e., Atlantic salmon and trout species) have low thermal tolerance thresholds compared to other fish species. The critical maximum temperature for Atlantic salmon aged 2+ is 24°C (i.e., low survival rates after 10 minutes at 25°C, Breau 2012; DFO 2012). Juveniles have a higher thermal tolerance threshold than mature fish, with a thermal optimum between 16 and 20°C and a critical temperature threshold at 30°C (i.e., low survival rates after 10 minutes exposure).

Atlantic Sturgeon

Atlantic sturgeon (*Acipenser oxyrinchus*) is an anadromous species, meaning they reside in the marine environment but spawn in freshwater estuaries and rivers (Scott and Scott 1988; COSEWIC 2011). Juveniles then reside in mesohaline estuarine environments before migrating offshore (Dadswell 2006). Individuals are estimated to survive on average 40 years, reaching maturity after 16-24 years for males and 27-28 years for females (Scott and Scott 1988; Dadswell 2006; COSEWIC 2011). Atlantic sturgeon spawn in June and July, when water temperatures reach 16-20°C, in rivers that are close to the tidehead and 1-3 m deep with gravel substrate, strong current, and deep pools. Females spawn once every 3-5 years, whereas males spawn every 5 years. Both adults and their eggs are particularly sensitive to high water temperatures, making them vulnerable to climate change, yet juveniles prefer water temperatures between 18-22°C (National Oceanic Atmospheric Administration (NOAA) Fisheries 2023). While in freshwater, juvenile Atlantic sturgeon feed on submerged vegetation and invertebrates, such as insects, molluscs, and crustaceans (Scott and Scott 1988; COSEWIC 2011). Mature fish have a similar diet in the marine environment but cease feeding during their spawning migration. Atlantic sturgeon habitat extends to the western side of the Burin Peninsula, but there are no records, to Strum's knowledge, of spawning occurring in Newfoundland.

Atlantic sturgeon is a culturally and commercially valuable species, targeted for the meat and eggs (DFO 2014). In eastern Canada, there remains a controlled commercial gill net fishery, recreational fishery, and an Indigenous fishery for food, social and ceremonial purposes. Individuals are also caught as bycatch in commercial fisheries, which can lead to post-release mortality. Warm water temperatures associated with climate change amplify the effect of bycatch stress, increasing the risk of immediate or delayed post-release mortality. Despite their cultural and commercial significance, there is limited data available to characterize population responses to exploitation (COSEWIC 2011). Other threats to Atlantic sturgeon population include anthropogenic-driven habitat loss and degradation caused by activities such as dredging, dams warming water temperatures, alterations to benthic habitats, offshore oil and gas development, and pollution (Dadswell 2006; COSEWIC 2011; NOAA Fisheries 2023).

4.3.3.3 Incidental Occurrences

Incidental detections of juvenile Blue runner (*Caranx crysos*), a tropical reef fish, was first observed off the coast of Marystown in 2013 (Devine and Fisher 2014), and again in North Harbour, Placentia Bay, in 2020 (Prystay 2023a). An incidental detection of a polar bear was also recorded in the ACCDC report by Wildlife Officials on September 4, 2017. Although future detections of these species are possible, the Burin Peninsula does not fall within the habitat range of these species, and observations were due to uncommon dispersal events.

Mummichog, a very similar species in appearance to the banded killifish, have been recorded in Terrenceville River, located just outside the Project Area (NLFFA 2016). However, these records are historical, dating back to 1960.

4.3.3.4 Invasive Species

In the coastal marine environment, the primary invasive species are green crab (*Carcinus maenas*), but others include violet tunicates (*Botrylloides violaceus*), golden star tunicates (*Botryllus schlosseri*), and coffin box bryozoan (*Membranipora membranacea*). Green crab were introduced to Newfoundland in 2007, including Placentia Bay and Fortune Bay (i.e., both bays on either side of the Burin Peninsula), presumably via vessel ballast water (Matheson et al. 2016). Occurrences of green crab correlated with a decline in eelgrass meadows and fish abundance in Placentia Bay. Green crab are generalists and can survive long durations in air, brackish water, and freshwater. Work, led by DFO and the Fisheries and Marine Institute of Memorial University, is ongoing to control the spread of green crab in Newfoundland.

4.3.3.5 Additional Socio-Economically Values Species

In addition to Atlantic salmon, Atlantic cod, brook trout and brown trout carry socio-economic value and in or near the Project Area.

Atlantic Cod

Atlantic cod stocks in Placentia Bay and Fortune Bay area managed under Northwest Atlantic Fisheries Organization (NAFO) subdivision 3Ps. Atlantic cod have historically been one of the most commercially fished species but entered in a moratorium that ceased commercial fishing in the early 1990s due to overfishing (DFO *2021a*). After 32 years, this moratorium was lifted after Northern cod scientific assessment changed the stock classification from “critical” to “cautious” (Eddy and Robertson 2024).

In Placentia Bay, Atlantic cod spawn between March and August (DFO 2021*a*). Juveniles (age 0 to ~3) inhabit structurally complex nursery habitats in the coastal zone, such as eelgrass (Zostera marina) meadows, before migrating offshore (Gotceitas et al. 1997; Laurel et al. 2004). Staging behaviour enables juvenile Atlantic cod to forage for food and develop, while providing refuge from predation risk. Juveniles predominantly feed on zooplankton then benthic and epibenthic species including other smaller fish as they mature (Scott and Scott 1988). As Atlantic cod mature, they move offshore into more diverse habitats. 3Ps Atlantic cod reach sexual maturity at ages 4–6.

Brook Trout

Brook trout (Salvelinus fontinalis) are targeted by recreational fisheries in Newfoundland. Brook trout are native to eastern North America, though brook trout have been introduced into other regions (Scott and Scott 1988). Habitat preferences of brook trout include clear streams or lakes with gravel or rocky substrate, often with alder covered banks. Brook trout typically live up to 6–7 years and feed on insects, other fish, and invertebrates. Although brook trout are an anadromous species, there are several populations that do not go to sea. Brook trout spawn in the fall, between September and November, in shallow streams with gravel substrates and occasionally in lakes.

Brown Trout

Brown trout (Salmo trutta) are targeted by recreational fisheries in Newfoundland and Labrador. Brown trout were introduced to Newfoundland, including the Burin Peninsula, in 1884 from a hatchery in Scotland for stocking purposes. Presence of sea-run brown trout was confirmed in Placentia Bay, including a population in the Salmonier River (Westley and Flemin 2011). Brown trout occupy medium to fast flowing, silt-free streams with pools; however, brown trout habitat is typically warmer and more turbid than brook trout (Scott and Scott 1988). Brown trout feed on other fish, insects and invertebrates, and can have a typical lifespan between 6–7 years.

4.3.4 Fish Habitat

Based on a watershed analysis using Newfoundland's 5 m digital elevation model (DEM), the Project Area intersects 468 watersheds (0.59 square kilometres *(*km^2*)* ± 54.2 km^2; median ± standard deviation) (Drawings 4.4a-g) (Appendix A).

4.3.4.1 Waterbodies

The Federal CanVec data defines waterbodies as the "polygon describing a body of water", which includes lakes and ponds (NRCan 2018). A review of the Federal CanVec Database – Hydrographic Features (2023) identified 354 named waterbodies and 17,034 unnamed waterbodies within the Project Area (17,388 waterbodies total; Drawings 4.4a-g, Appendix A). Named waterbodies in the Project Area have a median area of 0.087 km^2 (0.26 km^2 ± 0.70 km^2; mean ± standard deviation (SD), where Freshwater Pond is the largest waterbody with an area covering 9.5 km^2. The median area of named and unnamed waterbodies within the Project Area combined is <0.01 km^2 (0.012 km^2 ± 0.11 km^2; mean ± SD).

4.3.4.2 Watercourses

The Federal CanVec data defines watercourses as the "body of water through which water may flow" delineated by lines, which includes rivers, streams, and brooks (NRCan 2018). A review of the Federal CanVec Database – Hydrographic Features (NRCan 2023) identified 42 named watercourses and 27,774 unnamed watercourses that occur within the Project Area (27,816 watercourses in total; Drawings 4.4a-g, Appendix A). Of these watercourses, 23% are 3rd order streams or greater. The median distance covered by named watercourses in the Project Area is estimated to be 6.67 km (9.67 km ± 8.86 km; mean ± SD), whereas the estimated median length of named and unnamed watercourses combined is 0.078 km (0.18 km ± 0.57 km; mean ± SD). Sandy Harbour River, located in the UBP Wind Farm), is the longest watercourse flowing through the Project Area, estimated to be 39.34 km long. Salmonier River is the longest river in LBP Wind Farm with as estimated length of 23.1 km.

There are 13 scheduled Atlantic salmon rivers within the Project Area (Drawings 4.5a, 4.5b, and 4.5c, Appendix A). Garnish River Atlantic salmon spawn in the Project Area. Scheduled salmon rivers within Project Area are:

1. Peter's Brook
2. Salmonier River
3. Taylor's Bay River
4. Little Lawn River & tributary streams
5. Little St. Lawrence River & tributary streams
6. Main Brook (Tide's Brook, Mortier Bay, including Main Brook, Shearstick Brook & tributary streams)
7. Big Salmonier Brook
8. Northwest Brook (West Brook, North West Arm, Mortier Bay, & tributary streams)
9. Garnish River, including Lower Garnish & Upper or Black River & tributary streams
10. Red Harbour River, Northeast and Northwest branches, and tributary streams
11. Baie de l'Eau River
12. Cape Rodger River
13. Nonsuch Brook

Sections of the Atlantic Ocean coastline and one reservoir, Bakers Pond, fall within the Project Area (i.e., excluding the buffer).

4.3.4.3 Eelgrass (Zostera marina)

Eelgrass meadows provide numerous ecosystem functions and services, including but not limited to assisting with sediment and nutrient deposition, serving as a nursery ground for social-economically valuable species (e.g., Atlantic cod, Atlantic salmon), and have high levels of primary production and nutrient storage, including carbon and nitrogen (Murphy et al. 2021; Prystay et al. 2023b). There are known eelgrass meadows within and adjacent to the Project Area, including meadows that are undergoing active restoration and monitoring funded by the Coastal Restoration Fund under the National Ocean Protection Plan and conducted by the Fisheries and Marine Institute of Memorial University and World Wildlife Fund Canada (DFO 2024c). These meadow locations include Baie de l'Eau, Baine Harbour, Swift Current, among others (Figure 4.3; Prystay et al. 2023c; DFO 2024c). Eelgrass meadows in Placentia Bay have been declining since 2012, presumably due to the introduction of European green crab (*Carcinus maenas*). Increasing green crab abundance has corresponded with a 50% decline in eelgrass cover in Placentia Bay since 1998, and a 10 fold decline in fish abundance and biomass (i.e., shift in community structure and composition) (Matheson et al. 2016). In 2009, DFO designated eelgrass as an 'Ecologically Significant Species' in recognition that perturbations to eelgrass meadows would negatively affect other species and ecosystem functions (DFO 2009).

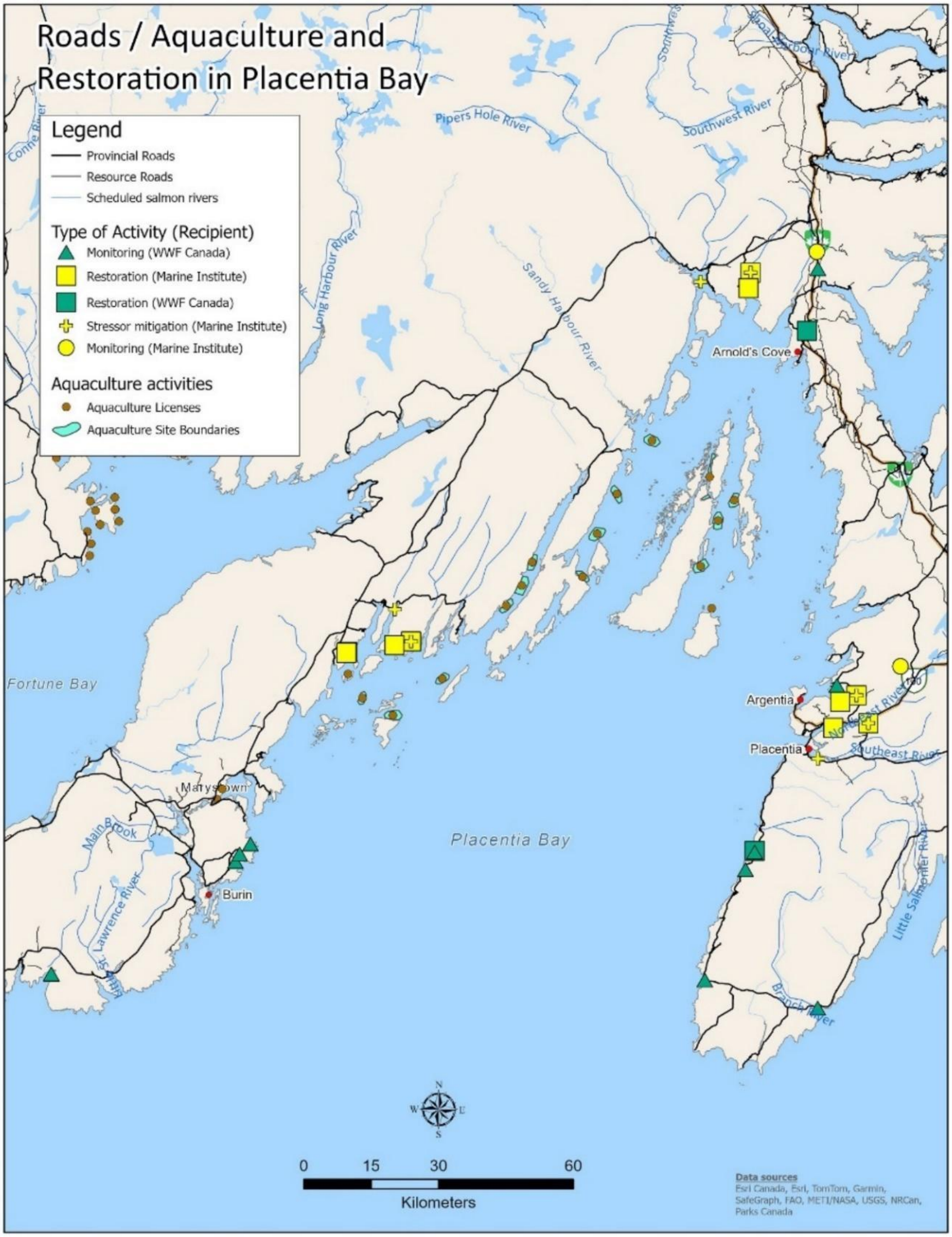

Figure 4.3: Maps of Ongoing Eelgrass Restoration Programs in Placentia Bay, Newfoundland Reproduced (DFO 2024b).

4.3.5 Aquatic Resource Use

4.3.5.1 Water Resource Management Areas
Water resource management areas include protected water supply areas overseen by the Water Resource Management Division under the NL *WRA*. There are 17 water resource management areas adjacent to the Project Area (Drawing 4.6, Appendix A).

4.3.5.2 Fisheries
Much of the inland fishing activities on the Burin Peninsula is recreational fisheries for food and cultural purposes. Targeted species include Atlantic salmon and trout species, predominantly brook trout and potentially brown trout (hereafter both species together are referred to as trout). Inland, brook trout angling season is open February 1 to April 15 and again May 15 to September 7, whereas brown trout fishing season is open from February 1 to October 7 (Government of Canada 2024b).

The Burin Peninsula falls between SFA 10 and 11. Atlantic salmon recreational fishing season opens June 1 until September 7 for both management zones (Government of Canada 2020). Fish may only be harvested inland if caught via angling (including fly fishing). In both SFA 10 and 11, all the scheduled Atlantic salmon rivers within the Project Area fall within class 2 (see section Aquatic Environment for list of scheduled Atlantic salmon rivers in the Project Area) (Government of Canada 2024c).

Indigenous Food, Social, and Ceremonial fisheries may also occur on the Burin Peninsula. Atlantic salmon is among the species commonly targeted by this fishery. American eels are also targeted by the fishery, however there are no trapping records on the Burin Peninsula. Few fishing licenses remain active, and distribution of new licenses has ceased (Qalipu Environment and Natural Resources (QENR) 2024). The recreational American eel fishery is open between November 1 and March 31. Indigenous fisheries are regulated under the Aboriginal Communal Fishing Licences Regulations (2009).

Commercial fisheries in the region are offshore. Targeted species include herring, Atlantic cod, capelin, and smelt. A more detailed description of marine commercial fisheries will be provided in a separate EA registration related to the proposed marine terminal.

4.3.5.3 Aquaculture
There are no licensed aquaculture facilities within the Project Area, but there are seven active facilities within 5 km (Drawings 4.5a-c, Appendix A). These facilities include the Bernard Norman Atlantic cod aquaculture farm, Marbase Cleanerfish Ltd. lumpfish hatchery, and five Grieg NL Nurseries Ltd. Atlantic salmon hatchery locations.

4.4 Terrestrial Environment
The following subsections outline the baseline conditions related to the terrestrial environment including; habitat, flora, avifauna, bats, and fauna.

4.4.1 Terrestrial Habitat

4.4.1.1 Ecoregion Overview

The Project Area encompasses two of the eight Newfoundland ecoregions: the maritime barrens ecoregion (the southeastern barrens and south coast barrens subregions) and the eastern hyper-oceanic barrens ecoregion (Drawing 4.7, Appendix A; Table 4-13).

Biogeoclimatic descriptions within each eco-region subtype are described in Table 4.13.

Table 4.12: Biogeoclimatic Descriptions of the Eco-Region Subtypes Located within the Proposed Project Area on the Burin Peninsula

Eco-Region Subtype	Characteristics
Southeastern barren subregion	• Dominated by balsam fir interspersed with extensive open heathland. • Forest productivity is highest on long slopes occurring in infrequent valleys. • History of frequent wildfire.
South coast barrens subregion	• Area covered by gently rolling ground moraine, with areas of exposed bedrock • Scarce forested areas due to fog and lower summer temperatures • Fire has played a significant role in the development of the subregion ecology.
Eastern hyper-oceanic barrens	• Occurs on the extreme south coast of the Avalon and Burin Peninsulas and in the Bay de Verde, Cape Freels and Bonavista areas. • Low elevation, but very cool summers due to the oceanic influence. • Dominated by exposed coastal barren and blanket bogs. • Limited balsam fir forest cover. • Arctic-alpine species occur even at sea level, mixed with species common to southern coastal plains.

4.4.1.2 Habitat Characterization

A desktop analysis was conducted to identify habitats and landcover types within the Project Area. The following data sources were used:

- Canada Landcover Atlas (NRCan 2024a)
- NLFFA Zone 2 and 3 forestry operation plans (NLFFA 2016)
- Newfoundland and Labrador Land Use Atlas (Gov. of NL 2023)
- CanVec (Canada Vector) Wooded areas and Saturated Soils dataset (NRCan 2023)
- Newfoundland and Labrador Forest Resource Inventory (NL FRI; NLFFA 2024d)

Newfoundland and Labrador Forestry operation plans describe the Burin Peninsula (Zone 3 management area) as a mosaic of shrubland barrens (*Kalmia* and *Empetrum*), forest, and wetland (NLFFA 2016). The desktop analysis showed that the Burin Peninsula is predominately covered by conifer forest (i.e., black spruce (*Picea mariana*), balsam fir (*Abies balsamea*), white spruce (*Picea glauca*), and occasional stems or small groups of tamarack (*Larix laricina*), shrubland, and wetland habitats (Table 1). Two deciduous species, white birch (*Betula papyrifera*) and trembling aspen (*Populus tremuloides*), occur as small pure stands intermittently throughout the Project Area; however, these species contribute <0.01 % of the landscape. Wetlands make up approximately 35% of the Project Area (Table 4-14). Wetlands are considered a VC for this Project and are discussed in Section 4.4.1.3.

Drawings 4.8a-c (Appendix A) documents the landcover habitat classifications within the Project Area.

Table 4.13: Approximate Area (km^2) and Relative Proportion (%) of Broad Habitat Classes in the Project Area, and on the Island of Newfoundland, According to Canada Landcover Classification using 30 x 30 m Pixels (NRCan 2024a)

Habitat Classification	Approximate Area (Project Area) (km^2)	Percent (%) of Classification in Project Area	Percent (%) of Classification on Island of NL
Coniferous forest	1,018.33	43.12	42.30
Wetland	840.23	35.57	29.47
Shrubland barrens	431.42	18.26	13.15
Mixed forest	43.55	1.84	12.14
Urban	17.19	0.73	1.03
Exposed rock	10.89	0.46	1.83
Deciduous forest	0.017	<0.01	0.06
Grassland	0.0009	<0.01	<0.01
Lichen-moss	0	0	0.02
Cropland	0	0	<0.01

A limitation with using existing data sets to generate land classifications include the large-scale resolutions (>30 m) resulting in the loss of fine scale data. Additionally, ecosystem information derived at the country scale may not translate directly to the ecosystems within the province, and even less to Burin Peninsula ecoregions. Additionally, multiple data sets may lead to conflicts between land cover classifications. Further analysis on land cover will be conducted in the EIS using alternative data to develop finer scale models within the Project Area.

4.4.1.3 Wetlands

A wetland is defined under the NL *WRA* (2002) as land that has the water table at, near or above the land surface and includes bogs, fens, marshes, swamps and other shallow open water areas. Wetlands are a predominate landcover type along the Burin Peninsula. Wetlands on the island of Newfoundland serve many critical ecosystem functions and services including freshwater purification, run-off and flooding storage, nutrient storage (e.g., blue carbon), and habitat for many wildlife and fish species. Ecosystem functions and services, including the value of a wetland to other wildlife, varies depending on the type of wetland (e.g., bog, fen, swamp). A desktop analysis will be conducted to delineate and classify all wetlands located within the Project Area. Wetland classification will follow the guidelines outlined in the Newfoundland and Labrador Water Resources Division classification document (AMEC 2015; National Wetland Working Group (NWWG) 1997).

Wetland classification and delineation will depend, to some extent, on the data sources used. For example, Canada Landcover classification identifies approximately 840 km^2 of wetland areas within the Project Area. Canada Landcover classification is inclusive of many types of wetland areas, including forested wetland areas (e.g., black spruce bogs) (Table 4.14) CanVec (Canada Vector) classification of saturated soils within the Project Area only identify 39.22 km^2, or <1% of the Project Area as wetland habitat. When including broader forested classification types, the percent coverage increases to 66%. A comprehensive review of wetland data sources in Newfoundland and Labrador will be conducted to identify sensitive wetland habitats as they pertain to wildlife habitat, ecosystem functioning, and challenges to development.

To coarsely identify wetland habitats for this document, Strum calculated wetland habitat areas according to the NL FRI layer (NLFFA 2024d). The NL FRI data broadly classifies wetland environments into soil barrens (e.g., peat bogs), wet bogs (e.g., wetland surrounded by water), treed bogs (e.g., black spruce bogs), and general bog (e.g., other classifications) (Drawings 4.9a-c, Appendix A). Table 4.15 outlines the coarse-scale classification of wetland environments according to the NL FRI. It is important to note that the NL FRI data is a different dataset with different classifications than the Canada Landcover (NRCan 2024a), and as such, the absolute area of "wetland" habitats within the Project Area is slightly different (31.8% versus 35.6%). For example, treed bog in the NL FRI data may be classified as coniferous forest or mixed forest under the Canada Landcover data; in addition, soil barrens in NL FRI may be classified under shrubland barren or exposed rock in the Canada Landcover data. Finally, the identification of wet bog under NL FRI may conflict with the water classification of Canada Landcover.

Table 4.14: Wetland Classification Separated into Three Coarse Types, According to the NL FRI Data

Wetland Classification	Approximate Area (km^2)	Percentage of Total Wetland	Percent of Total Project Area
Soil barren	186.03	21.8	6.9
Wet bog	195.62	23.0	7.3
Treed bog	1.79	<0.1	0.1
Bog (general)	468.72	55.0	17.5
Total	852.16	100	31.8

4.4.2 Terrestrial Flora

A desktop analysis was conducted to identify and characterize potential rare and legislatively protected botanical SAR and SOCC (as defined in section 3.2.1 under *Legislation*) within the Project Area.

Based on data acquired from the ACCDC, the desktop analyses identified 95 rare plant locations within the Project Area (ACCDC 2023). Of the 95 locations listed as rare plants for the area, there were 40 unique species and only two species, boreal felt lichen (*Erioderma pedicellatum*) and water pygmy-weed (*Crassula aquatica*), are listed provincially (NL *ESA*) or federally *(SARA*) as either Special Concern or Vulnerable. There were seven observations of Boreal Felt Lichen and 14 observations of Water pygmy-weed within the Project Area (Drawing 4.10, Appendix A).

Table 4.15: List of Terrestrial SAR flora identified within the Project Area by ACCDC

Common Name	Scientific Name	Habitat	Species Status			
			SARA	**NL *ESA***	**COSEWIC**	**S-Rank**
Boreal Felt Lichen	*Erioderma pedicellatum*	Spruce fen	Special Concern	Vulnerable	Special Concern	S3
Water pygmy-weed	*Crassula aquatica*	Silty, muddy and wet soils. Most identifications were near roadsides	Not Listed	Vulnerable	Not Listed	S1

Boreal Felt Lichen (Erioderma pedicellatum)

Boreal felt lichen is listed as Special Concern under SARA and Vulnerable under the NL *ESA*. Growing mainly on the trunks of balsam fir trees, boreal felt lichen is at risk because it is sensitive to forest harvesting, climate change, and moose herbivory (Environment Canada, 2007). The Atlantic population of boreal felt lichen prefer cool, moist, maritime climates. It is of special significance as it’s a good indicator of the health of a region due to its high sensitivities to stressors, especially air pollution. Due to the topography of the Project Area, boreal felt lichen are most likely to occur in the north central subregion, which falls within the MBP and UBP Wind Farm Areas (Drawing 4.11, Appendix A).

Water Pygmy-Weed (Crassula aquatica)

Water pygmy-weed is listed as Vulnerable under the NL *ESA*. Water pygmy-weed is a small, annual, succulent, herbaceous plant inhabiting semiaquatic environments close to the coast (Newfoundland and Labrador Wildlife Division, 2021). Within the province of Newfoundland and Labrador, it is known to occur only on the southern Avalon and Burin Peninsulas (Newfoundland and Labrador Wildlife Division, 2021). Occurrences known in Newfoundland are in intermittently wet habitats that were artificially created by human disturbance, such as quarry pits, roadside shoulders and ditches, and trail ruts (Newfoundland and Labrador Wildlife Division, 2021). Water pygmy-weed has the potential to occur throughout all coastal sections of the Project Area.

4.4.3 Avifauna

A desktop analysis was conducted to identify and characterize potential avifauna SAR and SOCC (as defined in section 3.2.1) and other legislatively protected avifauna within the Project Area, and to identify protected species that may frequent the Project Area at some time in their life history.

In addition to *SARA* (2002), other legislation relevant to avifauna includes:

- *Canada Wildlife Act* (*CWA,* 1985)
- *Migratory Birds Convention Act* (*MBA,* 1994)
- NL *Newfoundland and Labrador Wildlife Act* (*WLA, 1996*)
- NL *ESA* (2023)
- Newfoundland and Labrador *Endangered Species Act* (*ESA*, 2004)
- *Canadian Environmental Protection Act* (*CEPA,* 1999)
- NL *Environmental Protection Act* (*EPA, 2002)*

4.4.3.1 Avifauna Habitat

Southeastern Barrens Subregion

Characterized by exposed bedrock and substantial barrens, the southeastern barren subregion has limited trees, fog is a common occurrence along with strong southerly winds. Scattered throughout the barrens are slope bogs, basin bogs, and fens. Small stands of forest habitat are scarce but do occur in small pockets. The scarcity of forests is partly due to the area's frequent historical cutting and fires. The ecoregion's thin soil layer and climate allow dwarf shrubs to thrive where other species cannot. A plant community called dwarf shrub heath is common. Black spruce and larch are other common species (NLECC 2008a).

Within the scattered patches of forest, common migratory species such as the Ruby-crowned Kinglet (*Regulus calendula*), Northern Waterthrush *(Parkesia noveboracensisi),* White-throated Sparrow (*Zonotrichia albicollis*), Hermit Thrush (*Catharus guttatus*), Fox Sparrow (*Passerella ilica*), and Yellow-rumped Warbler (*Setophaga coronata*) use the ecoregion for breeding habitat. Year-round, Pine Grosbeak (*Pinicola enucleator*), and Dark-eyed Junco (*Junco hyemalis*) are also present within the forested areas. In barren habitat, the migratory species of Willow Ptarmigan (*Lagopus lagopus*), Savannah Sparrow (*Passerculus snadwichensis*), American Pipit (*Anthus rubescens*) and Horned Lark (*Eremophila alpestris*) breed. Swamp Sparrow (*Melospiza georgiana*), Common Snipe (*Gallinago gallinago*), Least Sandpiper (*Calidris minutilla*) and Greater Yellowlegs (*Tringa melanoleuca*) breed within the wetland habitat of this ecoregion (NLECC 2008a).

South Coast Barrens Subregion

The south coast barrens subregion is subject to strong southerly winds in the summer, and winters share the same climate as the southeastern barrens subregion. Forested areas in the south coast barrens are scarce and only occur in sheltered coves. Slope bogs, basin bogs, and fens are the primary wetland types. Dwarf shrubs dominate previously forested areas that are no longer due to large scale burns. On more upland areas and the coastal headlands crowberry and partridgeberry are found. Isolated pockets of balsam fir forest are present (NLECC 2008b).

A limited number of waterfowl breed in the area but include species such as the Canada Goose (*Branta canadensis*), American Black Duck (*Anas rubripes*), and Green Winged Teal (*Anas* *carolinensis*). Ruby-crowned Kinglet, Northern Waterthrush, White-throated Sparrow, Gray-Cheeked Thrush (*Catharus minimus*), Fox Sparrow, Yellow-Rumped Warbler are migratory residents, while Dark-eyed Junco, and Pine Grosbeak can be found in forested areas any time of the year. Willow Ptarmigan, Savannah Sparrow, and Horned Lark are migratory breeders that utilize the barren habitat. The American Pipit can be found throughout the ecoregion, and Common Snipe, Greater Yellowlegs, and Least Sandpiper breed in the ecoregion's wetlands (NLECC 2008b).

Eastern Hyper-Oceanic Barrens

Located at the southernmost edge of the Burin Peninsula, the eastern hyper-oceanic barrens ecoregion is characterized by cold climate and rocky shorelines, with a generally flat topography. There are scattered areas of balsam fir tuckamore, but this region lacks any true forests without stunted growth. Costal barrens vegetation primarily comprises this ecoregion with large areas covered in heath moss (*Rhacomitrium languinosum),* a species scarcely found elsewhere in North America. In pockets of land with poor drainage bogs can also be present. This ecoregion naturally lacks forest habitat. Instead, heath moss dominates with other species like crowberry, lichens, and arctic-alpine plants like alpine azalea (NLECC 2008c).

The eastern hyper-oceanic barrens ecoregion is important for seabird colonies like Leach's Storm Petrel (*Hydrobates leucorhous*), Atlantic Puffin (*Fratercula arctica*), Black-legged Kittiwakes (*Rissa tridactyla*), Common Murre (*Uria aalge*), and Northern Gannets (*Morus bassanus*) which nest in coastal habitat. Critical habitat for the Harlequin Duck (*Histrionicus histrionicus*), an at-risk species, is present within the ecoregion. A variety of other species breed on the coastal islands and headlands of the ecoregion, like Razorbill (*Alca torda*), Thick-billed Murre (*Uria lomvia*), Black Guillemot (*Cepphus grylle*), Herring Gull (*Larus argentatus*), Great Black-backed Gull (*Larus marinus*), Ring-billed Gull (*Larus delawarensis*), Common Eider (*Somateria mollissima*), Northern Fulmar (*Fulmar glacialis*), Manx Shearwater (*Puffinus puffinus*), Common Tern (*Sterna hirundo*), Arctic Tern (*Sterna paradisaea*), and Caspian Tern (*Hydroprogne caspia*). In more inland areas, species like Rough-legged Hawk (*Buteo lagopus*), Snowy Owl (*Bubo scandiacus*), Savannah Sparrow, and American Pipit can be found. Blackpoll Warbler (*Setophaga striata*), Dark-eyed Junco, and Northern Waterthrush are found in treed areas. Willow ptarmigan, Yellow Warbler (*Setophaga petechia*), and Wilson's Warbler (*Cardellina pusilla*) are found in shrubland (NLECC 2008c).

4.4.3.2 Species of Conservation Concern and Species at Risk

An ACCDC database search of the Project Area (2023) yielded 573 locations of rare avifauna (Appendix C),48 of which were unique species observations. There are nine SAR occurring in the Project Area that are designated as SAR in Newfoundland and Labrador (NL *ESA*) as well as federally (*SARA*) (Table 4.17) and four SOCC. Of the four SOCC present the Northern harrier (*Circus hudsonius*), Caspien tern (*Hydroprogne caspia*) and northern gannet (*Morus bassanus*) had the highest occurrences. These species typically occur in habitat near freshwater, coastlines, or ocean environments. The northern harrier is listed as an S3 species, the Caspien tern and northern gannet are both listed by ACCDC as S1B.

Table 4.16: SAR Avian Species Reported in the Project Area (ACCDC 2023)

Taxonomic Grouping	Scientific Name	Common Name	Species Status			
			SARA	NL *ESA*	COSEWIC	S-Rank
Passeriformes (Songbirds)	*Dolichonyx oryzivorus*	Bobolink	Threatened (2017)	Vulnerable (2015)	Special Concern (2022)	S1
	Euphagus carolinus	Rusty blackbird	Special Concern (2017)	Vulnerable (2020)	Special Concern (2017)	S2S3
Apodiformes	*Chaetura pelagica*	Chimney Swift	Threatened (2009)	Threatened	Threatened (2018)	SNR
Caprimulgiformes (Nightjar)	*Chordeiles minor*	Common Nighthawk	Special Concern (2023)	Vulnerable (2022)	Special Concern (2018)	SNA
Anseriformes (Waterfowl)	*Histrionicus histrionicus*	Harlequin duck	Special Concern (2003)	Vulnerable (2001)	Special Concern (2013)	S3
Charadriiformes (Seabirds)	*Pagophila eburnean*	Ivory Gull	Endangered (2009)	Endangered (2006)	Endangered (2023)	S1
	Charadrius melodus	Piping plover	Endangered (2003)	Endangered (2000)	Endangered (2013)	S1
	Calidris canutus	Red knot	Endangered (2012)	Endangered (2007)	Endangered (2020)	S2
Strigiformes (Owls)	*Asio flammeus*	Short-eared owl	Special Concern (2012)	Threatened (2022)	Threatened (2021)	S3

Bobolink

The bobolink is listed as Threatened under SARA and Vulnerable under the NL *ESA*. The bobolink breeds along the southern portion of all Canadian provinces including Newfoundland and Labrador. Across its breeding range, bobolinks nest in a range of open habitats including native tall-grass prairie, hayfields, cultivated crop-fields, salt marshes, and graminoid peatlands. The bobolink may occur in salt marshes or grassy areas surrounded by woodland which occur in the south coast barrens subregion within the Project Area (COSEWIC 2010).

Rusty Blackbird

The rusty blackbird is listed as Vulnerable under the NL *ESA* and of Special Concern under SARA. Rusty Blackbirds are part of the icterids family, they are a medium sized bird with a distinct rust coloring on their black plumage. They breed along wetland edges (COSEWIC 2017) and due to the number of wetlands identified within the Project Area via desktop review, suitable habitat is present within the Project Area for this species. Suitable habitat for the Rusty blackbird is most abundant in the south coast barrens ecoregion.

Chimney Swift
The Chimney swift is listed as Vulnerable under the NL *ESA*. This species is the only known swift species in North America. Swifts are aerial foragers, concentrating near water where insects are abundant. While rare, sightings within the province have been concentrated on the southeast coast of Newfoundland. The eastern ocean hyper barrens ecoregion of the Burin Peninsula creates ideal habitat for both foraging and nesting due to its food source available and nesting sites. Chimney swifts prefer hollow logs or trees, and snags are common in the southern portion of the Project Area as tree growth is stunted due to high winds and poor soil conditions (COSEWIC 2018a).

Common Nighthawk
The common nighthawk is listed as Vulnerable under the NL *ESA* and of Special Concern under SARA. The breeding range of the common nighthawk includes all Canadian provinces and territories, except for Nunavut. The common nighthawk is an aerial insectivore and is associated with open habitats including recently burned forest, clear cuts, barrens and open fields which are present in the Project Area (COSEWIC 2018b). The breeding range of the Common nighthawk does not encompass any part of the island of newfoundland, however, there have been recorded sightings in the Project Area.

Harlequin Duck
Harlequin duck is listed as Vulnerable under the NL *ESA*. The Harlequin duck is a small subarctic sea duck which breeds mostly in fast flowing rivers throughout Quebec and NL. Wintering habitat consists of rocky coastline, subtidal ledges, and exposed headlands (COSEWIC 2013a). They can often be found in Cape St. Mary's Ecological Reserve (Drawing 4.12, Appendix A) and suitable habitat is present within the Project Area.

Ivory Gull
The Ivory Gull is listed as Endangered under SARA and the NL *ESA*. The Ivory gull has a circumpolar breeding distribution across the high Arctic, with small, scattered colonies in North America. Ivory gulls winter among the pack ice of the Davis Strait, Labrador Sea, Strait of Belle Isle, and northern Gulf of St. Lawrence (COSEWIC 2006). The Ivory gull is unlikely to be found in the Project Area as it falls outside the typical range for this species (COSEWIC 2006).

Piping Plover
Piping plover is listed as Endangered under SARA and the NL *ESA*. The piping plover is a small shorebird that has limited habitats throughout its geographic range. The Piping Plover requires specific habitats to successfully achieve nesting, brood-rearing, feeding, and overwintering. The Project Area encompasses many beaches which may be ideal nesting habitat for piping plover as this species nests on wide sand, gravel, or cobble beaches, barrier island sandspits, or peninsulas in marine coastal areas (COSEWIC 2013b).

Short-Eared Owl

Short-eared owls are listed as Threatened under SARA and the NL *ESA*. Short-eared owls are associated with grasslands and barrens of subarctic and temperate environments. Their populations are typically irruptive and nomadic as they track small mammals across the landscape. Nearly all records of this species in insular Newfoundland have been from coastal regions including the southern region of the Burin Peninsula. Given the amount of open, barren habitat in the Project Area, there is potential for short-eared owls to occur in this region during both the breeding and migration periods (May to September) (COSEWIC 2021a).

4.4.3.3 Remote Sensing Surveys

Avian Radar Assessment

EverWind followed recommendations within the “Environment and Climate Change Canada's Canadian Wildlife Service (CWS) (Atlantic Region) - Wind Energy & Birds Environmental Assessment Guidance Update” (CWS 2022) to complete radar surveys for the Project.

Radar surveys were conducted using radar units consisting of Simrad Halo 20+ pulse compression marine surveillance radar angled diagonally at 45°. Each radar 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. The systems in their entirety were designed to be mobile, so the movement of the radar was possible throughout a season, if desired.

Five radar units were deployed across six[4] locations through the Project Area (Drawing 4.13, Appendix A), With the most northerly radar located near North Powderhorn and the most southerly radar located near Lamaline. The radars operated continuously during day and night, between December 2022 and December 2023, to cover both periods of spring and fall migration, per CWS guidance (CWS, 2022). Intermittent interruptions of data collections occurred due to extreme weather events, and/or technical challenges such as power interruptions and equipment malfunction. Data was retrieved from each radar approximately once per month when conducting routine equipment condition checks. Videos produced by the radar were recorded and archived for subsequent analysis.

Avian radar scans will be processed using the radR platform—an open-source platform designed for the processing of radr data for biological applications—and outputs analyzed using Microsoft Excel (Taylor et al, 2010). Standard settings for the identification of biological targets (BT), such as birds, and bats will be used. Targets reflected by the radar generate blips in the image of the radar scan. radR 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 to be 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

[4] The radar in North Powderhorn was relocated to the St Lawrence location to increase coverage in the LBP Wind Farm

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.

Avian Acoustic Assessment

The avian acoustic assessment was conducted using Autonomous Recording Units (ARUs). The ARUs were deployed adjacent to the radar units and are intended to document calls of migrating avian species during the night. ARUs were set to record from approximately sunset to sunrise while spring and fall radar sampling occurred. The recorded data were saved as compressed .wav files on high-capacity secure digital cards inside the units. Secure digital cards were retrieved and replaced with each radar maintenance check, approximately once per month.

Avian Radar and Acoustic Results

Analysis of the radar and ARU data will be conducted in conjunction with future avian studies to inform the EIS.

4.4.4 Bats

A desktop study was conducted to identify potential bat species known to reside in the Project Area or frequent it at some point during their life history.

The following laws and regulations apply to bats, within the Project Area:

- *SARA* (2002)
- NL *ESA* (2004)
- *CWA* (1985)

Three species of bats are native to the Island of Newfoundland: little brown bat (*Myotis lucifugus*), northern long-eared bat (*Myotis septentrionalis*), and the hoary bat (*Lasiurus cinereus*). The little brown bat is the most common species on the Island of Newfoundland. The little brown bat and the northern long-eared bat are listed as Endangered under *SARA* but are not listed provincially (*SARA* 2002; NL *ESA* 2023). The hoary bat is not listed but was assessed as Endangered in 2023 by COSEWIC.

Table 4.17: Potential SAR and SOCC Bat Species in the Project Area

Scientific Name	Common Name	Species Status			
		SARA	NL *ESA*	COSEWIC	S-Rank
Myotis septentrionalis	Northern Long-eared bat	Endangered (2014)	Not listed	Endangered (2013)	S2S3
Myotis lucifugus	Little brown bat	Endangered (2014)	Not Listed	Endangered (2013)	S4
Lasiurus cinerus	Hoary Bat	Not Listed	Not Listed	Endangered (2023)	SNR

4.4.4.1 Northern Long-eared Bat (Myotis septentrionalis)

The northern Myotis occurs in all the Atlantic provinces. Northern Myotis are forest dwelling gleaners (they eat stationary insects), although they are known to be aerial forages as well. They hunt throughout the night close to the understory of vegetation (1-3m above ground level). The northern myotis generally roosts either solitary or in small groups and maternity roosts are often found in cavities in large trees. However, anthropogenic structures have also been used. Once pups are born, females will often leave the maternal roost with their pups to find smaller roosts. Usually they utilize cavities, crevices under loose bark. They change their roost every few days. These roosts are usually found within less than one kilometer of foraging sites (COSEWIC 2014).

4.4.4.2 Little Brown Bat (Myotis lucifugus)

Little brown Myotis is the most widespread bat species in Atlantic Canada. This bat species is a cavity rooster which utilizes both natural (caves/snags) and human-made roosts (bridges/cabins). Females roost in large maternal colonies up to 1,000 individuals. This species is an aerial forager, they generally forage at night at a height of 1-6 m above or near water. They can also be found foraging along forest canopy, open clearings and streets. (COSEWIC 2013c).

Little brown Myotis prefer to roost within at least one kilometer of a water source as their preferred foraging habitat is above or near water. Thehibernacula of little brown myotis typically includes abandoned caves, mines, cabins or other covered structures. This species is known to frequent anthropogenic structures which have optimal conditions such as low temp (1-5 degrees) and High humidity (70-90%) (COSEWIC 2013c).

4.4.4.3 Hoary Bat (Lasiurus cinerus)

The Hoary bat is the largest bat in Canada and is a migratory species, It is widespread across Canada during the summer months however is s uncommon in Nova Scotia and New Brunswick, Prince Edward Island and Newfoundland.

Hoary bat typically forage in aquatic habitats, grasslands, open fields and along forest edges. While habitat use varies between seasons the species is capable of efficiently moving large distances to access required resources. This permits the species to occupy a wide diversity of habitats across their range (COSEWIC 2021b). It is presumed that Hoary bats fly far enough south in winter that they do not hibernate. They are a tree roosting species and are known to use both coniferous and deciduous forest of any age class, with maternity roosts tending to be large diameter trees (COSEWIC 2021b).

4.4.4.4 White Nose Syndrome

White nose syndrome (a highly pathogenic fungus – *Pseudogymnoascus destructans* – that affects hibernating bats) is cited as the leading cause for bat population declines in Canada. However, habitat loss (e.g., hibernacula, forage area destruction), and direct mortality (e.g., WTGs collision or barotrauma) also cause mortality (Environment Canada 2015). As of 2022, White nose syndrome has not been detected in the Newfoundland populations of hibernating bats.

A study conducted by Washinger et al. (2020) concluded that Hoary bats are infrequent visitors to the island of Newfoundland and are most likely to be detected as they travel along migratory pathways (western coast of the island). While Little myotis are expected to be found in older growth forests, the Northern Myotis is likely to occur in newer growth or scrub habitat. Both bat species require proximity to open water, forest canopy, and open corridors for foraging (COSEWIC 2021b).

Roosting habitat also varies between resident species as Little myotis prefers large colonies in caves, mines, cabins or other covered structures, the Northern myotis is more solitary and can roost in cavities, crevices or the bark of a tree (COSEWIC 2013c). Based on this information there is shared foraging habitat however no overlap in roosting preference. Within the Project Area there is an abundance of forested habitat therefore bat species may be distributed throughout the region.

4.4.5 Terrestrial Fauna

A desktop analysis was conducted to identify and characterize potential terrestrial SAR and SOCC (as defined in section 4.3.1) within the Project Area, as well as other legislatively protected terrestrial wildlife species and species that may be of socio-economic concern.

In addition to *SARA (2002)*, other legislation relevant to terrestrial fauna includes:

- *CWA* (1985)
- NL *WLA* (1996)
- NL *ESA* (2023)
- *CEPA* (1999)
- NL *EPA* (2002)

The desktop analysis was conducted using the following data sources:

- Atlantic Canada Conservation Data Centre (ACCDC) report (ACCDC 2023)
- COSEWIC reports (COSEWIC 2022)
- NL FFA Zone 2 and 3 forestry operation plans (NLFFA 2016)

Based on historic records and recent observations, terrestrial mammals in the Project Area include woodland caribou (Rangifer tarandus caribou), moose (*Alces alces*), American black bear (*Ursus americanus*), Canada lynx (Lynx canadensis), eastern coyote (*Canis latrans*), red fox (*Vulpes vulpes*), river otter (*Lutra canadensi*s), American mink (*Neogale vison*), ermine (*Mustela erminea*), snowshoe hare (*Lepus americanus*), red squirrel (*Tamiasciurus hudsonicus*), eastern chipmunk (*Tamias striatus*), deer mouse (*Peromyscus maniculatus*), meadow vole (Microtus pennsylvanicus), masked shrew (*Sorex cinereus*), beaver (*Castor canadensis*), and muskrat (*Ondatra zibethicus*) (NLFFA 2016; NLFFA 2024b). Except for caribou (see section 4.4.5.1), no other wildlife species identified in the Project Area are listed under *SARA* (2002) or NL *ESA* (2023). In addition to caribou, muskrat have been identified as SOCC due to significant population declines occurring over the last 20 year.

4.4.5.1 Woodland Caribou

Caribou are a culturally important species for diverse stakeholder (i.e., harvest, cultural, recreational, and ecological value, on the island of Newfoundland). The Newfoundland sub-population of caribou are currently listed as Special Concern under Schedule 1 of *SARA* (2002). Although no caribou populations on the island of Newfoundland are listed under the NL *ESA*, three caribou herds in Labrador are currently listed as Threatened (NL *ESA* 2023).

Caribou were translocated from other herds in Newfoundland to the Burin Peninsula in the mid-1900s. As of 2015, three herds were recognized on the Burin Peninsula, the Burin foot herd, the Burin knee herd, and the Cape Roger herd (COSEWIC 2014). Burin caribou were formerly managed under Provincial caribou management areas 73 and 74, though, harvest no longer occurs in these areas (NLFFA 2024a). The last publicly available survey on the Burin caribou occurred in 1995, where it was estimated that approximately 500 animals occupied the Burin Peninsula and that the population was increasing (COSEWIC 2014).

Very little data exists on Burin Peninsula caribou. Research from elsewhere on Newfoundland suggests that open barrens and shrub land are particularly important to caribou (Schaefer et al. 2016; Bastille-Rousseau et al. 2018). At broad spatial scales, caribou typically avoid dense coniferous forests, and at fine spatial scales, they tend to spend less time in dense coniferous forest, suggesting at finer scales, coniferous forest may be a more important habitat for movement rather than forage resources (Schaefer et al. 2016; Bastille-Rousseau et al. 2018). As such, it is expected that wetland and barren/shrubland habitats located within the Project Area may be particularly important for the Burin caribou.

4.4.5.2 Muskrat

Muskrat is a rodent native to the island of Newfoundland, with cultural importance to trappers and Indigenous Peoples. Muskrat populations across much of North America are in decline, with similar declines presumed in Newfoundland (Sadowski and Bowman 2020). Muskrat is a semiaquatic species that use a variety of wetlands and stagnant or slow-moving waterbodies (Boutin and Birkenholz 1987). Muskrats rely on bank burrows or constructed lodges for overwintering habitats, and prefer cattails, sedges, iris, horsetails, and rushes as forage. Hence, ideal muskrat habitats are restricted to wetland environments with preferred forage resources and with banks that could facilitate den construction (Ganoe et al. 2021).

Wetland delineation and classification, which is addressed in the wetland section of this document (Section 4.4.1.3), will contribute to modelling high value muskrat habitat within the Project Area that will be completed as part of the EIS.

4.4.5.3 Camera Trap Studies

Field studies involved the deployment of camera traps (Cabela's B48CABG4) on the Burin Peninsula. Camera traps were deployed broadly and generally to assess the potential occurrence of medium to large-sized mammals in the Project Area. As such, the camera results can be used to comment only on the occurrence of medium to large-sized mammals. Remote camera traps (n = 35) were deployed across a spatial extent of 125 km between the northern and southern-most cameras (Drawing 4.13, Appendix A). Cameras were placed approximately 1.5 m above ground and fixed to trees. Camera traps were deployed on May 11, 2023, and remained active until April 15, 2024. Twelve camera traps were established in the conifer forest landcover type, 17 camera traps were established in shrubland/barrens or edge habitats, and 6 camera traps in wetland habitats. Data was collected for a total of 11,955 camera trapping days.

Six terrestrial mammal species were recorded, as follows:

- Woodland caribou
- Moose
- Eastern coyote
- Canada lynx
- Red fox
- Snowshoe hare

Caribou were observed in camera traps located in MBP (and overlapping SIA) and UBP Wind Farm only. No instances of caribou were identified in any camera traps located in LBP Wind Farm.

Table 4.18: Species of Terrestrial Fauna Documented and Number of Independent Detections at Camera Traps

\Common Name	Scientific Name	Number of Independent observations	Number of Independent Observations in Each Habitat Classification		
			Coniferous Forest	Shrubland / Barrens	Wetland
Woodland caribou	*Rangifer tarandus*	8	0	8	0
Moose	*Alces alces*	185	88	84	13
Eastern Coyote	*Canis latrans*	17	8	9	0
Canada lynx	*Lynx canadensis*	3	3	0	0
Red fox	*Vulpes vulpes*	3	1	1	1
Snowshoe hare	*Lepus americanus*	8	5	3	0
Note: An independent detection is defined as photographs of the same species with no fewer than one hour between them.					

To assess how wildlife species presence changes throughout the year, Strum created Probability Density Functions (PDFs) based on the number of species occurrences in each month. PDFs determine the relative probability of an event occurring based off all other events in the data set. Thus, our figures represent the months where each species is more likely to be detected by our camera traps (Figure 4.4).

Our PDFs show that ungulate species (i.e., moose and caribou) are more likely to be observed at camera traps in later summer than in fall (Figure 4.4). This result corresponds with general ungulate movement, which are generally less in winter than in summer from constraints of snow depth. In addition, ungulate movements tend to be higher in the fall surrounding breeding and dispersal periods (Simkin 1965; Geist and Walther 1974).

PDFs for other species (i.e., eastern coyote, Canada lynx, and snowshoe hare) show peaks in occurrence during late winter and spring (Figure 4.4). These peaks correspond to breeding and juvenile dispersal periods for eastern coyote, Canada lynx, and snowshoe hare (Dodds 1965; Harrison 1992; Poole 1997).

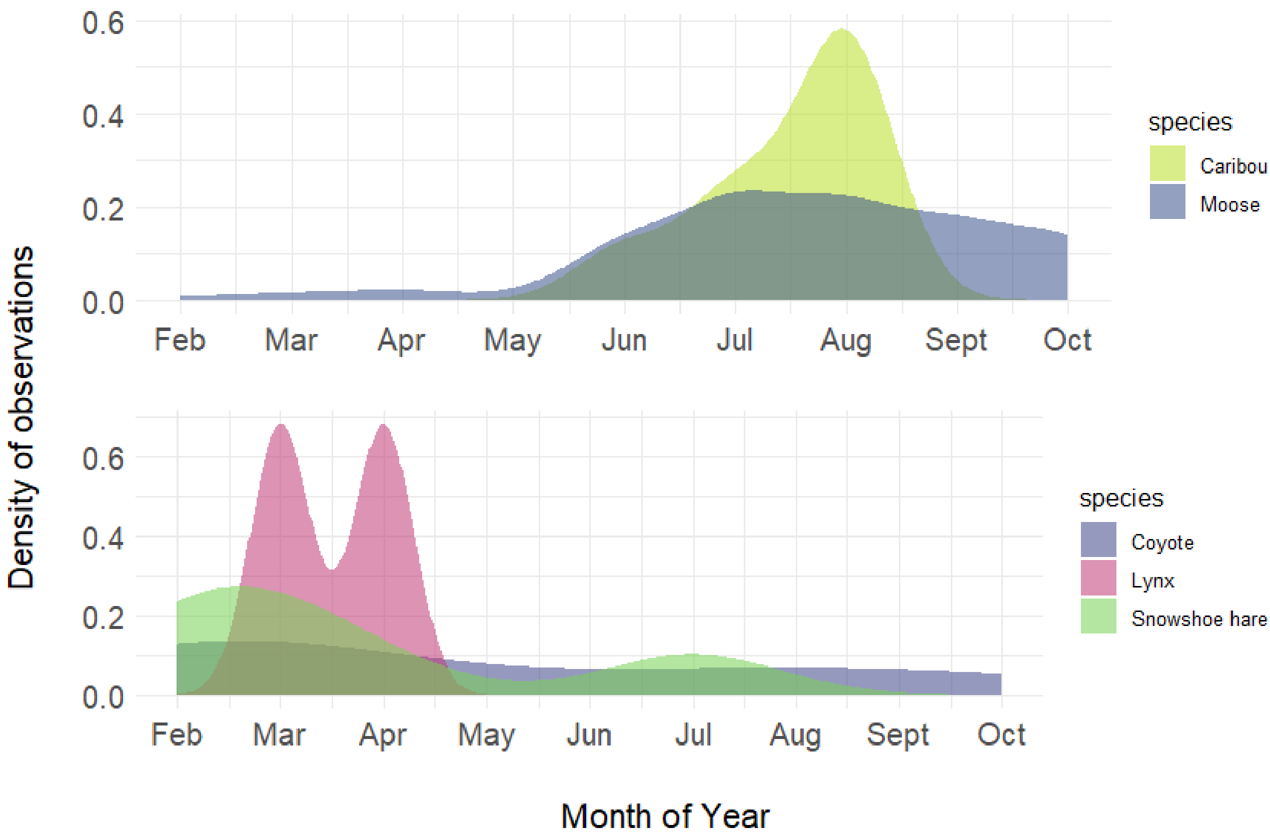

Figure 4.4: Probability Density Plots of Observed Terrestrial Mammal Species, at Camera Traps Within and Near the Project Area, in Relation to the Julian Month Photographs were Taken

4.4.5.4 Moose

Moose are not a SAR or SOCC but are culturally important to Newfoundland. The Project Area lies within Moose Management Areas 30 and 38, where a combined 925 moose tags are allocated each year (Newfoundland and Labrador Wildlife Division 2022). Moose population size estimates have not been conducted for the Burin recently, however, provincial management is targeting a density of 1 moose per km^2 on the peninsula.

Using data from deployed camera traps, Strum implemented an occupancy analysis on moose presence data following methods in Mackenzie et al. (2002). Strum investigated how moose occupancy of camera trap sites was influenced by habitat classification. Though results were not statistically significant, the occupancy model suggested conifer forest habitat along the Burin Peninsula are more likely to be occupied by moose compared to barren shrubland and wetland habitats (Figure 4.5). All three habitat types, however, had mean occupancy rates over 50%, suggesting that over half of all habitats on the Burin Peninsula may be occupied by moose.

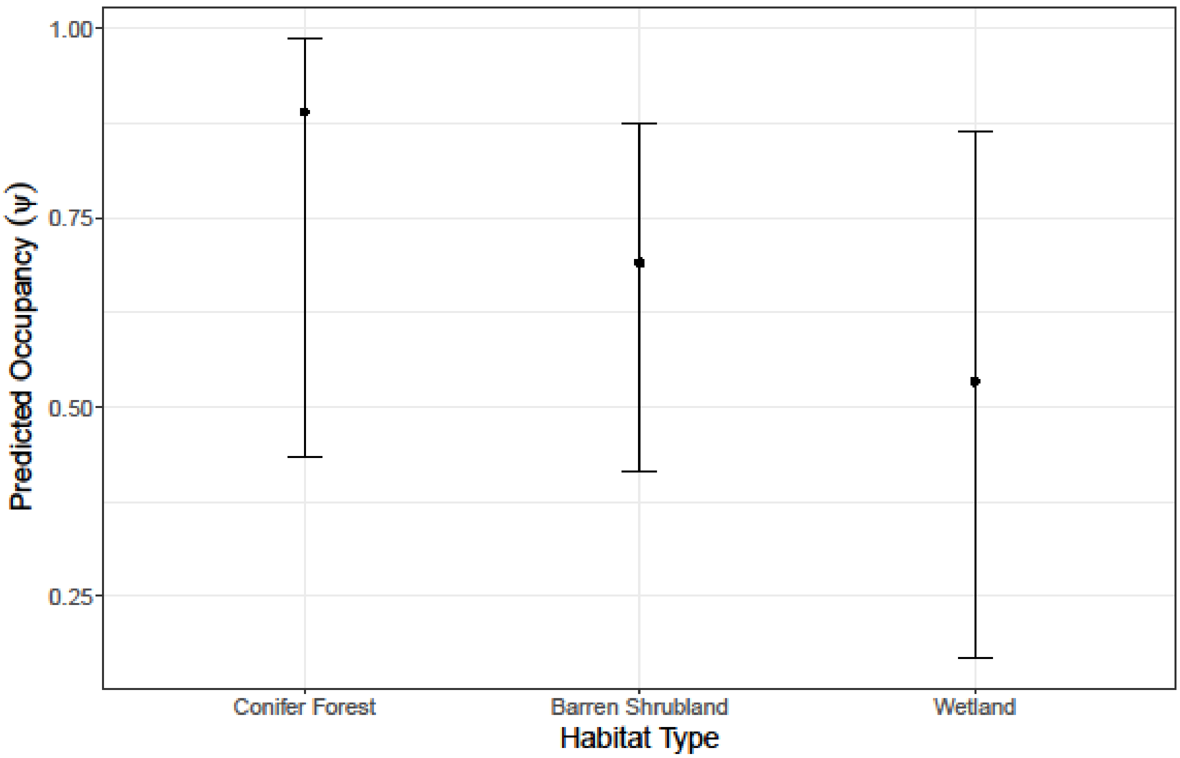

Figure 4.5: Predicted Probabilities of Site Occupancy (Ψ), and 95% Confidence Intervals, by Moose Across the Three Landcover Types (Conifer Forest, Barren Shrubland, And Wetland) Where Our Camera Traps (N = 35) Were Deployed Along the Burin Peninsula

The following tables document species occurrences at each camera trap, camera trap location, and the associated habitat classification for each camera.

Table 4.19: Terrestrial fauna species detections at remote camera traps, partitioned by species occurrence and camera trap ID.

Camera Trap ID	Lat	Long	Habitat Classification	Number of independent Detections at Camera Trap Locations					
				Woodland Caribou	Moose	Eastern Coyote	Canada Lynx	Red Fox	Snowshoe Hare
Strum 16	47.1056	-55.3921	Coniferous forest	0	13	0	0	0	0
Strum 21	47.4380	54.8818	Coniferous forest	0	18	2	2	0	1
Strum 32	47.4433	54.9076	Coniferous forest	0	3	0	0	0	0
Strum 33	47.4407	54.8946	Coniferous forest	0	4	1	1	0	0
Strum 34	47.1093	-55.3845	Shrubland barrens	0	19	0	0	0	0
Strum 35	47.2665	-55.0770	Shrubland barrens	0	2	11	0	1	2
Strum 36	47.2658	-55.0756	Wetland	0	6	0	0	1	1
Strum 39	46.9842	-55.4036	Coniferous forest	0	0	0	0	0	0
Strum 40	46.9921	-55.3963	Coniferous forest	0	5	0	0	0	0
Strum 41	47.0485	-55.6267	Shrubland barrens	0	0	0	0	0	1
Strum 42	47.0033	-55.3974	Shrubland barrens	0	0	0	0	0	0
Strum 44	46.9628	-55.7996	Shrubland barrens	0	0	0	0	0	0
Strum 45	46.9710	-55.4045	Coniferous forest	0	9	0	0	0	0
Strum 46	46.9685	-55.4771	Shrubland barrens	0	8	0	0	0	0
Strum 50	46.9699	-55.4753	Wetland	0	0	0	0	0	0
Strum 51	46.9699	-55.4061	Wetland	0	1	0	0	0	0
Strum 52	47.7060	-54.6331	Wetland	0	7	0	0	0	0
Strum 54	47.4264	-54.9800	Coniferous forest	0	3	1	0	0	0
Strum 55	47.4286	-54.9901	Wetland	7	8	0	0	0	0
Strum 56	47.2710	-55.0911	Wetland	0	4	0	0	0	0
Strum 57	47.2744	-55.0935	Coniferous forest	0	21	0	0	0	1
Strum 58	47.2697	-55.0953	Coniferous forest	0	5	2	0	1	2
Strum 59	47.2974	-55.0497	Shrubland barrens	0	3	0	0	0	0
Strum 60	47.3011	-55.0581	Shrubland barrens	1	3	0	0	0	0
Strum 61	47.2927	-55.0462	Wetland	0	5	0	0	0	0
Strum 63	46.9828	-55.5088	Wetland	0	0	0	0	0	0

Camera Trap ID	Lat	Long	Habitat Classification	Number of independent Detections at Camera Trap Locations					
				Woodland Caribou	Moose	Eastern Coyote	Canada Lynx	Red Fox	Snowshoe Hare
Strum 65	47.0432	-55.7910	Shrubland barrens	0	2	0	0	0	0
Strum 66	47.0232	-55.7980	Shrubland barrens	0	0	0	0	0	0
Strum 67	47.7060	-54.6331	Wetland	0	2	0	0	0	0
Strum 68	47.6699	-54.6183	Shrubland barrens	0	27	0	0	0	0
Strum 69	47.2289	-55.1996	Coniferous forest	0	7	0	0	0	0
Strum 70	47.2362	-55.1901	Coniferous forest	0	0	0	0	0	0

Note: An independent detection is defined as photographs of the same species with no fewer than one hour between them.

4.5 Land & Resource Use

The Project will be on Crown Lands and, within the constraints of efficient construction and operation, located to minimize potential impacts to local land users. The Industrial Facility is located on lands in the municipal planning area of the Town of Marystown that are in the process of being rezoned to accommodate industrial use. All designated cottage planning areas have been previously excluded from the Project Area, as have all identified parks, ecological reserves and sensitive wildlife or stewardship areas in the region. Access roads and trails exist throughout the Project Area, which are frequented by recreationalists for snowmobiling, hunting, and ATV use (as documented during public engagement sessions; Section 8.0). Drawings 3.2, 4.5, 4.6, 4.14, 4.15, and 4.16 (Appendix A) show current land use identified on the Newfoundland and Labrador Land Use Atlas. The following section outlines important land use activities that may occur within the Project Area.

EverWind values public engagement and has conducted over 50 community engagement sessions since 2022 across the Bruin Peninsula from Swift Current in the north to Point May in the south (Section 8.0). In addition, EverWind created a digital Information Knowledge portal at its Marystown office for the public to learn about the proposed Project and to identify and document on a map any areas of concerns such as cabins, hunting areas etc. In 2024 approximately 40 people have registered formal visits to the EverWind Marystown office and seven have used the Information Knowledge portal to identify areas of concern. This excludes the large number of regular local visitors who frequent the office for general updates on the project and to meet with EverWind team members.

EverWind has used public feedback during its 2023 MET Tower placement program for wind and solar data collection to effectively communicate and mitigate public concerns. One example of this adaptive management process involved re-scheduling helicopter slinging operations during MET Tower erection to avoid the opening weeks of ptarmigan (partridge) hunting season, an activity valued by many residents, and one specifically identified during Project engagement activities with local ATV trail associations. Engagement activities will continue as engineering design progresses so that public feedback can be obtained and used to mitigate other environmental and socio-economic effects.

4.5.1 Public Protected Water Supply Areas

Thirty-eight Public Protected Water Supply Areas (PPWSAs) occur along the Burin Peninsula, totaling a surface area of 357.96 km^2 (Drawing 4.6, Appendix A). This figure represents protected water supplies as well as high value water supply areas. PPWSAs are areas of land surrounding a public drinking source, protected under Section 39 of the NL *WRA* (2002), to prevent degradation of potable water. Thirty-four PPWSAs border or are surrounded by the Project Area, however, no PPWSAs directly overlap with the Project Area.

4.5.2 Protected Areas

The Project Area does not overlap with any currently designated Protected Areas (e.g., provincial parks, sensitive wildlife areas). Numerous Protected Areas, however, fall outside of or are adjacent to the Project Area. These protected areas include Fortune Head Ecological Reserve, Frenchman's Cove Provincial Park, Lawn Bay Ecological Reserve, two sensitive wildlife zones, an experimental wildlife area, and multiple eelgrass restoration areas (refer to Section 4.3.4.3) (Drawing 3.2, Appendix A).

4.5.2.1 Fortune Head Ecological Reserve

In Newfoundland and Labrador, ecological reserves are smaller areas (less than 1,000 km^2) designed to protect representative ecosystems. These representative ecosystems contain unique, rare, or Endangered plants, animals, or other elements related to Newfoundland and Labrador natural heritage (NLECC n.d.). Fortune Head Ecological Reserve is a 2.21 km^2 reserve at the southwestern edge of the Burin Peninsula, 1.6 km west of the community of Fortune and will border the Project Area (Drawing 3.2, Appendix A). The rocks in the exposed low cliffs represent the geological boundary between the Precambrian Era and the Cambrian Period, therefore, in 1992 the International Union of Geological Scientists chose to designate Fortune Head as a prime example of this significant global geological feature. Fortune Head Ecological Reserve also acts as a source of tourism for the town of Fortune (NLECC n.d.).

4.5.2.2 Lawn Bay Ecological Reserve

Lawn Bay Ecological Reserve is comprised of three islands, and surrounding marine environment, located ~1 km off the south coast of the Burin Peninsula and approximately 2.5 km east of the Project Area. Lawn Bay is the only known location in geopolitical North America where Manx shearwater (*Puffinus puffinus*) are known to breed. In addition, Lawn Bay Ecological Reserve provides nesting habitat for other shorebird species including, Leach's storm-petrels, Arctic tern, greater black-backed gull, and black-legged kittiwake. As Lawn Bay is an important seabird breeding location, access to the islands is strictly prohibited without a research permit (NL Parks 2015).

4.5.2.3 Frenchman's Cove Provincial Park

Frenchman's Cove is 0.51 km^2 provincial park located approximately 20 km west of Marystown and will border the Project Area (Drawing 3.2, Appendix A). The first documentation of Frenchman's Cove Provincial Park comes from Newfoundland and Labrador's first official census in 1836 and reference some of the first settlers of the region—from French origin. The park hosts locals and tourists on the Burin Peninsula, providing day-use, camping, and leisure activities. Frenchman's Cove is particularly important to bird watchers, as the combination of sands, tidal lagoons, mud flats, and surrounding forests provide unique habitat for shorebirds, waterfowl, and passerines including the provincially Threatened bobolink (NL *ESA* 2023) (Parks NL 2024).

4.5.2.4 Sensitive and Experimental Wildlife Areas

Numerous wildlife sensitive areas and wildlife experimental areas lie adjacent to the Project Area (Gov NL 2024a) (Drawing 3.2, Appendix A). Sensitive wildlife areas may pertain to SAR or SOCC species that inhabit the areas (e.g., caribou). Experimental wildlife areas may pertain to long term monitoring on terrestrial or marine wildlife, (e.g., aquaculture facilities, avian species monitoring programs). Though no sensitive or experimental wildlife areas overlap with the Project Area, EverWind will work with the Newfoundland and Labrador Wildlife Division to ensure Project activities do not interfere with mandates of the sensitive or experimental wildlife areas.

4.5.3 Forestry

The Project Area lies within the Zone 2 (District 2 and 3) forest management area on the island of Newfoundland (NLFFA 2016). Zone 2 harvest objectives attempt to emulate natural disturbances within the forest classification (i.e., relatively even-aged boreal forest). Silvicultural practices include irregular clearings, buffers to protect ecologically important features, and limiting viewshed impacts of harvest. Within the Project Area, 6.55 km^2 of land is currently allocated for silvicultural purposes (Drawing 4.14, Appendix A). The Project Area overlaps with land allocated for domestic harvest areas, important areas for local land users which represent land where personal cutting activity is permitted, within the Zone 2 forest management area (Gov NL 2024a).

4.5.4 Agriculture

Within the Southern Burin Peninsula, regional pasture and agricultural development areas partially overlap with the Project Area (Drawing 4.15, Appendix A). Regional pastures are community or not-for-profit operated parcels of land where proponents may buy in to allow livestock to graze on communal lands. Approximately 40 km^2 of regional pastureland overlaps with the Project Area on the southern-most tip of the Burin Peninsula.

Agricultural development areas are pieces of land set aside by NLFFA which recognize the agricultural potential of the land. As arable land is limited on the island of Newfoundland, agricultural development areas represent sufficient soil conditions and are important for the future longevity of agriculture on the island. There is a total of 230 km^2 of flagged agricultural development areas on the Burin Peninsula that are situated within the Project Area (Gov NL 2024a).

4.5.5 Tourism

Every year the Burin Peninsula hosts diverse tourists for its nature and ecological sites, local festivals and celebrations, and historic sites and towns. In addition, the Burin Peninsula receives transient tourists who may be travelling to St. Pierre et Miquelon—a French territory approximately 30 km off the coast of Fortune, NL. Popular tourist destinations on the Burin Peninsula include the town of Grand Bank, the town of Fortune, Fortune Head Ecological Reserve, and numerous hiking trails (Gov NL 2024b). Recently, community members from the Burin Peninsula identified sustainable eco-tourism as a focus and a goal of future tourism endeavors (The Harris Centre 2020). Ecotourism and sightseeing is the dominant form of tourism on the Burin Peninsula (e.g., Gov NL 2024b).

4.5.6 Hunting and Trapping

Harvest of big game and small game species are important activities of land users on the Burin Peninsula. During public engagement sessions (Section 8.0), community members indicated the importance of hunting (e.g., moose, ptarmigan, grouse etc.) in the region. The Project Area is located within Newfoundland and Labrador big game (moose and black bear) management areas 30 and 38. In addition, the Burin Peninsula is small game management area for ptarmigan) (NLFFA 2024d). In areas 30 and 38, moose harvest season is generally open from the beginning of September to late December. Black bear have two harvesting seasons, one in the spring (May–July) and one in the fall (September–November). Ptarmigan species are harvested in the fall (September–November) and grouse species in the fall and winter (September–December) each year.

The Project Area falls within the Newfoundland and Labrador trapping beaver fur zone 3. Beaver fur zone 3 contains 45 different traplines, 35 of which are currently listed as owned and active (NLFFA 2024e). In Newfoundland, furbearing species are allowed to be trapped on traplines, including, beaver (*Castor canadensis*), Canada lynx, American marten (*Martes americana atrata*), mink (*Neovision vision*), muskrat (*Ondatra zibethicus*), otter (*Lontra canadensis*), red squirrel (*Tamiasciurus hudsonicus*), wolf (*Canis lupus*), red fox, eastern coyote, and weasel species (*Mustela* sp.) (NLFFA 2024e).

4.5.7 Fisheries

Commercial, recreational, and Indigenous fisheries occur on the Burin Peninsula, within or adjacent to the Project Area. During public engagement sessions, members of the public indicated they fish recreationally within the Project Area and others stated that they fish commercially.

Additional details on fish species community and aquatic resource use are outlined sections 4.3.3 and 4.3.4.

4.5.7.1 Inland Fisheries

Freshwater fisheries target Atlantic salmon, ounaniche (i.e., landlocked Atlantic salmon), brook trout, brown trout, rainbow trout, American eels, and rainbow smelt. Trout and rainbow smelt fisheries typically extend throughout spring, summer, and fall (DFO 2024e) and occur in both waterbodies and watercourses.

The Atlantic salmon fishery carries social, economical, and cultural value. The Burin Peninsula falls under the salmon fishing zones 10 and 11, and the Project intersects 13 scheduled salmon rivers (see Section 4.3.4). The fishery is typically open from late Spring until the end of summer (DFO 2024e). In 2020, 20,574 Atlatinc salmon were retained in all of Newfoundland and 25,704 were released (DFO 2022e). Despite these numbers, Atlantic salmon angling rates in the Garnish River have declined by more than 60% compared to historical (1970's) captures. Retention of salmon is not permitted for Atlantic salmon caught in coastal waters or in non-scheduled waters.

American eel are targeted by commercial, recreational, and Indigenous fisheries (DFO 2024f). Fishing may occur on the Burin Peninsula for this species, given its known presence in the region. Across the Maritimes, the number of active commercial licenses have decreased to less than one-tenth of the number that were active a decade ago (DFO 2024f). Most landings of American eel originate from the commercial sector.

4.5.7.2 Marine Fisheries

The Burin Peninsula boarders the NAFO 3Ps division. Placentia Bay and Fortune Bay are both active coastal and offshore commercial fishing locations. Coastal fisheries include the American lobster (*Homarus americanus*) fishery, where the Burin Peninsula boarders the Newfoundland Lobster Fishing Area 10 and 11 (DFO 2021b). The lobster fishery is open 8-10 weeks in the spring and is controlled via licenses and trap limits. Traps are generally deployed in waters <20 m deep.

Scallops are another coastal fishery targeted by commercial, Indigenous, and recreational fisheries, where the commercial fishery targets both Icelandic scallops (*Chlamys islandica*) and sea scallops (*Placopecten magellanicus*). The Burin Peninsula also boarders the Newfoundland Scallop Fishing Area 10 and 11 (DFO 2019). In 2018, there are 771 commercial inshore scallop fishing licenses in Newfoundland and Labrador. The fishery is typically open April to December, with most fishing activity occurring in October. Scallop dragging was closed in Fortune Bay due to its negative effects on lobster and lobster habitat.

Other marine commercial fisheries in the region include groundfish fisheries (e.g., Atlantic cod, American Plaice), Atlantic herring, snow crab, whelk, capelin, mackerel, bluefin tuna, lumpfish, redfish, winter flounder, Greenland halibut, Atlantic halibut, squid, and sea cucumber. Atlantic cod (*Gadus morhua*) and capelin (*Mallotus villosus*) are also targeted by recreational fishers. Atlantic cod, queen crab (*Chionoecetes opilio*), and whelks (*Buccinum undatum*) account for the top three species caught in commercial fisheries in the 3Ps NAFO division (Figure 4.6; NAFO 2024).

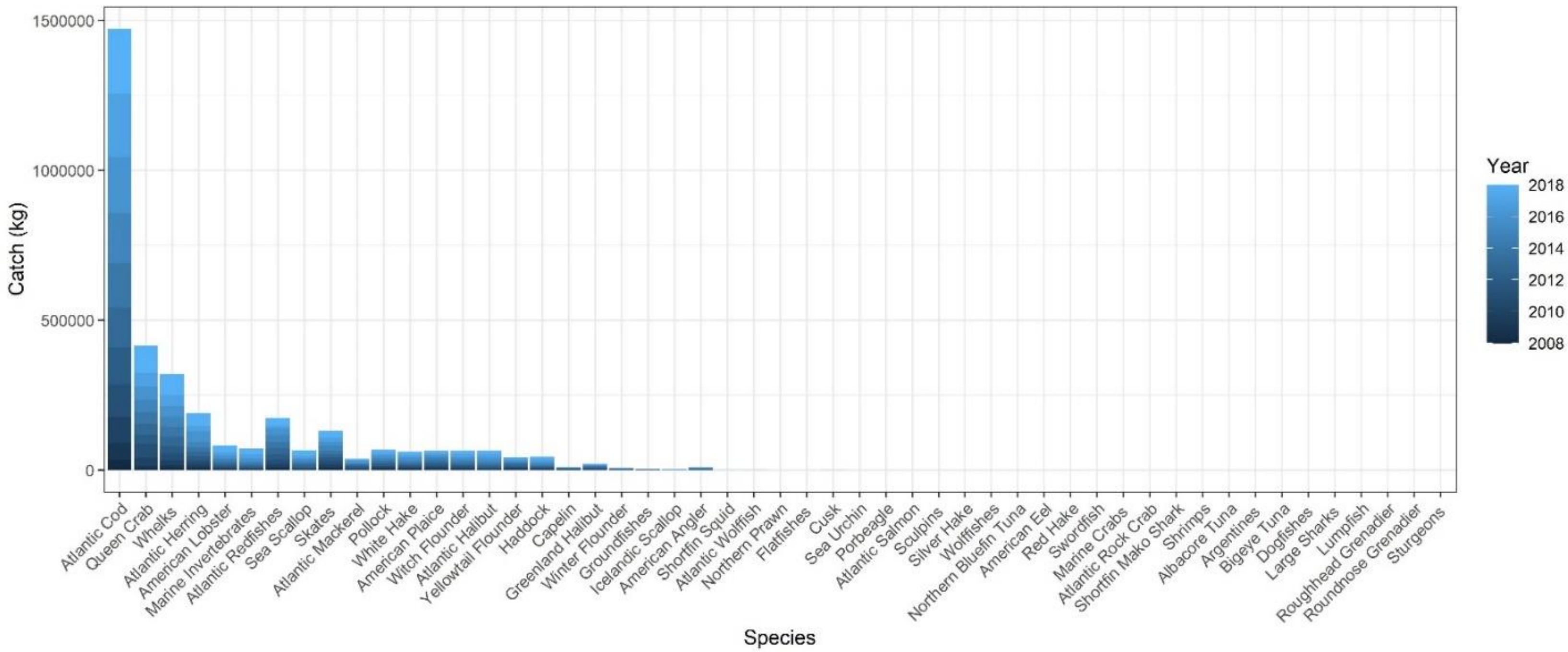

Figure 4.6: Fish Species Captured in Commercial Fisheries in NAFO 3Ps between 2008-2018 (NAFO 2024).

4.5.7.3 Aquaculture

There are seven active facilities within 5 km of the Project Area (Drawing 4.5, Appendix A). The location of these facilities and the species used for production are detailed in Table 4.20.

Table 4.20: Aquaculture Facilities within the 5 km buffer of the Project Area

Company Name	Facility Type	Species	Location
Marbase Cleanerfish Ltd.	Hatchery	Lumpfish	Marystown
Grieg NL Nurseries Ltd.	Hatchery	Atlantic Salmon	Marystown
Bernard Norman	Cod grow-out	Atlantic Cod	Jerseyman Island
Grieg NL Nurseries Ltd.	Cage culture	Atlantic Salmon	Gilbert's Cove
Grieg NL Nurseries Ltd.	Cage culture	Atlantic Salmon	Paradise Sound
Grieg NL Nurseries Ltd.	Cage culture	Atlantic Salmon & American Oyster	Paradise Sound
Grieg NL Nurseries Ltd.	Cage culture	Atlantic Salmon	Ship Island

A relatively new aquaculture facility (Grieg NL) was announced in Marystown, Newfoundland and Labrador and has been in development since 2023. The aquaculture facility focuses on post-smolt production of Atlantic salmon (NLFFA 2018). Marystown also contains two fish hatchery facility, one for Atlantic salmon and another for northern lumpfish (DFO 2024b).

4.5.8 Foraging

Foraging is a culturally important activity for Indigenous and local land users that occurs on lands near and within the Project Area. During public engagement sessions, members of the public indicated that they berry pick within the Project Area. Foraging may occur on various plant, mycological species such as:

- Blueberries (*Vaccinium* sp.)
- Bakeapple (*Rubus chamaemorus*)
- Partridgeberry (*Vaccinium vitis-idaea*)
- Chantarelles (*Cantharellus enelensis*; *Cantharellus tubaeformis*)
- Hedgehog mushrooms (*Hydnum repandum*)

4.5.9 Indigenous Land Use

The province of Newfoundland and Labrador is home to four peoples of Indigenous ancestry: the Mi'kmaq, Innu, Inuit and the Southern Inuit of NunatuKavut. The Innu are descended from Algonkian-speaking hunter-gathers that have inhabited parts of Labrador predating European arrival. The Inuit are descendants of the Thule people that have inhabited areas of north coast of Labrador for several hundreds of years. The Southern Inuit inhabit several communities in central and southern coastal Labrador and are descendants of Europeans and Labrador Native people primarily the Inuit. The Mi'kmaq live on the island of Newfoundland and are descendants of Algonkian-speaking hunter-gathers from various parts of what is now Atlantic Canada (Heritage NL 2024).

On the island Newfoundland there are two Mi'kmaq First Nations: Miawpukek First Nation formerly known as the Conne River Indian Reserve, and the Qalipu First Nation. The Miawpukek control the reserve of Samiajij Miawpukek in Bay d"Espoir. Qalipu First Nation established in 2011 is what Indigenous and Northern Affairs Canada calls a "landless band," meaning that Qalipu First Nation does not have any designated reserve lands. Qalipu First Nation's membership is spread across 67 traditional Newfoundland Mi'kmaq communities including Swift Current (Qalipu First Nation 2021).

EverWind recognizes that Indigenous peoples may reside in the local communities and undertake various commercial, recreational and traditional activities throughout the region. EverWind is committed to continuing engagement, learning, and where possible and appropriate incorporating Indigenous knowledge in the planning and implementation of this Project.

4.6 Heritage & Cultural Resources

The Arts and Heritage Division of the Department of Tourism, Culture, Arts, and Recreation with the Government of Newfoundland and Labrador is responsible for supporting the preservation and management of arts and heritage across the province, including the operation of the Provincial Archaeology Office (PAO). The Division is guided by the *Historic Resources Act*, RSNL 1990, c H-4, with a mandate to protect historic resources and paleontological resources. A permit is required for any archaeological or paleontological investigations. The PAO reviews the need for historic resources impact assessments through the review of land use referrals submitted by government agencies and the private sector, including the Environmental Assessment Division. Strum engaged local heritage consultant Stephen Mills to conduct a desktop survey of cultural resources found on the Burin Peninsula (Appendix D).

The PAO Archaeological Sites Database lists 150 archaeological and ethnographic sites within or near the Burin Peninsula. Figure 4.7 shows the location of the identified sites in relation to the Project Area. Over two thirds of these sites are from the historical period and include 55 shipwrecks and 14 ethnographic sites. Forty-eight sites are associated with European/ Newfoundlander populations from the 18th and 19th centuries and 33 sites are attributed to pre-contact and historic period Indigenous groups including that of the Beothuk and Mi'kmaq. There are no paleontological resources recorded in the Project Area.

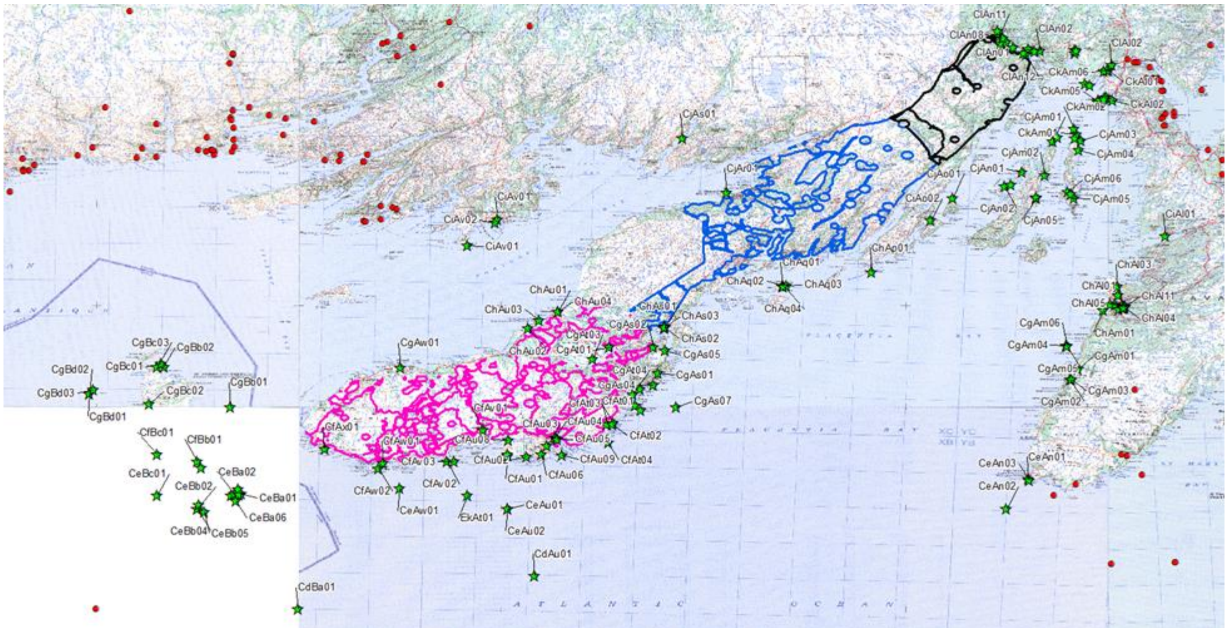

Figure 4.7: Map of the Burin Peninsula showing the Development Areas for the Wind Farms. The Area outlined in Black is the UBP, the Area outlined in Blue is the MBP and the Area outlined in Pink is the LBP. Map Courtesy of the Provincial Archaeology Office.

In Figure 4.7 the archaeological sites currently registered with the Provincial Archaeology Office are identified with green stars. The red dots are archaeological sites beyond the Study Area. Note: many of the sites on the Burin Peninsula coast are shipwrecks.

The archaeological sites recorded in Placentia Bay and Fortune Bay provide evidence for the presence of Indigenous and European inhabitants for thousands of years. Much of this evidence is limited to the coastal areas of the Burin Peninsula and the islands found off the peninsulas' coast. However, the lack of archaeological sites present within the interior portion of the peninsula is possibly due to a lack of survey effort. There are firsthand accounts from the nineteenth century along with nearby archaeological investigations that provided evidence that there may be unknown archaeological sites in the interior of the Burin Peninsula. Pre-construction archaeological surveys will be conducted based on guidance and direction from the PAO.

4.7 Communities

The Project is within the boundaries of Newfoundland and Labrador Census Division 2. Th3 largest communities within the region are Marystown, Burin, and Grand Bank (Drawing 4.16, Appendix A).

4.7.1 Population

Population statistics for the 2016 and 2021 Censuses are described in Table 4.21.

Table 4.21: Local Population

Population Statistics	Marystown	Burin	Grand Bank	Div 2
Population in 2021	5,204	2,237	2,152	19,392
Population in 2016	5,316	2,315	2,310	20,372
Population in 1981	6,300	2,800	3,885	30,280
Population change from 2016-2021 (%)	-2.1	-3.4	-6.8	-4.8
Population change from 1981-2021 (%)	-17.2	-20.1	-44.06	-36.0
Total private dwellings in 2021	2,607	1,155	1,162	11,551
Land Area (km^2)	62.26	34.49	16.82	5,915.59
Population density (per km^2)	83.6	64.9	127.9	3.3

Source: Statistics Canada 2022, Census of the Population

The median age for Division 2 (54.4) is older than the provincial median age (48.4) (Statistics Canada 2022). The average age for Division 2 (49.3) shows the same trend (Statistics Canada 2022). Of the three largest communities, Grand Bank has the highest median age at 58.4, with the other communities also all above the provincial median (Statistics Canada 2022).

Table 4.22: Age Distribution in Key Communities within the Project Area

Age Statistics	Marystown	Burin	Grand Bank	Div 2
0-14 years	680 (13.1%)	280 (12.5%)	210 (9.8%)	2,190 (11.3%)
15-64 years	3,165 (60.8%)	1,405 (62.7%)	1,125 (52.3%)	11,430 (58.9%)
65+ years	1,360 (26.1%)	555 (24.8%)	815 (37.9%)	5,780 (29.8%)
Total Population	5,205	2,240	2,150	19,400
Median Age	50.8	51.2	58.4	54.4
Average Age	46.7	46.8	53.3	49.3

Source: Statistics Canada 2022, Census of the Population

4.7.2 Schools

There are 12 grade school education facilities In in the Project Area (Table 4.23).

Table 4.23: Grade Schools and Locations across the Burin Peninsula

School	Grades	Location
Christ the King School	K-12	Rushoon
Donald C Jamieson	K-7	Burin
Fortune Bay Academy	K-12	St. Bernard's – Jacques Fontaine
Holy Name of Mary Academy	K-12	Lawn
John Burke High School	8-12	Grand Bank
Lake Academy	K-7	Fortune
Sacred Heart Academy	K-7	Marystown
Marystown Central High	10-12	Marystown
Pearce Junior High	8 – 9	Burin
St. Josephs Academy	K-12	Lamaline
St. Josephs All Grade	K-12	Terrenceville
St. Lawrence Academy	K-12	St. Lawrence
Swift Current Academy	K-12	Swift Current

In addition, there are two other schools not located on, but are only accessible from ferry services on the Burin Peninsula.

- Rencontre East – St. Stephens All-Grade – K-12 Ferry from Bay L'argent
- South East Bight – St. Annes School – K-10 Ferry from Petite Forte

4.7.3 Judicial

There is a single Royal Canadian Mounted Police (RCMP) detachment (and holding facility) in the Project Area, located in Marystown. There are no other satellite offices located in the Project Area. The T. Alex Hickman Courthouse is located in Grand Bank and supports Newfoundland and Labrador Supreme, Provincial, and Trial Courts

4.7.4 Health Centres and Medical Facilities

There are numerous health centres, providing emergency and clinic services, in the Project Area (Table 4.23). In addition, four family practice offices and four retirement living facilities serve the people of the Burin Peninsula (Table 4.24).

Table 4.24:Health Centres and Medical Facilities on the Burin Peninsula

Facility Type	Name	Location	Services
Health facility	Burin Peninsula Health Care Centre	Burin	Emergency (24/7) Clinic
	Terrenceville Medical Clinic	Terrenceville	Clinic (Nurse Practitioner, Appointment only)
	US Memorial Health Centre	St. Lawrence	Emergency (24/7) Clinic

Facility Type	Name	Location	Services
	Dr. S Beckley Health Centre	Grand Bank	Emergency (24/7) Clinic
	Placentia West Medical Clinic	Main Highway	Clinic
	Marystown Community Services	Marystown	Clinic Community Services Family Support
Family practice	Burin Family Practice	Burin Bay Arm	Clinic
	Fitzpatrick Family Practice	Burin Bay Arm	Clinic
	Dr. Power	Burin	Clinic
	Dr. Saunders	Burin	Clinic
	Dr. Roberts Clinic	Marystown	Clinic
	Dr. Moulton	Marystown	Clinic
	Dr. Surendra Meenaxi Acharya	Eastern Health Clinic - Bay L'argent	Clinic
Retirement living	Marystown Retirement Centre	Marystown	Retirement living
	Kingsway Living Grand Bank	Grand Bank	Retirement living
	Mount Margaret Manor	St. Lawrence	Retirement living
	Blue Crest Nursing Home	Grand Bank	Retirement living

4.7.5 Recreation Facilities, Museums, and Activities

There are a variety of recreational facilities, museums, outdoor activity facilities, and senior's clubs throughout the Project Area as outlined in Table 4.25

Table 4.25: Recreation Facilities, Museums and Activities on the Burin Peninsula

Activity type	Name	Location
Extracurricular	YMCA	Marystown
	F4K Dance Studio (private)	Marystown
	Soccer Association	Burin, Grand Bank, Marystown, St. Lawrence
	Softball Association	Burin, Marystown
Museums	Model Ship Museum	Marystown
	Seamans Museum	Grand Bank
	Miners Museum	St. Lawerence
	Heritage Grounds—Burin Heritage Museum	Burin

Activity type	Name	Location
Outdoor Activities	Golden Sands Resort	Burin
	Freshwater Pond Park	Burin
	Frenchmans Cove Provincial Park	Frenchmans Cove
	Grand Meadows Golf Course	Frenchmans Cove
	Summer Games Building	Marystown
	Fortune Head Ecological Reserve	Fortune
	Horsebrook Trailer Park – Camping Ground	Fortune
Senior's Activities	50+ Club	Burin
	Grand Bank senior citizen's club	Grand Bank
	Golden Age senior citizen's club	St. Lawrence
	Fortune senior citizen's club	Fortune

4.8 Economy, Employment, and Business

Average housing costs and average individual total incomes for the communities in the Project Area are all lower than the provincial and national averages, except for average income for Burin, which is higher than the provincial average but lower than the national average (Table 4.26).

Table 4.26: Housing Costs and Average Individual Income within Key Communities in Project Area

Jurisdiction	Average Dwelling Value in 2020	Average Total Income in 2020
Marystown	$205,400	$39,000
Burin	$196,400	$44,600
Grand Bank	$105,200	$35,000
Division 2	$148,800	$32,240
Province of Newfoundland Labrador	$246,800	$42,640
Canada	$618,506	$54,450

Source: Statistics Canada 2022, Census of the Population

The Project Area has a higher unemployment rate than the provincial and national average. The Project Area also generally has lower employment and participation rates than the province and Canada. A summary of the labour force is found in Table 4.27. The highest proportion of workers in the region are employed in healthcare and social assistance. A breakdown of top industries is found in Table 4.28

Table 4.27: Labour Force Statistics 2021 Census 25% Sample

Labour Statistic	Marystown	Burin	Grand Banks	Div 2	Nfld & Lab
Participation Rate	49.7	55.9	43.9	49.3	56.1
Employment Rate	39.5	45.7	36.1	39.5	47.5
Unemployment Rate	20.2	18.3	17.7	20.0	15.2

Source: Statistics Canada 2022, Census of the Population

Table 4.28: Top Industries for the Employed Labour Force

Industry	Marystown	Burin	Grand Banks	Div 2	Nfld & Lab
Health Care and Social Assistance	18.62%	23.74%	2.44%	20.47%	16.54%
Retail trade	15.63%	17.35%	6.71%	10.59%	12.31%
Construction	11.26%	7.31%	4.88%	9.63%	7.96%
Accommodation and Food Services	7.13%	5.02%	3.66%	5.03%	6.29%
Educational Services	6.67%	6.39%	4.88%	5.57%	7.07%
Mining, quarrying, and oil and gas extraction	5.06%	2.74%	3.05%	5.33%	3.99%
Manufacturing	4.60%	2.74%	20.73%	8.44%	4.80%
Agriculture, Forestry, Fishing, Hunting	4.37%	8.22%	8.54%	10.53%	3.87%
Transportation and warehousing	2.76%	4.57%	4.27%	4.13%	4.86%

Source: Statistics Canada 2022, Census of the Population

4.9 Future Studies

This section describes proposed studies to further determine baseline conditions and to assess the effects of the Project on VCs. Table 4.29 provides a list of the proposed additional studies including objective, location, and timing. The proposed future field studies are specific to the LBP Wind Farm, Solar Farm I, Industrial Facility, and supporting infrastructure to support the EIS. Additional studies related to future expansions will be provided to NLECC as required by the conditions of release. Additional detail on proposed methods and application of results is presented in the following subsections.

Table 4.29: Proposed Additional Studies for the Project

Valued Component (VC)	Objective	Location	Timing
Atmospheric			
Air quality	Using existing data, understand spatial and temporal variations in standard air quality measurements in relation to Project activities	LBP Wind Farm Solar Farm I Industrial Facility	2025
Climate change (Greenhouse Gases (GHGs)	Understand GHG emissions associated with the project	LBP Wind Farm Solar Farm I Industrial Facility	2025
Geophysical			
Surface and groundwater quality and quantity	Understand the quality and quantity of surface and groundwater resources in relation to the Project	Industrial Facility	2025
Linton Lake hydrologic assessment	Confirm the capacity of Linton Lake to act as an industrial water supply for the Project	Linton Lake	2025
Aquatic			
Fish habitat	Determine the habitat characteristics of watercourse crossings and assess suitability for fish species	LBP Wind Farm Solar Farm I Industrial Facility	Pre-construction (to support permitting watercourse crossings)
Fish species composition and abundance	Assess the abundance and diversity of fish species in watersheds that could be impacted by the Project	LBP Wind Farm Solar Farm I Industrial Facility	2025
Wastewater assessment	Assess wastewater discharge characteristics and the water characteristics of discharge locations	Industrial Facility	2025
Terrestrial			
Vegetation			
Ecological Land Classification development	Develop a detailed Ecological Land Classification to provide base maps for habitat delineation and study design	Project Area	2025
Wetland classification and delineation	Desktop mapping and classification of all wetlands to facilitate minimizing impacts to sensitive habitats and wetland species	Project Area	2025

Valued Component (VC)	Objective	Location	Timing
Rare Plants and Lichens	Assess abundance and locations of SAR and SOCC potentially impacted by Project development	LBP Wind Farm Solar Farm I Industrial Facility	2025
Avifauna			
Migration	Understand migrating avian species composition and abundance for potential impacts particularly for wind farms	LBP Wind Farm	April to May 2025 (spring migration) and August to October 2025 (fall migration)
Breeding	Understand breeding bird species composition and abundance for potential impacts (i.e., habitat loss from Project footprint)	LBP Wind Farm Solar Farm I Industrial Facility	June and July 2025
Shorebird	Understand shorebird distribution and abundance focusing on SAR and SOCC	LBP Wind Farm	2025
Targeted Species Surveys	Understand distribution and abundance of additional SAR and SOCC species as required (e.g., raptors, nightjars, waterbirds etc.)	LBP Wind Farm Solar Farm I Industrial Facility	2025
Bats	Understand the distribution and abundance of bats via the deployment of acoustic monitors	LBP Wind Farm Solar Farm I Industrial Facility	April to October 2025
Other wildlife			
Ungulates	Understand moose and caribou distribution and abundance using available data	Project Area	2025
Muskrat	Assess muskrat habitat and quantify potential impacts using geospatial data	Project Area	2025
Technical Studies			
Noise	Assess the potential for noise impacts	LBP Wind farm Solar Farm I Industrial Facility	2025
Shadow flicker	Assess the potential for shadow flicker impacts	LBP Wind Farm	
Visual impact	Use modelling tools to assess the visibility of Project infrastructure	LBP Wind Farm	2025
Electromagnetic Interference (EMI)	Assess potential for electromagnetic interference from WTGs to interfere with local telecommunications	LBP Wind Farm	2025

Valued Component (VC)	Objective	Location	Timing
Solar Glare	Assess the potential for solar glare hazard associated with the solar farm	Solar Farm I, II, and III	2025
Land and Resource Use			
Community Engagement	Assess the current land and resource use by local communities through community engagement	Project Area	2025
Communities			
Human Health Risk	Assess the potential for airborne contaminants released during construction or operations to impact human health	Industrial Facility	2025
Transportation	Assess the capacity of existing and proposed road networks to accommodate the additional vehicles required for construction and operation of the Project	LBP Wind Farm Solar Farm I Industrial Facility	2025
Heritage and Cultural Resources			
Archaeological resources	Asses the project site for high potential area for archaeological resources	LBP Wind Farm Solar Fam I Industrial Facility	2025

4.9.1 Atmospheric Studies

Atmospheric baseline surveys will be completed to quantify and predict air quality and climate change gas emissions pre-construction, during construction, and during operations.

4.9.1.1 Air Quality (Outdoor)

Air quality of the of the LBP Wind Farm, Phase I Solar Farm, and Industrial Facility will be estimated based on a review of existing data to quantify levels of nitrogen oxides (NOx), nitrogen dioxide (NO_2), nitric oxide (NO), carbon monoxide (CO), ozone (O_3), sulphur dioxide (SO_2), and particulate matter ($PM_{2.5}$ and PM_{10}) in the atmosphere, in proximity to the Project. No air samples are proposed to be collected as part of the baseline assessment of air quality.

- Air quality release estimates, with sample calculations, will be determined for the activities which can be expected to have measurable air contaminant release.

4.9.1.2 Green House Gas (GHG) Assessment

The GHG assessment will account for the most significant GHG emissions through the lifecycle of the of the LBP Wind Farm, Solar Farm I, and Industrial Facility, including construction, operation, and decommissioning. A full inventory of GHG's will be completed in the EIS once further information such as project layout, manufacturers, construction volumes, etc. are known. Once construction activities are completed, the operations phase will have significantly reduced GHG emissions.

The GHG emissions inventory will involve the identification of organizational and operation boundaries to delimit the scope of the inventory. Emission will be calculated from both direct and indirect for each development phase of the Project to determine model short and long-term emissions forecasts.

The methodology to complete this assessment will follow the guidance provided in the International Organization for Standardization (ISO 14064) and the Standards for Quantification, Reporting, and Verification of Greenhouse Gas Emissions (Nova Scotia Environment, 2020) as well as the Western Climate Initiative reporting methodology. The GHG assessment will also include:

- A summary of Project-related effects/mitigations with respect to GHGs
- Further regulatory requirements, if required, based on expected GHGs

4.9.2 Geophysical Studies

4.9.2.1 Surface Water and Groundwater Quality and Quantity

Static groundwater levels will be measured at existing groundwater wells in proximity to the Industrial Facility using a level measurement probe. The water wells to be sampled will be selected from the provincial drilled water well database and confirmed in the field. Static groundwater levels will be used to estimate groundwater depth and flow direction in proximity to Linton Lake and the Industrial Facility.

Groundwater quality will be assessed at the same wells. Each well will be purged until three to five well volumes have been removed, then a sample will be taken. Surface water samples will be collected from a randomized sample of streams, ponds, and other watercourses within proximity of the industrial site. One blind field duplicate of each surface water and groundwater sample will also be collected for Quality Assurance/Quality Control (QA/QC). All samples will be sent to an accredited laboratory for analysis for:

- TDS
- Metals
- Benzene, toluene, ethylbenzene, and xylene (BTEX)
- Total petroleum hydrocarbons (TPH)

Groundwater and surface water results will be compared to the Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for freshwater and Human Health Tier I EQS (groundwater only) guidelines.

4.9.2.2 Linton Lake Hydrologic Assessment
A bathymetric survey has been completed for Linton Lake to understand total water volume.

A hydrologic assessment of the Linton Lake water supply will be completed using bathymetric data, geomorphology, topography, precipitation, evaporation, and current water usage data from various sources to describe the water balance for Linton Lake. The average hourly demand, along with short-term maximum demand, will be compared to the minimum and average discharge rates from Linton Lake. Production implications, and potential mitigation measures, will be assessed for low water scenarios. A water quality and sediment assessment for Linton Lake will be completed through the collection of representative surface water and sediment samples for the purpose of establishing environmental baseline conditions in the water body prior to development. One blind field duplicate of each surface water and sediment sample will also be collected for QA/QC At each location, water depth, sediment thickness, and water field parameters will be recorded

All surface water samples will be sent to an accredited laboratory for analysis for:

- TDS
- metals
- Polycyclic Aromatic Hydrocarbons (PAH)
- BTEX
- TPH
- General chemistry

Sediment samples will be sent to an accredited laboratory for analysis for:

- Metals (including mercury)
- PAH (low level detection)
- BTEX
- TPH
- Polychlorinated Biphenyls (PCB)
- Total Organic Carbon (TOC)

Surface water and sediment results will be compared to the Atlantic RBCA Ecological Tier I EQS for freshwater and freshwater sediment.

4.9.3 Aquatic Environment

4.9.3.1 Fish Habitat Assessment
Fish habitat assessments will be conducted at a representative sample of watercourses as identified in consultation with the regulatory authority, within the of the LBP Wind Farm, Solar Farm I, and Industrial Facility. Per consultation with DFO (July 23, 2024), all watercourses that require culvert replacements or installations (i.e., instream work) will be assessed to support the pre-construction permitting process. Assessments will be conducted 50 m upstream and 50 m downstream from access road crossings. At each transect, physical channel characteristics (e.g.,

wetted channel width, bank height, substrate composition, water depth and surface water velocity, in-steam habitat diversity, in-stream cover, and barriers to fish passage) and *in-situ* water quality (e.g. pH, temperature, dissolved oxygen, conductivity, and turbidity) will be measured and recorded. An assessment of fish habitat potential across various life stages (i.e., spawning, overwintering) will also be made for each transect.

Physical Channel Characteristics include:

- Wetted channel width and bank height will be measured at the widest section of the watercourse along each transect. Bank conditions along the entire transect will be evaluated for evidence of siltation, erosion, stability, and undercutting.
- Substrate composition will be evaluated based on percent cover of bedrock, boulders, cobble, gravel, sand, and fines/muck. Habitat potential will be assessed based on the presence/absence of suitable areas for various fish life stages, including spawning and overwintering.
- Maximum water depth and surface water velocity will be assessed along each transect. These parameters can provide information on likely fish species within each transect.
- In-stream habitat diversity will be assessed by presence of pools, riffles, runs, flat sections, or rapids. A diverse selection of in-stream habitat can cater to a diverse assemblage of species.
- In-stream cover will be assessed by recording the physical characteristics that provide fish refuge, including boulders, overhanging and instream vegetation, woody debris, deep pools, and undercut banks. These characteristics will be ranked as being present in trace, moderate, or abundant amounts or as absent from the transect.
- Barriers to fish passage may include any physical structure or feature that hinders the ability of fish to navigate throughout the watercourse. Each transect will be examined for any barriers and the type, size, and location will be recorded.

4.9.3.2 Fish Species Composition and Abundance

Species composition and relative abundance in the LBP Wind Farm, Solar Farm I, and Industrial Facility will be determined by fish capture (electrofishing and trapping). Fish capture will occur at locations downstream of a subset of watercourses/watersheds where proposed Project infrastructure is sited. Fish species diversity at these locations will then be conservatively extrapolated to represent fish species diversity in upstream tributaries within the same watershed. This approach has several assumptions, including: 1) that the same species are found throughout the watershed; 2) that the area selected to survey is representative of the watershed and is inclusive of all stream habitat units; and 3) that the survey accounts for diversity in habitat use and resource partitioning. If information from the fish habitat assessments indicates substantial variability in characteristics of the upstream habitat, additional electrofishing transects may be conducted to better determine fish species abundance and diversity for each watershed. For waterbodies that are not conducive to electrofishing, a series of baited fyke nets and minnow traps will be deployed and left for at least nine hours before being assessed for fish species composition and abundance.

4.9.3.3 Wastewater Assessment

Wastewater assessment for the volume of effluent discharge, receiving environment, and treatment will be conducted once the effluent discharge locations have been confirmed. Baseline water quality sampling will involve collection of a minimum of two grab water samples at two depths (shallow and deep) to describe the receiving environment. Water samples will be taken using a Kemmerer water sampler to grab benthic and surface samples. The water samples will be analyzed for general chemistry (including nutrients), metals, and coliforms. Water quality profiles for salinity, temperature, turbidity, dissolved oxygen, and pH will be conducted at the same location. All samples will be sent to an accredited laboratory for analysis. If the receiving environment is marine, additional water samples will be required to capture the temporal variability in water quality parameters at high and low tide.

The following information will be used to complete the receiving water assessment, including (but not limited to):

- Previous assessment reports
- Relevant design specifications
- Effluent characteristics
- End-of-pipe effluent quality
- Receiving water location

The location and composition of the effluent discharge along with the water quality profiles at the effluent discharge locations will be used to determine the most effective means for treating effluent discharge to minimize effects on the aquatic environment. Regular monitoring of effluent discharge will be conducted throughout the life of the Project to ensure compliance with regulations.

4.9.4 Terrestrial Environment

4.9.4.1 Ecological Land Classification

Internationally, various systems exist to delineate natural regions based on ecological factors such as bedrock, climate (temperature, precipitation), physiography (soils, slope, aspect) and corresponding vegetation, creating an Ecological Land Classification (ELC) system (Ontario Ministry of Natural Resources (OMNR) 2007). This classification of the landscape enables planners and ecologists to organize ecological information into logical, integrated units to enable landscape planning and monitoring. The ELC provides a multi-scale, hierarchical approach that can extend from a broad provincial level down to very fine-scale vegetation and substrate levels. The ELC will be created based on available datasets including, satellite imagery (e.g., Landsat, Sentinel), the Newfoundland and Labrador Land Use Atlas, and the Newfoundland and Labrador provincial DEM. The ELC will then be used as a basis for investigating habitat availability, identifying and delineating wetlands, assessing water crossings, watersheds, and fish habitat, assessing wildlife habitat, and for determining sampling locations for a variety of studies.

4.9.4.2 Wetland Classification and Delineation

Wetland classification will be conducted for the entire Project Area via desktop review following the hierarchical approach in the Newfoundland and Labrador Wetland Classification guidelines. The ELC will form the basis for identifying and mapping the various wetland classes: bogs, fens, swamps, salt marshes, and shallow water wetlands and forms (Amec 2015; NWWG 1997). Wetland classification and delineation of the wetland boundaries will be based on vegetation composition, slope, aspect, elevation, topography, and hydrology.

Identification, classification, and delineation of wetland forms and types may not be possible based on satellite imagery alone and may require ground-truthing. A random sample of each wetland type will be selected from the ELC for ground truthing. Data from ground truthing will be used to improve the ability to define and classify wetlands from remotely sensed imagery.

Wetlands are integral to many ecosystem functions including water filtration, storage, and purification. Wetlands can also support species of fauna and flora that can be sensitive to disturbance. Classification and delineation of wetlands will provide additional information to allow for the development of a layout that minimize impacts and to identify locations for targeted surveys for rare habitats and species.

4.9.4.3 Vegetation

The ELC will be used to determine rare and sensitive habitats within the Project Area (e.g., fens, salt marsh). The ELC and the ACCDC data will be used to identify priority habitats and target areas for vascular plant and lichen surveys for SAR and SOCC. Surveys for vascular plants will be completed within the growing season in June/July (early) and in August/September (late) to capture seasonal variations in flowering (when plant identification is easiest). Survey data will be used to inform infrastructure siting and provide guidance for development of effective mitigation measures to minimize impacts of vegetation clearing. Initial vegetation surveys will be conducted in the LBP Wind Farm, Solar Farm I, and Industrial Facility. Survey protocols will be developed in consultation with the relevant regulatory agency (NLFFA – WD) prior to the commencement of the survey program.

Vascular Plant/Lichen Transects

Transect surveys will be conducted in rare and sensitive habitats that represent high potential areas for SAR or SOCC in the LBP Wind Farm, Solar Farm I, and Industrial Facility. The total number of transects will be determined based on habitat variability and habitat suitability assessment for SAR or SOCC. Random transects will be surveyed and any species (vascular plant or lichen) identified as SAR or SOCC will be documented with additional observation details including a photograph, location, and habitat type. If the plant or lichen identification is uncertain, a specimen will be photographed and georeferenced for later identification.

4.9.4.4 Avifauna

Bird species composition and abundance will be documented in the LBP Wind Farm, Solar Farm I, and Industrial Facility. A combination of active and passive monitoring techniques will be used to ensure the most comprehensive evaluation of avian diversity.

Guidelines from ECCC – CWS (ECCC-CWS; CWS 2007a, b; 2019; 2022) and from the NLFFA – WD will be followed for development of survey protocols and timing. Protocols will be provided to the relevant regulatory agencies prior to implementation of surveys.

Spring and Fall Migration Point Counts

Spring and fall migration point counts will be conducted during their respective migratory windows of April 15 to June 15 (spring) and August 15 to October 30 (fall). Observation points will be selected based on elevation, habitat types, visibility, and access.

At each point location, species diversity and abundance will be recorded for 10 min visual and auditory observation sessions. The approximate distance and bearing from the observer, flight direction, flight height, and behaviour (e.g., migrating, breeding or foraging behaviour) will be recorded for each bird observation, as well as information on habitat at the point count location and information on weather conditions.

Breeding Bird Surveys

Breeding bird surveys will be conducted during the early summer breeding season (June 15 to July 15) when bird activity is highest, and to capture changes in the breeding bird community over the breeding season (CWS, 2007a). Point count locations will be established in representative habitat types, and a habitat model for SAR and SOCC will be used to advise placement of point count surveys, to ensure representation of bird species abundance and diversity across all available habitat types. Point count locations will be spaced a minimum of 250 m apart in forested habitats, and a minimum of 500 m apart in open habitats, to reduce the risk of double counting. Survey effort includes 10 mins/point count location.

Surveys will occur within four hours of sunrise, when bird activity is highest, and during weather suitable for detection of birds. All birds observed (auditory and visual) will be recorded to species along with evidence of breeding. Habitat, weather, exact time of survey, bearing (if it can be determined), and background noise level will be recorded at each point count location.

Shorebird Surveys

Shorebird surveys will be conducted following the Atlantic Canada Shorebird survey protocols. Shorebird species listed under the *NL ESA* and the federal *SARA* include Piping Plover and Red Knot. ELC maps will be used to identify the most suitable habitat/survey sites for all shorebirds with a focus on habitats for listed species. During surveys all shorebird species will be documented as well as any other SAR and SOCC incidentally observed.

Targeted Species Surveys

In addition to the use of acoustic recordings (one year completed with radar surveys), point counts (outlined above) and radar systems (one year of radar surveys completed), targeted surveys for SOCC and SAR which are likely to occur in the LBP Wind Farm, Solar Farm I, and Industrial Facility are planned, based on ACCDC observations. These surveys may include groups such as raptors, waterbirds, and/or nightjars and will be determined in consultation with regulators.

4.9.4.5 Bats

The little brown Myotis, northern Myotis, and hoary bat are resident bats found in Newfoundland. Acoustic monitors will be established in locations determined to be suitable habitat through desktop analysis and subsequent ground-truthing. Selected location will be throughout the LBP Wind Farm, Solar Farm I, and Industrial Facility. Monitors will be deployed from April to October. The acoustic monitors are programmed to monitor 30 minutes before sunset to 30 minutes after sunrise for ultrasonic echolocation calls produced by bats. Acoustic monitor data will be processed to determine species presence, timing of peak activity, and total passes per detector night.

4.9.4.6 Wildlife

Desktop analyses and camera trap surveys identified species of terrestrial wildlife likely to be in the Project Area. Camera trapping surveys were completed in 2023, processing is ongoing. No additional camera surveys are proposed.

Ungulates

Desktops analysis of existing provincial data to review potential presence and abundance of moose and caribou populations will be completed within the LBP Wind Farm, Solar Farm I, and Industrial Facility. Further studies will be planned to address any potential data gaps in consultation with NLFFA and ECCC-CWS.

Muskrat

Muskrat habitat will be identified using information from local trappers and a desktop Geographic Information Systems (GIS) assessment of remote sensing imagery. Based on this data, a habitat suitability model will be generated to identify potential muskrat habitat within the in the LBP Wind Farm, Solar Farm I, and Industrial Facility.

4.9.5 Technical Studies

Studies proposed in this section will evaluate the potential impacts of the Project on human use from the LBP Wind Farm, Solar Farm I, and Industrial Facility. Project design, construction, and operations will be conducted to minimize potential impacts. Consultation with local users will identify high use areas and studies will be designed to identify best practices for minimizing impacts and developing effective mitigation strategies.

4.9.5.1 Noise/Vibration and Shadow Flicker Assessment

According to the Wind Farm Fact Sheet of Health Canada, maximum permissible noise levels are 40 dBA for WTG operations at a residence. There are currently no guidelines for vibration levels so anticipated vibration levels will be compared to levels at existing sites with similar infrastructure.

Noise/vibration will be evaluated using WindPRO (or a similar alternative software) sound models. A desktop review will be conducted to identify potential residences in proximity to WTG locations and other project infrastructure with the potential to generate excessive noise or vibration (e.g. Industrial Facility, substations). The models incorporate various parameters such as topographic data, WTG specifications, and WTG sound production levels (provided by the manufacturer). The models are conservative (i.e., used to estimate worst-case scenario) by assuming bare earth (i.e., no trees to increase attenuation). Model results will be used to microsite WTG locations as necessary to ensure noise compliance. If modelling results identify potential residences that exceed Health Canada requirements, recommendations for mitigation measures including design modifications and increased setbacks will be explored to reduce potential effects.

Operational noise/vibration monitoring will be completed, as requested by regulatory agencies.

4.9.5.2 Shadow Flicker

Shadow flicker is an intermittent shadow cast on a residence due to incident light rays on moving objects, such as WTG rotor blades. For shadow flicker to occur, certain criteria must be met:

- The sun must be shining and unobscured
- The WTG must be between the sun and the residence
- The line of sight between the WTG and residence must be clear
- The residence must be close enough to the WTG to be in the shadow of the WTG rotor.

Shadow flicker exposure will be evaluated using WindPRO (or a similar alternative software) shadow flicker model. A desktop review will be conducted to identify potential residences in proximity to WTG locations.

The models incorporate various parameters including WTG specifications. The models are used to estimate worst-case and/or actual-case scenario shadow flicker exposure levels. The actual-case model uses sunshine statistics and prediction data from the nearest station in the WindPRO database to calculate the predicted shadow flicker. To ensure a conservative approach, each residence is treated as a greenhouse with 1.5 m high by 1.5 m wide windows for 360° of the building. No topographical or ground cover shielding from obstacles (such as trees, buildings, awnings, etc.) has been considered between the WTGs and residences. The worst-case does not use data from the nearest station but assumes the sun is shining 100% of the time when above the horizon, the WTG rotor is always perpendicular to the sun, and the rotor blades are constantly spinning.

Model results will be used to microsite WTG locations as necessary to ensure compliance with Health Canada and industry standards for shadow flicker, a indicate maximum 30 minutes per day or 30 hours per year at a residence.

4.9.5.3 Visual Simulation Assessments

A desktop review and public engagement will determine suitable locations to complete visual assessments. A viewshed computer model will then be prepared using a combination of WindPRO software (or similar alternative) and ArcGIS. The software incorporates topographic data, specifications of proposed Project infrastructure for the LBP Wind Farm and vegetation cover to model the visibility. This viewshed model will then be used to evaluate the visibility of the WTGs associated with the LBP Wind Farm from specific locations. Approximately 50 simulations will be produced for visual assessment. Photo simulations will be prepared to demonstrate and characterize project component visibility and be used for reference during the public engagement process.

4.9.5.4 Electromagnetic Interference (EMI) Study

An EMI study will be conducted for the LBP Wind Farm. The EMI Study is designed to determine if a proposed development may have an impact on existing radio, telecommunications, and radar systems by identifying potential interference issues with the various systems. Methodology is based on guidelines published by the Radio Advisory Board of Canada and Canada Wind Energy Association (2020). These guidelines outline a consultation-based assessment protocol that establishes areas, called "consultation zones", around transmission systems, based on the type and function of the system. Three main systems will be reviewed:

- Impact on Radiocommunication Systems
- Impact on Radar Systems
- Impact on Air Navigation Systems

Consultation with key stakeholder agencies including NAV Canada, Department of National Defence (DND), and ECCC will be undertaken to inquire about potential interactions of the LBP Wind Farm with other infrastructure. One round of mail-outs will be undertaken to start the consultation process, with additional support possible under a separate scope if required.

Consultation with relevant agencies will be completed upon selection of a final WTG layout and as part of the EIS. Notification agencies are listed in Table 4.30.

Table 4.30: EMI Notification Agencies

Signal Source	Operator
Air defense and air control radar systems DND Radio Communications	DND
Maritime vessel traffic system radars	Canadian Coast Guard
Very High Frequency (VHF) omnidirectional range Primary air traffic control surveillance radar	NAV Canada
Weather radar	ECCC
Radiocommunication Systems	RCMP
Regulator	Innovation, Science and Economic Development Canada (ISED formerly Industry Canada)
Telecom	Bell Telus Rogers Communications
Emergency Services	Volunteer Fire Departments

The consultation process typically begins with a letter distribution to those parties affected by the development. A summary of the Radio Advisory Board of Canada (RABC) Guidelines for determining consultation zones can be found in Table 4.31.

Table 4.31: RABC Guidelines – Recommended Consultation Zones

Systems	Consultation Zone
Point-to-Point Systems above 890 megahertz (MHz)	**1 km**
Broadcast Transmitters (AM, FM, and television (TV) stations)	AM station: **5 km** for omnidirectional (single tower) antenna system **15 km** for directional (multiple towers) antenna system FM station: **2 km** TV station: **2 km**
Over-the-Air Reception (TV off-air pickup, consumer TV receivers)	Analog TV Station - National Television Standards Committee **15 km** Digital TV station - Advanced Television Systems Committee **10 km**
Cellular Type Networks, Land Mobile Radio Networks, and Point-to-Point Systems below 890 MHz	**1 km**
Satellite Systems (Direct to Home, Satellite Ground Stations)	**500 m**
Air Defence Radars, Vessel Traffic Radars, Air Traffic Control Radars, and Weather Radars	DND Air Defence Radar: **100 km** DND or Nav Canada Air Traffic Control Primary Surveillance Radar: **80 km** DND or Nav Can Air Traffic Control Secondary Surveillance Radar: **10 km** DND Precision Approach Radar: **40 km** Canadian Coast Guard Vessel Traffic Radar System: **60 km** Military or Civilian airfield: **10 km** Environment Canada Weather Radar: **50 km**
Very High Frequency (VHF) OmniRange	**15 km**

The following information regarding WTG design and placement is generally required to complete EMI notifications:

- WTG Universal Transverse Mercator coordinates
- Number of WTGs
- Ground elevation
- Tower/hub height of each WTG
- Nacelle height
- Rotor diameter
- WTG blade sweep diameter (or length of blades)
- WTG base diameter
- Substation/converter location coordinates and height(s) along with new transmission line(s) to connect to a grid

4.9.5.5 Solar Glare Hazard Assessment

The solar glare hazard assessment will be conducted for Solar Farm I. Photovoltaic (PV) solar panels generate electricity from sunlight; however, some of the light is reflected and can cause glint (a momentary flash of bright light) and glare (a continuous source of bright light). Glare is typically associated with stationary objects which reflect sunlight for a longer duration. Reflections from solar panels have the potential to impair observers which may cause risk to public safety if a driver is affected.

The desktop analysis will consider the angle of the PV panel, the path of the sun, the incoming radiation, the PV array shape and panel reflectivity characteristics to calculate the amount of glare expected at each specified observation point and along each observation route. The analysis will provide information on the length of time that glare is possible, and the time of day and month it is most likely to be expected. The analysis assumes clear sky conditions for all days modelled to determine any possible time that glare has the potential to occur. Atmospheric conditions, such as cloud cover, dust, and precipitation would reduce the direct sunlight hitting the PV panels and would thus impact glare duration and intensity. As it is likely that cloud cover and other factors will be present, this analysis will result in an over-estimate of glare potential. The historic (1940–present) average maximum number of sunny days in Burin is 4.5 (September) with the number of overcast days ranges from 12 days (September) to 20 days (December and January).

If the desktop analysis indicates significant potential for solar glare, then mitigation measures will be developed to minimize the potential risk during periods when solar glare potential is high.

4.9.6 Land and Resource Use

As EverWind continues along the path of developing the Project, it will continue to follow its comprehensive, inclusive, and transparent engagement strategy to address the latest issues and any future issues in relation to Land and Resource Use. An open form of communication will continue to be pursued to identify, engage with and incorporate feedback from local residents, local communities, Indigenous communities and organizations, as well as industry experts and government regulators. For further details refer to Section 8.0

4.9.7 Communities

4.9.7.1 Human Health Risk Assessments from Air Contaminants

This study will evaluate the potential for Project-related emissions of air quality contaminants that have the potential to affect human health during construction and operation of the Industrial Facility. A standard health risk assessment will be applied including the following components:

- Identification of appropriate spatial and temporal boundaries
- Toxicity assessment
- Exposure assessment
- Risk Characterization
- Uncertainty assessment

The assessment methodology will be based on Health Canada guidance documents including:

- Guidance for Evaluating Human Health Impacts in Environmental Assessment: Human Health Risk Assessment (Health Canada, 2019)
- Guidance to Evaluating Human Health Impacts in Environmental Assessments: Air Quality (Health Canada, 2016)
- Federal Contaminated Sites Risk Assessment in Canada, Part I: Guidance on Human Health Risk Preliminary Quantitative Risk Assessment, Version 3.0 (Health Canada, 2021)
- Federal Contaminated Sites Risk Assessment in Canada, Part V: Guidance on Complex Human Health Detailed Quantitative Risk Assessment for Chemicals (Health Canada, 2010)

The study will summarize risk of human exposure to contaminants in relation to Health Canada recommended exposure limits. Monitoring and mitigation measures will be recommended if human exposure limits are predicted to exceed threshold exposure limits at any time.

4.9.7.2 Transportation Impact Study

This study will consider the relevant traffic and transport implications for the LBP Wind Farm, Solar Farm I, and Industrial Facility. This study will assess the potential impacts of the Project and propose mitigation measures to be incorporated in the Traffic Management Plan. Maximum traffic impacts will occur during the construction phase which has the highest traffic volumes, including heavy and oversized vehicles (e.g., for WTG component delivery). The report will focus on potential impacts on the public road network in the immediate surrounds of the Project considering the likely Wind Farm, Solar Farm, and Industrial Facility components and construction schedule. The study will incorporate relevant information on construction schedules and estimates of transport volumes and weights.

The key traffic and transport implications from the Project arise from additional vehicle volumes and over dimensioned vehicles accessing the Wind Farm, Solar Farm, or Industrial Facility sites from the public road network during construction and operation. These issues include:

- The suitability of the existing roads for the type of vehicles that will need to access the site. Aspects affecting suitability include overall width of roads, radius and clearance at bends in the road and the nature of existing traffic use.
- The structural capacity of existing roads and structures to handle heavy vehicles for the delivery of WTG and transformer components.
- Disturbance to the local community because of increased vehicle movements.
- Management of traffic on site including traffic safety, minimizing disturbance to any environmentally sensitive areas, and minimizing erosion and dust.

Refer to Section 5.5.5 for more information on the Transportation Impact Study and Traffic Management Plan.

4.9.8 Heritage and Cultural Resources

An archaeological research permit will be requested from the PAO and an archaeological investigation conducted to help identify any specific high potential areas for archaeological resources prior to construction. Specific requirements for the archaeological investigation will be reviewed with the PAO.

All activities implemented in the archaeological investigation will adhere to the guidelines and requirements of the *Archaeological Investigation Permit Regulations and Historic Resources Act* and will be recorded in the EIS.

4.10 Predicted Future Condition of the Environment Without the Undertaking

The Project Area is primarily coniferous forests with persistent barrens, bogs, wetlands, and waterbodies. Land use around the Project Area is varied and includes forestry, agricultural, cabin and recreational land, residential properties, and fishing grounds (lakes, ponds). The Project Area also contains:

- Crown lands areas zoned for wind energy development (Gov. of NL, 2023b).
- Commercial forest land owned by the NLFFA and is designated for domestic harvest, silviculture and agricultural development

Should this Project not proceed, it would either be replaced by another wind energy project, or the land would remain as a forested/wetland region designated as a wind energy reserve, agricultural development area, and domestic wood harvest area. The Industrial Facility land may remain vacant or may be occupied by other industrial or commercial users.

The Project is anticipated to boost the regional economy of the Burin Peninsula, therefore, if the Project were not to proceed, it would be felt through a loss in economic development. Over the last 40 years, the peninsula has suffered the loss of many major industries and employers including fisheries and fish plants across the peninsula, the shipyard in Marystown, offshore & gas fabrication facility at Cow Head, and the fluorspar mine in St Lawrence. During this time the population of the peninsula declined by approximately 36%. Today's demographic trends also represent a significant challenge for the Burin Peninsula for years to come, with an aging population (median age of 54.4), 2.3 times more deaths than births and a 50% reduction in school enrolment since the early 2000s (Gov NL, 2024c). Over time, these trends will impact the socioeconomic sustainability of the Burin Peninsula. This Project represents one of the region's most important rural economic development opportunities.

5.0 ENVIRONMENTAL EFFECTS

The environmental effects assessment identifies the potential interactions of the Project with the environment and examines the potential mechanisms by which effects to the environment may occur. A full effects assessment would evaluate environmental effects associated with the proposed Project, determine appropriate mitigation measures to eliminate the effects to the greatest extent possible and predict the significance of residual negative effects. This evaluation enables a determination to be made as to whether a project is likely to result in significant adverse impacts on the environment.

For the EARD, the potential environment-project interactions, the expected pathways for effects, and the parameters to be measured to assess effects have been outlined for the LBP Wind Farm, Solar Farm I, and Industrial Facilities.

The effects analysis provided within this EARD is focused on identification of pathways of effect for each VC which will be evaluated during the EIS. The identification of these effect pathways has been completed based on an understanding of baseline conditions confirmed through desktop methodologies only. Additional pathways of effect will be identified as field work is completed and supporting studies and modelling is undertaken to quantify impacts.

Quantitative and qualitative modelling, analysis and studies to support a comprehensive effects assessment have not yet been completed. Determination of significant residual impacts (Section 6.0) has not been completed for this EARD, as studies are still required to evaluate the effects and assess the potential residual impacts following the implementation of mitigation measures. Section 5.1.3 describes the criteria to evaluate significance, and these general definitions will be fully described for each VC in the EIS. A preliminary list of mitigation measures that can be applied to reduce environmental effects are presented in Section 5.4. A full effects assessment will be provided in the EIS.

5.1.1 Project-Valued Component Interactions

The expected potential interactions between the Project and the VCs, by phase (construction, operation and maintenance, decommissioning and reclamation), are presented in Table 5.1. The table is divided according to each of the Project phases and includes sections for accidents, malfunctions, and unplanned events. This table will be updated for the EIS to include a final list of Project -VC interactions.

Table 5.1: Summary of Potential interactions between Project Components and VCs

Valued Component		Construction							Operations and Maintenance					Decommissioning and Reclamation		Accidents, Malfunctions, and Unplanned Events
		Clearing and Grubbing	Access Roads, Electrical Lines, Laydown Yards, Turbine Pads, Site Preparation	Temporary works – Quarries, Batch Plants, Accommodations	Turbine Assembly, Erection, and Commissioning	Solar Assembly, Installation, and Commissioning	Substation Assembly, Installation, and Commissioning	Industrial Facility Installation, and Commissioning	Turbine Operation	Solar Farm Operation	Industrial Facility Operation	Water Withdrawal	Inspection and Maintenance	Infrastructure Removal	Site Reclamation	
Atmospheric	Air Quality	X	X	X	X	X	X	X			X		X	X	X	X
	Climate Change	X	X	X	X	X	X	X	X	X	X		X	X	X	X
Geophysical	Surficial and Bedrock Geology	X	X	X	X	X	X	X						X	X	X
	Groundwater and Surface Water	X	X	X		X	X	X				X			X	X
Aquatic	Waterbodies and Watercourses	X	X	X		X	X	X			X	X			X	X
	Fish and Fish Habitat	X	X	X		X	X	X			X	X			X	X
	Wetlands	X	X	X	X	X	X	X							X	X
Terrestrial	Habitat	X	X	X	X	X	X	X							X	X
	Flora	X	X	X	X	X	X	X							X	X
	Fauna	X	X	X	X	X	X	X	X	X	X		X	X	X	X
	Avifauna	X	X	X	X	X	X	X	X	X	X		X	X	X	X
	Bats	X	X	X	X	X	X	X	X	X	X		X	X	X	X
Technical	EMI								X							
	Shadow Flicker								X							

Valued Component		**Construction**							**Operations and Maintenance**					**Decommissioning and Reclamation**		**Accidents, Malfunctions, and Unplanned Events**
		Clearing and Grubbing	Access Roads, Electrical Lines, Laydown Yards, Turbine Pads, Site Preparation	Temporary works – Quarries, Batch Plants, Accommodations	Turbine Assembly, Erection, and Commissioning	Solar Assembly, Installation, and Commissioning	Substation Assembly, Installation, and Commissioning	Industrial Facility Installation, and Commissioning	Turbine Operation	Solar Farm Operation	Industrial Facility Operation	Water Withdrawal	Inspection and Maintenance	Infrastructure Removal	Site Reclamation	
	Visual Aesthetics								X	X						
	Noise	X	X	X	X	X	X	X	X	X	X			X	X	X
	Solar Glare									X						
Socio-economic	Land & Resource Use	X	X	X	X	X	X	X	X	X	X		X	X	X	X
	Heritage and Cultural	X	X	X	X	X	X									X
	Communities	X	X	X	X	X	X	X	X	X	X		X	X	X	X
	Economy, Employment, and Business	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

5.1.2 Identification of Pathways of Effects for Project Components for VCs

This section describes how each VC might be impacted by Project activities (i.e., environmental effect), what the pathway is for this effect to be realized, and what parameters will be used to measure the effect. Environmental effects and associated pathways at this stage in the Project (EA Report) focus on construction and operation phases only. Table 5.1 outlines which Project components have the potential to produce environmental effects. A more detailed description of environmental effects and associated pathways for decommissioning and accidents/malfunctions will be provided in the EIS.

5.1.2.1 Atmospheric Environment

This section reviews the potential environmental effects, associated pathways and measurable parameters of the Project in relation to the atmospheric environment (Table 5.2).

Table 5.2: Atmospheric Environment – Effects Assessment Pathway

Environmental Effect	Effect Pathway	Measurable Parameter(s)
Change in Air Quality	Atmospheric dispersion of air contaminants from Project activities.	Ambient concentrations of particulate matter (PM2.5) and gases (CO, NO_x, NO_2, SO_2)
Change in GHGs	GHG emissions from Project equipment and activities.	GHG emissions (ex. CO_2, CH_4, N_2O) in tonnes per CO_2 equivalent per year (tCO_2e)

Changes in air quality may occur through fugitive dust emissions generated from open-air activities associated with construction and exhaust emissions from vehicular traffic. Site preparation and construction activities may change particulate matter in the atmosphere and can lead to broader reaching effects on air quality, water quality, vegetation, and human health. The increase in vehicular traffic, particularly during construction, will result in increased gaseous emission to the environment. While the gasses will dissipate, intermittent, local increases in gas concentrations are possible.

Changes to GHG emissions may occur during all development phases of this Project due to combustion residuals and/or exhaust tailpipe emissions, and may include NO_x, SO_2, and CO. These emissions may result from vehicles (i.e., heavy construction equipment, site equipment, personal vehicles, etc), Project activities (i.e., batch plants, quarries etc) and supply-chain activities (i.e., transportation of goods and services, manufacturing etc). GHG emissions are anticipated to be primarily associated with local roadways and roads developed for the Project within the Project Area. During operations, the Project will produce certified green hydrogen and ammonia from renewable energy resources, significantly reducing the GHG emissions generated from conventional hydrogen and ammonia production. Therefore, the Project is anticipated to have a positive effect on climate change.

EverWind is committed to following the mitigation hierarchy and avoiding impacts, where possible. Please refer to Section 5.4 for mitigations proposed to eliminate or reduce the Project's environmental impacts.

A full assessment of the potential effects of the Project on the atmospheric environment will be completed for the EIS.

5.1.2.2 Geophysical Environment

This section reviews the potential environmental effects, associated pathways and measurable parameters of the Project in relation to the geophysical environment (Table 5.3).

Table 5.3: Geophysical Environment - Effects Assessment Pathway

Environmental Effect	Effect Pathway	Measurable Parameter(s)
Loss or change in surficial and bedrock geology	Removal and movement of surface rock and bedrock from excavating and blasting	Changes in surficial geology required for the construction of access roads, turbine pads, solar plant, and plant facilities
Change in quality or quantity of groundwater	Blasting operations Change in percolation volumes and flow patterns Watercourse diversion Erosion and sedimentation	Water quality (TDS, Metals, BTEX, TPH) Safe yield analysis (m^3)
Change in quantity or quality of Linton Lake	Water withdrawal for plant operations Construction activities	Water quality analysis (TDS, metals, PAH, BTEX, TPH, General chemistry) Sediment analysis (Metals, PAH, BTEX, TPH, PCB, TOC)

Changes in surficial and bedrock geology could arise from activities such as blasting and earth as they are likely to occur during the construction phase of the Project (e.g., construction of access roads). The removal of overburden and rock, and replacement with other materials such as crushed stone and concrete may change the local geology and could have further reaching effects on habitat and water resources.

Changes in the quantity and quality of groundwater could arise from blasting operations which could alter the size, stability, and structure of underground reservoirs. Changes in substrate from construction activities can alter percolation rates and surface water flow patterns as well as change the types and volumes of sediment that may leach into underground reservoirs. Surface water can be affected by construction through erosion and sedimentation, effluent discharge and construction of roads which have the potential to alter natural flow patterns.

Water withdrawal for plant operations could influence water levels and water quality the Linton Lake water supply. Change in water quality may occur through the construction and operations phases of the industrial facility. These changes may result in not only changes to water quality but also chemical composition of sediment in Linton Lake.

EverWind is committed to following the mitigation hierarchy and avoiding impacts, where possible. Please refer to Section 5.4 for mitigations proposed to eliminate or reduce the Project's environmental impacts.

A full assessment of the potential effects of the Project on the geophysical environment will be completed for the EIS.

5.1.2.3 Aquatic Environment

This section reviews some potential environmental effects, associated pathways and measurable parameters of the Project in relation to the aquatic environment (Table 5.4)

Table 5.4: Aquatic Environment - Effects Assessment Pathway

Environmental Effect	Effect Pathway	Measurable Parameter(s)
Changes to waterbodies and watercourses	Altered flow patterns Increased sedimentation Infilling or dewatering Effluent discharge	Area of waterbodies and watercourses that may be altered by construction and operation activities (e.g., culvert installation). Identification and characterization of all water crossings. Analysis of flow alteration/disruption to surrounding waterbodies and watercourses Water quality
Changes to fish habitat	Loss of riparian vegetation Bank erosion Changes in water velocity Changes in channel components (i.e., proportion of pool, riffle, run) Increased sedimentation Effluent discharge	Assessment of fish habitat (km^2) availability and accessibility (e.g., fish passage barriers) Watercourse characterization (e.g., channel characteristics, substrate composition) and associated riparian vegetation (e.g., riparian distance, vegetation type). Assessment of water quality (i.e., temperature, dissolved oxygen, pH, conductivity, turbidity)
Changes in fish species community composition	Increased fish mortality Loss of habitat Increased fishing pressure Changes to water temperature	Assessment of fish species composition SAR and SOCC presence and distribution Observed fish mortality Reporting invasive species

Alterations to waterbodies and watercourses and their riparian vegetation may arise during construction activities that alter the landscape such as infilling, earthmoving, and clearing. Infilling and dewatering activities can alter water velocity and flow direction, ultimately changing watercourses and waterbodies in the Project Area. Changes in water flow may alter downstream and upstream processes. For example, decreasing the water velocity can cause higher water levels upstream and alter sediment composition in the stream bed by changing sedimentation rates.

Changes to fish habitat could occur through construction activities requiring work in or near water. Different species may occupy different habitats in a waterbody/watercourse, likewise habitat selection varies depending on life history stage and season. For instance, deep pools may serve as overwintering habitat, whereas shallow, low flowing runs with gravel substrate may serve as spawning habitat for salmonids. Such channel characteristics (i.e., pool, riffle, run) are dependent on water velocity and substrate. Alterations to habitat quality can occur due to construction-related activities that alter substrate composition, water velocity, and water physio-chemical properties (e.g., temperature, salinity, pH).

Changes to riparian habitat may occur at stream crossings, which could affect bank stability and alter water velocity and flow direction over time. Change to canopy cover can also lead to change to water temperatures or water turbidity, associated with wind exposure and mixing. Temperature changes can alter fish physiological stress, pathogen virulence, and dissolved oxygen. Changes to water turbidity can alter light penetration and instream vegetation, which are important for primary productivity, may contribute to regulating water velocity, and contribute to nutrient cycling in aquatic systems.

Changes to fish community composition can occur during construction activities that require in-water work (e.g., culvert installation) and activities that alter the local environment in and around fish habitat. Changes to fish habitat could influence fish species distribution in the landscape due to changes in water quality, predation refuge, and habitat suitability for different life history stages. Changes to access facilitated by new roads could change fishing effort in the region, and potentially further alter community composition, erosion, and local pollution (e.g., garbage dumping). Lastly, moving equipment between aquatic habitats may result in introducing non-native species into the habitat.

EverWind is committed to following the mitigation hierarchy and avoiding impacts, where possible. Please refer to Section 5.4 for mitigations proposed to eliminate or reduce the Project's environmental impacts.

A full assessment of the potential effects of the Project on the aquatic environment will be completed for the EIS.

5.1.2.4 Terrestrial Environment

This section reviews potential environmental effects, associated pathways and measurable parameters of the Project in relation to the terrestrial environment (Table 5.5).

Table 5.5: Terrestrial Environment - Effects Assessment Pathway

Environmental Effect	Effect Pathway	Measurable Parameter(s)
Changes to terrestrial habitats	Removal of vegetation and substrate (i.e., clearing and grubbing) Construction of Project infrastructure.	Community composition based on the ELC (km^2) Coverage of land class types (km^2, %)
Change in wetland structure and function	Wetland alteration (e.g., infilling) Change in hydrology Change in vegetation composition and structure	Area (km^2) of lost or altered wetland habitat
Changes to terrestrial flora species community compositions	Vegetation removal (i.e., clearing and grubbing activities) Altered environmental conditions	SAR and SOCC presence and distribution Habitat disturbance (km^2) Observed loss of individual flora species
Changes to terrestrial fauna species community compositions	Displacement due to project activities and infrastructure Changes in habitat composition Increase in harvesting pressure	Species presence and distribution Habitat disturbance (km^2)
Changes in avifauna and bat community compositions	Collisions with project infrastructure Changes in habitat composition Loss of nests/roosts/hibernacula Altered environmental conditions	Habitat distrubance (km^2) SAR and SOCC presence and distribution Identification of nest/roosts/hibernacula Observed mortality counts (post construction monitoring)

Changes to terrestrial habitats can occur during the construction phase of the Project. Removal of vegetation via clearing and grubbing may result in changes to community composition and vegetation community coverage. Changes to land cover class types may occur as the result of increase in Project infrastructure or site clearing operations.

Changes to wetlands may occur during construction of facilities infrastructure, solar farm, roads, turbine pads, and electrical infrastructure. Infilling, earth moving, and substrate replacement can alter wetland area or function. Changes to surface water or groundwater flow patterns can affect suitability for plant and animal species resulting in changes to the wetland function.

Changes to flora community compositions, including SAR and SOCC may occur (primarily during construction). Vegetation removal for all components of the Project could result in loss of SAR and SOCC plants from the local areas. Changes to microclimate from forest clearing and site preparation activities may change plant community composition, over time.

Changes to terrestrial fauna community compositions may occur during the construction and operations phase of this Project. Construction activities and Project infrastructure can result in temporary displacement of species. Habitat disturbance during construction activities and infrastructure may change habitat availability, connectivity, and suitability. As well, increased roads may provide increased access for humans and can result in changes to hunting and trapping pressure in some areas.

Direct and indirect mortality of avifauna and bats can occur due to collisions with wind turbine blades and towers during the operations phase. Loss of nests, roost trees and hibernacula can occur during forest clearing activities. Habitat changes associated with site preparation and construction can fragment and alter available habitat. Avoidance of wind turbines by avifauna and bats due to noise and light can disrupt migration.

EverWind is committed to following the mitigation hierarchy and avoiding impacts, where possible. Please refer to Section 5.4 for mitigations proposed to eliminate or reduce the Project's environmental impacts.

A full assessment of the potential effects of the Project on the terrestrial environment will be completed for the EIS.

5.1.2.5 Technical Considerations

This section reviews potential environmental effects, associated pathways and measurable parameters of the technical considerations related to this Project (Table 5.6).

Table 5.6: Technical Considerations - Effects Assessment Pathway

Environmental Effect	Effect Pathway	Measurable Parameter(s)
Potential EMI within the Project Area	WTGs	Locations of transmitter and receivers for EM signals Analysis of potential EMI impacts of WTGs on nearby radar and radio operations
Changes in Noise/Vibration	Project Equipment Project Infrastructure	Identification of potentially affected residences Modelling of estimated noise/vibration production by Project infrastructure (WTGs, Industrial components, substations)
Shadow Flicker	WTGs	Identification of potentially affected residences Modelling of estimate shadow flicker per WTG
Solar Glare	Produced by solar farm	Identification of potentially affected residences Modelling of estimate of solar glare
Changes to Visual Landscape	Construction of WTGs	Viewing location identification Viewshed analysis

EMI can occur during operations when structures associated with WTGs block or divert transmission of electromagnetic signals from the source to the receivers. This interference can alter radio communications and local communications including with emergency services.

During construction activities, changes to noise may occur during the operation of construction equipment and heavy machinery such as cranes, backhoes, excavators, dump trucks, graders and transportation vehicles. During the operational phase, changes to noise and vibration can result from WTGs, industrial facilities, and substations. These activities may result in changes to noise levels of residences within certain distance of the infrastructure.

Shadow flicker, experienced by residences, may occur during operation of WTGs. The rotating blades passing between the sun and the residence can cause a flickering effect inside a residence. Shadow flicker may be experienced by residences within certain distance of the WTGs during the operations phase.

Solar glare may occur with the installation of solar farms. Sunlight reflected from glazed, or metal components of the solar farm may cause change to solar glare within the Project Area. Solar glare experienced by residences within a certain distance of the Project may change as a function of this Project infrastructure.

Changes to the viewscape will occur with construction of WTGs. Local communities and residences within certain distances may experience changes in viewscape dependent on siting of WTGs. Existing topography may also change the visibility of WTGs.

EverWind is committed to following the mitigation hierarchy and avoiding impacts, where possible. Please refer to Section 5.4 for mitigations proposed to eliminate or reduce the Project's environmental impacts.

A full assessment of technical considerations will be completed for the EIS.

5.1.2.6 Land and Resource Use

This section reviews potential environmental effects, associated pathways and measurable parameters of the Project in relation to land and resource use (Table 5.7).

Table 5.7: Land and Resource Use - Effects assessment pathway

Environmental Effect	Effect Pathway	Measurable Parameter(s)
Change in land use	Current use / future development Disturbance to nearby residences Changes to traditional land use practices of Indigenous peoples	Change / restriction of land use (km^2); Proximity to land use sites, areas of traditional practice, and residences and confirmation of VC summaries relevant to land use sites, areas of traditional practice, and residences (km)
Changes in resource use	Resource harvesting Resource accessibility Resource availability	Presence and distribution of harvest species (VC) Total distance of roads and trail (km^2)
Change in recreational use areas	Clearing and construction activities Operational access limitations	Existing area of recreational use (trails, cabin areas, etc.) (km^2) Change to recreational use areas (km^2)

The Project may change current and future land use by occupying land that may have been used for other activities or change land availability for potential future developments. Changes to land use activities by locals, tourists, and Indigenous peoples may occur during Project construction and operation activities. Nearby residences may be affected by disturbances associate with Project activities and infrastructure. Additionally, changes to land use activities may result from increased access due to road construction.

The Project may influence resource harvesting use. Changes to composition of harvested species may result in changes to local harvesting activities. Additionally, changes to accessibility of the Project Area may result in changes to harvesting activities.

The Project may influence recreational use of the area by changing landscapes through construction of Project infrastructure by users. Recreational land may be removed for facilities infrastructure, solar farm, and wind turbines. New road construction may provide access to new areas for recreational activities such as hunting, fishing, berry picking, ATVing, and snowmobiling.

EverWind is committed to following the mitigation hierarchy and avoiding impacts, where possible. Please refer to Section 5.4 for mitigations proposed to eliminate or reduce the Project's environmental impacts.

A full assessment of the potential effects of the Project on land and resource use will be completed for the EIS.

5.1.2.7 Heritage and Cultural Resources

This section reviews potential environmental effects, associated pathways and measurable parameters of the Project in relation to heritage and cultural resources (Table 5.8).

Table 5.8: Heritage and Cultural Resources - Effects Assessment Pathway

Environmental Effect	Effect Pathway	Measurable Parameter(s)
Loss of information about or alteration to heritage, cultural, or archaeological site contents or context	Disturbance of previously-undisturbed ground	Number of heritage resource sites in Project Area Identification of potential historic resource sites Documentation of observed heritage resource sites

Changes to heritage, cultural and archaeological resources could occur during construction. Construction may require earth works at locations identified as having potential historical resources. Any area where earth works will occur that coincide with area identified as having potential historical resources could alter a heritage resource site.

EverWind is committed to following the mitigation hierarchy and avoiding impacts, where possible. Please refer to Section 5.4 for mitigations proposed to eliminate or reduce the Project’s environmental impacts.

A full assessment of the potential effects of the Project on cultural and heritage resources will be completed for the EIS.

5.1.2.8 Communities

This section reviews potential environmental effects, associated pathways and measurable parameters of the Project in relation to communities (Table 5.9).

Table 5.9: Communities - Effects Assessment Pathway

Environmental Effect	Effect Pathway	Measurable Parameter(s)
Change in Human Health	Air quality Noise Other hazards (e.g., ice throw)	Toxicity Assessment Exposure Assessment Risk Characterization Uncertainty Assessment
Change in housing and temporary accommodations	Project activities Project-related population growth	Availability of accommodations (rental vacancy rates, inventory levels, vacancy rates of commercial accommodations)
Change in transportation infrastructure	Project activities Project related population growth	Capacity of transportation infrastructure (road, air) Road volume (vehicles/day) Project-related traffic movements
Change in local services and infrastructure	Project activities Project-related population growth	Number of hospital beds Police officers/100,000 population Physician/100,000 population Teacher: Student Ratios

Changes in air quality can affect human health. Changes to air quality may occur during the construction phase of the Project. As discussed in Section 4.9.5.1, noise will be generated by the Project during all phases. Appropriate spatial and temporal scales will be identified to conduct the appropriate analysis and characterization of risk, and standard mitigation measures can be applied to reduce risk to human health.

Employment and procurement of goods and services can result in an in-migration of Project workers. Increased labour force in the region can result in changes to availability of existing accommodations for Project staff and local residents. This may also result in a change to the number of newly built accommodations to accommodate changes in local labour forces.

Demand on local transportation infrastructure may be affected by Project activities and Project related population growth. Supply chain logistics for consumables and regionally/locally supplied goods can change the volumes of commercial transportation on local roads and within local communities. Changes to workforce can result in changes to traffic volumes and flows both day-to-day and throughout the Project. These changes to overall traffic volumes and weight may result in changes to the traffic infrastructure within the region to support the Project.
Demand for local services and infrastructure may be affected by Project activities and Project-related population growth. Changes to local population growth may result in changes to local services such as teacher: student ratios and hospital bed occupancy. Change to local infrastructure may also occur in response to changes in Project-related population growth for services such as fire and emergency services, waste management, and recreation services.

EverWind is committed to following the mitigation hierarchy and avoiding impacts, where possible. Please refer to Section 5.4 for mitigations proposed to eliminate or reduce the Project's environmental impacts.

A full assessment of the potential effects of the Project on communities will be completed for the EIS.

5.1.2.9 Economy, Employment, and Business

This section reviews potential environmental effects, associated pathways and measurable parameters of the Project in relation to economy, employment, and business (Table 5.10).

Table 5.10: Economy, Employment, and Business – Effects Assessment Pathway

Environmental Effect	Effect Pathway	Measurable Parameter(s)
Change in regional labour force	Direct hiring of local labour Increased requirement for temporary labour force during construction	Qualified labour supply (persons) and existing wage levels Project employment (jobs and fulltime equivalents [FTEs])
Change in regional business	Project spending	Value of local and regional spending and related economy ($) Wage level ($)
Change in regional economy	Project employment Project spending	Gross Domestic Product ($) Tax Revenue ($)

The Project will increase the availability of jobs (Table 1.2) in the region and changes to the local workforce may arise from the different phases of this Project. A project of this size may require larger workforces than are present in local communities, requiring for an increase in the number of temporary workers, particularly during the construction phase. Additionally, the increase in available jobs may change availability of labour for other businesses operating within the region.

Changes to contracting and business opportunities can arise during all development phases of this Project. These changes may affect several sectors including, but not limited to supply chain, transportation, accommodation, manufacturing, etc. Additionally, changes to wage levels may result in changes for regional business either directly through business expenses or through changes to the disposable income of residents.

Changes to the local economy may occur through spending and revenue generation of the project. Tax revenues through business tax, both directly through the Project and through local suppliers may result in changes to regional economies. Benefits agreements negotiated between EverWind and local/regional governments may result in changes to regional economies in addition to those contemplated under traditional economic analysis.

A full assessment of the potential effects of the Project on Economy, Employment, and Business will be completed for the EIS.

5.1.3 Effects Assessment Criteria

To determine residual effects to each VC following mitigation measures, the Project team will consider the magnitude, likelihood, geographic extent, timing, duration, frequency, and reversibility of the Project's impact. A comprehensive effects assessment for each VC will be provided in the EIS.

Table 5.11 provides a preliminary description of each rating criteria and the degrees to which each criterion can contribute to an effect. The criteria will be refined and supplemented as more information becomes available through the EIS.

Table 5.11: 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. (to be completed at the EIS stage of the Project)**
Likelihood The chance that the anticipated residual effect will occur	**Unlikely –** Expected to occur with a low degree of certainty **Possible –** Expected to occur with a low to medium degree of certainty **Likely –** Expected to occur with a medium to high degree of certainty **Almost Certain –** Expected to occur with a high degree of certainty
Geographic Extent The geographic area in which an residual effect occurs	**Project Area –** residual effects are restricted to the Project Area **Local Assessment Area (LAA) -** residual effects can extend beyond the Project Area but will be restricted to the Burin Peninsula **Regional Assessment Area (RAA) -** residual effects can extend beyond the Burin Peninsula to the east coast of the province or beyond
Timing Considers when the residual effect is expected to occur	**Not applicable –** seasonal aspects are unlikely to affect the VC **Applicable –** seasonal aspects may affect the VC
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 effects restricted to no more than the duration of the construction phase **Medium term –** residual effects extend through the operation and maintenance phase **Long term –** residual effects extend beyond the decommissioning phase **Permanent** – VC does not return to pre-existing conditions

Rating Criteria	Rating
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 phases of the Project **Continuous –** occurs continuously
Reversibility Describes whether a measurable parameter or the VC can return to its pre-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

These criteria will be used to determine the significance of residual impacts (post mitigation) and will be provided in the EIS.

5.2 Accidents and Malfunctions

Accidents and malfunctions are unplanned events that are not anticipated to be part of any phase of the Project but could cause a significant adverse environmental effect to many, if not all the VCs identified.

Without proper mitigation, accidents and malfunctions have the potential to result in adverse effects. However, effective planning and preventative measures limits the probability of occurrence, and having appropriate response procedures in place reduces the magnitude of adverse residual effects.

5.2.1 Ammonia Release (Toxic Hazard)

Accidental ammonia release, although very unlikely, may occur at the Industrial Facility during Project operations. EverWind will adhere with the Environment and Climate Change Canada's Environmental Emergency Regulations (E2 Regulations). According to the NOAA (n.d.) Emergency Response Planning Guidelines (ERPG) for ammonia range as follows:

- ERPG-1 level = 25 ppm
- ERPG-2 level = 150 ppm
- ERPG-3 level = 1,500 ppm

Additionally, levels at 300 ppm are considered immediately dangerous to life and health by the U.S. Occupational Safety and Health Administration.

Ammonia release scenarios will be assessed and could be considered to fall within one of the applicable ERPG level ranges, in the event of the following:

- Ammonia storage tank release
- Transfer pipeline release
- Loading arm release (at the dock)

The consequences of a toxic ammonia release depend on the dilution rate and dispersion (of the ammonia cloud) to safe levels in the atmosphere. Liquid releases rely heavily on the pooled surface area within the release area. The evaporation rate of the chemical pool determines the toxic gas cloud volume, hazard zone, and/or impact radius.

Fertilizer Canada (2022) provides an anhydrous ammonia dispersion model[5] with concentrations identified in zones (Figure 5.1).

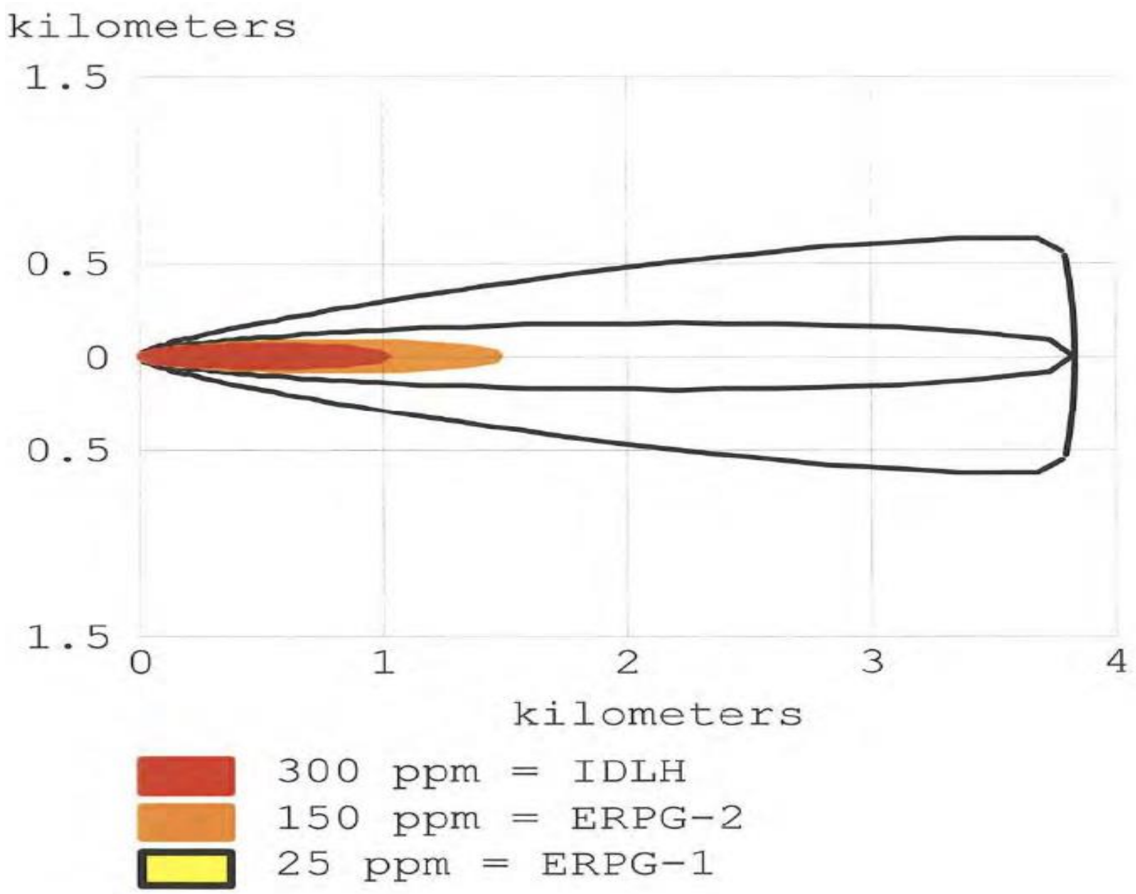

Figure 5.1: Model of Anhydrous Ammonia Dispersion Pattern

Source: Fertilizer Canada (2022)

The degree of atmospheric turbulence will affect the ammonia cloud's behaviour; and increased atmospheric turbulence will induce the entrainment and mixing of unpolluted air into the ammonia cloud and reduce the concentration of pollutants in the cloud (i.e., enhancing plume dispersion and dissipating the toxic ammonia).

[5] Model assumes a 5 cm pipe leak on a pressurized storage tank, with 24 km/hr wind and 15°C.

Detailed spill response plans for each potential release scenario will be developed, trained, and exercised by the Emergency Response Team (ERT) and Mutual Aid Partners (local Volunteer Fire Departments) per the requirements of ECCC Environmental Emergency (E2) regulations.

5.2.2 Hydrogen Release (Fire or Explosion Hazard)

As with any process plant, accidental release, fires, and/or vapor cloud explosions are potential hazards. These accidents have very low probability of occurrence at the Project due to the engineered safeguards and industry best practices inherent to safety-in-design principles that will be implemented (Section 5.5.4).

One such potential hazard could be accidental hydrogen release resulting in possible fire or explosion hazard at the Industrial Facility. Potential confined vapour cloud explosion, (cVCE), as well as unconfined vapour cloud explosion, (uVCE), and fireball hazard events may occur (although they are very unlikely) during the Project's process operations.

Hydrogen release scenarios considered to be the most probable emergency event scenarios for potential loss of containment include the following:

- Explosion event due to a connection leak at an electrolyzer stack.
- Explosion event due to a connection leak within the hydrogen compressor enclosure (on the high-pressure discharge line).
- Fireball event due to a connection leak on a hydrogen main manifold.

Regarding explosion scenarios, projectiles are typically part of explosion events and may significantly impact infrastructure and/or the integrity of process buildings which may compromise the safety of Project personnel. Mitigations to protect personnel and respond to damage from projectiles during an emergency event will be included in the Project's emergency response plan and mitigations (Section 5.5.1).

Detailed fire response pre-plans for each potential fire or explosion scenario will be developed, trained, and exercised by the Emergency Response Team (ERT) and Mutual Aid Partners (local Volunteer Fire Departments) per the requirements of ECCC Environmental Emergency (E2) regulations and the Authority Having Jurisdiction (AHJ).

5.2.3 Untreated Effluent Releases

Untreated Effluent releases from the Industrial Facility have the potential to cause adverse environmental effects. Untreated effluent may be introduced into the environment by exceeding the holding pond capacity (overflow) or malfunction of the treatment system. Where holding pond capacities are exceeded, untreated effluent may overflow the containment system and flow into the environment.

A malfunctioning treatment system will fail to effectively treat process wastewater and stormwater, which could lead to the discharge of contaminated effluent into the environment. The discharge of untreated and/or poorly treated effluent may result in the following impacts:

- Eutrophication of marine and freshwater sources
- Degradation of water quality
- Endangerment of aquatic species and habitat
- Contamination of soils
- Contamination of groundwater; impacts to residential potable groundwater

Effluent sources that have the potential to impact the surrounding area adversely include:

- Raw Freshwater Treatment Plant (RFWTP)
  - Chemical Enhanced Backwash, CIP, and concentrate from the UF, RO, and EDI treatment trains
- Wastewater Treatment Plant (WWTP)
  - Treated RFWTP effluent
  - Treated Hydrogen Plant blowdown
  - Treated Ammonia Plant blowdown
  - Treated service water from drains
- SWWTP
- Stormwater (internal and external)
- Cooling Tower Blowdown

Effluent from the RFWTP will be directed to the WWTP, along with the Project's process effluent (i.e., blowdown). The effluent from the WWTP, SWWTP, and the internal stormwater system will be directed into the effluent treatment ponds for processing, prior to discharge.

The external stormwater and cooling tower blowdown water will be discharged into the environment.

5.2.4 Erosion and Sediment Control Failures

Erosion and sediment control failures may occur during construction of the LBP Wind Farm, Solar Farm I, Industrial Facility, or any of the associated access roads, electrical lines, or substations. Failure of erosion and sedimentation controls implemented by the Project may result in potential adverse effects on the surrounding terrestrial and freshwater environment. Erosion and sedimentation controls are typically implemented to minimize impacts to watercourses (and to fish and fish habitat) from the migration of fine sediment from disturbed soils (i.e., grubbing, excavation), stockpiled material (i.e., removed fill), and former infill and sand during all phases of the Project.

Erosion and sedimentation controls may fail due to extreme weather conditions (e.g., flooding), improper installation, improper maintenance, and unforeseen accidents (e.g., on-site vehicle or equipment collisions with silt fences). Failure of these control measures may release sediment into the environment, impacting water quality and aquatic and terrestrial habitats.

EverWind is committed to ensuring erosion and sediment control is correctly installed, regularly inspected, and properly maintained.

5.2.5 Fires

An accidental fire may occur as a result of Project activities (construction, operations, or maintenance) at any Project component which could lead to larger events (explosions) and potentially adversely affect the atmospheric environment (emissions), the natural environment, Project infrastructure, and neighbouring communities. Note that this section does not consider fires as a result of accidental ammonia and/or hydrogen release (refer to Sections 5.2.1 and 5.2.2, respectively, for additional information on these scenarios).

Fires may occur from overheated equipment, hot work, fuel storage facilities and buildings, dry conditions, and mechanical shops. Of these potential sources, fires originating from, or in proximity to, fuel sources are inherently dangerous as fuel may sustain a fire for longer periods and lead to explosions and/or extensive damage. In addition, fires may release hazardous materials, which could impact air quality and cause adverse effects on the surrounding environment (i.e., terrestrial or aquatic habitat).

In the unlikely event of a fire, the immediate concern will be human health and the surrounding environment. Where the Project is located a fire will be segregated from residential communities. Refer to Section 5.5.1 for the Operational Safety and Emergency Response Plan.

5.2.6 General Hazardous Material Spills

Hazardous spills resulting from the use of fuel (i.e., storage, refuelling, 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.

Refer to Section 5.5.1 and 5.5.4 for more details on spill response.

5.2.7 Ice Throw

Under certain meteorological conditions, ice can form on the blades, tower, or any surface of the WTG. Ice formation on the blades can lead to vibrations and imbalances in the WTG, often resulting in the need to temporarily shut down the WTG. As the ice melts or is shaken loose by vibrations, it is possible for chunks of ice to fall from the structure or be thrown by the rotating blades. Ice throw causes a potential hazard to anyone in the vicinity of the WTG.

The Canadian Renewable Energy Association (CREA, 2020) provides a formula to determine the maximum ice throw distance:

$$d_t = 1.5 \times (D + H)$$

Where:
d^t = Maximum throwing distance (m)
D = Rotor diameter (m)
H = Hub height (m)

Assuming the most conservative rotor diameter and hub height indicated in Section 3.2.1, 135 m and 132 m, respectively, the maximum ice throw distance is d_t = 400.5 m. This remains well within the Projects WTG setback from residences (i.e., 1,000 m). A number of factors such as wind speed, rotational speed, size of the ice chunk, and position of the ice on the structure affect how far it may be thrown. It is widely accepted that the formula above generates a conservative ice throw distance and in practice this distance may be much smaller. The calculated strike risk does not factor in the presence of forest vegetation providing additional shelter or topographic variations.

All WTGs considered will be equipped with a reliable ice detection system. Once ice has been detected, the WTG rotor stops spinning, and will remain stopped until the ice has been melted, which will occur either passively through a natural melting process based on climatic conditions or actively with a de-icing system that heats and melts the ice on the WTG blade. This effectively reduces the risk of ice throw.

5.2.8 Risk and Risk Management

The EverWind Health, Safety, Security, and Environmental Management System (EverWind HSSE Management System) follows the Canadian Standards Association (CSA) Z45001:19 Standard for Occupational Health & Safety Management System and the Process Safety Management of Hazardous Chemicals.

The EverWind HSSE Management System uses a multi-faceted risk management strategy that includes:

- Process Safety Information, which refers to key documentation for identifying and understanding the hazards posed by the process activities involving hazardous chemicals.
- Process Hazard Analysis is an exercise used for the identification of hazards within the Industrial Facility and the qualitative or quantitative assessment of the associated risks.
- Operating Procedures, Pre-Startup Safety Review, Mechanical Integrity, and Management of Change each are essential elements that are critical to the management and elimination of risk.
- Incident Investigation provides an opportunity to learn from mistakes and disseminate the new knowledge gathered throughout EverWind and external stakeholders.
- Emergency Planning and Response can significantly reduce the consequences of an incident and ensure a return to normal operations.
- Employee and Contractor Involvement will sustain a strong Process Safety Culture.

EverWind will develop detailed Operating Procedures and Emergency Response Plans for each facet of the project that will transition to normal operations in two distinct divisions.

1. Wind and Solar Farms and Power Distribution - These are typically small maintenance groups or teams that will possess rescue & response training skills specific to their job function & trade skill. This is not part of the Emergency Response Team (ERT) system.
2. Industrial Facility - This will be run by shifts of Operators lead by a Shift Supervisor (4 Shifts). All Operations & Maintenance personnel will be part of the ERT, each Shift Supervisor will be the On-Scene Commander in the event of emergency, until they are relieved by a more senior role (Typically the General Manager or Health, Safety, and Environment (HSE) Manager).

Operations is a 24hr/day function (typically 12hr shifts), therefore there is 24hr ERT coverage provided by on-shift personnel (1st line of defense). Off-shift personnel are on call for emergency response. (2nd line of defense for event escalation). Mutual Aid partners (local volunteer fire departments [VFDs] with applicable training) will form the 3rd line of defense for event escalation.

All of this is organized & coordinated by following the Incident Command System (ICS) protocols and developed Emergency Pre-Plans.

5.3 Effects of the Environment on the Project

The following section discusses potential effects of the natural environment, including natural hazards and weather events, on the infrastructure and operation of the Project as well as mitigation and design strategies for reducing the significance of residual 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 operation and maintenance of the Project will be trained in the design and operation of the Wind Farm, Solar Farm, Industrial Facility and supporting infrastructure, including applicable operating procedures, safety protocols, and evacuation plans. To further mitigate damages, all applicable infrastructure will be equipped with safety mechanisms to limit damage resulting from extreme weather events.

5.3.1 Climate Change

Climate change is the persistent change in the state of the climate which lasts for decades or longer (Intergovernmental Panel on Climate Change (IPCC), 2018). Climate change has the potential to impact the project through the increased frequency and severity of severe weather events including heavy rainfall, hurricanes, blizzards and ice storms (see following section). The Project will contribute to mitigation for climate change by using green energy and reducing GHG emissions.

Sea level rise by 2100 in Newfoundland and Labrador is anticipated to be 100 cm, with future storm surges and storm wave heights to exceed 4 m and 10 m respectively in part of the province (NLECC 2024e). The minimum elevation at the Industrial Facility is 71 m above sea level (asl) with an average elevation of 97 m asl, placing the Industrial Facility well above the estimate sea level rise and projected storm surges and storm wave height. Mitigations for the effects of climate change on the Project will involve construction, operation, and safety protocols that prepare for at least 1 in 100-year events as well as other management (e.g., stormwater management plan) and monitoring plans.

5.3.2 Severe Weather Events

Newfoundland and Labrador is subject to severe weather events, including heavy rainfall, hurricanes, blizzards, and ice storms which may lead to power outages, health related emergencies, infrastructure damage, and road damage, and therefore may pose direct risks to Project infrastructure (Government of Canada, 2018). Heavy rainfall is a common, highly probable natural hazard in Newfoundland and Labrador. 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 2024b). Heavy rain or snow melt has the potential to deposit high quantities of water within the Project Area in a short period of time. Project design features will mitigate the effects of heavy rainfall and snow melt to maintain road access to all project infrastructure during severe precipitation events.

Wind and lightning, which may be associated with heavy rainfall or hurricane conditions, may increase the risk of mechanical issues or electrical fires. Restricted access to the Project Area during severe weather events (e.g., from road washouts or fallen trees blocking access) may limit the ability to shut down the system to prevent damage. To mitigate this risk to WTGs, they will be equipped with a remote automatic shut down when thresholds for wind are reached (i.e., cut-out speeds), blade imbalances from icing are present, and if the WTGs overheat (to prevent turbine fires). WTGs will also be designed with a built-in grounding system for lightning strikes.

Blizzards and ice storm occur during the winter months and can result in disruption of power supply, downed power lines, road closures, ice build-up on infrastructure, including WTGs and the Industrial Facility. Mitigation for such events would include back-up power supplies for critical systems, remote monitoring and operation capacity for critical systems, construction and maintenance protocols to ensure minimal build-up of snow and ice in critical infrastructure.

5.3.3 Flooding

Flooding in the Project Area may increase due to more frequent severe precipitation associated with climate change. Because of ocean warming, climate change is predicted to produce more intense precipitation, which may result in increased flood risk (IPCC 2018). Flooding may impact both terrestrial and aquatic habitat, damage Project infrastructure, and limit site access. The Project will mitigate the risks of flooding by concentrating the road and WTG layout in high elevation areas wherever possible, install cross drainage culverts (where appropriate), maintaining regular upkeep and grading of roads to reduce formation of ruts, designing roadside ditches and water off-take infrastructure next to all roads to encourage drainage of runoff off the roads, and revegetating roadsides to slow the movement of water and minimize sedimentation. Similarly, the Industrial Facility infrastructure will be located at the highest elevation possible and have appropriate stormwater management system design, to minimize risk of flood damage or site accessibility issues.

5.3.4 WTG Icing

WTG icing occurs when ice accumulates on the surface of WTG blades, a condition created by specific temperatures and levels of humidity or the presence of freezing rain. The chances of WTG icing increase when the blades reach 150 m above ground, where the lower clouds may contain supercooled rain (Seifert et al., 2003). WTG icing can cause imbalances of the blades which can affect the mechanics of the WTG and may lead to ice throw (Section 5.2.7). All WTGs will be equipped to automatically shut down when thresholds for ice formation are detected.

5.3.5 Wildfire

Forest fires have the potential to damage Project infrastructure such as collector lines. The risk of a forest fire is dependent on several weather conditions such as extended periods without precipitation and high temperatures. Forest fire risk is also dependent on potential ignition sources such as lightening or human-caused fires.

The Forest Fire Regulations, NL Reg. 11/1996 outline restrictions for burning and operating timber harvesting equipment. Burning restrictions are determined by the Fire Weather Index (FWI). The Newfoundland and Labrador government employs a FWI during the fire season to determine fire danger across the forested areas in Newfoundland and Labrador (NLFFA 2024f) 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 timber harvesting equipment and/or clearing saws in forested areas within the Project Area will only occur when and as permitted under the Forest Fire Regulations and the FWI. Any activities requiring burning during the Project lifetime will be timed according to local burning restrictions.

As a best practice, the FWI will be used to determine fire danger associated with activities that may result in burning. The FWI during the summer months across the Project Area ranges from low (0-5) to high (10-20) (NRCan 2024b, 2022). Furthermore, the FWI will be checked regularly at nearby weather stations during summer months to determine the potential for highly dangerous wildfires. Precautions will 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 (Wildfire Regulation, British Columbia, Reg. 38/2005). 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.

5.4 Mitigation

Although a full effects assessment for individual VCs will be completed as part of the EIS, the following suite of mitigation measures are expected to apply to the Project:

Table 5.12: Potential mitigation measure expected to apply to the Project

Potential Mitigation Measure
General
• Develop site-specific erosion and sedimentation control plans during the detailed design phase. Properly install, inspect, and repair erosion and sediment controls. • Conduct grading and site preparation in Project Area to minimize disturbed soil areas until just prior to construction activities. • Limit the slope and gradient of disturbed areas to minimize the velocity of surface water runoff. • Minimize clearing by only clearing the area that will be needed. This will reduce the use of equipment (lowering emissions produced during equipment operations) and minimize habitat loss for wildlife. • Vegetation clearing will be timed to avoid and the bird nesting window (April 15 to August 15). If unavoidable, nest seeps will be conducted in advance of clearing activities. • Stabilize exposed soil surfaces by sloping or using vegetation, stone, soil, or geotextiles to prevent dust and airborne particles. • Cease dust-generating construction activities during periods of excessive wind. • Wet roadways and heavy traffic areas with water or dust suppressant technologies to minimize airborne emissions, if 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. • Use locally sourced quarried materials, where possible, for road construction to reduce the introduction of invasive vascular plant species and to reduce emissions associated with transport. • 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. • 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. • Develop a site reclamation plan in accordance with engineering standards and in consultation with NLECC and NLFFA prior to decommissioning. • Maintain existing vegetation cover, where possible. • Minimize use of road salt to minimize attraction of ungulates to roadsides during the winter. • Post speed limit signs and enforce site speed limits to minimize dust generation. • Use the existing roads and access routes to the extent feasible. • Use the minimum number of vehicles possible to minimize impacts to road-way flow and air quality due to exhaust emissions. • Implement an anti-idling policy to limit GHG/exhaust emissions from vehicles and equipment. • Require that vehicles with an improperly functioning emission control system is not operated. • Require that regular equipment maintenance is undertaken to maintain good operations and fuel efficiency.

Potential Mitigation Measure
• Clean and inspect work vehicles prior to use to prevent the introduction of invasive/non-native species. • Wash down vehicles and equipment using hoses and water to remove accumulated mud/dirt on undercarriages, tracks, or wheel wells. • Develop a spill response plan, and an emergency response plan within the EPP to mitigate the impacts of spills, hazardous substances, and other emergencies. • Develop a fire response plan in accordance with provincial standards. • Equip staff and workers accessing the Project Area for maintenance or other purposes with necessary personal protective equipment (PPE) and associated safety protocols and procedures to mitigate risk of injury and/or fatality, especially during potential icing conditions. • Require that all fuels, lubricants, chemicals, and dangerous goods are stored in designated, adequately sized containers and are sited >30 m from a wetland or watercourse. • Require that fuel storage areas, refuelling and equipment lubrication are located a minimum of 30 m from any surface water. • Ensure operators remain with equipment during refuelling. • Require that all equipment, including mobile, are equipped with spill kits and appropriate spill mitigation materials. • Require that workers are fully trained in spill response. • Recover and recycle construction and demolition waste, where possible. • Recycle and compost workforce waste (i.e., food waste).
Atmospheric Environment
• Dispose of hazardous substances at an approved hazardous waste facility per applicable regulations and in compliance with local requirements. • Equip and automate shut-off valves on the connection point of the ammonia transfer liquid and gas pipeline feed. • Equip and automate emergency stops integrated and controlled through gas detection systems (monitors). • Require appropriate spacing between ammonia tanks and the hydrogen plant to minimize secondary risk explosions and domino events. • Require ammonia storage/piping areas are cool, dry, and out of direct sunlight (where possible) to minimize wear and tear and prevent damage. • Require ammonia storage/piping areas are developed away from heat and ignition sources. • Require that loading and routine operation procedures are reviewed; equipment inspection, maintenance and/or repairs schedule adhered to. • Require pumps, motors, instrumentation, and other electrical components associated comply with the applicable electrical hazard zone, which will minimize the probability of ignition and avoid domino events. • Require that engineering controls (e.g., automatic shut-off valves, sensors) are implemented into the design and can identify an ammonia leak for prompt response and isolation controls to engage. • Install positive pressure and blast-safe enclosures and control rooms to protect operations personnel from the effects of toxic release, explosions, and fire events, as well as to provide safe routes of egress in the event of an emergency.

Potential Mitigation Measure
• Require that critical equipment is located outside the heat radiation zone of concern, or the provision of passive fire protection should be included in the design requirements. • Develop and implement a Project-specific emergency response plan including emergency evacuation procedures and muster stations outside any potential blast radius.
Geophysical Environment
• Conduct blasting, if required, in accordance with provincial legislation and subject to terms and conditions of applicable permits. • Conduct a pre-blast survey for wells likely to be impacted by blasting. • Require that all blasts be conducted and monitored by certified professionals. • Require that all protective measures outlined in the EPP be implemented in advance of blasting activities. • Notify landowners within 800 m of any blasting activities. • Recover and revegetate exposed soils or bedrock as required to minimize any exposure following blasting.
Aquatic Environment

• Complete wetland and watercourse delineations and clearly mark sensitive areas prior to construction
• Approvals will be obtained for all watercourse crossings and be installed by a certified professional, and designed to avoid any permanent diversion, restriction, or blockage of natural flow, such that the hydrologic function of the watercourse is maintained.
• Maintain a 30 m vegetated buffers surrounding wetlands and watercourses, where possible.
• Revegetate along the watercourse edge and above the ordinary high-water mark to facilitate the stabilization of the area.
• Redesign existing watercourse crossings to facilitate habitat upgrades, including unblocking culverts and making waterways more conducive to fish passage.
• Avoid impacts to wetlands to the extent possible (including alteration, compaction, or otherwise).
    • Design wetland crossings to occur at the narrow part of the wetland or the wetland's edges, to the extent possible.
    • If travel through wetlands is required, use geotextile matting, time work to occur during frozen ground conditions (if possible), or travel through the drier portions of the wetland, as appropriate.
• Plan activities to align with low flow periods, where possible.
• Maintain surface water flow via cross drainage culverts on access roads.
• Require that surface run-off containing suspended materials or other harmful substances be minimized.
• Direct run-off from construction activities away from wetlands.
• Leave riparian vegetation as intact as Project developments will allow.
• Integrate water management systems including diversion and collection ditches, roadside drainage channels, and stormwater retention ponds.
• Design any necessary alterations in a way that maintains the natural grade of a watercourse, to ensure the hydroperiod remains as it was pre-alteration.
• Fit any watercourse crossings with appropriately sized infrastructure, as prescribed by a certified professional.
• Integrate outlet protection features to dissipate flow velocities and decrease erosion at the outflow.

Potential Mitigation Measure
• Utilize vegetated swales for the phytoremediation of contaminated runoff. • Utilize rock material that is clean, coarse granular, non-ore-bearing, non-watercourse-derived, and non-toxic to aquatic life. • Ensure wetland crossings will not result in permanent diversion, restriction, or blockage of natural flow, such that hydrologic function of wetlands will be maintained.
Terrestrial Environment
• Complete field studies as required, for rare plants, fish, wildlife, birds and bats prior to construction and avoid SAR and their habitat, if identified. • Complete clearing during winter months when birds and bats are overwintering (i.e., outside of the April 15 to August 15 nesting period, where possible. If clearing is required within the nesting period for birds, complete a pre-clearing nest survey. • Develop a wildlife management plan and provide wildlife awareness training to all site staff. • Prohibit harassment and feeding of wildlife by Project personnel. • Maintain good housekeeping practices during construction to avoid attracting nuisance wildlife. • Employ measures to reduce the spread of invasive species (e.g., cleaning and inspecting vehicles). • Install motion activated lights on site infrastructure to reduce insect attraction and subsequent attraction by bats during operations. Motion activated lighting is only applicable to the ground-based infrastructure (i.e., at doorways and the substation) as WTG lighting at the top of individual WTGs is regulated by Transport Canada. • Augment connectivity by creating semi-artificial pathways such as wildlife corridors, greenbelts, and vegetated buffers around wetlands and watercourses, where possible. • Implement adaptive management during operations should post-construction mortality monitoring identify significant mortality events from WTG strikes to a particular species of bird, at a particular time of the year, or during specific weather conditions.
Socio-Economic Environment
• Maintain 2 km setbacks from the production facilities to residences. • Maintain 1 km setbacks from WTGs to residences. • Prioritize local workers and contractors for employment • Design the Project's wind farms to comply with industry standards for operational noise, vibration, and shadow flicker. • Develop a complaint response protocol, which will consider complaints related to noise, vibration, and shadow flicker and outline a process to investigate complaints. • Warning signs will be posted at site entrances • Reduce WTG lighting to the extent possible, as allowable by Transport Canada • Conduct engagement and education with local recreational users regarding the safe continued use of lands within the Project Area. • Install notices in public areas to inform residents of signage removal or road infrastructure alterations. • Replace removed signage and guardrails immediately with appropriate temporary signage to ensure the safety of travelling public. • Complete upgrades to roads and overhead wires, branches, and signs if conflicts arise. • Ensure fencing is in place surrounding the substation for safety of the public.

Potential Mitigation Measure
• Fire extinguishers to be located throughout the tower and nacelle of each WTG • Avoid, to the extent possible, transportation through urban areas during high traffic times (e.g., 7-9 am and 3- 6 pm; Monday to Friday). • Conduct all travel using safe work practices for transporting oversized loads. • Work with local recreation groups (e.g. trail associations) to ensure continued access to recreation sites, including development site-specific safety plans in coordination with landowners, recreational groups, and the Project operations team.
Land and Resource Use
• Complete archaeological assessment as directed by PAO. • Immediately halt work and notify PAO if archaeological resources are identified during construction. • Install signage illustrating and warning of potential hazards associated with ice throw and fall around wind WTGs. • Complete consultation with operators of radiocommunication and radar systems within the consultation zones for EMI assessments.
Accidents and Malfunctions
Ammonia release • Develop and implement a Project-specific on-site and off-site emergency response plan. • include the potential risk of an ammonia cloud and how to manage the response in the event of an emergency • Equip and automate shut-off valves on the connection point of the ammonia transfer liquid and gas pipeline feed. For example, include a signal indicating pressure loss or leak detection, which would result in shut-off valve closure and assist in minimizing the gas cloud volume in the event of a leak. • Equip and automate emergency stops integrated and controlled through gas detection systems (monitors). • Ensure that the ammonia tank is located outside the 20 kPa explosion zone (not closer than 60 m) from the hydrogen plant to minimize secondary risks (i.e., explosions) and domino events. • Ensure ammonia storage/piping areas are cool, dry, and out of direct sunlight (where possible) to minimize wear and tear and prevent damage. • Ensure ammonia storage/piping areas are developed away from heat and ignition sources. • Install hard arms to perform loading operations to ship vessels. Loading arms will be continually assessed during routine operations and in the event that wear and tear or damage is identified, the effected loading arm will be tagged out of service until maintenance and/or repairs can be completed. • Select and purchase pumps, motors, instrumentation, and other electrical components associated with, or in proximity to, the Hydrogen and Ammonia Plants to comply with the applicable electrical hazard zone, which will minimize the probability of ignition and avoid domino events. • Ensure engineering controls (e.g., automatic shut-off valves, sensors) are implemented into the design and are able to identify an ammonia leak within 15 minutes, allowing for prompt response and isolation controls to engage. • Install positive pressure and blast-safe enclosures and control rooms to protect operations personnel from the effects of toxic release, explosions, and fire events, as well as to provide safe routes of egress in the event of an emergency.

Potential Mitigation Measure
Hydrogen release ● Develop and implement a Project-specific on-site and off-site emergency response plan. ● Include the potential risk of hydrogen release and how to manage the response in the event of an emergency. ● Provide Project personnel with emergency evacuation procedures and instruct them to muster to a safe area outside a potential blast radius. ● Ensure that critical equipment is located outside the heat radiation zone of concern (e.g., electrical and instrument cables to be located outside the 12.5 kW/m^2 zone, or ≥54 m away), or the provision of passive fire protection should be included in the design requirements. ● Ensure that the selection of pumps, motors, instrumentation, and other electrical components shall comply with the applicable electrical hazard zone, which will minimize the probability of ignition at the hydrogen plant. ● Install positive pressure and blast-safe enclosures and control rooms to protect operations personnel from the effects of toxic release, explosions, and fire events, as well as to provide safe routes of egress in the event of an emergency. ● Design and reinforce buildings (where practical) to protect from potential projectiles in the event of an explosion; include explosion propagation routes and exterior explosion panels to direct projectiles away from critical equipment and/or personnel. Untreated Effluent Release ● Ensure all internal stormwater drainage originating from the Industrial Facility is directed to the effluent treatment ponds. ● Ensure all internal stormwater drainage is directed to an oil/water separator for processing in the event of a spill or release. ● Ensure that the Stormwater Pond is designed with a conservative freeboard to accommodate unexpected flows. ● Ensure that any Stormwater Pond is equipped with a pumping system of sufficient capacity to handle all water directed to it. ● Ensure the final effluent from the effluent treatment is sampled to confirm that it meets all parameter limits (per regulatory requirements) prior to discharge. ● Continually assess the Stormwater Pond during routine operations; in the event that damage is identified or maintenance is required, the affected area will be repaired as soon as possible and all efforts will be made to redirect effluent away from the damaged location until repairs can be completed. Erosion and Sediment Control Failure ● Develop and implement an Erosion and Sediment Control Plan for all phases of the Project. ● Ensure erosion and sediment controls are installed per the manufacturer's specifications. ● Heed Environment Canada's special weather warnings to ensure proper care is given to stabilize erosion and sediment controls in advance of, and following, extreme weather events (i.e., precipitation). ● Conduct regular monitoring of all the erosion and sediment controls and repair or replace them as necessary.

Potential Mitigation Measure
● Ensure erosion and sediment controls are functioning effectively and that additional supports or controls are able to be applied and are available on hand to support with repair or reinforcement efforts, as needed Fires ● Implement fire detection and protection systems in vulnerable areas (e.g., fuel storage areas). ● Dispose of all flammable waste regularly at an approved facility. ● Smoke in designated areas only. ● Prohibit burning (of any material) on-site during Project activities. ● Ensure sufficient firefighting equipment to handle on-site fires is adequately maintained and readily accessible. ● Ensure that on-site personnel are trained in the use of firefighting equipment. General Hazardous Materials Spills ● Ensure all fuels, lubricants, and chemicals are stored in designated containers and areas. ● Provide secondary containment for all hazardous products placed in storage areas. ● Ensure equipment in use is inspected and free of fluid leaks. ● Ensure fuel storage areas, refuelling, and/or equipment lubrication are located a minimum of 30 m from any surface water feature (e.g., watercourse). ● Ensure refuelling of machinery and equipment is conducted on an impervious surface and/or that secondary containment is in place during product transfer. ● Ensure the storage of all dangerous goods comply with the Workplace Hazardous Material Information System. (WHMIS). ● Ensure all mobile equipment (including heavy equipment, welders, light plants, etc.) have spill kits stocked with 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 sensitive environmental features (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. ● Project's Emergency Management Plan will include a Spill Prevention and Response Plan for products being produced, stored, and transported by the Project, this plan will set out spill prevention and response procedures and best management practices to be implemented during Project activities.

5.5 Plans

The Guide for Registration of Onshore Wind Energy Generations and Green Hydrogen Production Projects (Gov NL 2023) identifies several plans that should be developed in consultation with the Environmental Assessment Division and government agencies, as follows:

- Operational Safety and Emergency Response
- Wildlife Emergency Response Plan
- Waste Management Plan
- Hazardous Material Response and Training Plan

- Transportation Impact Study and Traffic Management Plan
- Public Participation Plan
- Workforce and Employment Plan
- Domestic Wood Cutting Consultation Plan

The Environmental Protection Plan is described in Section 9.0

5.5.1 Operational Safety and Emergency Response Plan

EverWind's HSSE Management System follows the CAN/CSA Z45001:19 Standard for Occupational Health and Safety Management Systems, the national standard of Canada and follows ISO 45001:18.

The EverWind HSSE Management System also follows the ECCC, Environmental Emergency Regulations (E2 Regulations), Transport Canada, Environmental Response Standards (OHF Standards), and Transport Canada, Marine Transportation Security Regulations.

EverWind operates the Point Tupper Transshipment Terminal that has achieved a North American industry leading safety record (>19 years No Loss Time Incident) and environmental record (>9 years No Reportable Spills). As EverWind expands operations into the development of green energy projects, this experience will be leveraged to ensure this Project adheres to the highest safety standards in Newfoundland & Labrador.

Operation of wind farms, power transmission systems, green hydrogen and ammonia processing facilities, and green ammonia storage and marine shipment facilities will fall under the Newfoundland and Labrador Occupational Health and Safety Act & Regulations (NL OHS). In addition, the Newfoundland and Labrador Fire Protection Services Act & Regulations (NL Fire Protection) is the Authority Having Jurisdiction (AHJ). Newfoundland and Labrador Fire Protection has adopted the National Building Code of Canada, National Fire Code of Canada, and NFPA 101 – Life Safety Code.

EverWind HSSE Management System will ensure compliance with NL OHS and NL Fire Protection.
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. All wind farms, power distribution, production facilities, and storage & marine transportation facilities 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 Transshipment Terminal and recognizes the importance of ensuring the safety of workers, the public, and the environment. EverWind has created a world class ERT and Oil Spill Response Organization (OSRO). The EverWind ERT Team is comprised of 40 members that are NFPA 1081 Advanced Industrial Firefighter certified, NFPA 470/472 Haz Mat certified, NFPA 1006 Technical Rescue certified

(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 and recently relocated home to Nova Scotia to join the ERT team.

EverWind recognizes the need to foster good relationships with the communities in which they operate and has developed a great relationship with local VFDs in Nova Scotia and Newfoundland and Labrador.

EverWind operates a Nova Scotia Environment & Climate Change approved fire training facility at its Point Tupper Terminal and hosts bi-annual live fire training exercises for regional VFDs and other local industrial ERTs. Several Burin Peninsula VFD's were invited to the most recent exercise, which unfortunately conflicted with the Newfoundland and Labrador Provincial Fire School. Please refer to the following link to view a video from EverWind's May 2024 three-day Live Fire Exercise:

https://www.dropbox.com/scl/fi/kxflvhc9vjug93c0pfkqh/ERT-Video-04A.mp4?rlkey=1fh3yl676u9grfpuysdrgv05n&dl=0

Each year, EverWind ERT members (on a rotational basis) attend a 1-week Advanced Industrial Firefighter course at the Texas A&M Fire Training Facility in College Station, Texas. Each year EverWind invites and fully sponsors Volunteer Firefighters from Nova Scotia and Newfoundland and Labrador to attend (to date 3 VFD members from Marystown and Grand Bank have attended, and members of the Marystown and Burin VFDs are scheduled to attend in September 2024).

Two (2) members of EverWind ERT are guest instructors at the Texas A&M Fire School. One has been a long-serving guest instructor (23 years) and the other will become an instructor at this year's school, and in addition will be this program's first female instructor.

EverWind has developed contingency plans that meet Nova Scotia's AHJ and Environment Canada Climate Change – Environmental Emergency Regulations (E2 Regulations). EverWind will develop contingency plans that meet Newfoundland & Labrador AHJ and the ECCC E2 Regulations.

To ensure compliance with E2 Regulations, EverWind ERT has developed Fire Pre-Plans for each potential hazard area at the Point Tupper Transshipment Terminal. These Fire Pre-Plans are developed following the most relevant NFPA standards for the hazard type and follow industry best practices. Each Fire Pre-Plan is tested to ensure effectiveness and are regularly practiced by the ERT team and Everwind's VFD Mutual Aid partners.

In addition to people, training, and pre-planning; EverWind has put in place a large fleet of modern industrial fire apparatus & ancillary equipment, the largest inventory of alcohol resistant aqueous film forming foam high performance firefighting foam concentrate in Atlantic Canada, and a large inventory of modern technical rescue tools and equipment, and medical first response equipment.

EverWind is committed to developing an employee led ERT that will include knowledge from the team at the Point Tupper Transshipment Terminal and meet the unique needs of the Project. EverWind, through their affiliate Point Tupper Marine Services (PTMS) is one of four Transport Canada certified OSRO's and has a 2500 tonne response capacity at ready. PTMS is responsible for the Geographical Area of Responsibility of the Strait of Canso, Nova Scotia.

PTMS has seven full-time employes and has a team of ~200 part-time responders who are comprised of local fishers and independent contractors.

PTMS has at ready, a large inventory of Oil Spill Response equipment including a large ocean class barge, numerous small vessels, a large inventory of various oil spill boom and sweeping systems, oil skimmers and pumping systems, and ancillary equipment and facilities to support a large-scale marine oil spill event.

PTMS hosts regular tiered exercises in compliance with Transport Canada Oil Spill Response Regulations.

PTMS is an advisor to Transport Canada in the development of the pending Hazardous and Noxious Substances Regulations under Canada's Oceans Protection Plan which will be applicable to the marine transfer and transport of ammonia by ship.

EverWind ERT and PTMS OSRO utilize the ICS to manage each emergency response or each planned exercise. The ICS is a standardized on-site management system designed to enable effective, efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. www.icscanada.ca

5.5.2 Wildlife Emergency Response Plan

The Wildlife Emergency Response Plan (WERP) is applicable to the renewable energy infrastructure. There are several federal and provincial laws which govern land-use and acceptable practices regarding wildlife and habitat protection. All procedures implemented for protecting, managing, and responding to wildlife emergencies will be in keeping with the applicable legislation, including but not limited to:

- *Fisheries Act*
- Newfoundland and Labrador *Endangered Species Act*
- Newfoundland and Labrador *Wildlife Act*
- *Migratory Birds Convention Act*, S.C. 1994, c. 22
- *SARA,* S.C. 2002, c. 29

Key government departments include (list not exhaustive):

- Environment and Climate Change Canada
- ECCC-Canada Wildlife Service
- NLECC
- NLFFA

A comprehensive WERP for addressing wildlife concerns and emergencies at the Project will be developed. Mitigation measures will be implemented to reduce impacts on wildlife in the vicinity of the Project. Key plan components will include the identification of potential wildlife emergencies and sensitive species, communication strategies, and general and species-specific response procedures. The WERP will be updated on an annual basis and/or following a response.

Desktop reviews of the Project Area and photo-trap assessments identified wildlife presence in the area proposed for WTGs and associated infrastructure. Additional wildlife field studies will be completed as the Project progresses, which will contribute to the development of the WERP. Sensitive timing windows will be established for known SAR to reduce disturbances to wildlife, particularly during vulnerable life stages (e.g., bird nesting).

5.5.3 Waste Management Plan

The Waste Management Plan (WMP) is applicable to the renewable energy infrastructure and the Industrial Facility. All waste management procedures will adhere to applicable legislation including, but not limited to:

- Newfoundland and Labrador *Environmental Protection Act*
  - Waste Management Regulations, 2003
  - Storage and Handling of Gasoline and Associated Products Regulations, 2003
  - Environmental Control Water and Sewage Regulations, 2003
- *Transportation of Dangerous Goods Act*, S.C. 1992 c.34

Key government departments include:

- Service NL – Environmental Protection, Environmental Health
- NLECC – Pollution Prevention
- Environment & Climate Change Canada
- Transport Canada

A comprehensive WMP for dealing with waste management will be developed. Implemented mitigation measures (as discussed in Section 5.4) will reduce the effects to the environment and communities surrounding the Project. Key plan components will include proper collection and adequate storage of liquid waste from the WWTP, as well as designated containers for solid waste resulting from construction, demolition, and recyclable activities. A temporary waste storage area within the footprint of the Industrial Facility that will be used to temporarily store generated wastes prior to shipment of wastes to licensed disposal facilities.

Drainage and erosion control will be considered in the development of the WMP, as well as recycling and compost opportunities. Efforts will be concentrated on limiting and controlling treated discharge to the environment or disposal at approved waste management facilities.

5.5.4 Hazardous Materials Response and Training Plan

The Hazardous Materials Response and Training Plan (HMRTP) is applicable to the Industrial Facility and the construction phase of the renewable energy infrastructure.

All hazardous materials procedures implemented by the Proponent will adhere to applicable legislation including, but not limited to:

- Newfoundland and Labrador Environmental Protection Act
- Waste Management Regulations, 2003
- Storage and Handling of Gasoline and Associated Products Regulations, 2003
- Transportation of Dangerous Goods Act, S.C. 1992 c.34
- CEPA (1999)

Key government departments include:

- Service NL – Environmental Protection
- NLECC – Pollution Prevention
- Transport Canada
- Environment & Climate Change Canada

A comprehensive HMRTP for dealing with hazardous materials will be developed. Implemented mitigation measures (as discussed in Section 5.4) will reduce the effects to the environment and communities surrounding the Project. Key plan components include adequate storage of hazardous materials (including secondary containment), spill response supplies (and locations), spill response procedures, PPE, and dedicated training and resources.

An ERT will be established for the Project. Appropriate equipment and training will be available in the Project Area

In unforeseen circumstances, operational and maintenance personnel may be exposed to an ammonia and/or hydrogen leak, and/or potential fire events while working on the plant. Industry standard protocols and procedures to mitigate such events will be documented and implemented and the Project will require that each individual working in these areas will be trained in emergency response methods to mitigate potential risks. Site personnel will be trained as ERT members and will have professional qualifications for industrial firefighting and hazardous materials response technicians (Section 5.5.1). The proposed ammonia and hydrogen plant will apply world class maintenance strategies, and asset management practices to ensure that the integrity of all systems are held to industrial and design standards.

Through the design process, Safety-in-Design principles will be strictly followed by all members of the design team. Safety-in-Design considers and incorporates design elements intended to reduce safety hazards during construction, operation, or maintenance of facilities, with a goal of reducing all risks to as low as reasonably practicable levels. To accomplish this, several key design reviews will be conducted, including:

- Risk Assessment session to identify all risks and mitigations for the Project
- Hazard and Operability Study (HAZOP) to holistically review the entire plant design to identify hazards to personnel, equipment or the environment, as well as operability or maintainability problems, such as isolation procedures, that could affect operations efficiency. The HAZOP is conducted to minimize and maintain a very low probability of loss of containment of any hazardous and dangerous substance from the Industrial Facility. For risks that cannot be fully mitigated by design considerations, the Project will adapt procedural solutions. The Project will also implement emergency response programs and procedures which will be communicated to the local municipality.
- P&ID and 3D Model Reviews to assess the design for any process safety-related or personal safety-related design issues, including emergency egress studies
- Siting and Blast studies to ensure there are no adverse effects due to low-likelihood overpressure scenarios
- Hazardous area classification plots to ensure proper electrical and instrument devices are located in classified (hazardous) areas
- Arc Flash and overcurrrent protection studies
- Fire Protection Assessment and fire water study

5.5.5 Transportation Impact Study and Traffic Management Plan

The Transportation Impact Study (TIS) and Traffic Management Plan (TMP) are applicable to the LBP Wind Farm, Solar Farm I and the Industrial Facility.

There are several federal and provincial laws which govern transportation access. The TIS and TMP will implement procedures according to applicable legislation including, but not limited to:

- Newfoundland and Labrador Highway Traffic Act
- Vehicle Regulations, 2002

Key government departments include:

- Service NL – Environmental Protection
- Transport Canada

The Project is assessing the unloading and staging plans and currently anticipates it will occur at the Mortier Bay marine terminal. The Project will use a combination of public and private roads to access the Industrial Facility and wind farms. Details regarding the transportation of WTGs and Industrial Facility equipment can be found in Section 3.2.3.8. These details will be used to design the TIS and TMP.

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

- Preliminary Application to Develop Land Permit (Service NL)
    - Required for any alteration, including adjacent development, to existing highway access.
- Overweight Special Permit (Service NL and National Safety Code)
    - Required to transport oversized and overweight components, under the *Highway Traffic Act*. 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.

During the Project's construction phase, trucks and other vehicles will be frequently visiting the area resulting in increased vehicular sound and air emissions. During the operations and maintenance phase, the Project will only require technicians to access the site to perform regular maintenance/equipment checks. Mitigation measures that may be implemented are described in Section 5.4.

Ammonia will be transported via pipelines to the marine terminal, where it can be loaded onto fully refrigerated gas carriers operated at atmospheric pressure for ammonia transport. Handy-sized fully refrigerated gas tankers of 15,000 DWT will be used to ship ammonia to the EverWind facility in Point Tupper, Nova Scotia with an anticipated initial frequency of 1-2 vessels per week. Given this schedule of port calls a storage of approximately 40,000 to 50,000 tonnes of ammonia will be required.

The ammonia storage will be immediately adjacent the Industrial Facility, which will allow for operational and security oversight and will be sited to maximize the distance of the storage to residential areas while meeting operational requirements. Transportation of the liquid ammonia from the storage location to the loading jetty will be through an ammonia pipeline which will be buried along its entire length, except for connections to the tank and the loading facilities at the wharf. The pipeline will be designed to industry standards and all safeguards will be in place. During the operating phase the appropriate level of asset management and predictive maintenance programs will be enforced by company policies. Similarly, a buried vapor return line will transport flashed ammonia from the loading process back to the plant site to be cooled and placed into the refrigerated storage tanks.

The ammonia pipeline is intended to be pressurized and cold only during vessel loading. The pipeline will be emptied of liquid ammonia at the end of every vessel loading. During the non-loading times the line will be allowed to depressurize and contained ammonia gas will be purged and cooled down prior to the next shipment. The operation and loading practices will be controlled by the Project operators.

5.5.6 Public Participation Plan

The Public Participation Plan is applicable to the Industrial Facility and the Wind/Solar farms and infrastructure.

EverWind is dedicated to local community investment through the development of a Regional Benefit Agreement identifying various programs that will be jointly developed focusing primarily on sustainability concepts, and services that are beneficial to both the Project and the Region such as emergency response training and support through the local fire department, sharing of infrastructure such as water treatment.

EverWind understands and is committed to fulfilling the objectives and principles of the Province's local benefits requirements. EverWind will submit a provincial benefits plan with the Government of Newfoundland and Labrador, which includes commitments to full and fair opportunity, as well as a gender equity and diversity plan that outlines proactive measures for the inclusion of women and other under-represented groups.

Other commitments to be developed in the Public Participation Plan may include:

Table 5.13: Potential commitments for a Public Participation Plan

Community Engagement	Commitment to ensuring that local residents and provincial stakeholders are informed and able to provide feedback on the development, construction and operation of the Project. EverWind is committed to continuous engagement throughout the life of the Project, including annual site visits and safety tours.
Economic Alignment	Establishment of a regional development fund to the benefit of and managed by the communities on the Burin Peninsula. The fund will receive contributions on the Final Investment Date, the Commercial Operation Date and an ongoing percentage of sales annually for the life of the project.

Local Employment and Training	Full and fair employment opportunities to residents of the Burin Peninsula and Newfoundland and Labrador
Local Procurement and Supplier Development	Provide the local and provincial business community with full and fair opportunity to participate in the Project's procurement and develop local capabilities.
Local Office	Establish and maintain one or more local offices, including a Project information centre.
Other	Educational bursaries, charitable contributions and other.

EverWind will collaborate with environmental organizations and authorities to develop and implement environmental monitoring and mitigation plans throughout the Project's lifecycle. Additionally, EverWind will establish a monitoring and reporting framework to track progress on its regional and provincial benefits commitments and objectives, including regular reporting to stakeholders and the public.

The Project has established a website (https://everwindfuels.com/projects/burin_peninsula). It includes information about the Project, the forward-looking statement, and continues to be updated regularly. Emails can be received at info@everwindfuels.com.

5.5.7 Workforce and Employment Plan

The Workforce and Employment Plan is applicable to both the renewable energy infrastructure and the Industrial Facility.

Employment opportunities for the construction, operation and decommissioning of the Project include (but are not limited to):

During Construction:
- Health and safety
- Engineers
- Environmental monitors
- Equipment operators
- Laborers
- Millwrights
- Boilermakers
- Pipe fitters
- Electricians
- Powerlines persons

During Operations:
- Health and safety
- Engineers
- Environmental monitors
- Wind farm technicians
- Plant operations
- Marine operations
- Maintenance
- Snow removal
- Security

Table 5.14: Estimated Job Numbers Associated with Construction and Operation of the Project

Project component	LBP & Solar Farm I		MBP & Solar Farm II		UBP and Solar Farm III	
	Construction	Operations[6]	Construction	Operations	Construction	Operations
Industrial Facility	4,000	220-350	7,000	250	3,200	100
Wind Farm	1,000	250-360	2,000	300	900	130
Solar Farm	500	30-40	1,000	50	400	20
Total	**5,500**	**500-750**	**10,000**	**600**	**4,500**	**250**

Estimates include both direct and indirect labour associated with the Project.

As part of the Workforce and Employment Plan EverWind commits to:

- Full and fair opportunity for employment shall be given to qualified provincial residents.
- Employment opportunities shall be made available to qualified provincial residents, during all phases of the project, on a timely basis, through a company website, social media, Indigenous communities, advocacy associations, community engagement, and other recruitment efforts, such as career fairs and accessing government employment centres.
- Promote employment of the labour force of Newfoundland and Labrador. For instance, we will work with local personnel agencies to advise and support our operations
- Implement programs and policies targeting under-represented individuals and groups to facilitate access to employment, training and procurement opportunities.
- Provide education and training, R&D, technology transfer with respect to the project in Newfoundland and Labrador.
- Facilitate technology and knowledge transfer through programming such as work term placements, mentoring, professional development etc.
- Use of Provincial graduates and/or co-op students will be maximized.
- Develop and implement programs to maximize succession of residents to higher levels of responsibility.

EverWind's Gender, Equity, Inclusion and Diversity Plan (GEIDP), required by the Province of Newfoundland and Labrador, will outline, and describe the gender-equity and diversity goals and initiatives that will be implemented throughout the Project and the measures that will be taken through stakeholder consultation and collaboration to ensure that, where possible, there is fair and equal access to benefits arising from the Project. The goal of the Plan is to work towards improving equity in employment and business access for individuals belonging to designated groups in Newfoundland and Labrador.

- Positive policies and practices towards increasing business access and employment of under-represented groups.
- Measures to recruit, retain and support under-represented people.

[6] Operations job estimates subject to technology selection and development of detailed operations & maintenance plan.

- Qualitative and quantitative goals that are set and tracked for occupational categories where under-representation exists.
- Provisions in the labour agreements that specifically reference support of EverWind's diversity initiatives.
- Collaboration and communication with stakeholders.
- Commitment to a respectful workplace for all employees and contractors through proactive policies and training.
- A Women's Employment Plan, designed to improve the participation of women in employment in the Project.This Plan will support EverWind's commitment to reduce gender wage gaps by increasing women's access to a wider range of employment, particularly in trades and technical occupations.

5.5.8 Domestic Wood Cutting Consultation Plan

The Domestic Wood Cutting Consultation Plan (DWCP) is applicable to the renewable energy infrastructure and the Industrial Facility

The DWCP will include a description of methodology and frequency of engagement on domestic woodcutting within the Project Area, including types of messaging such as print and social media.

The objective of the DWCP is to engage local users of the Project Area in a meaningful manner to collect and incorporate spatial and temporal information on where, when and by whom, the areas are being used for domestic woodcutting. These areas will be avoided where feasible and mitigation communicated to the local users on an ongoing basis throughout the life of the Project.

Every effort will be made to collect data on access trails, harvesting plots, seasonal use, and user lists to develop a comprehensive database to inform the consultation plan. This includes engagement with local organizations and NLFFA for information on land use zones and restricted activity. The information will be integrated in the construction and operation plans and will include feedback received from the local community users. This engagement may be held alongside local public engagement in the community and with local indigenous groups, in the form of in person meetings, mailout/online surveys, and other media.

5.6 Environmental Effects Follow up and Monitoring Programs

As part of the EIS, the need for an Environmental Effects Follow up and Monitoring Program (EEMP) for each VC will be evaluated.

Existing mitigation measures may be reviewed and adjusted accordingly, throughout the EEMPs, to determine the effectiveness of the current measures and develop new ones if necessary.

6.0 RESIDUAL EFFECTS

Residual effects refer to environmental effects which cannot be avoided or mitigated, or that remain after mitigations (i.e., control technologies and best management practices) are implemented (NLECC, 2023).

This EARD provides an overview of the Project and the surrounding environment and a proposed methodology for effects assessment including a description of expected environmental effects for each identified VC. A comprehensive EIS will be completed, which will include a more detailed project description (including layout of WTGs and WTG specifications, solar array details and proposed Industrial Facility plans) and review of baseline conditions. The EIS will also include an evaluation of potential environmental effects, proposed mitigations, and residual adverse effects. Residual effects will be determined as significant or not significant after mitigations have been implemented, based on magnitude, frequency, likelihood of occurrence, severity, reversibility of the predicted effect.

7.0 CUMULATIVE EFFECTS

Cumulative effects are changes to environmental, social, and economic VCs caused by the combined effect of past, present, and potential future human activities and natural processes (Government of British Columbia, u.d). Concerns are often raised about long-term changes that may occur not only because of a single action but of the combined effects of each successive action on the environment (Hegman 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 adverse effect to one or more VCs.

The goal of a cumulative effects assessment (CEA) is to assess changes to an environmental condition (i.e., 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 will be 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. The certainty in effects predictions must be considered. It is not uncommon for data on effects of other projects or activities to be limited, increasing the uncertainty of the CEA predictions.

The spatial boundaries selected for a CEA can vary depending on the VC being evaluated. In some VCs, such as climate change, a very large spatial boundary is appropriate, compared to other VCs such as fish and fish habitat, it should be defined as only the Project's watershed(s) as the spatial boundary.

For the CEA, EverWind will consider past Projects as those registered, approved, and constructed and those projects that are visible via aerial imagery. Reasonably foreseeable future projects are those which have been registered with Newfoundland and Labrador but have not been approved or constructed. Projects registered through the EA process will be considered based on availability of effects assessment data.

General land use is not accounted for as "other activities or Projects" in the CEA. Newfoundland and Labrador's landscape is a mosaic of forests, wetlands, and barrens with patches of communities and residential development, and other land use activities. 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 will be considered in the determination of residual environmental effects within each VC within the Projects EIS, so no additional conclusions can be made through the lens of a CEA.

8.0 PUBLIC AND INDIGENOUS ENGAGEMENT

8.1 Community Engagement

Community engagement and fostering strong relationships with stakeholders is a core value of EverWind. EverWind's approach involves working with stakeholders at the community level and beyond to understand their concerns and incorporate their priorities and recommendations early into project planning. EverWind believes in an open and transparent approach to engagement, whether the audience is local citizens and communities, Indigenous communities and organizations, press/media, or Provincial/Federal Government representatives.

In 2022, prior to the Land Nomination Bid to the Government of Newfoundland and Labrador, EverWind met with representatives of communities throughout the Burin Peninsula in a series of open houses, presentations and meetings. Then, as part of the preparation of the formal Bid Submission to Government of Newfoundland and Labrador in 2023, EverWind continued its engagement activities in the region with numerous public and stakeholder meetings. This approach continued in preparation of this EA Registration as EverWind held five formal public engagement sessions in Fortune, Burin, Lawn, Boat Harbour West and Terrenceville between June 25 and 27, 2024.

As the Project proceeds, EverWind will continue to gather public feedback and use it to help guide its decision-making. EverWind believes that effective and responsible project development should be an iterative process, where information from engineering and technical workstreams, environmental diligence and feedback from communities and government are used together to inform Project planning.

The engagement activities to date include numerous community; indigenous; diversity, equity and inclusion; government; and business-related engagements. The following stakeholders have been consulted:

Table 8.1: Overview of Indigenous Groups and Stakeholders Engaged 2022 to August 2024

Stakeholder Group	Examples

Towns, Communities, and Service Districts	• Councils
	• Residents
	• Local Associations
	    ○ ATV Associations
	    ○ Lions Clubs
	    ○ Kinsmen Clubs

Government of Newfoundland and Labrador	• Department of Environment and Climate Change (and various divisions) • Department of Fisheries, Forestry and Agriculture • Department of Industry, Energy and Technology (and various divisions) • Department of Transportation and Infrastructure • Provincial Advisory Council on the Status of Women • Office of Indigenous Affairs and Reconciliation • Members of the House of Assembly (MHA) for District of Burin-Grand Bank • Member of Parliament, MP for Bonavista-Burin-Trinity
Government of Canada	• NAV Canada • NAVCAN • Transport Canada • DFO • Environment and Climate Change Canada • Canadian Coast Guard
Industry Groups	• Burin Peninsula Chamber of Commerce • Trades NL • TechNL • St. John's Board of Trade • Econext • EnergyNL • Burin Peninsula Energy Board

Stakeholder Group	Examples
Educational Institutions	• College of the North Atlantic • Memorial University of Newfoundland & Labrador – Department of Engineering • Memorial University of Newfoundland & Labrador - Office of Public Engagement • Fisheries and Marine Institute
Indigenous Communities and Organizations	• Miawpukek First Nation • Qalipu First Nation • First Light • People of the DAWN • Ulnooweg Development Corporation
Diversity and Equity Groups	• Association for New Canadians • Inclusion NL • Women in Resource Development Committee (WRDC) • Newfoundland & Labrador Organization Women Entrepreneurs (NLOWE) • Women in Science and Engineering (WISE) • Office to Advance Women Apprentices
Local Conferences and Trade Shows	• Stephenville Green Energy Trade Show • Energy NL (2023, 2024) • Burin Peninsula Chamber of Commerce AGMs

Engagement for the Project with all stakeholders started in 2022 and will continue throughout the life of the Project. The main goal of the engagement completed to date has been to provide information around the Project as it develops, receive feedback related to concerns or issues from stakeholders, and try to incorporate those concerns into future planning and design. The following sections provide an overview of the engagement activities that have taken place for several stakeholder and Indigenous communities from 2022 to 2024.

2022 engagements included:

- 7 Town Hall style public meetings
- 4 community meetings with public and community leaders present
- 2 meetings with community leaders from across the Burin peninsula
- 2 meetings with specific community leaders (mayors, councilors, town employees)
- 20 communities consulted, spread over all meeting occasions
- Residents of 25 different communities represented at meetings
- 15 regional associations were represented at meetings (trail associations, fire departments, Burin Chamber of Commerce, environmental organizations etc.)
- 3 Indigenous meetings (Miawpukek First Nation, Qalipu First Nation)
- 3 meetings with 2 educational institutions (CNA, Memorial University of Newfoundland and Labrador (MUN))

- 4 meetings involving 2 government departments and MHA Grand Bank-Burin
- 4 industry organization meetings with relevant organizations (EnergyNL, TradesNL, econext, TechNL)
- 6 Diversity, Equity, and Inclusion (DEI) related meetings with relevant organizations (TradesNL, WISE, CNA, Association for New Canadians (ANC), St. John's board of Trade, Burin Chamber of Commerce, Office for Women Apprentices, First Light, MUN Office of Public Engagement, Provincial Advisory Council on the Status of Women, NLOWE, Inclusion NL, WRDC)
- Received 22 Letters of Support from Burin Peninsula communities for the Project

2023 engagements included:

- 8 public meetings
- 10 meetings/communications with municipalities and their representatives (Marystown, Local Service District Swift Current, Lamaline, Grand Bank, Frenchman's Cove)
- 10 communities consulted spread over public and municipal meetings
- 12 meetings/communications with various trail associations primarily regarding the MET tower 2023 installations (Powderhorn, L'Anse Au Loup, Southern Hill, Greater Lamaline Multipurpose, Burin Peninsula, Marystown, St. Lawrence)
- 6 meetings with regional associations (Burin Peninsula Energy Board, Burin Chamber of Commerce, Burin Peninsula Waste Management Board))
- 11 meetings/ communications with Indigenous groups (People of DAWN, Qalipu First Nation, Miawpukek First Nation)
- Marine transshipment partnership MoU signed with Miawpukek Horizon
- Meeting with CNA
- 7 regulatory/ government (MHA, NLECC, NLECC WRMD, NLIET, Transportation and Works, Mineral Lands Division)
- Ongoing communications with 12 provincial government departments/divisions regarding regulatory and permitting matters (Office of Indigenous Affairs and Reconciliation, EA division, NLECC; Pollution Prevention; Crown Lands, NLFFA; Forestry Division, NLFFA; Renewable Energy Division, NLIET; Energy Division, NLIET; Natural Areas Division, NLECC; Central Cash, Exchequer; Highways Depot, Grand Bank, (Transportation & Infrastructure); Eastern Lands Office, Crown Lands; NLECC WRMD, NLECC; Mineral Lands)
- 4 meetings/presentations with industry association EnergyNL
- Attendance at EnergyNL conference
- 6 DEI related meetings with relevant organizations (Office for Women Apprentices, Burin Chamber of Commerce, St. John's Board of Trade, ANC, CNA, WISE)
- Received 2 Letters of support from trail associations regarding the 2023 MET tower campaign
- Received 5 Letters of support from municipalities regarding the 2023 MET tower campaign

2024 engagements included:

- 1 public meeting
- 5 formal public consultation sessions as per NL EPA guidelines
- Ongoing permitting and regulatory discussions with 14 Gov NL departments and divisions, as well as two federal departments (See Appendix E)
- Ongoing discussions with Qalipu First Nation and Miawpukek First Nation regarding participation opportunities in the project
- Discussions with 2 municipalities regarding development permits
- Discussions with trail associations

Refer to Appendix E for additional details.

EverWind believes that its community engagement efforts on the Burin Peninsula represent one of the most comprehensive programs implemented of any mega project in North America. EverWind is truly proud of the relationships developed with local communities, and this will continue to be a priority throughout the lifecycle of the project. EverWind has received written letters of support for the Project from 29 of 30 communities on the Burin Peninsula.

8.1.1 Local Consideration

On December 1, 2022, EverWind officially opened its Burin Peninsula Engagement Office in Marystown. A local office allows residents to learn more about the Project in an informal setting. This setting is conducive to generating discussions surrounding the Project, and any concerns or questions can be noted and provide valuable feedback.

The office administrator provides an in-person contact for local residents, fielding questions and comments, presenting information and resources, and acting as connection to the greater EverWind team. This role also involves volunteering with community fundraising efforts, assisting with contractor onboarding, and tracking both local businesses and locals seeking employment opportunities.

Figure 8.1: EverWind's Burin Peninsula Consultation Office Grand Opening (December 2022)

EverWind is excited about the implementation of its local knowledge tool, located on a computer in the EverWind Marystown office. This interactive application provides two services; (i) blending Project-related information with data visualization software, allowing for a guided tour of the Project and (ii) using the tool to capture and succinctly present engagement information. The local knowledge tool can display where and when past engagement events have occurred, where and when future engagements will be, and residents can indicate specific areas of importance on the map. Previously, residents wanting to identify areas of concern would need to provide general descriptions. With this tool, residents can pinpoint their area of concern (e.g., hunting area, berry picking area, cabin location etc.), accurately label it, and elaborate on why it is an area of concern.

Figure 8.2: EverWind CEO Trent Vichie and Risk and HSE Manager Bruce Woolridge demonstrating local knowledge tool to local resident and RCMP Officer

Figure 8.3 is an example of what a user may see as they progress through the guided tour while using the local knowledge tool. Written information is provided in the panel on the left-hand side of the image, while relevant data, in this case wind speed, is displayed on the right. Some of the data presented in the guided tour are interactive; in this example, different mean wind speeds are shown at each of the squares on the map. The interactive aspect of the tool will allow the user to have a greater understanding of Project details and information.

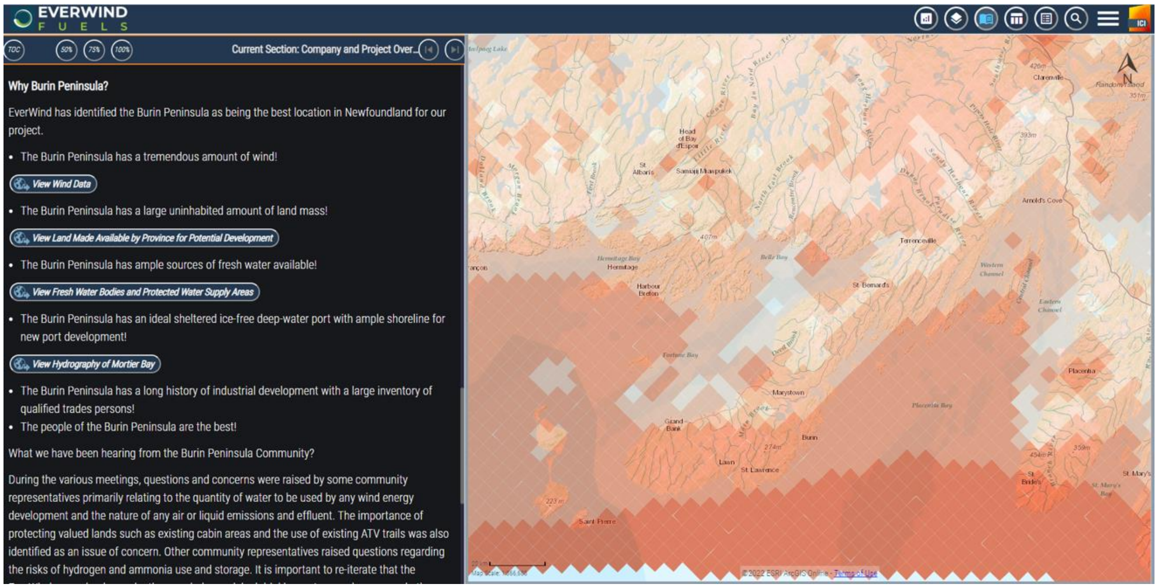

Figure 8.3: Screenshot of the Local Knowledge Tool user interface – data presentation

Figure 8.4 displays the data collection aspects of the tool. This figure shows points that have been identified as areas of concern by local residents. Areas of concern have unique labels and identifiers that quickly identify categories of areas of concern. Using this tool, EverWind can quickly solicit feedback from local residents about areas they frequent for hunting, fishing, berry picking, accessing cabins, harvest wood etc.

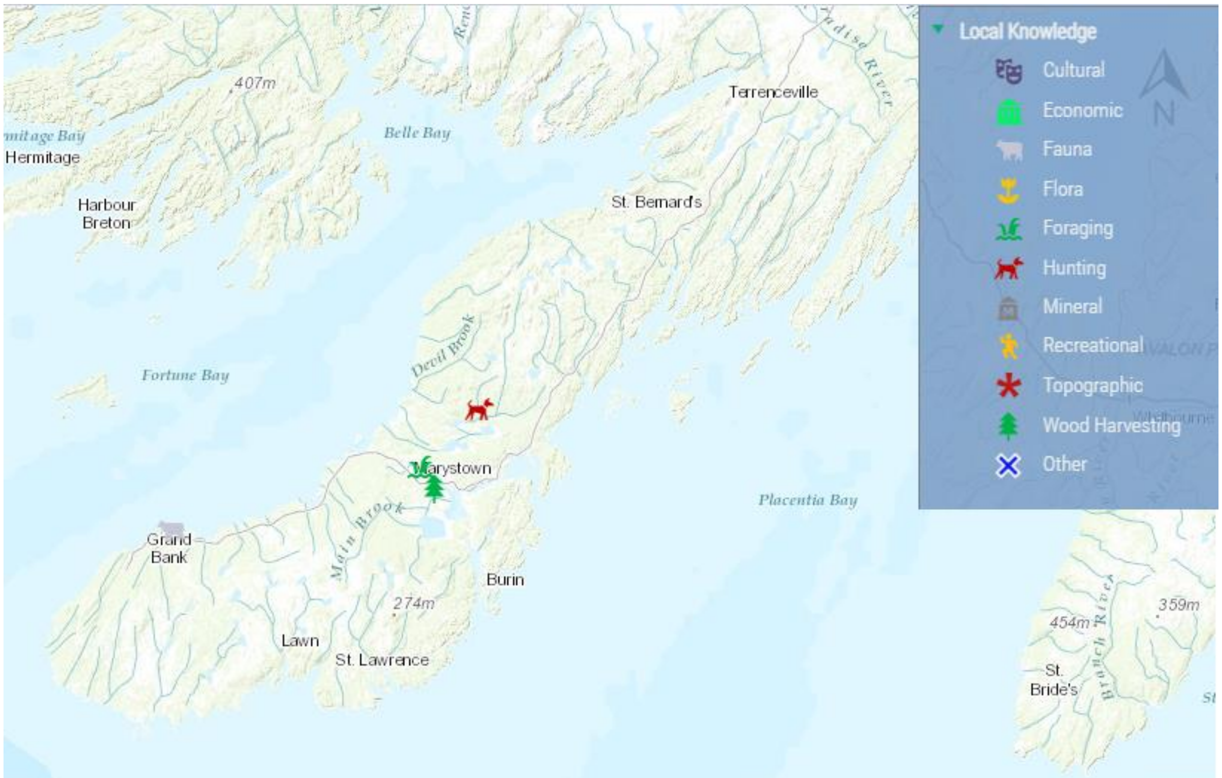

Figure 8.4: Screenshot of the Local Knowledge Tool user interface – data collection

8.1.2 Summary of Issues During Engagement

During the various engagements that have been undertaken by The Proponent to date, some concerns and questions were raised by interested parties related to the Project. A summary of these concerns from engagement activities are presented below in Table 8.2. Responses to these concerns were provided during engagement sessions, where possible and where responses were known, and these issues will be fulsomely addressed during the development of the EIS with responses shared with communities and stakeholders during the next round of engagement sessions completed prior to submission of the EIS.

Table 8.2: Summary of Issues from Engagement Activities (2022-2024)

Topic	Question or Concern	EverWind Response/Approach	Primary EARD Reference
Project Design and location	How far away will project infrastructure be from local residents?	Early planning includes a commitment to site the plant 2km from residences and WTGs >1 km from residences	3.1.2
	How many turbines, and where they will be located?	The number of WTGs and layout will depend on the wind resource and environmental data being collected. Preliminary estimates suggest between 350 to 450 WTGs for the LBP. If smaller machines are utilized, more than 450 WTGs would be required.	1.2
	Will turbines be spread out?	To increase effectiveness, WTGs will be separated from one another by ~500m. WTGs will likely be built in clusters.	N/A
	How will turbines be accessed and constructed?	A road network is planned to access the WTGs. Existing road infrastructure will be used to the extent possible to reduce habitat loss and fragmentation. New access roads will also be required.	3.2.3.2
	How many new roads need to be built?	The road network has yet to be designed, as it is dependent on WTG layout. A WTG and access road layout will be presented to the public prior to the EIS submission.	3.2.3.2
	How safe is the plant and pipeline?	EverWind is committed to ensuring that the Project will be built and operated to a world class health, safety, environmental and emergency response standard. The Industrial Facility will be sited >2 km from residences.	3.1.2
	What constraints are being considered? How are they mapped? Is information accurate and how much is being missed? Some things may not be on a map or in data.	Numerous environmental constraints and land areas were considered and excluded for development by the Gov of NL in the "Crown Land Call For Bids for Wind Projects", NLIETIET, 2023. EverWind's proposed Project includes careful consideration of additional desktop constraints. Additionally, field identified constraints observed during surveys to support the EIS will be considered during layout development. EverWind has implemented a local knowledge tool at its office in Marystown. The local knowledge tool is an interactive application where members of the public can input information (e.g., cabins, hunting areas etc.).	3.1.2

Topic	Question or Concern	EverWind Response/Approach	Primary EARD Reference
	Where are workers going to be housed during construction and operations?	The need and feasibility of accommodations facilities during construction will be determined during engineering design and in consultation with communities. Workforce accommodations may well be required given the size of the Project.	5.1.2.8
Water Usage	Will the volume of water needed for the project affect local water resources?	The Project includes the proposal to use Linton Lake for provision of fresh water. Linton Lake was a former water supply of the Town of Marystown supplying both residential and industrial users. EverWind's proposed water requirements are lower than previous water volume extractions required by the Town and industrial users, and is within the capacity of the Linton Lake watershed. Additional studies will be completed to support the EIS.	3.2.1
	Will water supply of local communities be impacted during operations?	The Project includes the careful consideration of public drinking water supply areas, and these watersheds have been excluded from development. The Project is not anticipated to interact with any local community water supplies.	3.1.1
	Will fresh or salt water be used for the plant, and what happens to the used water?	Freshwater from Linton Lake will be used to convert water to green hydrogen. Cooling water for plant operations will come from seawater extraction. Cooling water will be returned to the marine environment in accordance with applicable guidelines and regulatory standards.	3.2.1
Wildlife	How will the Project impact local wildlife such as caribou?	Land areas of known sensitive habitat for Caribou such as the large land area to the northwest of the Town of Marystown and known raptor sites were considered and excluded for development by the Government of Newfoundland and Labrador in the "Crown Land Call For Bids for Wind Projects", NLIETIET, 2023. EverWind has and is continuing to collect baseline data on wildlife. The proposed Project will include careful consideration of these areas to reduce the potential adverse effects on wildlife. Additional mitigations during the construction and operation of the Project will also be implemented to mitigate potential impacts.	3.1.1
	What risk do the turbines pose to birds and other species?	WTGs are known to interact with birds and bats and unfortunately can cause mortality via bird/bat strikes with rotating WTG blades.	5.4

Topic	Question or Concern	EverWind Response/Approach	Primary EARD Reference
		EverWind is completing extensive baseline studies (including a radar survey program) to understand bird/bat species, abundance, use, and movement in proximity to the Project. WTGs will be sited based on environmental information collected to minimize potential adverse effects to wildlife. During operations, bird and bat mortality monitoring will be completed, and adaptive management will be implemented, as required, based on consultation with the applicable provincial and federal regulators.	
	Will turbines scare wildlife away from areas, including those areas for hunting?	Wildlife may temporarily avoid portions of the Project during construction where loud, sporadic noise may be generated (e.g., blasting). During operations, the noise generated from WTGs is more constant and ungulates (caribou and moose) are unlikely to avoid the Project footprint.	5.1.2.4
Local Land Use	Will local trails, cabins, and hunting areas be impacted by the project?	EverWind has collected available information from Provincial databases regarding trails and cabins on the Burin Peninsula to be incorporated into its infrastructure layout and design. EverWind also continues to collect data on trail and cabin locations that may not be reflected in these databases from community engagement sessions, as well as the local knowledge tool located in its community engagement office in Marystown. Residents will continue having access to the Crown lands throughout the wind farm sites. Access roads for the project will be open to local residents and ATVers and will increase accessibility to the open country. Residents will be able to continue hunting, fishing and berry picking throughout the wind farm.	8.0
	Will there be a large increase in traffic in the region on local roads?	There will be an increase in traffic from the development of the Project, particularly during the construction phase. A traffic impact study will be completed as part of the EIS. EverWind will avoid, to the extent possible, transportation through urban areas during high traffic times (e.g., 7-9 am and 3- 6 pm; Monday to Friday).	5.1.2.8
	How far away from turbines do people need to be?	EverWind is committed to siting WTGs >1 km from residences. Individuals will continue having access to WTG locations once construction activities have been completed on the specific sites. There will not be a mandated distance from the WTG towers.	3.1.2

Topic	Question or Concern	EverWind Response/Approach	Primary EARD Reference
		Residents will be asked to use their own judgement. General caution should be exercised, no different than other types of infrastructure (e.g. highways, bridges, transmission lines, water management systems).	
	Will we be unable to access land during important times of the year?	Access roads will temporarily be restricted to sites in active construction to ensure safety of the public (no different than any active construction sites in the province). EverWind will ensure that cabin owners will continue to be able to access their cabins throughout all phases of the project. No gating of access is proposed. Fencing will be required surrounding substations, Industrial Facility and other infrastructure for safety purposes.	3.2.3
Economy and Employment	What kind of economic benefit will the project provide for the region?	EverWind is committed to the communities on the Burin Peninsula and to ensuring the people of the region are the beneficiaries of the economic benefits that will accrue from the Project. The Project is expected to generate significant economic benefits to the Burin Peninsula, Newfoundland and Labrador, and to Canada. These will include gross domestic product (GDP), employment, income and government revenue impacts, capacity building and business opportunities providing goods and services during construction and operation. EverWind is also contemplating additional benefits including bursaries, charitable contributions and the establishment of a regional development fund to the benefit of and managed by the communities on the Burin Peninsula.	5.5.6
	Will there be opportunities for local residents to have jobs? Enthusiasm for potential for local jobs and benefits	EverWind is committed to hiring local workers, wherever possible. The Project will generate 5,500 construction jobs and 500-750 operations job for the LBP wind farm, solar farm, and plant. This estimates includes labour directly and indirectly associated with the Project.	5.5.7
Health and Safety	What protections will be in place for any emissions / leaks from ammonia plant / pipeline?	EverWind is committed to ensuring that the Project will be built and operated to a world class health, safety, environmental and emergency response and operating standard.	5.5.1

Topic	Question or Concern	EverWind Response/Approach	Primary EARD Reference
		This operating philosophy has been demonstrated through an industry leading environmental, health and safety track record at the Point Tupper Transshipment Terminal located in Nova Scotia.	
	Do turbines give off emissions / vibrations?	No, the WTGs do not have emissions.	5.1.2.1
	Visual impact of turbines on local residents.	WTG siting including 1 km setback distances from residences is an important consideration for the Project. Visual simulations will be generated for future public engagement and visual impact will be assessed as part of the EIS.	3.1.2
	Is there more risk for forest fires with all these turbines?	Forest fire risk will be considered during the Project engineering design and during the EA and EIS.	5.2.5
Timeline	How quickly can this project begin?	A Final Investment Decision (FID) is not expected until after all Environmental Assessment planning work has been completed and the Project is formally approved by the Province.	3.2.2
	What is the schedule for development?	The proposed schedule includes FID in 2026 and construction to begin shortly thereafter.	3.2.2

8.2 Indigenous Engagement

EverWind's engagement involved several Indigenous communities and organizations, including the two Mi'kmaq Nations, Qalipu Mi'kmaq First Nation and Miawpukek First Nation, as well as Indigenous organizations, First Light and People of the DAWN. EverWind engaged with and received a letter of support from Ulnooweg, an Atlantic Canada not-for-profit that has been instrumental in opening up new opportunities for Atlantic Indigenous businesses and community enterprises.

People who identify as Indigenous live throughout the island, including the community of Swift Current. EverWind also recognizes that the Indigenous Peoples of Canada travel and live throughout all regions of the country and welcomed engagement opportunities from Indigenous organizations such as First Light.

EverWind acknowledges the importance of respect for the environment and sustainable development and is committed to engage and learn from Indigenous communities and groups and incorporate Indigenous knowledge in the planning and operations of the Project.

Indigenous engagement is most effective when initiated as early as possible. EverWind has demonstrated meaningful engagement in Newfoundland and Labrador, focused on long term relationships built on mutual respect. EverWind will continue to engage and consult with Indigenous communities over the life of the Project. EverWind hopes to receive guidance regarding how the Company can embrace traditional knowledge and "two-eyed" seeing to be used in the Project, from environmental baseline studies to exploration, and development to reclamation.

EverWind will also continue to seek opportunities for Miawpukek First Nation and Qalipu Mi'kmaq First Nation as well as Indigenous companies in the province to participate in business streams, service provider and supply chains required for the Project. These conversations are active and ongoing.

8.3 Future Engagement

As EverWind continues along the path of developing the Project, it will continue to follow its comprehensive, inclusive, and transparent engagement strategy to address these latest issues and any future issues. An open form of communication will continue to be pursued to identify, engage with and incorporate feedback from local residents, local communities, Indigenous communities and organizations, as well as industry experts and government regulators.

9.0 ENVIRONMENTAL PROTECTION PLAN

An EPP will be developed following EA release. The EPP is the primary mechanism for ensuring that mitigation is implemented, as determined through the EA process, to avoid or mitigate potential adverse environmental effects that might otherwise occur from construction activities, and as required by applicable agencies through the permitting processes.

The EPP is developed for all Project personnel, including contractors, and describes the responsibilities, expectations, and methods for environmental protection associated with Project activities. The EPP will incorporate:

- Major construction and operational activities
- Means to comply with requirements of relevant legislation
- Environmental protection measures identified as part of the EA
- Environmental commitments made as part of the EA
- Permit requirements
- Contingency planning

A suggested Table of Contents for the EPP is provided in Appendix F. The EPP will be provided to NLECC prior to the start of construction for review.

10.0 ASSESSMENT SUMMARY AND CONCLUSIONS

EverWind is proposing the Burin Peninsula Green Fuels Project (the Project) on the Burin Peninsula, Newfoundland and Labrador. The Project will involve construction, operations, and decommissioning and reclamation of wind farms, solar farms, plant facilities for green hydrogen production and ammonia synthesis, including air separation, water treatment and ammonia storage. A multi-purpose marine terminal will be utilized to support the Project (new marine terminal constructed or existing marine terminal upgraded), as well as other local industry needs, but will be registered under a separate Environmental Assessment.

EverWind is an Atlantic Canadian based private developer of green hydrogen and ammonia production, storage facilities, and associated transportation assets. EverWind is concurrently developing world-scale projects on the Burin Peninsula in Newfoundland and Labrador and at Point Tupper in Nova Scotia.

EverWind's projects will harness Atlantic Canada's preeminent natural renewable resources and convert them into green fuel. EverWind has a world-class team with expertise in all critical areas required to execute infrastructure mega projects including; technical engineering, environmental, operations, health and safety, commercial, legal, and financial. In total, EverWind has a team of over 216 people committed to the development and operation of green fuel projects and energy logistics infrastructure in Atlantic Canada.

Over the last three years, EverWind has conducted extensive public and Indigenous engagement as described in Section 8.0 and is committed to continuing this engagement for the life of the Project. EverWind has also made substantial progress on the development of its projects in Atlantic Canada, notably the first completion of FEED for an industrial scale green hydrogen and ammonia project in the Western Hemisphere. Pre-FEED of the Project has been completed, as EverWind continues to collect environmental and wind resource data (MET campaign) required to support detailed engineering. To date, EverWind has invested over $240 million in the development of its green fuels projects in Atlantic Canada, representing one of the largest investments in the industry to date.

The Project includes the LBP, MBP, and UBP Wind Farms which are proposed to be 3 GW, 5 GW, and 2 GW, respectively (Project total of 10 GW of wind energy). Additionally, Solar Farms I, II and III will be 0.75 GW, 1.25 GW, and 0.5 GW (Project total of 2.5 GW of solar energy), respectively, to compliment the wind farms. Annual production of green hydrogen is estimated to be approximately 180 ktpa for the LBP Wind Farm and Solar Farm I, 310 ktpa for the MBP Wind Farm and Solar Farm II, and 120 ktpa for the UBP Wind Farm and Solar Farm III (610 ktpa of green hydrogen for the Project). Annual production of green ammonia is estimated to be approximately 1,000 ktpa for the LBP Wind Farm and Solar Farm I, 1,700 ktpa for the MBP Wind Farm and Solar Farm II, and 700 ktpa for the UBP Wind Farm and Solar Farm III (3,400 ktpa of green ammonia for the Project).

EverWind is committed to developing Regional and Provincial Benefits Agreement and the Project is anticipated to provide a stimulus for the local economy (e.g., restaurants, hotels etc.) and create of 5,500 direct and indirect jobs during the construction phase of the Project for the development of the LBP Wind Farm and Solar Farm I, 10,000 for the MBP Wind Farm and Solar Farm II, and 4,500 for the UBP Wind Farm and Solar Farm III. As well as an additional 500-750, 600, and 250 direct and indirect jobs during the operational phase in each of the developments respectively.

Preliminary desktop analyses and field surveys have been initiated to assess impacts to VCs. Future planned baseline studies to support the EIS will improve understanding of interactions between the Project and VCs and potential cumulative impacts while fulfilling commitments of the regulatory process. Identification of environmental constraints and the continued collection of wind data will allow EverWind to develop a buildable Project layout that will be presented within the EIS. EverWind will implement a mitigation sequence to first avoid impacts, minimize impacts, and mitigate unavoidable impacts.

EverWind is commited to developing management plans to ensure impacts are minimized and monitoring plans to confirm EIS findings. EverWind is also committed to continue working with provincial and federal regulators, Indigenous communities,organizations, and the residents on the Burin Peninsula.

11.0 PERSONNEL

This EA Registration Document was completed by Strum Consulting, an independent, multi-disciplinary team of consultants with extensive experience with submission of EA Registration Documents for undertakings within Atlantic Canada. Curriculum vitae for EA Report contributors and Project Team members are available. A list of the Project Team and their associated roles is provided below.

Senior review and oversight

- Shawn Duncan, BSc., Executive Director
- Meghan Johnston, MES, Vice President, Environmental Assessment and Approvals

Environmental Assessment Authors

- Nicole Thomas, BSc., EP, Newfoundland and Labrador Manager, Environmental Assessment and Approvals
- Christine Doucet, MSc., Senior Advisor
- Robert MacLeod, MSc., P.Geo., Senior Advisor
- Stephen Mills, MA, Senior Archaeologist
- Amanda Rietze, MSc., P.Geo, Senior Environmental Scientist
- Casidhe Dyke, MNRM, EP, Senior Environmental Scientist
- Diedre Park, M.M.s, B.Tech, Senior Environmental Scientist
- Tanya Prysty, PhD, Senior Environmental Scientist
- Beth Spencer, MSc., Senior Geomatics Technician
- Brendan Carswell, MSc. Intermediate Environmental Scientist
- Ashley Locke, MSc., Intermediate Environmental Scientist
- Adam Gaudet. BSc. Junior Environmental Scientist
- Alex Scott, BSc, EPt, Junior Environmental Scientist
- Megan Trotman, BSc., Geomatics Technician

Public and Indigenous Engagement work, open houses, and authorship of Section 8.0 was completed by ICI innovations. A list of the ICI Innovations Project Team and their associated roles is provided below.

- David Robbins, MES, Vice President, Environmental Management
- Colin Taylor, M.Sc., Vice President, Technology
- Jeffrey Janes, MREM, Senior Environmental Consultant

12.0 COMMITMENTS MADE IN THE EA REGISTRATION DOCUMENT

In preparing this EA Registration Document, EverWind commits to the following:

Section 2.1

- Submit an EIS that will include a detailed project description, and associated field and desktop studies for the LBP Wind Farm, Solar Farm I, and the Industrial Facility and associated water supply.
- The EIS will also include a description and desktop studies for the MBP and UBP Wind Farms, and Solar Farms II and III, with commitments to complete the required field studies as per government guidelines ahead of proceeding to construction.
- The EIS submission will also reference the expansion of the downstream Industrial Facilities, with commitments to providing a detailed project description and completion of field and desktop studies prior to proceeding to construction.
- Regarding the marine terminal, file the appropriate documentation following the applicable regulatory pathway once a decision has been made regarding the development of the terminal.

Section 3.2.1

- EverWind will continue to engage with local communities/trails associations for the additional measurement (MET tower and LiDAR) locations proposed.
- EverWind will implement operational procedures to minimize corrosion effects and subsequent potential releases associated with the ammonia pipeline.
- Should blasting be required as part of site preparation for the WTG foundations or other facilities infrastructure, a certified blasting contractor (holding a valid blasters certificate issued by the NLECC), will be contracted to develop a blast design for review and approval prior to carrying out the work.

Section 3.2.3.1

- Prior to site preparation and construction activities, surveyors will clearly mark the perimeter of all areas to be developed, including WTG pads, laydown areas, limits of road construction or upgrades, transmission line right of ways, solar farm development area, as well as the hydrogen and ammonia plant and facilities areas.
- A site assessment will be performed to determine the type, extent, depth, location, and quality of soils on the site and a comprehensive site preparation plan will be developed.
- Adequate vegetated buffers will be maintained between the footprint of all project components and wetlands, watercourses, or other sensitive features/areas, as required.
- All vegetation clearing activities will be conducted outside the bird nesting season (i.e., annually from April 15th to August 15th) where possible and adhere to all mitigation measures. If it is necessary for clearing to occur within the bird nesting season, nest sweeps will be conducted by qualified personnel no more than five days before clearing.
- Should a temporary explosives storage facility be required, it will meet government regulations including required separation distances as regulated by the Explosives

Regulatory Division of Natural Resources Canada, with explosives and accessories stored at the approved explosive storage facility.
- If blasting is required, an Explosives and Blasting Management Plan will be developed by the licensed blasting contractor to provide direction for the safe storage, handling, and use of explosives and explosive components, to address the safety of the public and Project personnel, and protection of the environment.

Section 3.2.3.2
- EverWind will use locally available aggregate from quarries in proximity to the Project, where possible.
- EverWind will also explore the development of quarries within the Project Area.

Section 4.5.2.4
- EverWind will work with the Newfoundland and Labrador Wildlife Division to ensure Project activities do not interfere with mandates of the sensitive or experimental wildlife areas.

Section 5.2.1
- EverWind will adhere with Environment and Climate Change Canada's Environmental Emergency Regulations (E2 Regulations).

Section 5.2.8
- EverWind will develop detailed Operating Procedures and Emergency Response Plans for each facet of the project that will transition to normal operations.

Section 5.5.1
- EverWind will develop contingency plans that meet Newfoundland & Labrador AHJ and the ECCC E2 regulations.

Section 5.5.6
- EverWind will collaborate with local environmental organizations and authorities to develop and implement environmental monitoring and mitigation plans throughout the Project's lifecycle.
- EverWind will establish a monitoring and reporting framework to track progress on the RBA commitments and objectives, including regular reporting to stakeholders and the public.

Section 5.5.7
- EverWind will incorporate fair opportunity gender equity and diversity initiatives in a Regional Benefits Agreement (RBA).

Section 8.0
- EverWind will continue to gather public feedback and use it to help guide its decision-making.
- EverWind is committed to continued engagement with public and Indigenous communities and organizations for the life of the Project.

Section 8.1.2
- A traffic impact study will be completed as part of the EIS.

- EverWind will avoid, to the extent possible, transportation through urban areas during high traffic times (e.g., 7-9 am and 3- 6 pm; Monday to Friday).
- EverWind will ensure that cabin owners will continue to be able to access their cabins throughout all phases of the Project.

Section 8.2

- EverWind will continue to engage and consult with Indigenous communities over the life of the Project.
- EverWind will also continue to seek opportunities for Miawpukek First Nation and Qalipu Mi'kmaq First Nation as well as Indigenous companies in the province to participate in business streams, service provider and supply chains required for the Project.

Section 9.0

- An EPP will be developed following EA release.

Section 10.0

- EverWind will implement a mitigation sequence to first avoid impacts, minimize impacts, and mitigate unavoidable impacts.
- EverWind is committed to developing management plans to ensure impacts are minimized and monitoring plans to confirm EIS findings.
- EverWind is also committed to continue working with provincial and federal regulators, Indigenous communities and organizations, and the public.

13.0 REFERENCES

Amec Foster Wheeler Environnent & Infrastructure (AMEC). 2013. Hydrogeology of Eastern Newfoundland. Prepared for Newfoundland and Labrador Department of Environment and Conservation (now NLECC) – Water Resources Management Division (WRMD).

Amec Foster Wheeler Environnent & Infrastructure (AMEC). 2015. Wetlands inventory and classification summary. Final Report, prepared for Newfoundland and Labrador Hydro. 33 pp.

The American Society of Mechnical Engineers (ASME). 2022. ASME code for pressure piping, B31. Available from https://www.asme.org/codes-standards/find-codes-standards/b31-3-process-piping.

Atlantic Canada Conservation Data Centre (ACCDC). 2023. Response to Request for Data on the Burin Peninsula. http://www.accdc.com/.

Bastille-Rousseau G, Murray DL, Schaefer JA, Lewis MA, Mahoney SP, Potts JR. 2018. Spatial scales of habitat selection decisions: implications for telemetry-based movement modelling. Ecography. 41(3):437–443. doi:10.1111/ecog.02655.

Blakeslee, C.J., Galbraith, H.S., and Deems, R.M. 2018. The effects of rearing temperature on American glass eels. Agric. Sci. **09**(08): 1070–1084. doi:10.4236/as.2018.98074.

Bradbury, C., Roberge, M.M., and Minns, C.K. 1999. Life History Characteristics of Freshwater Fishes Occurring in Newfoundland and Labrador, with Major Emphasis on Lake Habitat Requirements. Available from https://epe.lac-bac.gc.ca/100/200/301/dfo-mpo/cdn_manuscript_report/no2485/235358.pdf.

Breau, C. 2012. Stock Assessment of Newfoundland and Labrador Atlantic Salmon in 2020. Canadian Science Advisory Secretariat Science Advisory Report.

Boulanger, J.A., Adamczewski, J., and Croft, B. 2011. A data-driven demographic model to explore the decline of the Bathurst caribou herd. Journal of Wildlife Management. 75:883–896.

Boutin, S. & Birkenholz, D. E. 1987. Muskrat and round-tailed Muskrat. In M. Novak, J. A. Baker, M. E. Obbard, & B. Malloch (Eds.), Wild furbearer management and conservation in North America (pp. 315–325). Ontario Ministry of Natural Resources.

Canadian Council of Ministers of the Environment (CCME). n.d. Canada's Air. Available from https://ccme.ca/en/air-quality-report#slide-1.

Canada Energy Regulator (CER). 2022. Canada's Renewable Power—Canada. Government of Canada. Ottawa, ON. https://www.cer-rec.gc.ca/en/data-analysis/energy-commodities/electricity/report/canadas-renewable-power/provinces/renewable-power-canada-canada.html

Canadian Environmental Protection Act (*CEPA*). 1999. In S.C. 1999, c. 33. https://laws-lois.justice.gc.ca/eng/acts/c-15.31/

Canadian Wildlife Act (*CWA*). 1985. In R.S.C. 1985, c. W–9. https://laws-lois.justice.gc.ca/eng/acts/w-9/

Canadian Wildlife Service (CWS). 2007a. Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds. 33 pp.

Canadian Wildlife Service (CWS). 2007b. Wind Turbines and Birds: A Guidance Document for Environmental Assessment. 46 pp.

Canadian Wildlife Service (CWS). 2019. Additional Information Requirements for Wind Turbines. Available from https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/SectorGuidelines/WindTurbines.pdf

Canadian Wildlife Service (CSW) 2022. Wind Energy & Birds Environmental Assessment Guidance Update. Environment and Climate Change Canada.

Chaput, G., Pratt, T.C., Cairns, D.K., Clarke, K.D., Bradford, R.G., Mathers, A., and Verreault, G. 2013. Recovery Potential Assessment for the American Eel (Anguilla rostrata) for eastern Canada: description and quantification of threats. Canadian Science Advisory Secretariat (CSAS). Available from https://publications.gc.ca/collections/collection_2014/mpo-dfo/Fs70-5-2013-135-eng.pdf.

Chippett, J.D. 2004. An examination of the distribution, habitat, and genetic and physical characteristics of *fundulus diaphanus*, the banded killifish, in newfoundland and labrador. M.Sc., Memorial University of Newfoundland. Available from https://research.library.mun.ca/10301/1/Chippett_JamieD.pdf.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2006. COSEWIC assessment and status report on the Ivory gull (*Pagophila eburnnea*). https://www.SARAregistry.gc.ca/virtual_SARA/files/cosewic/sr_ivory_gull_e.pdf

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2010. COSEWIC assessment and status report on the Bobolink (*Dolichonyx oryzivorus*). https://www.SARAregistry.gc.ca/virtual_SARA/files/cosewic/sr_Bobolink_0810_e.pdf.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2011. COSEWIC assessment and status report on the Atlantic sturgeon (*Acipenser oxyrinchus*) St. Lawrence populations Maritimes populations in Canada. Available from https://www.SARAregistry.gc.ca/virtual_SARA/files/cosewic/sr_Atlantic%20Sturgeon_2011_e.pdf.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2012. COSEWIC assessment and status report on the American eel, Anguilla rostrata, in Canada. Ottawa, ON.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2013a. Harlequin duck (*Histrionicus histrionicus*) eastern population COSEWIC assessment and status report 2013. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/harlequin-duck-eastern-population-2013.html

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2013b. COSEWIC assessment and status report on the Piping plover (*Charadrius melodus*). https://www.SARAregistry.gc.ca/virtual_SARA/files/cosewic/sr_Piping%20Plover_2013_e.pdf

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2013c. COSEWIC assessment and status report on the Little Brown Myotis (*Myotis lucifugus*) Northern Myotis (*Myotis septentrionalis*) Tri-colored Bat (*Perimyotis subflavus*) in Canada. https://www.registrelep-SARAregistry.gc.ca/virtual_SARA/files/cosewic/sr_Little%20Brown%20Myotis%26Northern%20Myotis%26Tri-colored%20Bat_2013_e.pdf

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2014. Caribou (*Rangifer tarandus*) specific populations: COSEWIC assessment and status report 2014.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2017. Rusty blackbird (*Euphagus carolinus*) COSEWIC assessment and status report 2017. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/rusty-blackbird-2017.html

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2018a. Chimney swift (*Chaetura pelagica*) COSEWIC assessment and status report 2018. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/chimney-swift-2018.html

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2018b. Chimney swift (*Chordeiles minor*) COSEWIC assessment and status report 2018. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/common-nighthawk-2018.html

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2021a. Short-eared Owl (*Asio flammeus*) COSEWIC assessment and status report 2021. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/short-eared-owl-2021.html

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2021b. Hoary bat (*Lasiurus cinereus*), Eastern red bat (*Lasiurus borealis*), Silver-haired bat (*Lasionycteris noctivagans*) COSEWIC assessment and status report 2023. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/hoary-bat-eastern-red-bat-silver-haired-bat-2023.html

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2022. *Species at Risk Act*: COSEWIC assessments and status reports. Government of Canada. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports.html.

Dadswell, M.J. 2006. A Review of the Status of Atlantic Sturgeon in Canada, with Comparisons to Populations in the United States and Europe. Fisheries **31**(5): 218–229. doi:10.1577/1548-8446(2006)31[218:AROTSO]2.0.CO;2.

Devine, B.M., and Fisher, J.A.D. 2014. First records of the blue runner *Caranx crysos* (Perciformes: Carangidae) in Newfoundland waters. J. Fish Biol. **85**(2): 540–545. doi:10.1111/jfb.12438.

Department of Fisheries and Oceans Canada (DFO). 1983. Fishes occurrence database. Unpublished data.

Department of Fisheries and Oceans Canada (DFO). 2009. Does eelgrass (*Zostera marina*) meet the criteria as an ecologically significant species? DFO Can Sci Advis Sec Sci Advis Rep 2009/018.

Department of Fisheries and Oceans Canada (DFO). 2012. Temperature threshold to define management strategies for Atlantic salmon (*salmo salar*) fisheries under environmentally stressful conditions. Canadian Science Advisory Secretariat Science Advisory Report. Available from https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/346488.pdf.

Department of Fisheries and Oceans Canada (DFO). 2014. Atlantic sturgeon (*Acipenser oxyrhynchus oxyrhynchus*): species at risk consultation. Available from https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/consultation-documents/atlantic-sturgeon.html.

Department of Fisheries and Oceans Canada (DFO). 2019. Scallop - Newfoundland and Labrador Region. Available from https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/scallop-petoncle/2019/index-eng.html#toc1.

Department of Fisheries and Oceans Canada (DFO). 2021a. Stock assessment of NAFO subdivision 3PS cod.

Department of Fisheries and Oceans Canada (DFO). 2021b. Assessment of American Lobster in Newfoundland. Canadian Science Advisory Secretariat. Available from https://publications.gc.ca/collections/collection_2021/mpo-dfo/fs70-6/Fs70-6-2021-008-eng.pdf.

Department of Fisheries and Oceans Canada (DFO). 2022a. Stock Assessment of Newfoundland and Labrador Atlantic Salmon in 2020. Science Advisory Report. Available from https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/41073629.pdf.

Department of Fisheries and Oceans Canada (DFO). 2022b. Capelin (*Mallotus villosus*) Newfoundland & Labrador Region Divisions 2+3 (Capelin Fishing Areas 1-11). Available from https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/capelin-capelan/2021/zone-area_1-11-eng.html.

Department of Fisheries and Oceans Canada (DFO). 2022c. Banded Killifish: Newfoundland Population. Available from https://www.dfo-mpo.gc.ca/species-especes/publications/SARA-lep/bandedkillfish-fondulebarre/index-eng.html.

Department of Fisheries and Oceans Canada (DFO). 2022d. Newfoundland and Labrador Region - aquatic species at risk. Available from https://www.dfo-mpo.gc.ca/species-especes/SARA-lep/regions/nl-tnl-eng.html#speciesTable [accessed 12 April 2024].

Department of Fisheries and Oceans Canada (DFO). 2022e. Stock Assessment of Newfoundland and Labrador Atlantic Salmon in 2020. Science Advisory Report. Available from https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/41073629.pdf.

Department of Fisheries and Oceans Canada (DFO). 2024a. Atlantic Herring Abundance in Placentia Bay. Available from https://open.canada.ca/data/dataset/8876f846-1e9a-4997-986b-3eec2c319f35.

Department of Fisheries and Oceans Canada (DFO). 2024b. Aquatic species at risk map. Available from https://www.dfo-mpo.gc.ca/species-especes/SARA-lep/map-carte/index-eng.html.

Department of Fisheries and Oceans Canada (DFO). 2024c. Habitat Highlight: Restoring fish habitat in Newfoundland and Labrador, with a Placentia Bay case study. Available from https://www.dfo-mpo.gc.ca/ecosystems-ecosystemes/habitat/highlights-faitssaillants/nfl-tnl/restoring-fish-habitat-restauration-poisson-eng.html.

Department of Fisheries and Oceans Canada (DFO). 2024d. Canada Marine Planning Atlas - Atlantic. Available from https://gisp.dfo-mpo.gc.ca/apps/Atlantic-Atlas/?locale=en [accessed 30 July 2024].

Department of Fisheries and Oceans Canada (DFO). 2024e. Newfoundland and Labrador Angler's guide 2024-2025. Available from https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/41236221.pdf.

Department of Fisheries and Oceans Canada (DFO). 2024f. Update on the Status of American Eel and Elver Fisheries in Maritimes Region and Science Advice on Available Regional Indices. Science Advisory Report. Available from https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/41234996.pdf.

Dodds, D.G. 1965. Reproduction and productivity of snowshoe hares in Newfoundland. Journal of Wildlife Management. 29(2):303–315. https://doi.org/10.2307/3798435

Eddy, T.D., and Robertson, M. 2024. The federal government has lifted the moratorium on Northern cod fishing after 32 years. Available from https://theconversation.com/the-federal-government-has-lifted-the-moratorium-on-northern-cod-fishing-after-32-years-233522.

Energy Efficiency & Renewable Energy. n.d.-a. Energy Efficiency & Renewable Energy. Available from https://www.energy.gov/eere/office-energy-efficiency-renewable-energy.

Energy Efficiency & Renewable Energy. n.d.-b. Hydrogen Production: Electrolysis.

Energy Efficiency & Renewable Energy. n.d.-c. Hydrogen Production: Biomass-Derived Liquid Reforming. Available from https://www.energy.gov/eere/fuelcells/hydrogen-production-biomass-derived-liquid-reforming.

Energy Efficiency & Renewable Energy. n.d.-d. Biofuel Basics. Available from https://www.energy.gov/eere/bioenergy/biofuel-basics.

European Commission. 2022. REPowerEU. Available from https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en#repowereu-at-a-glance.

Environment and Natural Resources Canada. 2014. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/caribou-specific-populations-2014.html.

Environment Canada (EC). 2007. Recovery Strategy for the Boreal Felt Lichen (*Erioderma pedicellatum*), Atlantic Population, in Canada. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. viii + 31 pp.

Environment Canada (EC). 2015. Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*). Ottawa: Environment and Natural Resources Canada.

Environment and Climate Change Canada (ECCC). 2024a. Historic Climate Data. Government of Canada. https://climate.weather.gc.ca/

Environment and Climate Change Canada (ECCC). 2024b. Criteria for public weather alerts. Government of Canada. https://www.canada.ca/en/environment-climate-change/services/types-weather-forecasts-use/public/criteria-alerts.html

ERM Worldwide Group Limited (ERM). 2023. Carbon footprinting and evaluation of RED II conformance at design phase report. ERM Worldwide Group Limited.

Endangered Species Act (NL *ESA*). 2004. *Endangered Species Act*. In O.C. 2002–274. https://www.assembly.nl.ca/legislation/sr/regulations/rc020057.htm

European Commission (EU). 2022. REPower EU. European Commission, Brussels. Available from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A230%3AFIN&qid=1653033742483

Fertilizer Canada. 2022. Anhydrous Ammonia Code of Practice User Guide. 452pp.

Fisheries Act. 1985. In R.S.C., 1985, c. F-14. https://lois-laws.justice.gc.ca/eng/acts/F-14/

Ganoe, L. S., Lovallo, M. J., Brown, J. D., & Walter, W. D. 2021. Ecology of an isolated muskrat population during regional population declines. Northeastern Naturalist, *28*(1), 49-64.

Geist, V., & Walther, F. [Editors] In: The behaviour of ungulates and its relation to management. Symposium paper, University of Calgary, Alberta. 1971.

Gotceitas, V., Fraser, S., and Brown, J.A. 1997. Use of eelgrass beds (Zostera marina) by juvenile Atlantic cod (Gadus morhua). Can. J. Fish. Aquat. Sci. 1319: 1306–1319.

Government of British Columbia (Gov BC). 2016. Cumulative Effects Framework: Interim policy for the Natural Resource sector. Natural Resources Board, Government of British Columbia. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/cumulative-effects/cef-interimpolicy-oct_14_-2_2016_signed.pdf

Government of Canada. 2013. Code of practice to eliminate halocarbon emissions from refrigeration and air conditioning systems. Government of Canada. https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/publications/code-practice-eliminate-halocarbon-emissions/chapter-1.html

Government of Canada. 2018. Get prepared. Available from https://www.getprepared.gc.ca/cnt/hzd/rgnl/nl-en.aspx

Government of Canada. 2019. Canada's changing climate report. Bush, E and Lemmen, D.S., editors. Government of Canada. https://changingclimate.ca/CCCR2019/

Government of Canada. 2020. Atlantic Salmon - Newfoundland and Labrador Region. Available from https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/salmon-saumon/2020/index-eng.html.

Government of Canada. 2024a. *Species at Risk Act* (S.C. 2002, c. 29). Available from https://laws-lois.justice.gc.ca/eng/acts/S-15.3/index.html.

Government of Canada. 2024b. Anglers' Guide 2024-2025 - Trout. Available from https://www.nfl.dfo-mpo.gc.ca/en/anglers-guide-2024-2025-trout.

Government of Canada. 2024c. In-Season River Status. Available from https://www.nfl.dfo-mpo.gc.ca/nfl-tnl/en/isrs.

Government of Canada. 2022. *Species at Risk Act*: COSEWIC assessments and status reports. Available from https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports.html.

Government of Newfoundland and Labrador (Gov NL). n.d. Fish. Fisheries, Forestry and Agriculture. Available from https://www.gov.nl.ca/ffa/wildlife/endangeredspecies/fish/.

Government of Newfoundland and Labrador (Gov NL). 2019. The Way Forward on Climate Change in Newfoundland and Labrador. Available from https://foranewearth.org/wordpress/wp-content/uploads/Report-on-Climate-Change-in-Newfoundland-and-Labrador.pdf.

Government of Newfoundland and Labrador (Gov NL). 2021. Maximizing our renewable future. Available from https://www.gov.nl.ca/iet/files/Renewable-Energy-Plan-Final.pdf.

Government of Newfoundland and Labrador (Gov NL). 2022. Air pollution control regulations. Newfoundland and Labrador Regulation 11/22.

Government of Newfoundland and Labrador (Gov NL). 2023a. Land Use Details. Available from https://www.gov.nl.ca/landuseatlas/details/.

Government of Newfoundland and Labrador (Gov NL). 2023b. The Guide for Registration of Onshore Wind Energy Generations and Green Hydrogen Production Projects. Available from https://www.gov.nl.ca/ecc/files/env_assessment_EA-Guidance-for-Onshore-Wind-Energy-Generation-and-Green-Hydrogen-Production-Projects.pdf

Government of Newfoundland and Labrador (Gov NL). 2024a. Zone 2 forest management plan 2022-2026. Available from https://www.gov.nl.ca/ffa/files/Zone-2-Forest-Management-Plan-2022-26.pdf

Government of Newfoundland and Labrador (Gov NL). 2024b. Four hidden gems of the Burin Peninsula. Available from https://www.newfoundlandlabrador.com/trip-ideas/travel-stories/four-hidden-gems-of-the-burin-peninsula

Government of Newfoundland and Labrador (Gov NL). 2024c. Community Accounts. Available from https://nl.communityaccounts.ca//Default.asp?

Government of Nova Scotia Department of Environment (NSE). 2020. Standards for Quantification, Reporting, and Verification of Greenhouse Gas Emissions. Available from https://climatechange.novascotia.ca/sites/default/files/QRV_Standards.pdf.

Hamilton, C.D., Goulet, P.J., Stenson, G.B., and Lang, S.L.C. 2023. Counts and spatial distribution of harbour seals (Phoca vitulina) and grey seals (Halichoerus grypus) from an aerial survey of the coast of the Newfoundland Shelf and Sandwich Bay, Labrador during the summer of 2021. Northwest Atlantic Fisheries Centre, St. John’s, Newfoundland and Labrador. Available from https://publications.gc.ca/collections/collection_2023/mpo-dfo/Fs97-6-3566-eng.pdf.

Harrison, D.J. 1992. Dispersal characteristics of juvenile coyotes in Maine. Journal of Wildilfe Management. 56(1): 128–138. https://doi.org/10.2307/3808800

The Harris Centre. 2020. Summary Report: Burin Peninsula thriving regions workshop #2. The Leslie Harris centre of regional policy and development, with College of the North Atlantic—Burin Campus. Burin, NL.
https://www.mun.ca/harriscentre/media/production/memorial/administrative/the-harris-centre/media-library/BurinTRPP_W2.pdf

Health Canada. 2010. Federal contaminatied site risk assessment in Canada, Part V: Guidance on human health detailed quantitative risk assessment for chemicals (DQRACHEM). Government of Canada. https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/contaminated-sites/federal-contaminated-site-risk-assessment-canada-part-guidance-human-health-detailed-quantitative-risk-assessment-chemicals-dqrachem-health-canada.html

Health Canada. 2016. Guidance for evaluating human health impacts in environmental assessment: Noise. Government of Canada.
https://publications.gc.ca/site/eng/9.802343/publication.htmlf

Health Canada. 2017. Guidance for evaluating human health impacts in environmental assessment: air quality. Government of Canada. https://iaac-aeic.gc.ca/050/documents/p80054/119378E.pdf

Health Canada. 2019. Guidance for evaluating human health impacts in environmental assessmet: human health risk assessment. Government of Canada. https://publications.gc.ca/site/eng/9.870475/publication.html

Health Canada. 2020. Guidelines for Canadian Drinking Water Quality. Government of Canada. https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html

Health Canada. 2021. Federal contaminated site risk assessment in Canada: Guidance on human health preliminary quantitative risk assessment (PQRA). Government of Canada. https://publications.gc.ca/collections/collection_2021/sc-hc/H129-114-2021-eng.pdf

Hegman, G., Cocklin, C., Creasey, R., Dupuis, S., Kennedy, A., Kingsley, L., Ross, W., Spaling, H., and Stalker D. 1999. Cumulative effects assessment: Practitioner Guide. Canadian Environmental Assessment Agency. https://publications.gc.ca/collections/Collection/En106-44-1999E.pdf

Hydrogen strategy for Canada (HSC). 2020. Hydrogen strategy for Canada. Available from https://natural-resources.canada.ca/sites/nrcan/files/environment/hydrogen/NRCan_Hydrogen%20Strategy%20for%20Canada%20Dec%2015%202200%20clean_low_accessible.pdf.

Impact Assessment Act (*IAA*). 2019. In SC 2019, c.28, s.1. https://laws.justice.gc.ca/eng/acts/i-2.75/index.html

International Energy Agency (IEA). 2023. Net zero roadmap A global pathway to keep the 1.5 °C goal in reach. Available from https://iea.blob.core.windows.net/assets/9a698da4-4002-4e53-8ef3-631d8971bf84/NetZeroRoadmap_AGlobalPathwaytoKeepthe1.5CGoalinReach-2023Update.pdf.

International Energy Agency (IEA). 2021. Ammonia technology roadmap: towards more sustainable nitrogen fetriliser prodction. Internaitonal Energy Agency. https://iea.blob.core.windows.net/assets/6ee41bb9-8e81-4b64-8701-2acc064ff6e4/AmmoniaTechnologyRoadmap.pdf

Intergovernmental Panel on Climate Change (IPCC). 2018. Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)].

Laurel, B.J., Gregory, R.S., Brown, J.A., Hancock, J.K., and Schneider, D.C. 2004. Behavioural consequences of density-dependent habitat use in juvenile cod Gadus morhua and G. ogac: The role of movement and aggregation. Mar. Ecol. Prog. Ser. 272: 257–270. doi:10.3354/meps272257.

Mackenzie, D.I., Nichols, J.D., Lachman, G.B., Droege, S., Royle, J.A., and Langtimm, C.A. 2002. Estimating Site Occupancy Rates When Detection Probabilities Are Less Than One. Ecology. 83(8):2248–2255. https://doi.org/10.1890/0012-9658(2002)083[2248:ESORWD]2.0.CO;2

Matheson, K., Mckenzie, C.H., Gregory, R.S., Robichaud, D.A., Bradbury, I.R., Snelgrove, P.V.R., and Rose, G.A. 2016. Linking eelgrass decline and impacts on associated fish communities to European green crab Carcinus maenas invasion. Mar. Ecol. Prog. Ser. **548**: 31–45. doi:10.3354/meps11674.

Migratory Birds Convention Act (MBA). 1994. In S.C. 1994, c. 22. https://laws-lois.justice.gc.ca/eng/acts/m-7.01/

Murphy, G.E.P., Dunic, J.C., Adamczyk, E.M., Bittick, S.J., Côté, I.M., Cristiani, J., Geissinger, E.A., Gregory, R.S., Lotze, H.K., O'Connor, M.I., Araújo, C.A.S., Rubidge, E.M., Templeman, N.D., and Wong, M.C. 2021. From coast to coast to coast: ecology and management of seagrass ecosystems across Canada. FACETS **6**(1): 139–179. doi:10.1139/facets-2020-0020.

Northwest Atlantic Fisheries Organisation (NAFO). 2024. NAFO 21A database. Available from https://www.nafo.int/Data/STATLANTold.

National Fire Protection Agency (NFPA). 2022. Standard for the Installation of Sprinkler Systems. NFPA. https://www.nfpa.org/codes-and-standards/nfpa-13-standard-development/13
National Wetland Working Group (NWWG). 1997. The Canadian Wetland Classification System, Second Edition. Published by the University of Waterloo, Wetlands Research Centre, Waterloo, ON.

Natural Resources Canada (NRCan). 2018. ISO 19110 Feature Catalogue – National Vector Catalogue Profile (NVCP). Available from https://ftp.maps.canada.ca/pub/nrcan_rncan/vector/canvec/doc/info.html [accessed 1 August 2024].

Natural Resources Canada (NRCan). 2020. Hydrogen Strategy of Canada. Government of Canada, Ottawa, ON. https://natural-resources.canada.ca/sites/nrcan/files/environment/hydrogen/NRCan_Hydrogen-Strategy-Canada-na-en-v3.pdf

Natural Resources Canada (NRCan). 2023. Topographic data of Canada—CanVec series. Natural Resources Canada, Ottawa, ON. https://open.canada.ca/data/dataset/8ba2aa2a-7bb9-4448-b4d7-f164409fe056

Natural Resources Canada (NRCan). 2024a. The atlas of Canada—Canada's Landcover Map. Natural Resources Canada, Ottawa, ON. https://atlas.gc.ca/lcct/en/index.html

Natural Resources Canada (NRCan). 2024b. Interactive map. Available from https://cwfis.cfs.nrcan.gc.ca/interactive-map

Newfoundland and Labrador Department of Environment and Climate Change (NLECC). n.d. Wilderness and Ecolgical Reserves. Newfoundland and Labrador Department of Environment and Climate Change. https://www.gov.nl.ca/ecc/natural-areas/wer/

Newfoundland and Labrador Department of Environment and Climate Change (NLECC). 2008a. Maritime Barrens Southeastern Barrens subregions protected areas. Newfoundland and Labrador Department of Environment and Climate Change, Parks and Natural Areas Division. https://www.gov.nl.ca/ecc/files/natural-areas-pdf-island-6b-southeast-barrens.pdf

Newfoundland and Labrador Department of Environment and Climate Change (NLECC). 2008b. Maritime Barrens Southcoast Barrens subregion. Newfoundland and Labrador Department of Environment and Climate Change, Parks and Natural Areas Division. https://www.gov.nl.ca/ecc/files/natural-areas-pdf-island-6c-south-coast-barrens.pdf

Newfoundland and Labrador Department of Environment and Climate Change (NLECC). 2008c. Eastern hyper-oceanic barrens. Newfoundland and Labrador Department of Environment and Climate Change, Parks and Natural Areas Division. https://www.gov.nl.ca/ecc/files/natural-areas-pdf-island-7-eastern-hyper-oceanic-barrens.pdf

Newfoundland and Labrador Department of Environment and Climate Change (NLECC). 2017. Ecoregions of Newfoundland. https://www.gov.nl.ca/ecc/apa/eco/

Newfoundland and Labrador Department of Environment and Climate Change (NLECC). 2019.The Way Forward on Climate Change in Newfoundland and Labrador. Government of Newfoundland and Labrador. St. John’s, NL. https://www.gov.nl.ca/ecc/files/publications-the-way-forward-climate-change.pdf

Newfoundland and Labrador Department of Environment and Climate Change (NLECC). 2024a. Climate Data. Government of Newfoundland and Labrador. https://www.gov.nl.ca/ecc/occ/climate-data/

Newfoundland and Labrador Department of Environment and Climate Change (NLECC). 2024b. Air quality Data. Government of Newfoundland and Labrador. https://www.gov.nl.ca/ecc/env-protection/science/airmon/

Newfoundland and Labrador Department of Environment and Climate Change (NLECC). 2024c. Air Quality Management System. Government of Newfoundland and Labrador. https://www.gov.nl.ca/ecc/env-protection/science/aqms/

Newfoundland and Labrador Department of Environment and Climate Change (NLECC). 2024d. NLFFA—Land Cover—Newfoundland and Labrador. https://geohub-gnl.hub.arcgis.com/maps/ea86e8a2a296425bb4eff8fb8ee40f97/about

Newfoundland and Labrador Department of Environment and Climate Change (NLECC). 2024e. Coastal flooding. Available from https://www.gov.nl.ca/ecc/waterres/flooding/coastal-flooding/#:~:text=Sea%20level%20in%20parts%20of,expected%20to%20exceed%2010%20m.

Newfoundland and Labrador Department of Environment and Climate Change, Water Resources Management Division (NLECC WRMD). 2024. Newfoundland and Labrador Water Resources Portal. Government of Newfoundland and Labrador. https://maps.gov.nl.ca/water/

Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture (NLFFA). 2011. Management plan American Eel (Anguilla rostrata). Available from https://www.gov.nl.ca/ffa/files/wildlife-endangeredspecies-american-eel-management-plan.pdf.

Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture (NLFFA). 2016. Newfoundland and Labrador crown forest management zone 2 five-year operating plan (2017–2021). Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture. https://www.gov.nl.ca/ffa/programs-and-funding/forestry-programs-and-funding/managing/districts-zones/zone2/.

Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture (NLFFA). 2018. News Releases: New Aquaculture Project to Create Hundreds of Jobs on the Burin Peninsula. Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture. https://www.gov.nl.ca/releases/2018/exec/0914n04/#:~:text=New%20Aquaculture%20Project%20to%20Create%20Hundreds%20of%20Jobs%20on%20the%20Burin%20Peninsula,-Share%20this%20article&text=Today%20in%20Marystown%2C%20representatives%20from,the%20provincial%20and%20federal%20governments.

Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture (NLFFA). 2023. Aquaculture Licenses. Available from https://geohub-gnl.hub.arcgis.com/datasets/GNL::aquaculture-licenses-1/explore?location=47.030248%2C-
Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture (NLFFA). 2024a. Newfoundland (Island) Caribou Management Areas. Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture. https://www.gov.nl.ca/ffa/public-education/wildlife/hunting/caribou/.

Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture (NLFFA). 2024b. Wildlife. Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture. https://www.gov.nl.ca/ffa/wildlife/.

Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture (NLFFA). 2024c. Little Brown Bat. Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture. https://www.gov.nl.ca/ffa/wildlife/snp/programs/education/animal-facts/mammals/brown-bat/

Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture (NLFFA). 2024d. Newfoundland Big Game Management Areas (Moose & Black Bear). Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture. https://www.gov.nl.ca/ffa/public-education/wildlife/hunting/moosebear/

Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture (NLFFA). 2024e. Newfoundland Fur Zones. Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture. https://www.gov.nl.ca/ffa/public-education/wildlife/trapping/maps/fz3/
Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture (NLFFA). 2024f. Forest Fire Season. Available from https://www.gov.nl.ca/ffa/public-education/forestry/forest-fires/

Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture (NLFFA). (n.d.-b). Banded Killifish (Fundulus diaphanus). Available from https://www.gov.nl.ca/ffa/files/wildlife-endangeredspecies-banded-killifish-information-sheet.pdf.

Newfoundland and Labrador Department of Industry, Energy, and Technology (NLIET). 2021. A plan for development of the renewable energy industry in Newfoundland and Labrador. St. John’s, NL. https://www.gov.nl.ca/iet/renewable-energy-plan/

Newfoundland and Labrador Department of Industry, Energy, and Technology (NLIET). 2023. Newfoundland and Labrador Geoscience Atlas. Government of Newfoundland and Labrador. https://gis.geosurv.gov.nl.ca/

Newfoundland and Labrador Department of Parks (NL Parks). 2015. Lawn Bay Ecological Reserve Management Plan. Newfoundland and Labrador Department of Parks. https://www.gov.nl.ca/ecc/files/natural-areas-wer-r-lbe-lawn-bay-management.pdf

Newfoundland and Labrador Department of Parks (NL Parks). 2024. Frenchman's Cove Provincial Park. Newfoundland and Labrador Department of Parks. https://www.parksnl.ca/parks/frenchmans-cove-provincial-park/

Newfoundland and Labrador Endangered Species Act (NL *ESA*). 2023. Endangered Species Act. Available from https://www.assembly.nl.ca/Legislation/sr/statutes/e10-1.htm.

Newfoundland and Labrador Environmental Protection Act (NL *EPA*). 2002. In SNL 2002 Chapter E-14.2. https://www.assembly.nl.ca/legislation/sr/statutes/e14-2.htm

Newfoundland and Labrador Heritage (Heritage NL). 1997-2024. Available from https://www.heritage.nf.ca/

Newfoundland and Labrador Wildlife Division. 2010. Recovery Plan: American Marten (Martes americana atrata) in Newfoundland. https://www.gov.nl.ca/ffa/files/wildlife-endangeredspecies-marten-recovery-plan.pdf

Newfoundland and Labrador Wildlife Division. 2021. Management Plan for the Water Pygmyweed (Tillaea aquatica) in Newfoundland and Labrador. Newfoundland and Labrador Department of Fisheries, Forestry and Agriculture. https://www.gov.nl.ca/ffa/files/Water-Pygmyweed-Management-Plan.pdf

Newfoundland and Labrador Wildlife Division. 2022. Newfoundland and Labrador moose management plan (2022–2026). Newfounland and Labrador Department of Fisheries, Forestry, and Agriculture.

National Oceanic Atmospheric Administration (NOAA) Fisheries. 2023. Atlantic Sturgeon and Climate Change: Warming Water Impacts Spawning and Development. Available from https://www.fisheries.noaa.gov/feature-story/atlantic-sturgeon-and-climate-change-warming-water-impacts-spawning-and-development.

National Oceanic Atmospheric Administration (NOAA). n.d. CAMEO Chemicals Ammonia, Anhydrous. version 3.1.0. Available from https://cameochemicals.noaa.gov/chemical/4860

Ontario Ministry of Natural Resources (OMNR). 2007. Ecological Land Classification Primer. Ontario Ministry of Natural Resources. Peterborough, ON. ISBN 978-1-4249-4066-0 PDF

Parks NL. 2024. Frenchman's cove provincial park. https://www.parksnl.ca/parks/frenchmans-cove-provincial-park/

Physical Activities Regulations. 2019. In SOR/2019-285. https://laws.justice.gc.ca/eng/regulations/SOR-2019-285/index.html

Protected Areas Association of Newfoundland and Labrador. 2008. Maritime Barrens Ecoregion – Southeastern Barrens subregion.

Protected Areas Association of Newfoundland and Labrador. 2008. Maritime Barrens – South Coast Barrens subregion.

Protected Areas Association of Newfoundland and Labrador. 2008. Eastern Hyper-Oceanic Barrens

Poole, K.G. 1997. Dispersal patterns of lynx in the Northwest Territories. Journal of Wildlife Management. 61(6):497–505. https://doi.org/10.2307/3802607

Porter, T.R. 1975. Biology of Atlantic Salmon in Newfoundland and Labrador. Available from https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/71819.pdf.

Prystay, T.S. 2023a. From ecosystems to people: Examining the variability in the provision of ecosystem services by eelgrass meadows in Atlantic Canada. PhD, Memorial University of Newfoundland. Available from https://research.library.mun.ca/16255/1/thesis.pdf.

Prystay, T.S., Sipler, R.E., Foroutani, M.B., and LeBris, A.L. 2023b. The role of boreal seagrass meadows in the coastal filter. JGR Biogeosciences **128**(12): e2023JG007537. doi:https://doi.org/10.1029/2023JG007537.

Prystay, T.S., Adams, G., Favaro, B., Gregory, R.S., and Le Bris, A. 2023c. The reproducibility of remotely piloted aircraft systems to monitor seasonal variation in submerged seagrass and estuarine habitats. FACETS **8**: 1–22. doi:10.1139/facets-2022-0149.

Qalipu Environment and Natural Resources (QENR). 2024. Traditional Eel Harvest. Available from https://qalipu.ca/traditional-eel-harvest/#:~:text=American%20Eel%20in%20Newfoundland&text=Currently%20the%20recreational%20eel%20spearing,of%20eel%20in%20the%20area.

Qalipu First Nation. 2021. Comprehensive Community Plan. 104pp. Available from https://qalipu.ca/qalipu/wp-content/uploads/2021/11/Comprehensive-Community-Plan.pdf

Radio Advisory Board of Canada (RABC) and Canadian Wind Energy Association (CanWEA) 2020. Technical information and coordination process between wind turbines and radiocommunication and radar systems. https://www.rabc-cccr.ca/wpfd_file/rabc-canwea-guidelines-_updated-2020/

Robichaud, D., and Rose, G.A. 2006. Density-dependent distribution of demersal juvenile Atlantic cod (Gadus morhua) in Placentia Bay, Newfoundland. ICES J. Mar. Sci. **63**(4): 766–774. doi:10.1016/j.icesjms.2005.12.002.

Sadowski C, Bowman J. Historical surveys reveal a long-term decline in muskrat populations. Ecol Evol. 2021 May 2;11(12):7557-7568. doi: 10.1002/ece3.7588. PMID: 34188834; PMCID: PMC8216904.

Species at Risk Act (*SARA*). 2002. *Species at Risk Act*. In S.C. 2002, C. 29. https://laws.justice.gc.ca/eng/acts/s-15.3/page-10.html

Sargent, P.S., Dalley, K.L., and Osborne, D.R. 2021. Banded Killifish (Fundulus diaphanus) and Mummichog (Fundulus heteroclitus) distributions in insular Newfoundland waters: implications for a Species at Risk. Can. Field-Nat. **134**(4): 307–315. doi:10.22621/cfn.v134i4.2373.

Schaefer, J.A., Mahoney, S.P., Weir, J.N., Luther, J.G., and Soulliere, C.E. 2016. Decades of habitat use reveal food limitation of Newfoundland caribou. J. Mammal. **97**(2): 386–393. doi:10.1093/jmammal/gyv184.

Scott, W.B., and Scott, M.G. 1988. Atlantic fishes of Canada. University of Toronto Press and Fisheries and Oceans Canada, Supply and Services Canada.

Seifert, H., Westerhellweg, A., and Kröning, J. 2003. Risk analysis of ice throw from wind turbines. Available from https://files.ceqanet.opr.ca.gov/123569-2/attachment/FIOFQ2hMKkvbpVWfQ_PSHxhb-FFQDmRPkYd0rK9NH8Oyg134rKJh58R4SrJNk9FLdCcXArCMhgUfNbLg0.

Simkin, D.W. 1965. Reproduction and productivity of moose in northwestern Ontario. Journal of Wildlife Management. 29(4): 740–750. https://doi.org/10.2307/3798551

Statistics Canada. 2022. Census Profile, 2021 Census of Population. Available from https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=Swift Current&DGUIDlist=2021A0006100110&GENDERlist=1,2,3&STATISTIClist=1&HEADERlist=0.

Taylor, P. D., J. Brzustowski, C. Matkovich, M. Peckford, and D. Wilson. 2010. radR:an open-source platform for acquiring and analysing data on biological targets observed by radar. BMC-Ecology:10:22; doi:10.1186/1472-6785-1110-1122.

The American Society of Mechanical Engineers (ASME). 2022. ASME code for pressure piping, B31. Available from https://www.asme.org/codes-standards/find-codes-standards/b31-3-process-piping.

United States Environmental Protection Agency (US EPA). 2023. Draft inventory of U.S. greenhouse has emissions and sinks. Governemtn of the United States of America. https://www.epa.gov/system/files/documents/2023-02/US-GHG-Inventory-2023-Main-Text.pdf

United States Department of Energy. n.d. Hydrogen production: hydrogen and fuel cells technologies office. Government of the United States of America. https://www.energy.gov/eere/fuelcells/hydrogen-production

Washinger, D.P., Reid, R. and Fraser, E.E. 2020. Acoustic evidence of hoary bats (*Lasiurus cinereus*) on Newfoundland, Canada. Northeastern Naturalist. 27(3):567–575. https://doi.org/10.1656/045.027.0315

Water Resources Act (*WRA*). 2002. In SNL 2002, c. W-4.01. https://www.assembly.nl.ca/legislation/sr/statutes/w04-01.htm

Wilderness and Ecological Reserves Act (*WER* Act). 1980. *Newfoundland and Labrador Wilderness and Ecological Reserves Act*. https://www.assembly.nl.ca/legislation/sr/statutes/w09.htmHome-range characteristics and habitat use by American martens in eastern Newfoundland. Journal of Mammalogy. 86(6):1156–1163. doi:10.1644/1545-1542(2005)86[1156:HCAHUB]2.0.CO;2.

Westley, P.A.H. and Flemming I.A. 2011. Landscape factors that shape a slow and persistent aquatic invasion: brown trout in Newfoundland 1883–2010. Diversity and Distributions. 17(3): 566–579. https://doi.org/10.1111/j.1472-4642.2011.00751.x

Wild Life Act (*WLA*). 1996. In O.C. 96–809. https://www.assembly.nl.ca/legislation/sr/regulations/rc961156.htm