

INGLISVILLE ROAD PIT PROJECT

Environmental Assessment Registration Document

3341581 Nova Scotia Limited

November 10, 2026

fraxinus
ENVIRONMENTAL & GEOMATICS

November 10, 2026

Anthony Heggelin
Environmental Assessment Officer
Policy Division, EA Branch
1903 Barrington Street, Suite 2085
PO Box 442, Halifax, NS B3J 2P8

Re: Inglisville Road Pit Project – EA Submission

Dear Mr. Heggelin,

On behalf of 3341581 Nova Scotia Limited, Fraxinus Environmental & Geomatics Limited is pleased to submit this Environmental Assessment Registration Document for the Inglisville Road Pit Project in Annapolis County, Nova Scotia, for your review and consideration.

Please contact us should you require any additional information.

Sincerely,



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LIST OF ACRONYMS

AADT	Annual Average Daily Traffic
ACCDC	Atlantic Canada Conservation Data Centre
ARD	Acid rock drainage
ARIA	Archaeological Resource Impact Assessment
AGB	Above-ground dried biomass
AVFN	Annapolis Valley First Nation
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
CEA	Cumulative effects assessment
CEPA	Canadian Environmental Protection Act
CHSP	Canadian Housing Statistics Program
CH_4	Methane
CNWI	Canadian National Wetlands Inventory
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CO	Carbon monoxide

CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DFO	Fisheries and Oceans Canada
DO	Dissolved oxygen
ECCC	Environment and Climate Change Canada
EA	Environmental assessment
EPP	Environmental Protection Plan
ESA	Endangered Species Act
ESC	Erosion and sediment control
FBP	Function-Benefit Product
FHWA	Federal Highway Administration
GHG	Greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GPS	Global Positioning System
ha	Hectares
HPA	High Potential Area
IA	Industrial Approval
IAAC	Impact Assessment Agency of Canada
IBA	Important Bird Area
KMK	Kwilmu'kw Maw-klusuaqn
LAA	Local Assessment Area
LAeq	Equivalent A-weighted sound level (dBA)
Lpm	Litres per minute
LUB	Land Use Bylaw
MAPC	Maritime Aboriginal Peoples Council
masl	Metres above sea level
MBBA	Maritimes Breeding Bird Atlas
MLA	Member of the Legislative Assembly
MoCA	Municipality of the County of Annapolis
MPS	Municipal Planning Strategy
MRLU	Mineral Resource Land Use
Mt	Megatonnes
NGO	Non-governmental organization

NO	Nitrogen monoxide
NO_x	Nitrogen oxides
NO_2	Nitrogen dioxide
NSCCTH	Nova Scotia Communities, Culture, Tourism, and Heritage
NSECC	Nova Scotia Environment and Climate Change
NSHN	Nova Scotia Hydrographic Network
NSNRR	Nova Scotia Natural Resources and Renewables
OHS	Occupational health and safety
O_3	Ozone
PGI	Pellet Group Inventory
$PM_{2.5}$	Fine particulate matter (particles ≤2.5 µm)
PM_{10}	Coarse particulate matter (particles ≤10 µm)
PSL	Permissible Sound Level
RAA	Regional Assessment Area
SAR	Species at risk
SARA	Species at Risk Act
SOCI	Species of conservation interest
SO_2	Sulphur dioxide
SWPP	Source Water Protection Plan
TB	Total Biomass
TC	Total Carbon
TDS	Total dissolved solids
TSS	Total suspended solids
µm	Micrometres
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
USACE	U.S. Army Corps of Engineers
UTM	Universal Transverse Mercator
VEC	Valued ecosystem component
VOC	Volatile organic compound
WESP-AC	Wetland Ecosystem Services Protocol
WMP	Wildlife Management Plan
WNS	White-nose syndrome
WSS	Wetlands of Special Significance

LIST OF APPENDICES

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Appendix K: Complete Hourly Noise and Weather Data

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CHAPTER 1: EXECUTIVE SUMMARY

Fraxinus Environmental & Geomatics Limited has prepared this Environmental Assessment (EA) Registration Document on behalf of 3341581 Nova Scotia Limited (the Proponent) for the Inglisville Road Pit Project, a proposed new sand and gravel extraction operation located on Inglisville Road, West Inglisville, Annapolis County, Nova Scotia. The Project is intended to meet growing regional demand for high-quality aggregate, support local employment, and operate in compliance with provincial environmental standards. The Project will be privately funded.

The Project Site spans approximately 76 ha and will be developed progressively in 1-hectare (ha) operational blocks, to a maximum extraction area of 36 ha, over an anticipated operational lifespan of 20 to 30 years. The initial phase of development (Blocks 1-4) will comprise a 4.0 ha active footprint, with additional blocks developed and progressively reclaimed in sequence as the Project advances. The proposed operation is expected to support an annual production rate of approximately 50,000 tonnes.

The Project requires registration as a Class I Undertaking under the *Environment Act,* S.N.S. 1994-95, c. 1, and associated Environmental Assessment Regulations, given its anticipated scope and cumulative footprint over its operational life. The EA Registration Document has been prepared in accordance with applicable guidance documents, including *A Proponent's Guide to Environmental Assessment* (NSECC, 2025a).

The EA evaluates potential effects on a range of valued ecosystem components (VECs), including surface water and groundwater, wetlands, terrestrial and aquatic habitats, climate and air quality, soil and geology, economy and employment, land use, transportation, noise, dust, and human health. Cultural and heritage resources, including Mi'kmaq traditional land use, were also considered. A combination of desktop review, field assessments, and consultation with regulatory databases informed the analysis.

Engagement activities were carried out with the Mi'kmaq of Nova Scotia, relevant government departments and regulatory agencies, and local non-governmental organizations, community groups, and the public. Feedback received, including from the Blomidon Naturalists Society and the Lawrencetown Source Water Protection Plan (SWPP) Committee, raised considerations related to habitat, hydrology, groundwater protection, haul route safety, and noise. These issues have been assessed in this document, and mitigation measures are described where appropriate.

The assessment concluded that the Project is not expected to result in significant adverse environmental effects for any VEC assessed. While minor to moderate residual effects may occur for some VECs, such as fauna and terrestrial habitat, these will be limited in extent and duration and will be managed through established

mitigation and monitoring measures, including a Wildlife Management Plan and progressive reclamation. The cumulative effects assessment determined that the Project will not meaningfully contribute to regional environmental impacts when considered alongside other existing and foreseeable activities in the region.

With the implementation of proposed mitigation and monitoring, the Project is expected to proceed in an environmentally responsible manner that aligns with regional development priorities while minimizing environmental impact and supporting community interests.

CHAPTER 2: INTRODUCTION

2.1 PROJECT TITLE

The Project is titled the Inglisville Road Pit Project (the Project).

2.2 PROJECT PROPONENT

The Proponent for this Project is 3341581 Nova Scotia Limited (the Proponent), a locally owned and operated company based in Kingston, Nova Scotia, that will begin to provide aggregate for local excavation and construction projects throughout Annapolis County and surrounding areas. The Proponent is committed to environmentally responsible practices and ensuring compliance with all relevant environmental regulations and standards in Nova Scotia.

The Nova Scotia Registry of Joint Stocks information is provided in Appendix A. Contact information is provided below.

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2.3 PROJECT LOCATION

The Project, comprising PID 05062815, is located on Inglisville Road, in West Inglisville, Annapolis County, Nova Scotia, approximately 4 km south of Highway 1 (Drawing 2.3.1). The majority of the Project lies within the South Mountain ecodistrict (Ecodistrict 720), and a small portion of the central-eastern area lies within the Valley Slope ecodistrict (Ecodistrict 710; Drawing 2.3.2). The Project Site spans approximately 76 ha and is situated in a predominantly rural area with mixed land use, including residential, agricultural, and forested areas (Drawing 2.3.3).

2.4 PROJECT OBJECTIVE AND SCOPE

The primary objective of the Project is to support the establishment of a sand and gravel extraction operation to meet local and regional demand for aggregate materials.

The scope of the Project includes site preparation, sand and gravel extraction, processing through screening and occasional crushing, stockpiling of materials, and progressive site reclamation to minimize long-term environmental effects.

The Project aims to:

- Support the supply of aggregate materials to local markets;
- Operate in compliance with provincial environmental standards;
- Implement best practices for minimizing environmental impact; and
- Reclaim the site to ensure safety and environmental integrity compatible with the surrounding environment.

2.5 PROJECT NEED AND JUSTIFICATION

The demand for high-quality sand and gravel has increased significantly due to ongoing infrastructure development in Nova Scotia. The Project is justified based on the following factors:

- Availability of high-quality sand and gravel deposits at the Project location.
- Proximity to major markets, reducing transportation emissions and costs.
- Contribution to the local economy through job creation and business opportunities.

This Project aligns with regional development goals while prioritizing local employment opportunities, environmental stewardship, and community engagement.

2.6 REGULATORY CONTEXT

The Project is subject to the environmental assessment (EA) requirements outlined in the *Environment Act,* S.N.S. 1994-95, c. 1. The assessment follows the guidelines set out in *A Proponent's Guide to Environmental Assessment* (NSE, 2017), *A Proponent's Guide to Environmental Assessment* (NSECC, 2025a), and the *Pit and Quarry Guidelines* (NSEL, 2003) to ensure thorough evaluation and transparency, as well as compliance with the Province of Nova Scotia's EA requirements.

The regulatory context that is specific to each valued ecosystem component (VEC) will be discussed in subsequent sections.

2.7 STRUCTURE OF THE ENVIRONMENTAL ASSESSMENT

This EA is structured to provide a detailed evaluation of the potential impacts of the Project, including proposed mitigation measures, as well as residual and cumulative environmental effects. The document is organized as follows:

- **Chapter 1 - Executive Summary:** Summary of key findings.
- **Chapter 2 - Introduction:** Overview of the Project and its context.
- **Chapter 3 - Proponent Information:** A description of the Proponent.
- **Chapter 4 - Description of the Undertaking:** A detailed description of the Project and associated activities during the different phases of development, including site preparation, extraction, and reclamation activities.
- **Chapter 5 - Valued Ecosystem Component Identification:** Identification of key VECs for consideration.
- **Chapter 6 - Engagement:** Summary of engagement activities with the public and key stakeholders, including the Mi'kmaq and regulatory agencies.
- **Chapter 7 - Baseline Environmental Conditions:** Baseline data on the VECs, including biophysical, socioeconomic, cultural and heritage resources, and human health and well-being.
- **Chapter 8 - Effects of the Project on the Environment:** Analysis of environmental effects, description of mitigation measures, identification of cumulative and residual effects, description of reclamation measures, and adaptive management. The spatial and temporal boundaries and criteria by which environmental effects will be assessed will be described further in Chapter 8 and will be specific to each VEC.
- **Chapter 9 - Cumulative Environmental Effects:** Assessment of whether the Project's residual environmental effects may interact with those of other past, present, or reasonably foreseeable projects or activities, potentially resulting in cumulative impacts on the VECs.
- **Chapter 10 - Effects of the Environment on the Project:** Analysis of potential environmental effects and risks, including climate change considerations and mitigation measures.
- **Chapter 11 - Emergency and Risk Management:** Identification of risks and descriptions of emergency response plans, mitigation measures, and contingency response plans.

- **Chapter 12 - Additional Approvals, Authorizations, and Funding Sources:** Summary of additional approvals and authorizations required to proceed with the Project. This chapter also identifies the source of funding for the Project.
- **Chapter 13 - Conclusion:** Final conclusions and recommendations.
- **Chapter 14 - Closure:** Closure and Project Team.
- **Chapter 15 - References:** Reference list.

2.8 SPATIAL AND TEMPORAL BOUNDARIES

Spatial and temporal boundaries that will be used throughout this assessment are defined below:

Spatial Boundaries and Terms

- **Project Site** - The areas owned or leased by the Proponent to develop the Project (i.e., PID 05062815).
- **Project Area** - The area immediately surrounding the Project Site, including portions of neighbouring properties.
- **Project Footprint** - The area of ground disturbance associated with the Project. For Phase 1 of operations, the Project Footprint is strictly defined as the 4.0 ha area encompassing Blocks 1 through 4 (see Appendix B). Future operational footprints (Blocks 5 and beyond) will be developed progressively over the 20-to-30-year lifespan of the Project, to a maximum extraction area of 36 ha (36 one-hectare blocks) within the Project Site, ensuring that the active disturbed area at any single point in time remains minimized.
- **Project Region** - The broader area of the Project (i.e., the Annapolis Valley from Annapolis Royal to Greenwood).
- **Local Assessment Area (LAA)** - The area used in the environmental effects assessment where the Project has a direct impact. This will be specific to each VEC identified.
- **Regional Assessment Area (RAA)** - The area used in the environmental effects assessment where the Project has an indirect impact. This will be specific to each VEC identified.

Temporal Boundaries and Terms

- **Land Preparation** - The pre-operational phase of the Project, during which land is prepared for Project operations. This includes vegetation clearing and any necessary site preparation.

- **Operation** - The operational phase of the Project, which includes activities such as aggregate extraction, processing, and stockpiling.
- **Decommissioning and Reclamation** - The post-operational phase of the Project, which includes decommissioning and land reclamation activities such as land grading, topsoil dispersion, and revegetation.
- **Post-Reclamation** - The phase after all Project activities have been completed.

2.9 ENVIRONMENTAL ASSESSMENT CONCORDANCE

Table 2.1 identifies where each of the 18 minimum requirements under Section 9(1A)(b) of the Environmental Assessment Regulations is addressed within this document, to support Nova Scotia Environment and Climate Change's (NSECC) review of this EA Registration Document for completeness.

Table 2.1: Concordance with EA Registration Requirements

#	Requirement (9(1A)(b))	Document Location	Page #
i	Name of the proposed undertaking	Section 2.1 (Project Title)	3
ii	Location of the proposed undertaking	Section 2.3 (Project Location); Section 4.2 (Location and Site Details)	3; 10-11
iii	Name, address, and identification of the proponent	Section 2.2 (Project Proponent)	3
iv	List of contact persons and their contact information	Section 2.2 (Project Proponent)	3
v	Name and signature of CEO / signing authority	Section 2.2 (Project Proponent)	3
vi	Nature and sensitivity of the surrounding area	Section 4.2 (Location and Site Details); Chapter 7 (Baseline Environmental Conditions)	10-11; 34-142
vii	Purpose and need for the undertaking	Section 2.4 (Project Objective and Scope); Section 2.5 (Project Need and Justification)	4
viii	Proposed construction and operation schedules	Section 4.1 (Overview); Section 4.6 (Project Timeline)	10; 15
ix	Description of the proposed undertaking	Chapter 4 (Description of the Undertaking)	10-18
x	Environmental baseline information	Chapter 7 (Baseline Environmental Conditions)	34-142
xi	Licenses, certificates, permits, approvals required	Chapter 12 (Additional Approvals, Authorizations, and Funding Sources)	262
xii	Sources of public funding	Chapter 12 (Additional Approvals, Authorizations, and Funding Sources)	262
xiii	Steps taken to identify public/Mi'kmaq concerns	Chapter 6 (Engagement)	22-33
xiv	List of concerns expressed by public/Mi'kmaq	Section 6.1, 6.2, 6.3 ("Summary of Comments and Issues Raised"); Table 6.4	22-33
xv	Steps taken to address those concerns	Table 6.4; Chapter 8 (mitigation measures throughout)	30-33; 143-243
xvi	Climate-change-related environmental effects (positive	Section 7.1.7; Section 8.1.7; Section 10.1	91-100;

#	Requirement (9(1A)(b))	Document Location	Page #
	and adverse)		194-197; 256
xvii	Plain-language summary	See separate Plain Language Summary document	N/A
xviii	Environmental effects (positive and adverse)	Chapter 8 (Effects of the Project on the Environment); Chapter 9 (Cumulative Environmental Effects)	143-243; 244-255

CHAPTER 3: PROPONENT INFORMATION

3.1 DESCRIPTION OF THE PROPONENT

3341581 Nova Scotia Limited is a locally owned and operated company based in Kingston, Kings County, Nova Scotia, with experience in aggregate extraction and land rehabilitation. The Proponent is committed to compliance with applicable regulatory requirements and the implementation of environmentally responsible practices. The Proponent is seeking to establish a new sand and gravel extraction operation to supply aggregate materials to local and regional markets, supporting construction and infrastructure needs throughout Annapolis County and surrounding areas.

3.2 PROPONENT'S COMMITMENT TO ENVIRONMENTAL MANAGEMENT

The Proponent is committed to environmental stewardship and regulatory compliance. The Proponent integrates practical expertise with best practices to ensure safety, minimal environmental impact, and full regulatory compliance. This commitment includes implementing proactive measures to mitigate potential impacts, developing ongoing monitoring programs, and employing adaptive management strategies to address unforeseen challenges. The Proponent also conducts regular consultations with neighbouring landowners to ensure open communication and collaboration. The Proponent prioritizes transparency and collaboration with stakeholders, including Mi'kmaq communities, adjacent property owners, and nearby community members, to foster shared environmental goals and address concerns effectively. To support respectful and informed engagement with Mi'kmaq communities, the Proponent's President completed an online Indigenous awareness course in October 2026.

3.3 ORGANIZATIONAL STRUCTURE AND RESOURCES

3341581 Nova Scotia Limited will employ two full-time and two seasonal staff members and operate under the leadership of Craig Parsons, the company's President. The organizational structure follows a linear model, enabling clear communication and efficient decision-making.

The Proponent is well-equipped to execute the Project, delivering it in an environmentally responsible manner with a focus on sustainable land use and regulatory compliance. To support environmental survey services, the Proponent has retained the expertise of Fraxinus Environmental & Geomatics Limited (Fraxinus) and DeWolfe & Morse Surveying Limited, ensuring thorough and professional environmental assessments for the Project.

CHAPTER 4: DESCRIPTION OF THE UNDERTAKING

4.1 OVERVIEW

The proposed undertaking involves the development and operation of the Project, a new sand and gravel extraction facility located in West Inglisville, Nova Scotia. The Project aims to supply high-quality sand and gravel for local construction and infrastructure projects in the Annapolis Valley region and around Nova Scotia. This operation will provide the necessary materials to support economic growth and community development while maintaining a commitment to environmental stewardship. The Project Site encompasses approximately 76 ha and is located on lands owned by the Proponent on Inglisville Road, Annapolis County, Nova Scotia, comprising PID 05062815. To minimize the active disturbed footprint and align with progressive reclamation standards, the Project is designed around 1-hectare (ha) operational blocks, with a maximum of 36 blocks (36 ha) of extraction area over the life of the Project. The initial phase of development and active extraction will be strictly confined to Blocks 1 through 4, representing a total initial active footprint of 4.0 ha. Progressive reclamation will be implemented as areas are completed and phased out of active use. The Project is proposed to be developed in stages over an anticipated operational lifespan of approximately 20 to 30 years. The proposed operation is expected to support an annual production rate of approximately 50,000 tonnes.

4.2 LOCATION AND SITE DETAILS

The Project Site spans approximately 76 ha, centred at approximately 331140 m E, 4967297 m N (UTM zone 20N), or 44.839682° N, 65.137176° W. The Project Site is situated in a predominantly rural area with mixed land use, including residential, agricultural, and forested areas. The Project Site is located on Inglisville Road, in West Inglisville, Annapolis County, Nova Scotia, approximately 3 to 4 km south of the Village of Lawrencetown and 12 km southwest of the Town of Middleton. Highway 101 lies approximately 6 km north of the Project Site, and Highway 1 (the Evangeline Trail) lies approximately 3.7 km north. The Project Site is accessed via a private driveway connecting to Inglisville Road.

The Project Site lies within two ecodistricts: the majority of the Project Site lies within Ecodistrict 720 (South Mountain), and a small portion of the central-eastern area lies within Ecodistrict 710 (Valley Slope). Further, the Project Site is located within the Annapolis River Primary and Secondary Watersheds. Surface water features within and adjacent to the Project Site include watercourses and wetland habitat.

The Project Site itself (PID 05062815) has a history of commercial resource use, primarily dominated by industrial forestry. While the subject property is currently undeveloped for commercial aggregate extraction, physical ground reconnaissance and archaeological surveys conducted as part of an Archaeological Resource Impact Assessment (ARIA) under Heritage Research Permit A2025NS056 confirmed localized past mechanical

disturbance on-site. The primary historic aggregate pit workings are situated on the adjacent property (PID 05140058) near the northern Project boundary.

Historical disturbance observed within the actual Project Site is primarily limited to historic logging roads, old bulldozer soil mounds, and weathered woods roads traversing the parcel. Weathering and vegetative regrowth indicate that these localized forestry activities and the adjacent aggregate workings have been inactive for more than a decade.

In addition to these past workings, the Project Site has been repeatedly harvested for timber, with the most recent intensive commercial harvest occurring approximately 20 years ago. Consequently, the vast majority of the site does not support mature, undisturbed forest, but is instead dominated by highly fragmented, early successional regenerating mixedwood forest. Siting the Project within this previously harvested footprint and utilizing the existing access roads significantly minimizes the Project's overall environmental impact compared to developing a mature, undisturbed greenfield site.

4.3 PROJECT COMPONENTS

Key components of the undertaking include:

- **Extraction Areas:** Defined zones for sand and gravel extraction within the Project Site, as shown on Drawing 4.3.1. The extraction area will comprise a maximum of 36 one-hectare blocks (36 ha) over the life of the Project. To align with progressive reclamation standards, extraction will be developed in a phased manner using 1-hectare operational blocks. Initial extraction activities under this application will be strictly limited to a 4.0 ha active footprint comprising Blocks 1-4. Progressive reclamation will be implemented concurrently as these initial blocks are depleted, allowing future block developments (Blocks 5 and beyond) to proceed systematically while keeping the total active, unreclaimed area minimized throughout the 20-to-30-year lifespan of the Project.
- **Material Processing:** On-site processing activities may include screening and occasional crushing of aggregate materials using mobile equipment. Processing methods will be tailored to Project needs and market demand. Aggregate washing is not currently proposed but may be considered in the future, subject to applicable regulatory approvals.
- **Site Equipment:** Typical equipment that will be used at the site includes the following:
    - Excavators
    - Front-end loaders (equipped with integrated wheel loader scales for product weighing)
    - Mobile jaw crusher
    - Mobile cone crusher

- Mobile screeners
- Haul trucks (on-site and off-site transport)
- Dozers
- Graders
- Other support vehicles (e.g., water truck for dust control)

Product weighing will be conducted using wheel loader scales integrated with the front-end loaders, eliminating the need for a permanent weigh station. Equipment may be stored on site during off-season periods. No permanent structures are proposed for the Project Site.

- **Product Stockpiling Areas:** Designated areas within the Project Site will be used for the temporary stockpiling of sand, gravel, and other aggregate products generated through extraction and processing activities.

- **Reclamation Material Stockpiling Areas:** Native topsoil and organic materials salvaged during site preparation will be stockpiled for use in progressive reclamation activities. Grubbings and woody debris may also be stockpiled and managed in accordance with applicable regulatory requirements, with material reused where feasible to support site rehabilitation.

- **Access Roads:** Access to the Project Site is currently provided via an existing private access road connecting to Inglisville Road, which will be maintained and, where necessary, upgraded to support Project operations. The existing roadside slopes descending toward on-site watercourses are currently stable; should any localized road upgrades or maintenance be required in these areas, works will be planned and executed using standard erosion and sediment control (ESC) mitigations to preserve slope stability and protect downstream water quality.

- **Water Management Systems:** Surface water management measures will be implemented to manage runoff and reduce erosion and sedimentation. Stormwater is anticipated to be managed through on-site drainage features and infiltration into native soils, as appropriate. Excavation activities will remain at least 1 m above the groundwater table. ESC measures will be implemented as required during site development and operation.

- **Environmental Protection Measures:** Vegetated buffers will be maintained around identified watercourses in accordance with applicable regulatory requirements. ESC measures will be implemented as required during site development and operation. Berms will be constructed around the pit area and will be incorporated in future expansion areas where the Project abuts neighbouring property lines for safety and noise abatement. Dust control measures may include the application of water and approved chloride mixtures using a water truck on access roads and active work areas, as

required during operations.

A detailed illustration of the Project footprint and proposed operational layout is provided in Appendix B (Reclamation Plan).

4.4 ACTIVITIES

The primary activities associated with the Project include:

- **Site Preparation:** Clearing vegetation and grading land within areas proposed for aggregate extraction and stockpiling. Organic materials and topsoil may be salvaged for use in progressive reclamation.
- **Extraction Operations:** Using mechanical equipment such as excavators, trucks, and loaders to extract sand and gravel and transport it to mobile processing units.
- **Processing:** Sorting and screening extracted materials to meet aggregate product specifications using mobile processing units. Sand will be filtered and graded, while stones will be crushed using mobile processing units to create the desired aggregate material size. Aggregate washing is not currently proposed but may be considered in the future, subject to applicable regulatory approvals.
- **Stockpiling:** Temporary storage of sand, gravel, crusher dust, and salvaged topsoil on-site. Organic materials, woody debris, and grubbings may be stockpiled and managed to support reclamation activities.
- **Aggregate Quantification:** Products will be measured by weight using wheel loader scales prior to sale.
- **Transportation:** Hauling materials to markets throughout western Nova Scotia, including the Annapolis Valley and South Shore regions, using trucks or semi-trailer trucks as required. Approximately half of production is anticipated to be distributed to the South Shore (e.g., Lunenburg and Shelburne counties) via Highway 103, with the remainder distributed among the Annapolis Valley and other western counties (e.g., Yarmouth, Digby, Annapolis, Kings, and Hants) via Highway 101. Some aggregate may be sold in the Halifax area as well, depending on business opportunity.
- **Site Reclamation:** Grading slopes, distributing stockpiled overburden, seedbank and organic materials, and re-vegetating exposed areas.

4.5 ALTERNATIVES CONSIDERED

The Project involves the development of a new sand and gravel pit at a location that has been evaluated and determined to be the most viable and environmentally suitable option. The Proponent considered the "no development" alternative, as well as the development of a pit at an alternative location, but determined that the proposed Project Site represents the most practical and responsible approach based on the following key factors:

- **Land Ownership and Availability:** The Proponent holds ownership of the Project Site, eliminating the need for new land acquisition and the associated environmental and socioeconomic impacts of evaluating and developing an entirely unfamiliar parcel.

- **Geological Suitability:** The presence of suitable sand and gravel deposits at the Project Site makes it an optimal location for extraction. As shown on Drawing 7.1.9.1 (Surficial Geology), the Project Site is underlain by glaciofluvial and till deposits (Section 7.1.9), surficial materials commonly associated with sand and gravel resources used for aggregate extraction elsewhere in the region. Identifying an alternative location with comparable deposit quality and volume would require extensive site investigation and potentially significant land disturbance.

- **Existing Site Access:** A well-established access road traverses the Project Site, reducing the need for new access infrastructure construction and the associated environmental disturbance that would accompany development at a greenfield location.

- **Previously Harvested and Modified Land:** The Project Site's terrestrial habitat is already highly fragmented by past commercial resource use. The property is traversed by pre-existing logging roads and mechanically modified trails, and the baseline vegetation consists of a young, regenerating forest harvested approximately 20 years ago. The broader area, including land in the immediate vicinity of the Project Site, has an established history of aggregate extraction, including a former aggregate pit located on the adjacent property (PID 05140058). Choosing a previously harvested and modified parcel, while focusing extraction away from mature forest stands and utilizing existing access infrastructure, significantly minimizes the Project's overall ecological footprint.

- **Rural Setting:** The Project Site is situated in a predominantly rural area, minimizing potential conflicts with sensitive land uses and receptors that may be associated with pit development in more densely populated areas.

4.6 PROJECT TIMELINE

The Project is proposed to be developed in stages over an anticipated operational lifespan of approximately 20 to 30 years. The exact lifespan of the Project will be dependent on commercial opportunities and demand for aggregate.

Progressive reclamation will occur throughout the life of the Project, ensuring that disturbed areas are restored in a phased manner. Upon completion of pit operations, final decommissioning and site rehabilitation will be carried out, with ongoing monitoring to confirm the effectiveness of reclamation measures. Once pit operations cease, decommissioning activities will be completed within two years. Reclamation activities may extend beyond decommissioning as the site undergoes monitoring, with final completion anticipated within five years of closure.

4.7 RECLAMATION AND CLOSURE

Reclamation activities will be implemented concurrently with extraction through a program of progressive reclamation managed systematically in phases, utilizing the proposed 1-hectare operational block layout (Appendix B). While the site layout is mapped using 1-hectare blocks to facilitate precise sequencing and resource tracking, physical reclamation activities will be executed in larger, operationally practical phases – typically reclaiming groups of completed blocks (such as the initial Blocks 1 through 4 phase) concurrently. As extraction in a designated group of blocks is completed, those areas will be progressively graded, contoured, and stabilized as active operations transition into the subsequent block phase. This progressive approach ensures that the active, unreclaimed disturbed footprint is strictly minimized throughout the 20-to-30-year operational lifespan of the Project, while maintaining necessary operational area for heavy equipment and stockpiles.

To support these progressive reclamation efforts, topsoil, organic material, and woody debris will be systematically salvaged during site preparation and stockpiled in designated areas. Salvaged native topsoil and organic materials will be managed carefully to preserve the local seed bank for reuse during progressive revegetation. Some woody debris may be managed through controlled burning to enrich topsoil stockpiles and promote successful soil conditioning prior to spreading.

Progressive reclamation measures will be refined over time and formally incorporated into future applications or amendments to the site's Industrial Approval (IA), as required, to reflect changes in active extraction areas and the rehabilitation of completed pit areas. Reclamation activities will return disturbed areas to a stable geological condition that supports forest habitat and is compatible with surrounding land uses and the natural environment.

The majority of the site is expected to be re-naturalized following completion of extraction activities, allowing native forested vegetation to re-establish and supporting long-term ecological function. However, portions of the

Project Site may be considered for alternative future development, subject to future planning and regulatory approvals.

Upon the permanent cessation of extraction activities, decommissioning activities will be completed within two years, with final reclamation monitoring anticipated within five years of closure. Final closure activities will include the complete removal of mobile equipment, final grading and slope stabilization, re-vegetation of remaining disturbed areas, and post-closure monitoring to confirm the long-term effectiveness of the reclamation and stabilization measures. Additional details regarding specific environmental mitigations and monitoring are provided in subsequent chapters of this registration document.

4.8 SOCIOECONOMIC AND ENVIRONMENTAL BENEFITS

The Project will provide numerous benefits, including:

- **Economic Contributions:** The Project will employ two full-time and two seasonal staff members, providing stable employment opportunities. Additionally, the Project will support local businesses through the procurement of goods and services required for operations, such as equipment maintenance, fuel supply, and transportation. The Project will also seek to create employment opportunities for Mi'kmaq communities, fostering inclusive economic participation.

- **Material Supply:** The Project will supply high-quality sand and gravel essential for construction and infrastructure projects. The availability of these materials supports regional growth and development.

- **Environmental Stewardship:** The Proponent, through their execution of the Project, aims to implement best practices to mitigate environmental impacts. The Project is committed to regulatory compliance, ensuring all activities adhere to provincial and federal environmental standards. Additionally, the Project will integrate biodiversity conservation measures, such as habitat preservation and progressive reclamation, to support local ecosystems. Sustainable development practices will be incorporated to balance economic growth with environmental responsibility, ensuring long-term resource stewardship and minimal ecological disruption.

- **Community Support:** The Project will make positive contributions to local infrastructure development and regional growth. Beyond economic impacts, the Proponent is dedicated to ongoing community engagement and strengthening long-term collaborative relationships with Mi'kmaq partners and local stakeholders.

4.9 COMPLIANCE AND ENVIRONMENTAL PROTECTION MEASURES

To ensure compliance with environmental regulations, the Project will incorporate:

- **Environmental Monitoring and Management Plans:** Erosion and sediment controls and slope stability will be inspected on a routine basis and following significant precipitation events, with maintenance undertaken as required. Surface water and groundwater conditions will be monitored through the Surface Water Monitoring Plan and the Groundwater Management and Monitoring Plan (Section 8.1.1), and contingency plans for emergencies will be developed and implemented to ensure regulatory compliance.

- **Water Resource Protection:** Measures will be taken to manage water conditions and prevent contamination, including property stormwater management systems, a Spill Response and Contingency Plan, and adherence to all applicable water quality protection requirements.

- **Dust and Noise Management:** Dust suppression techniques, including the application of water, lignin-based solutions, and/or chloride mixtures, will be utilized on roads and processing areas. Noise will be managed through restricted production hours (7:00 AM to 7:00 PM), retained forest buffers, equipment siting and maintenance, and, if additional attenuation is needed, earth berms or acoustic barriers, in support of compliance with provincial noise guidelines.

- **Regulatory Compliance:** All activities will be conducted in accordance with Nova Scotia's environmental regulations and permitting requirements, including the terms and conditions of operations and EA approvals.

Additional details on specific mitigation, monitoring, and management strategies will be provided in subsequent chapters.

4.10 ALIGNMENT WITH PROVINCIAL PRIORITIES

The Project aligns with provincial priorities for sustainable resource development, economic growth, housing development, renewable energy, and employment creation, including opportunities for Mi'kmaq communities. It supports Nova Scotia's goals for responsible resource management and contributes to the long-term well-being of local communities.

The Project will provide direct economic benefits by employing two full-time and two seasonal staff members and supporting local businesses through the procurement of goods and services such as equipment maintenance, fuel supply, and transportation. The Project contributes to construction and infrastructure development by supplying sand and gravel materials to markets throughout western Nova Scotia, including the South Shore and the Annapolis Valley and other western counties, as well as potentially the Halifax area, supporting ongoing construction and infrastructure needs throughout the region. In addition to supporting local construction and infrastructure needs, the Project's aggregate materials may also support renewable energy and

green infrastructure development in the region, further contributing to Nova Scotia's climate and sustainability goals.

In addition to economic and infrastructure contributions, the Project is committed to sustainable environmental practices. It integrates biodiversity conservation measures, regulatory compliance, and sustainable development strategies to balance economic growth with long-term environmental responsibility. By adhering to strict environmental management practices, the Project ensures that resource development is conducted responsibly and sustainably, supporting both economic progress and ecological integrity.

CHAPTER 5: VALUED ECOSYSTEM COMPONENT IDENTIFICATION

VECs refer to environmental, socioeconomic, cultural, and human health features that may be affected, positively or negatively, by a proposed undertaking. These components are identified based on their ecological, economic, social, and cultural significance, including their importance to local communities, regulatory agencies, and the Mi'kmaq. The following VECs have been identified based on the Project's anticipated environmental interactions:

BIOPHYSICAL ENVIRONMENT: The following VECs have been identified:

- **Surface Water and Groundwater:** The quality, quantity, and hydrological functions of water resources within and around the Project Area.
- **Wetlands:** The presence, function, and potential impact on wetland ecosystems.
- **Flora, Fauna, and Terrestrial Habitat:** The diversity and abundance of plant and animal species, including any species at risk (SAR) and their habitats.
- **Fish and Aquatic Habitat:** Waterbodies supporting aquatic life and the potential impacts of the Project on fish populations and their habitats.
- **Climate Change, Air Quality, and Atmospheric Conditions:** The potential effects of the Project on climate change, air quality, and the atmospheric environment, including greenhouse gas (GHG) emissions, dust and other emissions, and other airborne contaminants.
- **Soil and Geology:** Potential impacts on soil stability, erosion, sedimentation, and the geological environment.

SOCIOECONOMIC ENVIRONMENT: The following VECs have been identified:

- **Local Economy, Labour Force, and Employment:** Economic benefits and potential impacts on local businesses and workforce.
- **Land Use and Property Values:** Potential changes to land use patterns and property values in the surrounding area.
- **Transportation and Infrastructure:** Impacts on local and regional road networks, traffic volume, and infrastructure.
- **Recreation and Tourism:** Effects on outdoor recreational activities and local tourism attractions.

CULTURAL & HERITAGE RESOURCES: The following VECs have been identified:

- **Archaeological Resources and Historical Sites:** The presence of significant cultural heritage resources and features, as well as potential impacts on these sites.
- **Mi'kmaq Cultural Resources:** Areas of importance to Mi'kmaq communities, including traditional land use, cultural resources and cultural practices.

HUMAN HEALTH & WELL-BEING: The following VECs have been identified:

- **Noise Levels:** Noise levels generated by the Project and their effect on local populations.
- **Dust and Emissions:** Dust levels and other emissions generated by the Project and their effect on local populations.
- **Safety and Community Well-Being:** Potential disruptions to local communities and public safety, including quality of life and access to essential services.

Each VEC will be assessed in detail. Baseline conditions for each VEC will be described in Chapter 7, while Chapter 8 will apply the environmental effects assessment framework to determine potential environmental effects, identify mitigation measures, and establish monitoring protocols.

5.1 ASSESSMENT OF WILDLIFE SPECIES

Wildlife species, including birds, mammals, fish and other aquatic species, and plants, were assessed following the *Guide to Addressing Wildlife Species and Habitat in an EA Registration Document* (NSE, 2008). Particular attention was given to SAR, as listed under the *Species at Risk Act* (SARA) and/or the *Endangered Species Act,* S.N.S. 1998, c. 11 (ESA), as well as species of conservation interest (SOCI). In this EA Registration Document, SOCI refers to species that meet the following criteria:

- Designated as 'Endangered', 'Threatened', or 'Special Concern' by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) but not yet listed under SARA; and/or
- Assigned a subnational rank (S-Rank) in Nova Scotia of 'S3', 'S2', or 'S1', and variants thereof (i.e., S1S3, S3S4) by the Atlantic Canada Conservation Data Centre (ACCDC). For this assessment, species assigned an S-Rank of S3S4 are treated as SOCI.

SAR and their habitats receive legal protection under SARA as well as the ESA and the *Biodiversity Act,* S.N.S. 2021, c. 3, if provincially listed.

Priority species are SAR that were observed to occur on the Project Site, or that have a high potential of occurring on the Project Site based on the presence of habitat that directly supports SAR (e.g., breeding habitat, nesting habitat, foraging habitat, etc.).

CHAPTER 6: ENGAGEMENT

6.1 ENGAGEMENT WITH THE MI'KMAQ OF NOVA SCOTIA

Engagement has been initiated with Mi'kmaq First Nations communities and provincial Indigenous organizations to provide information about the proposed Project and to offer opportunities for feedback during Project planning. Communications have been focused on providing transparency, sharing the Project Description, and inviting questions, concerns, or requests for further discussion.

On April 20, 2026, formal letters and a Project Description were distributed via email to the Chiefs and administrative contacts of 13 Mi'kmaq First Nations in Nova Scotia, the Native Council of Nova Scotia, the Kwilmu'kw Maw-klusuaqn (KMK), and the Maritime Aboriginal Peoples Council (MAPC). These communications invited feedback, outlined the purpose and scope of the proposed Project, and offered to arrange meetings to discuss the Project further. Following this outreach, a virtual meeting was held with representatives from MAPC on April 27, 2026, to discuss the Project details and archaeological considerations.

Table 6.1 summarizes engagement activities conducted to date with Mi'kmaq First Nations and Organizations.

Table 6.1: Summary of Engagement to Date with Mi'kmaq First Nations and Organizations

First Nation / Organization	Contacted Parties	Stakeholder Category	Summary
Wasoqopa'q (Acadia) First Nation	Chief Deborah Robinson	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
Annapolis Valley First Nation	Chief Rodney Peterson	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback. Response received the same day, indicating the materials were forwarded to council for input. June 9, 2026 Brochure sent via email to advertise upcoming Open House.
L'sitkuk (Bear River) First Nation	Chief Carol Dee Potter	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback. June 9, 2026 Brochure sent via email to advertise upcoming Open House.

First Nation / Organization	Contacted Parties	Stakeholder Category	Summary
Eskasoni First Nation	Chief Leroy Denny	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
Glooscap First Nation	Chief Sidney Peters	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback. June 9, 2026 Brochure sent via email to advertise upcoming Open House.
Membertou First Nation	Chief Terrance Paul	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
Millbrook First Nation	Chief Robert Gloade	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
Paqtnkek Mi'kmaw Nation	Chief Cory Julian	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
Pictou Landing First Nation	Chief Tamara Young	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
Potlotek First Nation	Chief Wilbert Marshall	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
Sipekne'katik First Nation	Chief Michelle Glasgow	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
Wagmatcook First Nation	Chief Norman Bernard	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
We'koqma'q First Nation	Chief John L. Bernard	Mi'kmaq First Nation	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
Native Council of Nova Scotia	Chief and President Lorraine Augustine	Indigenous Organization	April 20, 2026 Project Description and engagement letter sent via email to

First Nation / Organization	Contacted Parties	Stakeholder Category	Summary
			introduce the Project and invite feedback. June 9, 2026 Brochure sent via email to advertise upcoming Open House.
Kwilmu'kw Maw-klusuaqn (KMK)	Director of Consultation Twila Gaudet	Mi'kmaw Treaty Advisory Body	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
Maritime Aboriginal Peoples Council (MAPC)	Vanessa Mitchell, Christina Davis	Indigenous Organization	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback. MAPC responded April 21, requesting a meeting. April 27, 2026 Virtual meeting held. No major concerns were raised, though MAPC recommended additional shovel testing near any High Potential Areas (HPAs) for high archaeological potential identified on site if additional ground disturbances are anticipated. June 9, 2026 Brochure sent via email to advertise upcoming Open House.

Follow-up with First Nations communities and organizations will continue to confirm receipt of Project information, arrange meetings, and address any questions or concerns. All feedback received will be carefully considered and integrated into the planning and development of the Project.

Summary of Comments and Issues Raised: During the virtual meeting held with MAPC, no major project concerns were raised; however, MAPC recommended that shovel testing be conducted if ground disturbances are anticipated near any HPA identified on site. This recommendation has been noted and integrated into the Project's archaeological mitigation strategy.

6.2 ENGAGEMENT WITH GOVERNMENT DEPARTMENTS AND REGULATORY AGENCIES

Engagement has been initiated with provincial government departments and municipal governments near the Project Site to provide information about the proposed Project and to solicit feedback. Communications have focused on transparency and providing opportunities for comments prior to EA registration.

On April 20, 2026, formal letters and a Project Description were distributed via email to representatives of the Municipality of the County of Annapolis (MoCA), the Village of Lawrencetown, the Town of Bridgetown, the Town of Middleton, and the local Member of the Legislative Assembly (MLA). Virtual meetings were subsequently held with MoCA planning staff on April 30, 2026, and with NSECC on May 13, 2026, to discuss zoning, source water protection, and regulatory scope.

Table 6.2 summarizes engagement activities conducted to date with government departments and regulatory agencies.

Table 6.2: Summary of Engagement to Date with Government Departments and Regulatory Agencies

Organization	Contacted Parties	Stakeholder Category	Summary
Nova Scotia Environment and Climate Change, Environmental Assessment Division	Paula Francis, Brent Jackson, Jeremy Higgins	Provincial Government	May 1, 2026 NSECC extended an invitation for an EA kickoff meeting. May 13, 2026 Virtual meeting held. A summary of the Project was presented, and feedback was solicited regarding source water protection, ecological assessments, and surface water/groundwater management requirements. May 14, 2026 Follow-up email received from Jeremy Higgins providing EA registration requirements and timelines.
Municipality of the County of Annapolis (MoCA)	Linda Bent, Barbara Boateng	Municipal Government	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback. April 30, 2026 Virtual meeting held. Discussed municipal bylaw and zoning compliance, the definition of “structures” regarding planned equipment, and prioritized source water protection for the Village of Lawrencetown. May 1, 2026 Follow-up email received from Barbara Boateng detailing zoning definitions, the Land Use Bylaw, and the rezoning process. June 9, 2026 Brochure sent via email to advertise upcoming Open House.

Organization	Contacted Parties	Stakeholder Category	Summary
Village of Lawrencetown	Melissa Roscoe, Brian Reid	Municipal Government	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback. A phone call was received regarding heavy truck routing and potential impacts on Village water mains. April 27, 2026 Follow-up email sent regarding the Lawrencetown Municipal Water Supply Area. Response received on May 4, stating they are reviewing the documents with their engineer and provincial engineers as it pertains to their Source Water Protection Plan. June 9, 2026 Brochure sent via email to advertise upcoming Open House.
Town of Bridgetown	Andy Kerr	Municipal Government	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback. Responded April 20, clarifying that the town falls under the jurisdiction of the County of Annapolis. June 9, 2026 Brochure sent via email to advertise upcoming Open House.
Town of Middleton	Mayor Gail Smith, Sara Marceau	Municipal Government	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback. Responded April 20, directing inquiries to the County of Annapolis. June 9, 2026 Brochure sent via email to advertise upcoming Open House.
Nova Scotia House of Assembly	MLA David Bowlby	Provincial Government	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.

Engagement with relevant regulatory agencies and municipal governments will continue throughout Project planning and development. All feedback received will be reviewed and considered by the Proponent.

Summary of Comments and Issues Raised: Feedback from municipal and provincial regulators has primarily focused on zoning compliance, source water, and site management. Both MoCA and the Village of Lawrencetown flagged source water protection as a top priority, with the Village and the Lawrencetown Source Water

Protection Plan (SWPP) Committee reviewing the Project to ensure alignment with their Source Water Protection Plan. Additionally, early public inquiries routed through the Village regarding heavy truck routing and potential impacts on municipal water mains prompted active municipal participation in the public engagement sessions. Four members of the SWPP Committee subsequently attended the June 23, 2026 Public Open House to discuss these municipal infrastructure and water protection concerns, with ongoing correspondence maintained with the SWPP Chair to confirm mitigation commitments (refer to Section 6.3 and Table 6.4 for a detailed breakdown of issues raised and responses). Lastly, feedback solicited from NSECC during the EA kickoff meeting provided general guidance on the expectations for baseline ecological assessments, hydrogeological reporting, and future site management plans.

6.3 ENGAGEMENT WITH THE PUBLIC AND OTHER STAKEHOLDERS

Engagement with the public and other stakeholders is an important part of the EA process. Engagement has been initiated to inform community members, non-governmental organizations (NGOs), and other stakeholders about the proposed Project and to provide opportunities for input during the planning phase.

Non-Governmental and Other Organizations: On April 20, 2026, Project information was distributed via email to local environmental NGOs and recreational trail organizations. These communications included a Project Description and a cover letter inviting questions, feedback, or further discussion.

Public Outreach Strategy: To ensure broad, accessible, and transparent communication with the surrounding community, the Proponent executed a multi-channel advertising and notification campaign. This program combined digital outreach, physical flyer distribution, and direct stakeholder notification:

- **Digital Campaign:** A targeted social media advertising campaign (via Facebook) was directed at residents within the Annapolis Valley region between June 15, 2026 and June 23, 2026. The advertisements linked to a dedicated Project website (https://www.fraxinusenviro.com/inglisvillerd), which remains publicly accessible until January 2027 to provide Project details, an overview of the EA process, as well as a dedicated email address for submitting comments, questions, or concerns.
- **Physical Flyer Distribution:** On June 10, 2026, the Project Team distributed physical brochures and flyers advertising the upcoming Open House. These materials were hand-delivered and posted on prominent community bulletin boards and storefront windows at 15 key hubs across Middleton, Lawrencetown, and Bridgetown. Locations targeted for physical drops included local libraries (such as the Rosa M. Harvey Middleton & Area Library, the Dr. Frank W. Morse Memorial Library in Lawrencetown, and the Bridgetown Regional Library), Royal Canadian Legion branches (Middleton, Lawrencetown, and Bridgetown), local grocery markets (Foodland and Avery's Farm Market), the NSCC Annapolis Valley Campus, and busy commercial areas.

- **Direct Stakeholder Notification:** On June 9, 2026, the Project Team distributed the Open House brochure via email to pre-established engagement contacts, including Chiefs and administrative representatives of 13 Mi'kmaq First Nations, MAPC, KMK, MoCA, the Village of Lawrencetown, and local environmental NGOs. On June 11, 2026, the brochure was also emailed to local community churches (including the Lawrencetown United Baptist, Nictaux Baptist, Middleton Baptist, and Emmanuel Congregational Christian churches) requesting that the details be shared with their congregations to maximize community awareness.

Public Open House: The combined outreach campaign advertised an in-person, drop-in style Public Open House hosted on Tuesday, June 23, 2026, from 5:00 PM to 8:00 PM at the Inglisville Community Club (1407 Inglisville Road, Inglisville, NS). The Open House allowed community members to view detailed Project maps, ask questions directly to the Project Team, and submit feedback. A sign-in sheet and written comment form were available for attendees, and written comments were collected at the event.

The event was attended by local residents and representatives of community organizations. Discussion themes focused primarily on source water protection (given the site's location within the Lawrencetown Municipal Water Supply Area), heavy truck traffic routing, public safety, and road infrastructure. Attendees, including four members of the Lawrencetown SWPP Committee, raised concerns regarding potential structural impacts from heavy haul trucks on the Village's water mains and pedestrian safety near the local school and pool zones on Trout Lake Road and Lawrencetown Lane.

The Project Team provided clarification at the event, confirming that the Project is designed strictly as a sand and gravel extraction pit with no blasting, committing to directing haul traffic away from the sensitive Village streets of concern to the greatest extent possible, and explaining that a comprehensive site-specific Groundwater Management and Monitoring Plan would be developed by a licensed hydrogeologist during the subsequent IA stage.

Engagement materials are included in Appendix C.

Table 6.3 summarizes engagement activities conducted to date with the public and other stakeholders.

Table 6.3: Summary of Engagement to Date with Community Groups, NGOs, and Other Stakeholders

Organization	Contacted Parties	Stakeholder Category	Summary
Blomidon Naturalists Society	General Inquiries	NGO	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.

Organization	Contacted Parties	Stakeholder Category	Summary
			April 29, 2026 Detailed formal written response received. Complete details in Table 6.4 below. June 9, 2026 Brochure sent via email to advertise upcoming Open House.
Clean Annapolis River Project	Levi Cliche, Susan Lane	NGO	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback. June 9, 2026 Brochure sent via email to advertise upcoming Open House.
Mersey Tobeatic Research Institute	General Inquiries	NGO	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback.
Annapolis County ATV & Multiuse Trails Society	Steve Foster, Marty Fancey	Trail Society	April 20, 2026 Project Description and engagement letter sent via email to introduce the Project and invite feedback. June 9, 2026 Brochure sent via email to advertise upcoming Open House.
General Public	Nearby residents	Public	June 11, 2026 Brochure sent to four community churches via email to advertise upcoming Open House. June 15-23, 2026 A targeted Facebook ad campaign was executed, linking to a dedicated Project website and advertising the Open House. June 23, 2026 A Public Open House was held at the Inglisville Community Club to inform local residents and gather feedback.

Engagement with public stakeholders will continue throughout the EA and permitting process. All feedback received will be reviewed and considered in the development of the Project.

Summary of Comments and Issues Raised: Feedback and submissions received to date from community members, municipal commissions, and NGOs have emphasized the importance of a rigorous and transparent EA process. Key issues raised have primarily centred around municipal and domestic water resource protection, ecological conservation, heavy vehicle routing, and site-specific operational mitigations.

The Blomidon Naturalists Society submitted a formal written response requesting detailed mapping, site-specific groundwater analyses, and localized field baselines to evaluate migratory birds, SOCI flora, and local terrestrial and aquatic fauna.

Additionally, during and following the June 23, 2026 Public Open House, local residents and representatives from the Lawrencetown SWPP Committee submitted feedback and follow-up communications focusing on:

- **Haul Routing & Public Safety:** Minimizing heavy truck traffic on local streets (specifically Trout Lake Road, Lawrencetown Lane, and Main Street) to safeguard shallow municipal pipelines and protect pedestrian school and recreation zones;
- **Operational Design (No Blasting):** Reconfirming that the operation will function strictly as a sand and gravel extraction pit with no blasting or bedrock fracturing, eliminating seismic risks to water infrastructure or aquifers; and
- **Groundwater Protection:** Outlining the timelines, depth controls, and process for developing a robust, site-specific groundwater monitoring program.

All of these constructive inquiries have been thoroughly evaluated and integrated directly into the Project's design, operational boundaries, and environmental constraints. A comprehensive summary of the specific questions, comments, and recommendations received from both organizational stakeholders and the general public, alongside the Proponent's formal responses and built-in Project mitigations, is presented in Table 6.4.

Table 6.4: Stakeholder and Public Comment and Response Table

Comment / Question Raised	Proponent Response & Built-In Project Mitigations
BLOMIDON NATURALISTS SOCIETY *Formal Written Submission – April 28, 2026*	
The proposed Environmental Assessment should contain a detailed topographic map showing the relationship between proposed areas for excavation and surface water features (e.g., streams, wetlands, springs).	Topographic contours, alongside field-delineated watercourses (with 30 m setbacks) and field-delineated wetlands, are presented in relation to the proposed extraction areas on Drawing 4.3.1.
Provide a geological map showing the relationship between the proposed excavated material and the overlying and underlying materials.	The surficial and bedrock geology of the Project Site, including the target sand and gravel deposits and the underlying Goldenville Formation, is detailed in Section 7.1.9.

Comment / Question Raised	Proponent Response & Built-In Project Mitigations
Provide a map showing groundwater contours, current and proposed public and domestic water supply wells, and a table showing distances between these wells, their aquifer lithologies and screen depths, and the nearest part of the excavation.	Section 7.1.1 assesses local hydrogeology, including proximity to the Lawrencetown Municipal Water Supply Area and surrounding domestic wells based on the NS Groundwater Atlas. Rather than regional contour mapping, a planar surface model of surrounding well data was used to determine a predominant regional groundwater flow direction of 356° (Northward). Site-specific piezometric monitoring will be used to establish the surficial water table prior to operations, which will inform the Groundwater Management and Monitoring Plan at the IA stage.
Provide a detailed series of cross-sections showing the current topographic surface, maximum seasonal groundwater surface, and proposed depth and extent of excavations.	Because regional well data primarily reflects the deep bedrock aquifer, the site-specific depth to the surficial water table will be established through on-site piezometric monitoring prior to operations as part of the Groundwater Management and Monitoring Plan (Section 7.1.1). This data will be used to determine the exact depth and extent of excavations while maintaining the committed 1 m separation distance. Consequently, detailed cross-sections will be developed and provided to NSECC during the IA stage once this monitoring is complete.
Indicate the thickness of a proposed buffer between the bottom of the excavation and the groundwater to protect from potential contamination.	As noted in Section 8.1.1, the Project will maintain a minimum 1 m buffer above the seasonal high groundwater table to prevent direct interaction with the aquifer. The Groundwater Management and Monitoring Plan will include contingency measures to ensure this separation is maintained throughout operations.
Provide a management plan showing actions to be taken should groundwater enter the buffer thickness or pit bottom, or if hydraulic fluid/petroleum is spilled.	Spill prevention, including the restriction of refuelling within 30 m of water resources, is detailed in Section 8.1.1. A formal Emergency Response Plan and Spill Response and Contingency Plan will be developed prior to operations, as detailed in Section 11.3. A Groundwater Management and Monitoring Plan will be required at the IA stage.
The EA should contain a breeding (nesting) migratory bird survey of the proposed work site.	Breeding bird surveys as well as nightjar surveys were conducted across the Project Site. The methodologies and results, including species diversity and breeding status, are provided in Section 7.1.4.
The project website indicated the trail camera presence of bobcat, coyote, and black bear. An assessment of effects on these and other fauna would indicate whether the excavation is a hazard (e.g., are any species over-wintering in the proposed excavation area?).	Trail camera methodology and results are detailed in Section 7.1.4. The effects of habitat alteration, sensory disturbance, and potential human-wildlife conflict on fauna are assessed in Section 8.1.4, along with mitigations.

Comment / Question Raised	Proponent Response & Built-In Project Mitigations
Provide a rare plant survey of the proposed excavation, soil and product storage sites, and site management building sites.	A comprehensive vegetation inventory and rare plant survey were conducted by qualified botanists. Results, including the identification of SOCI species, are detailed in Section 7.1.3.
Provide an assessment of the age distribution and species of trees on the site that would need removal.	The dominant forest cover types, successional stages, and species composition of the Project Site (which is largely previously harvested, regenerating forest) are described in the Flora baseline (Section 7.1.3) and Terrestrial Habitat baseline (Section 7.1.5).
Provide an assessment of the risks to turtle, salamander, fish, and other species, both on land and in freshwater.	Specific Wood Turtle surveys, aquatic habitat assessments, and fish potential assessments were conducted on Eel Weir Brook and the unnamed watercourses. The baseline data are in Sections 7.1.4 and 7.1.6, and the risk assessment and mitigations (including 30 m buffers) are in Sections 8.1.4 and 8.1.6.
PUBLIC & MUNICIPAL SWPP COMMITTEE *Public Open House & Written Inquiries – June 23-24, 2026*	
Traffic & Public Safety: Concerns over increased traffic from trucks, especially in residential areas and school zones, and pedestrian safety (such as children walking to the pool on Trout Lake Road) in areas where trucks travel.	- Trucks will use routes that avoid populated areas and school zones to the greatest extent possible. It is noted that the road network connecting the Project Site to the broader highway system is already used regularly by other commercial and heavy truck traffic, and that alternate routing options are limited given the Project's access requirements. - Truck drivers will be instructed to obey speed limits, road signage, and rules of the road, and will be briefed on school zones and populated areas near the Project Site.
Road Infrastructure: Concerns that roads cannot withstand heavy trucks and will experience increased wear and tear.	- Trucks will not exceed road weight limits and will not operate during spring weight restriction periods. - Truck drivers will be instructed to obey speed limits.
Water Resources & Infrastructure: Concerns regarding domestic and municipal water supply protection, watershed proximity, groundwater monitoring timelines, and potential physical damage from heavy trucks to pipelines beneath Trout Lake Road, Lawrencetown Lane, Main Street, and Highway 201.	- A Groundwater Management and Monitoring Plan will be developed by a licensed professional hydrogeologist prior to pit operation and will be submitted to NSECC for approval. - Trucks will not exceed weight restrictions and will obey speed limits. - A Surface Water Management Plan will be developed and implemented to manage surface water and reduce the risk of surface water impacts to nearby water features.
Recreation: Inquiry regarding whether existing woods trails on the property can continue to be used recreationally for ATVing or mountain biking.	- The Project Site will remain closed to unauthorized access to ensure public safety. - The Project will not impact access to the road network on adjacent

Comment / Question Raised	Proponent Response & Built-In Project Mitigations
	Crown land (such as the Rifle Range Road).
Noise: Concerns about noise from crusher equipment as well as haul trucks.	- The Project will make all efforts to comply with municipal and provincial noise restrictions. - Hours of operation will be restricted to between 7:00 AM and 7:00 PM when the pit is in operation. - The Proponent will consider additional noise mitigations as needed, which may include construction earthen berms to block noise exposure to nearby receptors, or restricting the operation of noisy equipment (e.g., rock crushers) to hours between 9:00 AM and 5:00 PM.
Dust & Agriculture: Concern about potential fugitive dust deposition on nearby vegetation and agricultural lands (such as local apple orchards).	- Dust suppression solutions will be applied to pit roads as needed to manage dust levels. - On-site speed limits will be enforced on pit roads to reduce dust emissions. - Truck drivers will be instructed to obey speed limits when travelling on unpaved road surfaces.
Environment and Forestry: General concern for local environmental habitat loss and the removal of the regenerating young forest.	- An Environmental Protection Plan will be developed prior to Project operations to manage Project impacts on sensitive environmental features. - The Proponent will conduct rolling reclamation activities to restore forested areas after aggregate extraction activities are complete.

CHAPTER 7: BASELINE ENVIRONMENTAL CONDITIONS

This Chapter provides a thorough description of the baseline environmental conditions within the Project Area, covering key VECs, including the biophysical environment, socioeconomic factors, cultural and heritage resources, and human health and well-being. The baseline conditions will be described using a combination of desktop research, review of existing data sources and literature, as well as targeted field programs conducted in the Project Area.

7.1 BIOPHYSICAL ENVIRONMENT

7.1.1 SURFACE WATER AND GROUNDWATER

REGULATORY CONTEXT

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to surface water and groundwater.

FEDERAL

- ***Fisheries Act*** **(R.S.C., 1985, c. F-14)** - This Act prohibits the deposit of harmful substances into waters frequented by fish and protects fish habitat. Specifically, Section 35 prohibits the harmful alteration, disruption, or destruction (HADD) of fish habitat, and Section 36 prohibits the deposit of deleterious substances into waters frequented by fish, both of which are highly relevant to sedimentation control measures and stormwater discharge.

- ***Canadian Environmental Protection Act*** **(S.C. 1999, c. 33)** - The *Canadian Environmental Protection Act* (CEPA) regulates the release of pollutants and hazardous substances that could contaminate surface or groundwater. Pit operations may involve activities such as fuel storage, vehicle maintenance, or the use of chemicals, all of which could introduce contaminants into the environment.

PROVINCIAL

- ***Environment Act*** **(S.N.S. 1994-95, c. 1)** - This Act provides the legal framework to prevent harm to surface water or groundwater. It mandates environmental assessments, pollution prevention measures, and compliance with regulatory standards for water quality. Project operators must implement measures to prevent sedimentation, control erosion, and manage potential contaminants to comply with the Act.

- ***Activities Designation Regulations*** **(N.S. Reg. 47/95)** - These regulations list pits and quarries as designated activities that require environmental approvals from NSECC. Pit operations that involve watercourse alterations, groundwater withdrawal, or stormwater discharge must obtain the necessary permits. Compliance ensures that the Project adheres to best management practices for water protection and environmental management.

- ***Pit and Quarry Guidelines*** **(1999, Revised 2003)** - These guidelines establish specific requirements for protecting surface water and groundwater at excavation sites. They set minimum separation distances from watercourses, mandate sedimentation control measures, and regulate effluent discharge to prevent contamination. Pit operators must follow these guidelines to ensure that operations do not negatively impact nearby waterbodies or groundwater supplies.

DESKTOP REVIEW: METHODOLOGY

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

- Aerial imagery and topography
- Nova Scotia Hydrographic Network (NSHN; Service NS, 2024)
- Nova Scotia Groundwater Atlas (NSNRR, 2025a)
- ACCDC Data Report (ACCDC, 2025; Appendix D)
- Nova Scotia Well Logs Database (NSNRR, 2025b)
- Nova Scotia Wet Areas Mapping and Flow Accumulation Channel (NSNRR, n.d.-e)
- Site-specific LiDAR-based Wet Areas Mapping and Flow Channel models [Proprietary modelling completed by Fraxinus based on Nova Scotia Natural Resources and Renewables (NSNRR) LiDAR datasets] (GeoNova, n.d.)
- Technical papers (Carsel & Parrish, 1988; Rawls et al., 1983)

DESKTOP REVIEW: RESULTS

SURFACE WATER: The Project Site is located within the Annapolis River Primary (1DC), Secondary (1DC-3), and Tertiary (1DC-3-S) Watersheds (Drawings 7.1.1.1A-C). Watercourses within and near the Project Area primarily drain north through these watersheds, eventually connecting to the Annapolis River, which discharges into the Bay of Fundy.

According to the NSHN, there are two watercourses within the Project Site: Eel Weir Brook, which flows northeast along the northernmost property boundary, and an unnamed watercourse, which flows northwest near the southern property boundary (Drawing 7.1.1.1C). The unnamed watercourse connects to Eel Weir Brook west of the Project Site.

Eel Weir Brook originates from Eel Weir Lake, approximately 1.8 km southwest of the Project, and flows north from Roxbury to Lawrencetown, eventually discharging into the Annapolis River approximately 3.5 km north of the Project. The Annapolis River is approximately 120 km long, flowing southwest through the Annapolis Valley from Aylesford to Annapolis Royal, where it discharges into the Annapolis Basin.

Local topography influences surface water flow within the Project Site. Based on available mapping and desktop analysis (including the Nova Scotia Flow Accumulation dataset and proprietary modelling completed by Fraxinus), surface water drainage is generally directed northward where topographic gradients allow, consistent with regional drainage patterns toward Eel Weir Brook and the Annapolis River watershed. Localized variation in flow direction is expected across the Project Site, particularly given the relatively undeveloped condition of the area.

Further information on flow direction and infiltration rates is discussed in the groundwater section below.

GROUNDWATER: The Project Site lies within two bedrock groundwater regions: the Metamorphic bedrock groundwater region, which comprises the majority of the Project Site, and the Plutonic bedrock groundwater region to the south and a small portion to the northwest, as identified in the provincial Groundwater Atlas (Drawing 7.1.1.2). Additionally, the Project lies within two surficial groundwater regions: the Glaciolacustrine/Till Plains/Colluvial region to the south and the Glaciofluvial/Alluvial region to the north (Drawing 7.1.1.3).

Importantly, the Nova Scotia Groundwater Atlas identifies no suspected surficial aquifer within or immediately adjacent to the Project Site (Drawing 7.1.1.3). This is consistent with the shallow depth to bedrock documented across the area (1.22-11.57 m; Table 7.1) and indicates that the thin overburden deposit targeted for extraction does not constitute a regionally significant surficial aquifer. The primary groundwater resource in the area is therefore the underlying fractured bedrock aquifer, which is discussed further below.

According to ACCDC records, the Project Site is located within the Lawrencetown Municipal Water Supply Area (Drawing 7.1.1.4). According to the Nova Scotia Well Logs Database, the nearest municipal well is approximately 2.9 km north of the Project Site, and 14 well records are located within 1 km of the Project Site boundary (Drawing 7.1.1.5). One of these wells is located within or immediately adjacent to the Project Site and is associated with two well records (Well IDs 781970 and 781971). Of the 14 well records, 13 are designated for domestic use, and one has an unspecified use.

All 14 well records within 1 km of the Project Site are drilled bedrock completions, with well depths ranging from 24.36 to 231.42 m. In each case, the well casing passes through the thin overburden, and the well screen is completed in fractured bedrock well below the overburden-bedrock contact. This pattern is consistent with the absence of a suspected surficial aquifer identified in the provincial mapping. No wells completed in the surficial overburden were identified within 1 km of the Project Site.

Table 7.1: Summary of Well Records Within 1 km of the Project Site

Statistic	Drilled Date (year)	Well Depth (m)	Casing Length (m)	Depth to Bedrock (m)	Depth to Static Water Levels (m)	Estimated Yield (Lpm)
Minimum	1978	24.36	6.09	1.22	1.52	0.00
Maximum	2016	231.42	18.88	11.57	24.36	158.90
Average	N/A	74.06	9.96	6.02	9.24	32.49

Source: NSNRR (2025b)

The Nova Scotia Pumping Test Database was reviewed to characterize regional groundwater conditions. The nearest pumping test well is located approximately 1.9 km north of the Project Site in Lawrencetown (Well ID VL-P1). The well is located in plutonic bedrock with a depth of 58.5 m. The pumping test was conducted in July 2004, and results indicate a long-term yield (Q20) of approximately 373 litres per minute (Lpm) and an apparent transmissivity of 50.11 m^2/day.

Further, the Nova Scotia Groundwater Observation Well Network was reviewed to assess regional groundwater level conditions. The nearest observation is located approximately 14 km northeast of the Project Site in the community of Wilmot (ID 005). The well has a total depth of approximately 18.3 m, with casing installed to a depth of approximately 6.4 m, and is completed in gravel overburden associated with the Pleistocene Outwash geologic unit. The well has been monitored since 1966, and recorded groundwater levels at this location have ranged between approximately 5.49 and 9.23 metres above sea level (masl) over the monitoring period.

GROUNDWATER FLOW: To estimate the direction of groundwater flow, water level elevation data were derived from the Nova Scotia Well Logs Database for wells located within 1 km of the Project Site boundary. Water level elevation was calculated by subtracting the recorded static water level from the well surface elevation. Wells lacking either elevation or static water level data were excluded from the analysis. Each well's spatial position was defined relative to the Project Site centroid (UTM Zone 20N: 331140 E, 4967297 N) by computing Cartesian offsets (ΔX and ΔY) from its UTM coordinates. These spatial offsets, along with the corresponding water level elevations, were used to perform a weighted least squares regression to fit a planar surface representing the regional water table. Weighting factors were applied to assign greater influence to wells that were closer to the Project Site and had more recent measurement dates, thereby reducing the impact of spatially or temporally outlying data. The horizontal gradient of the fitted surface was used to identify the direction of steepest descent, which was interpreted as the predominant groundwater flow direction.

The resulting flow vector indicates a predominant flow direction of approximately 356° from North, suggesting a predominantly northward trend in groundwater movement across the site. This is consistent with the regional topographic gradient descending northward from South Mountain toward the Annapolis Valley and with the orientation of surface drainage toward Eel Weir Brook.

It is important to note that all 14 well records within 1 km of the Project Site are drilled bedrock completions (see Well Records discussion above). The static water levels used in this analysis therefore reflect hydraulic head conditions in the underlying bedrock aquifer, which may differ from the water table in the overlying surficial overburden that the Project will interact with. Installation of on-site piezometers screened in the overburden is planned as part of the Groundwater Management and Monitoring Plan to establish site-specific surficial water table conditions prior to and during operations.

OVERBURDEN THICKNESS: Overburden thickness, defined as the vertical depth from ground surface to the top of bedrock, was assessed using well log data from the Nova Scotia Well Logs Database for wells within 1 km of the Project Site boundary. Of the 14 well records, 13 include a recorded depth to bedrock. Summary statistics are presented in Table 7.1.

These results indicate that bedrock is encountered at shallow depths across the area surrounding the Project Site, with overburden thickness consistently less than 12 m. This is consistent with the South Mountain metamorphic terrain and with the absence of a suspected surficial aquifer identified in the provincial mapping.

A meaningful estimate of saturated overburden thickness, defined as the vertical interval between the water table and the bedrock surface, cannot be derived from the available well records. As all wells are drilled bedrock completions, their static water levels reflect hydraulic head in the bedrock aquifer, which in several cases falls below the bedrock contact elevation, producing negative saturated overburden values. This is a physically expected characteristic of deep bedrock wells and does not indicate an anomalous hydrogeological condition, but it confirms that the well log data cannot characterize the surficial water table. The depth to the overburden water table within the proposed extraction area will be established through on-site piezometric monitoring as part of the Groundwater Management and Monitoring Plan, prior to commencement of extraction.

WATER TABLE ELEVATION: Water table elevation in the vicinity of the Project Site was estimated using static water level and well elevation data from the Nova Scotia Well Logs Database for wells within 1 km of the Project Site boundary. Water table elevation at each well location was calculated by subtracting the recorded static water level depth from the ground surface elevation. Wells with missing or invalid data were excluded. Of the 14 well records, 9 contained sufficient data for inclusion.

Two summary statistics were generated: an unweighted mean, which treated all valid wells equally, and a weighted mean in which each well was assigned a weighting factor based on the inverse of the product of its distance to the Project Site centroid and the number of days since the measurement was taken, giving greater influence to wells that are both geographically proximate and recently measured. The unweighted mean groundwater elevation was calculated to be 147.43 masl, and the weighted mean was estimated at 166.68 masl.

These values are consistent with the Project Site's topographic setting on South Mountain, where ground surface elevations across surrounding wells range from 136 to 189 m.

As noted above, all wells used in this analysis are drilled bedrock completions, and these estimates therefore reflect hydraulic head in the bedrock aquifer rather than the surficial overburden water table directly. These estimates are considered indicative of regional conditions. The site-specific surficial water table within the proposed extraction area, including seasonal range, will be established through on-site piezometric monitoring as part of the Groundwater Management and Monitoring Plan described in Section 8.1.1.

HYDROGEOLOGICAL CHARACTERISTICS: The proposed pit is situated within a deposit of clean, well-sorted glaciofluvial sand, characterized by high permeability and rapid infiltration capacity. Published infiltration rates for clean sand typically range from 2.0 to 11.0 cm/hr (approximately 0.5 to 3.0×10^{-5} m/s) depending on compaction, grain size distribution, and moisture conditions (Carsel & Parrish, 1988; Rawls et al., 1983). The high infiltration capacity of this material means that surface water moves rapidly into the subsurface and contributes to recharge of the underlying bedrock aquifer. This characteristic is relevant to the assessment of potential Project effects on groundwater quality, which is addressed in Section 8.1.1.

FIELD PROGRAMS: METHODOLOGY

Field assessments were undertaken between May and October 2025 to delineate and characterize watercourses within the Project Site and document prevailing hydrological conditions. This period notably coincided with a severe drought in Nova Scotia.

The delineation of watercourses relied on defining characteristics such as a defined bed and bank, observable channel morphology, and evidence of surface or subsurface flow. Field data, including watercourse location, flow status, and key features, were mapped using Global Positioning System (GPS)-enabled devices and Fraxinus field forms. Each watercourse segment was classified based on observed hydrological conditions at the time of assessment as permanent, intermittent, or ephemeral.

Where surface water was present in October 2025, water quality measurements were collected. These measurements included pH, conductivity, total dissolved solids (TDS), and dissolved oxygen (DO). Additional observations documented channel morphology and riparian condition. Assessment methodology specific to fish is detailed separately in Section 7.1.6.

FIELD PROGRAMS: RESULTS

Field assessments identified and characterized four permanent watercourse segments within the Project Site: WC1 (a subsection of Eel Weir Brook), WC2, WC3, and WC4 (Drawing 7.1.1.6). WC1 flows northeast along the

northern property boundary through a linear floodplain wetland (WL1), while WC2 collects drainage from WC3 and WL3 and flows northwest off-site before connecting to Eel Weir Brook. WC4 flows in a northwest direction into the southeast corner of the property, eventually dissipating into WL7. Observed conditions likely represent minimum hydraulic conditions.

Water quality measurements were collected for WC1, WC2, and WC3, indicating pH values between 4.87 and 6.01, falling below the typical range for freshwater systems (6.5 to 9.0; CCME, 1987). Dissolved Oxygen (DO) levels for these systems ranged from 5.89 mg/L to 10.97 mg/L, with the highest concentrations found in WC2. Conductivity across these three watercourses ranged from 45.4 µS/cm to 134 µS/cm.

Detailed assessments of channel morphology, substrate composition, riparian vegetation, and fish habitat suitability are provided in Section 7.1.6. Representative photos of Project watercourses are found in Appendix E.

7.1.2 WETLANDS

REGULATORY CONTEXT

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to wetlands.

FEDERAL

- **The Federal *Policy on Wetland Conservation* (1991)** - Although not enforceable, this policy provides guiding principles for wetland conservation in Canada and encourages incorporating wetland protection into project planning and decision-making processes. Adherence to this policy ensures the preservation of wetland functions, such as water filtration and flood attenuation, during Project operations.

PROVINCIAL

- **Nova Scotia *Wetland Conservation Policy* (2019)** - This policy aims to achieve the goal of no loss of Wetlands of Special Significance (WSS) and no net loss in area or function for other wetlands. WSS are wetlands that support significant species or species assemblages, support high wildlife biodiversity, have significant hydrologic value, or have high social or cultural importance. The following are considered WSS under this policy:
    - All salt marshes.
    - Wetlands that are within or partially within a designated Ramsar site, Provincial Wildlife Management Area (Crown and Provincial lands only), Provincial Park, Nature Reserve,

Wilderness Area, or lands owned or legally protected by non-government charitable conservation land trusts.

- Intact or restored wetlands that are project sites under the North American Waterfowl Management Plan and secured for conservation through the Nova Scotia Eastern Habitat Joint Venture program.
- Wetlands that are known to support at-risk species, as designated under SARA or the ESA.
- Wetlands in designated protected water areas as described within Section 106 of the *Environment Act,* S.N.S. 1994-95, c. 1, s. 1.
- A wetland that scores as a WSS based on functional characteristics using the Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC).

Under this policy, wetland alterations require permit approval from NSECC, and as part of the permit approval, compensation activities must be included to compensate for the area of wetland habitat lost through the alteration activity.

- ***Activities Designation Regulations*** **(N.S. Reg. 47/95)** - These regulations list pits and quarries as designated activities that require environmental approvals from NSECC. Pit operations that involve wetland or watercourse alterations must obtain the necessary permits. Compliance ensures that the Project adheres to best management practices for wetland protection and environmental management.

DESKTOP REVIEW: METHODOLOGY

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

- Aerial imagery and topography
- Canadian National Wetlands Inventory (CNWI) (ECCC, 2025)
- NSNRR Wetland Inventory (NSNRR, 1999)
- Nova Scotia Wet Areas Mapping and Flow Accumulation Channel (NSNRR, n.d.-e)
- Provincial Landscape Viewer (NSNRR, n.d.-d)

DESKTOP REVIEW: RESULTS

The CNWI and the NSNRR Wetland Inventory did not identify any wetlands within the Project Site. However, two wetlands are located within 500 m of the Project Site (Drawing 7.1.2.1). A 1.68 ha treed swamp is located adjacent to the northwestern Project boundary and is likely associated with the floodplain of Eel Weir Brook,

which flows northeast along the northern edge of the Project Site. A second wetland, approximately 0.87 ha and classified as 'unknown', is located south of the Project Site.

The Provincial Landscape Viewer was reviewed to identify any areas of interest related to wetlands within and near the Project Site. No areas were identified that fall under specific designations such as Special Management Zones, WSS, or other protected wetland areas.

In-house modelling was completed using available LiDAR-derived elevation data to determine the potential extent of wetlands intersecting the Project Site, as a supplement to existing inventories and field delineation. This analysis utilized the Wetland Likelihood Index (WLI), a proprietary terrain-hydrology composite index developed by Fraxinus that estimates relative wetland likelihood by integrating topographic depressions with modelled depth-to-water, producing higher values where both conditions coincide (Drawing 7.1.2.2). Modelling results suggest a greater extent of NSNRR-mapped wetlands, as well as the potential presence of unmapped wetlands within the vicinity of the Project.

FIELD PROGRAMS: METHODOLOGY

WETLAND DELINEATION: During the assessment, the delineation of all encountered wetlands on the Project Site was conducted per the protocols of the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory, 1987). Diagnostic parameters for wetland identification were recorded, including those for hydric soils, presence of wetland hydrology, and presence of hydrophytic (water-loving) vegetation. The USACE methodology is widely implemented and is the standard practice within Nova Scotia; as such, the methodology is well understood and is not discussed further within this report. The wetland boundaries were georeferenced to ± 3-5 m accuracy using a handheld GPS. Wetland and upland control plots were established within an undisturbed portion of the site, with all appropriate conditions recorded digitally using ESRI Survey123 field data collection forms.

WETLAND FUNCTIONAL ASSESSMENT: Wetland functional assessments were completed using WESP-AC (Adamus, 2018) for all identified wetlands within the Project Properties. WESP-AC is a standardized rapid assessment tool, evaluating 17 specific wetland functions through a combination of desktop (landscape-level) and field-based data collection, including biophysical attributes and stressor identification.

Each function receives a Function Score (reflecting ecological capacity) and a Benefit Score (reflecting ecological, social, or economic value). Scores are classified as *Lower*, *Moderate*, or *Higher* based on provincial calibration, allowing for standardized comparison among wetlands across Nova Scotia.

Grouped function scores are further organized into two supergroups: Support (Hydrologic, Water Quality, and Aquatic Support) and Habitat (Aquatic and Transition Habitat), to determine potential WSS status. WSS designation is based on predefined combinations of moderate and high scores across these groups.

WESP-AC also evaluates non-functional attributes such as Wetland Condition, Sensitivity, Public Use, and Stressors, based solely on benefit scores. The protocol allows assessments to focus on defined portions of wetlands when full delineation is not feasible, while still incorporating broader landscape context through the Office Form.

FIELD PROGRAMS: RESULTS

WETLAND DELINEATION: Wetland surveys completed on the Project Site identified nine wetlands (hereafter referred to as WL1-WL9), ranging in size from 0.09 ha to 3.49 ha (Drawings 7.1.2.3A-C; Table 7.2). All wetlands on site are classified as swamps (eight are forested, and one [WL2] is shrub-dominant; NWWG, 1997). Wetland plot data are attached in Appendix F, and representative photos are found in Appendix E.

Table 7.2: Summary of Wetland Types and Sizes

Wetland ID	Wetland Type	Area (ha)
WL1	Treed Swamp	0.379
WL2	Shrub Swamp	0.467
WL3	Treed Swamp	3.488
WL4	Treed Swamp	0.443
WL5	Treed Swamp	0.089
WL6	Treed Swamp	0.200
WL7	Treed Swamp	1.419
WL8	Treed Swamp	0.086
WL9	Treed Swamp	0.392

Two wetlands (WL1 and WL7) are identified as throughflow floodplain swamps. WL3 is associated with an inlet watercourse (WC2), as well as a self-contained watercourse (WC3), which are likely hydrologically associated. The northwest-to-southeast flow transported through WC2 and WC3 eventually dissipates into WL3's southernmost lobe without the presence of an exit channel. The remaining six wetlands (WL2, WL4 to WL6, WL8 and WL9) are hydrologically isolated from watercourses, though WL2 notably has an open water component observed during much of the season that dried up during the drought. Common primary hydrological indicators observed across the Project Site include evidence of soil saturation at or near the surface, water-stained leaves, high water tables, and, at WL1, the presence of surface water and aquatic fauna. Sparsely vegetated concave surfaces were also noted at several wetlands (WL2, WL4, WL6, WL8, and WL9). Common

secondary indicators included drainage patterns in all wetlands, with additional secondary indicators observed locally such as stunted or stressed plants (WL2, WL8, WL9) and moss trim lines (WL2).

The tree stratum of wetlands on site was predominantly deciduous, with Red Maple (*Acer rubrum*) present in all wetlands and commonly co-occurring with White Ash (*Fraxinus americana*), Yellow Birch (*Betula alleghaniensis*), and, in some areas, Sugar Maple (*Acer saccharum*) and Willow (*Salix spp.*). Coniferous species including Balsam Fir (*Abies balsamea*) and Black Spruce (*Picea mariana*) were regularly present in lesser amounts, particularly in riparian and less disturbed areas. Shrub strata varied in density but were typically characterized by abundant Speckled Alder (*Alnus incana*) and/or Black Holly (*Ilex verticillata*), with immature stems of canopy species and trace occurrences of species such as Serviceberry (*Amelanchier spp.*), Striped Maple (*Acer pensylvanicum*), and White Meadowsweet (*Spiraea alba*). The herbaceous layer was consistently well-developed and largely fern- and graminoid-dominated, with widespread Cinnamon Fern (*Osmundastrum cinnamomeum*) alongside species such as Sensitive Fern (*Onoclea sensibilis*), New York Fern (*Amauropelta noveboracensis*), Fowl Manna-grass (*Glyceria striata*), and various sedges (*Carex spp.*), with additional site-specific forbs and graminoid species.

Wetland soils were predominantly shallow organic histosols of varying decomposition.

Wetland 1 (WL1)

WL1 is a 0.379 ha treed swamp associated with the most significant watercourse on site: Eel Weir Brook (WC1). It is a throughflow deciduous-dominant treed swamp with large trees consisting of several different species, including Red Maple, White Ash, Sugar Maple, Yellow Birch, Balsam Fir, and Black Spruce. Speckled Alder and Balsam Fir are prevalent in the shrub stratum throughout the wetland, with trace other shrub species such as Serviceberry and Canada Fly Honeysuckle (*Lonicera canadensis*). A variety of ferns (e.g. Cinnamon Fern, Sensitive Fern, Royal Fern [*Osmunda spectabilis*]), asters (e.g. Whorled Wood Aster [*Oclemena acuminata*]), and graminoids (e.g., Fowl Manna Grass, Nodding Sedge [*Carex gynandra*]) make up the riparian wetland's herbaceous stratum. Typical soil conditions found in WL1 are a mix of sand and shallow sapric (highly decomposed) histosol (i.e., organic matter).

Wetland 2 (WL2)

WL2 is a 0.467 ha shrub swamp with an open water component. The relatively sparse tree stratum is dominated by Red Maple. In the shrub stratum, there is abundant Black Holly mixed with small Red Maple stems, and trace other shrubs including small Gray and Paper Birch and White Meadowsweet. The herbaceous stratum consists of a variety of graminoids including both Black-girdled (*Scirpus atrocinctus*) and Common Woolly Bulrush (*Scirpus cyperinus)*, Bluejoint Reedgrass (*Calamagrostis canadensis*), etc., with trace fern species present, such as

Crested Wood Fern (*Dryopteris cristata*). Typical soil conditions observed in WL2 were organic soil of increasing decomposition from fibric (minimally decomposed) at the surface down to sapric (highly decomposed) histosols.

Wetland 3 (WL3)

WL3 is a 3.488 ha treed swamp with an inlet watercourse (WC2) and a watercourse that runs through its centre (WC3) that dissipates within the wetland. The wetland has two lobes to the south; the lobe closest to the road was cut over and is dominated by Broad-leaved Cattail (*Typha latifolia*) and young mixedwood trees. The riparian areas of WL3 are dominated by Balsam Fir, Red Maple, Sugar Maple, White Ash, Yellow and Paper Birch, and Black Spruce, with trees closer to the watercourses being mid-successional, likely due to forestry buffering around watercourses. Some areas of WL3 were historically cut over and exhibit early successional traits, exhibiting conditions similar to WL's 4, 5, 6, 8 and 9 below. The shrub stratum in WL3 mainly consists of immature stems of species found in the tree stratum (e.g. Black Spruce, Yellow Birch, etc.), with Speckled Alder common, particularly around the watercourse, and trace other species such as Striped Maple. Fern species dominate the herbaceous stratum, with abundant Cinnamon Fern and notable New York Fern, Evergreen Wood Fern (*Dryopteris intermedia*) and Eastern Marsh Fern (*Thelypteris palustris*). Other present herbaceous species include Goldthread (*Coptis trifolia*), Wild Sarsaparilla (*Aralia nudicaulis*), Fowl Manna-grass, etc. Soils at WL3 are mainly shallow histosols.

Wetland 4 (WL4)

WL4 is a 0.443 ha early successional treed swamp that is hydrologically isolated from watercourses. The tree stratum is relatively open and has low overall cover, with scattered Red Maple and Willow, along with minor Trembling Aspen (*Populus tremuloides*), Paper Birch (*Betula papyrifera*), Balsam Fir, and Yellow Birch. In the shrub stratum, Yellow Birch and Black Holly are abundant and intermixed with Balsam Fir, with lesser amounts of Red Maple and Northern Wild Raisin (*Viburnum cassinoides*). The herbaceous layer is dominated by Cinnamon Fern, with common Dwarf Red Raspberry, Three-seed Sedge (*Carex trisperma*), Broad-leaved Cattail, and Bluejoint Reedgrass, and trace occurrences of Rough-stemmed Goldenrod (*Solidago rugosa*), Wild Sarsaparilla, and Swamp Aster (*Symphyotrichum puniceum*). Soils at WL4 consist of shallow hemic (i.e., moderate decomposition) textured histosols.

Wetland 5 (WL5)

WL5 is a 0.089 ha early successional treed swamp that is hydrologically isolated from watercourses. The tree stratum has patchy cover, most significantly provided by Red Maple, with lesser Paper Birch, Balsam Fir, and White Ash present. In the shrub stratum, Speckled Alder is common and intermixed with Red Maple, White Ash, Black Spruce, and Paper Birch, with trace Serviceberry. The herbaceous layer is characterized by abundant

Cinnamon Fern, common Sensitive Fern, Common Woolly Bulrush, Dwarf Red Raspberry (*Rubus pubescens*), with scattered Spinulose Shield Fern (*Dryopteris carthusiana*), and minor occurrences of Twinflower (*Linnaea borealis*), Wild Strawberry (*Fragaria virginiana*), and Grass-leaved Goldenrod (*Euthamia graminifolia*). Soils at WL5 consist of shallow organic soils of hemic texture.

Wetland 6 (WL6)

WL6 is a 0.200 ha treed swamp that is hydrologically isolated from watercourses. The tree stratum is very sparse, consisting of scattered Balsam Fir with minor Black Spruce. The shrub layer is dominated by Red Maple with lesser amounts of Black Spruce and Balsam Fir and trace Paper Birch and Speckled Alder. The herbaceous stratum is strongly dominated by Cinnamon Fern, with common Fowl Manna-grass and Sensitive Fern and lesser Rough Sedge, Red Raspberry, Field Horsetail, and Wild Strawberry. Soils at WL6 consist of shallow hemic histosols.

Wetland 7 (WL7)

WL7 is a 1.419 ha throughflow treed swamp with a significant shrub layer. WC4 dissipates into the main western lobe of the wetland on site, but desktop analysis indicates downslope (off-site) flow, hence the throughflow designation. The tree stratum has low overall cover and is composed primarily of Red Maple with lesser Yellow Birch. The shrub layer is strongly dominated by Speckled Alder, with common Yellow Birch and lesser Balsam Fir and White Ash. The herbaceous stratum is characterized by abundant Cinnamon Fern, with common Nodding Sedge, Rough-stemmed Goldenrod, Sensitive Fern, and New York Fern. Typical soils at WL7 consist of shallow histosols that are more fibric at the surface, down to sapric after ~10 cm.

Wetland 8 (WL8)

WL8 is a narrow 0.086 ha treed swamp with a significant shrub layer that is hydrologically isolated from watercourses, with some relatively intact mixedwood forest adjacent to the wetland. There are many hummocks and moist depressions (dried at the time of assessment). The tree stratum has low overall cover and consists primarily of Red Maple, with lesser Balsam Fir and Black Spruce. The shrub layer is dominated by Black Holly and Speckled Alder, with scattered Red Maple. The herbaceous stratum is characterized by abundant Fowl Manna-grass, Marsh Bedstraw (*Galium palustre*), Northern Bugleweed (*Lycopus uniflorus*), and Three-seed Sedge growing from depressions, with plants such as Goldthread and Spinulose Shield Fern growing on hummocks. Soils at WL8 consist of shallow fibric histosols.

Wetland 9 (WL9)

WL9 is a 0.392 ha treed swamp that is hydrologically isolated from watercourses. The tree stratum has relatively moderate overall cover and is co-dominated by Willow and Red Maple, with lesser Gray Birch (*Betula populifolia*), Paper Birch, Balsam Fir, and Yellow Birch. The shrub layer is dominated by Speckled Alder and Red Maple, with smaller amounts of Wild Black Cherry (*Prunus serotina*), Balsam Fir, and Black Spruce. The herbaceous stratum is relatively diverse and is characterized by abundant Cinnamon Fern, Crested Wood Fern, New York Fern, and Rough-stemmed Goldenrod, and less prevalent Sensitive Fern, Dwarf Dogwood (*Cornus unalaschkensis*), Dwarf Red Raspberry, Marsh Bedstraw, Swamp Loosestrife (*Lysimachia terrestris*), and Field Horsetail (*Equisetum arvense*). Soils at WL9 consist of shallow hemic histosols.

WETLAND FUNCTIONAL ASSESSMENT: Wetlands on the Project Site exhibit a broad range of functional strengths and ecological values. The Functional WSS status of wetlands on site was determined using the WESP-AC Function-Benefit Product (FBP) method, which evaluates grouped functions under two supergroups: Support (hydrologic, water/climate protection, aquatic support) and Habitat (aquatic and transition habitat). Each FBP score is classified as Low, Moderate, or High based on standard thresholds, and WSS status is assigned if any of the rules in Table 7.3 are satisfied.

Table 7.3: Functional WSS Rule Definitions

Rule	Requirement
Habitat	2 high or 1 high and 1 moderate habitat FBP subgroup scores
Support	3 high or 2 high and 1 moderate support FBP subgroup scores
Habitat/Support Hybrid	1 high habitat score and 2-3 high support FBP subgroup scores

A consolidated summary of the FBP score categories and Functional WSS determinations for all wetlands on the Project Site is presented in Table 7.4. None of the wetlands on the Project Site met the criteria for designation as a Functional WSS. Detailed WESP-AC functional scoring tables for each individual wetland (WL1 through WL9) are provided in Appendix G. Furthermore, the raw WESP-AC calculator Excel files have been provided digitally to NSECC concurrently with this submission to facilitate regulatory review.

Table 7.4: Summary of WESP-AC Function-Benefit Product (FBP) Scores and WSS Status

Wetland ID	Hydrologic FBP	Water & Climate Protection FBP	Aquatic Support FBP	Aquatic Habitat FBP	Transition Habitat FBP	Functional WSS Status
WL1	Low	Low	Moderate	Moderate	Low	**No**
WL2	High	High	Low	Moderate	Moderate	**No**
WL3	Low	Low	Low	Low	Low	**No**
WL4	High	Low	Low	Low	Low	**No**
WL5	Moderate	Low	Low	Low	Low	**No**
WL6	Moderate	Low	Low	Low	Low	**No**
WL7	Low	Low	Low	Low	Moderate	**No**
WL8	Low	Low	Low	Low	Moderate	**No**
WL9	Moderate	Low	Low	Low	Low	**No**

Wetland 1

WL1 exhibits a generally strong, habitat-oriented functional profile, with particularly high performance across aquatic and transition habitat functions. Anadromous Fish Habitat (FA), Resident Fish Habitat (FR), Keystone Mammal Habitat (KMH), and Pollinator Habitat (POL) all achieved high functional and benefit ratings, indicating that the wetland provides high-quality habitat and trophic support for multiple aquatic and terrestrial taxa. While the individual grouped scores for Aquatic Habitat (AHg) and Transition Habitat (THg) achieved 'Higher' ratings for both function and benefit, reinforcing the site's role as an important biodiversity feature within the landscape, their combined mathematical FBP scores ultimately fell into the Moderate and Low classifications, respectively.

Hydrologic and water quality functions are more mixed. Surface Water Storage (WS), Sediment Retention (SR), and Phosphorus Retention (PR) were functionally low to moderate but exhibited moderate to high benefit scores, illustrating a pattern where relatively modest intrinsic process performance still delivers meaningful downstream services. In contrast, Stream Flow and Temperature Support (SFTS) and Organic Nutrient Export (OE) were functionally high, highlighting a stronger role in regulating aquatic processes.

Climate-related and biogeochemical functions, including Wildfire Resistance (WFR), Carbon Capture (CC), and Carbon Stock Preservation (CSP), were generally moderate, suggesting that WL1 contributes to climate buffering and nutrient cycling without representing a major regional carbon sink.

The wetland shows high sensitivity and moderate stressor exposure, indicating some vulnerability to disturbance but not an extreme level of risk.

Based on the FBP results, WL1 does not meet any of the WESP-AC criteria for designation as a Functional WSS.

Wetland 2

WL2 is characterized by a highly specialized functional profile dominated by strong hydrologic and water-quality functions and comparatively limited aquatic habitat value. Surface Water Storage (WS), Sediment & Toxicant Retention & Stabilization (SR), Phosphorus Retention (PR), Nitrate Removal (NR), and Carbon Stock Preservation (CSP) all scored high functionally, indicating that the wetland plays a significant role in water storage and nutrient attenuation. In contrast, Stream Flow and Temperature Support (SFTS) and Organic Nutrient Export (OE) were absent, reflecting limited hydrologic connectivity (i.e., no watercourse association).

Habitat functions are present but uneven. While the individual grouped scores for Aquatic Habitat (AHg) and Transition Habitat (THg) were rated high in function and benefit – driven largely by Waterbird Feeding (WBF), Waterbird Nesting (WBN), Keystone Mammal Habitat (KMH), and Pollinator Habitat (POL) – their final calculated FBP scores both resulted in Moderate classifications. Fish and amphibian habitat functions were comparatively weaker.

Climate-related functions (WFR, CC, CSP) were moderate to high, indicating general climate buffering capacity, though the absence of SFTS limits broader watershed-scale hydrologic benefits.

WL2 exhibits high sensitivity and moderate stressor exposure, suggesting potential vulnerability to disturbance despite strong support functions.

Although both Hydrologic and Water & Climate Protection Supergroups achieved high FBP scores, WL2 does not satisfy any of the WSS designation rules.

Wetland 3

WL3 exhibits a mixed functional profile characterized by weak hydrologic and water-quality performance, but stronger aquatic support and habitat-related values. Hydrologic function is low, with Surface Water Storage (WS) rated lower and only moderate benefit, indicating limited capacity for water retention and modest downstream relevance. Water and climate protection functions are also constrained: Sediment & Toxicant Retention & Stabilization (SR), Phosphorus Retention (PR), and Nitrate Removal & Retention (NR) are uniformly low in both function and benefit, suggesting limited nutrient and contaminant attenuation at the site. Stream Flow and Temperature Support (SFTS) is a notable exception, scoring high functionally but low in benefit, indicating that while the process is present, its broader landscape-scale value may be limited.

Aquatic support functions are comparatively stronger. Organic Nutrient Export (OE) and Aquatic Primary Productivity (APP) are moderate, and the overall Aquatic Support group (ASg) is rated high in function,

reflecting a stronger contribution to aquatic processes and trophic support than is suggested by the site's water-quality scores. However, its final Aquatic Support FBP score evaluates to Low. Aquatic Habitat (AHg) is rated higher in both function and benefit, driven primarily by very strong Waterbird Nesting Habitat (WBN), despite the absence of fish habitat functions (FA and FR) and low amphibian habitat (AM). Transition Habitat (THg) is also rated high, supported by strong Pollinator Habitat (POL) and Native Plant Habitat (PH), with moderate Raptor and Songbird Habitat (RSB). Despite these high individual habitat scores, their combined mathematical FBP scores ultimately fell into the Low classification.

Climate-related functions are generally low to moderate, with Carbon Stock Preservation (CSP) in the moderate range and relatively low Carbon Capture (CC) and Wildfire Resistance (WFR), suggesting limited climate buffering relative to higher-performing sites.

The wetland exhibits high sensitivity and moderate stressor exposure, indicating vulnerability to disturbance but not the highest stressor loading among assessed wetlands.

WL3 does not meet the criteria for designation as a Functional WSS under the WESP-AC FBP framework.

Wetland 4

WL4 displays a highly specialized functional profile dominated by strong hydrologic and nutrient processing functions but very limited aquatic habitat value. Surface Water Storage (WS), Sediment Retention (SR), Phosphorus Retention (PR), and Nitrate Removal (NR) all achieved high functional scores, indicating a strong role in water storage and nutrient attenuation. However, benefit scores for SR, PR, and NR were low to moderate, suggesting that these processes have limited landscape-scale relevance.

Aquatic Support (ASg) and Aquatic Habitat (AHg) were both low, reflecting the absence of fish and waterbird habitat and limited trophic support functions. In contrast, the individual scores for Transition Habitat (THg) were moderate to high, supported primarily by Pollinator Habitat (POL), Raptor and Songbird Habitat (RSB), and Keystone Mammal Habitat (KMH), indicating that WL4 contributes more to terrestrial and aerial habitat than to aquatic systems, though the final Transition Habitat FBP score ultimately categorizes as Low.

Climate-related functions were mixed, with high Carbon Stock Preservation (CSP) but low Wildfire Resistance (WFR), suggesting some carbon storage capacity but limited climate resilience.

WL4 exhibits high sensitivity and moderate stressor exposure, indicating potential vulnerability to disturbance.

Despite high Hydrologic FBP, WL4 does not satisfy any WSS designation rules.

Wetland 5

WL5 closely resembles WL4 in functional pattern, exhibiting strong hydrologic and nutrient processing functions alongside very limited aquatic habitat value. WS, SR, PR, and NR were all functionally high, reinforcing the wetland's role in water storage and nutrient attenuation, though benefit scores for the same functions were low to moderate, indicating limited downstream importance.

Aquatic Support (ASg) and Aquatic Habitat (AHg) were low, with no meaningful fish, amphibian, or waterbird habitat functions. The individual scores for Transition Habitat (THg) were moderate, supported by Pollinator Habitat (POL), Raptor and Songbird Habitat (RSB), and Keystone Mammal Habitat (KMH), indicating that WL5 primarily serves terrestrial and aerial taxa, although its final Transition Habitat FBP score evaluates to Low.

Climate-related functions were moderate, with high Carbon Stock Preservation (CSP) but low Wildfire Resistance (WFR), suggesting some carbon retention potential but limited climate buffering.

WL5 shows high sensitivity and moderate stressor exposure, indicating susceptibility to disturbance.

WL5 does not meet any of the WESP-AC criteria for Functional WSS designation.

Wetland 6

WL6 exhibits a moderately balanced functional profile, with moderate hydrologic and aquatic support functions but limited aquatic habitat value. Surface Water Storage (WS) and Nitrate Removal (NR) were moderate, while Sediment & Toxicant Retention & Stabilization (SR) was also moderate functionally but low in benefit, indicating that this process has limited landscape-scale relevance. Stream Flow and Temperature Support (SFTS) was moderate in function but low in benefit.

While the raw score for Aquatic Support (ASg) was moderate, suggesting a role in trophic processes, its final FBP score is Low. Aquatic Habitat (AHg) was low functionally due to the absence of fish and waterbird habitat and generally weak amphibian habitat.

Transition Habitat (THg) performed best in its individual categories, with moderate to high scores driven by Pollinator Habitat (POL), Raptor and Songbird Habitat (RSB), and Keystone Mammal Habitat (KMH), indicating that WL6 contributes primarily to terrestrial and aerial species, though the mathematical FBP evaluates to Low.

Sensitivity and stressor exposure were both moderate, suggesting intermediate vulnerability to disturbance.

WL6 does not meet the criteria for Functional WSS designation.

Wetland 7

WL7 exhibits a generally moderate functional profile, with balanced but not exceptional performance across most function groups. While individual Hydrologic (HYg) and Water & Climate Protection (WQg) functions were moderate, their final FBP scores evaluate to Low.

Similarly, raw scores for Aquatic Support (ASg) were moderate, suggesting some contribution to trophic processes, and Aquatic Habitat (AHg) was moderate in function but high in benefit (driven primarily by Waterbird Nesting Habitat and moderate amphibian habitat), though both ultimately resulted in Low FBP classifications.

Transition Habitat (THg) was the strongest functional group, rated high in both individual function and benefit, supported by strong Native Plant Habitat (PH), Pollinator Habitat (POL), and moderate Raptor and Songbird Habitat (RSB), which is accurately reflected in its Moderate Transition Habitat FBP score.

Sensitivity and stressor exposure were both moderate, indicating intermediate resilience.

WL7 does not meet any of the WESP-AC rules for Functional WSS designation.

Wetland 8

WL8 shows a moderate but uneven functional profile, with stronger transition habitat values and weaker aquatic habitat performance. Hydrologic and water-quality functions were generally moderate to low, with WS, SR, and PR performing modestly and NR rated moderate in function but low in benefit, suggesting limited landscape-scale water-quality services, which resulted in Low FBP scores.

While the raw scores for Aquatic Support (ASg) were moderate, indicating some role in trophic processes, its final FBP category is Low. Aquatic Habitat (AHg) was low functionally, reflecting the absence of fish and waterbird habitat and only limited amphibian habitat.

Transition Habitat (THg) was high in both individual function and benefit, driven by strong Pollinator Habitat (POL), moderate Raptor and Songbird Habitat (RSB), and moderate Native Plant Habitat (PH). This suggests WL8 primarily supports terrestrial and aerial species, resulting in a Moderate Transition Habitat FBP score.

WL8 exhibits high sensitivity and moderate stressor exposure, indicating potential vulnerability to disturbance.

WL8 does not meet the criteria for Functional WSS designation.

Wetland 9

WL9 exhibits a functional profile similar to WL6, with moderate hydrologic performance but weak aquatic habitat values. WS was moderate, while SR, PR, and NR were functionally moderate to high but consistently low in benefit, indicating limited landscape-scale relevance of these processes. SFTS and OE were absent, reflecting limited hydrologic connectivity.

Aquatic Support (ASg) was low functionally, as was Aquatic Habitat (AHg) due to the absence of fish and waterbird habitat and only limited amphibian habitat.

Individual scores for Transition Habitat (THg) were moderate to high, supported by Pollinator Habitat (POL), Raptor and Songbird Habitat (RSB), and Keystone Mammal Habitat (KMH), indicating that WL9 primarily supports terrestrial and aerial taxa rather than aquatic species, though its combined FBP evaluates to Low.

Sensitivity was high and stressor exposure moderate, suggesting vulnerability to disturbance.

WL9 does not meet any of the WESP-AC criteria for Functional WSS designation.

7.1.3 FLORA

REGULATORY CONTEXT

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to flora.

FEDERAL

- ***Species at Risk Act*** **(S.C. 2002, c. 29)** - This Act protects SAR and their critical habitats across Canada, prohibiting harm to listed species and habitat destruction. For this Project, it ensures listed terrestrial flora species are safeguarded, with measures in place to prevent habitat impacts.

PROVINCIAL

- ***Endangered Species Act*** **(S.N.S. 1998, c. 11)** - This Act protects SAR and their critical habitats in Nova Scotia, prohibiting harm, harassment, or destruction. For this Project, it ensures listed terrestrial flora species are safeguarded, with measures in place to prevent habitat impacts.
- ***Biodiversity Act*** **(S.N.S. 2021, c. 3)** - This Act provides a legal framework for the protection, conservation, and sustainable use of biodiversity in Nova Scotia, including the protection of provincially

listed SAR and their habitats. Project activities must comply with the provisions of this Act to ensure the preservation of local ecological integrity and sensitive species.

DESKTOP REVIEW: METHODOLOGY

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

- ACCDC Data Report (ACCDC, 2025; Appendix D)
- Provincial Landscape Viewer (NSNRR, n.d.-d)
- Significant Species and Habitats Database (NSNRR, 2023)

DESKTOP REVIEW: RESULTS

According to ACCDC records, 13 SAR/SOCI flora species have been identified within 5 km of the Project, including seven vascular and six nonvascular species (Table 7.5; Drawing 7.1.3.1). Four SAR were recorded near (but outside) the Project Site, including Eastern White Cedar (*Thuja occidentalis*), Black-foam Lichen (*Anzia colpodes*), Frosted Glass-whiskers – Atlantic population (*Sclerophora peronella*), and Wrinkled Shingle Lichen (*Pannaria lurida*). None of these species were observed during site-specific surveys.

Table 7.5: SAR/SOCI Flora Species Identified Within 5 km of the Project Based on ACCDC Records

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
Vascular Flora						
American Beech	*Fagus grandifolia*	---	---	---	S3S4	4.8 ± 0.2
Arrow-Leaved Violet	*Viola sagittata var. ovata*	---	---	---	S3S4	4.4 ± 0.01
Blue Vervain	*Verbena hastata*	---	---	---	S3S4	5.0 ± 0.2
Climbing False Buckwheat	*Fallopia scandens*	---	---	---	S3S4	5.0 ± 2.5
Downy Rattlesnake-Plantain	*Goodyera pubescens*	---	---	---	S2S3	4.4 ± 0.2
Eastern White Cedar	***Thuja occidentalis***	**---**	**---**	**Vulnerable**	**S3**	**3.7 ± 0.01**
Yellow Ladies'-tresses	*Spiranthes ochroleuca*	---	---		S3?	3.2 ± 1.0
Nonvascular Flora						
Acadian Jellyskin Lichen	*Leptogium acadiense*	---	---	---	S3S4	3.7 ± 0.01
Black-foam Lichen	***Anzia colpodes***	**Threatened**	**Threatened**	**Threatened**	**S3**	**3.7 ± 0.2**
Frosted	***Sclerophora peronella (Atlantic***	**Special**	**Special**	**---**	**S3S4**	**3.9 ± 0.01**

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
Glass-whiskers (Atlantic population)	***pop.)***	**Concern**	**Concern**			
Tenacious Scalewort	*Radula tenax*	---	---	---	S1S3	3.9 ± 0.2
Valley Oakmoss Lichen	*Evernia prunastri*	---	---	---	S3S4	4.2 ± 0.01
Wrinkled Shingle Lichen	***Pannaria lurida***	**Threatened**	**Threatened**	**Threatened**	**S3**	**4.1 ± 0.01**

Source: ACCDC (2025)

Note: Bold indicates SAR. Conservation ranks reflect the most current designations available, which may differ from ACCDC (2025).

A review of the Provincial Landscape Viewer within 5 km of the Project Site did not identify any flora-related features of conservation concern.

FIELD PROGRAMS: METHODOLOGY

GENERAL INVENTORY: A general vegetation (including lichens) survey was conducted within the Project Site, with numerous surveys completed through the period of May to October 2025. Additional opportunistic vegetation observations were made during Mainland Moose winter tracking surveys completed in early March 2026. Surveys were conducted using a 'meandering transect' technique and were completed across multiple seasonal visits to maximize exposure to species phenology. Vegetation data were also collected in tandem with other surveys (e.g., fish habitat assessments and wetland delineation). Field survey tracks are shown on Drawing 7.1.3.2. Special emphasis was placed upon identifying SAR/SOCI and their habitats. Data were collected to the standards of the ACCDC spatial data schema, and individual observations were recorded using a digital data collection form. Occurrences of rare taxa were georeferenced and documented (habitat conditions, abundance, etc.) accordingly for each individual occurrence encountered by the surveyor, except for the case of American Beech (*Fagus grandifolia*; S3S4) due to the widespread nature of this species within the Project Area. Non-rare species were recorded at their first encounter.

FIELD PROGRAMS: RESULTS

GENERAL INVENTORY: During the general vegetation surveys of the Project Site, 82 vascular plant species and seven nonvascular (lichen and liverwort) species were observed, for a total of 89 species (Appendix H; survey coverage is shown on Drawing 7.1.3.2). None are SAR, and one is SOCI: American Beech. American Beech is ubiquitous throughout the site, particularly in the early successional areas and in the deciduous forest areas (Section 7.1.5) where immature stems of the species are widespread.

Of the 89 species observed, three were exotic species not native to Nova Scotia. Of these three exotic species, none are considered to be invasive.

The relatively low species diversity observed on site is likely due to the limited variety of habitats, as much of the Project Site consists of young, regenerating forest that was previously subject to forestry activities.

7.1.4 FAUNA

REGULATORY CONTEXT

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to fauna.

FEDERAL

- ***Species at Risk Act*** **(S.C. 2002, c. 29)** - This Act protects SAR and their critical habitats across Canada, prohibiting harm to listed species and habitat destruction. For this Project, it ensures listed terrestrial fauna species are safeguarded, with measures in place to prevent habitat impacts.
- ***Migratory Birds Convention Act, 1994*** **(S.C. 1994, c. 22)** - This Act protects migratory birds, their nests, and eggs across Canada, prohibiting disturbance or harm without appropriate authorization. For this Project, it ensures that construction and operational activities are planned to avoid disturbance to migratory birds, particularly during the breeding season, through mitigation measures such as timing restrictions and pre-construction nest surveys.
- ***Migratory Birds Regulations, 2022*** **(SOR/2022-105)** - These regulations provide detailed rules for the protection of migratory birds, their nests, and eggs. They outline prohibitions on harm during key periods like nesting and include species whose nests are protected year-round, as specified in Schedule 1. The regulations set out circumstances for issuing permits and reinforce the need to avoid disruptive activities during nesting. For this Project, they support the use of mitigation measures, such as nest surveys and timing windows, to prevent harm to protected species.
- ***Canada Wildlife Act*** **(R.S.C., 1985, c. W-9)** - This Act provides authority for wildlife protection and management in Canada, including the establishment of wildlife areas for research and conservation. For this Project, it reinforces the need to consider general wildlife species in project planning and to minimize habitat disturbance where feasible.

PROVINCIAL

- ***Endangered Species Act* (S.N.S. 1998, c. 11)** - This Act protects SAR and their critical habitats in Nova Scotia, prohibiting harm, harassment, or destruction. For this Project, it ensures listed terrestrial fauna species are safeguarded, with measures in place to prevent habitat impacts.

- ***Wildlife Act* (R.S.N.S. 1989, c. 504)** - This Act governs wildlife protection, hunting, trapping, and habitat disturbance in Nova Scotia. For this Project, it ensures that general wildlife species are considered and protected through standard mitigation practices.

- ***Biodiversity Act* (S.N.S. 2021, c. 3)** - This Act provides a legal framework for the protection, conservation, and sustainable use of biodiversity in Nova Scotia, including the protection of provincially listed SAR and their habitats. Project activities must comply with the provisions of this Act to ensure the preservation of local ecological integrity and sensitive species.

DESKTOP REVIEW: METHODOLOGY

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

- ACCDC Data Report (ACCDC, 2025)
- NatureCounts Data (NatureCounts, n.d.)
- Important Bird Areas (IBAs) (IBA Canada, n.d.-b)
- Provincial Landscape Viewer (NSNRR, n.d.-d)
- Significant Species and Habitats Database (NSNRR, 2023)
- Nova Scotia Geoscience Atlas (NSNRR, n.d.-c)

DESKTOP REVIEW: RESULTS

According to ACCDC records, 35 SAR/SOCI terrestrial fauna species have been identified within 5 km of the Project, including 31 avifauna, two herpetofauna, and two mammals (Table 7.6; Drawing 7.1.4.1). Ten avifauna species, both herpetofauna species, and one mammal are listed as SAR.

Table 7.6: SAR/SOCI Terrestrial Fauna Species Identified Within 5 km of the Project Based on ACCDC Records

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
Avifauna						
American Goshawk	*Accipiter atricapillus*	Not at Risk	---	---	S3S4	4.4 ± 7.07
American Kestrel	*Falco sparverius*	---	---	---	S3B,	4.4 ± 7.07

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
					S4S5M	
Baltimore Oriole	*Icterus galbula*	---	---	---	S2S3B, SUM	4.4 ± 7.07
Bank Swallow	***Riparia riparia***	**Threatened**	**Threatened**	**Endangered**	**S3B**	**4.3 ± 0.25**
Barn Swallow	***Hirundo rustica***	**Special Concern**	**Threatened**	**Endangered**	**S3B**	**3.9 ± 0.25**
Bay-breasted Warbler	*Setophaga castanea*	---	---	---	S3S4B, S4S5M	4.4 ± 7.07
Black-backed Woodpecker	*Picoides arcticus*	---	---	---	S3S4	4.4 ± 7.07
Bobolink	***Dolichonyx oryzivorus***	**Special Concern**	**Threatened**	**Vulnerable**	**S2S3B**	**3.9 ± 0.25**
Boreal Chickadee	*Poecile hudsonicus*	---	---	---	S3	4.4 ± 7.07
Brown-headed Cowbird	*Molothrus ater*	---	---	---	S3B	4.3 ± 0.25
Canada Jay	*Perisoreus canadensis*	---	---	---	S3	4.4 ± 7.07
Canada Warbler	***Cardellina canadensis***	**Special Concern**	**Threatened**	**Endangered**	**S2S3B**	**4.4 ± 7.07**
Chimney Swift	***Chaetura pelagica***	**Threatened**	**Threatened**	**Endangered**	**S2S3B, S2S3M**	**2.7 ± 0.15**
Cliff Swallow	*Petrochelidon pyrrhonota*	---	---	---	S3S4B	4.4 ± 7.07
Common Nighthawk	***Chordeiles minor***	**Special Concern**	**Special Concern**	**Threatened**	**S3S4B**	**4.1 ± 0.1**
Eastern Kingbird	*Tyrannus tyrannus*	---	---	---	S3?B	4.4 ± 7.07
Eastern Wood-Pewee	***Contopus virens***	**Special Concern**	**Special Concern**	**Vulnerable**	**S3S4B**	**3.9 ± 0.25**
Evening Grosbeak	***Coccothraustes vespertinus***	**Special Concern**	**Special Concern**	**Vulnerable**	**S3B, S3N, S3M**	**3.9 ± 0.25**
Killdeer	*Charadrius vociferus*	---	---	---	S3B	3.9 ± 0.25
Olive-sided Flycatcher	***Contopus cooperi***	**Special Concern**	**Special Concern**	**Threatened**	**S3B**	**4.4 ± 7.07**
Philadelphia Vireo	*Vireo philadelphicus*	---	---	---	S2?B, SUM	3.9 ± 0.25
Pine Grosbeak	*Pinicola enucleator*	---	---	---	S3B, S5N,	4.4 ± 7.07

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
					S5M	
Pine Siskin	*Spinus pinus*	---	---	---	S3	4.7 ± 0.25
Pine Warbler	*Setophaga pinus*	---	---	---	S2S3B, S4S5M	4.4 ± 7.07
Red Crossbill	*Loxia curvirostra*	---	---	---	S3S4	4.4 ± 7.07
Red-breasted Merganser	*Mergus serrator*	---	---	---	S3B, S4S5N, S5M	4.4 ± 7.07
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	---	---	---	S3B	3.9 ± 0.25
Rusty Blackbird	***Euphagus carolinus***	**Special Concern**	**Special Concern**	**Endangered**	**S2S3B**	**4.3 ± 0.25**
Scarlet Tanager	*Piranga olivacea*	---	---	---	S2B, SUM	4.4 ± 7.07
Tennessee Warbler	*Leiothlypis peregrina*	---	---	---	S3B, S5M	4.4 ± 7.07
Wilson's Snipe	*Gallinago delicata*	---	---	---	S3B, S4M	4.4 ± 7.07
Herpetofauna						
Eastern Painted Turtle	***Chrysemys picta picta***	**Special Concern**	**Special Concern**	**---**	**S4**	**4.3 ± 0.2**
Wood Turtle*	***Glyptemys insculpta***	**Threatened**	**Threatened**	**Threatened**	**S2**	**---**
Mammals						
Fisher	*Pekania pennanti*	---	---	---	S3	3.6 ± 0.05
Mainland Moose*	***Alces alces americana***	**---**	**---**	**Endangered**	**S1**	**---**

Source: ACCDC (2025)

Note: Bold indicates SAR. Conservation ranks reflect the most current designations available, which may differ from ACCDC (2025).

*Location-sensitive species

ACCDC records also indicate the presence of two location-sensitive species: Wood Turtle (*Glyptemys insculpta*) and Mainland Moose (*Alces alces americana*). Due to the location-sensitive nature of these records, detailed occurrence information is not publicly available. No SAR/SOCI terrestrial fauna species have been identified by ACCDC within the Project Site.

The Project Site is located within Atlas Square 20LQ36 of the Maritimes Breeding Bird Atlas (MBBA). According to point count data from the most recent edition of the MBBA (2006 to 2010; NatureCounts, n.d.), 40 species were identified as possible breeders within square 20LQ36, including one SAR, Barn Swallow (*Hirundo rustica*).

The Project is situated between two IBAs: the Southern Bight of the Minas Basin (IBA NS020), located approximately 62 km east, and Brier Island (IBA NS021), about 99 km southwest. The Southern Bight of the Minas Basin is a large tidal embayment within the Minas Basin, Bay of Fundy, characterized primarily by intertidal mudflats. These mudflats are divided into five sections by river channels, each differing in invertebrate fauna and substrate composition. They serve as crucial staging grounds for an estimated 1 to 2 million shorebirds during late July and early August (IBA Canada, n.d.-c). Brier Island, positioned at the westernmost tip of Nova Scotia, approximately 50 km southwest of Digby, is predominantly forested, with lowland areas that include bogs and ponds. It provides an essential year-round feeding ground for marine birds, serves as a key migration stopover for landbirds, and supports a high diversity of birds (IBA Canada, n.d.-a).

A review of the Significant Species and Habitats Database identifies one 'Species at Risk' record and two 'Species of Concern' features within 5 km of the Project, but not within the Project Site (Drawing 7.1.4.1). The 'Species at Risk' feature pertains to Mallard (*Anas platyrhynchos*) observations; however, the Mallard is not classified as a SAR or SOCI. The 'Species of Concern' features pertain to Fisher (*Martes pennanti - S3*) observations near Eel Weir Brook and a Wood Turtle observation near Highway 10.

No abandoned mine openings were identified within 5 km of the Project Site.

FIELD PROGRAMS: METHODOLOGY

PELLET GROUP INVENTORY: Between March 30 and April 1, 2025, a Pellet Group Inventory (PGI) was conducted to survey for Mainland Moose. The survey involved eight transects, which were located both within the Project Site and the surrounding Project Area (Table 7.7). The transects, labelled from PGI-1 to PGI-8, were stratified to ensure coverage of representative habitats, including both road-based and off-road routes, and ranged in length from approximately 1,142 m to 2,510 m (Drawing 7.1.4.2). Survey efforts extended beyond the boundaries of the Project Site to account for the species' large home range, ensuring that potential movement corridors and landscape-level habitat use were adequately characterized. Surveys followed standard visual assessment methods, where field staff scanned a 4 m-wide corridor centred on the transect line, with a specific focus on Mainland Moose. Presence of Moose pellet groups, as well as tracks, browsing, and signs of other wildlife, was recorded and georeferenced using GPS-enabled devices. Habitat conditions were documented opportunistically, noting vegetation types for both road and off-road sections. Surveys were completed under suitable weather conditions, with air temperatures ranging from 2 °C to 8 °C.

Table 7.7: Mainland Moose PGI Survey Transect Details

Transect ID	Road Distance (m)	Off-Road Distance (m)	Total Distance (m)	Survey Date	Weather Notes	Road Habitat	Off-Road Habitat
PGI-1	2,365	---	2,365	2025-04-01	Light rain, minimal wind, 8°C	Along a dirt road bisecting the Project Site. Intersects with mixedwood, deciduous, and coniferous forest	---
PGI-2	2,511	---	2,511	2025-03-30	Cloudy, minimal wind, 2°C	Along dirt road southwest of Project Site, intersects with wetlands, cutblock, and forested areas	---
PGI-3	---	1,591	1,591	2025-03-30	Cloudy, minimal wind, 3°C	Along a dirt road southeast of the Project Site. Intersects with cutblock, as well as mixedwood, coniferous, and deciduous forest	---
PGI-4	---	1721	1,721	2025-03-30	Cloudy, minimal wind, 5°C	---	Streamside wetland; Streamside mixedwood forest; Stream/lakeside mature coniferous forest; Immature coniferous forest
PGI-5	396	1137	1,533	2025-04-01	Light rain, minimal wind, 8°C	Dirt road section intersects with mixedwood and coniferous forest	Stream-side mixedwood; Coniferous forest; Regenerating cut-block,
PGI-6	---	1,142	1,142	2025-04-01	Light rain, minimal wind, 8°C	Transect extends from road surveyed by PGI-1	Stream-side deciduous forest; Wetland; Regenerating cutblock
PGI-7	---	1,153	1,153	2025-03-30	Cloudy, minimal wind, 4°C	Transect extends from road surveyed by PGI-3	Coniferous forest adjacent to unnamed wetland and watercourse; Mixedwood forest
PGI-8	1,527	---	1,527	2025-03-30	Cloudy, minimal wind, 4°C	Along a dirt road southeast of the Project Site. Intersects with coniferous forest, wetland, mixedwood forest, and regenerating cutblock	---

MAINLAND MOOSE WINTER TRACKING: On March 3, 2026, a winter tracking survey was conducted to survey for Mainland Moose. The survey involved five transects, which were located both within the Project Site and the surrounding Project Area (Table 7.8). The transects, labelled from MMWT-1 to MMWT-5, were stratified to ensure coverage of representative habitats, including both road-based and off-road routes, and ranged in length from approximately 270 m to 5.3 km (Drawings 7.1.4.3A-C). Survey efforts extended beyond the boundaries of the Project Site to account for the species' large home range, ensuring that potential movement corridors and landscape-level habitat use were adequately characterized. Surveys followed standard visual assessment methods, where field staff scanned a 4 m-wide corridor centred on the transect line, with a specific focus on Mainland Moose. Presence of moose tracks, browse, pellet groups, and signs of other wildlife were recorded and georeferenced using GPS-enabled devices. For each transect, a species density rating (low, medium, or high) was attributed based on the amount of evidence observed. Habitat conditions were documented opportunistically, noting vegetation types for both road and off-road sections. Surveys were completed under suitable weather and snow conditions with air temperatures ranging from -1 °C to 1 °C.

Table 7.8: Mainland Moose Winter Tracking Survey Transect Details

Transect ID	Type	Length (m)	Survey Date & Time	Weather Notes	Snow Conditions	Habitat
MMWT-1	Road	2,760	March 3, 2026; 11:50-14:20	0 °C, sunny, moderate wind	Clear, deep (~.75 m), crisp surface, no anthropogenic tracks	Along a dirt road bisecting the Project Site. Intersects with mixedwood, deciduous, and coniferous forest
MMWT-2	Off-Road	1,580	March 3, 2026; 14:40-16:15	1 °C, sunny, moderate wind	Clear, deep (~.75 m), crisp surface, no anthropogenic tracks	Stream-side deciduous forest, wetland, and regenerating cutblock
MMWT-3	Off-Road	270	March 3, 2026; 17:30-18:00	-1 °C, partly cloudy with sun setting, low wind	Clear, deep (~.75 m), crisp surface, no anthropogenic tracks	Mature riparian mixed-wood forest adjacent to Eel Weir Brook.
MMWT-4	Road	5,330	March 3, 2026; 12:20-16:09	-1 °C to 1 °C, sunny, moderate wind	Clear, deep (~.75 m), crisp surface, ~2 cm of fresh snow on top of old snowmobile tracks.	Along a dirt road southwest of the Project Site that intersects regenerating coniferous forest, regenerating mixed-wood forest, cutblocks, wetlands, small watercourses, mid-successional coniferous forest, and mid-successional mixed-wood forest. Active forestry in the area.
MMWT-5	Off-Road	1,740	March 3, 2026; 16:30-18:00	1 °C to -1 °C, partial cloud with setting sun, moderate wind	Clear, deep (~.75 m), crisp surface, no anthropogenic tracks	Wetland (fen, treed swamp, bog), regenerating coniferous, mid-successional mixed-wood, early-successional deciduous, mature deciduous, small watercourses. Active forestry in the area.

WOOD TURTLE SURVEYS:

Round One (2025): A preliminary round of Wood Turtle surveys was completed on April 24, 2025, within and adjacent to the Project Site. The survey strategy focused on four approximately 200-metre stretches of watercourse selected for their perceived suitability as habitat. The chosen sections included two reaches of Eel Weir Brook (the delineated WC1 area and an additional segment approximately 400 m downstream to the west), along with subsections of both WC2 and WC4.

In each of these four sections, three transects were surveyed:

> **First Transect (e.g., WT-1a)**: Involved characterizing turtle habitat within and along the brook banks and searching for turtles or signs of their presence.
> **Second and Third Transects (e.g., WT-1b, WT-1c):** Extended progressively inland to identify terrestrial foraging habitat and to search for turtles or signs of their activity.

During these surveys, the air temperature ranged from 12 °C to 16 °C, and the water temperature was 2 °C.

Round Two (2026): A supplemental round of Wood Turtle surveys was completed on April 28, 2026, encompassing an approximately 2 km stretch of Eel Weir Brook southwest of the Project Site. As previous field surveys and desktop assessments indicated the presence of suitable habitat along this watercourse, and considering the capacity of the species to disperse significantly from riparian corridors during summer periods, additional survey efforts were undertaken to quantify their presence within the general vicinity of the Project.

Field personnel traversed the 2 km extent of the riparian corridor along the watercourse edge, looking for turtles and their sign. Within this reach, four specific subsections, designated as WT-5 through WT-8, were designated for supplemental assessment, including a repeat survey of WT-2. A methodology centred on the established three-transect system, which moves progressively inland, was used to survey these areas. This approach follows the same protocol as the initial Wood Turtle survey phase.

During the 2026 surveys, the air temperature ranged from 10 °C to 15 °C, and the water temperature was approximately 2 °C.

Survey transects from both years are detailed in Table 7.9 and shown on Drawing 7.1.4.4.

Table 7.9: Wood Turtle Survey Transect Details

Transect ID	Location	Length (m)	Survey Date & Time	Weather Notes
WT-1	Eel Weir Brook (Watercourse 1)	~200	April 24, 2025; 13:30	**Conditions:** Sunny **Air Temp:** 12 °C **Water Temp:** 2 °C **Ground Temp:** 5 °C
WT-2	Eel Weir Brook (Upstream)	~200	April 24, 2025; 14:30	**Conditions:** Sunny **Air Temp:** 12 °C **Water Temp:** 2 °C **Ground Temp:** 5 °C
WT-3	Watercourse 2	~200	April 24, 2025; 15:00	**Conditions:** Sun & clouds **Air Temp:** 14 °C **Water Temp:** 2 °C **Ground Temp:** 5 °C
WT-4	Watercourse 4	~200	April 24, 2025; 12:00	**Conditions:** Sun & clouds **Air Temp:** 16 °C **Water Temp:** 2 °C **Ground Temp:** 7 °C
WT-5	Eel Weir Brook (Upstream - Same section as WT-2))	~200	April 28, 2026; 10:00	**Conditions:** Sunny **Air Temp:** 10 °C **Water Temp:** 2 °C **Ground Temp:** 4 °C
WT-6	Eel Weir Brook (Upstream)	~150	April 28, 2026; 11:30	**Conditions:** Sunny **Air Temp:** 12 °C **Water Temp:** 2 °C **Ground Temp:** 4 °C
WT-7	Eel Weir Brook (Upstream)	~200	April 28, 2026; 12:30	**Conditions:** Sunny **Air Temp:** 13 °C **Water Temp:** 2 °C **Ground Temp:** 4 °C
WT-8	Eel Weir Brook (Upstream)	~400	April 28, 2026; 13:30	**Conditions:** Sunny **Air Temp:** 14 °C **Water Temp:** 2 °C **Ground Temp:** 4 °C

BREEDING BIRD SURVEYS: Breeding bird surveys were conducted using the 10-minute point count method to inventory avian species and assess their breeding activity within the Project Site. Surveys were completed at twelve point count locations distributed across the Project Site. Each location was visited twice, once on June 17, 2025, and again on July 3, 2025, to capture seasonal variations in bird activity during the core breeding season for most migratory species in Nova Scotia (early June to late July). All survey locations are shown on Drawing 7.1.4.5.

Breeding evidence was recorded using the MBBA breeding evidence codes, which include confirmed, observed, probable, and possible, to classify the breeding status of each species detected (Stewart et al., 2015; Table 7.10).

Table 7.10: MBBA Breeding Codes

Breeding Code	Description
OBSERVED	
X	Species observed during its breeding season but in non-breeding habitat (no evidence of breeding). Presumed migrants should not be recorded. Note that this code is rarely used, as birds tend to occupy nesting habitat during the breeding season.
POSSIBLE	
H	Species observed during its breeding season in suitable nesting habitat.
S	Singing male present, or breeding calls heard, during the species' breeding season and in suitable nesting habitat.
PROBABLE	
P	Pair observed during their breeding season in suitable nesting habitat.
T	Permanent territory presumed through registration of territorial song, or the occurrence of an adult bird, at the same place, in breeding habitat, on at least two days, one week or more apart, during its breeding season.
D	Courtship or display between a male and a female or two males, including courtship feeding or copulation.
V	Adult visiting probable nest site.
A	Agitated behaviour or anxiety calls of an adult.
B	Brood patch on adult female or cloacal protuberance on adult male.
N	Nest building or excavation of nest hole (woodpeckers and wrens). Both groups may build dummy or roosting nests, so nest building alone is not enough to confirm breeding.
CONFIRMED	
NB	Nest building (by all except wrens and woodpeckers) or adult carrying nesting material.
DD	Distraction display or injury feigning.
NU	Used nest or eggshell found (occupied or laid within the period of the survey).
FY	Recently fledged young (nidicolous species) or downy young (nidifugous species), including young incapable of sustained flight.
AE	Adult leaving or entering nest site in circumstances indicating occupied nest.
FS	Adult carrying fecal sac.
CF	Adult carrying food for young.
NE	Nest containing eggs.

Breeding Code	Description
NY	Nest with young seen or heard.

Source: Stewart et al. (2015)

At each survey point, two stationary observers recorded all birds observed or heard during a 10-minute period. Bird observations were logged using a Fraxinus-developed mobile application, which allowed observers to record the estimated distance and bearing of each detection based on a map interface with distance reference overlays. Flyovers were also recorded within the application. Habitat characteristics, such as vegetation type and cover, were also documented to provide context for bird activity at each location.

Weather conditions, including wind speed, wind direction, air temperature, and precipitation, were recorded to account for environmental factors that might influence bird activity. All data were collected and stored digitally using Fraxinus field data collection forms, and survey points were georeferenced.

NIGHTJAR SURVEYS: Nightjar surveys were conducted on July 7, 2025, following the Canadian Nightjar Survey Protocol (Knight et al., 2019). Surveys were completed at two predetermined stations and were six minutes in duration. Surveys were conducted between dusk and two hours post-dusk under suitable conditions, including low wind, no precipitation, and appropriate sky conditions. Survey locations are shown on Drawing 7.1.4.5.

Target species for these surveys are the Common Nighthawk (*Chordeiles minor*) and the Eastern Whip-Poor-Will (*Antrostomus vociferus*). All detections of target species were recorded with associated data, including estimated distance, direction of detection, and behavioural observations where applicable.

TRAIL CAMERAS: Trail cameras were deployed from May 7 to October 29, 2025, at two locations within the Project Site to passively document wildlife presence. Two motion-activated trail cameras equipped with infrared night-vision were installed in representative areas, including Camera 1 located along Eel Weir Brook (WC1) in the northern portion of the Project Site and Camera 2 located in the central-northern portion of the Project Site along the road bisecting the Site. Cameras were checked regularly to replace storage cards and batteries as needed. At the end of the deployment period, all photos were reviewed by a biologist to identify wildlife species, document activity patterns, and assess general wildlife use of the Project Site. Trail camera locations are shown on Drawing 7.1.4.5.

BAT MONITORING: An acoustic bat monitor (AudioMoth) was deployed from April 11 to October 29, 2025, capturing data across the summer and fall active seasons. The monitor was positioned near the central-southern end of the Project Site within WL3 and was programmed to record from 20:00 to 6:00, aligning with peak bat activity, and set to an ultrasonic sampling rate of 192 kHz. Regular checks ensured the monitor's functionality,

with storage cards and batteries replaced as needed. The bat monitor deployment location is shown on Drawing 7.1.4.5.

The data were processed using Kaleidoscope Pro, with sonograms analyzed for potential bat-generated ultrasonic vocalizations. Calls were identified to species when possible. Initially, Kaleidoscope Pro automatically identified the calls, which were then manually verified or corrected by a biologist.

Due to the similarity in their calls, Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis (*Myotis septentrionalis*) are difficult to reliably distinguish. As a result, these calls were not identified to the species level. Additionally, sounds from non-bat sources were classified as either 'Noise' (e.g., environmental sounds such as vegetation movement, wind, or precipitation) or 'Bird'.

Below are the identification codes used for bat species or groups:

- **MYOT** - *Myotis* species (Little Brown Myotis or Northern Myotis)
- **LABO** - Eastern Red Bat (*Lasiurus borealis*)
- **LACI** - Hoary Bat (*Lasiurus cinereus*)
- **LANO** - Silver-haired Bat (*Lasionycteris noctivagans*)

BIRD MONITORING: An acoustic bird monitor (AudioMoth) was deployed from April 11 to October 29, 2025, capturing data across the spring, summer, and fall active seasons. The monitor was positioned near the central-southern end of the Project Site within WL3 and was programmed to record from 05:00 to 6:15, aligning with dawn chorus activity, and set to a sample rate of 48 kHz. Regular checks ensured the monitor's functionality, with storage cards and batteries replaced as needed. The bird monitor deployment location is shown on Drawing 7.1.4.5.

Recorded .wav files were processed manually by a qualified biologist, with a total of 1,079 files reviewed over the monitoring period. Files ranged in length from 10 to 60 seconds. Calls were identified and assessed on a weekly basis, with species presence notes across a 9-week breeding season spanning June 1 to July 27.

Below are the species codes used for bird species:

- **ALFL** - Alder Flycatcher (*Empidonax alnorum*)
- **AMRO** - American Robin (*Turdus migratorius*)
- **BAWW** - Black-and-white Warbler (*Mniotilta varia*)
- **BCCH** - Black-capped Chickadee (*Poecile atricapillus*)
- **BTNW** - Black-throated Green Warbler (*Setophaga virens*)
- **CEWA** - Cedar Waxwing (*Bombycilla cedrorum*)

- **COYE** - Common Yellowthroat (*Geothlypis trichas*)
- **DEJU** - Dark-eyed Junco (*Junco hyemalis*)
- **GCKI** - Golden-crowned Kinglet (*Regulus satrapa*)
- **HAWO** - Hairy Woodpecker (*Dryobates villosus*)
- **HETH** - Hermit Thrush (*Catharus guttatus*)
- **NAWA** - Nashville Warbler (*Leiothlypis ruficapilla*)
- **OVEN** - Ovenbird (*Seiurus aurocapilla*)
- **RBNU** - Red-breasted Nuthatch (*Sitta canadensis*)
- **REVI** - Red-eyed Vireo (*Vireo olivaceus*)
- **SOSP** - Song Sparrow (*Melospiza melodia*)
- **WTSP** - White-throated Sparrow (*Zonotrichia albicollis*)

FIELD PROGRAMS: RESULTS

The following summarizes the findings of the Mainland Moose PGI, Wood Turtle, breeding bird, and nightjar surveys, trail camera and bird and bat acoustic monitoring results, and winter tracking surveys.

PELLET GROUP INVENTORY: No evidence of Mainland Moose was recorded during the eight PGI surveys. Documented signs of other wildlife species included tracks, pellets, bones, and browse from White-tailed Deer (*Odocoileus virginianus*); tracks and scat from the Coyote (*Canis latrans*); scat from the North American Porcupine (*Erethizon dorsatum*); pellets from Snowshoe Hare (*Lepus americanus*); gnaw marks from North American Beaver (*Castor canadensis*); one visual sighting of an Eastern Chipmunk (*Tamias striatus*)*;* and several Pileated Woodpecker (*Dryocopus pileatus*) feeding cavities (Table 7.11).

American Black Bear (*Ursus Americanus*) tracks were also opportunistically documented within WL2, in addition to the observations made along these transects.

Representative photos of PGI observations are included in Appendix I (Wildlife Photo Log).

Table 7.11: Summary of Moose PGI Survey Results

Transect ID	Observations
PGI-1	Coyote scat, Deer tracks, Porcupine scat
PGI-2	Coyote scat
PGI-3	Coyote scat, Chipmunk observation, Deer tracks
PGI-4	Hare pellets, Deer pellets
PGI-5	Porcupine scat, Deer browse, Deer bones, Beaver gnaw, Pileated Woodpecker feeding cavities, Coyote scat
PGI-6	Pileated Woodpecker feeding cavities, Coyote scat, Hare pellets, Deer pellets

Transect ID	Observations
PGI-7	Deer pellets, Deer tracks, Hare pellets
PGI-8	Coyote scat

Note: American Black Bear tracks opportunistically observed approximately 125 m from PGI-1, within WL2

MAINLAND MOOSE WINTER TRACKING: No evidence of Mainland Moose was recorded during the five winter tracking surveys. Documented signs of other wildlife species included tracks and browse from White-tailed Deer, tracks and scat from the Coyote, tracks and scat from Snowshoe Hare, visual sightings and tracks from Red Squirrel (*Tamiasciurus hudsonicus*), tracks from Bobcat (*Lynx rufus*), and tracks from unidentified small mammals. Abundance of species observations and additional notes are depicted in Table 7.12 below.

Representative photos of winter tracking observations are included in Appendix I (Wildlife Photo Log).

Table 7.12: Summary of Mainland Moose Winter Tracking Survey Results

Transect ID	Observations	Notes
MMWT-1	• Snowshoe Hare tracks (high density) • White-tailed Deer tracks (low density) • Coyote tracks (moderate density) • Red Squirrel tracks (low density) • Small mammal tracks (low density)	A set of Coyote prints with an adjacent drag mark was observed. Blood droplets were observed along the drag mark.
MMWT-2	• Snowshoe Hare tracks and scat (high density) • White-tailed Deer tracks and browse (low density) • Coyote tracks (moderate density) • Red Squirrel tracks (low density)	Snowshoe Hare tracks most prevalent in regenerating cut area
MMWT-3	• Snowshoe Hare tracks (Moderate density) • White-tailed Deer tracks (low density) • Red Squirrel tracks (low density)	Short transect, ran out of daylight
MMWT-4	• Red Squirrel visual & tracks (low density) • Coyote tracks and scat (high density) • Snowshoe Hare tracks (high density) • Ruffed Grouse visual (high density) • Bobcat tracks (moderate density) • Small mammal tracks (low to moderate density)	A set of small mammal tracks was observed leading to talon marks, likely indicating raptor predation.
MMWT-5	• Coyote tracks (high density) • Snowshoe Hare tracks and scat (high density) • Red Squirrel (low density) • White-tailed Deer tracks (low density) • Small mammal tracks (moderate density)	A partially snow-covered mammal skeleton (likely a White-tailed Deer or Coyote) was observed at the beginning of the transect along the dirt road.

WOOD TURTLE SURVEYS: No Wood Turtles were observed within any of the transects assessed. However, habitat characterization revealed distinct functional attributes across the watercourses surveyed (Table 7.13).

Round One (2025): Overwintering habitat was identified within both sections of Eel Weir Brook (WT-1 and WT-2). This is the only watercourse with sufficient pool depth (>0.5 m) to support successful hibernation. In contrast, WC2, WC3, and WC4 were deemed unsuitable for overwintering due to shallow water depths (<0.40 m) and, in the case of WC3, hypoxic conditions.

Seasonal habitat (Basking and Foraging) was more widely distributed. Functional basking areas were recorded along the banks of WC1 (WT-1), downstream Eel Weir Brook (WT-2), and WC2 (WT-3). While field observations highlighted WC4 (WT-4) as having the most distinct foraging characteristics during this survey, the riparian communities of WC1 and WC2 containing Speckled Alder and Cinnamon Fern also provide high-quality foraging potential during the active summer months. No suitable nesting habitat (exposed sandy beaches or gravel bars) was identified within any of the surveyed sections.

Round Two (2026): Field assessments documented suitable habitat features across the full extent of the survey reach, indicating that the assessed stretch of Eel Weir Brook possesses high overall habitat complexity for Wood Turtles.

Functional overwintering habitat was identified within all four transect sections, characterized by the presence of permanent flowing water, sufficient pool depths (>0.5 m), and appropriate shelter locations. The consistent occurrence of these qualifying features suggests that this reach of Eel Weir Brook provides reliable hibernation conditions for the species.

Basking habitat was distributed across all transects. Suitable basking sites, comprising logs and rocks at the water surface, many featuring open aspects with unobstructed water access, were recorded along all four transects. High-quality foraging habitat was similarly widespread; riparian floodplains, alder-shrub edges, and open movement corridors were documented across the four transects. Noteworthy foraging features included dense graminoid and shrub cover associated with deep pools in WT-5, a rocky floodplain situated off the main channel in WT-6, and a shrubby fen characterizing WT-8. Additionally, beaver activity recorded in WT-5 and WT-8 likely contributes to localized pool formation and increased habitat complexity.

No suitable nesting habitat, such as exposed sandy beaches or gravel bars, was identified within any of the surveyed transect sections.

Table 7.13: Summary of Wood Turtle Survey Results

Transect ID	Location	Weather Notes	Turtles Observed? (Y/N)	Habitat			
				Overwintering Present? (Y/N)	Basking Present? (Y/N)	Nesting Present? (Y/N)	Foraging Present? (Y/N)
WT-1	Eel Weir Brook (WC1)	**Conditions:** Sunny **Air Temp:** 12°C **Water Temp:** 2°C **Ground Temp:** 5°C	No	Yes	Yes	No	Yes
WT-2	Eel Weir Brook (Upstream from Project Site)	**Conditions:** Sunny **Air Temp:** 12°C **Water Temp:** 2°C **Ground Temp:** 5°C	No	Yes	Yes	No	Yes
WT-3	WC2	**Conditions:** Sun & clouds **Air Temp:** 14°C **Water Temp:** 2°C **Ground Temp:** 5°C	No	No	Yes	No	Yes
WT-4	WC4	**Conditions:** Sun & clouds **Air Temp:** 16°C **Water Temp:** 2°C **Ground Temp:** 7°C	No	No	No	No	Yes
WT-5	Eel Weir Brook (Upstream - Same section as WT-2))	**Conditions:** Sunny **Air Temp:** 10 °C **Water Temp:** 2 °C **Ground Temp:** 4 °C	No	Yes	Yes	No	Yes
WT-6	Eel Weir Brook (Upstream from Project Site)	**Conditions:** Sunny **Air Temp:** 12 °C **Water Temp:** 2 °C **Ground Temp:** 4 °C	No	Yes	Yes	No	Yes
WT-7	Eel Weir Brook (Upstream from Project Site)	**Conditions:** Sunny **Air Temp:** 13 °C **Water Temp:** 2 °C **Ground Temp:** 4 °C	No	Yes	Yes	No	Yes
WT-8	Eel Weir Brook (Upstream from Project Site)	**Conditions:** Sunny **Air Temp:** 14 °C **Water Temp:** 2 °C **Ground Temp:** 4 °C	No	Yes	Yes	No	Yes

BREEDING BIRD SURVEYS: A total of 32 bird species from 13 different families were observed during the two rounds of breeding bird surveys within the Project Site (Table 7.14; Drawing 7.1.4.6). Of these, one species, Eastern Wood-Pewee (*Contopus virens*), is listed as a SAR.

Table 7.14: Avifauna Identified During 2025 Breeding Bird Surveys

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Breeding Evidence
Alder Flycatcher	*Empidonax alnorum*	---	---	---	S5B	Possible (S)
American Goldfinch	*Spinus tristis*	---	---	---	S5	Possible (S)
American Redstart	*Setophaga ruticilla*	---	---	---	S5B	Possible (S)
American Robin	*Turdus migratorius*	---	---	---	S5B, S5N	Possible (H, S)
Black-and-white Warbler	*Mniotilta varia*	---	---	---	S5B	Possible (S)
Black-capped Chickadee	*Poecile atricapillus*	---	---	---	S5	Possible (S)
Blue Jay	*Cyanocitta cristata*	---	---	---	S5	Possible (S)
Black-throated Blue Warbler	*Setophaga caerulescens*	---	---	---	S4B	Possible (S)
Black-throated Green Warbler	*Setophaga virens*	---	---	---	S4B	Probable (T)
Cedar Waxwing	*Bombycilla cedrorum*	---	---	---	S5B	Possible (S)
Common Yellowthroat	*Geothlypis trichas*	---	---	---	S5B	Possible (S)
Chestnut-sided Warbler	*Setophaga pensylvanica*	---	---	---	S5B	Possible (S)
Dark-eyed Junco	*Junco hyemalis*	---	---	---	S4S5	Possible (S)
Downy Woodpecker	*Dryobates pubescens*	---	---	---	S5	Possible (S)
Eastern Wood-Pewee	***Contopus virens***	**Special Concern**	**Special Concern**	**Vulnerable**	**S3S4B**	**Possible (S)**
Hermit Thrush	*Catharus guttatus*	---	---	---	S5B	Possible (H, S)
Least Flycatcher	*Empidonax minimus*	---	---	---	S5B	Possible (S)
Magnolia Warbler	*Setophaga magnolia*	---	---	---	S4S5B	Possible (S)
Mourning Dove	*Zenaida macroura*	---	---	---	S5	Possible (S)
Northern Flicker	*Colaptes auratus*	---	---	---	S5B	Possible (S)
Northern Parula	*Setophaga americana*	---	---	---	S5B	Possible (S)

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Breeding Evidence
Ovenbird	*Seiurus aurocapilla*	---	---	---	S5B	Possible (S)
Palm Warbler	*Setophaga palmarum*	---	---	---	S5B	Possible (S)
Pileated Woodpecker**	*Dryocopus pileatus*	---	---	---	S5	Observed (X)
Purple Finch	*Haemorhous purpureus*	---	---	---	S5B, S4N	Possible (S)
Red-breasted Nuthatch	*Sitta canadensis*	---	---	---	S4S5	Possible (S)
Red-eyed Vireo	*Vireo olivaceus*	---	---	---	S5B	Possible (S)
Turkey Vulture	*Cathartes aura*	---	---	---	S4B	Observed (X)
White-breasted Nuthatch	*Sitta carolinensis*	---	---	---	S4	Possible (S)
White-throated Sparrow	*Zonotrichia albicollis*	---	---	---	S4S5B, S5M	Possible (S)
Yellow-bellied Sapsucker	*Sphyrapicus varius*	---	---	---	S5B	Possible (S)
Yellow-rumped Warbler	*Setophaga coronota*	---	---	---	S5B	Possible (S)

**Subject to nest protections under the *Migratory Birds Regulations, 2022*, S.O.R./2022-105

Note: Bold indicates SAR

Species most frequently observed across both survey rounds included Ovenbird (*Seiurus aurocapilla*; 21 individuals), Red-eyed Vireo (*Vireo olivaceus*; 17 individuals), Hermit Thrush (*Catharus guttatus*; 16 individuals), Black-and-white Warbler (*Mniotilta varia*; 16 individuals), and Mourning Dove (*Zenaida macroura*; 12 individuals).

Most species were assigned a Possible Breeding status, primarily based on the presence of singing males or breeding calls in suitable habitat during the breeding season. One species, Black-throated Green Warbler (*Setophaga virens*), was classified as Probable Breeding based on the detection of a territorial male in suitable breeding habitat. A small number of species were recorded as Observed, indicating detection during the breeding season without evidence of breeding.

NIGHTJAR SURVEYS: No nightjar species were detected at the survey station located within the Project Site (NJ1). Two Common Nighthawks were detected by call at the survey station located west of the Project Site on adjacent Crown land (NJ2), indicating continued presence during the survey period. Both individuals were estimated to be located at distances greater than 100 m from the survey station.

No wing-booming or visual detections were recorded. Eastern Whip-Poor-Will was not detected during the survey.

TRAIL CAMERAS: Trail camera data captured a total of 15 species (four birds and 11 mammals; Table 7.15), notably including one SOCI, a Fisher, which was documented by Camera 1 along Eel Weir Brook in the northern portion of the Project Site. See the Wildlife Photo Log (Appendix I) for representative images.

Table 7.15: Trail Camera Fauna Observations

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	# of Obs.
American Black Bear	*Ursus americanus*	Not at Risk	---	---	S5	12
American Robin	*Turdus migratorius*	---	---	---	S5B, S5N	7
Blue Jay	*Cyanocitta cristata*	---	---	---	S5	2
Bobcat	*Lynx rufus*	---	---	---	S4S5	1
Coyote	*Canis latrans*	---	---	---	S5	54
Red Squirrel	*Tamiasciurus hudsonicus*	---	---	---	S5	10
Fisher	***Pekania pennanti***	**---**	**---**	**---**	**S3**	**2**
North American Porcupine	*Erethizon dorsatum*	---	---	---	S5	4
Raccoon	*Procyon lotor*	---	---	---	S5	19
Ruffed Grouse	*Bonasa umbellus*	---	---	---	S5	5
Striped Skunk	*Mephitis mephitis*	---	---	---	S5	2
Snowshoe Hare	*Lepus americanus*	---	---	---	S5	1
White-tailed Deer	*Odocoileus virginianus*	---	---	---	S5	22
Winter Wren	*Troglodytes hiemalis*	---	---	---	S5B	1
North American Deer Mouse	*Peromyscus maniculatus*	---	---	---	S5	30

Note: Bold indicates SOCI

BAT MONITORING: A total of 128 files out of 65,618 files were recorded by the bat monitor as bat-generated ultrasound (Table 7.16). The remaining files were attributed to non-bat sources, including environmental noise (e.g., vegetation movement, wind, or precipitation), bird calls, and dummy files (files that have no data). The following bat species were detected during the acoustic survey:

- *Myotis* species (MYOT)
- Eastern Red Bat (LABO)
- Hoary Bat (LACI)
- Silver-haired Bat (LANO)

Table 7.16: Summary of Bat Call Detections From the Passive Acoustic Survey

MYOT (*Myotis Spp.)*	LABO (*L. Borealis)*	LACI (*L. cinereus*)	LANO (*L. noctivagans*)	Total Calls
41	10	70	7	128

All species identified are SOCI, with *Myotis* species additionally designated as SAR; a summary of their conservation status is provided in Table 7.17.

Table 7.17: Conservation Status of Bat Species Detected

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank
Eastern Red Bat	*Lasiurus borealis*	Endangered	---	---	SUB, S1M
Hoary Bat	*Lasiurus cinereus*	Endangered	---	---	SUB, S1M
Little Brown Myotis	*Myotis lucifugus*	Endangered	Endangered	Endangered	S1
Northern Myotis	*Myotis septentrionalis*	Endangered	Endangered	Endangered	S1
Silver-haired Bat	*Lasionycteris noctivagans*	Endangered	---	---	SUB, S1M

Resident species (those that hibernate in caves and abandoned mines during the winter, such as *Myotis* species) accounted for 32% of calls, while migratory species (those that migrate south for the winter, such as Eastern Red Bat, Hoary Bat, and Silver-haired Bat) made up the remaining 68%. Monthly call activity by species is presented in Figure 7.1.4.1.

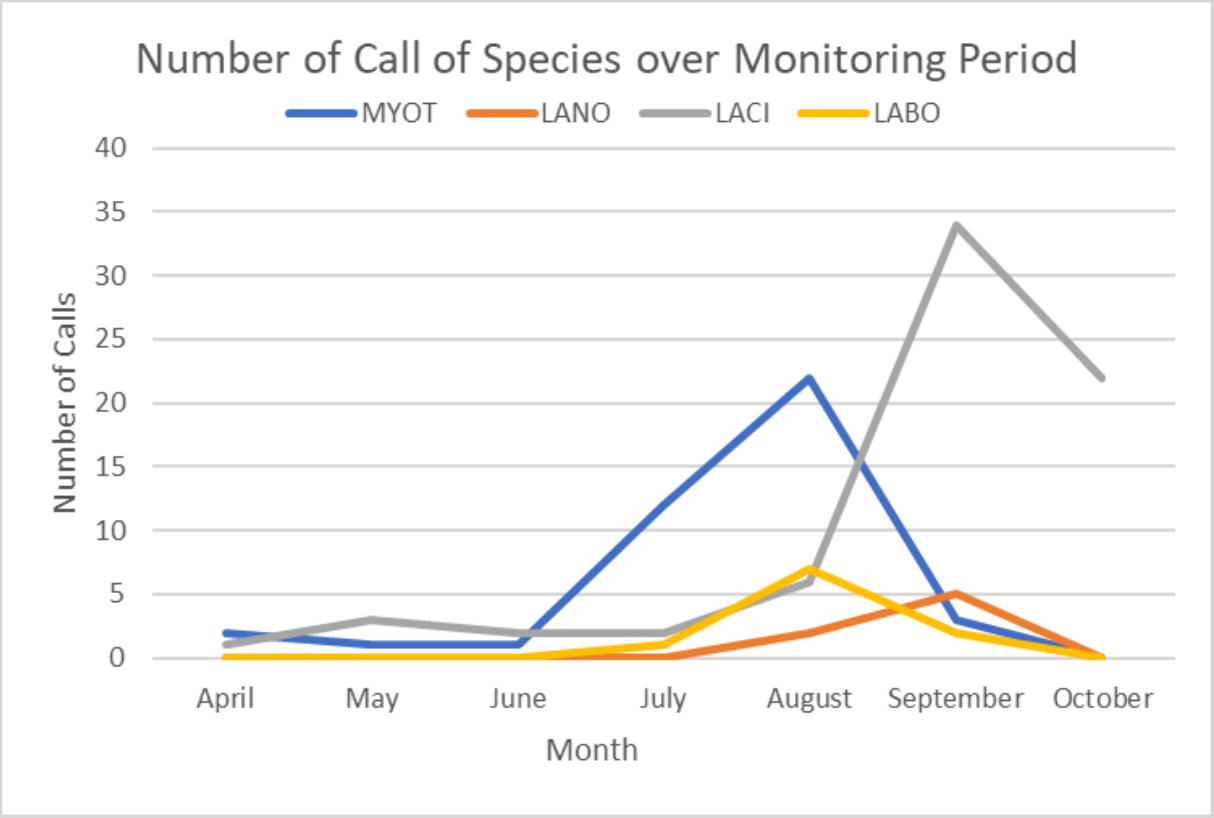


Figure 7.1.4.1: Monthly bat call activity by species.

Myotis activity was consistent throughout the monitoring period. June showed relatively low *Myotis* bat activity, with no distinct peaks. In July, *Myotis* bat activity increased significantly, suggesting heightened foraging or breeding activity during this month. August showed the highest volume of *Myotis* bat activity, with a decline into September, likely due to seasonal changes resulting in reduced foraging opportunities before hibernation. Overall, *Myotis* bat activity was highest in July and August, most likely associated with pre-hibernation foraging activity.

Hoary Bat, a migratory species, had little to no calls until July, with activity increasing significantly in August. Hoary Bat activity then spiked, becoming the species with the highest recorded level of activity in September. These numbers coincide with pre-migratory foraging activity. Activity began to decline in October, suggesting that migration was underway.

Eastern Red Bat, another migratory species, did not exhibit the same volume of calls as Hoary Bat but was detected periodically, with the most significant volume recorded in August, followed by a decline into September and no detections in October. This pattern coincides with the migration period.

Silver-haired Bat was most similar in activity to Eastern Red Bat, with no detections until August, followed by another increase in September.

BIRD MONITORING: The following bird species were detected during the acoustic survey (Figure 7.1.4.2):

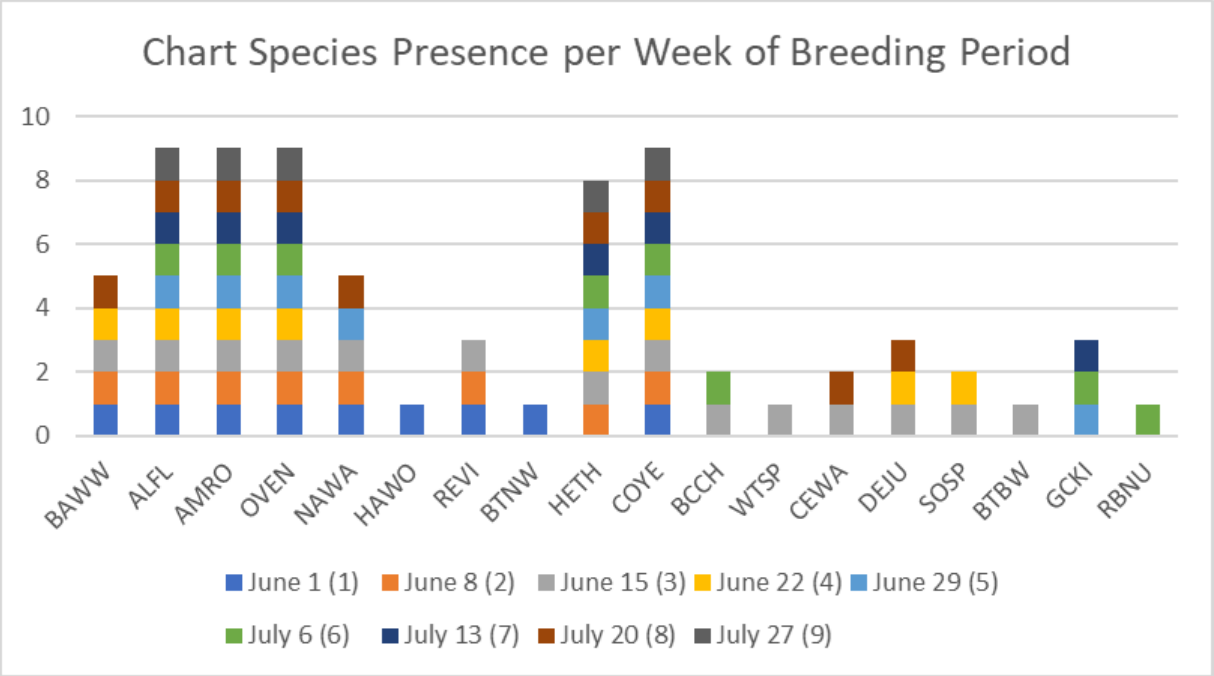


Figure 7.1.4.2: Bird species detected over a 9-week breeding period.

The data show that Alder Flycatcher (*Empidonax alnorum*), American Robin (*Turdus migratorius*), Ovenbird, and Common Yellowthroat (*Geothlypis trichas*) occur every week and account for a large proportion of detections, consistent with the breeding period. These species were followed closely by Hermit Thrush, which was detected in all but the first week. Nashville Warbler (*Leiothlypis ruficapilla*) and Black-and-white Warbler were detected during five of the nine weeks, with most detections occurring early in the monitoring period. Red-eyed Vireo was detected in three of the nine weeks, but only during the first month. Dark-eyed Junco (*Junco hyemalis*) and Golden-crowned Kinglet (*Regulus satrapa*) were detected in three out of the nine weeks, closer to the middle of the breeding period. Black-capped Chickadee (*Poecile atricapillus*) was detected twice, during weeks 3 and 6. Cedar Waxwing (*Bombycilla cedrorum*) and Song Sparrow (*Melospiza melodia*) were each detected twice during the monitoring period, with Cedar Waxwing recorded in weeks 3 and 8, and Song Sparrow in weeks 3 and 4. Hairy Woodpecker (*Dryobates villosus*) and Black-throated Green Warbler were both detected only once, in the first week. White-throated Sparrow (*Zonotrichia albicollis*) and Black-throated Blue Warbler (*Setophaga caerulescens*) were both detected only in the third week. Red-breasted Nuthatch (*Sitta canadensis*) was detected once, in the sixth week.

7.1.5 TERRESTRIAL HABITAT

REGULATORY CONTEXT

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to the terrestrial habitat.

FEDERAL

- ***Species at Risk Act*** **(S.C. 2002, c. 29)** - This Act protects SAR and their critical habitats across Canada, prohibiting harm to listed species and habitat destruction. For this Project, it ensures listed terrestrial species are safeguarded, with measures in place to prevent habitat impacts.

PROVINCIAL

- ***Endangered Species Act*** **(S.N.S. 1998, c. 11)** - This Act protects SAR and their critical habitats in Nova Scotia, prohibiting harm, harassment, or destruction. For this Project, it ensures listed terrestrial species are safeguarded, with measures in place to prevent habitat impacts.
- ***Biodiversity Act*** **(S.N.S. 2021, c. 3)** - This Act provides a legal framework for the protection, conservation, and sustainable use of biodiversity in Nova Scotia, including the protection of provincially listed SAR and their habitats. Project activities must comply with the provisions of this Act to ensure the preservation of local ecological integrity and sensitive species.

DESKTOP REVIEW: METHODOLOGY

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

- Provincial Landscape Viewer (NSNRR, n.d.-d)
- Parks and Protected Areas (Government of NS, n.d.)
- Ecological Land Classification for Nova Scotia (Neily et al., 2017)

DESKTOP REVIEW: RESULTS

The Project Site is located within Ecoregion 7, the Western Ecoregion, which covers approximately 30.5% of Nova Scotia. This ecoregion occupies a large portion of western Nova Scotia and is characterized by a milder climate, early springs, warm summers, and relatively high precipitation. The landscape includes granitic uplands and till plains, slate ridges, barrens, and extensive wetlands, and contains several of the province's longest river systems. Forest cover within this ecoregion is characterized by a greater prominence of Eastern White Pine

(*Pinus strobus*), Eastern Hemlock (*Tsuga canadensis*), and Northern Red Oak compared to other regions of the province (Neily et al., 2017).

The Project Site is located within two provincial ecodistricts (Drawing 2.3.2). The majority of the Project Site lies within Ecodistrict 720, the South Mountain, a rugged upland that extends approximately 150 km from east of the Sissiboo River to Panuke Lake. This ecodistrict is characterized by rocky, boulder-strewn terrain, shallow, coarse-textured soils, and numerous lakes, rivers, and wetlands. Forests are dominated by Acadian softwoods, including Red Spruce (*Picea rubens*), Eastern White Pine, and Eastern Hemlock, with mixedwood and tolerant hardwoods occurring on richer sites. Wetlands are typically shrub swamps and open peatlands, some of which support rare Atlantic Coastal Plain Flora (Neily et al., 2017).

A small portion of the central-eastern portion of the Project Site is located within Ecodistrict 710, the Valley Slope, a long, narrow band of foothills along the northwesterly-facing slope of the South Mountain. It is situated between the Annapolis Valley and South Mountain ecodistricts and extends west to east from the Acacia Valley in Digby County to Mount Denson in Hants County. This ecodistrict is characterized by sloping terrain, relatively well-drained soils, and a climate moderated by westerly exposure. Forest cover is dominated by Spruce-Hemlock forest types, with Red Spruce, Eastern Hemlock, and Eastern White Pine common on upper and shaded slopes, and mixedwood and tolerant hardwood forests occurring on lower slopes and in sheltered ravines. Wetlands within the Valley Slope ecodistrict are typically small and localized, consisting mainly of shrub swamps and open peatlands (Neily et al., 2017).

According to the Forest Inventory data available through the Provincial Landscape Viewer, land cover within the Project Site is dominated by the 'Mixedwood' (92%) land cover type, with smaller amounts of 'Hardwood' (8%) and 'Softwood' (>1%) (Table 7.18; Drawing 7.1.5.1).

Table 7.18: Land Cover Classification and Percent Cover Within the Project Site

Land Cover Type	Area (m^2)	Percent Cover (%)
Mixedwood	694,457.98	91.87
Hardwood	57,933.49	7.66
Softwood	3,546.04	0.47
TOTAL	**755,937.51**	**100**

Source: NSNRR (n.d.-d)

Further, the Forest Inventory identifies 19 forest stands that are located within or intersecting the Project Site, representing a range of stand sizes and forest types. The stands are primarily dominated by deciduous and mixed forest types, with Paper Birch and Red Maple being the most common, along with smaller numbers of Balsam Fir, Trembling Aspen, Northern Red Oak, Red Spruce, and Black Spruce stands.

Parks and protected areas within 15 km of the Project Site include Roxbury Provincial Park (~4 km southwest; pending, under interim policy), Valleyview Provincial Park (~14 km northwest), St. Croix Cove Conservation Lands (~14 km northwest), Torbrook Nature Reserve (~12 km east), Cloud Lake Wilderness Area (~7 km southeast), and McGill Lake Wilderness Area (~15 km south) (Drawing 7.1.5.2).

FIELD PROGRAMS: METHODOLOGY

Habitat characterization was conducted through an integrated review of observational data collected concurrently with targeted field programs (e.g., wetland delineation, rare plant surveys). Rather than a standalone ecosystem classification survey, habitats were defined based on dominant vegetation and structural attributes documented during site traversals. These field observations were synthesized to classify broad habitat units.

FIELD PROGRAMS: RESULTS

The Project Site is a landscape mosaic of different forest habitats typical of the Acadian Forest Region. These forest habitats have experienced varying degrees of anthropogenic influence (predominantly forestry-related). The riparian areas around Eel Weir Brook to the northwest and the topographic ridges just southeast of that remain relatively undisturbed, whereas the remaining forest habitats are in early stages of regeneration post-harvesting, which occurred ~20 years ago. There are scattered areas of mixedwood forest that seem to have avoided the harvesting, often near wetlands and watercourses. An old dirt road runs through the length of the Project Site, ending near the southeast extent at WC4.

Eel Weir Brook and Mature Riparian Habitat: At the northwestern extent of the Project Site, Eel Weir Brook (WC1) is associated with a mature riparian floodplain swamp that is dominated by Red Maple and Sugar Maple, with Yellow Birch, Balsam Fir, and Black Spruce filling out the canopy and subcanopy. Speckled Alder and immature trees are found scattered throughout the swamp in the shrub stratum, with graminoids and fern species, such as Cinnamon Fern and Royal Fern, dominating along the watercourse. This more mature mixedwood composition continues upland of the watercourse/wetland for approximately 30 m, likely due to forestry-related buffering, before transitioning into regenerating mixedwood forest.

The brook itself is also likely used by anadromous fish such as Brook Trout (*Salvelinus fontinalis*), although no individuals were documented. The flat open floodplains and large boulders found on site in Eel Weir Brook could act as potential basking areas for Wood Turtles. Potential Wood Turtle basking and foraging habitat was observed on site, with potential overwintering habitat also observed in Eel Weir Brook upstream of the Project Site, although no individuals were documented.

Undisturbed Deciduous Ridges: North of WC2 along the eastern boundary of the Project, where there are unique topographic ridges, a less disturbed deciduous forest composition exists. This forest habitat canopy consists of large Trembling Aspen, White Ash, Red Oak (*Quercus rubra*), Balsam Fir, and Eastern White Pine, with young conifers and scattered American Beech found in the shrub layer.

Early Successional Regenerating Forest: The majority of the rest of the Project Site, including many of the wetlands, exhibits dense early-successional stand characteristics, with Red Maple, Gray Birch, Paper Birch, Balsam Fir, and Red Spruce commonly found in upland habitats, and Red Maple, Yellow Birch, Black Spruce, and Speckled Alder commonly found in the wetlands. Immature American Beech is also present throughout the regenerating habitats on site. The wetlands and riparian areas within the Project Site support several hydrophilic species, as detailed in Sections 7.1.2 and 7.1.6.

Mixedwood Forest: In some scattered upland areas, often near wetlands and other watercourse features, mixedwood forest remains relatively undisturbed when compared to the early successional regenerating forest that covers much of the Project Site.

Wildlife Habitat Functionality: Numerous wildlife species were documented using the Project Site. The area on the Project Site associated with Eel Weir Brook was shown to be used by several species to forage and as a travel corridor. Most notable of these species was a SOCI Fisher (S3) that was documented by a trail camera, as well as several other species of mammals walking and foraging beside the brook, as detailed in Section 7.1.4.

Several other species of mammals were observed (by trail camera, scat, and tracks) using the road through the Project Site as a travel corridor, such as White-tailed Deer, Coyote, Bobcat, American Black Bear, North American Porcupine, and others.

Refer to Section 7.1.3 for comprehensive species inventories and invasive species documentation.

7.1.6 FISH AND AQUATIC HABITAT

REGULATORY CONTEXT

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to fish and aquatic habitat.

FEDERAL

- ***Fisheries Act*** **(R.S.C., 1985, c. F-14)** - This Act prohibits the deposit of harmful substances into waters frequented by fish and protects fish habitat. Specifically, Section 35 prohibits the harmful alteration, disruption, or destruction of fish habitat, and Section 36 prohibits the deposit of deleterious

substances into waters frequented by fish, both of which are highly relevant to sedimentation control measures and stormwater discharge.

- ***Canadian Environmental Protection Act*** **(S.C. 1999, c. 33)** - CEPA regulates the release of pollutants and hazardous substances that could affect surface water quality. Pit operations may involve activities such as fuel storage, vehicle maintenance, or the use of chemicals, all of which could introduce contaminants into nearby watercourses if not properly managed.

- ***Species at Risk Act*** **(S.C. 2002, c. 29)** - This Act protects SAR and their critical habitats across Canada, prohibiting harm to listed species and habitat destruction. For this Project, it ensures listed aquatic species are safeguarded, with measures in place to prevent habitat impacts.

PROVINCIAL

- ***Activities Designation Regulations*** **(N.S. Reg. 47/95)** - These regulations list pits and quarries as designated activities that require environmental approvals from NSECC. Pit operations that involve watercourse alterations, groundwater withdrawal, or stormwater discharge must obtain the necessary permits. Compliance ensures that the Project adheres to best water protection and environmental management practices.

- ***Endangered Species Act*** **(S.N.S. 1998, c. 11)** - This Act protects SAR and their critical habitats in Nova Scotia, prohibiting harm, harassment, or destruction. For this Project, it ensures listed aquatic species are safeguarded, with measures in place to prevent habitat impacts.

- ***Pit and Quarry Guidelines*** **(1999, Revised 2003)** - These guidelines establish specific requirements for protecting watercourses. They set minimum separation distances from watercourses, mandate sedimentation control measures, and regulate effluent discharge to prevent contamination. Pit operators must follow these guidelines to ensure that operations do not negatively impact nearby waterbodies.

- ***Biodiversity Act*** **(S.N.S. 2021, c. 3)** - This Act provides a legal framework for the protection, conservation, and sustainable use of biodiversity in Nova Scotia, including the protection of provincially listed SAR and their habitats. Project activities must comply with the provisions of this Act to ensure the preservation of local ecological integrity and sensitive species.

DESKTOP REVIEW: METHODOLOGY

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

- Aquatic Species at Risk Map (DFO, 2025)
- ACCDC Data Report (ACCDC, 2025)

DESKTOP REVIEW: RESULTS

The Project Site is located within the Annapolis River Primary (1DC), Secondary (1DC-3), and Tertiary (1DC-3-S) Watersheds (Drawings 7.1.1.1A-C). Eel Weir Brook flows along the northern boundary of the Project Site before continuing north and discharging into the Annapolis River approximately 3.5 km downstream of the Project Site. An unnamed watercourse also occurs within the Project Site and drains northwest before connecting to Eel Weir Brook west of the Project Site (Drawing 7.1.1.1C). The Annapolis River is a major river system spanning approximately 120 km, ultimately draining into the Annapolis Basin and supporting various aquatic species. Further details on surface water are provided in Section 7.1.1.

A review of the Aquatic Species at Risk Map indicated that Eel Weir Brook and the unnamed watercourse within the Project Site do not contain any SAR. However, the Annapolis River, to which Eel Weir Brook connects, contains or may contain Brook Floater (*Alasmidonta varicosa*), a freshwater mussel listed as 'Special Concern' under COSEWIC and SARA and as 'Threatened' under the ESA, with an S-Rank of 'S3' in Nova Scotia.

According to ACCDC records, three aquatic SOCI have been identified within 5 km of the Project (Table 7.19; Drawing 7.1.6.1).

Table 7.19: SOCI Aquatic Species Identified Within 5 km of the Project Based on ACCDC Records

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
American Eel	*Anguilla rostrata*	Threatened	---	---	S3N	3.9 ± 0.01
Brook Trout	*Salvelinus fontinalis*	---	---	---	S3	4.3 ± 0.2
Striped Bass - Bay of Fundy Population	*Morone saxatilis pop. 2*	Endangered	---	---	S2S3B, S2S3N	1.8 ± 0.01

Source: ACCDC (2025)

Further, ACCDC identifies Atlantic Salmon - Nova Scotia Southern Upland population (*Salmo salar pop. 6*) (S1, SOCI) habitat along the Annapolis River, extending from Greenwood to the Annapolis Basin (Drawing 7.1.6.1).

FIELD PROGRAMS: METHODOLOGY

FISH AND FISH HABITAT ASSESSMENT: Fish and fish habitat assessments were conducted within four watercourses previously delineated as part of the surface water assessment (Section 7.1.1). These assessments were completed on October 29, 2025. Sampling locations are shown in Drawing 7.1.6.2.

Methods followed protocols outlined in the *Nova Scotia Fish Habitat Suitability Assessment: A Field Methods Manual* (NSLC AAS & NSSA, 2018) and the *Reconnaissance (1:20 000) Fish and Fish Habitat Inventory* (BC Fisheries Information Services Branch, 2001; BC Ministry of Environment, 2006).

Key parameters assessed included:

- **Channel Biophysical Features**: Channel/wetted width, bankfull depth, pool depth, bank height, gradient, barriers to fish movement.
- **Geomorphology**: Channel morphology, confinement, pattern, and bank features.
- **Fish Habitat**: Substrate composition, instream cover, spawning, and migration suitability.
- **Riparian Features**: Vegetation stage and type, dominant species, crown closure.
- **Disturbance Indicators**: Erosion, sediment deposits, abandoned channels.
- **Water Quality**: Conductivity, TDS, pH, and temperature.
- **Watercourse Classification**: Permanent, intermittent, ephemeral.
- **Watercourse Stage**: High, mid, low, dry, frozen.

Watercourses were classified by channel width and flow regime (Table 7.20).

Table 7.20: Watercourse Classification

Type	Channel Width	Description
Large Permanent	>5 m	Defined channel, year-round flow, fish habitat.
Small Permanent	<5-2 m	Defined channel, year-round flow, fish habitat.
Intermittent	<2 m	Seasonal flow, may be fish-bearing.
Ephemeral	<1 m	Infrequent flow, minor scour, not fish habitat.
No Channel	N/A	No defined channel, surface, or subsurface drainage.

FISH HABITAT QUALITY ASSESSMENT: Habitat suitability was evaluated using in situ water quality data and assessments of:

- **Spawning Habitat**: Flow, depth, groundwater upwelling, substrate size, and embeddedness.
- **Rearing Habitat**: Cover abundance and type, flow, and connectivity.
- **Migration**: Upstream/downstream connectivity, depth, flow.
- **Foraging Habitat**: Invertebrate presence, substrate, riparian cover.
- **Overwintering Habitat**: Deep pools (>50 cm), water quality, and year-round flow potential.

SUBSTRATE CLASSIFICATION: Substrate classification was adapted from Bain and Stevenson (1999), the Wentworth Scale (Wentworth, 1922), and other sources. Substrate types included:

- **Fines**: <2 mm

- **Silt & Clay**: <0.06 mm
- **Sand**: 0.06-2 mm
- **Small Gravel**: 2-16 mm
- **Large Gravel**: 16-64 mm
- **Cobble**: 64-256 mm
- **Boulder**: >256 mm
- **Bedrock**: Continuous slab (>2 m diameter)

INTERPRETATION & CLASSIFICATION: Fish habitat quality was ranked from 'None' to 'Good' based on observed features, and a conservative approach classified intermittent and permanent watercourses as potentially fish-bearing. When habitat suitability spanned multiple species, rankings prioritized the most sensitive likely species, typically salmonids (e.g., Brook Trout).

HYDROLOGICAL CONTEXT AND LIMITATIONS: Field assessments were conducted during a period of severe drought in Nova Scotia. These conditions resulted in critically low or absent surface water in some watercourses (WC3 & WC4), limiting water quality measurements and influencing habitat availability. As such, data collected represent a snapshot of aquatic habitat conditions under hydrologically stressed, low-flow conditions and likely reflect minimum seasonal habitat availability within the Project Site.

FIELD PROGRAMS: RESULTS

WATER QUALITY: Watercourses within the Project Site were generally acidic, with oxygenation correlating to stream size and flow. During the dry October sampling, pH was low, ranging from 4.87 in WC3 to 6.01 in WC2, falling below the typical range for freshwater systems (6.5 to 9.0; CCME, 1987), as well as below the ideal range for freshwater species (US EPA, 2025). The smaller WC3 showed the most stress with low dissolved oxygen (52.2% saturation) and high conductivity (134 µS/cm), likely due to stagnant, shallow water. Larger WC1 and WC2 maintained higher dissolved oxygen (peaking at 95.8% saturation), indicating better flow. Total Dissolved Solids (TDS) were nearly three times higher in WC3 (87.1 mg/L) than in WC1 (29.5 mg/L), suggesting concentration in lower volumes. Despite seasonal fluctuations, all watercourses have high bank stability. All water quality measurements are in Table 7.21. Representative photos of Project watercourses are found in Appendix E.

Table 7.21: Water Quality Across Project Site

Transect ID	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Specific Conductivity (µS/cm	TDS (mg/L)
WC1-T1	5.51	8.22	72.7	45.9	29.8
WC1-T2	5.46	8.73	77.1	45.7	29.7
WC1-T3	5.44	10.91	95.1	45.4	29.5
WC2-T1	5.78	10.62	92.6	108.4	70.5
WC2-T2	5.9	10.83	95.8	109.5	71.1
WC2-T3	6.01	10.97	95.3	109.5	71.2
WC2-T6	5.57	10.14	88.1	116.3	75.6
WC2-T8	5.75	7.95	70.3	111.1	72.3
WC3-T3	5.14	6.84	60.5	134	87.1
WC3-T4	4.87	5.89	52.2	132	85.8

Note: The table only includes transects where water quality measurements were taken.

WATERCOURSE CHARACTERISTICS AND FISH HABITAT: Four watercourse segments (WC1, WC2, WC3, and WC4) were assessed for fish habitat suitability within the study area. Channel dimensions, substrate composition, instream cover, riparian condition, and water quality varied across the site and were influenced by both natural features and drought conditions (Table 7.22).

Table 7.22: Characteristics of Watercourses Within the Project Site

WC ID	Class	Average Bankfull Width (m)	Average Wetted Width (m)	Average Bankfull Height (m)	Depth Range (m)	Substrate (Listed by Prevalence)	Habitat Types	Bank Stability	Average Stream Shade	Pools >0.5 m Deep? (Y/N)	# of Fish Cover Locations	Fish Habitat Quality	Notes:
WC1	Large Permanent	6.30	6.17	0.40	0.20-1.40	Cobble, Boulders, Gravel, Fines, Bedrock	Run, Pool	High	75.00%	Yes	12	Good	Flows northeast along northern property boundary. Floodplain is WL1.
WC2	Small Permanent / Ephemeral	1.68	1.49	0.33	0.03-0.40	Cobble, Boulders, Bedrock, Fines, Gravel	Riffle, Pool, Run	High	63.75%	No	10	Good	Collects drainage from WC3 and WL3, flows northwest off property boundary.
WC3	Small Permanent / Ephemeral	1.14	0.67	0.37	0.00-0.09	Boulders, Fines, Cobble, Bedrock, Gravel	Riffle, Run	High	53.00%	No	4	Moderate	Flows north within WL3 and on to WC2.
WC4	Small Permanent / Ephemeral	1.74	1.03	0.29	0.00-0.32	Fines, Boulders, Bedrock, Cobble	Riffle, Run	High	86.08%	No	18	Moderate	Flows into southeast corner of property, dissipating in WL7. Northwest flow direction.

WATERCOURSE DESCRIPTIONS:

Watercourse 1 (WC1) - Eel Weir Brook

Fish Habitat Quality: Good

WC1 represents a mapped reach of Eel Weir Brook, a primary watercourse identified within the Project Site. This segment is classified as a large permanent system flowing northeast along the northern property boundary, with its floodplain situated within Wetland 1 (WL1). Despite the dry conditions observed during the survey year, the brook maintained consistent flow, with an average wetted width of 6.17 m nearly matching its bankfull width of 6.30 m.

The channel morphology within this reach consists of run and pool sequences, with depths ranging from 0.20 m to a maximum of 1.40 m. The substrate is characterized by a diverse composition of cobbles and boulders, followed by gravel, fines, and bedrock. As a segment of Eel Weir Brook, WC1 provides potential fish habitat supported by high bank stability, 75% average stream shade, and 12 observed fish cover locations. Deep pools exceeding 0.5 m are present throughout the reach. Water quality sampling in this section revealed naturally acidic conditions (pH 5.44-5.51) and robust dissolved oxygen levels reaching 10.91 mg/L (95.1% saturation). Given these attributes, WC1 is assessed as having good fish habitat potential; it offers the most comprehensive habitat within the Project Site, featuring deep overwintering pools, suitable spawning substrates, and consistent flow that supports all life history stages of native fish.

The riparian zone is situated within the WL1 floodplain and consists of a diverse, multi-story vegetative community that contributes to the high bank stability and thermal regulation of the stream. The tree canopy is dominated by Red Maple, Balsam Fir, and Sugar Maple, with Black Spruce and Yellow Birch also frequently occurring. A distinct mid-story shrub layer is present, featuring Speckled Alder, American Beech, and Eastern White Pine. The herbaceous ground cover is primarily composed of Rough-stemmed Goldenrod, Hairy Flat-top White Aster (*Doellingeria umbellata*), and Cinnamon Fern.

Additionally, this watercourse intersects with an identified Archaeological High Priority Area (HPA-01).

Watercourse 2 (WC2)

Fish Habitat Quality: Good

WC2 is a small permanent system functioning as a primary drainage corridor, capturing flow from WC3 and WL3 before exiting the property's northwest boundary. During the dry sampling season, the system maintained an average wetted width of 1.49 m, closely mirroring its bankfull width of 1.68 m.

The channel morphology exhibits a sequence of riffles, pools, and runs, with water depths varying from 0.03 m to 0.40 m. The substrate is characterized by a mix of cobble, boulders, and bedrock, supplemented by fines and gravel. While the watercourse benefits from high bank stability, nearly 64% average stream shade, and 10 distinct fish cover locations, it lacks deep pools exceeding 0.5 m. Water quality assessments indicated a pH range of 5.57 to 6.01, with dissolved oxygen levels remaining high and peaking at 10.97 mg/L (95.8% saturation). Overall, WC2 is assessed as having good fish habitat potential, primarily due to its permanent flow, diverse riffle-pool morphology, and favourable water quality, which collectively support foraging and rearing despite depth limitations for larger adult fish.

The riparian zone within WC2 supports a dense and diverse plant community. The tree canopy is dominated by Balsam Fir, Sugar Maple, Red Maple, Trembling Aspen, Paper Birch, Red Spruce, and White Ash. Below this, the shrub layer consists of Speckled Alder, American Beech, Black Spruce, and Yellow Birch. The herbaceous layer features Cinnamon Fern, Hairy Flat-top White Aster, Rough-stemmed Goldenrod, Fowl Manna-grass, New York Fern, and Christmas Fern.

Watercourse 3 (WC3)

Fish Habitat Quality: Moderate

WC3 is a small permanent system that flows northward within Wetland 3 (WL3) before discharging into WC2. The watercourse is defined by a narrow channel winding through a rocky, bouldery, and occasionally shrubby floodplain. Topographically, the reach is distinct: the right bank rises steeply to a mature forest upslope, while the left bank extends into the adjacent wetland floodplain. Drought conditions significantly impacted this reach during the survey, resulting in an average wetted width of 0.67 m compared to a bankfull width of 1.14 m. Water depths were extremely shallow, ranging from 0.00 m to 0.09 m.

The channel morphology is limited to riffle and run sequences. The substrate is primarily composed of boulders and fines, with smaller amounts of cobble, bedrock, and gravel. Habitat quality is moderate, characterized by high bank stability but a lower average stream shade of 53% and only four observed fish cover locations. This watercourse exhibited the highest environmental stress at the site, with a naturally acidic pH dropping as low as 4.87 and dissolved oxygen levels decreasing to 5.89 mg/L (52.2% saturation). Based on these factors, WC3 is assessed as having moderate fish habitat potential; although it provides permanent hydraulic connectivity to the broader drainage network, its productive capacity is severely limited by critical water depths and physiological stressors (acidic pH and low dissolved oxygen).

The riparian zone of WC3 is dominated by an overstory of Balsam Fir, Red Maple, Sugar Maple, White Ash, and Paper Birch. The mid-story shrub layer includes Black Spruce, Speckled Alder, Northern Red Oak, and

Serviceberry. Common herbaceous species include Cinnamon Fern, Rough-stemmed Goldenrod, Fowl Manna-grass, and Eastern Marsh Fern.

Watercourse 4 (WC4)

Fish Habitat Quality: Moderate

WC4 is a small permanent system that flows northwest into the southeast corner of the property before eventually dissipating into WL7. The channel morphology is characterized by riffle and run sequences, with an average wetted width of 1.03 m relative to a bankfull width of 1.74 m. Similar to WC3, parts of this reach were dry during the survey, with water depths ranging from 0.00 m to 0.32 m.

The substrate is dominated by fines, consisting of organic, mucky material, and boulders, followed by bedrock and cobble. Despite its small size, WC4 provides some habitat value, featuring high bank stability, the highest average stream shade observed at the site (86%), and 18 identified fish cover locations. Water quality data were not collected for this specific watercourse. Consequently, WC4 is assessed as having moderate fish habitat potential; while it offers excellent refuge and thermal cover, its productive capacity is limited by the dominance of organic substrates and the lack of clear downstream connectivity.

The riparian zone of WC4 features a consistent vegetative profile across the tree and shrub layers, dominated by Yellow Birch, Paper Birch, Red Maple, Red Spruce, Striped Maple, and Balsam Fir. The herbaceous layer is well-established, consisting of Fowl Manna-grass, Cinnamon Fern, Sensitive Fern, Wild Sarsaparilla, Wild Lily-of-the-valley, and Common Woolly Bulrush.

7.1.7 CLIMATE CHANGE

REGULATORY CONTEXT

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to GHG emissions and climate change.

FEDERAL

- ***Canadian Environmental Protection Act*** **(S.C. 1999, c. 33)** - CEPA provides the legal authority for managing GHGs as toxic substances under Schedule 1. It enables the development of sector-specific regulations to limit emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and other GHGs that contribute to climate change. While the Project is not expected to exceed reporting thresholds, CEPA provides the overarching framework for federal climate change regulations and emissions reporting.

- ***Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations*** **(S.O.R./2013-24) -** These regulations, enacted under CEPA, establish GHG emission standards for new on-road heavy-duty vehicles and engines, such as dump trucks and transport vehicles. While the Project does not manufacture vehicles, its reliance on regulated vehicle types means its mobile emissions are indirectly influenced by these federal standards.

PROVINCIAL

- ***Environment Act*** **(S.N.S. 1994-95, c. 1) -** This Act provides the legal framework for environmental protection in Nova Scotia, including air quality management. It supports pollution prevention and regulatory measures to limit emissions that may impact air quality. Project activities must comply with air quality standards set under this legislation.

- ***Environmental Goals and Climate Change Reduction Act*** **(S.N.S. 2021, c. 20) -** This Act sets the framework for Nova Scotia's commitment to reducing GHG emissions and addressing climate change. It outlines specific targets for emission reductions, renewable energy adoption, and climate resilience. The Project will need to consider the Act's goals and ensure compliance with carbon reduction targets, including the adoption of practices that minimize its contribution to climate change and align with provincial sustainability objectives.

- ***Nova Scotia's Climate Change Plan for Clean Growth*** **(NSECC, 2022b) -** This plan sets out 68 actions across all provincial departments to address climate change and transition to a clean economy over five years. It implements the objectives of the *Environmental Goals and Climate Change Reduction Act*, S.N.S. 2021, c. 20, including the 53% below 2005 reduction target by 2030, an 80% renewable electricity target by 2030, and a full phase-out of coal-fired electricity by 2030. The Project will need to consider the Plan's goals and ensure its operations align with provincial clean-growth priorities.

DESKTOP REVIEW: METHODOLOGY

A GHG emissions assessment for the Project was conducted in accordance with the *Proponent's Guide to Environmental Assessment* (NSECC, 2025a). The assessment followed a systematic approach to identify, quantify, and evaluate all significant sources of GHG emissions associated with the proposed Project.

EMISSION SOURCE IDENTIFICATION AND QUANTIFICATION: GHG emissions were estimated for two primary categories: (1) direct emissions from on-site equipment operations; and (2) indirect emissions from aggregate transportation. The equipment inventory was based on information provided by the Proponent (see Section 4.3). Operating schedule assumptions are described under Project Operational Context below.

CARBON STOCK ASSESSMENT: The carbon storage capacity of the forested areas within the Project Site was estimated using average above-ground dried biomass (AGB) values for the South Mountain Ecodistrict reported by Townsend (2008), with above-ground biomass equations consistent with Lambert et al. (2005). Below-ground biomass was estimated using root-to-shoot ratios from IPCC (2019) Table 4.4. Forest type classification and areas were derived from provincial Forest Inventory data available through the Provincial Landscape Viewer (NSNRR, n.d.-d). The purpose of this assessment was to characterize the one-time carbon stock loss associated with vegetation clearing within the extraction footprint.

CLIMATE PROJECTION DATA SOURCES: Historical climate data were obtained from the Greenwood A meteorological station (Climate ID 8202000), as detailed in Section 7.1.8. Projected climate change conditions for Annapolis County were drawn from the *Annapolis Census Division: Climate Risk Summary* (NSECC, 2022a) and the provincial *Powering the Transition: Nova Scotia 2025 Climate Change Risk Assessment* (NSECC, 2025b).

DESKTOP REVIEW: RESULTS

NOVA SCOTIA GHG CONTEXT

Climate change refers to long-term changes in temperature, precipitation, and other atmospheric conditions driven in part by increasing concentrations of GHGs in the atmosphere. GHGs such as CO_2, CH_4, and N_2O are emitted from both natural processes and human activities, including transportation, industry, and land use changes.

There are no GHG monitoring stations located at or near the Project, and no site-specific GHG measurements are available. The Project Site is situated in a predominantly rural area with mixed land use, including residential, agricultural, and forested areas. Existing GHG emissions in the vicinity are limited to those associated with occasional vehicle use, home heating, and agricultural activity; no significant point sources of GHG emissions are present within the Project Region.

At the provincial scale, Nova Scotia's GHG emissions were approximately 13.69 megatonnes (Mt) of carbon dioxide equivalent (CO_2e) in 2024, down from approximately 22 Mt CO_2e in 2005 - a decline of approximately 38%, representing one of the steepest provincial reductions in Canada (ECCC, 2026b). Nova Scotia contributes approximately 2% of Canada's total GHG emissions. The province's largest GHG-emitting sectors are electricity generation (~39%), transportation (~33%), and buildings (~12%). Emissions have generally declined since 2005, largely due to reductions in coal-fired electricity generation and efficiency improvements across sectors. To meet its legislated 2030 target of 10.35 Mt CO_2e (53% below the 2005 baseline), Nova Scotia must reduce emissions by a further approximately 3.3 Mt CO_2e from the 2024 level (CER, 2026; ECCC, 2026b).

PROJECT OPERATIONAL CONTEXT

The assessment assumes an operational schedule of approximately 150 working days per year, reflecting typical seasonal constraints and market demand patterns in the regional aggregate industry. Site preparation, extraction, and stockpiling activities are assumed to occur on a standard work week basis between May and October, with reduced operating frequency during the colder months of November through April.

Equipment utilization rates were estimated based on standard industry practices and the specific operational requirements of the Project. Primary extraction and material-handling equipment (excavators, wheel loaders, dozer, and on-site haul truck) average approximately six hours of active daily operation (~900 hours per year). Processing equipment, including the jaw crusher, cone crusher, and primary screener, operates intermittently during active crushing and screening activities only (~600 hours per year). An additional screener available for use as required is assumed to operate at a reduced frequency (~300 hours per year). Auxiliary equipment such as the water truck for dust suppression operates at reduced frequency (~450 hours per year). Off-site aggregate transport is assumed to occur primarily between May and December, with transport activities paused during the spring weight restriction period affecting local access roads (Section 7.2.3).

EMISSION CALCULATION METHODOLOGY

GHG emissions were calculated using established emission factors from Environment and Climate Change Canada (ECCC) and the United States Environmental Protection Agency. The methodology applies fuel consumption rates specific to each equipment type, operating hours, and the standardized diesel combustion emission factor.

On-site Equipment: Annual fuel consumption for each piece of equipment was calculated as follows:

Annual Fuel Consumption (L/yr) = Fuel Consumption Rate (L/hr) x Annual Operating Hours (hr/yr)

Fuel consumption rates were estimated from manufacturer specifications and standard industry references for diesel-powered non-road equipment, and are intended to represent conservative (upper-bound) estimates appropriate for pit operations at typical load factors. All on-site equipment operates on diesel fuel.

Transportation: Annual transport fuel consumption was calculated based on the estimated number of truckloads per year, the average round-trip delivery distance, and the fuel efficiency of the haul fleet under mixed road conditions. An annual production volume of approximately 50,000 tonnes and an average payload of 20 tonnes per load yield approximately 2,500 round trips per year. At an average round-trip delivery distance of 100 km and a fuel efficiency of 50 L/100 km, reflecting a weighted average for loaded and unloaded trips, total annual transport fuel consumption is estimated at 125,000 L/year.

Emission Factor: All GHG emissions are reported in CO_2e, incorporating the global warming potential of CO_2, CH_4, and N_2O associated with diesel combustion. The emission factor applied is 2.68 kg CO_2e per litre of diesel consumed, consistent with the CO_2 emission factor for diesel combustion published in ECCC's *Greenhouse Gas Quantification Requirements* (ECCC, 2024).

GREENHOUSE GAS EMISSIONS SUMMARY

Table 7.23 summarizes the estimated annual GHG emissions for the Project.

Table 7.23: Greenhouse Gas Emissions Summary

Category	Equipment /Activity	Annual Operating Hours (hr/yr)[1]	Fuel Consumption Rate (L/hr)[2]	Annual Fuel Consumption (L/yr)	Emission Factor (kg CO_2e/L)[3]	Annual Emissions (t CO_2e)
On-site Operations	Excavator (Large)	900	45	40,500	2.68	108.5
	Excavator (Medium)	900	32	28,800	2.68	77.2
	Front-end Loader (Large)	900	38	34,200	2.68	91.7
	Front-end Loader (Medium)	900	32	28,800	2.68	77.2
	Dozer	900	45	40,500	2.68	108.5
	Grader	900	35	31,500	2.68	84.4
	Jaw Crusher (intermittent)[a]	600	22	13,200	2.68	35.4
	Cone Crusher (intermittent)[a]	600	20	12,000	2.68	32.2
	Screener (intermittent)[a]	600	12	7,200	2.68	19.3
	Screener (available/intermittent)[b]	300	12	3,600	2.68	9.6
	Articulating Dump Truck (on-site haulage)	900	35	31,500	2.68	84.4
	Water Truck (dust suppression)[c]	450	20	9,000	2.68	24.1
	Subtotal: On-site Operations			**280,800**		**752.5**
Transportation	2 x Tandem Dump Trucks (off-site transport)[d]	---	---	125,000	2.68	335.0
	Subtotal: Transportation			**125,000**		**335.0**

Category	Equipment /Activity	Annual Operating Hours (hr/yr)[1]	Fuel Consumption Rate (L/hr)[2]	Annual Fuel Consumption (L/yr)	Emission Factor (kg CO_2e/L)[3]	Annual Emissions (t CO_2e)
Total Project Emissions				**405,800**		**1,087.5**

[1] Annual operating hours based on an assumed operational schedule of approximately 150 working days per year and average daily active operation times as described under Project Operational Context above.

[2] Fuel consumption rates estimated from manufacturer specifications and standard industry references; conservative upper-bound estimates used. Actual rates will vary with equipment age, maintenance condition, ambient temperature, material characteristics, and operator behaviour.

[3] Diesel emission factor of 2.68 kg CO_2e/L based on ECCC guidance for diesel combustion, incorporating CO_2, CH_4, and N_2O.

[a] Intermittent operation – processing equipment operates only during active crushing and screening activities, not continuously throughout the operating season.

[b] Available/intermittent – an additional screening unit is available for use as required; 300 hours/year assumed as a conservative estimate.

[c] Auxiliary equipment – the water truck operates at reduced frequency during dust suppression activities only; not continuously during all working days.

[d] Based on an assumed annual production volume of approximately 50,000 tonnes and an average payload of 20 tonnes per load, resulting in approximately 2,500 round trips per year. An average round-trip delivery distance of 100 km and a fuel efficiency of 50 L/100 km (weighted average for loaded and unloaded trips under mixed road conditions) were applied.

On-Site Equipment Emissions: The analysis of direct emissions from on-site equipment operations indicates a total annual emission rate of 752.5 tonnes CO_2e. The largest individual contributors are the large excavator and the dozer, each accounting for 108.5 tonnes CO_2e annually, reflecting their large engine displacement and sustained operating hours. The processing units (jaw crusher, cone crusher, and screeners) collectively contribute a smaller portion of on-site emissions, as they operate intermittently rather than continuously.

Transportation Emissions: Transportation of aggregate materials represents a meaningful component of the Project's GHG footprint. Based on an assumed annual production volume of approximately 50,000 tonnes and an average payload of 20 tonnes per load, the off-site haul fleet is estimated to complete approximately 2,500 round trips per year. Using an average round-trip delivery distance of 100 km, reflecting a mix of local, regional, and South Shore markets via Highway 101 and Highway 103, transportation activities are estimated to generate approximately 335.0 tonnes CO_2e annually.

Total Project Emissions: The combined GHG emissions from the Project are estimated at 1,087.5 tonnes CO_2e annually, comprising 752.5 tonnes CO_2e from on-site equipment operations and 335.0 tonnes CO_2e from aggregate transportation. This total remains well below the 10,000-tonne threshold above which mandatory annual reporting to ECCC's Greenhouse Gas Reporting Program (GHGRP) is required (ECCC, 2026a). At 1,087.5 tonnes CO_2e, the Project's annual emissions represent less than 0.008% of Nova Scotia's total annual GHG emissions of 13.69 Mt CO_2e in 2024 (ECCC, 2026b).

CARBON STOCK LOSS FROM VEGETATION CLEARING

The clearing of vegetation during site preparation will result in the permanent loss of the carbon currently stored in the above-ground and below-ground woody biomass of trees and other vegetation within the extraction footprint. Unlike the operational GHG emissions described above, this represents a one-time, non-recurring release of stored carbon rather than an ongoing annual emission. Carbon is released to the atmosphere gradually through decomposition of residual organic matter, and, where applicable, through the burning of cleared material.

Methodology: Carbon storage was estimated using average AGB values for the South Mountain Ecodistrict from Townsend (2008), with above-ground biomass equations consistent with Lambert et al. (2005) and below-ground biomass estimated using root-to-shoot ratios from IPCC (2019) Table 4.4. The following relationships were applied:

- **Total Biomass (TB)** = AGB x (1 + R), where R is the ratio of below-ground to above-ground biomass for the applicable forest type, derived from IPCC (2019) Table 4.4 (Temperate Oceanic, North and South America, natural forest, AGB ≤ 125 t/ha); R = 0.337 for softwood (natural conifer); R = 0.466 for hardwood (natural other broadleaf); R = 0.402 for mixedwood (mean of conifer and broadleaf values, as no mixed forest category exists in the IPCC table).
- **Total Carbon (TC)** = TB x 0.5
- **CO_2 weight** = TC x 3.67 (molecular weight ratio of CO_2 to carbon: 44/12)

Average AGB values applied were: softwood 50.1 t/ha; hardwood 33.4 t/ha; mixedwood 41.75 t/ha (arithmetic mean of softwood and hardwood values; Townsend, 2008). Forest type classification and areas within the Project Site were derived from provincial Forest Inventory data (Table 7.18; NSNRR, n.d.-d).

It is noted that these AGB values represent provincial averages across all age classes for each forest type within the South Mountain Ecodistrict. The majority of the Project Site consists of early successional regenerating forest that was subject to forestry harvesting approximately 20 years prior to this assessment; actual per-hectare biomass in these younger stands is likely lower than the ecodistrict averages, meaning the estimates in Table 7.24 are considered conservative (i.e., likely overestimates of carbon stock). Wetland areas on the Project Site (total 6.96 ha; Section 7.1.2) have been excluded from this analysis.

Table 7.24: Estimated Carbon Storage by Forest Type Within the Project Site

Forest Type	Area (ha)	AGB (t/ha)[1]	R^2	Total Biomass (t)[3]	Total Carbon (t)[4]	Carbon Stock (t CO_2)[5]	Carbon Density (t CO_2/ha)[6]
Softwood	0.36	50.1	0.337	24.1	12.1	44.4	123.3
Hardwood	5.79	33.4	0.466	283.5	141.8	520.4	89.9
Mixedwood	69.45	41.75	0.402	4,065.2	2,032.6	7,459.6	107.4
Total	**75.60**	---	---	**4,372.8**	**2,186.5**	**8,024.4**	**~106.1**

[1] Average AGB from Townsend (2008), South Mountain Ecodistrict; mixedwood is the mean of softwood and hardwood values.

[2] Root-to-shoot ratio (R) from IPCC (2019) Table 4.4, Temperate Oceanic zone, North and South America, natural forest, AGB ≤125 t/ha. Mixedwood value is the mean of natural conifer (0.337) and natural other broadleaf (0.466), as no mixed forest category is provided in the IPCC table.

[3] TB (t) = AGB (t/ha) x (1 + R) x Area (ha)

[4] TC (t) = TB (t) x 0.5.

[5] Carbon Stock (t CO_2) = TC (t) x 3.67.

[6] Carbon density (t CO_2/ha) = Carbon Stock (t CO_2) ÷ Area (ha).

Across the ~75.6 ha of forested land within the Project Site, an estimated 8,024 tonnes of CO_2 is currently stored in above- and below-ground woody biomass. This represents the upper bound of potential carbon stock loss if the entire Project Site were cleared, which is not the case, as the proposed extraction footprint constitutes only a portion of the total site area at any given time.

The Project will be developed progressively in 1-hectare operational blocks; the confirmed initial phase of development (Blocks 1-4) comprises a 4.0 ha footprint, below the minimum footprint size illustrated in Table 7.25. Based on the average carbon density of approximately 106.1 tonnes CO_2 per hectare of mixed forest on the Project Site, Table 7.25 provides illustrative estimates of one-time carbon stock loss at a range of extraction footprint sizes.

Table 7.25: Estimated One-Time Carbon Stock Loss by Extraction Footprint Scenario

Extraction Footprint (ha)	Estimated Carbon Stock Loss (t CO_2)	Approximate Equivalent in Years of On-site Operational Emissions[1]
10	~1,061	~1.4
20	~2,122	~2.8
30	~3,183	~4.2
40	~4,244	~5.6
50	~5,305	~7.0

[1] Calculated relative to estimated on-site annual emissions of 752.5 t CO_2e. The comparison is illustrative only; carbon stock loss is a one-time event, while operational emissions recur annually.

At the maximum extraction area of 36 ha, the corresponding one-time carbon stock loss would be approximately 3,820 t CO_2 (about 5.1 years of on-site operational emissions). It is important to note that the carbon stock loss from vegetation clearing is a one-time, non-annual event, unlike operational emissions, which accumulate

throughout the 20-30-year project lifespan. The combined total impact - annual operational emissions plus the annualized one-time carbon stock loss - remains well below 10,000 tonnes CO_2e per year regardless of the extraction footprint size within the ranges shown.

Progressive reclamation will be implemented throughout the operational lifespan of the Project, whereby disturbed areas are revegetated concurrently with extraction. This approach will gradually restore the site's carbon sequestration capacity over time. Full recovery of pre-disturbance forest biomass levels will require decades following final closure, consistent with the typical development trajectory of regenerating Acadian forest stands.

PRECIPITATION PATTERNS AND CLIMATE PROJECTIONS

The *Annapolis Census Division: Climate Risk Summary* (NSECC, 2022a) and the provincial *Powering the Transition: Nova Scotia 2025 Climate Change Risk Assessment* (NSECC, 2025b) were used to characterize projected changes in climate conditions relevant to the Project. Projections draw on an ensemble of global climate models under a high-emissions pathway (RCP8.5), statistically downscaled by the Pacific Climate Impacts Consortium (PCIC), and are summarized as medians over 30-year periods (early: 2015-2045; mid: 2035-2065; late: 2065-2095) relative to a 1981-2010 baseline.

Temperature: Average annual temperatures in Annapolis County are projected to increase by approximately 2.6 °C by mid-century and 4.5 °C by end-of-century relative to the 1981-2010 baseline under a high-emissions pathway (NSECC, 2022a). These increases will be accompanied by more frequent and intense heat events and a reduction in the frequency of very cold days. Average winter temperatures may rise above the freezing threshold more regularly, altering freeze-thaw cycles relevant to road infrastructure and slope stability. The 2025 provincial risk assessment identifies extreme heat events as among the primary hazards by the 2080s (NSECC, 2025b).

Precipitation: A trend toward a wetter overall climate is projected, with most of the increase concentrated in the cool season. Total annual precipitation for Annapolis County is expected to increase from a 1981-2010 baseline of 1,293 mm to approximately 1,438 mm by end-of-century (2065-2095) under a high-emissions scenario, an increase of approximately 11%. Snow contributions will decline substantially as more cold-season precipitation falls as rain; the number of days with snow is projected to decline from 37.5 days (baseline) to 16.2 days by end-of-century (NSECC, 2022a).

Heavy Precipitation: The behaviour of extreme rainfall events changes significantly and is directly relevant to site design and operations. Provincial indices show intensification of short-duration extremes, with maximum 1-day and 5-day rainfall totals increasing by mid- and end-of-century under high emissions, consistent with national assessments projecting more frequent heavy downpours across Canada (Bush & Lemmen, 2019). In

practice, this means greater loadings on stormwater management systems and elevated pluvial flood and erosion risk during the operational lifespan of the Project, even where annual totals rise only modestly.

Flooding and Wildfire: The 2025 provincial risk assessment characterizes the hazard progression for Nova Scotia as: flooding as the primary concern in the 2030s; wildfire as the dominant emerging risk by the 2050s; and extreme heat becoming the leading hazard by the 2080s (NSECC, 2025b). These projections are relevant to both site management and the long-term resilience of progressive reclamation areas. Wildfire risk is discussed further in Section 10.4 as an effect of the environment on the Project.

Observed local climate data from the Greenwood A Meteorological Station, located approximately 23 km northeast of the Project Site, are summarized in Table 7.27 of Section 7.1.8 and provide the quantitative baseline against which projected changes should be interpreted.

7.1.8 AIR QUALITY AND ATMOSPHERIC CONDITIONS

REGULATORY CONTEXT

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to air quality and atmospheric conditions.

FEDERAL

- ***Canadian Environmental Protection Act*** **(S.C. 1999, c. 33)** - CEPA governs the prevention and control of pollution in Canada, including air pollutants. It provides the legal framework for the management of air quality by establishing regulations for substances that may be harmful to human health or the environment. This Act supports the establishment of air quality standards and regulatory measures to manage pollutants such as nitrogen dioxide (NO_2), ozone (O_3), and fine particulate matter ($PM_{2.5}$), which refers to particles smaller than 2.5 micrometres (µm) in diameter and are also of concern for the Project Area.

- ***Canadian Ambient Air Quality Standards*** **(CCME, n.d.)** - Developed by the Canadian Council of Ministers of the Environment (CCME), the Canadian Ambient Air Quality Standards (CAAQS) provide health-based and environmentally protective standards for $PM_{2.5}$, O_3, NO_2, and sulphur dioxide (SO_2). Project emissions combined with baseline ambient air quality must be managed to prevent exceedances of these federal standards.

PROVINCIAL

- ***Environment Act*** **(S.N.S. 1994-95, c. 1) -** This Act provides the legal framework for environmental protection in Nova Scotia, including air quality management. It supports pollution prevention and regulatory measures to limit emissions that may impact air quality. Project activities must comply with air quality standards set under this legislation.

- ***Pit and Quarry Guidelines*** **(1999, Revised 2003) -** These guidelines set air quality limits for pit and quarry operations in Nova Scotia. They establish maximum allowable levels for particulate emissions, including dust, to help minimize air quality impacts. Compliance with these guidelines helps mitigate potential air quality effects associated with the Project.

- ***Air Quality Regulations*** **(N.S. Reg. 8/2020) -** Under the *Environment Act,* S.N.S. 1994-95, c. 1, these regulations set the maximum permissible ground-level concentrations for several air pollutants, including carbon monoxide (CO), hydrogen sulphide (H_2S), NO_2, O_3, SO_2, and total suspended particulate, at ambient air quality monitoring stations across the province. The regulations establish both short-term and long-term (annual) standards aimed at maintaining air quality within acceptable limits to protect human health and the environment.

DESKTOP REVIEW: METHODOLOGY

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

- NSECC Ambient Air Quality Data (NSECC, n.d.)
- Historical Climate Data (Government of Canada, 2025b)
- CAAQS (CCME, n.d.)

DESKTOP REVIEW: RESULTS

AIR QUALITY: Air quality in the Project Area was assessed using data from the two nearest ambient air quality monitoring stations: Aylesford Mountain, approximately 34 km northeast of the Project Site, and Kentville, approximately 57 km northeast of the Project Site.

Ambient air quality data over a five-year period (December 1, 2020 to November 30, 2025) were reviewed for key parameters including nitrogen monoxide (NO), NO_2, nitrogen oxides (NO_x), O_3, and $PM_{2.5}$ from the Kentville monitoring station. The Aylesford Mountain monitoring station currently records only O_3 and $PM_{2.5}$; therefore, data for these parameters were analyzed for the same period (December 2020 to November 2025).

Additionally, NO, NO_x, and NO_2 data from the Aylesford Mountain monitoring station were reviewed over a separate five-year period (April 1, 2012 to March 31, 2017).

To provide a comprehensive evaluation of regional air quality, existing baseline conditions are compared against both the maximum permissible ground-level concentrations set by the *Air Quality Regulations*, N.S. Reg. 8/2020 and the CAAQS. The results indicate that measured concentrations remained below the applicable regulatory thresholds (Table 7.26).

Table 7.26: Maximum Ambient Air Quality Conditions in Aylesford and Kentville Compared to Provincial Regulations

Monitoring Station / Period	Averaging Period	NO (ppb)	NO_x (ppb)	NO_2 (ppb)	O_3 (ppb)	$PM_{2.5}$ (µg/m3)
Aylesford (April 2012 to March 2017)	1 hour	25.2	37.5	12.3	---	---
	24 hours	1.1	3.7	3.3	---	---
	Annual	0.1	0.5	0.3	---	---
Aylesford (December 2020 to November 2025)	1 hour	---	---	---	72.9	185.9
	24 hours	---	---	---	57.9	35.1
	Annual	---	---	---	32.6	3.7
Kentville (December 2020 to November 2025)	1 hour	23.9	33.6	15.7	72.5	111.6
	24 hours	3.8	6.5	5.1	53.5	29.9
	Annual	0.3	1.1	0.8	29.4	4.7
***Air Quality Regulations*, N.S. Reg. 8/2020 - Schedule A**	1 hour	210	---	---	82	---
	24 hours	---	---	---	---	---
	Annual	50	---	---	---	---
CAAQS (2025)	1 hour	---	---	42	---	---
	8 hours*	---	---	---	60	---
	24 hours	---	---	---	---	23**
	Annual	---	---	12	---	8.0**

Source: NSECC (n.d.); CCME (n.d.)

*Note: The raw ambient air quality datasets utilized for the 2012-2017 and 2020-2025 baseline period do not report the specific 8-hour rolling averages required for direct comparison against the 60 ppb CAAQS Ozone standard. While provincial Air Zone Reports do calculate these values, they rely on a 3-year rolling average that does not align with the 5-year maximums presented in this assessment.

**Note: The $PM_{2.5}$ values presented reflect the 2030 CAAQS standards.

ATMOSPHERIC CONDITIONS: Local temperature, precipitation, and wind data were obtained from the Greenwood A meteorological station (Climate ID 8202000), located approximately 23 km northeast of the Project. Climate data over a 10-year period (January 1, 2016, to December 31, 2025) were analyzed (Table 7.27).

For temperature, daily values were averaged for each month over the 10 years, except for extreme maximum and minimum temperatures, which represent the highest and lowest recorded values for each month during this period.

For precipitation, daily rainfall and snowfall totals were summed for each month and then averaged over the 10-year period to derive mean monthly rainfall and snowfall values.

For wind, the average maximum wind gust speed was calculated for each month over the 10 years, and the most frequently occurring wind direction was identified.

Table 7.27: Climate Data Summary From the Greenwood A Meteorological Station (January 2016 - December 2025)

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature													
Daily Avg. (°C)	-3.4	-3.3	0.5	5.8	11.3	16.7	20.8	19.9	15.7	10.3	4.4	-0.9	8.2
Daily Max (°C)	0.8	1.6	5.1	11.0	17.5	22.8	26.8	26.0	21.9	16.0	8.7	3.3	13.5
Daily Min (°C)	-7.7	-8.2	-4.1	0.7	5.1	10.4	14.7	13.7	9.5	4.6	0.1	-5.0	2.9
Extreme Max (°C)	19.0	20.0	19.9	22.5	31.8	33.6	35.0	35.5	32.8	30.1	25.0	18.3	35.5
Extreme Min (°C)	-26.5	-25.2	-18.4	-7.9	-2.8	-1.5	5.9	4.8	-2.0	-5.3	-12.3	-17.5	-26.5
Precipitation													
Rain (mm)	54.2	47.0	58.8	76.3	75.7	91.5	96.9	95.6	86.0	92.3	97.9	80.6	79.4
Snow (cm)	75.9	61.0	32.3	9.0	0.9	0.0	0.0	0.0	0.0	0.2	10.1	37.9	18.9
Wind													
Max Hourly Speed (km/h)	49.6	50.3	50.6	47.4	44.0	42.1	40.3	39.2	42.2	45.0	50.2	50.8	46.6
Most Frequent Wind Origin Direction	W	W	W	W	W	W	W	W	W	W	W	W	W

Source: Government of Canada (2025b)

Over the 10-year period from January 2016 to December 2025, average monthly temperatures ranged from -3.4 °C in January to 20.8 °C in July, with an annual mean temperature of 8.2 °C. The highest recorded extreme temperature was 35.5 °C, recorded on August 7, 2018. The lowest recorded extreme temperature was -26.5 °C, recorded on January 22, 2022.

Mean monthly precipitation varied throughout the year. Average rainfall ranged from 47.0 mm in February to 97.9 mm in November, while snowfall was recorded during the colder months, with an average monthly maximum of 75.9 cm in January. Over the 10-year period, the annual average rainfall was 79.4 mm per month (equivalent to approximately 953 mm per year), and the annual average snowfall was 18.9 cm per month (equivalent to approximately 227 cm per year).

Wind conditions were characterized by an average maximum wind gust speed of 46.6 km/h, with monthly averages ranging from 39.2 km/h in August to 50.8 km/h in December. The predominant wind direction over the 10-year period was west.

7.1.9 SOIL AND GEOLOGY

REGULATORY CONTEXT

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to soil and geology.

FEDERAL

- ***Canadian Environmental Protection Act*** **(S.C. 1999, c. 33) -** CEPA addresses the prevention and management of pollution, including the regulation of hazardous substances that may contaminate soil. Pit operations may involve activities that could introduce contaminants, such as fuel storage, equipment maintenance, or chemical use.

PROVINCIAL

- ***Environment Act*** **(S.N.S. 1994-95, c. 1) -** This Act provides the legal framework for environmental protection in Nova Scotia, including the management of soil and geological resources. It supports pollution prevention, site remediation, and regulatory measures to prevent contamination from industrial activities. Pit operations must comply with this legislation to ensure proper site management and reclamation.

- ***Pit and Quarry Guidelines*** **(1999, Revised 2003) -** These guidelines outline requirements for the management of overburden, erosion control, and site rehabilitation at pit and quarry operations in Nova Scotia. They set standards for minimizing soil disturbance, managing stockpiles, and restoring excavated areas to promote long-term environmental stability. Compliance with these guidelines helps mitigate soil erosion and supports land rehabilitation efforts for the Project.

- ***Mineral Resources Act*** **(S.N.S. 2016, c. 3) -** This Act governs the exploration and development of mineral resources in Nova Scotia, including sand and gravel extraction. It includes provisions for the protection of soil and the management of geological impacts during extraction activities. Compliance with the Act ensures that the Project follows sustainable practices while minimizing environmental disturbances, particularly to soil and geology.

- ***Mineral Resources Regulations*** **(N.S. Reg. 196/2018) -** These regulations, enacted under the *Mineral Resources Act,* S.N.S. 2016, c. 3, govern the exploration and development of mineral resources, including sand and gravel extraction, in Nova Scotia. They establish requirements for exploration licensing, environmental protection, land reclamation, and community engagement to ensure that mineral operations are conducted responsibly, minimizing adverse impacts on soil and geological features.

DESKTOP REVIEW: METHODOLOGY

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

- Aerial imagery and topography
- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- GeoNOVA Elevation Explorer (GeoNOVA, n.d.)
- Nova Scotia Geoscience Atlas (NSNRR, n.d.-c)
- Mineral Resource Land Use (MRLU) Atlas (NSNRR, n.d.-a)
- Nova Scotia Acid Rock Drainage (ARD) Risk (NSNRR, n.d.-b)
- Karst Risk Map of Nova Scotia (NSNRR, 2019)

DESKTOP REVIEW: RESULTS

TOPOGRAPHY: The Project Site lies within two provincial ecodistricts (Drawing 2.3.2). The majority of the Project Site is located within the South Mountain Ecodistrict (720), part of the Western Ecoregion. The South Mountain Ecodistrict is a rugged upland extending approximately 150 km from east of the Sissiboo River to Panuke Lake. Topography within this ecodistrict is characterized by rolling to locally rugged terrain, shallow and coarse-textured soils, frequent bedrock exposures, and abundant lakes, wetlands, and headwater streams.

Elevations within the ecodistrict reach up to approximately 289 masl, with a mean elevation of about 175 masl. The South Mountain forms the headwaters of several major river systems in western Nova Scotia, including the Medway, Mersey, LaHave, and Annapolis rivers (Neily et al., 2017).

A small portion of the central-eastern part of the Project Site lies within the Valley Slope Ecodistrict (710), part of the Western Ecoregion. This ecoregion forms a long, narrow band of foothills along the north-westerly facing slope of the South Mountain and is situated between the Annapolis Valley and South Mountain ecodistricts and extends west to east from the Acacia Valley in Digby County to Mount Denson in Hants County. Topography within the Valley Slope Ecodistrict is characterized by sloping and locally rugged terrain that descends from the uplands of the South Mountain toward the Annapolis Valley floor. Elevations within the ecodistrict range from approximately 270 masl along the edge of the South Mountain Ecodistrict to sea level on the valley floor, with a mean elevation of about 130 masl (Neily et al., 2017).

Within the Project Site, elevations range from approximately 132 masl to 222 masl, which is consistent with its location along the lower slopes of the South Mountain and within the foothill terrain associated with the Valley Slope Ecodistrict.

SURFICIAL GEOLOGY: The Project Site is underlain by surficial deposits of Quaternary age associated with the Wisconsinan glaciation, as mapped by the Nova Scotia Geoscience Atlas (Drawing 7.1.9.1). Three primary surficial geological units are present within the Project Site, reflecting its location across the South Mountain and Valley Slope ecodistricts.

The northern portion of the Project Site is underlain by Glaciofluvial Deposits associated with Kame Fields and Esker Systems. These deposits consist of gravel, sand, and silt with locally occurring diamicton layers and poorly to well-bedded, horizontal to angular stratification. Collapse structures and faulting features are common. The resulting topography is characterized by steep-sided mounds or hummocks (moulin kames), pitted terraces along valley sides (kame terraces), and sinuous, steep-sided ridges (eskers). Deposit thickness generally ranges from approximately 4 to 6 m, with localized thickening in kames (4-20 m) and kame terraces (3-30 m). Eskers are typically narrower features with thicknesses of approximately 5 m. These materials were deposited by glacial meltwater streams within and beneath stagnant ice and along valley margins. Due to their coarse texture, rapid drainage, stoniness, and irregular terrain, these deposits have limitations for crop production but are commonly utilized as sources of aggregate and for pasture or blueberry cultivation.

The central portion of the Project Site, which comprises the majority of the site, is underlain by Silty Till Plain, a unit of Ground Moraine and Streamlined Drift. This unit consists of silty, compact till derived from both local and distant bedrock sources and forms flat to gently rolling topography with relatively few surface boulders. The till is sufficiently thick to mask underlying bedrock relief, with reported thicknesses ranging from approximately 3

to 30 m. These deposits were released from the base of ice sheets centred over Nova Scotia during deglaciation. Silty Till Plain deposits generally exhibit moderate drainage and stoniness and have moderate to good buffering capacity due to the inclusion of transported calcareous bedrock components.

The southern portion of the Project Site is underlain by Stony Till Plain, a unit of Ground Moraine and Streamlined Drift. This unit consists of stony till with a sandy matrix, derived primarily from local bedrock sources. Surface expression is generally flat to rolling and is characterized by abundant surface boulders. The till is typically shallow to moderately thick, with reported thicknesses ranging from approximately 2 to 20 m, and may locally reflect underlying bedrock relief. These deposits were released from the base of ice sheets centred over Nova Scotia during deglaciation. Stony Till Plain deposits generally exhibit rapid drainage and high stoniness, resulting in moderate limitations for agricultural use and construction, and they have relatively poor buffering capacity due to the limited presence of calcareous material.

BEDROCK GEOLOGY: The northern portion of the Project Site is primarily underlain by the Goldenville Formation, part of the Meguma Group (Drawing 7.1.9.2). This formation dates from the Cambrian to the Ordovician and consists of sandstone turbidites and slate, representing a continental rise prism. In places, the unit is metamorphosed to schist and gneiss. The formation is regionally extensive, with thicknesses exceeding 5,600 m.

A small northwestern area is underlain by Middle-Late Devonian fine-grained leucomonzogranite, a fine-grained plutonic rock representing localized Devonian intrusions.

The central-southern portion of the Project Site is underlain by the White Rock Formation, which dates from the Ordovician to Silurian. This formation primarily consists of paralic to nearshore marine deposits, including quartzite, conglomerate, siltstone, and slate, with localized rhyolite and basalt at its base. The White Rock Formation has variable thickness ranging from approximately 30 to 1,000 m and represents nearshore sedimentary environments along the evolving Meguma passive margin.

Finally, the southern portion of the Project Site is underlain by Middle-Late Devonian biotite monzogranite. This plutonic unit consists of biotite-bearing monzogranite and intruded during the Middle to Late Devonian.

Well log data from the Project Site, based on records within 1 km, indicate that the maximum depth to bedrock is approximately 11.57 m (NSNRR, 2025b), reflecting a relatively thin layer of glacial overburden above the underlying formations.

LIKELIHOOD OF GEOLOGICAL HAZARDS: A review of available provincial geological hazard datasets indicates a generally low likelihood of geological hazards within the Project Site. The Nova Scotia ARD Risk Map does not include coverage for the Project Site, as formations occur primarily in southwestern Nova Scotia. A

review of the provincial sulphide-bearing slates layer indicates no mapped sulphide-bearing units near the Project Site (Drawing 7.1.9.3). Based on the mapped bedrock geology and the absence of known sulphide-bearing formations, the overall likelihood of ARD is considered low.

The Karst Risk Map of Nova Scotia classifies the Project Site as being within a low-risk zone for karst topography, indicating a low likelihood of subsurface dissolution features or sinkhole development (Drawing 7.1.9.3).

According to the MRLU Atlas, radon potential within the Project Site is predominantly classified as medium, with small localized areas of high potential in the northern portion of the site and a very limited area in the southern portion (Drawing 7.1.9.4). The surrounding area exhibits a mix of medium to high radon potential, particularly to the north and southwest of the Project Site. With respect to groundwater quality indicators, the Atlas identifies a predominantly medium relative risk for arsenic in bedrock wells across much of the Project Site, with small areas of high risk in the northern and southern portions and low risk across parts of the south-central area (Drawing 7.1.9.5). Uranium risk is primarily low across most of the Project Site, with a higher relative risk identified in the southern portion (Drawing 7.1.9.6).

OVERBURDEN CONDITIONS AND INFERRED SUBSURFACE MATERIALS: Based on provincial surficial geology mapping, the Project Site is underlain by Quaternary glacial deposits, including glaciofluvial materials associated with kame and esker systems in the north, silty till in the central portion, and stony till in the southern portion. These deposits are characteristic of the surrounding South Mountain and Valley Slope ecodistricts, and reflect the glacial history of the region.

While the Project Site is currently inactive, it has been subjected to historical resource-related disturbances. Portions of the property have a documented history of previous forest harvesting activities and localized, historic open-pit aggregate extraction. Outside of these localized historical footprints, the broader site remains inactive, and subsurface conditions across the proposed extraction blocks have not been directly observed. Well log data from within 1 km of the Project Site indicates that the maximum depth to bedrock is approximately 11.57 m (NSNRR, 2025b). This depth indicates a substantial, commercially viable aggregate deposit. The uppermost layer of the site consists of non-commercial overburden (e.g., topsoil, organics, and silty subsoils). Materials directly beneath this overburden are expected to consist primarily of the targeted sand and gravel deposits, with minor rock fragments, extending down to the consolidated bedrock layer. Actual overburden thickness and site-specific subsurface stratigraphy will be confirmed as progressive extraction occurs during future site development.

7.2 SOCIOECONOMIC ENVIRONMENT

7.2.1 LOCAL ECONOMY, LABOUR FORCE, AND EMPLOYMENT

REGULATORY CONTEXT

Several federal, provincial, and municipal laws and regulations are relevant to the operations of the Project with respect to the local economy, the labour force, and employment.

FEDERAL

- ***Income Tax Act*** **[R.S.C. 1985, c. 1 (5th Supp.)]** - This Act governs taxation in Canada, including payroll and corporate taxes. The Project's economic activities will be subject to applicable tax regulations.

PROVINCIAL

- ***Labour Standards Code*** **(R.S.N.S. 1989, c. 246)** - This Code establishes minimum employment standards in Nova Scotia, including provisions for wages, hours of work, overtime, vacation entitlements, and employee protections. The Project must comply with these standards to ensure fair labour practices and adherence to provincial employment regulations.
- ***Occupational Health and Safety Act*** **(S.N.S. 1996, c. 7)** - This Act establishes the framework for workplace health and safety in Nova Scotia, outlining the responsibilities of employers to ensure a safe working environment. For pit operations, compliance with this Act is essential to protect workers from potential hazards associated with excavation and material handling activities.

MUNICIPAL

- ***Annapolis County Land Use Bylaw*** **(County of Annapolis, 2024)** - This bylaw regulates land use, zoning, and development within the Municipality of the County of Annapolis. It establishes various land use zones and outlines the types of activities permitted within each zone, including provisions for industrial and aggregate-related industries. The bylaw also sets requirements for development permits, ensuring that any proposed activities comply with zoning regulations and local land use policies. Compliance with this bylaw ensures the Project adheres to municipal requirements for zoning and development approval, promoting responsible land use and environmental protection.

DESKTOP REVIEW: METHODOLOGY

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

- Municipality of the County of Annapolis Website (County of Annapolis, 2026)
- 2016 and 2021 Census Data (Statistics Canada, 2024, 2025)
- Annapolis County Agricultural Profile (NSFA, 2021)

DESKTOP REVIEW: RESULTS

OVERVIEW OF THE ECONOMY IN THE PROJECT REGION: The Project is located in Annapolis County, part of the Annapolis Valley Economic Region, which also includes Kings and Hants counties. Annapolis County, Nova Scotia, has a diverse economy driven by several key sectors:

- **Agriculture:** Annapolis County is a major agricultural hub, known for its cattle, dairy, poultry, fruit, and tree nut farms. In 2021, the county contained 17% of the provincial total of oilseed and grain farms. It also possessed 5 soybean farms, representing 33% of the provincial total. Cattle farming in Annapolis County increased by 9%, and beef farming increased by 19% between the 2016 and 2021 censuses.
- **Tourism:** The region attracts visitors for its ecotourism, including visiting tidal beaches, forest trails and parks, as well as the Bay of Fundy. Annapolis County contains many historical sites, coastal communities, and significant landmarks, contributing to its famed heritage tourism. Its local cuisine and wine are well-renowned as well.
- **Manufacturing:** Annapolis County is an emerging hub for this sector, and manufacturing jobs rose by 1.8% between 2016 and 2021 (Statistics Canada, 2024, 2025).
- **Aggregate Production:** Several pits and quarries operate in Annapolis County, providing construction materials to local and provincial markets.
- **Healthcare Services:** Healthcare services across Annapolis County, including the Annapolis Community Health Centre, support both local residents, tourists, and the surrounding region.
- **Commercial Hubs:** The towns of Annapolis Royal, Bridgetown, and Middleton serve as commercial centres, providing retail, professional services, and other businesses that support the regional economy.

EMPLOYMENT AND LABOUR FORCE: The demographic profile of Annapolis County and the Annapolis Valley Economic Region provides important context for assessing the local labour force and employment opportunities. Population growth, age distribution, and income levels are key factors that influence the availability of workers and economic activity in the area.

Annapolis County's population grew by 3.2% from 2016 to 2021, a slightly lower rate compared to the 4.5% growth in the Annapolis Valley and the 5.0% growth in the province (Table 7.28).

Table 7.28: Population Characteristics From 2016 to 2021

Statistics	Annapolis County	Annapolis Valley	Nova Scotia
Population (2021)	21,255	129,306	969,383
Population (2016)	20,591	123,749	923,598
Population Change From 2016 to 2021	+3.2%	+4.5%	+5.0%
Total Private Dwellings (2021)	11,612	62,284	476,007
Land Area	3,183.23 km^2	8,352.72 km^2	52,824.71 km^2
Population Density (2021)	6.7/km^2	15.5/km^2	18.4/km^2

Source: Statistics Canada (2025)

The age distribution in Annapolis County is slightly older overall than that of the Annapolis Valley and Nova Scotia as a whole. Annapolis County has a notably higher proportion of adults aged 65 and over, compared to both the Annapolis Valley and the province (Table 7.29). Both the average and median ages in Annapolis County and the Annapolis Valley are slightly higher than the provincial averages.

Table 7.29: Age Distribution in 2021

Statistics	Annapolis County	Annapolis Valley	Nova Scotia
0-14 years	2,700 (12.7%)	18,870 (14.6%)	136,710 (14.1%)
15-64 years	12,375 (58.2%)	79,945 (61.8%)	617,345 (63.7%)
65+ years	6175 (29.1%)	30,495 (23.6%)	215,325 (22.2%)
Average age	48.8	45.2	44.2
Median age	54.0	48.0	45.6

Source: Statistics Canada (2025)

The median total income of households increased from 2015 to 2020 in Annapolis County, the Annapolis Valley, and the province, and the employment rate decreased from 2016 to 2021 in all three regions. Although in both the Annapolis Valley and the province, unemployment rates rose from 2016 to 2021, in Annapolis County, they decreased by 0.8% (Table 7.30).

Table 7.30: Employment Rates, Unemployment Rates, and Median Household Income (2016 vs. 2021)

Statistics	Annapolis County	Annapolis Valley	Nova Scotia
Employment Rate (2021)	45.0%	51.0%	51.9%
Employment Rate (2016)	45.9%	53.8%	55.2%
Unemployment Rate (2021)	12.3%	11.1%	12.7%
Unemployment Rate (2016)	13.1%	9.7%	10.0%
Median Total Income of Household (2020)	$56,800	$68,500	$71,500

Median Total Income of Household (2015)	$48,116	$58,135	$60,764

Source: Statistics Canada (2024, 2025)

The local economy in Annapolis County is diverse, with key sectors contributing to employment and economic activity. These sectors are crucial for understanding labour force availability and how they align with the Project's needs.

The top three industries in Annapolis County in both 2016 and 2021 were retail trade, health care and social assistance, and public administration (Table 7.31). Manufacturing saw a 1.8% increase in employment in 2021 when compared to 2016, and it rose from the seventh most popular industry in 2016 to the fourth in 2021. In addition to manufacturing, only two of the top seven industries saw increases in employment in 2021 when compared to 2016, which were health care and social assistance (0.5% increase) and agriculture, forestry, fishing, hunting (0.9% increase).

Table 7.31: Top Industries for the Employed Labour Force in Annapolis County (2016 vs. 2021)

Industry	2016	2021
Total Labour Force Aged 15+ Years (25% Sample Data)	9,280 (100%)	9,345 (100%)
Retail Trade	1,330 (14.3%)	1,310 (14.0%)
Health Care and Social Assistance	1,255 (13.5%)	1,305 (14.0%)
Public Administration	870 (9.4%)	840 (9.0%)
Construction	830 (8.9%)	780 (8.3%)
Agriculture, Forestry, Fishing, Hunting	665 (7.2%)	755 (8.1%)
Educational Services	660 (7.1%)	605 (6.5%)
Manufacturing	620 (6.7%)	795 (8.5%)

Source: Statistics Canada (2024, 2025)

LABOUR FORCE, SKILLS, AND LOCAL BUSINESS SUPPORT: The availability of a skilled workforce is critical to the Project.

Labour Force and Skills: The regional labour force includes workers trained in health care, retail, administration, and manufacturing. Employment in trades and construction-related fields, such as heavy equipment operation and mechanics, is also relevant to the Project. These industrial fields are present in the contingency of the Annapolis County workforce.

Relevant Skillsets for Pit Operations: Heavy equipment operators, general labourers, and truck drivers will be required. Training in occupational health and safety (OHS) and first aid is typically required for these roles. The second most common occupation in Annapolis County is in 'trades, transport, and equipment operators and

related occupations', suggesting that these skills are likely available. Further, OHS and first aid training are accessible within the Project Region in Kings County, ensuring that workers can meet basic safety requirements.

Local Business Support: Several sectors may provide auxiliary support to the Project, including:

- Fuel suppliers for heavy machinery
- Heavy equipment mechanics
- Trucking companies for material transport
- Construction and engineering firms for site development and monitoring

Project Phases and Employment Opportunities:

- During operation, employment will be steady, with ongoing demand for equipment operators and truck drivers.
- During reclamation, fewer workers may be required, but some roles (e.g., environmental monitoring and revegetation) may increase.

7.2.2 LAND USE AND PROPERTY VALUES

REGULATORY CONTEXT

Several provincial and municipal laws and regulations are relevant to the operations of the Project with respect to land use and property values.

PROVINCIAL

- ***Assessment Act*** **(R.S.N.S. 1989, c. 23)** - This Act establishes the framework for property assessment in Nova Scotia. Under this Act, the Property Valuation Services Corporation is responsible for determining the market value of properties for taxation purposes.
- ***Municipal Government Act*** **(S.N.S. 1998, c. 18)** - This Act grants municipalities the authority to create land use bylaws and planning strategies, and collect property taxes. The Project must comply with relevant municipal bylaws and planning regulations to ensure alignment with local land use policies and community interests.

MUNICIPAL

- ***Annapolis County Land Use Bylaw*** **(County of Annapolis, 2024)** - This bylaw regulates land use, zoning, and development within the Municipality of the County of Annapolis. It establishes various land use zones and outlines the types of activities permitted within each zone, including provisions for

industrial and aggregate-related industries. The bylaw also sets requirements for development permits, ensuring that any proposed activities comply with zoning regulations and local land use policies. Compliance with this bylaw ensures the Project adheres to municipal requirements for zoning and development approval, promoting responsible land use and environmental protection.

- ***Annapolis County Municipal Planning Strategy*** **(County of Annapolis, 2025) -** This Municipal Planning Strategy (MPS) provides the foundation for all policies regarding land use to structure all modes of development in Annapolis County. Its purpose is to regulate activity in each of the land use zones, implementing specific guidelines to enforce safe and healthy development in each zone. The Project Site falls within the MPS area and will be subject to it. Secondary Planning Areas have been implemented in multiple areas within Annapolis County prior to the development of the MPS, each with its own Secondary Planning Strategies tailored to the unique needs of each separate area. These are targeted areas with localized higher population densities. Wastewater and municipal water systems are usually provided, with a focus on the sustainability and proper use of water in each municipality, due to its importance to local communities. None of the Secondary Planning Areas encompasses the land of the Project Site and therefore is subject only to the jurisdiction of the county-wide MPS. The Project Site and nearby area are rural, and the Future Land Use Map does not contain any changes to the present land use zoning of Mixed Use (MX). No additional regulations must be followed aside from those enforced by the MPS.

DESKTOP REVIEW: METHODOLOGY

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

- Annapolis County Municipal Planning Strategy (County of Annapolis, 2025)
- Annapolis County Land Use Bylaw (LUB; County of Annapolis, 2024)
- ViewPoint Map (ViewPoint, 2026)
- Nova Scotia Finance and Treasury Board Report (Storring, 2021)

DESKTOP REVIEW: RESULTS

MUNICIPAL LAND USE: ZONING OF THE PROJECT AREA: The Project is situated within one primary zoning category as defined by the *Annapolis County Land Use Bylaw*: MX - Mixed Use. The Mixed Use Zone is intended to provide a wide variety of developmental opportunities and permits a broad range of activities. Examples of permitted uses in this zone include:

- **Existing Uses:** Certain non-agricultural uses are permitted where they legally existed at the time of adoption of the LUB, including hotels and dwellings.

- **Agricultural Uses:** A range of agricultural activities is permitted, including farming, livestock operations, greenhouses, forestry uses, farm markets, agricultural-related industries, and other farm-supportive uses.

- **Residential Uses:** A variety of residential developments are permitted, including one-unit dwellings, two-unit dwellings, cottages, boarding homes, and land lease communities, subject to the bylaw's general regulations and location criteria. Multi-unit dwellings are prohibited.

- **Commercial Uses**: A large range of commercial uses are permitted, including automotive businesses, construction and landscaping industry, farm markets, campgrounds, building supplies, and recreation centres.

- **Land Uses:** Many land uses are permitted in Mixed Use zones, including stores, medical clinics, service stations, storage facilities, and private utilities and services.

- **Industrial Uses**: A select range of industrial uses is permitted, including excavation operations, agricultural processing facilities, light industrial uses, and distribution facilities. Extractive-related facilities, heavy industrial operations, and construction debris disposal sites are not permitted.

Within 1 km of the northern border of the Project Site is land containing two additional zoning categories: GW4 - Groundwater Buffer and GW5 - Groundwater General (Drawing 7.2.2.1). Aggregate resource extraction and alteration of any kind are strictly prohibited within the GW4 and GW5 zones, as well as up to 30.4 m away from these zones.

JURISDICTION AND PERMITTED USES: Per consultation with the Municipality of the County of Annapolis and the *Annapolis County Land Use Bylaw* (County of Annapolis, 2024), aggregate extraction activities themselves are regulated by the Province of Nova Scotia, and municipal development permits are not required for the extraction itself. However, any structures or facilities associated with these operations are regulated by the municipality under the Bylaw.

Under the Bylaw, "Excavation Operations" are fully permitted within the MX zone. However, "Extractive-Related Facilities" are strictly prohibited in the MX zone and are only permitted in the Local Industrial (M1) zone. The Bylaw defines extractive-related facilities as:

"The use of and structures related to, associated with and/or fundamental to the operation of an extractive surface, or underground mine, pit, quarry or drill site, including those lands, buildings and structures related to, associated with and/or fundamental to the storage, washing, crushing, sifting, reducing, leaching, weighing, processing, distribution and/or sale of such extracted materials, including but not limited to, sand, gravel, oil and natural gas, minerals, stone, rock or clay."

The Project will operate without the construction or installation of any permanent structures, buildings, or fixed foundations. All operational, processing, and administrative activities will be executed utilizing a temporary, fully mobile equipment configuration, consisting of:

- **Extraction & Earthmoving Equipment:** Excavators, dozers, and graders;
- **Processing Equipment:** Mobile jaw crushers, mobile cone crushers, and mobile screening units;
- **Handling & Transport Equipment:** Front-end loaders and standard haul trucks; and
- **Auxiliary Vehicles:** A dedicated water truck for on-site dust suppression.

To further ensure no structural footprint is introduced, product weighing and aggregate quantification will be conducted using integrated wheel loader scales built directly into the front-end loaders. This mobile configuration completely eliminates the requirement for a permanent truck scale, scale house, or associated foundation structures on-site. Lavatory facilities will consist of portable toilets.

Because the Project is designed strictly around the temporary use of mobile machinery and contains no permanent buildings, fixed foundations, or structural facilities, it does not meet the LUB's threshold or definition for an "extractive-related facility". Consequently, the Project's activities are classified under "Excavation Operations" and represent a permitted land use within the Mixed Use (MX) zone. The Proponent is committed to ongoing, proactive consultation with the Municipality of the County of Annapolis to ensure that the site's mobile configuration and progressive development continue to align with municipal planning interpretations and community development strategies.

SURROUNDING LAND USES: The Project Site is surrounded by a mix of land uses. Residential properties are located directly to the north and east along adjacent roads, and light to moderately disturbed woodland encompasses the remaining land surrounding the Project Site. All of the surrounding area is within land use zone MX (Mixed Use), with the exception of the area located to the north. This land is within land use zones GW4 (Groundwater Buffer) and GW5 (Groundwater General), with a small section of GW3 (Groundwater Supply) slightly farther north.

BROADER LAND USES IN THE REGION: The broader Project Region is predominantly rural, with a mix of agricultural, residential, and resource-based land uses to the north. Northward of the groundwater land use zones are very large sections of AG (Agricultural) zones, which are located in the lower elevation portions of the Annapolis Valley. The small village of Lawrencetown is 3 to 4 km north of the Project Site, and consists mostly of R1 (Low-density Residential) and R2 (Multi-use Residential) zones between the large AG (Agricultural) zones. All of the land towards Lawrencetown and directly surrounding the Project Site is privately owned. Most of the land south and southwest of the Project Site is Crown land, and some sections directly east are Crown land as well.

PROPERTY VALUES: The property values nearby and within the Project Area were assessed by reviewing several nearby properties, categorized by land use types, including residential, forest/woodland, and vacant land. Property sizes and assessment values were averaged for each land type using data from ViewPoint (2026) based on a sample size of ten properties per category. The average assessment value per acre was then calculated for each category (Table 7.32).

Table 7.32: Property Assessment Values by Land Use

Land Use	Average Property Size (Acres)	Average Assessment Value ($)	Average Assessment Value per Acre ($)
Residential	2.6	238,430	91,703
Agricultural	52.9	212,300	4,013
Commercial	15.5	369,500	23,846
Forest/Woodland	186.8	867,390	4,643
Vacant Land	25.5	16,460	647

Source: ViewPoint (2026)

To provide additional context, property value data from Statistics Canada's Canadian Housing Statistics Program (CHSP), as discussed in a 2021 report by the Nova Scotia Finance and Treasury Board, was reviewed. This report provides a broader regional perspective on assessment values and ownership trends in Nova Scotia, using data from the CHSP. According to CHSP data, the median assessment value of residential properties in Nova Scotia was $131,000 in 2020, a slight increase from $129,000 in 2019. For Annapolis Subdivision B, where the Project Area is located, the median assessment value was $95,500 in 2020, indicating notably lower property values compared to the provincial median.

It is important to note the differences between the ViewPoint dataset and the CHSP data. The ViewPoint data represents a small, localized sample of ten properties per land-use category, while the CHSP data provides a broader perspective based on median values, focusing primarily on residential properties. While the CHSP data reflects trends at the provincial and regional levels, the ViewPoint data encompasses a wider variety of land uses relevant to the Project Area. These differences in methodology and scope contribute to variations in reported property values, which should be considered when assessing potential impacts on property values in the context of the Project.

7.2.3 TRANSPORTATION AND INFRASTRUCTURE

REGULATORY CONTEXT

Several provincial laws and regulations are relevant to the operations of the Project with respect to transportation and infrastructure.

PROVINCIAL

- ***Carriage of Freight by Vehicle Regulations*** **(N.S. Reg. 24/95) -** These regulations, under the *Motor Vehicle Act,* R.S.N.S. 1989, c. 293, impose insurance and inspection requirements for vehicles over 4,500 kg. They ensure the safe and compliant transportation of freight by regulating vehicle standards, load securing, and safety measures. Compliance with these regulations is important for the Project to ensure the legal and safe transport of materials.

- ***Spring Weight Restriction Regulations*** **(N.S. Reg. 46/2025) -** These regulations, made under the *Public Highways Act,* R.S.N.S. 1989, c. 371, impose restrictions on the weight of vehicles operating on specific roads in Nova Scotia during the thawing of road surfaces. If the Project involves heavy transportation during the spring, it will need to comply with these restrictions to avoid exceeding weight limits and to ensure the protection of the provincial road network.

- ***Pit and Quarry Guidelines*** **(1999, Revised 2003) -** In accordance with provincial regulations, the active area of a pit or quarry operation must be located at least 30 m from the boundary of a public or common highway unless consent is obtained from Nova Scotia Public Works (NSPW). These regulations ensure safe distances from transportation corridors and minimize disruption to public infrastructure.

DESKTOP REVIEW: METHODOLOGY

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

- Road Weight Designations Map (Government of NS, 2025)
- Road Weight Designations (NSTIR, 2026)
- Spring Weight Road Restrictions Map (NSPW, 2026)
- Traffic Volumes - Provincial Highway System Data (NSPW, 2025)

DESKTOP REVIEW: RESULTS

TRANSPORTATION: The Project Site is accessed via Inglisville Road, a commonly travelled local unpaved road that connects to the broader transportation network. Inglisville Road connects to Highway 201 to the northwest, a 78 km-long highway that connects agricultural and rural areas to major provincial highways in Annapolis County. Highway 201 runs parallel to the vital Highway 1 and can be accessed via Lawrencetown Lane in downtown Lawrencetown. An alternative route to the Project Site is available by driving east along Inglisville Road, immediately turning north onto Trout Lake Road, and following it until it intersects with Highway 1 via Lawrencetown Lane. Trout Lake Road is a paved road and turns into Lawrencetown Lane when it intersects with Highway 201.

For wider regional distribution, Highway 101, a major east-west highway running through the northern part of Nova Scotia from Bedford to Yarmouth, lies slightly north of Highway 1. It is a primary route to markets beyond the local area, including connections to Halifax and other provincial destinations, and has higher speed limits and more traffic than Highway 1 and Highway 201. The nearest access to Highway 101 from the Project Site is available via Elliot Road and Highway 1 in the village of Lawrencetown.

Another major east-west highway, Highway 103, runs along the South Shore from Halifax to Yarmouth and serves as a key transportation route to markets in that region. The nearest and most commonly used route from the Project Site to Highway 103 is Highway 10, which begins in Nictaux and runs south to Bridgewater. Highway 10 is accessed east of the Project Site via Crisp Road, which connects directly to Inglisville Road.

The key roads leading to the Project Site are subject to various weight designations. The *Road Weight Designations Map* for Nova Scotia identifies the weight restrictions on major routes. Inglisville Road has an 'All Other Highways' weight designation of 41,500 kg, and must be utilized to access the site directly. Connecting roads to Inglisville Road, including Crisp Road and Trout Lake Road, have 'Intermediate Weight' designations of 49,500 kg. The portion of Highway 1 nearest the Project Site has a 'B Train' designation of 62,500 kg in Lawrencetown, and the nearest portion of Highway 101 has a 'Maximum Weight' designation of 62,500 kg. Highway 101 has the 'Maximum Weight' designation across its entire length, but Highway 1 has portions designated as 'Intermediate Weight' (49,500 kg) on either side of Lawrencetown. Highway 10 has an 'Intermediate Weight' designation of 49,500 along its whole length. Highway 103 has a 'Maximum Weight' designation of 62,500 for its entire length.

Additionally, the Project Area is affected by spring weight restrictions, which are in place to protect road infrastructure during thawing periods and enforce restrictions on axle and gross weight of vehicles. These restrictions, outlined in the *Spring Weight Restriction Regulations,* N.S. Reg. 46/2025, are in effect each spring and impact most non-major roads. The key highways used for the Project, including Highway 1, Highway 101, and Highway 10, as well as other major routes, are exempt from these restrictions. Roads that connect the Project Site to all major highways, including Inglisville Road, Trout Lake Road, and Crisp Road, are subject to the spring weight restrictions, and all vehicles must adhere to them while they are active.

Traffic volumes on the primary roads used for transporting materials and equipment to and from the Project Site are monitored by the provincial government. The *Traffic Volumes Provincial Highway System* data offers insights into traffic levels on these routes. The nearest 'Traffic Volume Section' to the Project Site is a 10.9 km stretch along Highway 201, from the village of Nictaux to Lawrencetown Lane. The Annual Average Daily Traffic (AADT) along this section was 890 in 2025. Another nearby 12.9 km stretch along Highway 10, from the village of Nictaux to Crisp Road in Albany, had an AADT of 2,780 in 2025. The vicinity around the Project Site is rural,

with limited commercial and industrial enterprises, so the area is expected to display a notable increase in traffic compared to normal, with the traffic expected to come with the proposed Project.

UTILITIES AND INFRASTRUCTURE: The Project Site is accessed via an existing private access road that connects to Inglisville Road, linking the site to the broader regional transportation system. The Project will not require on-site water or wastewater systems, such as a drilled well or a septic field. During the operational phase, sanitary facilities will be provided via portable restrooms. The Project does not require permanent infrastructure, and no new utility connections are anticipated.

The site is located within the reach of existing power lines and transmission lines, which supply electricity to nearby areas. These power lines are part of the regional infrastructure and will support any temporary power needs.

7.2.4 RECREATION AND TOURISM

REGULATORY CONTEXT

Several municipal bylaws are relevant to the operations of the Project with respect to recreation and tourism.

MUNICIPAL

- ***Annapolis County Land Use Bylaw*** **(County of Annapolis, 2024)** - This bylaw regulates land use, zoning, and development within the Municipality of the County of Annapolis, including provisions for recreational, ecological, and tourism-related activities. It establishes various land use zones, such as the Parks and Recreation (PR) Zone, which is designated for community and environmental developments, outdoor recreation, and open spaces. It includes maintenance and regulation of both active and passive recreation. Compliance with this bylaw helps maintain designated areas for recreation and tourism while supporting responsible land use planning.

- ***Annapolis County Municipal Planning Strategy*** **(County of Annapolis, 2025)** - The MPS outlines long-term land use policies and community goals for Annapolis County, including provisions for recreation and rural self-reliance. Its strategy intends to retain the county's historical and environmental values while providing continual development in economics and tourism. It identifies areas designated for commercial and public recreation, supports tourism-related development, and aims to balance economic growth with environmental and community interests. The strategy guides decision-making on zoning, infrastructure, retention of heritage, resource use, and land use to ensure that recreational and tourism activities align with broader municipal planning objectives.

DESKTOP REVIEW: METHODOLOGY

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

- Nearby Trails (AllTrails, n.d.)
- Fishing Areas (Fish Nova Scotia, n.d.)
- Parks and Protected Areas (Government of NS, n.d.)
- Tourism Nova Scotia (Tourism Nova Scotia, n.d.)
- Location of Public Firearm and Archery Ranges (NSNRR, 2021a)
- Parks Canada (Parks Canada, n.d.)
- County of Annapolis (n.d.)

DESKTOP REVIEW: RESULTS

RECREATION AND TOURISM OVERVIEW: Recreation and tourism activities in the Project Region and surrounding area contribute significantly to both the local quality of life and the economy. These activities include outdoor recreation like hiking, kayaking, canoeing, and cycling, and tourism attractions such as parks, trails, heritage sites, local food and beverage, and cultural sites. Scenic landscapes and oceanscapes are also key components of nature-based tourism, with ecotourism and sustainable tourism initiatives becoming increasingly popular. Local businesses, including accommodations, restaurants, and other hospitality services, rely heavily on tourism traffic.

RECREATIONAL ACTIVITIES AND SITES IN THE REGION

Hiking Trails: Several trails are located within the Project Region, including the 110 km Harvest Moon Trailway, which spans from Annapolis Royal to Grand Pré, and can be accessed 6 km north of the Project Site, in Lawrencetown. This trailway, a partnership of 22 trails, is commonly used for hiking, cycling, ATV riding, snowmobiling, and dog walking, among other recreational uses.

There are several other hiking trails in the region, including the Lower Delancy Falls trail, a 5 km loop located approximately 9.7 km northeast of the Project. Located approximately 2.5 km north of the Project Site is Eel Weir Brook Falls, a 1.8 km long hiking trail with a scenic waterfall, accessible from Trout Lake Road. Roxbury Road hosts the Roxbury Falls and Break Neck Hill, two hiking destinations located approximately 3 km west of the Project.

Coastal sea cliff hiking is also popular in Annapolis County, and several prominent locations are present approximately 14 km to the north of the Project, situated along the Bay of Fundy. These include Healy Brook Falls and Cave and Keatings Sand Beach.

Bicycle Annapolis County: Biking both locally and longer distances is very popular in Annapolis County, and Bicycle Annapolis County is a project that has connected bikers through the creation of routes, circuits, and maps that tourists and locals can use.

Fishing and Hunting: Fishing is a popular recreational activity across the Annapolis Valley, due to its close proximity to the Annapolis River. The river stretches across nearly the entire length of Annapolis County, eventually flowing into the Annapolis Basin. It runs alongside many of the most populous communities in the region and contains many American shad and striped bass, two sought-after species for fishing. There are numerous access points across the county, and two popular sites exist close to the Project Area. The Lawrencetown Boat Launch is located approximately 3.6 km north of the Project Site and provides access for boats and kayaks to enter the river for fishing purposes. Jubilee Park (~12 km west of the site) is a popular location for fishing on the edge of the Annapolis River and attracts both locals and passing tourists. There is a firing range 900 m west of the Project Site, on Crown Land.

Parks and Protected Areas: There are several parks and protected areas within 20 km of the Project Site, and many are located adjacent to the Annapolis River, which flows approximately 6 km from the Project at its closest (Drawing 7.1.5.2). Belleisle Marsh is a former Acadian settlement site that sits on a vast expanse of marsh and dykeland. It is protected by Ducks Unlimited Canada and NSNRR and is located approximately 20 km northwest of the Project Site. The Marsh's proximity to the Annapolis River makes it an important bird breeding and migration location, and it is one of the largest intact wetlands in the Annapolis Valley. Valleyview Provincial Park is a protected area located approximately 14 km northwest of the Project Area, which provides a 3.1 km hiking trail, 30 campsites, and two lakes. The Cloud Lake Wilderness Area is an expansive protected area, and its closest border is located approximately 7 km southeast of the Project Area. Its land spans over 15,000 ha and is shared with the neighbouring Kings County, although most of its area is in Annapolis County.

Additionally, various local parks and recreational areas are within a short distance of the Project, including sports fields, playgrounds, and community parks. Examples include facilities at Lawrencetown Consolidated School and Lawrencetown Education Centre, both located approximately 5.5 km north of the Project and featuring multiple sports fields and recreational amenities. Open spaces do not occur within 10 km of the Project Site, but in the neighbouring town of Middleton, there are several, including Riverside Park, which has picnic tables and an open recreational area. Approximately 12 km from the Project Site is Queen Elizabeth II Jubilee Park, a large open space with amenities and picnic tables in the village of Bridgetown. The Lawrencetown Village Walk, approximately 6 km from the Project Site, does not have an open space, but provides picnic tables and a walk along the Annapolis River.

Several golf courses are near the Project, including the Island Green Golf Club, approximately 5.7 km west of the Project, and Above Par Golf Course, approximately 15.1 km northeast of the Project.

Scenic Areas, Lookoffs, and Beaches: The Annapolis Valley is renowned for its diverse scenic landscapes, including coastal views, agricultural fields, rivers, the Bay of Fundy, and rolling forested hills, which support a strong nature-based tourism industry.

A popular coastal destination is Margaretsville, located on the North Mountain. It offers panoramic views of the coastline, local seafood vendors, a walk along the beach to the Margaretsville Beach Waterfall, and a large lighthouse.

There are several dozen waterfalls in Annapolis County on both the North and South Mountains, which attract a significant amount of ecotourism every year. Many of these waterfalls have trails attached to them, and locals and tourists use them year-round. Nictaux Falls (~11 km east of Project), Upper and Lower Black River Waterfalls (~12 km east of Project), and Slocum Brook Falls (~13 km northeast of Project) are among the closest prominent waterfalls to the Project Site.

The Project Region also offers several scenic drives, particularly along Highway 1, which runs parallel to the Annapolis River across Annapolis County. This highway passes through historical towns and villages, and provides constant views of natural landscapes and agriculture alike, away from Highway 101, which bypasses the Annapolis River. Another prominent scenic drive is Granville Road, which runs along the coast of the Annapolis Basin and passes by Port Royal, a significant heritage tourism location. Granville Road loops around the coast to provide views of the Bay of Fundy and Digby Neck near its termination, where the road turns into Everett Mountain Road.

The Project is within approximately 14 km of the Bay of Fundy, near several scenic coastal communities including Port George and Port Lorne. These areas are summer tourist destinations known for their rocky shores, lighthouses, art shops, and oceanfront views.

TOURIST ATTRACTIONS AND BUSINESSES RELIANT ON TOURISM

Museums and Cultural Sites: The Project Region contains several museums, historic sites, and cultural attractions that contribute to local tourism, including:

- **Macdonald Museum** (Middleton) - The first consolidated school in Canada, this museum also hosts a recreated classroom, a natural history exhibit, and historical artifacts.
- **Middleton Railway Museum** (Middleton) - Displays many intact historical railroad artifacts, including original locomotives and infrastructure.
- **Fort Anne National Historic Site** (Annapolis Royal) - A now-extant fort built by Scottish settlers, Fort Anne protected the broader region from attack over its service period of 225 years. It was the first

Historic Site ever created in Canada, and its preserved grounds are open year-round. Guided tours are conducted here in the warmer months of the year.

- **North Hills Museum** (Annapolis Royal) - Offers a large 18th-century collection of Georgian art pieces and an intact, complete 20th-century homestead.
- **O'Dell House Museum** (Annapolis Royal) - A historical Victorian home, the House is a 19th-century stagecoach inn, which also periodically features changing displays of archival materials (Annapolis Heritage Society, 2026a).
- **Sinclair Inn Museum** (Annapolis Royal) - The Inn is a preserved, intact 18th-century building that is the oldest surviving Acadian building in Canada (Annapolis Heritage Society, 2026b).
- **Port-Royal National Historical Site** (Port Royal) - A recreation of the historical French Habitation at the head of the Annapolis Basin, this historical site provides a living history experience and other interactive tours and activities.

Tourist-related Businesses: The regional economy benefits from businesses that depend on seasonal and year-round tourism, including:

- **Accommodations** - Several hotels, inns, and bed-and-breakfasts serve visitors, particularly in towns such as Annapolis Royal, Bridgetown, and Middleton.
- **Restaurants and Cafés** - Local eateries serve both residents and visitors, offering a mix of casual dining, bakeries, seafood, farm-to-table locations, and restaurants featuring regional specialties.
- **Breweries** - Annapolis County is home to renowned breweries, including the Annapolis Brewing Company and Still Fired Distilleries, which serve locals and contribute to the tourism industry.
- **Farm Markets and Agritourism** - Farmers' markets are major economic drivers in Annapolis County for both locals and tourists, and are commonly seen on the sides of important roadways across the region. They are local businesses where their breads, produce, and other goods are grown in the area close to the markets. They also provide local crafts and artisan goods. These farmers' markets support other local small agricultural businesses and often sell nearby markets' fare as well. Alongside the many smaller farmers' markets, larger enterprises such as the Annapolis Royal Farmers & Traders Market, Inglis Legacy Farm, and Bushel & Barrel Farm Market are renowned across the Maritimes. Local greenhouses also contribute to agritourism in the region.
- **Recreational Outfitters and Guides** - Businesses offering kayaking, cycling rentals, and guided tours contribute to nature-based tourism in the region. The County of Annapolis municipality offers various

guides to outdoor recreation, including Canoe Annapolis County, which outlines kayaking and canoeing routes throughout the county.

- **Retail and Artisan Shops** - Local artisans, galleries, and gift shops provide handcrafted goods, arts, and souvenirs, catering to tourists exploring the Annapolis Valley.

7.3 CULTURAL AND HERITAGE RESOURCES

7.3.1 ARCHAEOLOGICAL RESOURCES AND HISTORICAL SITES

REGULATORY CONTEXT

Several provincial laws and regulations are relevant to the operations of the Project with respect to archaeological and historical resources.

PROVINCIAL

- ***Special Places Protection Act*** **(R.S.N.S. 1989, c. 438)** - This Act protects archaeological and historical sites in Nova Scotia. It prohibits any exploration or excavation on land, including land covered by water, for the purpose of seeking heritage objects without a heritage research permit. The Project will comply with the Act, and any necessary archaeological investigations will be conducted under the appropriate permit.

DESKTOP REVIEW AND FIELD PROGRAMS: METHODOLOGY

In accordance with the *Special Places Protection Act,* R.S.N.S. 1989, c. 438, an ARIA was completed for the proposed Project by Boreas Heritage Consulting Inc. (Boreas Heritage), under Heritage Research Permit A2025NS056 (Boreas Heritage, 2026). The assessment was conducted in accordance with provincial guidelines and included Mi'kmaq engagement, background research, and archaeological fieldwork.

The desktop component involved a review of historic and environmental mapping, previous archaeological studies, and heritage site databases to evaluate archaeological potential within the Project Site. The field component involved an archaeological reconnaissance survey conducted on May 9 and August 8, 2025, to identify any surface indications of archaeological resources or areas of elevated archaeological sensitivity.

Further details of the assessment methodology were documented in the ARIA report, which was submitted to Nova Scotia Communities, Culture, Tourism, and Heritage (NSCCTH) and approved on July 20, 2026.

DESKTOP REVIEW AND FIELD PROGRAMS: RESULTS

No registered Ancestral and/or archaeological sites were identified within the Project Site during the background research, and no archaeological features or areas of culturally significant modification were encountered during the field reconnaissance. However, the ARIA identified one area within the Project Site considered to exhibit high potential for encountering Ancestral sites and/or archaeological resources.

Based on these findings, Boreas Heritage has recommended avoiding this area during any proposed development and/or ground disturbance activities associated with the Project to prevent potential impacts to archaeological resources. If the area cannot be avoided, it is recommended to be subjected to a subsurface assessment involving a systematic program of shovel testing.

Further details of the results were documented in the ARIA report, which was submitted to NSCCTH and approved on July 20, 2026.

7.3.2 MI'KMAQ CULTURAL RESOURCES

REGULATORY CONTEXT

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to Mi'kmaq cultural resources.

FEDERAL

- ***The Constitution Act* (1982, c. 11) -** This Act affirms the treaty and Aboriginal rights of Indigenous peoples in Canada, as recognized under Section 35. These rights include cultural and heritage protections, relevant to the Project's consideration of Mi'kmaq cultural resources. The duty to consult arises from Section 35, which mandates the Crown to consult with Indigenous peoples when a proposed action may affect their rights, stemming from the Honour of the Crown. This consultation process is essential for addressing Mi'kmaq concerns during the Project.
- ***Peace and Friendship Treaties* (1725-1779) -** The Mi'kmaq of Nova Scotia hold treaty rights, established under the historic Peace and Friendship Treaties, to hunt, fish, and gather for food and to earn a moderate livelihood. These rights were affirmed and clarified by the Supreme Court of Canada in the landmark *R. v. Marshall* (1999) decision, which recognized the Mi'kmaq's continuing entitlement to harvest and trade in their traditional territories. These treaties remain in effect and are constitutionally protected under Section 35 of the *Constitution Act, 1982*.

- ***United Nations Declaration on the Rights of Indigenous Peoples Act* (S.C. 2021, c. 14)** - This Act affirms the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) as a universal human rights instrument applicable in Canadian law. It commits the federal government to aligning Canadian laws with UNDRIP in consultation and cooperation with Indigenous peoples. The Declaration includes provisions relevant to the protection of cultural sites:

    - **Article 11(1):** Indigenous peoples have the right to practice and revitalize their cultural traditions and customs, including the right to maintain, protect, and develop the past, present, and future manifestations of their cultures, such as archaeological and historical sites.

    - **Article 12(1):** Indigenous peoples have the right to maintain, protect, and access their religious and cultural sites in privacy.

PROVINCIAL

- ***Special Places Protection Act* (R.S.N.S. 1989, c. 438)** - This Act protects archaeological and historical sites in Nova Scotia. Under the Act, a heritage research permit is required for any exploration or excavation related to cultural or heritage objects. The Project will ensure compliance with this Act, as well as all necessary permits, in consultation with relevant stakeholders.

- ***Terms of Reference for a Mi'kmaq-Nova Scotia-Canada Consultation Process* (2010)** - This consultation process is used whenever Canada or Nova Scotia engages in consultation with one or more Mi'kmaq Bands regarding decisions or activities that may impact Mi'kmaq Aboriginal or treaty rights, including those related to Crown land, water, or natural resources. The process aims to ensure that consultation is conducted meaningfully, respecting the Mi'kmaq's Section 35 rights. While it does not guarantee agreement on outcomes, it is the preferred framework for consultation between the parties.

DESKTOP REVIEW AND FIELD METHODS: METHODOLOGY

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

- Peace and Friendship Treaties (Government of Canada, 2015a)
- Town of Annapolis Royal Website (Town of Annapolis Royal, 2026)
- 2021 Census Data (Statistics Canada, 2025)

ARIA STUDY

As part of the ARIA conducted under Heritage Research Permit A2025NS056, Boreas Heritage included a focus on identifying potential Pre-contact Ancestral and/or archaeological resources (Boreas Heritage, 2026). The

assessment was carried out in accordance with provincial guidelines and involved both background research and archaeological fieldwork.

The background study included a review of historic and environmental mapping, previous archaeological studies, and heritage site databases to evaluate archaeological potential. Fieldwork included an archaeological reconnaissance of the Project Site on May 9 and August 8, 2025, to search for, document, interpret, and make management recommendations for cultural heritage resources and areas of elevated archaeological potential.

Further details of the assessment methodology were documented in the ARIA report, which was submitted to NSCCTH and approved on July 20, 2026.

DESKTOP REVIEW AND FIELD METHODS: RESULTS

The Project is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq, the founding people of Nova Scotia. Archaeological evidence indicates that the Mi'kmaq have inhabited Nova Scotia for 9,000 to 11,000 years. Within the Annapolis Valley, the Mi'kmaq lived in the region known as Kespukwik, later renamed Annapolis Royal by European settlers. The Mi'kmaq had a deep connection to the land, utilizing its resources for their food, social, and ceremonial practices. This connection has shaped the Mi'kmaq culture and traditions for millennia.

The Mi'kmaq were part of the larger Algonquin-speaking peoples who lived in northeastern North America. Over the thousands of years they inhabited the region, several periods of settlement have been identified by archaeologists, each revealing the Mi'kmaq's relationship with the land and ecosystems. The Mi'kmaq developed technologies, practices, and belief systems that were closely tied to the natural resources of their homeland. Today, Mi'kmaq cultural heritage and practices continue to be vital to communities across Nova Scotia, including in the Annapolis Valley.

The Mi'kmaq of the Annapolis Valley are part of the Mi'kmaq Nation, which is a party to the Peace and Friendship Treaties signed with the British Crown in the 18th century, including the 1725-26 Treaty ratified at Annapolis Royal, the 1752 Treaty with Chief Jean-Baptiste Cope, and the 1760-61 Halifax Treaties. These treaties, which remain in effect and are constitutionally protected under Section 35 of the *Constitution Act, 1982*, affirm Mi'kmaq rights to hunt, fish, and gather towards earning a moderate livelihood (Government of Canada, 2015a).

Three First Nations communities are located within the Annapolis Valley:

- **Bear River First Nation -** Located approximately 50 km southwest of the Project Site, Bear River First Nation is a nearby Mi'kmaq community in the Annapolis Valley, located in both Annapolis County and Digby County

- **Annapolis Valley First Nation (AVFN) -** Located approximately 45 km northeast of the Project Site, AVFN is one of the Mi'kmaq communities in the Annapolis Valley, with a strong cultural connection to the region.
- **Glooscap First Nation -** Located approximately 74 km east of the Project Site, Glooscap First Nation is a nearby Mi'kmaq community with historical ties to the region.

The regenerating forest, wetlands and watercourses within and adjoining the Project Site may support resources used by the Mi'kmaq for hunting, trapping, fishing and gathering. These include wildlife and fish, plants used for food and medicine, and natural materials used for crafts and cultural purposes. Although most of the site was harvested approximately 20 years ago, regenerating habitats may continue to provide these resources. Their availability and accessibility may also support land-based learning and the transfer of cultural knowledge.

Information on engagement with the Mi'kmaq of Nova Scotia can be found in Section 6.1.

ARIA STUDY

No archaeological resources were identified during the May and August 2025 archaeological reconnaissance conducted by Boreas Heritage. However, one area within the Project Site was identified as having high potential for encountering Ancestral sites and/or archaeological resources. Boreas Heritage has recommended that the area be avoided during Project activities.

Further details of the results were documented in the ARIA report, which was submitted to NSCCTH and approved on July 20, 2026.

7.4 HUMAN HEALTH AND WELL-BEING

7.4.1 NOISE LEVELS

REGULATORY CONTEXT

Several provincial and municipal laws and regulations are relevant to the operations of the Project with respect to noise levels.

PROVINCIAL

- ***Guidelines for Environmental Noise Measurement and Assessment* (NSECC, 2023) -** These guidelines provide direction for proponents required to assess environmental noise as part of the regulatory process under the *Environment Act,* S.N.S. 1994-95, c. 1. Applicable to activities regulated by the *Activities Designation Regulations*, N.S. Reg. 47/95, the guidelines outline noise measurement

standards, Permissible Sound Levels (PSLs), and compliance expectations for noise assessments. The guidelines ensure that noise impacts are quantified accurately, showing the maximum noise expected from the proposed activity and demonstrating compliance with provincial environmental standards.

- ***Pit and Quarry Guidelines*** **(1999, Revised 2003) -** These guidelines outline noise level limits for pit and quarry operations at property boundaries, specifying acceptable sound levels during different times of the day (day, evening, night) to ensure compliance with provincial standards. Regular monitoring and reporting are required to maintain these limits and minimize noise disturbances in surrounding areas.

MUNICIPAL

- ***Noise Bylaw*** **(Municipality of the County of Annapolis, Bylaw 8) -** This bylaw regulates noise from any source, including construction, industrial, and residential activities, that may disturb the tranquillity of a neighbourhood. The bylaw establishes time-based restrictions, exemptions, and enforcement provisions, and applies noise limits at the point of reception (i.e., noise is assessed based on what is received at a dwelling rather than at the source). The Project would be required to comply with the provisions of this bylaw in conjunction with any applicable municipal approvals.

DESKTOP REVIEW: METHODOLOGY

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

- Nova Scotia Civic Address File Data (GeoNOVA, 2026)
- Guidelines for Environmental Noise Measurement and Assessment (NSECC, 2023)
- Pit and Quarry Guidelines (NSEL, 2003)
- Noise Assessment of Stone/Aggregate Mines: Six Case Studies (Bauer & Babich, 2007)
- Construction Noise Handbook (FHWA, 2017a)
- Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise (BSI, 2014)
- Published aggregate-industry Noise Impact Assessments providing measured equipment sound power levels (e.g., AMEC, 2014; GHD, 2016)

DESKTOP REVIEW: RESULTS

EXISTING ACOUSTIC ENVIRONMENT

The Project is located in a mixed-use land zone that contains mostly rural areas, with scattered residences and agricultural lands further to the north. The Project Site is currently undeveloped and consists primarily of

forested land. The existing acoustic environment is typical of rural mixed-use settings and is generally quiet, with intermittent and localized noise from human activity.

Background noise sources include vehicular traffic on nearby rural roads and minor highways, which contributes to a moderate daytime background level. Recreational vehicle use (e.g., four-wheelers, side-by-sides, and dirt bikes) occurs during warmer months. Agricultural activities and local goods delivery vehicles also contribute intermittently to the soundscape.

Residential receptors are sparsely distributed in the immediate Project Area (Drawing 7.4.1.1). Only four residential receptors are located within 500 m of the Project Site, with the nearest receptor located approximately 84 m north of the Project boundary. When expanding the boundary to 1.5 km, a total of 35 civic addresses are present. Notably, the nearest receptor is separated from the proposed active extraction footprint (Blocks 1-4) by a substantially greater distance – approximately 500 m, as the extraction blocks are set back from the property boundary near this receptor.

This distinction between property-boundary distance and receptor distance is directly relevant to the assessment approach discussed below. The *Pit and Quarry Guidelines* (NSEL, 2003) sound level limits (65/60/55 dBA for day/evening/night) are applied at the property boundary. The *Guidelines for Environmental Noise Measurement and Assessment* (NSECC, 2023) PSLs are applied at the receptor itself (i.e., the dwelling), and define a PSL as the maximum level allowed "in the ambient environment (outside a receptor...)." Because the Project is located in a rural area, with a population density and settlement pattern meeting the NSECC (2023) definition of "Rural" (population under 1,000; density under 400 persons/km^2), the applicable receptor-based PSL is the Rural classification: 53 dBA (day, 0700–1900 hrs), 48 dBA (evening, 1900–2300 hrs), and 40 dBA (night, 2300-0700 hrs). As residences are set back from the Project boundary, this receptor-based threshold is the more stringent of the two applicable standards, and is the threshold used to characterize the significance of predicted noise effects on human receptors in Section 8.4.1.

Vegetation and natural topography associated with the existing forested landscape may provide some degree of acoustic buffering under existing conditions.

TYPICAL NOISE SOURCES ASSOCIATED WITH PIT OPERATIONS

While the Project Site is currently undeveloped, aggregate pit operations typically involve the use of heavy equipment that generates noise during construction and operation. Common noise sources include excavation and loading equipment, haul trucks, and processing or screening units. Noise levels vary depending on equipment type, operating conditions, and distance from the source.

Table 7.33 provides reference sound levels for the equipment types identified for this Project (Section 4.3) at a distance of 15 m, consistent with the reference distance used in the Federal Highway Administration (FHWA) (2017a) database, along with estimated sound levels at two distances relevant to this Project: approximately 370 m, the measured distance between the northern edge of the proposed active extraction footprint (Blocks 1-4) and the northern Project boundary (the boundary nearest the identified residential receptors), and approximately 500 m, the measured distance from the active extraction footprint to the nearest residential receptor.

The estimated sound levels at these distances were calculated using the inverse square law for sound propagation from a point source in a free field. For a point source in open space, sound levels decrease by approximately 6 dBA with each doubling of distance. The general formula is as follows:

$$L_2 = L_1 - 20 \times \log_{10}(d_2 / d_1)$$

Where:

- L_1 = original sound level at distance d_1 (e.g., 15 m)
- L_2 = estimated sound level at distance d_2

Applying this to the case of estimating noise at the Project boundary (370 m) from a known value at 15 m:

$$L_2 = L_1 - 20 \times \log_{10}(370 / 15)$$
$$L_2 = L_1 - 20 \times \log_{10}(24.67)$$
$$L_2 = L_1 - 20 \times 1.392$$
$$L_2 = L_1 - 27.8 \text{ dBA}$$

Therefore, 27.8 dBA is subtracted from the reference level at 15 m to estimate the predicted operational free-field noise level reaching the Project boundary at 370 m.

Applying the same formula to estimate noise at the nearest residential receptor (500 m):

$$L_2 = L_1 - 20 \times \log_{10}(500 / 15)$$
$$L_2 = L_1 - 20 \times \log_{10}(33.33)$$
$$L_2 = L_1 - 20 \times 1.523$$
$$L_2 = L_1 - 30.5 \text{ dBA}$$

Therefore, 30.5 dBA is subtracted from the reference level at 15 m to estimate the predicted operational free-field noise level reaching the nearest residential receptor at 500 m.

It should be noted that this calculation represents an unimpeded free-field scenario and does not account for the significant acoustic attenuation provided by the pit floor, stockpiles, and the forested buffers present at the Inglisville site.

Table 7.33: Typical Noise Levels by Equipment

Equipment	Reference Level at 15 m (dBA)	Estimated Level at 370 m (dBA)	Estimated Level at 500 m (dBA)	Source
Excavator	81	53.2	50.5	FHWA (2017a)[1]
Front-end loader	79	51.2	48.5	FHWA (2017a)[1]
Dozer	82	54.2	51.5	FHWA (2017a)[1]
Grader	85[2]	57.2	54.5	FHWA (2017a)[1, 2]
Mobile jaw crusher	85	57.2	54.5	BSI (2014); AMEC (2014); GHD (2016)[3]
Mobile cone crusher	83	55.2	52.5	BSI (2014); AMEC (2014); GHD (2016)[3]
Mobile screener	85	57.2	54.5	BSI (2014); AMEC (2014); GHD (2016)[3]
Articulated dump truck (on-site haulage)	80	52.2	49.5	BSI (2014); AMEC (2014)[3]
Tandem dump truck (off-site transport)	76	48.2	45.5	FHWA (2017a)[1]
Water truck (dust suppression)	80	52.2	49.5	BSI (2014)

[1] FHWA (2017a), Table 9.1, Actual Measures Lmax at 50 ft (approx. 15 m), Roadway Construction Noise Model reference database.

[2] No "Actual Measured" sample is available for grader in the FHWA RCNM database; the value shown is the RCNM specification limit (Lmax @ 50 ft), a conservative upper bound.

[3] Crusher, screener, and articulated dump truck values are derived from published sound power levels (LwA) for mobile aggregate processing equipment, converted to sound pressure at 15 m assuming hemispherical (on-ground) point-source radiation (a reduction of 31.5 dB from LwA at 15 m).

These values represent single-source, free-field sound levels for individual pieces of equipment operating in isolation. They do not yet account for the simultaneous operation of multiple pieces of equipment (addressed using logarithmic summation in Section 8.4.1), nor do they account for the acoustic attenuation expected on-site from the pit floor and berms, internal stockpiles, and forested buffers. Table 7.33 is therefore presented as an unmitigated screening baseline of individual equipment levels. The assessment of anticipated busy-hour production scenarios, and its comparison against the NSECC (2023) Rural receptor PSLs, is presented in Section 8.4.1, together with the mitigation measures that will be implemented to minimize noise effects.

FIELD PROGRAMS: METHODOLOGY

Baseline noise monitoring was conducted over a two-day period from May 18 to May 20, 2026, to characterize the existing acoustic environment at the Project Site. Measurements were recorded using a TSI SoundPro DL-1 Datalogging Sound Level Meter, a high-precision instrument certified to meet the requirements of IEC 61672-1 for Class 1 performance. The instrument was housed in a dedicated outdoor environmental enclosure, and the microphone was fitted with an outdoor windscreen to minimize acoustic interference from wind turbulence. The equipment was calibrated using a compatible acoustic calibrator immediately prior to and following the deployment.

The noise monitor was deployed within young mixedwood forest near the northwestern end of the Project Site, approximately 300 m from the nearest residential receptor (Drawing 7.4.1.1). The microphone was positioned at a consistent height above grade and located a minimum of 3.5 m from any reflecting surfaces. Representative photos of the deployment are provided in the General Photo Log (Appendix J). The monitor was programmed to continuously log the A-weighted equivalent sound pressure level (LAeq) at one-second intervals throughout the monitoring period.

Meteorological data were obtained from ECCC's Greenwood A meteorological station (Climate ID: 8202000), located approximately 23 km northeast of the Project Site, to characterize weather conditions during the monitoring period and to support data screening.

DATA ANALYSIS: The raw dataset was processed to produce one-hour equivalent sound levels (LAeq(1hr)) to allow for direct comparison against the provincial PSLs. This was achieved by calculating the logarithmic average of the 1-second data within consecutive 60-minute blocks, using all complete, clock-aligned hours between 15:00 on May 18 and 12:00 on May 20, yielding 46 discrete one-hour blocks.

The resulting 46 LAeq(1hr) values were screened against concurrent meteorological data from Greenwood A. Greenwood A data are reported in Local Standard Time (LST); one hour was added to convert to Atlantic Daylight Time (ADT) prior to matching weather observations to noise blocks. In accordance with Section 4.0 of NSECC (2023), seven hours were excluded from the compliance assessment due to recorded wind speeds exceeding 5 m/s (18 km/h) or active precipitation. The remaining 39 weather-valid hours were categorized into the Day (07:00-19:00), Evening (19:00-23:00), and Night (23:00-07:00) compliance periods defined for rural areas under NSECC (2023).

For this baseline deployment, the TSI SoundPro DL-1 was programmed to exclusively log continuous 1-second LAeq values to prioritize high-resolution energy averaging; as such, the hourly LA90 and LAMax statistics listed in Appendix 3 of NSECC (2023) were not recorded as native instrument outputs. Given that all measured LAeq(1hr) values remain well below the applicable Rural PSLs, the standard compliance method applies to this

baseline rather than the alternative LA90-based method. Consequently, the absence of these specific metrics does not affect the compliance determination, though both LA90 and LAMax will be incorporated into any future operational noise monitoring programs.

FIELD PROGRAMS: RESULTS

The baseline noise monitoring results confirm that the acoustic environment at the Project Site is representative of a quiet, rural setting. Night-time noise levels were consistently the lowest of the three compliance periods, with the overnight log mean of 33.2 dBA approximately 4 to 5 dBA below the Day and Evening log means, reflecting the quiet, rural character of the Project Site. Figure 7.4.1.1 illustrates the measured LAeq(1hr) values alongside concurrent wind speeds and identifies hours excluded from the assessment. The complete hourly dataset is provided in Appendix K.

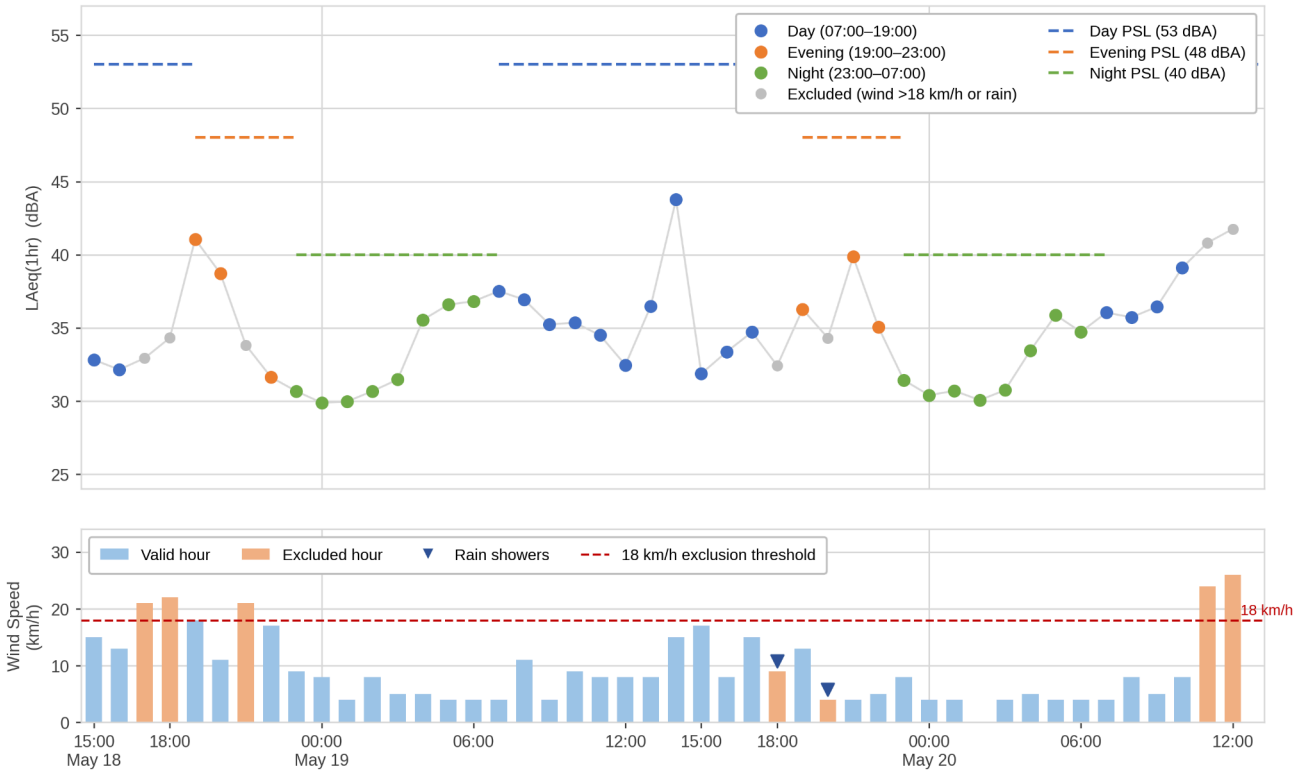


Figure 7.4.1.1: Hourly LAeq(1hr) baseline noise levels and concurrent wind speed.

Table 7.34 presents a statistical summary of the weather-valid LAeq(1hr) results by compliance period, and Table 7.35 compares the maximum recorded levels against the Rural PSLs.

Table 7.34: Summary of Weather-Valid LAeq(1hr) Results by Compliance Period

Compliance Period	Total Hours	Valid Hours	Max (dBA)	Min (dBA)	Log Mean (dBA)
Day — 07:00-19:00	22	17	**43.8**	31.9	36.8
Evening — 19:00-23:00	8	6	**41.1**	31.6	38.1
Night — 23:00-07:00	16	16	**36.8**	29.9	33.2

Table 7.35: Comparison of Maximum Baseline LAeq (1hr) to Rural Permissible Sound Levels (NSECC, 2023)

Compliance Period	Max LAeq(1hr) (dBA)	Rural PSL (dBA)	Margin (dB)	Status
Day — 07:00-19:00	**43.8**	53	+9.2	Compliant
Evening — 19:00-23:00	**41.1**	48	+6.9	Compliant
Night — 23:00-07:00	**36.8**	40	+3.2	Compliant

Measured sound levels remained well below the applicable Rural PSLs during all three compliance periods, establishing a quiet baseline acoustic environment that provides a representative foundation for assessing the potential noise contribution of proposed Project operations.

7.4.2 DUST AND EMISSIONS

REGULATORY CONTEXT

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to dust and emissions.

FEDERAL

- ***Canadian Environmental Protection Act*** **(S.C. 1999, c. 33)** - CEPA regulates air pollutants and GHG emissions that may impact air quality and human health. Pit operations can generate dust and emissions from activities such as material handling, vehicle operation, and combustion sources. Compliance with federal air quality standards and emission regulations helps mitigate potential environmental effects.

PROVINCIAL

- ***Environment Act*** **(S.N.S. 1994-95, c. 1)** - This Act provides the legal framework for managing environmental impacts, including air quality and emissions. It mandates the prevention of air pollution and requires compliance with regulatory standards for air quality. Pit operators must implement dust control measures, monitor emissions, and ensure that activities do not exceed permissible limits to protect air quality and public health in accordance with the Act.

- ***Air Quality Regulations*** **(N.S. Reg. 8/2020) -** Under the *Environment Act,* S.N.S. 1994-95, c. 1, these regulations set permissible limits for various air pollutants, including SO_2, O_3, and other air contaminants. For pit and quarry operations, dust control measures may be required to minimize emissions and prevent the degradation of air quality.

- ***Pit and Quarry Guidelines*** **(1999, Revised 2003) -** These guidelines establish limits for dust emissions and particulate matter from pit and quarry operations. If requested by the Department, operators must monitor suspended particulate levels at or beyond the property boundary. Monitoring methods and specific limits are outlined to ensure compliance with air quality standards.

DESKTOP REVIEW: METHODOLOGY

The review of dust sources and emissions from heavy equipment and vehicles was based on typical operations in pit and quarry settings, informed by industry standards.

DESKTOP REVIEW: RESULTS

EXISTING CONDITIONS

The Project Site is currently undeveloped and is characterized by rural land use, including forested areas and some agricultural fields. No industrial or pit-related activities are present. As such, existing dust and air emissions are limited to background sources, including wind-blown soil from agricultural areas, vehicle traffic on nearby roads, and other typical rural activities. No site-specific dust suppression or emissions controls are currently in place.

DUST

Dust is a common byproduct of pit operations and can be generated from various activities. The main sources of dust emissions associated with pit operations can be grouped into the following categories:

Sources of Dust

- **Site preparation and excavation:** Dust can be produced during site preparation activities, such as the removal of topsoil and vegetation and the excavation of sand materials. These activities disturb loose particles, which can become airborne, especially in dry conditions.

- **Processing and stockpiling:** Dust may be released during screening, stacking, or stockpiling of materials.

- **Vehicle and machinery movement:** The movement of vehicles, including haul trucks, and machinery in the pit contributes to dust emissions by disturbing exposed surfaces. Additionally, dust can be generated by the transport of aggregate in open truck beds.
- **Wind erosion:** In dry conditions, wind can carry dust from exposed surfaces into the surrounding area.

Current Dust Conditions

At present, the site is undeveloped and does not generate pit-related dust. Existing dust levels reflect typical rural background conditions, including wind-blown soil from agricultural areas and local traffic.

EMISSIONS

Emissions are common in pit operations and can be generated from various activities. The main sources of emissions associated with pit operations can be grouped into the following categories:

Sources of Emissions

- **Heavy equipment:** Diesel-powered equipment, such as excavators, loaders, and bulldozers, contributes to air emissions, including NO_x, SO_2, CO, CO_2, and particulate matter.
- **Transport vehicles:** Haul trucks used for transporting materials can release emissions, including CO_2, CH_4, and NO_x. Idling trucks can also contribute to emissions.
- **Volatile organic compounds (VOCs):** The use of diesel fuel, lubricants, and other chemicals in equipment can lead to the release of VOCs into the atmosphere during operation.

Current Emission Conditions

At present, the site is undeveloped and does not generate pit-related emissions. Existing emissions in the area are limited to background rural sources, including vehicle traffic on local roads and emissions from agricultural activities.

7.4.3 SAFETY AND COMMUNITY WELL-BEING

REGULATORY CONTEXT

Several provincial and municipal laws and regulations are relevant to the operations of the Project with respect to safety and community well-being.

PROVINCIAL

- ***Occupational Health and Safety Act* (S.N.S. 1996, c. 7) -** This Act establishes the framework for workplace health and safety in Nova Scotia. It outlines the responsibilities of employers, employees, and contractors to ensure a safe working environment, including hazard identification, training, and emergency preparedness. Compliance with this Act will help mitigate occupational risks associated with the Project.

- ***Environment Act* (S.N.S. 1994-95, c. 1) -** The purpose of this Act is to promote the protection, enhancement, and responsible use of the environment, with a focus on safeguarding human health and maintaining ecosystem integrity. It includes provisions for managing environmental impacts, public safety, and ensuring the reclamation of disturbed areas, which are crucial to the long-term well-being of communities.

- ***Pit and Quarry Guidelines* (1999, Revised 2003) -** These guidelines outline safety protocols and environmental measures for pit and quarry operations in Nova Scotia, including public safety, dust control, and land reclamation. They help minimize risks to the community and ensure the safe restoration of the site, supporting the overall safety and well-being of local residents.

MUNICIPAL

- ***C6 Regional Emergency Management Bylaw* (Municipality of the County of Annapolis, Bylaw C6) -** This bylaw establishes protocols for declaring a State of Local Emergency and outlines the roles and responsibilities of agents in the Municipality of the County of Annapolis. These measures are designed to ensure a coordinated and effective response to emergencies, thereby safeguarding public health, safety, and property within the community. The Warden or the Council of the Municipality can declare a State of Local Emergency for any event within the County of Annapolis. When necessary, the towns of Middleton and Annapolis Royal form an agreement with the Municipality of the County of Annapolis to create the Regional Emergency Management Organization (REMO). The bylaw outlines the proper procedures and roles formed within REMO that respond to a State of Local Emergency. Employees and agents of the Municipality will assume roles outlined in the Regional Emergency Management Plans.

DESKTOP REVIEW: METHODOLOGY

The desktop review was based on industry standards and regional regulations, as well as typical safety and community measures for resource extraction projects in Nova Scotia.

DESKTOP REVIEW: RESULTS

Safety and community well-being in the Project Area are influenced by existing land use, transportation infrastructure, and public safety measures. The site is currently undeveloped, and no pit-related safety measures are in place. This section provides an overview of relevant future safety considerations for workers, the public, and the surrounding community.

WORKER HEALTH AND SAFETY: Workplace safety in resource extraction industries in Nova Scotia is governed by the *Occupational Health and Safety Act*. Businesses operating in the region, including resource industries, adhere to standard OHS measures, which typically include:

- Safe work procedures and training programs.
- Use of personal protective equipment.
- Regular inspection and maintenance of equipment.

PUBLIC SAFETY CONSIDERATIONS: Future pit operations would need to implement safety measures to protect the public, including:

- Restricted access through fencing, gates, and safety signage.
- Site stability measures, such as berms and maximum slope angles to reduce terrain hazards.
- Dust and air quality controls to mitigate dust emissions.

TRANSPORTATION SAFETY: Existing road networks in the region support both residential and industrial traffic. Pit operations would need to follow standard practices to ensure transportation safety, including:

- Driver and operator training requirements for drivers and equipment operators.
- Weight limit restrictions on public roads.
- Routine vehicle inspections and maintenance to ensure road safety.

WATER RESOURCES PROTECTION: Future operations would be expected to follow practices to minimize potential impacts on water resources, including measures to prevent surface water runoff and groundwater contamination, such as sediment controls and adherence to setback requirements from waterbodies. Contingency planning would be required to reduce the risk of fuel or hazardous substance leaks.

COMMUNITY CONSIDERATIONS AND LONG-TERM PLANNING: Community engagement is a recognized practice for addressing public concerns related to industrial activities in Nova Scotia. Additionally, resource extraction sites in the province are typically subject to long-term planning requirements, including progressive site rehabilitation to support land-use compatibility following operations. The Proponent is conducting an

engagement program as part of this EA registration. More information on the public and stakeholder engagement activities is provided in Chapter 6.

CHAPTER 8: EFFECTS OF THE PROJECT ON THE ENVIRONMENT

The following effects assessment examines how the Project may interact with VECs and evaluates potential environmental effects and mitigation measures to reduce or eliminate negative effects. Residual effects are those environmental effects that remain after mitigation has been applied and can be characterized based on their magnitude, geographic extent, duration, frequency, and reversibility, as described in Table 8.1 below.

Table 8.1: Residual Effects Assessment Criteria

Criteria	Rating Term	Definition
Magnitude The degree of variation in measurable parameters, or the VEC compared to baseline conditions	VEC-specific (e.g. will be described in the discussion for each VEC)	VEC-specific.
Geographic Extent The geographic area impacted by the effect	Local	Effects do not extend beyond the LAA.
	Regional	Effects extend into the RAA.
Duration The length of time the effect lasts, or how long it takes for the parameter or VEC to return to baseline conditions or become undetectable	Short-term	Effects that occur during site preparation or other short-term activities, typically lasting less than a year and not persisting beyond the activity phase.
	Medium-term	Effects that occur during the active extraction and processing phases, typically lasting as long as the Project is in operation.
	Long-term	Effects that persist beyond the life of the Project, occurring after decommissioning and rehabilitation, and lasting for a period of five years or more.
Frequency How often the effect occurs, including the rate of occurrence and its repetition during the Project's phases	Rarely	Occurs once during the Project.
	Intermittent	Occurs periodically throughout the Project lifespan.
	Ongoing	Continues consistently throughout operations.
Reversibility The likelihood of the effect returning to baseline conditions after Project activity ceases.	Reversible	The effect is short-lived and expected to return to baseline quickly (e.g. within one year or less).
	Partially Reversible	The effect will persist for one to five years, and/or is expected to partially revert to baseline conditions.
	Irreversible	The effect is permanent and not reversible.

If residual effects are identified based on the criteria in Table 8.1, their significance is evaluated based on the following criteria (Table 8.2).

Table 8.2: Residual Environmental Effects Significance Criteria

Rating Term	Definition
Significant	An effect that causes a moderate to high change in baseline conditions, persists for a medium- to long-duration, and occurs on an ongoing basis. This effect may require additional mitigation, monitoring, or recovery actions.
Not Significant	An effect that results in a negligible to low change, or a moderate change that is highly localized and reversible or partially reversible, is expected to return to baseline conditions in the short to medium term, and occurs rarely or intermittently. Ongoing effects of low magnitude, with proper mitigation, are still considered not significant and do not require additional mitigation or monitoring.

For each VEC, the assessment follows these steps:

1. **Identification of Geographic Extent of Assessment Boundaries:** Identifies the spatial assessment boundaries (LAA and RAA, where applicable).
2. **Identification of Relevant Project Activities:** Identifies specific Project activities (outlined in Section 4.4) that may interact with the VEC.
3. **Description of Assessment Criteria:** Describes the assessment criteria and provides the VEC-specific definition for magnitude.
4. **Description of Potential Effects:** Describes the nature and severity of potential effects.
5. **Mitigation Measures:** Identifies measures to reduce or eliminate potential negative effects.
6. **Monitoring Programs:** Outlines programs to track the effectiveness of mitigation measures and ensure compliance.
7. **Characterization and Significance of Residual Effects:** Identifies and characterizes residual effects based on the criteria in Table 8.1, and evaluates their significance using the criteria in Table 8.2.

8.1 EFFECTS ON THE BIOPHYSICAL ENVIRONMENT

8.1.1 EFFECTS ON SURFACE WATER AND GROUNDWATER

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA includes the Project Site and Project Area – that is, the areas directly adjacent to Project activities, including the four delineated on-site watercourses (WC1-WC4), the nine delineated wetlands (WL1-WL9), and documented domestic and municipal groundwater wells within 1 km of the Project boundary.
- **Regional Assessment Area:** The RAA for surface water and groundwater includes the broader Annapolis River Primary Watershed (1DC) and the underlying bedrock aquifer system, including the Lawrencetown Municipal Water Supply Area.

PROJECT INTERACTIONS

The following Project activities may interact with surface water and groundwater:

- Site Preparation
- Extraction Operations
- Stockpiling
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on surface water and groundwater. The VEC-specific definition for magnitude is:

- **Negligible** - No measurable change in surface water or groundwater quality or quantity. No alterations to hydrology or flow regimes. No impact on surrounding aquatic or groundwater systems.
- **Low** - Minor, localized changes in surface water or groundwater quality or quantity, with limited alteration to hydrology or flow regimes. Effects are unlikely to cause measurable disruption to the surrounding environment.
- **Moderate** - Measurable changes in surface water or groundwater quality or quantity. Hydrology or flow regimes may be altered, but can be managed with standard mitigation measures. Temporary impacts to aquatic or groundwater systems may occur, but are not expected to be long-term.
- **High** - Significant alterations in surface water or groundwater quality or quantity, with substantial changes to hydrology or flow regimes. Major impacts to surrounding aquatic or groundwater systems may occur, potentially affecting resource sustainability.

DESCRIPTION OF EFFECTS

SURFACE WATER

Project activities including site preparation, extraction, stockpiling, and reclamation have the potential to influence surface water primarily through changes to local drainage patterns, increased erosion and sedimentation risk, and degraded water quality from sediment or contaminant inputs. However, given the site's moderately to rapidly draining surficial geology, the absence of mapped watercourses within the proposed extraction areas, the 30 m vegetated buffers to be maintained around all on-site watercourses, and the proposed ESC measures, significant effects are not expected.

- **Runoff and Sedimentation:** Vegetation removal and soil disturbance during site preparation and ongoing extraction operations will increase the proportion of exposed, unprotected soil across the active extraction footprint, elevating erosion risk particularly during high-intensity precipitation events. Stockpiled aggregate and overburden materials may also contribute to sediment transport if not adequately protected.

  The surficial geology underlying the Project Site provides meaningful mitigation of this risk under normal conditions. The Glaciofluvial Deposits in the northern portion and the Stony Till Plain in the south are characterized by rapid drainage and high infiltration capacity, which promotes vertical percolation of precipitation rather than overland flow. The Silty Till Plain in the central area exhibits moderate drainage, and this is the zone where ESC measures will be most critical during site preparation and active operations.

  Critically, the proposed extraction areas do not intersect any of the four field-delineated permanent watercourses. The 30 m buffer maintained between all extraction activities and delineated watercourses provides a substantive distance for runoff velocity reduction, sediment filtration, and natural infiltration before any disturbed drainage could reach a watercourse. Vegetated buffers of this width are well-documented to significantly reduce suspended sediment loads in surface runoff (US EPA, 2021).

- **Changes to Drainage Patterns:** Conversion of vegetated land surface to an active extraction pit modifies local drainage in two primary ways: removal of the vegetated canopy reduces evapotranspiration and increases net precipitation inputs to the system, and the creation of exposed pit surfaces increases impervious-equivalent conditions where soils are compacted by equipment traffic.

  Within the proposed extraction areas, the high infiltration capacity of the target glaciofluvial sand deposit means that stormwater is expected to continue to percolate into the subsurface rather than

generating significant overland flow. No surface water is expected to exit the Project Area as direct runoff under normal precipitation conditions. Ditching or active diversion of drainage will not be constructed, and existing drainage patterns will be maintained to the greatest extent practicable.

The primary pathway for Project-related changes to surface water baseflow would be through modification of groundwater recharge inputs to watercourses. As excavation is committed to remain at least 1 m above the seasonal high water table (which will be confirmed through on-site piezometric monitoring prior to and throughout operations), no dewatering of the saturated zone is anticipated, and consequently no reduction in the groundwater contribution to baseflow in Eel Weir Brook or any of the other on-site watercourses is expected. The commitment against pumping or dewatering further eliminates the principal mechanism by which aggregate operations commonly reduce local baseflow.

- **Water Quality and ARD:** The risk of water quality degradation through sedimentation is primarily associated with site preparation and early extraction phases, when exposed soil area is greatest and vegetative cover has not been re-established by progressive reclamation. This risk is reduced by the draining characteristics of the surficial deposits, the absence of watercourses within the extraction footprint, the maintained 30 m buffer, and the implementation of an ESC Plan.

  The risk of contaminant inputs from equipment operation primarily includes hydrocarbons from fuel storage, refuelling, and hydraulic fluid leaks. This risk is addressed by restricting all fuelling and equipment servicing to areas more than 30 m from any watercourse or wetland, and by implementing a Spill Response and Contingency Plan prior to the commencement of operations. Given the high infiltration capacity of the sand deposit, any surface spill within the extraction area would rapidly migrate downward. This characteristic increases the importance of spill prevention and rapid response over passive landscape filtration.

  The Project's access road requires crossings at two locations. A new bridge crossing will be constructed over WC1 (Eel Weir Brook), replacing the existing bridge, designed as a clearspan structure installed perpendicular to the watercourse with no contact between the structure and the bed or bank; as designed, no alteration of WC1 is anticipated as a result of this crossing. Should removal of the existing bridge or installation of the new structure affect the bed or bank, a Watercourse Alteration Approval will be obtained from NSECC, and review under the *Fisheries Act* will be requested where applicable. An existing culvert crosses WC2 and may require upgrading to support Project operations; the scope and timing of any such upgrade has not yet been determined. Should an upgrade to the WC2 culvert be required, it will be assessed by a qualified professional and carried out in accordance with all applicable regulatory requirements, including a Watercourse Alteration Approval from NSECC where the bed or bank is affected, and review under the *Fisheries Act* where applicable. *Activities Designation*

Regulations requirements will be satisfied in advance of any works, and strict ESC measures will be implemented during construction at both crossings to prevent degradation of downstream water quality.

Additionally, while the generation of ARD is highly unlikely since excavation will be strictly limited to surficial sand and gravel and will not contact the underlying consolidated bedrock, there is a minor risk of encountering isolated sulphide-bearing materials within the glacial deposits. Any unexpected sulphide-bearing materials encountered will be immediately reported to NSECC and managed in accordance with applicable guidance.

- **Climate Change Considerations:** Projected increases in the intensity of short-duration precipitation events under a high-emissions pathway (NSECC, 2022a) are relevant to the surface water effects assessment. Total annual precipitation in Annapolis County is projected to increase by approximately 11% by end-of-century, with a shift toward more precipitation falling during the cool season as rain rather than snow (snow days declining from 37.5 to 16.2 days per year). Higher-intensity events increase the potential for overland flow generation from exposed soils even where average conditions favour infiltration, increase the sediment transport capacity of any runoff that does occur, and place greater intermittent loads on ESC measures. The ESC Plan will be designed to account for this trend.

GROUNDWATER

Project activities are not expected to result in significant impacts to groundwater resources, including domestic or municipal water supplies. The basis for this conclusion rests on two site-specific conditions that distinguish this Project from scenarios in which groundwater impacts would be of greater concern.

First, all 14 groundwater wells documented within 1 km of the Project Site are drilled bedrock completions, with casings passing through the thin glacial overburden and screens completed in fractured bedrock at depths ranging from 24.36 to 231.42 m (NSNRR, 2025b). The target sand and gravel deposit to be extracted is not identified as a suspected surficial aquifer in provincial mapping (Nova Scotia Groundwater Atlas; NSNRR, 2025a). No wells screened in the surficial overburden were identified within 1 km of the Project Site. Extraction of the sand and gravel deposit therefore does not directly interact with the aquifer from which domestic or municipal water is drawn.

Second, extraction will be maintained at a minimum of 1 m above the seasonal high water table, verified by site-specific piezometric monitoring in the surficial overburden prior to and throughout operations. This separation buffer prevents direct hydraulic connection between the pit floor and the saturated zone and eliminates the principal pathway by which extraction could affect groundwater quantity in the underlying bedrock aquifer.

- **Municipal Water Supply and Groundwater Zoning:** The Project Site is located within the Lawrencetown Municipal Water Supply Area and is situated just south of the GW4 (Groundwater Buffer) and GW5 (Groundwater General) municipal zoning areas. Measured from the northernmost Project Site boundary, the GW4 zone is located approximately 150 m to the north and the GW5 zone approximately 475 m to the northwest; extraction is not proposed within this northernmost portion of the Project Site, and the separation from these zones to the nearest proposed extraction blocks is correspondingly greater. Extraction within these GW zones, or within 30.4 m of their boundaries, is strictly prohibited under the Annapolis County LUB (County of Annapolis, 2024), and no Project activities are proposed within these zones or their setbacks.

  The nearest municipal supply well is located approximately 2.9 km north of the Project Site boundary and is a deep bedrock completion (NSNRR, 2025a). Given the dominantly northward groundwater flow direction estimated from regional well data (approximately 356° from North), the Project Site is upgradient of the municipal supply area, pending confirmation through on-site piezometric monitoring. However, because extraction is limited to the surficial deposit and will not contact the bedrock aquifer from which the municipal supply is drawn, the potential for any Project-related change in water quality or quantity at the municipal well is considered negligible. The Groundwater Management and Monitoring Plan will include provisions for baseline characterization and ongoing water level monitoring, and will be reviewed by NSECC prior to the commencement of operations.

- **Groundwater Recharge and Flow:** The high infiltration capacity of the target glaciofluvial sand deposit (published rates of 2.0 to 11.0 cm/hr; Carsel & Parrish, 1988; Rawls et al., 1983) means that precipitation falling on the active extraction area will continue to percolate rapidly into the subsurface, maintaining recharge inputs to the system. Removal of vegetative cover will reduce evapotranspiration losses, which may marginally increase net infiltration relative to pre-development conditions during the operational phase.

  No pumping or dewatering of the pit is anticipated. Downward excavation will cease if groundwater is encountered during excavation. In the absence of active dewatering, and with the 1 m buffer above the water table maintained, no drawdown of the local or regional water table is expected, and no reduction in groundwater-derived baseflow contributions to Eel Weir Brook or the connected Annapolis River system is anticipated.

  Progressive reclamation and eventual re-vegetation of completed pit areas will, over time, restore evapotranspiration losses and may enhance long-term infiltration through improved soil structure and preferential flow pathways (Qiu et al., 2023).

- **Groundwater Quality:** The principal risk to groundwater quality is accidental spillage of hydrocarbons or other contaminants within the extraction area. The high infiltration rate of the sand deposit means that surface contaminants would move downward relatively rapidly, with limited lateral spread under normal conditions. This pathway is mitigated by restricting all fuelling and equipment servicing to designated areas more than 30 m from any watercourse or wetland, maintaining equipment in good mechanical condition through regular inspections, and implementing a Spill Response and Contingency Plan during operations.

- **Climate Change Considerations:** A shift toward more winter precipitation falling as rain rather than snow (projected snow days declining from 37.5 under baseline conditions to 24.1 by mid-century; NSECC, 2022a) is expected to advance the seasonal high water table earlier in the calendar year relative to the historical regime. This has implications for the timing of the annual piezometric high and, consequently, for the operating window during which excavation at the lower extents of the extraction area can be safely conducted while maintaining the 1 m buffer. The Groundwater Management and Monitoring Plan will account for this seasonal shift.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on surface water and groundwater during the Project.

GENERAL WATER RESOURCES MITIGATIONS

Erosion and Sediment Control

- An ESC Plan will be developed and implemented prior to land disturbance. The ESC Plan will be consistent with applicable NSECC guidance and will be updated as required to reflect changes in the active extraction footprint.
- ESC measures (e.g., silt fences, sediment traps, rock check dams as appropriate to site conditions) will be installed prior to site preparation in all areas where disturbed drainage could reach a watercourse, wetland, or the property boundary.
- ESC installations will be routinely inspected, particularly following any precipitation event of 25 mm or more. Deficiencies will be repaired promptly.
- Progressive reclamation will be implemented concurrently with extraction to reduce the area of exposed, unprotected soil at any given time.

Surface Water Management

- A Surface Water Management Plan will be developed and implemented.
- No Project activities (including refuelling) will be conducted, nor will vegetation be removed, within 30 m of a surface watercourse.
- Soil compaction in active areas will be minimized to the extent practicable to support natural infiltration as the primary stormwater management mechanism.
- Stormwater management practices will be implemented to direct runoff toward infiltration areas and reduce sediment transport to Project watercourses.
- The creation of significant ditches or diversions will be avoided to maintain existing drainage patterns, and site drainage will be inspected regularly (particularly after heavy rainfall) to detect any significant changes and maintain existing drainage patterns.
- The new WC1 bridge will be designed and constructed as a clearspan structure with no contact between the structure and the bed or bank. A Watercourse Alteration Approval will be obtained where work at either crossing (the WC1 bridge or an upgrade to the existing WC2 culvert) involves the bed or bank, any WC2 culvert upgrade will be assessed by a qualified professional, and effective ESC measures will be implemented during construction at both crossings.

Water Quality Protection

- The storage of hazardous products and fuelling/servicing of equipment will be restricted to areas more than 30 m away from watercourses and wetlands.
- A Spill Response and Contingency Plan will be developed for quick action in the event of spills of fuel or hazardous material.
- Equipment will be regularly inspected and maintained to prevent fuel leaks or hydraulic fluid losses.
- If effluent leaves the site, total suspended solids (TSS) will be monitored to ensure compliance with applicable water quality standards.
- In the event that sulphide-bearing materials are encountered during excavation, NSECC will be contacted immediately. The materials will be managed in accordance with applicable guidance and as directed by the regulator.

GROUNDWATER MITIGATIONS

Groundwater Recharge and Flow

- Dewatering or pumping activities that could affect groundwater levels will not be conducted.
- Excavation will not occur within 1 m of the maximum annual water table elevation, as established by on-site piezometric monitoring.

- Operations will cease immediately if groundwater is encountered at the pit floor during excavation.
- A Groundwater Management and Monitoring Plan will be developed and implemented prior to the commencement of operations. The Plan will establish baseline surficial water table conditions, define the adaptive management protocol for maintaining the 1 m excavation buffer, specify monitoring well locations and measurement frequency, and include provisions for detection of groundwater quality exceedances.

MONITORING

Monitoring will be conducted to ensure the effectiveness of mitigation measures and to detect any unforeseen impacts on surface water and groundwater quality and quantity.

SURFACE WATER MONITORING

- Water quality (at minimum: TSS, pH, conductivity) will be monitored in WC1 (Eel Weir Brook) and WC2 at baseline and at a frequency to be established in the Surface Water Monitoring Plan, with additional sampling triggered by any significant spill event or ESC failure.
- ESC installations and site drainage will be inspected quarterly and within 24 hours of precipitation events of 25 mm or more.

GROUNDWATER MONITORING

- A Groundwater Management and Monitoring Plan will be developed by a licensed hydrogeologist and implemented throughout operations. The Plan will specify piezometer network design, monitoring frequency, analyte suite, reporting requirements, and adaptive management triggers.
- Groundwater levels will be measured at a frequency sufficient to characterize seasonal variation and to support real-time management of the excavation buffer above the water table.
- Any exceedance of trigger levels established in the monitoring plan will be reported to NSECC and will prompt implementation of corrective actions.

CONCLUSION

After implementation of the mitigation and monitoring measures described above, the residual effects on surface water and groundwater are anticipated to be:

- **Magnitude** - Low, as minor and localized changes in surface water quality or drainage patterns may occur during active operations, and no changes to groundwater quantity or quality are expected given the maintained separation between extraction activities and the saturated zone, and the absence of any

hydraulic connection between the target sand deposit and the bedrock aquifer from which all domestic and municipal wells in the area are completed.

- **Geographic Extent** - Within the LAA, as effects are confined to the immediate Project Area. No effects to the RAA (Annapolis River Watershed or regional aquifer) are anticipated.
- **Duration** - Short- to medium-term, as surface water quality and drainage effects are associated with active disturbance and will diminish progressively as reclamation advances and re-vegetation establishes.
- **Frequency** - Intermittent, as disturbances to surface water are associated with specific Project phases (site preparation, active extraction, and stockpiling) rather than being continuous.
- **Reversibility** - Reversible, as effects are expected to diminish following reclamation and are not expected to result in persistent changes to surface or groundwater resources.
- **Significance** - Not significant, as residual effects are low in magnitude and extent, are manageable through the proposed mitigation and monitoring framework, and do not interact with the bedrock aquifer providing domestic and municipal water supply to the area.

8.1.2 EFFECTS ON WETLANDS

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for wetlands includes the Project Site and immediately adjacent areas where direct or indirect impacts could occur.
- **Regional Assessment Area:** The RAA for wetlands includes the broader Annapolis River Watershed.

PROJECT INTERACTIONS

The following Project activities may interact with wetlands:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on wetlands. The VEC-specific definition for magnitude is:

- **Negligible** - No direct loss of wetland habitat, and no measurable indirect alterations to wetland hydrology, plant diversity, soils, or overall function.
- **Low** - No direct loss of wetland habitat, but minor indirect alterations may occur. Overall wetland functions remain intact, and effects are local, causing no measurable hydrological disruption to the broader Annapolis River Watershed.
- **Moderate** - Direct loss of wetland habitat or indirect effects causing a measurable impact to wetland hydrology, plant diversity, soils, or overall function. Alterations can be managed with standard mitigation measures and appropriate regulatory approvals. Effects are local, unlikely to cause measurable hydrological disruption to the broader Annapolis River Watershed.
- **High** - Direct loss or severe indirect degradation of wetland habitat and function that is significant enough to impact the hydrology of the broader Annapolis River Watershed.

DESCRIPTION OF EFFECTS

The Project will be developed progressively, in 1-hectare operational blocks, over an anticipated operational lifespan of 20 to 30 years. The initial phase of development (Blocks 1-4, comprising a 4.0 ha active footprint) has been sited to avoid wetlands. Wetland 2 (WL2), a 0.467 ha shrub swamp, is located nearest to the Blocks 1-4 footprint and is the wetland most applicable to potential Project interactions during this initial phase; a vegetated buffer will be maintained around WL2 throughout Blocks 1-4, and no direct effects on this or any other wetland are anticipated during this phase. Indirect effects during this and subsequent phases may arise from dust, invasive species, and Project Site runoff, as described below.

The configuration of future operational blocks (Blocks 5 and beyond) has not yet been finalized and will be developed progressively over the life of the Project, informed by ongoing site development and confirmed at the IA stage as extraction advances. Given the density and distribution of wetlands across the Project Site, direct alteration of one or more wetlands is considered reasonably foreseeable over the full operational life of the Project, though the specific wetland(s), area, and timing cannot be determined at this stage. The Proponent is committed to minimizing impacts to wetland areas and maintaining vegetated buffers between project areas and wetland boundaries to the greatest extent possible. Should direct alteration of a wetland be required to support future blocks, the Proponent will obtain a provincial Wetland Alteration Approval, including a compensation plan developed in consultation with NSECC.

- **Dust Generation:** Loose particles will be disturbed and become airborne, especially in dry conditions, during different Project activities. Site preparation and excavation will generate dust during topsoil and vegetation removal; processing and stockpiling will produce dust when screening and stacking; vehicle and machinery movement on site will produce dust when disturbing exposed surfaces such as those found on access roads and open pit surfaces; and wind will blow dust from the exposed surfaces on site

into the surrounding area. Dust can impact wetland vegetation on the Project Site by impeding plant photosynthesis and transpiration, which could result in reduced growth, increased risk for disease, and even mortality (Javanmard et al., 2019). Broad-leaved deciduous plants are particularly vulnerable to dust (Farmer, 1993). Excessive fugitive dust could cause sedimentation in wetlands, potentially altering hydrology, reducing water quality, and affecting fish, invertebrate, and amphibian respiration, breeding, and feeding. As the active footprint within Blocks 1-4 is set back from WL2 – the nearest wetland to this phase – by a vegetated buffer, significant dust deposition is not anticipated, and any residual effects will be minimized through the implementation of standard dust suppression mitigation measures.

- **Invasive Species:** Wetlands are particularly vulnerable to invasive species. A disproportionately high percentage of the most invasive species are wetland plants, many of which form monotypes that reduce wetland biodiversity, alter habitat structures, and disrupt ecosystems (Zedler & Kercher, 2004). Invasive species spread into wetlands through flowing water (e.g., runoff), wind dispersal, wildlife vectors, and anthropogenic disturbances. Invasive species can spread on boots, clothing, construction equipment, and transportation vehicles (NPS, n.d.). Disturbances such as those on the Project Site create favourable environmental conditions for invasive species to establish and spread, such as open canopies, exposed soil, and altered hydrology, which reduce competition with native plants, allowing invasive species to establish on site and spread to surrounding habitats (Dix et al., 2010; Subedi et al., 2024).

- **Runoff:** Runoff can exacerbate many of the negative effects impacting wetlands. Nutrient loading from runoff can fuel invasive species proliferation in wetlands (Cui et al., 2023). Additionally, as many invasive wetland species use water for seed dispersal and transport of whole plants and plant fragments (Zedler & Kercher, 2004), runoff can facilitate this proliferation. Runoff can also lead to sedimentation within wetlands, which, as described in the effects of dust above, can lead to negative impacts on wetland function and wetland fish, amphibian, and invertebrate species health.

- **Climate Change Considerations**: Heavier short-duration rainfall can increase flashy inflows to wetlands and mobilize sediment/nutrients from disturbed areas, potentially altering the wetland's natural hydroperiod and increasing risk of sediment delivery at wetland edges.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on wetlands during Project activities:

- A vegetated buffer will be maintained from the boundary of all delineated wetlands throughout Blocks 1-4, with no vegetation clearing or Project activities permitted within this zone. If direct alteration of a wetland is required to support future operational blocks, a provincial Wetland Alteration Approval will be obtained, and a compensation plan and monitoring plan (if applicable) will be developed and implemented in consultation with NSECC, prior to that alteration occurring.
- The boundaries of areas to be cleared will be well-marked prior to the start of clearing activities to prevent accidental encroachment into wetland habitat.
- An ESC Plan will be developed and implemented.
- ESC measures upgradient of wetlands (e.g., silt fences) will be inspected quarterly and after severe storm events of 25 mm precipitation or more to ensure sediment is not transferred into wetland areas.
- Stormwater management practices will be implemented, if needed, to direct runoff toward infiltration areas and reduce sediment transport into a wetland, water resource, or beyond the property boundary.
- Roads, pits, and other disturbed areas will be graded in ways that limit slope and direct runoff and drainage away from wetlands.
- Dust suppression techniques, including the application of water, lignin-based solutions, and/or chloride mixtures, will be used on haul roads, stockpiles, and processing areas.
- Speed limits for vehicles on-site will be implemented to reduce dust emissions.
- Enclosed or covered trucks will be used for material transport to minimize dust generation.
- Dust-generating activities will be timed to avoid periods of excessive wind, and activities will be paused when wind speeds are high.
- Storage areas and material stockpiles will be designed with prevailing wind directions in mind, and loose site materials will be tied down, covered, or stored prior to inclement weather to prevent them from becoming airborne.
- Disturbed areas will be minimized to the extent possible and progressively reclaimed to reduce exposed soil available for invasive species establishment and reduce the potential for dust generation.
- Vehicles and equipment will be routinely cleaned and inspected to reduce the spread of invasive species seeds and pollen into wetland environments.

MONITORING

A dedicated wetland monitoring program is not proposed for Blocks 1-4, as this footprint avoids direct wetland alteration and maintains a vegetated buffer from wetlands within its extent.

If direct alteration of a wetland is required to support future operational blocks, a formal Wetland Monitoring Plan will be developed by a qualified wetland professional and implemented to monitor the hydrological and

functional integrity of remaining wetland habitats adjacent to the alteration zone, as required by the provincial Wetland Alteration Approval.

CONCLUSION

After mitigation measures, the residual effects on wetlands are anticipated to be:

- **Magnitude** - Negligible for Blocks 1-4, as direct loss of wetland habitat is avoided by maintaining a vegetated buffer, and no measurable indirect wetland losses of area or function are expected. Direct alteration of one or more wetlands is considered reasonably foreseeable over the full operational life of the Project as future blocks are developed; the magnitude of any such future effect cannot be determined at this stage and will be assessed independently, together with proposed compensation, at the time a Wetland Alteration Approval is sought.
- **Geographic Extent** - Within the LAA, as any effects are confined to the Project Site and immediately adjacent areas.
- **Duration** - Medium-term for indirect effects during Blocks 1-4, which will last throughout the operational and reclamation phases of this footprint but are expected to diminish once operations conclude and the site is fully reclaimed. If direct wetland alteration occurs during a future block, that effect would be long-term, as it would persist beyond the operational life of the specific block, though functional capacity would be offset through compensation and monitoring.
- **Frequency** - Intermittent, as disturbances to wetlands may occur periodically during site preparation, extraction, processing, stockpiling, and reclamation activities.
- **Reversibility** - Reversible for the indirect effects associated with Blocks 1-4, which are expected to diminish with proper mitigation and reclamation. Direct alteration of a wetland during a future block, if required, would be irreversible for that wetland's footprint, though functional losses would be offset through compensation.
- **Significance** - Not significant for the assessed Blocks 1-4 footprint, as residual effects are low in magnitude, localized, and temporary, with effective mitigation measures in place. Any wetland alteration required to support future blocks would be independently evaluated for significance, alongside proposed compensation, through the Wetland Alteration Approval process.

8.1.3 EFFECTS ON FLORA

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for flora includes the Project Site.
- **Regional Assessment Area:** The RAA for flora includes the Project Site and all adjacent natural environment.

PROJECT INTERACTIONS

The following Project activities may interact with flora:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on flora. The VEC-specific definition for magnitude is:

- **Negligible** - No anticipated loss of flora SOCI or SAR, or changes to their supporting habitat.
- **Low** - No anticipated loss of flora SOCI or SAR, but minor loss of their supporting habitat.
- **Moderate** - Minor loss of flora SOCI or SAR and their supporting habitat, but populations remain largely intact.
- **High** - Loss of an entire population of flora SOCI or SAR, and/or major loss of their supporting habitat.

PRIORITY SPECIES: METHODOLOGY

A multi-step screening approach was applied to identify flora species for consideration in this effects assessment:

- **Initial species pool:** The assessment considered:
    - All SAR and SOCI flora species observed during field surveys conducted on the Project Site; and
    - SAR flora species reported by ACCDC to occur on or within 5 km of the Project Site.
- **Evaluation of potential occurrence:** Species identified from these sources were reviewed for either direct observation on the Project Site or the presence of suitable supporting habitat.
- **Priority species determination:** Species were identified as priority species if they are legally listed SAR and were either observed on the Project Site or considered likely to occur based on the presence of suitable habitat. This approach aligns with the definition provided in Chapter 5.

Flora SOCI that did not meet the criteria for priority species are still described below to acknowledge their presence and inform general mitigation planning.

SPECIES DESCRIPTIONS

The following SAR and SOCI flora species were identified during field surveys and/or through ACCDC data. SAR are shown in bold:

Vascular Flora:

- American Beech (*Fagus grandifolia*)
- **Eastern White Cedar (*Thuja occidentalis*)**

Nonvascular Flora:

- **Black-foam Lichen (*Anzia colpodes*)**
- **Frosted Glass-whiskers (*Sclerophora peronella*) - Atlantic Population**
- **Wrinkled Shingle Lichen (*Pannaria lurida*)**

Each of these species is described in more detail below, including habitat requirements and observed or potential site interactions.

American Beech

American Beech is a large, deciduous tree native to eastern North America, including Nova Scotia. It is characterized by smooth, silver-grey bark and dark green, elliptical leaves that turn brilliant yellow and orange in the fall. The tree produces edible nuts enclosed in a woody husk resembling a burr.

In Nova Scotia, American Beech is typically found in mature mixed and hardwood forests, often in association with species such as Sugar Maple, Yellow Birch, and Red Spruce. These forests are commonly located on moist, well-drained slopes and rich bottomlands (Neily et al., 2023).

American Beech was identified by ACCDC to be within 5 km of the Project Site and observed during field surveys. However, as it is not listed under SARA or the ESA, it was not identified as a priority species for this assessment.

Eastern White Cedar

Eastern White Cedar has been listed as 'Vulnerable' under the ESA since 2006. It is a monoecious, evergreen tree belonging to the Cypress Family, generally reaching heights of 10 to 20 m, and is characterized by flattened branchlets that form horizontal sprays and small (1-2 mm), scale-like leaves arranged in alternating pairs. The bark is light reddish-brown and peels in narrow, vertical strips, while the cones are small (1 cm), woody, and

erect. The heartwood is light brown, possesses a characteristic odour, and is noted for its resistance to decay (Newell, 2005).

Ecologically, this long-lived species, capable of exceeding 400 years in age, inhabits swamps, lakeside forests, and riparian zones where soil pH and drainage are critical factors. In Nova Scotia, its range is restricted to five western counties: Yarmouth, Digby, Annapolis, Kings, and Cumberland (NSNR, 2010). The species holds significant cultural value as a Mi'kmaq ceremonial plant and provides important winter shelter for deer populations. However, populations face threats from clearcutting, highway construction, and heavy browsing by deer and Snowshoe Hare, which limits regeneration (Newell, 2005).

Eastern White Cedar was identified by ACCDC to be within 5 km of the Project Site. However, the species was not observed during field surveys, nor was likely habitat identified within the LAA. Consequently, despite being a SAR, it was not designated as a priority species for this assessment.

Black-foam Lichen

The Black-foam Lichen is a foliose (leafy) lichen designated as 'Threatened' under SARA and the ESA. It grows as greenish-grey rosettes that can reach up to 20 cm in diameter on the trunks of deciduous trees. The species derives its common name from a distinctive, thick layer of black, sponge-like fungal filaments (the hypothallus) upon which its solid lobes rest (COSEWIC, 2015a).

In Canada, the Black-foam Lichen is found at the northern limit of its range and is currently restricted to Nova Scotia, appearing to be extirpated from Ontario and Quebec. It typically grows on the trunks of mature deciduous trees, most commonly Red Maple, as well as Sugar Maple, White Ash, and Red Oak. The species requires high humidity levels supplied by nearby wetlands, streams, or lakes (COSEWIC, 2015a).

Black-foam Lichen was identified by ACCDC as being within 5 km of the Project Site. However, the species was not observed during field surveys, nor was likely habitat identified within the LAA. The Project Site itself is characterized by early- to mid-successional regenerating forest lacking the mature or old-growth deciduous canopy and stable humidity conditions required by this species, making occurrence within the LAA unlikely. As such, despite being a SAR, it was not designated as a priority species for this assessment.

Frosted Glass-whiskers

Frosted Glass-whiskers is a tiny, cryptic lichen belonging to a group known as calicioid or "stubble" lichens and its Atlantic population is listed as 'Special Concern' under SARA. It is extremely inconspicuous; the main body of the lichen is embedded within the substrate, leaving only the minute, pale-coloured fruiting bodies visible. These

fruiting bodies consist of tiny stalks with spore-bearing heads that project merely 0.5 to 0.8 mm above the surface of the wood (Environment Canada, 2011).

In Nova Scotia, the species is known only from the exposed heartwood of living Red Maple trees situated in mature or old-growth hardwood forests. It requires specific microhabitats characterized by stable humidity and low temperature fluctuations. Due to these specific requirements and its sensitivity to air pollution and acid rain, Frosted Glass-whiskers is considered a sensitive bioindicator of forest ecosystem health and old-growth continuity (Environment Canada, 2011).

Frosted Glass-whiskers was identified by ACCDC as being within 5 km of the Project Site. The Project Site itself is characterized by early- to mid-successional regenerating forest lacking the mature or old-growth deciduous canopy and stable humidity conditions required by this species, making occurrence within the LAA unlikely. As such, despite being a SAR, it was not designated as a priority species for this assessment.

Wrinkled Shingle Lichen

Wrinkled Shingle Lichen is listed as 'Threatened' under SARA and the ESA. It is a foliose lichen that forms brownish-grey patches or rosettes up to 10 cm in diameter. Its common name refers to the distinctive wrinkles that cover the upper surface of the thallus. This lichen associates with the cyanobacterium Nostoc as its photosynthetic partner, which causes the thallus to become gelatinous when wet. Unlike many other lichens, it lacks specialized structures for vegetative reproduction (such as soredia or isidia); instead, it relies on frequent apothecia to produce fungal spores for reproduction (COSEWIC, 2016b).

In Canada, it is found in New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. The species typically colonizes the rough bark of mature deciduous trees, most commonly Red Maple, growing in humid habitats near treed swamps or floodplains. Rare occurrences have also been documented on Eastern White Cedar in Prince Edward Island and White Spruce on coastal cliffs in Newfoundland. The primary threats to this species include forest harvesting, which removes host trees and alters microclimates, as well as climate change and air pollution, to which cyanolichens are particularly sensitive (COSEWIC, 2016b).

Wrinkled Shingle Lichen was identified by ACCDC as being within 5 km of the Project Site. The Project Site itself is characterized by early- to mid-successional regenerating forest lacking the mature or old-growth deciduous canopy and stable humidity conditions required by this species, making occurrence within the LAA unlikely. As such, despite being a SAR, it was not designated as a priority species for this assessment.

PRIORITY SPECIES: RESULTS

Based on the screening criteria and the definition of priority species used in this EA, no priority flora species were identified. Four SAR (Eastern White Cedar, Black-foam Lichen, Frosted Glass-whiskers, and Wrinkled Shingle Lichen) were all reported in the ACCDC database but not identified during field surveys and are considered unlikely to occur based on habitat availability.

General mitigation measures to protect native flora and minimize disturbance to habitat will be applied during all phases of the Project.

DESCRIPTION OF EFFECTS

The activities with the greatest effect on flora species on site will be those associated with site preparation, such as clearing and grubbing, which will result in the direct removal of vegetation. As the Project will be developed progressively in 1-hectare blocks, with initial site preparation confined to Blocks 1-4 (4.0 ha) and future blocks developed and reclaimed in sequence, the extent of vegetation clearing exposed at any one time will be limited throughout the Project's operational life. Less notable will be the impacts from extraction operations, processing, stockpiling, and reclamation activities, causing dust which can coat plants, inhibiting photosynthesis. Buildup of particles on leaf surfaces can disrupt stomatal activity and hinder gas exchange, leading to decreased photosynthetic efficiency and plant growth (Farmer, 1993; Sharifi et al., 1997). Additionally, there is potential for construction equipment, vehicles, and workers to spread and introduce invasive species. However, given the lack of SAR flora identified on site and the progressive reclamation of the extraction areas, significant effects are not expected.

- **Vegetation Clearing, Edge Effects, and Species Diversity:** As part of site preparation activities, vegetation will be cleared within the 4.0 ha Blocks 1-4 Project footprint, resulting in the direct removal of plants and a localized change in species diversity within this area. Additional vegetation clearing will occur progressively as future blocks are developed over the Project's operational life, with the extent of clearing exposed at any given time limited by the commitment to progressive reclamation. While no SAR flora were identified on site, one SOCI vascular plant, American Beech, was identified throughout the Project Site. Beyond direct removal, clearing activities will create new forest-pit boundaries, resulting in localized edge effects. These edge effects include changes in light availability, moisture conditions, and microclimate at the forest boundary, which can alter plant community composition (Franklin et al., 2021) and facilitate the establishment of opportunistic or invasive species in adjacent intact habitats (Dix et al., 2010; Subedi et al., 2024).
- **Dust:** Loose particles will be disturbed and become airborne, especially in dry conditions, during different Project activities. Site preparation and excavation will generate dust during topsoil and

vegetation removal; processing and stockpiling will produce dust when screening and stacking sand; vehicle and machinery movement on site will produce dust when disturbing exposed surfaces such as those found on access roads and open pit surfaces; and wind will blow dust from the exposed surfaces on site into the surrounding area. This dust can impede plant photosynthesis, which could result in reduced growth, increased risk of disease and even mortality (Javanmard et al., 2019) of plants within and adjacent to the Project Site. Broad-leaved deciduous plants are particularly vulnerable to dust.

- **Invasive Species:** Invasive flora species are harmful to local species as they can crowd them out, outcompeting them for sunlight and nutrients. Invasive species invasions typically result in decreased species diversity and altered ecosystem functions, such as soil nutrient levels and forest fire response (Pyšek et al., 2012). Invasive species can spread on boots, clothing, construction equipment, and transportation vehicles (NPS, n.d.), establishing on site (particularly in cleared areas) and spreading to surrounding habitats. Disturbances such as those on the Project Site create favourable environmental conditions for invasive species to establish and spread, such as open canopies, exposed soil, and altered hydrology, which reduce competition with native plants, allowing invasive species to establish on site and spread to surrounding habitats (Dix et al., 2010; Subedi et al., 2024).

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on flora during the Project:

- The boundaries of areas to be cleared will be well-marked prior to the start of clearing activities to prevent accidental mechanical damage to intact flora.
- Dust suppression techniques, including the application of water, lignin-based solutions, and/or chloride mixtures, will be used on haul roads, stockpiles, and processing areas.
- Stockpiles and disturbed areas will be minimized to the extent possible and progressively reclaimed to reduce the potential for dust generation.
- Enclosed or covered trucks will be used for material transport to minimize dust generation.
- Dust-generating activities will be timed to avoid periods of excessive wind, and activities will be paused when wind speeds are high.
- Prior to the commencement of site preparation, a pre-operational invasive species survey will be conducted within and adjacent to the proposed clearing boundary to document existing invasive species presence and inform the development of a targeted prevention and control strategy.
- If invasive species are noted within or near the Project footprint during operation, the extent of the species will be assessed, and a plan for removal and/or control will be developed.

- Storage of hazardous products and fuelling and servicing of equipment will occur more than 30 m from watercourses, waterbodies, and wetlands.
- Storage areas and material stockpiles will be designed with prevailing wind directions in mind to reduce the potential for dust dispersion.
- Loose site materials and products will be tied down, covered, and/or stored prior to inclement weather or wind events to prevent them from becoming airborne.
- An ESC Plan will be developed and implemented.
- Vehicles and machinery will be restricted to designated access roads and paths to reduce soil compaction and damage to surrounding vegetation.
- Vehicles will be routinely cleaned and inspected to reduce the spread of invasive species.
- Buffers of 30 m from the bank or ordinary high water mark of any watercourse will be implemented.
- After final extraction, the pit walls will be rehabilitated to a 3:1 side slope. The pit wall slopes and pit floor will be covered with topsoil and seeded with a native grass mix. Over time, the area will return to forest through natural regeneration.

MONITORING

Dedicated flora monitoring is not considered necessary given the absence of SAR flora on the Project Site and the prevalence of American Beech across the broader landscape. Invasive species presence will be assessed through regular environmental site inspections during operations, and a targeted response plan will be developed if problematic establishments are detected within or adjacent to the active footprint. Progressive reclamation will be monitored as part of the broader site reclamation program.

CONCLUSION

After mitigation measures, the residual effects on flora are anticipated to be:

- **Magnitude** - Low, as no SAR flora were identified on or likely to occur within the Project Site. The primary SOCI species affected, American Beech, is common regionally, prevalent across the Project Site, and readily colonizes the early successional habitat created by progressive extraction and reclamation. As no more than the active block(s) will be disturbed at any given time, no measurable reduction in the regional American Beech population is anticipated over the Project's operational lifespan.
- **Geographic Extent** - Within the LAA, as any effects are confined to the Project Site.
- **Duration** - Medium-term, as effects will last throughout the operational and reclamation phases but are expected to diminish once operations conclude and the site is fully reclaimed.
- **Frequency** - Intermittent, as disturbances to flora may occur periodically during Project activities.

- **Reversibility** - Partially reversible, as while the site will be progressively reclaimed and naturally regenerate into forest over time, the re-establishment of mature vegetation communities will not return to baseline conditions in the short term.
- **Significance** - Not significant, as the residual effects are low in magnitude, localized to the active block(s) at any given time due to progressive reclamation, intermittent, and partially reversible, with effective mitigation measures in place.

8.1.4 EFFECTS ON FAUNA

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for fauna includes the Project Site.
- **Regional Assessment Area:** The RAA for fauna includes the Project Site and a 5 km radius encompassing the surrounding portions of the South Mountain and Valley Slope Ecodistricts.

PROJECT INTERACTIONS

The following Project activities may interact with fauna:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on fauna. The VEC-specific definition for magnitude is:

- **Negligible** - No anticipated loss of fauna. Habitat loss or behavioural impact is insignificant. No loss of SAR habitat.
- **Low** - Minor loss of fauna habitat, no loss of SAR habitat, and low risk of direct mortality.
- **Moderate** - Minor to moderate loss of fauna habitat, including SAR habitat, and/or risk of direct mortality; however, these impacts are localized and are not expected to affect populations.
- **High** - Significant loss of fauna habitat, including SAR habitat, and/or risk of mortality that may impact species at a population level.

PRIORITY SPECIES: METHODOLOGY

To determine which fauna species warranted further consideration in this effects assessment, a conservative multi-step screening approach was applied:

- **Initial species pool:** The assessment considered:
    - All SAR and SOCI fauna species observed during field surveys conducted on the Project Site; and
    - SAR fauna species reported by ACCDC to occur on or within 5 km of the Project Site.
- **Evaluation of potential occurrence:** Species identified from these sources were reviewed for either direct observation on the Project Site or the presence of suitable supporting habitat.
- **Priority species determination:** Species were identified as priority species if they are legally listed SAR and were either observed on the Project Site or considered likely to occur based on the presence of suitable habitat. This approach aligns with the definition provided in Chapter 5.

Fauna SOCI that did not meet the criteria for priority species are still described below to acknowledge their presence and inform general mitigation planning.

SPECIES DESCRIPTIONS

The following SAR and SOCI fauna species were identified during field surveys or through ACCDC data. SAR are shown in bold:

Avifauna

- Bank Swallow (*Riparia riparia*)
- Barn Swallow (*Hirundo rustica*)
- Bobolink (*Dolichonyx oryzivorus*)
- Canada Warbler (*Cardellina canadensis*)
- Chimney Swift (*Chaetura pelagica*)
- Common Nighthawk (*Chordeiles minor*)
- Eastern Wood-Pewee (*Contopus virens*)
- Evening Grosbeak (*Coccothraustes vespertinus*)
- Olive-sided Flycatcher (*Contopus cooperi*)
- Rusty Blackbird (*Euphagus carolinus*)

Bats

- Eastern Red Bat (*Lasiurus borealis*)
- Hoary Bat (*Lasiurus cinereus*)
- **Little Brown Myotis (*Myotis lucifugus*)**
- **Northern Myotis (*Myotis septentrionalis*)**
- Silver-haired Bat (*Lasionycteris noctivagans*)

Herpetofauna

- **Eastern Painted Turtle (*Chrysemys picta picta*)**
- **Wood Turtle (*Glyptemys insculpta*)**

Mammals

- Fisher (*Pekania pennanti*)
- **Mainland Moose (*Alces alces americana*)**

Each of these species is described in more detail below, including habitat requirements and observed or potential site interactions.

Avifauna

Bank Swallow

The Bank Swallow, a small migratory songbird, is experiencing significant population declines across its North American breeding range, including in Nova Scotia. Once widespread and relatively common, the species is now listed as 'Threatened' under SARA and 'Endangered' under the ESA due to rapid declines largely driven by habitat loss and degradation (COSEWIC, 2013a; NSNRR, 2021b).

Bank Swallows are colonial nesters that rely on exposed, vertical soil faces to excavate nesting burrows. In Nova Scotia, they typically breed in eroding riverbanks, coastal bluffs, gravel pits, and sand or soil stockpiles associated with construction or resource extraction (NSLF, 2020c). The species shows a strong preference for fine-textured soils (silt, sand, or loam) that are soft enough to dig but stable enough to support a burrow structure (Garrison, 1999). In addition to nesting habitat, Bank Swallows require nearby open areas such as wetlands, agricultural fields, or waterbodies to forage for flying insects, which make up the bulk of their diet (COSEWIC, 2013a).

The Bank Swallow was identified by ACCDC within 5 km of the Project Site. It was not observed during field surveys, consistent with the absence of suitable nesting habitat on the Project Site, which supports a young, regenerating forest lacking the exposed vertical soil faces required for burrow excavation. However, pit operations are expected to create potentially suitable nesting habitat over time, through the development of

exposed soil and overburden faces during extraction, as well as the formation of stockpiles. As such, it was identified as a priority species in this assessment.

Species-specific mitigation beyond general seasonal vegetation clearing restrictions for nesting bird protection measures is not anticipated at this time; however, Bank Swallow nesting habitat created by pit operations will be monitored, and if active nesting is confirmed, species-specific mitigation will be developed in consultation with relevant regulatory authorities.

Barn Swallow

The Barn Swallow is experiencing significant population declines across North America, including Nova Scotia. Listed as 'Threatened' under SARA and 'Endangered' under the ESA, this species' decline is attributed to factors such as habitat loss, reduced insect prey availability, and changes in agricultural practices (NSLF, 2020d).

Historically, Barn Swallows nested in natural structures like caves and cliff faces. However, they have largely adapted to human-made structures, building their mud nests on barns, sheds, bridges, and other buildings. These nests are often reused annually, and the presence of suitable nesting sites is crucial for their breeding success. Barn Swallows forage over open habitats, including grasslands, agricultural fields, wetlands, and shorelines. They feed on flying insects, making the availability of insect prey in these areas vital for their sustenance (COSEWIC, 2021).

The Barn Swallow was identified by ACCDC within 5 km of the Project Site and recorded within Atlas Square 20LQ36 of the MBBA; however, it was not observed during field surveys. The Project Site supports a young, regenerating forest, which does not provide suitable nesting habitat, and the surrounding area is predominantly forested with limited open or agricultural habitat available for foraging. As a result, this species was not identified as a priority species for this assessment. This species will be addressed through the implementation of general mitigation measures intended to minimize disturbance to wildlife and habitat, including birds.

Bobolink

The Bobolink is a migratory grassland songbird that breeds across southern Canada, including Nova Scotia, and winters in South America. In Nova Scotia, the species is listed as 'Vulnerable' under the ESA, reflecting concerns over its declining population and habitat threats. Nationally, the Bobolink is designated as 'Special Concern' under SARA, following a reassessment by COSEWIC (2022).

Bobolinks are obligate grassland specialists, relying on open habitats for breeding and feeding. In Nova Scotia, they primarily nest in hayfields and pastures (these agricultural lands provide the tall grasses necessary for

nesting and foraging) and abandoned fields/wet meadows (areas with dense herbaceous vegetation offer suitable nesting sites).

The Bobolink was identified by ACCDC within 5 km of the Project Site; however, it was not observed during field surveys. The Project Site supports a young, regenerating forest, which does not provide the open grassland or agricultural habitat required for nesting or foraging. As a result, this species was not identified as a priority species for this assessment. This species will be addressed through the implementation of general mitigation measures intended to minimize disturbance to wildlife and habitat, including birds.

Canada Warbler

The Canada Warbler has experienced significant population declines across its range, with particularly steep losses observed in the eastern provinces. In Nova Scotia, the species is listed as 'Endangered' under the ESA. Nationally, it is designated as 'Threatened' under SARA, although a 2020 reassessment by COSEWIC recommended a status of 'Special Concern' to acknowledge slowing decline rates in some regions. The primary factors contributing to its decline include the cumulative loss of forested wetlands and complex understory habitats in its breeding range, as well as extensive deforestation in its South American wintering grounds. Additional pressures include reductions in insect prey availability and increasing mortality from collisions with windows and other structures during migration (COSEWIC, 2020).

In Nova Scotia, the Canada Warbler breeds in moist, mixedwood or deciduous forests characterized by a dense, structurally complex shrub layer. The species shows a strong affinity for wet forest types, including treed swamps, riparian thickets, and sphagnum bogs where a rich understory of ferns, mosses, and shrubs (such as Speckled Alder) is present. It also utilizes regenerating forests disturbed by windthrow or forestry, provided sufficient ground cover exists. Nests are built on or near the ground, typically well-concealed within mossy hummocks, rotting tree stumps, or the upturned root masses of fallen trees. As an insectivore, the Canada Warbler relies on these structurally diverse habitats to forage for flying insects and spiders, often capturing prey on the wing within the shrub canopy.

The Canada Warbler was identified by ACCDC within 5 km of the Project Site. Although it was not observed during field surveys, suitable habitat exists on site in the riparian areas and treed swamps, including the mature riparian floodplain swamp associated with Eel Weir Brook, which supports Speckled Alder, ferns, and a dense shrub stratum, as well as in areas such as WL7 adjacent to WC4 where similar understory conditions are present. As such, it was identified as a priority species in this assessment.

Species-specific mitigation is not anticipated to be required beyond the application of general bird protection measures. WL1, associated with the mature riparian floodplain along Eel Weir Brook, is not anticipated to be altered by the Project. Habitat within WL7, near WC4, is also not currently anticipated to be affected based on

the Project's current block layout, though the configuration of blocks in this area of the Project Site has not yet been finalized. Should future development affect either area, species-specific mitigation for Canada Warbler would be reassessed at that time in consultation with NSECC and NSNRR.

Chimney Swift

The Chimney Swift is a small aerial insectivore and long-distance migrant that breeds in central and eastern Canada and winters primarily in the upper Amazon River basin of South America. The species has experienced a severe long-term population decline of nearly 90% since 1970. Due to these steep declines, the Chimney Swift is federally listed as 'Threatened' under SARA and provincially listed as 'Endangered' under the ESA. These declines are driven primarily by the reduced availability of aerial insects - likely linked to broad-scale ecosystem modifications and pesticide use - as well as the ongoing loss of suitable roosting and nesting sites as old chimneys are modified or demolished (COSEWIC, 2018a).

Although often mistaken for a swallow, the Chimney Swift is the only swift species regularly found in central and eastern North America. It is easily distinguished by its "cigar-shaped" dark sooty brown body, long narrow pointed wings, short spiny tail, and a rapid, jerky flight style. Historically, Chimney Swifts nested and roosted inside large hollow trees in mature and old-growth forests. Following widespread forest clearing by European settlers, the species quickly adapted to use human-made structures, particularly stone or brick chimneys. Consequently, they are now largely associated with urban and rural areas where such structures are available alongside abundant aerial insects. They construct unique, half-saucer-shaped nests by cementing small twigs against vertical surfaces using their own sticky saliva. Ecologically, they are specialized feeders that forage on the wing for flying insects over a variety of habitats, including urban areas, wetlands, and other natural landscapes. Swifts have also aroused considerable public interest due to the spectacle they create during migration, when large flocks gather at dusk to circle and "pirouette" into communal roosting chimneys (COSEWIC, 2018a).

The Chimney Swift was identified by ACCDC within 5 km of the Project Site; however, it was not observed during field surveys. The Project Site supports a young, regenerating forest, which does not provide suitable nesting or roosting habitat, and the surrounding area is predominantly forested with limited rural settlement. As a result, this species was not identified as a priority species for this assessment. This species will be addressed through the implementation of general mitigation measures intended to minimize disturbance to wildlife and habitat, including birds.

Common Nighthawk

The Common Nighthawk has experienced widespread population declines across Canada, including Nova Scotia. In Nova Scotia, the species is listed as 'Threatened' under the ESA, reflecting concern over continued population

losses and habitat pressures (NSLF, 2021a). Nationally, the Common Nighthawk is designated as 'Special Concern' under SARA. This designation, downgraded from 'Threatened' in 2007 to 'Special Concern' in 2018 by COSEWIC, acknowledges ongoing threats while recognizing some recovery potential. The primary factors contributing to its decline include habitat loss, reduced availability of insect prey due to pesticide use, urban development, and the increasing frequency of extreme weather events, which can disrupt nesting success and food availability (COSEWIC, 2018b).

In Nova Scotia, the Common Nighthawk breeds in a variety of open habitats that offer sparse vegetation and flat, exposed ground suitable for ground nesting. These habitats include natural environments such as coastal sand dunes, rock barrens, peat bogs, and burned or logged forest areas, as well as human-altered landscapes like pastures, gravel rooftops, and clearings created through forestry activities. The species lays its eggs directly on bare ground, sand, or gravel without building a traditional nest. Successful nesting depends on the availability of open, undisturbed sites with good visibility and proximity to areas where insects are abundant, as the Common Nighthawk feeds almost exclusively on flying insects captured in flight during dawn and dusk foraging periods (NSLF, 2021a).

The Common Nighthawk was identified by ACCDC within 5 km of the Project Site, and two individuals were detected by call at the survey station located west of the Project Site on adjacent Crown land (NJ2), indicating continued presence during the survey period. Suitable nesting habitat is present within the Project Site in the open, sparsely vegetated areas associated with the road through the site. Furthermore, pit operations are expected to expand suitable nesting habitat over time through the creation of exposed gravel and bare ground surfaces associated with extraction activities. As such, it was identified as a priority species in this assessment.

Species-specific mitigation beyond general seasonal vegetation clearing restrictions for nesting bird protection measures is not anticipated at this time; however, Common Nighthawk nesting habitat created by pit operations will be monitored, and if active nesting is confirmed, species-specific mitigation will be developed in consultation with relevant regulatory authorities.

Eastern Wood-Pewee

In Nova Scotia, the Eastern Wood-Pewee has been classified as 'Vulnerable' under the ESA since 2013. Nationally, it is listed as 'Special Concern' under SARA, following a 2012 assessment by COSEWIC. These designations reflect ongoing declines in population, attributed to factors such as habitat loss, changes in forest structure, and reductions in insect prey availability (ECCC, 2023; NSNRR, 2022b).

The Eastern Wood-Pewee favours mature deciduous and mixed forests with open understories, which facilitate its foraging strategy of sallying from perches to catch flying insects. In Nova Scotia, important breeding habitats

include mature upland forests and treed swamps. The species tends to avoid regenerating forests and areas with dense understory vegetation, likely due to reduced foraging efficiency in such environments (NSNRR, 2022b).

The Eastern Wood-Pewee was identified by ACCDC within 5 km of the Project Site and was detected during the second round of breeding bird surveys at two locations – once within a roadside deciduous forest and once within a mixedwood forest in the southern portion of the Project Site. The forest within the Project Site is generally young and regenerating; however, relatively undisturbed deciduous forest exists along the eastern boundary, and scattered mixedwood forest near wetlands and watercourses has avoided disturbance to a greater degree than the surrounding regenerating stands. These areas, along with the adjacent Crown land, are considered to provide suitable foraging and breeding habitat. As such, it was identified as a priority species in this assessment.

Species-specific mitigation is not anticipated to be required beyond the application of general seasonal vegetation clearing restrictions for nesting bird protection measures.

Evening Grosbeak

In Nova Scotia, the Evening Grosbeak is listed as 'Vulnerable' under the ESA and nationally as 'Special Concern' under SARA, following a recommendation by COSEWIC (2016a). These designations reflect a substantial long-term decline, with population reductions estimated between 77% and 90% since 1970. In eastern Canada, including Nova Scotia, the species has experienced some of the steepest regional losses, with declines of up to 97% observed in parts of Ontario, Quebec, and the Maritimes.

In Nova Scotia, the Evening Grosbeak inhabits mature mixed and softwood boreal forests, where it forages in treetops and branches for insects, seeds, and berries. Breeding typically occurs in coniferous and mixed forests, with nests built on horizontal branches or in tree forks.

The Evening Grosbeak was identified by ACCDC within 5 km of the Project Site; however, it was not observed during field surveys. The Project Site supports a young, regenerating forest, which does not provide the mature mixed or softwood boreal forest habitat required by this species. As a result, this species was not identified as a priority species for this assessment. This species will be addressed through the implementation of general mitigation measures intended to minimize disturbance to wildlife and habitat, including birds.

Olive-sided Flycatcher

The Olive-sided Flycatcher is a migratory songbird experiencing significant population declines across North America. In Nova Scotia, it is classified as 'Threatened' under the ESA. Nationally, it is listed as 'Special Concern' under SARA. In Nova Scotia, it breeds in open coniferous or mixedwood forests, typically near wetlands or

waterbodies where tall snags and forest edges provide elevated foraging perches (COSEWIC, 2018d; NSLF, 2021b).

National Breeding Bird Survey data indicate a long-term population decline of approximately 72% in Canada since 1970, with an estimated annual rate of decline of 3.4%. Contributing factors to these declines may include reduced insect prey availability, forest harvesting, fire suppression, habitat loss on both breeding and wintering grounds, and broader landscape changes from development and resource extraction (COSEWIC, 2018d; NSLF, 2021b).

The Olive-sided Flycatcher was identified by ACCDC within 5 km of the Project Site; however, it was not identified during field surveys. The species favours open coniferous or mixedwood forests near wetlands or waterbodies, where tall snags and forest edges provide elevated foraging perches. While the Project Site is predominantly young regenerating forest, the wetlands and watercourses on site are associated with mid-successional coniferous and mixedwood stands along their edges, and the adjacent Crown land supports more mature forest structure. Tall snags suitable for perching are present along forest edges adjacent to these features. Given the presence of these habitat elements and the species' confirmed occurrence within 5 km, the Olive-sided Flycatcher was identified as a priority species in this assessment.

Species-specific mitigation is not anticipated to be required beyond the application of general bird protection measures. The confirmed habitat features for this species are associated with forested wetland and riparian edge habitat where a 30 m vegetated buffer from watercourses is maintained throughout the Project's operational life. The wetlands themselves will be avoided during Blocks 1-4; direct alteration of one or more wetlands elsewhere on the Project Site is considered reasonably foreseeable over the Project's full operational life. Should future development affect the specific habitat features identified for this species, species-specific mitigation would be reassessed at that time.

Rusty Blackbird

The Rusty Blackbird is listed as 'Special Concern' by COSEWIC and SARA, and 'Endangered' under the provincial ESA, having experienced significant population declines across its range. This decline has been attributed to habitat loss, particularly the conversion of wetland areas to agricultural land and urban development, as well as potential impacts from mercury contamination and blackbird control programs in the southeastern U.S. Nationally, the species has seen a decline of over 80% since the 1960s (COSEWIC, 2017; Government of Canada, 2015b).

In Nova Scotia, the Rusty Blackbird is primarily found in forested wetlands, beaver ponds, and regenerating coniferous forests, particularly in areas like the Cape Breton Highlands and Taiga, which provide the necessary habitat for breeding and foraging (Stewart et al., 2015). The species' distribution is patchy in the province, and

observation rates have notably decreased in recent years. Habitat pressures, such as forest clearing for development, logging, and wetland degradation, are likely contributing to these declines. Due to its significant role in Canada's boreal ecosystems, the Rusty Blackbird remains a priority species for conservation efforts in the Maritimes.

The Rusty Blackbird was identified by ACCDC within 5 km of the Project Site; however, it was not observed during field surveys. While the Project Site contains forested wetlands and areas of regenerating mixedwood forest, the species' breeding distribution in Nova Scotia is strongly associated with the Cape Breton Highlands and Taiga ecoregions, and the Project Site in Annapolis County lies outside the core of the species' known provincial breeding range. Suitable habitat features, including forested wetlands with standing water and coniferous cover, are present but limited on the Project Site relative to preferred breeding habitat. As such, the Rusty Blackbird was not identified as a priority species for this assessment.

Species-specific mitigation is not anticipated to be required beyond the application of general seasonal vegetation clearing restrictions for nesting bird protection measures.

Bats

Eastern Red Bat

The Eastern Red Bat is listed as 'Endangered' by COSEWIC and is found across much of eastern North America, including Canada, the U.S., and parts of northeastern Mexico. These migratory bats can travel thousands of kilometres between their wintering and summering grounds. In summer, they typically roost in foliage, often choosing large, mature trees that reach or exceed the surrounding canopy height. They roost alone or with dependent young (COSEWIC, 2023).

This species forages in a range of habitats, including forest edges, open woodlands, and over clearings. However, they are generally less active in heavily disturbed environments such as urban areas, major roads, or active mining sites. Migration is thought to occur along coastlines or across large open areas (COSEWIC, 2023).

The Eastern Red Bat was detected during acoustic surveys. Although this species is designated as Endangered by COSEWIC, it is not currently listed under SARA or the ESA, and therefore does not meet the definition of a priority species applied in this assessment. The priority species framework used in this EA is based on legal listing status under SARA and the ESA, consistent with the approach described in Chapter 5. This species will be addressed through the implementation of general mitigation measures intended to minimize disturbance to wildlife and habitat, including bats.

Hoary Bat

The Hoary Bat is listed as 'Endangered' by COSEWIC and is one of the most widespread bat species in North America, with a range extending across Canada, the U.S., and into Central America. As a long-distance migrant, this species overwinters in warmer coastal areas of the U.S. and Mexico, migrating north each spring to breed. In Nova Scotia, Hoary Bats are typically observed during the summer months (COSEWIC, 2023).

During the breeding season, they roost in foliage, often selecting mature coniferous or deciduous trees that provide dense canopy cover and open flight space beneath. Foraging typically occurs in semi-open habitats such as forest edges, wetlands, and clearings. Although adaptable in terms of roosting and foraging habitat, Hoary Bats generally avoid areas that are heavily disturbed, including major roads, developed landscapes, and industrial sites. Migration is believed to follow coastal routes or large open landscapes (COSEWIC, 2023).

The Hoary Bat was detected during acoustic surveys. Although this species is designated as Endangered by COSEWIC, it is not currently listed under SARA or the ESA, and therefore does not meet the definition of a priority species applied in this assessment. The priority species framework used in this EA is based on legal listing status under SARA and the ESA, consistent with the approach described in Chapter 5. This species will be addressed through the implementation of general mitigation measures intended to minimize disturbance to wildlife and habitat, including bats.

Little Brown Myotis

The Little Brown Myotis is listed as 'Endangered' by COSEWIC, SARA, and the ESA and was once the most widespread and familiar bat species in Canada. Found in all provinces and territories except Nunavut, it commonly roosts in buildings, attics, and barns during summer, making it more likely to be observed by people than other species (COSEWIC, 2013b; NSLF, 2020a).

This species forages primarily over lakes, ponds, and along forest edges, and is often seen hunting insects near streetlights and open water. It overwinters in humid, underground hibernacula such as caves and abandoned mines, sometimes migrating hundreds of kilometres between summer and winter sites (COSEWIC, 2013b). Populations in eastern Canada have experienced catastrophic declines due to white-nose syndrome (WNS), a fungal disease that affects hibernating bats. Although once abundant, the species is now rare in many areas. Additional threats include the loss of roosting sites, chemical exposure, and disturbance during hibernation (COSEWIC, 2013b).

The Little Brown Myotis was detected during acoustic surveys. The wetland area within the Project Site likely provides good foraging habitat, supporting the potential for regular use. Given its legal status and the presence of suitable habitat, the Little Brown Myotis was identified as a priority species in this assessment.

Mitigation measures will be incorporated into the Wildlife Management Plan (WMP) and will include avoiding disturbance to wetland habitat throughout Blocks 1-4, and limiting Project activities to daytime hours to reduce potential impacts on bat foraging behaviour.

Northern Myotis

The Northern Myotis is listed as 'Endangered' by COSEWIC, SARA, and the ESA and occurs across most of Canada, excluding Nunavut. Its range spans from Newfoundland to British Columbia and includes much of the boreal forest, with breeding confirmed as far north as the Yukon and Northwest Territories (COSEWIC, 2013b; NSLF, 2020b). This forest-dependent species typically roosts in large-diameter trees during the summer, often forming small maternity colonies. It forages along forest edges, streams, and in canopy gaps, avoiding large open areas such as clearcuts and fields. In autumn, individuals migrate, sometimes over long distances, to overwinter in cold, humid caves or abandoned mines (NSLF, 2020b).

WNS, a fungal disease introduced to Canada around 2010, has caused severe population declines. Like the Little Brown Myotis, the Northern Myotis was once common in eastern Canada but has experienced steep declines in WNS-affected areas. Other threats include habitat loss, disturbance, and potentially climate change (COSEWIC, 2013b; NSLF, 2020b).

The Northern Myotis was detected during acoustic surveys. The wetland area within the Project Site likely provides good foraging habitat, supporting the potential for regular use. Given its legal status and the presence of suitable habitat, the Northern Myotis was identified as a priority species in this assessment.

Mitigation measures will be incorporated into the WMP and will include avoiding disturbance to wetland habitat throughout Blocks 1-4, and limiting Project activities to daytime hours to reduce potential impacts on bat foraging behaviour.

Silver-haired Bat

The Silver-haired Bat is listed as 'Endangered' by COSEWIC and ranges widely across North America, from British Columbia and the southern Northwest Territories to the Atlantic provinces, including Nova Scotia. It is also a long-distance migrant, wintering in the southern U.S. and Mexico and returning northward in spring to breed (COSEWIC, 2023).

This species commonly roosts under loose bark or in cavities of large dead or decaying trees. In some cases, buildings may also provide roosting opportunities. Maternity roosts are typically small and found in decaying deciduous trees. Silver-haired Bats are forest-adapted and usually forage along forest edges, over water, or in

small clearings. While specific migratory pathways are not well understood, movements are presumed to occur over broad, forested landscapes and potentially along coastlines (COSEWIC, 2023).

The Silver-haired Bat was detected during acoustic surveys. Although this species is designated as Endangered by COSEWIC, it is not currently listed under SARA or the ESA, and therefore does not meet the definition of a priority species applied in this assessment. The priority species framework used in this EA is based on legal listing status under SARA and the ESA, consistent with the approach described in Chapter 5. This species will be addressed through the implementation of general mitigation measures intended to minimize disturbance to wildlife and habitat, including bats.

Herpetofauna

Eastern Painted Turtle

The Eastern Painted Turtle is a freshwater species native to eastern Canada and the northeastern U.S. and is listed as 'Special Concern' by COSEWIC and SARA. Recognized for its striking shell coloration and semi-aquatic lifestyle, this turtle plays a vital role in freshwater ecosystems, aiding in nutrient cycling and seed dispersal. It is also of cultural significance to Indigenous peoples of Canada. The Eastern Painted Turtle is well-adapted to colder climates and is found in various aquatic habitats such as marshes, ponds, and slow-moving rivers across its range. It is commonly associated with areas that provide abundant basking sites and aquatic plants for cover and feeding (COSEWIC, 2018c).

In Canada, the species is found in the eastern provinces, including New Brunswick and Nova Scotia, where it occupies shallow, well-vegetated wetlands. Suitable nesting sites are typically found in open, often south-facing areas with sandy-loamy or gravelly substrates near aquatic habitats. The Eastern Painted Turtle faces several threats, including road mortality, habitat loss, climate change, and predation, which can destabilize populations. Although the species is generally secure across North America, localized declines in population have been observed, highlighting the need for ongoing conservation efforts to protect this iconic species (COSEWIC, 2018c).

The Eastern Painted Turtle was identified by ACCDC within 5 km of the Project Site. Although it was not observed during field surveys, suitable aquatic and basking habitat is present along Eel Weir Brook and associated wetlands, supporting the potential for occurrence. Suitable nesting habitat was not identified during surveys; however, pit operations may create open areas with gravelly substrates that could provide nesting opportunities over time. As such, it was identified as a priority species in this assessment.

A wildlife nesting monitoring program will be developed as part of the WMP to monitor potential Eastern Painted Turtle activity and help avoid disturbance during sensitive periods.

Wood Turtle

The Wood Turtle is listed as 'Threatened' by COSEWIC, SARA, and the ESA. Native to eastern North America, it occurs in small, isolated populations across parts of Ontario, Quebec, New Brunswick, and Nova Scotia, typically inhabiting clear, meandering streams and adjacent riparian areas (COSEWIC, 2018e; NSLF, 2020e).

Unlike most freshwater turtles, the Wood Turtle is highly terrestrial during the active season, often venturing far from water into forests, fields, and wetlands. It overwinters in streams and rivers and returns to known nesting areas, such as sandy streambanks and gravel pits, year after year. Long-lived and slow to mature, the species is highly sensitive to increases in adult mortality (NSLF, 2020e). Populations are declining across much of their range due to road mortality, nest predation, habitat degradation, and illegal collection for the pet trade. Its vulnerability is closely linked to increased human access to remote areas, particularly via roads and trails (COSEWIC, 2018e; NSLF, 2020e).

The Wood Turtle was identified by ACCDC within 5 km of the Project Site, and a historical observation was recorded near Highway 10 in the provincial Significant Species and Habitats Database. Although no individuals were observed during dedicated Wood Turtle surveys, suitable overwintering, basking, and foraging habitat was confirmed along Eel Weir Brook and associated riparian areas. Suitable nesting habitat, such as exposed sandy beaches or gravel bars, was not identified during surveys; however, as Wood Turtles are known to utilize gravel pits as nesting habitat, pit operations may create suitable nesting opportunities over time. As such, it was identified as a priority species in this assessment.

A wildlife nesting monitoring program will be developed as part of the WMP to monitor potential Wood Turtle activity and help avoid disturbance during sensitive periods.

Mammals

Fisher

The Fisher is a medium-sized carnivore native to the forests of eastern North America. In Nova Scotia, the species shows a strong preference for mature conifer, hardwood, and mixedwood forests. These diverse, mature habitats support the Fisher's primary prey base of medium-sized mammals, specifically Snowshoe Hare, Red Squirrel, and North American Porcupine.

Historically, the Fisher was present throughout mainland Nova Scotia but faced severe population declines and local extirpation by the mid-20th century. These declines were largely attributed to over-trapping and habitat loss caused by logging. While the species was considered extirpated from the province by the 1940s,

reintroduction programs using stock from other regions successfully re-established populations on the mainland between 1947 and 1995 (Proulx, 2025).

The Fisher was identified by ACCDC within 5 km of the Project Site and recorded in the provincial Significant Species and Habitats Database in association with Eel Weir Brook. Additionally, a Fisher was documented on two occasions by a trail camera deployed near Eel Weir Brook (CAM1), confirming use of the Project Site as foraging and travel habitat. As the Fisher is listed as SOCI but is not listed under SARA or the ESA, it was not identified as a priority species for this assessment. This species will be addressed through the implementation of general mitigation measures intended to minimize disturbance to wildlife and habitat, as outlined in the WMP to be developed prior to construction.

Mainland Moose

The Mainland Moose is listed as 'Endangered' under the provincial ESA, having experienced severe and ongoing population declines. Once abundant across Nova Scotia, the population is now estimated at fewer than 1,000 individuals isolated within specific regions, primarily the Cumberland/Colchester, Pictou/Antigonish/Guysborough, and Tobeatic areas. This steep decline is driven by interrelated threats, including habitat loss and fragmentation from forestry and roads, poaching, and vehicular collisions. Furthermore, parasites such as Brainworm (*Parelaphostrongylus tenuis*) and Winter Tick (*Dermacentor albipictus*), transmitted by White-tailed Deer, are major limiting factors that are expected to worsen with climate change (McNeil, 2013; NSNRR, 2021c; Parker, 2003).

Mainland Moose require a diverse mosaic of woodland and wetland habitats to meet their daily needs for food, shelter, and thermoregulation. In the summer, they rely on wetlands and shorelines for aquatic forage and cooling, while heavily depending on mature, closed-canopy coniferous and mixedwood forests to avoid heat stress. During winter, their preference shifts toward mature conifer stands that offer shelter from deep snow, interspersed with young, regenerating deciduous trees and shrubs for browsing. Unfortunately, high-density road construction and certain forest harvesting practices have significantly fragmented these landscapes and removed vital mature thermal cover, making habitat conservation and connectivity critical for the species' recovery (McNeil, 2013; NSNRR, 2021c).

The Mainland Moose was identified by ACCDC within 5 km of the Project Site. Dedicated Mainland Moose surveys, including PGI and winter tracking surveys, were conducted across the Project Site; however, no evidence of Mainland Moose was recorded during either survey program. The Project Site supports predominantly young, regenerating mixedwood forest and modest amounts of open wetland habitat, which may provide limited winter browsing areas and summer thermal refuge opportunities for moose. However, the Project Site does not provide sufficient high-quality forest habitat to support moose at a population level, beyond

the occasional occurrence of transient individuals. Although the Mainland Moose is listed under the ESA, it was not identified as a priority species for this assessment. This species will be addressed through the implementation of general mitigation measures intended to minimize disturbance to wildlife and habitat, as outlined in the WMP to be developed prior to construction.

PRIORITY SPECIES: RESULTS

Based on the screening criteria and the definition of priority species used in this EA, the following fauna species have been identified as priority species:

Avifauna

- Bank Swallow
- Canada Warbler
- Common Nighthawk
- Eastern Wood-Pewee
- Olive-sided Flycatcher

Bats

- Little Brown Myotis
- Northern Myotis

Herpetofauna

- Eastern Painted Turtle
- Wood Turtle

All identified priority species will be addressed through a WMP to avoid or reduce adverse effects during all phases of the Project. The WMP will include targeted measures for priority species, as appropriate. Species not identified as priority will still be considered through the application of general mitigation measures intended to minimize disturbance to wildlife and habitat.

DESCRIPTION OF EFFECTS

The activities that will impact fauna include removing and altering habitats during site preparation, creating sensory disturbance (noise, vibrations, and potentially light) during extraction operations/processing/stockpiling/transportation, and direct mortality and injuries from wildlife-vehicle collisions. Mammals, birds, and amphibians may avoid the area, experience interruptions in breeding or foraging activities, or face increased predation risks due to habitat fragmentation.

- **Habitat Alteration:** Clearing vegetation during site preparation will result in an area of alteration of 4.0 ha within Blocks 1-4, with additional habitat cleared progressively as future blocks are developed over the Project's operational life, removing habitat used by fauna species and could result in habitat fragmentation effects. Habitat fragmentation occurs when continuous habitats are broken up into smaller, isolated patches, reducing wildlife species' access to food, mates, and shelter, and increasing their exposure to predation and competition for resources (Fahrig, 2003; Haddad et al., 2015). These effects are most pronounced in smaller species such as small mammals and amphibians. Additionally, breeding bird species are also at risk of direct mortality and/or nest destruction during vegetation clearing activities if the clearing occurs during the breeding season (approximately April 1 to August 31). While this 4.0 ha initial area of alteration represents a notable change to the landscape, the progressive reclamation of the site and the implementation of mitigation measures will limit long-term fragmentation effects, and no more than the active block(s) will be disturbed at any given time as the Project advances through future blocks over its operational life.

- **Sensory Disturbance and Dust:** The sounds, vibrations, and visual disturbances made by heavy equipment and personnel during the extraction, processing, and transportation of the aggregate may result in altered behaviour and movement of local wildlife species currently using and surrounding the Project Site. Bats and birds are particularly sensitive to the effects of sound. Sound can result in altered bat activity and behaviour by adjusting echolocation, which could impact navigation and foraging (Bunkley et al., 2015). Site activities will be restricted to daylight hours as a committed mitigation measure for bat SAR, which eliminates the risk of artificial lighting disrupting nocturnal foraging patterns. In the event that emergency maintenance is required outside of daylight hours, lighting will be directed downward and away from wetland and riparian areas to minimize disruption to foraging bats. Anthropogenic sound can also be particularly disruptive to avian species as they use it extensively for communication (mating, warning of predators, etc.). Anthropogenic sound has been found to alter breeding song timing of nearby bird populations (de Framond & Brumm, 2022) and induce altered hormonal levels in a quail bird study (Amjad et al., 2024). Sound and vibrations may repel certain species, increasing habitat fragmentation effects, and may also attract others, potentially leading to an increase in deleterious human-wildlife conflicts. Dust can also impact wildlife species' ability to forage and breathe. Dust has been found to reduce the foraging quality for herbivores (Watkinson et al., 2021), and a study exposing rats to dust storm fine particulate matter caused inflammation and injury to the rats' respiratory, cardiovascular, endocrine, hematological, and digestive systems (Cao et al., 2018). Provincial guidelines and municipal bylaws protecting human health will be followed, which, coupled with dust suppression and noise mitigation measures detailed below, will help prevent significant effects on fauna.

- **Opportunistic Habitat Use (Attractive Nuisance):** The creation of exposed sand and gravel faces, stockpiles, and open pit areas may inadvertently attract certain wildlife species, creating an 'attractive nuisance' that increases their risk of injury or mortality (Battin, 2004; Schlaepfer et al., 2002). For instance, Bank Swallows (a SAR) are highly adaptable and known to opportunistically excavate nests in vertical aggregate pit faces and stockpiles. Similarly, priority species such as the Wood Turtle, Eastern Painted Turtle, and Common Nighthawk may utilize exposed, well-drained gravel surfaces for nesting, basking, or foraging. Without proactive site management, these species could be exposed to direct harm from equipment operation or material handling.

- **Vehicle Collisions:** The pit development could increase the risk of wildlife-vehicle collisions due to heightened traffic from heavy machinery, transport trucks, and support vehicles. As the natural habitats within the planned Project footprint are disturbed, wildlife may be forced to cross access roads and active pit areas more frequently in search of food, shelter, or mates. Species that are attracted to roads but lack the ability to avoid traffic, such as reptiles (e.g., nesting in roadside gravel), amphibians (e.g., breeding in road ruts), and large mammals (e.g., deer using roads as paths of least resistance), are particularly at risk of experiencing negative effects of roads and vehicular traffic (Fahrig & Rytwinski, 2009). This includes priority species identified in the LAA, such as the Wood Turtle and Eastern Painted Turtle, which may utilize exposed gravel or open corridors. Additionally, certain avian species, particularly ground-nesting birds or those foraging near open sand and gravel surfaces, may be exposed to collisions or disturbance from passing vehicles. Mitigations for these species are detailed below.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on fauna during the Project:

- Vegetation clearing will be avoided during peak breeding season for birds (April 1 to August 31). If vegetation clearing must occur during this time, pre-disturbance nest searches will be conducted, and appropriate nest buffers will be applied and avoided.
- A WMP will be developed and incorporated into the Environmental Protection Plan (EPP). This Plan will include measures to avoid or reduce adverse effects on priority fauna species during all phases of the Project. Included in this plan will be contingencies for managing Bank Swallow activity on the Project Site.
- Prior to daily operations during the active turtle nest establishment season (mid-May to mid-July), visual sweeps of active work areas and access roads will be conducted to search for evidence of nest establishment. If a turtle nest is found, work will pause in the immediate vicinity until a qualified biologist is consulted to establish site-specific management measures. Furthermore, if a turtle is

observed on site, a qualified biologist will be consulted to provide specific management recommendations.

- To minimize noise- and vibration-related sensory disturbance to wildlife, pit activities will be limited to daylight hours, and all heavy equipment will be kept well-maintained with functional mufflers.
- Wildlife awareness training will be provided to workers.
- A Waste Management Plan will be implemented to ensure waste will be properly disposed of and secured on the Project Site.
- Dust suppression techniques, including the application of water, lignin-based solutions, and/or chloride mixtures, will be used on haul roads, stockpiles, and processing areas.
- Speed limits for vehicles on-site will be implemented to reduce dust emissions and limit the potential for wildlife collisions.
- A state of good housekeeping will be maintained on the Project Site to avoid attracting nuisance wildlife.
- Stockpiles and disturbed areas will be minimized to the extent possible and progressively reclaimed to reduce the potential for dust generation.
- Stockpiles and areas of exposed soil, as well as other Project infrastructure, will be routinely inspected to rule out the possibility of nesting wildlife. Contingencies for nest management will be included in the EPP.
- Enclosed or covered trucks will be used for material transport to minimize dust generation.
- Dust-generating activities will be timed to avoid periods of excessive wind, and activities will be paused when wind speeds are high.
- Storage areas and material stockpiles will be designed with prevailing wind directions in mind to reduce the potential for dust dispersion.
- Loose site materials and products will be tied down, covered, and/or stored prior to inclement weather or wind events to prevent them from becoming airborne.
- An emergency response spill kit will be kept on site for spill cleanup.
- A 30 m buffer from the bank or ordinary high water mark of any watercourse will be implemented. A vegetated buffer will be maintained around wetlands during Blocks 1-4, as described in Section 8.1.2.
- After final extraction, the pit walls will be rehabilitated to a 3:1 side slope. The pit wall slopes and pit floor will be covered with 100 mm and 500 mm of topsoil, respectively, and seeded with a native grass mix. Over time, the area will return to forest through natural regeneration.
- Project activities will be limited to daytime hours to reduce potential impacts on bat foraging behaviour. In the event that emergency maintenance is required outside daylight hours, lighting will be directed downward and away from wetland and riparian habitat, and the occurrence will be documented and reported in the annual monitoring report.

MONITORING

A Wildlife Management Plan (WMP) will be developed in consultation with NSECC and NSNRR prior to the commencement of operations. The WMP will guide monitoring and adaptive management for all priority species identified in this assessment and will include, at minimum: seasonal monitoring protocols for Bank Swallow and Common Nighthawk nesting activity in exposed pit faces, stockpiles, and bare ground areas, with defined trigger conditions and operational response actions if active nesting is confirmed; turtle monitoring and relocation protocols for the active turtle season consistent with the daily sweep commitment in the Mitigations section above; pre-disturbance nest survey requirements for any vegetation clearing during the nesting bird season (April 1 to August 31); and a schedule for annual review and update in consultation with NSECC and NSNRR.

CONCLUSION

After mitigation measures, the residual effects on fauna are anticipated to be:

- **Magnitude** - Moderate, as habitat alteration will result in the localized loss of usable habitat for some species and potential sensory disturbance, but overall regional populations will remain intact following the implementation of mitigation measures.
- **Geographic Extent** - Within the LAA, as any effects are confined to the Project Site.
- **Duration** - Long-term, as the alteration of habitat will persist beyond the operational phase until the forest fully regenerates post-reclamation.
- **Frequency** - Intermittent, as disturbances to fauna may occur periodically during Project activities, but may differ seasonally depending on species needs.
- **Reversibility** - Partially reversible, as while the site will be progressively reclaimed and naturally regenerate into forest over time, the re-established forest habitat may differ from baseline conditions in some areas where site topography is permanently altered, which may alter habitat suitability for some species.
- **Significance** - Not significant, as the residual effects are Moderate in magnitude but confined to the LAA, and regional populations of all priority species extend well beyond the Project Site. The retained watercourse and wetland buffers preserve the highest-value habitat features on the Project Site. The long-term duration of habitat alteration reflects forest regeneration timelines rather than permanent loss, and progressive reclamation will restore habitat function over time. Effective mitigation measures are in place for all priority species through the WMP

8.1.5 EFFECTS ON TERRESTRIAL HABITAT

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for terrestrial habitat includes the Project Site and immediately adjacent areas.
- **Regional Assessment Area:** The RAA for terrestrial habitat includes the Project Site and a 5 km radius encompassing the surrounding portions of the South Mountain and Valley Slope Ecodistricts.

PROJECT INTERACTIONS

The following Project activities may interact with the terrestrial habitat:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on terrestrial habitat. The VEC-specific definition for magnitude is:

- **Negligible** - No measurable change to habitat quality, extent, or ecological function.
- **Low** - Minor loss or alteration of terrestrial habitat, with no change to key habitat functions.
- **Moderate** - Minor to moderate loss of terrestrial habitat or loss of key habitat functions.
- **High** - Significant loss or degradation of terrestrial habitat and its ecological functions.

DESCRIPTION OF EFFECTS

- **Habitat Loss and Fragmentation:** Vegetation clearing within Blocks 1-4 will result in the direct loss of approximately 4.0 ha of terrestrial habitat, with additional habitat cleared progressively as future blocks are developed over the Project's operational life. As identified in the baseline surveys, this habitat has experienced past anthropogenic disturbance from forestry harvesting approximately 20 years ago, and currently largely consists of early successional, regenerating forest. Some minor fragmentation may also occur where previously continuous habitat patches are further subdivided. However, baseline field programs confirmed that no rare or sensitive terrestrial habitat types or priority

flora species are present within the footprint. One SOCI, the American Beech, is present throughout the site. The surrounding landscape remains largely forested and vegetated, and there are no designated conservation lands, significant old-growth forest stands, or other priority ecological features within the LAA aside from the identified wetland areas. Wetlands and their vegetated buffers will remain undisturbed within Blocks 1-4, continuing to support ecological functions during this phase; direct alteration of one or more wetlands or their buffers is considered reasonably foreseeable over the full operational life of the Project as future blocks are developed, and any such alteration would be managed through the appropriate regulatory approvals described in Section 8.1.2.

- **Edge Effects:** Vegetation removal creates new artificial forest edges. These changes may temporarily alter local microclimates (such as changes in light availability, moisture conditions, and wind exposure) at the forest-pit boundary, potentially altering plant community composition (Franklin et al., 2021). However, due to the localized nature of the Blocks 1-4 footprint and the continued presence of vegetated buffers and adjacent forest, indirect effects on terrestrial habitat structure and function are expected to be minor and localized during this phase; this will be reassessed as future blocks are developed.

- **Dust Generation:** Dust will be generated across multiple Project phases, including site preparation, extraction, processing, stockpiling, and transportation. Dust deposition on nearby vegetation can physically block stomata, impeding plant photosynthesis and transpiration, which could result in reduced growth, increased disease risk, and potential mortality (Javanmard et al., 2019). Broad-leaved deciduous plants, such as the American Beech present on site, are particularly vulnerable to heavy dust accumulation (Farmer, 1993). Any potential impacts from dust deposition on adjacent terrestrial habitat will be minimized through the implementation of standard dust suppression mitigation measures.

- **Invasive Species:** Vegetation removal and the creation of exposed soils establish highly favourable environmental conditions for opportunistic or invasive plant species to colonize, as open canopies reduce competition from native flora (Dix et al., 2010; Subedi et al., 2024). Furthermore, Project equipment and transportation vehicles act as primary vectors for spreading invasive seeds and plant fragments into newly disturbed areas (NPS, n.d.). Ongoing site management and reclamation measures will reduce the likelihood of lasting indirect effects.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on terrestrial habitat during the Project:

- Vegetation clearing will be limited to the minimum area required, and existing disturbed areas (such as areas previously cleared during historical forestry operations) will be prioritized for active extraction to reduce overall habitat fragmentation.
- SAR and SOCI flora species will be avoided during vegetation clearing activities wherever feasible, utilizing buffers where practical. Due to the prevalence of American Beech on site, total avoidance is not always feasible.
- Buffers of 30 m from the bank or ordinary high water mark of any watercourse will be implemented to protect habitat functions and connectivity. A vegetated buffer will be maintained around wetlands during Blocks 1-4, as described in Section 8.1.2.
- Dust suppression techniques, including the application of water, lignin-based solutions, and/or chloride mixtures, will be used on haul roads, stockpiles, and disturbed areas.
- An ESC Plan will be implemented to prevent sedimentation in surrounding habitat areas.
- Vehicles and machinery will remain on designated access roads and trails to reduce habitat disturbance and soil compaction.
- Equipment will be regularly cleaned to prevent the spread of invasive species.
- After extraction, pit slopes will be graded to a 3:1 ratio and seeded with a native grass mix to promote natural regeneration. Only native species will be used in restoration activities.

MONITORING

No monitoring is recommended for this VEC.

CONCLUSION

After mitigation measures, the residual effects on terrestrial habitat are anticipated to be:

- **Magnitude** - Moderate. While the initial phase of development (Blocks 1-4, 4.0 ha) represents a low-impact footprint, the Project's full operational lifespan may result in a considerably larger cumulative area of terrestrial habitat alteration as future blocks are developed across the Project Site. Although progressive reclamation ensures that no more than the active block(s) are disturbed at any given time, the recovery of key habitat functions (e.g., canopy structure, connectivity, cover) following reclamation occurs over a period of decades, meaning a meaningful portion of the Project Site's terrestrial habitat may be in a regenerating, rather than fully functional, state at any point throughout the Project's operational life.
- **Geographic Extent** - Within the LAA, as any effects are confined to the Project Site, and habitat change within the RAA will be insignificant.
- **Duration** - Long-term, as habitat alteration will persist beyond the life of the Project.

- **Frequency** - Intermittent, as habitat disturbance will occur periodically during active phases of site development and operation.
- **Reversibility** - Partially reversible, as some disturbed habitat will be reclaimed post-closure and naturally regenerate, but the re-established forest habitat may differ from baseline conditions in some areas where site topography is permanently altered.
- **Significance** - Not significant, as the residual effects are moderate in magnitude but localized to the LAA at any given time due to progressive reclamation, not permanent, and effective mitigations such as buffers, minimized clearing, and site rehabilitation are in place to reduce long-term effects.

8.1.6 EFFECTS ON FISH AND AQUATIC HABITAT

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for fish and aquatic habitat includes the Project Site, specifically Project watercourses such as Eel Weir Brook and their hydrologically connected wetlands.
- **Regional Assessment Area:** The RAA for fish and aquatic habitat includes the broader Annapolis River Watershed.

PROJECT INTERACTIONS

The following Project activities may interact with fish and aquatic habitat:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on fish and aquatic habitat. The VEC-specific definition for magnitude is:

- **Negligible** - No measurable change in fish health or behaviour. No loss of fish or aquatic habitat. No change in stream hydrology.
- **Low** - A minor, temporary alteration to aquatic habitat on or directly adjacent to the Project Site, resulting in no measurable impacts to fish health and a low likelihood of changes to local hydrology or fish behaviour.

- **Moderate** - Measurable changes to portions of aquatic and fish habitat are expected, including moderate habitat loss and localized behavioural effects on individual fish, not extending to the population level. Anticipated hydrological changes can be managed with standard mitigation measures. Temporary impacts to fish and fish habitat are expected to recover to pre-Project conditions.
- **High** - Significant loss of fish and aquatic habitat is anticipated, with major impacts to regional populations that may affect long-term resource sustainability. Hydrological changes will be difficult to manage with standard practices. Population-level behavioural and life cycle impacts are expected.

PRIORITY SPECIES: METHODOLOGY

To determine which aquatic species warranted further consideration in this effects assessment, a conservative multi-step screening approach was applied:

- **Initial species pool:** The assessment considered:
    - All SAR and SOCI aquatic species observed during field surveys conducted on the Project Site; and
    - SAR aquatic species (or their habitat) reported by ACCDC and/or Fisheries and Oceans Canada (DFO) to occur on or within 5 km of the Project Site.
- **Evaluation of potential occurrence:** Species identified from these sources were reviewed for either direct observation on the Project Site or the presence of suitable supporting habitat.
- **Priority species determination:** Species were identified as priority species if they are legally listed SAR and were either observed on the Project Site or considered likely to occur based on the presence of suitable habitat. This approach aligns with the definition provided in Chapter 5.

Aquatic SOCI that did not meet the criteria for priority species are still described below to acknowledge their presence and inform general mitigation planning.

SPECIES DESCRIPTIONS

No aquatic SOCI or SAR were observed during field surveys, and one SAR, Brook Floater, was identified through desktop DFO data.

This species is described in more detail below, including habitat requirements and observed or potential site interactions.

Brook Floater

The Brook Floater is listed as 'Special Concern' under COSEWIC and SARA, and 'Threatened' under the ESA. It is a freshwater mussel native to eastern North America, with the Canadian population restricted to Nova Scotia and New Brunswick. In Nova Scotia, Brook Floater is known from a small number of disjunct watersheds, including the Annapolis, LaHave, St. Marys, and Salmon River systems. It typically occurs in low numbers, often fewer than five individuals observed at any one site, with the exception of the East St. Marys River, which supports the largest known population. Brook Floater prefers clean, well-oxygenated rivers and streams with moderate flow and sandy or gravel substrates. Key threats in Nova Scotia include water pollution, habitat degradation from land use (e.g., forestry, agriculture, development), and increased sedimentation from the loss of riparian vegetation (COSEWIC, 2009; NSNRR, 2022a).

The DFO Aquatic Species at Risk Map identified the Annapolis River, to which Eel Weir Brook connects, as containing, or potentially containing, Brook Floater. However, Eel Weir Brook was not identified as containing this species, nor was it identified during field surveys, and, as such, the Brook Floater was not considered a priority species for this assessment.

PRIORITY SPECIES: RESULTS

Based on the screening criteria and the definition of priority species used in this EA, no priority aquatic species were identified. While DFO recorded one SAR in the Annapolis River (Brook Floater), no SAR were identified within Project-related watercourses.

General mitigation measures to protect fish and other aquatic species and to minimize disturbance to habitat will be applied during all phases of the Project.

DESCRIPTION OF EFFECTS

- **Hydrological Alterations and Habitat Loss:** Baseline surveys identified four watercourse segments within the Project Site (WC1 to WC4), as well as several wetlands with direct hydrological connections to these watercourses (WL1, WL3, and WL7). The Project's access road requires crossings at two locations within the Project Site. A new bridge crossing will be constructed over Eel Weir Brook (WC1), replacing the existing bridge, designed as a clearspan structure installed perpendicular to the watercourse with no contact between the structure and the bed or bank; as designed, no alteration of WC1 is anticipated as a result of this crossing. Should removal of the existing bridge or installation of the new structure affect the bed or bank, a Watercourse Alteration Approval will be obtained from NSECC, and review under the *Fisheries Act* will be requested where applicable. An existing culvert crosses WC2 and may require upgrading to support Project traffic; the scope and timing of any such

upgrade has not yet been determined. Should an upgrade to the WC2 culvert be required, it will be assessed by a qualified professional and carried out in accordance with all applicable regulatory requirements, including a Watercourse Alteration Approval from NSECC where the bed or bank is affected, and review under the federal *Fisheries Act* where applicable. Beyond these two crossing locations, the Project's extraction footprint does not require any new watercourse crossings or alterations, and the 30 m vegetated buffer described in Section 8.1.1 will be maintained along all four Project watercourses (WC1-WC4). Plants facilitate the evaporation of precipitation through transpiration. Additionally, soil and vegetation store and slow water movement across land. Removing vegetation and soil during the clearing and grubbing activities involved in site preparation may result in increased surface water runoff from the Project Site. This increased runoff may lead to higher rates of sediment erosion and the transport of sediment, minerals, and ions into local watercourses, particularly during heavy rainfall or snowmelt events. This runoff could negatively impact the water quality of these watercourses, leading to negative effects on fish health and behaviour; for instance, fine sediment deposition degrades spawning habitat by smothering fish eggs and preventing them from adhering to rocks, leaving them vulnerable to scour and mortality (Crane & Farrell, 2013). Similar effects could also be caused by altered drainage patterns due to site grading and access road development. While severe alterations to drainage areas or infiltration rates can theoretically reduce stream baseflow below what is needed for ecological maintenance and fish passage, the Project's commitment to maintain excavation at least 1 m above the seasonal high water table, with no active dewatering or pumping, is expected to preserve groundwater recharge inputs to on-site watercourses.

- **Dust:** Loose particles will be disturbed and become airborne, especially in dry conditions, during different Project activities. Site preparation and excavation will generate dust during topsoil and vegetation removal; processing and stockpiling will produce dust when screening and stacking sand; vehicle and machinery movement on site will produce dust when disturbing exposed surfaces such as those found on access roads and open pit surfaces; and wind will blow dust from the exposed surfaces on site into the surrounding area. If this dust is not suppressed, it could land in Project-associated watercourses. Dust deposition in aquatic environments can adversely affect fish and aquatic habitats by increasing turbidity, thereby reducing light penetration and limiting photosynthetic activity in primary producers such as periphyton and macrophytes. Fine particulate matter can physically irritate or occlude fish gill surfaces, impairing respiratory efficiency and elevating physiological stress. Accumulation of dust on the benthic substrate may result in the smothering of fish eggs and invertebrate communities, leading to habitat degradation (Crane & Farrell, 2013). These physical and biological disturbances can also alter fish behaviour, potentially causing habitat avoidance and interference with critical life history processes such as spawning and migration.

- **Water Contamination:** There will be fuel and other substances on site that, if introduced into watercourses (e.g., via spill and subsequent runoff), would negatively affect fish health, behaviour and surface water quality.

MITIGATIONS

Beyond the two access road crossings described above, no new watercourse crossings or alterations are proposed as part of the Project, and the 30 m vegetated buffer will be maintained along WC1-WC4. The new WC1 bridge will be designed and constructed as a clearspan structure with no contact between the structure and the bed or bank. Should removal of the existing bridge or installation of the new structure involve the bed or bank, the work will be designed in accordance with NSECC and, where applicable, DFO requirements, and a Watercourse Alteration Approval will be obtained. Should an upgrade to the existing WC2 culvert be required, it will be designed and installed in accordance with NSECC and, where applicable, DFO requirements, using construction methods (e.g., isolation and erosion controls during in-water work) that minimize disturbance to the streambed, bank, and fish passage, and a Watercourse Alteration Approval will be obtained where that work involves the bed or bank. ESCs will be designed in accordance with NSECC's *Guide to Developing Erosion and Sediment Control Plans* and installed along approaches to watercourse crossings. The following mitigation measures will be implemented to minimize potential impacts on fish and aquatic habitat during the Project.

- Project activities, including fuelling, vegetation clearing, stockpiling, etc., will not occur within 30 m of any watercourse.
- To maintain groundwater recharge and prevent baseflow reduction to local watercourses, excavation will not occur within 1 m of the maximum annual water table elevation.
- NSECC will be contacted immediately in the unlikely event that sulphide-bearing materials are encountered during excavation.
- Stormwater management practices will be implemented to direct runoff toward infiltration areas and reduce sediment transport into a wetland, water resource, or beyond the property boundary.
- Roads, pits, and other disturbed areas will be graded in ways that limit slope and direct runoff and drainage away from watercourses and wetlands.
- An ESC Plan will be developed and implemented.
- Dust suppression techniques, including the application of water, lignin-based solutions, and/or chloride mixtures, will be used on haul roads, stockpiles, and processing areas.
- Speed limits for vehicles on-site will be implemented to reduce dust emissions.
- Stockpiles and disturbed areas will be minimized to the extent possible and progressively reclaimed to reduce the potential for dust generation.
- Enclosed or covered trucks will be used for material transport to minimize dust generation.

- Dust-generating activities will be timed to avoid periods of excessive wind, and activities will be paused when wind speeds are high.
- Storage areas and material stockpiles will be designed with prevailing wind directions in mind to reduce the potential for dust dispersion.
- Loose site materials and products will be tied down, covered, and/or stored prior to inclement weather or wind events to prevent them from becoming airborne.
- An emergency response spill kit will be kept on site for spill cleanup.

MONITORING

Monitoring will be conducted to ensure the effectiveness of mitigation measures and to detect any unforeseen impacts to fish and aquatic habitat:

- A Surface Water Monitoring Plan will be developed and implemented to monitor water quality in nearby watercourses for TSS to ensure fish health and aquatic habitat are protected.
- ESC measures will be inspected regularly, including quarterly and after severe precipitation events of 25 mm or more.
- Compliance checks will be conducted to ensure that all avoidance buffers and mitigation measures remain effective.

CONCLUSION

After mitigation measures, residual effects on fish and aquatic habitat are anticipated to be:

- **Magnitude** - Negligible, as minor, temporary indirect alterations to aquatic habitat may occur (e.g., from intermittent dust or runoff), but measurable effects to fish health and behaviour, watercourse hydrology, and surface water quality are not anticipated with the listed mitigation measures.
- **Geographic Extent** - Within the LAA, as any effects are confined to the Project Site and the immediate surrounding areas.
- **Duration** - Medium-term, as effects will last throughout the operational and reclamation phases but are expected to diminish once operations conclude and the site is fully reclaimed.
- **Frequency** - Intermittent, as runoff from precipitation and dust may occur periodically during the site preparation, extraction, and reclamation phases.
- **Reversibility** - Reversible, as the effects are not expected to be measurable or lasting, and any localized disturbance is expected to return to baseline conditions following mitigation and reclamation.
- **Significance** - Not significant, as the residual effects are negligible in magnitude, localized, and temporary, with effective mitigation measures in place.

8.1.7 EFFECTS ON CLIMATE CHANGE

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for climate change includes the Project Site and immediate surroundings.
- **Regional Assessment Area:** The RAA for climate change is the province of Nova Scotia.

PROJECT INTERACTIONS

The following Project activities may interact with climate change:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on climate change. The VEC-specific definition for magnitude is:

- **Low** - The Project generates 10,000 tonnes or less of CO_2e annually. Emissions below this threshold fall outside the mandatory reporting requirements of ECCC's GHGRP and are therefore recognized as non-substantive.
- **Moderate** - The Project generates a measurable but manageable contribution, representing between 10% and 25% of provincial GHG emission totals, or offsetting provincial reduction targets by the same margin.
- **High** - The Project generates a substantial regional contribution, exceeding 25% of provincial GHG emission totals, or offsetting provincial reduction targets by more than 25%.

DESCRIPTION OF EFFECTS

The Project will interact with climate change primarily through the release of GHGs into the atmosphere during various phases of development and operation.

- **GHG Emissions:** Project activities, including site preparation, extraction operations, processing, and material transportation, rely on the combustion of fossil fuels (primarily diesel) by heavy equipment and vehicles. This combustion releases GHGs, including CO_2, CH_4, N_2O, and VOCs into the atmosphere.

  Based on the operational assumptions described in Section 7.1.7, on-site equipment operations will generate approximately 752.5 tonnes of CO_2e annually. This figure encompasses all primary and auxiliary equipment identified in Section 4.3. The largest individual contributors are the large excavator and the dozer, each accounting for approximately 108.5 tonnes CO_2e annually, reflecting their large engine displacement and sustained operating schedules.

  Transportation of aggregate materials to markets throughout western Nova Scotia, including the South Shore via Highway 103 and the Annapolis Valley and other western counties via Highway 101, will contribute an estimated additional 335.0 tonnes CO_2e annually, based on an assumed annual production volume of approximately 50,000 tonnes and an average round-trip haul distance of 100 km. Combined, total estimated Project emissions are 1,087.5 tonnes CO_2e per year.

  At 1,087.5 tonnes CO_2e, total annual Project emissions represent less than 0.008% of Nova Scotia's total annual GHG emissions of 13.69 Mt CO_2e in 2024 (ECCC, 2026b), and remain well below the 10,000-tonne GHGRP reporting threshold (ECCC, 2026a). This is a negligible contribution to the provincial GHG inventory and to the provincial emission reduction trajectory under the *Environmental Goals and Climate Change Reduction Act*, S.N.S. 2021, c. 20.

- **Loss of Carbon Sink:** Site preparation activities, specifically the clearing of vegetation and the removal of topsoil and organic material within the extraction footprint, will result in a localized, one-time reduction of the site's carbon storage capacity. As estimated in Section 7.1.7, the Project Site stores an estimated 8,024 tonnes of CO_2 in forested biomass across approximately 75.6 ha, at an average density of approximately 106.1 tonnes CO_2/ha. The confirmed Blocks 1-4 footprint (4.0 ha) corresponds to an estimated one-time carbon stock loss of approximately 424 tonnes CO_2, applying this average density. The carbon stock loss associated with the confirmed extraction footprint will be proportional to this density; illustrative estimates for a range of footprint sizes are provided in Table 7.25.

  This one-time carbon loss is distinct from operational GHG emissions in that it is non-recurring and is partially offset over time by progressive reclamation and natural forest regeneration in completed pit areas. The extraction footprint will constitute only a portion of the total Project Site area; vegetated buffers and unextracted areas will remain throughout operations, and wetlands will remain undisturbed within Blocks 1-4. Progressive reclamation will be implemented concurrently with extraction to restore

the site's carbon sequestration capacity, though full recovery to pre-disturbance biomass levels will require decades following final closure.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on climate change during the Project:

- Equipment and vehicles that are in a good state of repair will be used when possible to minimize fuel consumption and emissions.
- Sustainable construction and operational practices will be followed.
- Engine idling will be minimized to the greatest extent possible for equipment and vehicles operating on site when not in use.
- Speed limits for vehicles on-site will be implemented to reduce excess emissions.
- Heavy equipment will be maintained in accordance with manufacturer specifications, and emissions control technologies (e.g., diesel particulate filters and catalytic converters) will be used to reduce exhaust emissions.
- Progressive reclamation will be implemented throughout operations to restore the carbon sequestration capacity of disturbed areas and limit the extent of exposed, unvegetated soil at any given time.

MONITORING

No monitoring is recommended for this VEC.

CONCLUSION

After mitigation measures, residual effects on climate change are anticipated to be:

- **Magnitude** - Low, as annual GHG emissions from the Project will fall well below the 10,000-tonne federal reporting threshold, meaning the emissions are not considered substantive.
- **Geographic Extent** - Global, as GHG emissions accumulate in the atmosphere and contribute to climate change on a global scale.
- **Duration** - Medium-term, as effects are expected to occur throughout the operational phase but are anticipated to diminish once operations conclude.
- **Frequency** - Intermittent, as the effects may occur sporadically throughout the various Project phases.
- **Reversibility** - Irreversible with respect to GHG emissions, which contribute to cumulative atmospheric concentrations; partially reversible with respect to carbon stock loss, as progressive reclamation and natural forest regeneration will restore sequestration capacity over time.

- **Significance** - Not significant. Although GHG emissions are irreversible, the annual quantity generated by the Project is expected to be low in magnitude and will not result in a measurable increase in Nova Scotia's total GHG emissions.

8.1.8 EFFECTS ON AIR QUALITY AND ATMOSPHERIC CONDITIONS

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for air quality and atmospheric conditions includes the Project Site and a 500 m buffer surrounding the Project boundary, encompassing the nearest residential receptors identified in Section 7.4.1. This distance reflects the typically localized nature of fugitive dust deposition from aggregate operations, particularly given the extensively forested buffer surrounding the Project Site.
- **Regional Assessment Area:** The RAA for air quality and atmospheric conditions is not applicable.

PROJECT INTERACTIONS

The following Project activities may interact with air quality and atmospheric conditions:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on air quality and atmospheric conditions. The VEC-specific definition for magnitude is:

- **Negligible** - No measurable changes in air quality or atmospheric conditions (i.e., no observable impacts on air quality or local atmospheric conditions).
- **Low** - Minor changes to air quality or atmospheric conditions, with no significant or lasting impact (e.g., small increase in dust levels or pollutants that remain within acceptable limits).
- **Moderate** - Noticeable but manageable changes to air quality or atmospheric conditions, potentially requiring mitigation to reduce impacts (e.g., measurable changes in local air quality).
- **High** - Significant and lasting changes to air quality or atmospheric conditions that are difficult to mitigate (e.g., significant air quality degradation or major alteration to local atmospheric conditions).

DESCRIPTION OF EFFECTS

- **Air Quality:** Project activities have the potential to temporarily degrade local air quality primarily through the generation of fugitive dust (particulate matter, including $PM_{2.5}$ and PM_{10}) and the release of exhaust emissions. Fugitive dust will be generated during site preparation (vegetation clearing and grubbing), sand and gravel excavation, crushing, screening, stockpiling, and the movement of heavy trucks over unpaved surfaces. Diesel-powered heavy equipment and haul trucks will release combustion emissions, including NO_x, SO_2, and CO.

  These emissions will be highly localized, short-lived, and heavily dependent on weather conditions (e.g., dry, windy days). Given the baseline air quality conditions, the emissions generated by the Project are not expected to cause exceedances at nearby sensitive receptors, and impacts will remain confined to the immediate area.

- **Atmospheric Conditions:** The removal of vegetation, though minor, and the disturbance of land surfaces may result in highly localized changes to atmospheric conditions, including minor variations in wind speed, wind direction, and microclimate temperatures (Sleeter et al., 2018). These effects are expected to be temporary and localized, but could affect microclimates in the immediate vicinity of the Project Site. However, the progressive reclamation approach will limit the spatial extent of exposed surface at any given time, constraining the degree of microclimate modification associated with vegetation removal and surface disturbance.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on climate change, air quality, and atmospheric conditions during the Project:

- Equipment and vehicles that are in a good state of repair will be used to minimize fuel consumption and emissions.
- Engine idling will be minimized to the greatest extent possible for equipment and vehicles operating on site when not in use.
- Dust suppression techniques, including the application of water, lignin-based solutions, and/or chloride mixtures, will be used on haul roads, stockpiles, and processing areas.
- Speed limits for vehicles on-site will be implemented to reduce dust emissions.
- Stockpiles and disturbed areas will be minimized to the extent possible and progressively reclaimed to reduce the potential for dust generation.
- Enclosed or covered trucks will be used for material transport to minimize dust generation.

- Dust-generating activities will be timed to avoid periods of excessive wind, and activities will be paused when wind speeds are high.
- Heavy equipment will be maintained in accordance with manufacturer specifications, and emissions control technologies (e.g., diesel particulate filters and catalytic converters) will be used to reduce exhaust emissions.
- Storage areas and material stockpiles will be designed with prevailing wind directions in mind to reduce the potential for dust dispersion.
- Loose site materials and products will be tied down, covered, and/or stored prior to inclement weather or wind events to prevent them from becoming airborne.

MONITORING

Formal air quality monitoring is not proposed for this Project. Dust generation will be localized, intermittent, and actively managed through the dust suppression measures described above. Site inspections will be conducted regularly to assess whether suppression measures are working effectively, and the frequency of dust suppression activities will be adjusted based on observed site conditions and weather.

CONCLUSION

After mitigation measures, residual effects on air quality and atmospheric conditions are anticipated to be:

- **Magnitude** - Low, as the impacts on air quality and atmospheric conditions are localized with minor changes that can be managed through mitigation (e.g., localized changes in dust levels and air quality).
- **Geographic Extent** - Within the LAA, as any effects are confined to the Project Site and the immediate surrounding areas.
- **Duration** - Medium-term, as effects are expected to occur throughout the operational phase but are anticipated to diminish once operations conclude.
- **Frequency** - Intermittent, as the effects may occur sporadically throughout the various Project phases.
- **Reversibility** - Reversible, as localized air quality and atmospheric conditions are expected to return to baseline conditions after operations cease.
- **Significance** - Not significant, as the residual effects on air quality and atmospheric conditions are low in magnitude, localized, and expected to return to baseline conditions in the medium-term.

8.1.9 EFFECTS ON SOIL AND GEOLOGY

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for soil and geology includes the Project Site and immediate surroundings, where direct soil disturbance and geological interactions may occur.

- **Regional Assessment Area:** The RAA for soil and geology is not applicable as the Project's impacts on soil and geology are anticipated to be localized and do not extend beyond the immediate Project Site.

PROJECT INTERACTIONS

The following Project activities may interact with soil and geology:

- Site Preparation
- Extraction Operations
- Stockpiling
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on soil and geology. The VEC-specific definition for magnitude is:

- **Negligible** - No measurable changes to soil stability, composition, or geological integrity.
- **Low** - Minor soil disturbance or erosion risk, with no significant changes to site geology.
- **Moderate** - Noticeable alteration to soil structure or composition, but effects can be managed with mitigation (e.g., localized erosion, changes in soil texture).
- **High** - Significant geological disruption, such as subsidence, instability, or major erosion.

DESCRIPTION OF EFFECTS

- **Soil Disturbance:** Excavation activities will disturb existing soil layers, specifically topsoil and the targeted sand and gravel deposits. This process will create changes to the local topography and soil profile within the extraction footprint.

- **Erosion and Sedimentation:** Due to the nature of the operations, localized erosion and sedimentation could occur, particularly in areas disturbed by heavy machinery and material stockpiling. If uncontrolled, the movement of surface water, especially during periods of heavy rain or snowmelt, could mobilize sediment runoff that may affect adjacent areas.

- **Geological Stability and Hazards:** The Project Site is underlain by the Goldenville Formation, the White Rock Formation, and Devonian granitic intrusions. Provincial datasets indicate a generally low likelihood of geological hazards, including ARD and karst topography. Furthermore, Project development is strictly limited to the extraction of surficial sand and gravel deposits. As excavation activities are strictly limited to the surficial sand and gravel deposit and will not contact the underlying

consolidated bedrock, the risk of ARD generation through oxidation of sulphide-bearing bedrock is considered negligible. Nonetheless, any such materials encountered during excavation will be immediately reported to NSECC and managed in accordance with applicable guidance.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on soil and geology during the Project:

- An ESC Plan will be developed and implemented.
- Progressive reclamation and the use of sediment barriers will be employed to limit soil loss.
- All stockpiled materials, such as topsoil and grubbing, will be stored in designated areas with proper ESC measures to prevent the mobilization of sediment-laden surface water.
- Topsoil will be salvaged during site preparation and stockpiled separately from other excavated materials for reuse during progressive reclamation and final site restoration.
- Ditches and other ESC infrastructure will be regularly inspected and maintained to minimize sediment build-up, particularly during and after periods of heavy rainfall.
- Existing drainage patterns will be maintained, and unnecessary land disturbance will be avoided.
- Immediate assessment and reporting to NSECC if unexpected geological risks (e.g., sulphide-bearing materials) are encountered.

MONITORING

Monitoring will be conducted to ensure the effectiveness of mitigation measures and to detect any unforeseen impacts to soil and geology:

- Routine inspections of soil stability and ESC measures will be conducted.
- Compliance checks will be conducted to ensure that mitigation measures remain effective.

CONCLUSION

After mitigation measures, residual effects on soil and geology are anticipated to be:

- **Magnitude** - Negligible to low, as effects are limited to minor soil disturbance, localized erosion, and manageable changes in soil texture.
- **Geographic Extent** - Within the LAA, as any effects are confined to the Project Site and the immediate surrounding areas.
- **Duration** - Medium-term, as effects will last throughout the operational and reclamation phases but are expected to diminish once operations conclude and the site is fully reclaimed.

- **Frequency** - Intermittent, as disturbances to soil and geology may occur periodically during the site preparation, extraction, and reclamation phases.
- **Reversibility** - Reversible, as the effects are expected to diminish over time with proper reclamation and mitigation measures.
- **Significance** - Not significant, as the residual effects are negligible to low in magnitude, localized, and temporary, with effective mitigation measures in place.

8.2 EFFECTS ON THE SOCIOECONOMIC ENVIRONMENT

8.2.1 EFFECTS ON LOCAL ECONOMY, LABOUR FORCE, AND EMPLOYMENT

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for the local economy, labour force, and employment includes the Municipality of the County of Annapolis.
- **Regional Assessment Area:** The RAA for the local economy, labour force, and employment includes the entire province of Nova Scotia.

PROJECT INTERACTIONS

All Project activities have the potential to interact with the local economy, labour force, and employment:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Aggregate Quantification
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on the local economy, labour force, and employment. The VEC-specific definition for magnitude is:

- **Positive** - The Project is expected to have a positive impact on the economy, labour force, and employment by creating jobs and supporting local businesses.
- **Negative** - The Project is expected to have a negative impact on the economy, labour force, and employment if it causes a loss of jobs or business activity.

DESCRIPTION OF EFFECTS

The impacts of the proposed Project on the local economy, labour force, and employment are expected to be positive. As a new sand and gravel extraction facility, the Project will create steady employment opportunities (e.g., equipment operators, truck drivers, general labourers) and generate auxiliary economic benefits through the procurement of goods and services from local businesses (e.g., fuel supply, equipment maintenance, and transportation). Furthermore, the Proponent will seek to create employment opportunities for Mi'kmaq communities, fostering inclusive economic participation. Therefore, the Project will positively contribute to the local and regional economy without causing any significant disruptions to regional employment trends.

MITIGATIONS

No mitigation measures are recommended for this VEC, as the expected impacts are positive.

MONITORING

No monitoring is recommended, as the potential effects are expected to be positive.

CONCLUSION

The impacts of the proposed Project on the local economy, labour force, and employment are expected to be positive. The Project will create local jobs and support regional businesses, with no significant negative residual effects anticipated:

- **Magnitude** - Positive, as the Project will generate local employment and support the local economy.
- **Geographic Extent** - Localized to the LAA, with potential economic benefits extending to the entire province (RAA).
- **Duration** - Medium-term, as positive effects are expected to last primarily during the operational life of the Project.
- **Frequency** - Ongoing, as positive effects will continue consistently throughout operations.
- **Reversibility** - Partially reversible, as direct economic benefits are tied to the Project's operation, but some positive effects (e.g., skills training, local business growth) may remain in the community.
- **Significance** - Not significant, as positive effects are anticipated.

8.2.2 EFFECTS ON LAND USE AND PROPERTY VALUES

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for land use and property values is defined as the Project Site and the surrounding area, including nearby residential properties.

- **Regional Assessment Area:** The RAA for land use and property values is not applicable.

PROJECT INTERACTIONS

All Project activities have the potential to interact with land use and property values:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Aggregate Quantification
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on land use and property values. The VEC-specific definition for magnitude is:

- **Negligible** - No measurable changes in property values and/or land use.
- **Low** - Minor changes in property values and/or minor restrictions to surrounding land use.
- **Moderate** - Noticeable changes in property values and/or moderate restrictions to surrounding land use.
- **High** - Significant changes in property values and/or significant restrictions to surrounding land use.

DESCRIPTION OF EFFECTS

The Project is situated on privately owned, previously disturbed land within the MX (Mixed Use) zone under the *Annapolis County Land Use Bylaw*. As detailed in Section 7.2.2, the Project's use of temporary, fully mobile equipment, with no permanent structures, buildings, or fixed foundations, means it does not meet the LUB's definition of an "extractive-related facility"; the Project is instead classified as an "Excavation Operation", a permitted use within the MX zone. No rezoning or Future Land Use Map amendment is anticipated to be required on this basis. The Proponent will continue to engage with the Municipality of the County of Annapolis to confirm this interpretation and ensure ongoing alignment with municipal planning strategies.

The Project Site is surrounded by a mix of residential properties, woodland, and agricultural lands, with Crown land located to the south, southwest, and east. To the north, the land transitions into sensitive GW4 (Groundwater Buffer) and GW5 (Groundwater General) zones. The implementation of a 30 m setback from watercourses and a vegetated buffer from wetlands during Blocks 1-4 will protect sensitive environments,

ensuring that pit operations do not encroach on these features or conflict with the groundwater protection zones located further north.

While the Project introduces a new sand and gravel extraction facility to the area, the implementation of strict mitigations to control noise, dust, and traffic will ensure the operation does not create significant nuisance conflicts with adjacent land uses (such as nearby residential properties). The active extraction areas are set back from the Project boundary by retained forest and are not expected to be visible from surrounding roads or residential areas. Consequently, no substantial disruptions to local land use patterns are anticipated, and it is expected that surrounding property values will remain stable and unaffected by the Project's operation.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on land use and property values during the Project:

- A 30 m setback from watercourses will be maintained. A vegetated buffer will be maintained around wetlands throughout Blocks 1-4, as described in Section 8.1.2.
- Clear signage will be put up indicating Project contact information to address any concerns or complaints from surrounding landowners.
- A Spill Response and Contingency Plan will be developed for quick action in the event of spills of fuel or hazardous material.

MONITORING

No monitoring is recommended for this VEC.

CONCLUSION

After mitigation measures, residual effects on land use and property values are anticipated to be:

- **Magnitude** - Negligible, as there are no measurable changes expected to property values and/or land use.
- **Geographic Extent** - Within the LAA, as any effects are confined to the Project Site and the immediate surrounding areas.
- **Duration** - Medium-term, as effects will last throughout the operational phase.
- **Frequency** - Ongoing, as effects will continue throughout the operational phase.
- **Reversibility** - Reversible, as the effects are expected to revert once the operation concludes and the site is reclaimed.
- **Significance** - Not significant, given the minor nature of the effects on land use and property values.

8.2.3 EFFECTS ON TRANSPORTATION AND INFRASTRUCTURE

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for transportation and infrastructure includes the Project Site, the private access road, and any transportation routes directly affected by increased traffic from material hauling. This includes Inglisville Road, Trout Lake Road, Crisp Road, Highway 201, Highway 10, and Highway 1, along with any associated transportation infrastructure within the immediate vicinity of the Project.
- **Regional Assessment Area:** The RAA for transportation and infrastructure includes the broader transportation network, including major provincial highways (Highway 101 and Highway 103), and any associated transportation infrastructure that may experience minor, indirect effects from regional material distribution.

PROJECT INTERACTIONS

The following Project activities may interact with transportation and infrastructure:

- Transportation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on transportation and infrastructure. The VEC-specific definition for magnitude is:

- **Negligible** - No measurable impact on transportation networks or infrastructure.
- **Low** - Minor, localized changes to transportation flow or infrastructure use, with no disruption to existing services.
- **Moderate** - Noticeable changes to transportation flow or infrastructure use, with some temporary or localized disruptions.
- **High** - Significant changes to transportation networks or infrastructure, potentially requiring major modifications or causing widespread disruptions.

DESCRIPTION OF EFFECTS

- **Traffic and Road Use:** As a new sand and gravel pit, the Project will result in an increase in heavy truck traffic on the local road network compared to current rural baseline conditions. However, the primary routes used to access the site, including Inglisville Road (41,500 kg designation) and connecting routes like Trout Lake Road and Crisp Road (49,500 kg designation), are designated by the Province to

accommodate this type of commercial traffic. With proper traffic management, the anticipated volume of haul trucks is not expected to significantly disrupt existing traffic flows or cause congestion on local or regional roadways. Approximately half of the Project's production is anticipated to be distributed to South Shore markets via Highway 10 and Highway 103, with the remainder distributed to Annapolis Valley and other regional markets via Highway 101.

- **Road Wear and Tear:** The addition of loaded haul trucks may contribute to incremental wear and tear on local unpaved and paved roads over the lifespan of the Project.

- **Spring Weight Restrictions:** The local connector roads used to access major highways (Inglisville Road, Trout Lake Road, and Crisp Road) are subject to spring weight restrictions, while the highways themselves (Highway 1, Highway 101, Highway 10, and Highway 103) are exempt. As a result, off-site hauling is anticipated to occur primarily between May and December, with site preparation, extraction, and stockpiling continuing during the restricted period as needed.

- **Infrastructure:** The Project will not require the construction of any new public roads or utility connections. The existing private access road connecting to Inglisville Road will be maintained and upgraded as necessary to safely support haul truck traffic.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on transportation and infrastructure during the Project:

- Access roads will be monitored and maintained to ensure they remain in good condition throughout the Project.
- Truck operators will be instructed to obey all rules of the road including speed limits, road signage, etc.
- Haul routes will be selected to avoid populated areas and school zones to the greatest extent possible.
- Hauling during high-traffic hours will be avoided if it could cause significant disruption (e.g., during peak commuting times).
- Vehicles will operate within speed limits.
- Spring weight restrictions will be adhered to where applicable.
- The need for appropriate signage, such as truck entrance signs, will be assessed to warn drivers and nearby residents about increased truck traffic.

MONITORING

A complaint response protocol, with a focus on transportation-related concerns, will be developed.

CONCLUSION

After mitigation measures, the residual effects on transportation and infrastructure are anticipated to be:

- **Magnitude** - Low, as effects are minor and localized, with no significant disruption to existing transportation flow or infrastructure services.
- **Geographic Extent** - Primarily within the LAA, covering the Project Site, access roads, and the immediate surrounding area. However, the RAA may experience minor indirect effects due to transportation activities.
- **Duration** - Medium-term, as effects will last throughout the operational phase of the Project but are expected to diminish after the site is fully reclaimed and transport activities cease.
- **Frequency** - Ongoing, as transportation activities will occur regularly throughout Project operations, with periodic variations depending on hauling schedules and market demand.
- **Reversibility** - Reversible, as the effects are expected to diminish once operations end.
- **Significance** - Not significant, as the residual effects are low in magnitude, localized, managed by provincial weight designations, and will have minimal impact after operations conclude.

8.2.4 EFFECTS ON RECREATION AND TOURISM

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for recreation and tourism includes the Project Site and immediate surrounding areas within the Municipality of the County of Annapolis.
- **Regional Assessment Area:** The RAA for recreation and tourism includes the broader Annapolis Valley region, providing context for the Project's interaction with regional tourism and recreational patterns.

PROJECT INTERACTIONS

All Project activities have the potential to interact with recreation and tourism:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Aggregate Quantification
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on recreation and tourism. The VEC-specific definition for magnitude is:

- **Negligible** - No discernible impact on recreation and tourism activities.
- **Low** - Minor, localized changes to tourism and recreation opportunities, with minimal effect on overall use.
- **Moderate** - Noticeable changes to tourism and/or some limitations on recreation activities, but not affecting overall access or use significantly.
- **High** - Significant disruptions or limitations to tourism and recreation activities, with widespread effects on availability or enjoyment.

DESCRIPTION OF EFFECTS

The Project is situated on privately owned land and does not directly overlap with any designated provincial parks, municipal recreation areas, or managed tourism sites. While recreational trails and scenic areas exist within the broader region, they are located at a sufficient distance from the Project Site to avoid any direct interactions. Potential indirect effects, such as minor, intermittent increases in local traffic or noise, are typical of the rural mixed-use setting and are not expected to impact visitor experiences or regional recreation patterns. Consequently, no measurable changes to regional tourism or established recreational infrastructure are anticipated.

MITIGATIONS

No mitigations are recommended for this VEC.

MONITORING

No monitoring is recommended for this VEC.

CONCLUSION

No significant negative residual effects are anticipated:

- **Magnitude** - Negligible, as no changes to recreation or tourism are expected.
- **Geographic Extent** - Within the LAA.
- **Duration** - Medium-term, as the Project will operate for several years, but no lasting effects on recreation or tourism are expected.
- **Frequency** - Ongoing, as potential effects could occur throughout the Project.

- **Reversibility** - Reversible, as no permanent changes to recreation or tourism will occur.
- **Significance** - Not significant, as no measurable effects on recreation or tourism are expected.

8.3 EFFECTS ON CULTURAL AND HERITAGE RESOURCES

8.3.1 EFFECTS ON ARCHAEOLOGICAL RESOURCES AND HISTORICAL SITES

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for archaeological resources and historical sites includes the Project Site and an appropriate buffer around areas where ground disturbance may occur.
- **Regional Assessment Area:** The RAA for archaeological resources and historical sites is not applicable.

PROJECT INTERACTIONS

The following Project activities may interact with archaeological resources and historical sites:

- Site Preparation
- Extraction Operations
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on archaeological resources and historical sites. The VEC-specific definition for magnitude is:

- **Low** - Low potential for encountering archaeological resources, with little to no disruption expected from Project activities.
- **Moderate** - Moderate to high potential for encountering archaeological resources, but any effects can be effectively mitigated through established procedures.
- **High** - Moderate to high potential for encountering archaeological resources, with a risk that some artifacts or sites may be disturbed despite mitigation efforts.

DESCRIPTION OF EFFECTS

The potential for impacts on archaeological resources and historical sites within the active extraction area was assessed as low during the ARIA study conducted by Boreas Heritage. However, the ARIA identified one area of high potential for Ancestral sites and archaeological resources in an area outside of the development footprint, which will be avoided during site development.

Additionally, the Project will likely require the replacement and upgrading of the existing access road bridge over Eel Weir Brook. Level, well-drained areas near watercourses have higher potential for encountering archaeological resources. It is anticipated that this work will be limited to the previously disturbed footprint of the existing roadway, which will reduce the potential for uncovering archaeological resources.

Despite the previous disturbance within the Project Site, there remains a small chance that previously undocumented artifacts or historical remnants could be encountered. Should archaeological resources be uncovered, standard protocols under the *Special Places Protection Act*, R.S.N.S. 1989, c. 438 will be followed, including reporting findings to NSCCTH.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on archaeological resources and historical sites during the Project:

- The area identified as having high archaeological potential (HPA-01) will be avoided during general pit development and extraction activities.
- Bridge replacement activities over Eel Weir Brook will be confined to the existing, previously disturbed footprint to the extent possible. Should replacement or upgrading activities require new ground disturbance in the adjacent high-potential areas, a subsurface assessment involving a systematic program of shovel testing will be conducted prior to that disturbance, as recommended by Boreas Heritage.
- If any archaeological resources or historical sites are encountered during operations, work will stop immediately, and the NSCCTH Special Places Coordinator will be contacted for further guidance.

MONITORING

No monitoring is recommended for this VEC.

CONCLUSION

After mitigation measures, residual effects on archaeological resources and historical sites are anticipated to be:

- **Magnitude** - Low, as the potential for encountering archaeological resources in the main extraction areas is minimal, and areas of high potential will be avoided.
- **Geographic Extent** - Within the LAA.
- **Duration** - Medium-term, as effects could occur throughout the operational phase but will cease once operations conclude.

- **Frequency** - Rarely, as encountering archaeological and cultural resources is unlikely outside of the identified high-potential zones.
- **Reversibility** - Irreversible, as any disturbance to archaeological resources would be permanent if artifacts are uncovered and removed.
- **Significance** - Not significant, as any potential effects would be limited to the operational phase, with a low likelihood of encountering archaeological resources and established measures in place to address any discoveries.

8.3.2 EFFECTS ON MI'KMAQ CULTURAL RESOURCES

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for Mi'kmaq cultural resources includes the Project Site and adjacent areas where Project activities may cause disturbance or affect culturally significant resources.
- **Regional Assessment Area:** The RAA for Mi'kmaq cultural resources is not applicable.

PROJECT INTERACTIONS

The following Project activities may interact with Mi'kmaq cultural resources:

- Site Preparation
- Extraction Operations
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate potential effects on Mi'kmaq cultural resources. The VEC-specific definition for magnitude is:

- **Low** - Low potential for impact; a minor change to cultural resources, their setting, or opportunities for access and use that does not materially impair the continuation of associated Mi'kmaq cultural practices.
- **Moderate** - Moderate potential for impact; an appreciable reduction in the availability, quality or accessibility of culturally important resources, or alteration of a cultural place or its setting, requiring meaningful changes to where or how associated practices occur.
- **High** - High potential for impact; a substantial loss or impairment of culturally important resources, places, access or setting that severely limits associated cultural practices, or damage to a culturally irreplaceable place or resource.

DESCRIPTION OF EFFECTS

- **Mi'kmaq Archaeological Resources:** Ground disturbance during clearing, grubbing, excavation, road and bridge works, and reclamation could damage or remove previously unidentified Mi'kmaq archaeological resources. Disturbance could also disrupt the spatial relationships between archaeological materials and their surroundings, resulting in a permanent loss of cultural and historical information.

  The ARIA identified one area of high archaeological potential within the Project Site, while the main extraction footprint was assessed as having low potential for pre-contact archaeological resources. Avoidance of the high-potential area reduces the likelihood of direct effects. However, low archaeological potential does not eliminate the possibility of encountering previously unidentified resources. Bridge works at Eel Weir Brook could also encounter buried resources if excavation extends beyond previously disturbed ground.

- **Hunting and Trapping Opportunities:** Clearing and excavation will remove wildlife habitat within the development footprint, reducing the area available to support hunting and trapping. Although most of the site was harvested approximately 20 years ago and no mature forest will be affected by the Project, regenerating forest may provide food, shelter, and movement corridors for harvestable wildlife.

  Noise, equipment operation and vehicle movements may cause wildlife to avoid active work areas and nearby habitat, potentially reducing harvesting opportunities beyond the extraction footprint. The closure of the site to the public will also prevent hunting and trapping within the restricted area during operations. Habitat alteration and access restrictions will persist during operation, while recovery following reclamation will depend on vegetation establishment, wildlife use and future access arrangements.

- **Fishing and Aquatic Resources:** The Project could affect fishing opportunities if sediment runoff, accidental fuel or chemical releases, or changes in drainage reduce water quality or alter aquatic habitat. Changes to groundwater levels or discharge could also affect connected wetlands and watercourses if excavation intercepts groundwater or alters the water balance.

  Wetland and watercourse buffers and the proposed minimum 1 m separation between excavation and the water table will reduce these potential interactions; however, indirect effects remain possible and depend on site drainage, seasonal groundwater conditions, and the effectiveness of operational controls. These changes could influence fish or the suitability of downstream habitat areas for fishing.

- **Plant Gathering and Other Natural Materials:** Vegetation clearing, soil stripping and excavation will remove plants and other natural materials within the development footprint. These may include resources used by the Mi'kmaq for food, medicine, crafts, tools or ceremonial purposes. Regenerating forest and openings can support culturally important resources, even where mature forest is absent.

  Dust deposition and changes in drainage may affect the condition or suitability of plants, especially herbaceous species near active operations. Reclamation may allow some resources to return, although the species present, their abundance and their suitability for gathering may differ from existing conditions.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on Mi'kmaq cultural resources during the Project:

- The area identified as having high archaeological potential (HPA-01) will be avoided during general pit development and extraction activities.
- Bridge replacement activities over Eel Weir Brook will be confined to the existing, previously disturbed footprint of the roadway.
- The Proponent will continue to engage with Mi'kmaq communities and organizations to ensure culturally appropriate management of resources.
- If any Ancestral resources are encountered during operations, work will stop immediately, and the NSCCTH Special Places Coordinator will be contacted for further guidance.
- Noise, traffic controls, and site speed limits will be applied to reduce wildlife disturbance, while engagement with local users will guide timing and access arrangements for hunting and trapping.
- A 30 m buffer will be maintained from watercourses and a vegetated buffer will be maintained around wetlands during Blocks 1-4, and excavation will remain at least 1 m above seasonal high groundwater levels.
- **Hunting and Trapping:** Vegetation clearing will be avoided during the peak bird breeding season (April 1 to August 31) where possible, wildlife awareness training will be provided to workers, and a Wildlife Management Plan will be implemented (Section 8.1.4).
- **Fishing and Aquatic Resources:** Project activities, including fuelling and vegetation clearing, will not occur within 30 m of watercourses outside the two access road crossings. The new Eel Weir Brook bridge will be a clearspan structure with no contact with the bed or bank, and an ESC Plan, a Spill Response and Contingency Plan, and a Groundwater Management and Monitoring Plan will be implemented (Sections 8.1.1 and 8.1.6).

- **Plant Gathering:** Clearing boundaries will be marked before clearing, vehicles will be restricted to designated roads, dust will be suppressed, invasive species will be surveyed and controlled, and disturbed areas will be progressively reclaimed, and reclaimed pit surfaces will be seeded with a native grass mix (Section 8.1.3).

MONITORING

No monitoring is recommended for this VEC.

CONCLUSION

After mitigation measures, residual effects on Mi'kmaq cultural resources are anticipated to be:

- **Magnitude** - Low, as the potential for encountering cultural resources in the main extraction areas was assessed as low, areas of high potential will be avoided, and effects on harvesting opportunities are localized to the Project Site and reduced by the mitigation measures above.
- **Geographic Extent** - Within the LAA.
- **Duration** - Medium-term, as effects could occur throughout the operational phase but will cease once operations conclude.
- **Frequency** - Rarely, as encountering cultural resources is unlikely outside of the identified high-potential zones.
- **Reversibility** - Irreversible, as any disturbance to cultural resources would be permanent if artifacts are uncovered and removed.
- **Significance** - Not significant, as any potential effects would be limited to the operational phase, with a low likelihood of encountering cultural resources and established measures in place to address any discoveries.

8.4 EFFECTS ON HUMAN HEALTH AND WELL-BEING

8.4.1 EFFECTS OF NOISE LEVELS

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for noise levels includes the Project Site and a buffer extending 1.5 km from the Project boundary, encompassing nearby residential receptors where Project noise may be experienced.
- **Regional Assessment Area:** The RAA for noise levels is not applicable.

PROJECT INTERACTIONS

All Project activities have the potential to interact with noise levels:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Aggregate Quantification
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The following provincial criteria are relevant:

- The *Pit and Quarry Guidelines* (NSEL, 2003) prescribe property-boundary sound level limits of 65 dBA during the day, 60 dBA during the evening, and 55 dBA at night. These guidelines also apply the night limit throughout Sundays and statutory holidays.
- The *Guidelines for Environmental Noise Measurement and Assessment* (NSECC, 2023) establish Rural PSLs of 53 dBA during the day, 48 dBA during the evening, and 40 dBA at night, expressed as LAeq(1-hour) at receptors. Comprehensive levels include baseline and Project noise, together with any applicable tonal adjustment. Impulsive noise is subject to additional criteria.

The receptor assessment uses the daytime Rural PSL of 53 dBA, corresponding to proposed production hours of 7:00 AM to 7:00 PM. Property-boundary requirements remain a separate consideration. Applicable approval conditions take precedence where they differ from the guidance.

The assessment criteria outlined in Table 8.1 will be used to evaluate the potential effects of noise levels. The VEC-specific definition for magnitude is:

- **Negligible** - Project noise produces little discernible change in the acoustic environment and remains within applicable sound-level criteria.
- **Low** - Project noise is discernible during operating periods, but applicable sound-level criteria are expected to be met and disturbance is limited in extent and duration.
- **Moderate** - Project noise causes appreciable disturbance at nearby receptors or predicted exceedances that require additional noise controls.

- **High** - Substantial disturbance or repeated exceedances are expected to remain after reasonably feasible noise controls are applied.

DESCRIPTION OF EFFECTS

AGGREGATE PRODUCTION NOISE ASSESSMENT

The nearest residential receptor is approximately 500 m from the active extraction footprint (Blocks 1-4). The footprint is set back from the northern Project boundary nearest this receptor, and established forested areas extend across the intervening separation between the Project's operational area and the receptor. The assessment uses this minimum distance to estimate noise from anticipated busy-hour production configurations.

Up to a four-person crew is expected on site to conduct aggregate extraction activities. The anticipated processing arrangement comprises one operating crusher, a screener, an excavator and a front-end loader. The jaw and cone crushers are assessed separately, with only one operating at a time.

Three noise production scenarios are assessed based on anticipated operations:

1. **Extraction and Loading:** Excavator and front-end loader conducting raw aggregate extraction;
2. **Jaw-crusher Processing:** Jaw crusher, screener, excavator, and front-end loader, with the cone crusher off, conducting preliminary aggregate sorting and processing; and,
3. **Cone-crusher Processing:** Cone crusher, screener, excavator, and front-end loader, with the jaw crusher off, conducting final aggregate processing.

The selected crusher and screener are assumed to operate continuously throughout the operating hours. A 40% acoustical usage factor is applied to the excavator and front-end loader using the default values published in the *Roadway Construction Noise Model User Guide* (FHWA, 2017b). This factor accounts for equipment noise changing during normal work: engines are louder during demanding tasks, such as digging or lifting material, and quieter during less demanding parts of the cycle. For estimating average noise over one hour, the model represents this varying output as the equivalent of 24 minutes at the reference maximum noise level. This does not mean that the equipment operates for only 24 minutes or is silent for the remaining time, rather the acoustical usage factor is used here as an assumption for typical cyclic operation of the equipment, rather than assuming that both machines produce their maximum noise continuously throughout the hour.

FOREST ATTENUATION

The noise predictions incorporate a 6 dB attenuation credit to account for sound propagation through the dense forest situated between the production area and the nearest residence. This estimate is derived from the

simplified foliage attenuation method outlined in ISO 9613-2:2024, Annex A.2.2 (as described in DataKustik technical documentation), which quantifies sound reduction through dense vegetation. For a reference sound frequency of 500 Hz, the method applies a reduction of 0.05 dB per metre of dense foliage over distances between 20 m and 200 m. Based on this rate, 120 m of dense foliage yields a 6 dB reduction in audible noise from Project operations. Consequently, the assessment conservatively credits only a portion of the approximately 500 m of intervening forest as qualifying dense vegetation, even though attenuation may continue across the full distance in practice (DataKustik, n.d.; ISO, 2024). Furthermore, while ISO permits calculating attenuation at the 500 Hz reference frequency under the assumption that attenuation occurs across all audible frequencies, the adopted 6 dB reduction serves as a conservative estimate based on this methodology.

Project operations are expected to be reduced from November through April, with the majority of activity occurring during warmer months under leaf-out conditions, when foliage provides enhanced sound attenuation. While attenuation is less predictable when trees lack leaves, winter operational activity will be reduced, resulting in lower noise generation overall. Additionally, the forest surrounding the Project site consists of mixed wood with substantial coniferous cover, which maintains consistent noise attenuation year-round despite the seasonal loss of deciduous leaves.

PREDICTION METHOD AND RESULTS

The equipment reference levels at 500 m are taken from Table 7.33. Individual hourly contributions are calculated as:

$$L_{i,}hour = L_{i,}500\ m + 10\ log_{10}(U_i) - Aforest$$

Where:

- $L_{i,}500\ m$ is the equipment reference level at 500 m.
- U_i is the acoustical usage factor, expressed as a fraction.
- **Aforest** is the adopted forest attenuation of 6 dB.

The individual contributions are combined logarithmically:

$$Lproduction = 10\ log_{10}[\Sigma\ 10\text{^}(L_{i,}hour/10)]$$

The maximum measured daytime baseline of 43.8 dBA reported in Section 7.4.1 is then added logarithmically:

$$Lcombined = 10\ log_{10}[10\text{^}(Lproduction/10) + 10\text{^}(43.8/10)]$$

No vegetation attenuation factor is applied to the baseline noise as it is assumed that it is representative of the broader area including the location of nearby residences. No penalty for tonality is applied to the operating equipment estimates.

Table 8.3 presents the equipment reference levels, usage factors, and individual hourly contributions with and without forest attenuation. Table 8.4 presents the combined production and baseline levels for each scenario at the nearest residential receptor.

Table 8.3: Production Equipment Inputs and Hourly Contributions at 500 m

Equipment	Reference Level at 500 m (dBA)	Acoustical Usage Factor	Hourly Contribution Before Forest Attenuation (dBA)	Forest Attenuation (dBA)	Hourly Contribution After Forest Attenuation (dBA)
Excavator	50.5	40%	46.5	6.0	40.5
Front-end loader	48.5	40%	44.5	6.0	38.5
Mobile jaw crusher	54.5	100%	54.5	6.0	48.5
Mobile cone crusher	52.5	100%	52.5	6.0	46.5
Mobile screener	54.5	100%	54.5	6.0	48.5

Note: The jaw and cone crushers are not run simultaneously in this single scenario. A 100% usage factor is applied to reflect continuous processing equipment noise emissions throughout the operational hour.

Table 8.4: Predicted Aggregate Production Noise at the Nearest Residential Receptor

Scenario	Combined Production Level Before Forest Attenuation (dBA)	Forest Attenuation (dB)	Production Level After Forest Attenuation (dBA)	Combined Production and Baseline Level (dBA LAeq(1-hour))	Daytime Rural PSL (dBA)	Margin Below PSL (dB)
Extraction and loading	48.6	6.0	42.6	**46.3**	53.0	**6.7**
Jaw-crusher processing	58.0	6.0	52.0	**52.6**	53.0	**0.4**
Cone-crusher processing	57.3	6.0	51.3	**52.0**	53.0	**1.0**

Berm effectiveness depends on its position relative to the source and receptor, crest elevation, length, continuity and sound propagation around its ends. FHWA guidance indicates approximately 5 dB of attenuation when a sufficiently long, continuous barrier blocks the source-to-receptor sightline, with greater reduction possible as the crest rises above that line. This is indicative guidance; any berm would be designed for the relevant site geometry. No berm attenuation is included in Tables 8.3 or 8.4 (FHWA, 2021).

DISCUSSION OF NOISE IMPACTS

As shown in Table 8.4, the assessed production scenarios are predicted to comply with the daytime Rural PSL of 53 dBA (LAeq, 1 hour) at the nearest residential receptor, located approximately 500 m away. Predicted combined sound levels (including the 43.8 dBA daytime baseline) range from 46.3 dBA during extraction and loading (6.7 dB margin below PSL) to 52.6 dBA during jaw-crusher processing (0.4 dB margin below PSL) and 52.0 dBA during cone-crusher processing (1.0 dB margin below PSL). The processing scenarios operate with narrow compliance margins and rely directly on the assumed equipment inventory, cyclic operational usage factors, and the 6 dB forest attenuation credit derived from ISO 9613-2.

Project noise is expected to remain discernible at nearby residences, particularly during quiet ambient conditions (such as low wind speeds). The character of the operational noise will vary by activity: crushing and screening emit steady mechanical noise during operation, whereas extraction and loading cycle dynamically as engines ramp under heavy load, resulting in fluctuating sound levels for each operating activity.

Potential micro-siting benefits, such as placing processing equipment deeper within the pit or behind product stockpiles, offer localized acoustic shielding; however, no numeric attenuation credit was taken for these features in the model. Should monitoring or operational changes indicate a need for further noise reduction, constructed earth berms or acoustic barriers can be deployed to provide additional noise attenuation.

MITIGATIONS

The following mitigation measures will be implemented to minimize the potential impacts of noise levels on human health and well-being during the Project:

- Production activities will be restricted to daylight hours (7:00 AM to 7:00 PM), and will be limited on holidays and weekends to the greatest extent possible.
- Equipment will be maintained in accordance with manufacturer specifications to minimize avoidable mechanical noise.
- Unnecessary idling will be minimized, and quieter equipment will be favoured where practicable.
- Existing forest buffers within the Proponent's control will be retained between production areas and nearby residences.
- Best efforts will be made to operate the jaw and cone crushing equipment on alternating duty cycles to reduce cumulative noise levels.
- Product and overburden stockpiles will be positioned between production equipment and nearby receptors where operationally feasible.
- Site speed limits will be established to reduce vehicle-related noise.

- Equipment may be relocated farther from receptors or to more sheltered operating positions if additional noise reduction is required.
- Designed earth berms or acoustic barriers may be used as secondary mitigation where additional attenuation is needed.
- Production equipment will be located within the active extraction footprint (Blocks 1-4), maintaining the separation from the nearest residential receptor assumed in this assessment.

MONITORING

A complaint-response protocol will be developed to document and respond to noise-related concerns. Responses may include reviewing the activity giving rise to the concern and considering adjustments to equipment placement or operating practices. Targeted noise assessment and additional mitigation may be considered in response to substantiated concerns. Monitoring or assessment required by an approval or the regulator will be undertaken.

CONCLUSION

Based on the anticipated production arrangements, minimum separation distance and adopted forest attenuation, the assessed aggregate-production scenarios are expected to meet the daytime Rural PSL at the nearest residential receptor without reliance on constructed berms. Additional shielding measures remain available if required.

After mitigation measures, the residual effects of noise levels are anticipated to be:

- **Magnitude** - Low, as production noise is expected to be audible, but predicted combined levels of 46.3-52.6 dBA remain below the daytime Rural PSL of 53 dBA.
- **Geographic Extent** - Within the LAA, as any effects are confined to the Project Site and the immediate surrounding areas.
- **Duration** - Medium-term, as effects will occur throughout the operational phase and cease following completion of the relevant activities.
- **Frequency** - Ongoing, as noise will consistently occur during operational hours.
- **Reversibility** - Reversible, as the effects will subside after Project closure.
- **Significance** - Not significant, as the residual effects are low in magnitude, localized, and reversible, with effective mitigation measures in place.

8.4.2 EFFECTS OF DUST AND EMISSIONS

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for dust and emissions includes the Project Site and the immediate surrounding area, where dust and emissions from Project activities may be directly noticeable and potentially affect human health. This area includes nearby residential properties and roads that may be impacted by airborne dust and emissions.
- **Regional Assessment Area:** The RAA for dust and emissions is not applicable.

PROJECT INTERACTIONS

The following Project activities may contribute to dust and emissions:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate the potential effects of dust and emissions. The VEC-specific definition for magnitude is:

- **Negligible** - No measurable impact on human health, as dust and emissions remain at or near background levels.
- **Low** - Minor, localized changes in air quality that remain within acceptable provincial health limits, resulting in no significant or lasting health impacts.
- **Moderate** - Noticeable changes in air quality that approach or temporarily exceed acceptable health limits, requiring mitigation to prevent health effects.
- **High** - Significant degradation of air quality that frequently exceeds acceptable health limits, leading to potential deterioration in human health.

DESCRIPTION OF EFFECTS

Dust and emissions can have various impacts on human health and overall well-being.

DUST

- **Respiratory Issues:** Fine particulate matter can penetrate deep into the lungs, aggravating conditions like asthma, bronchitis, and other respiratory ailments (Health Canada, 2021). Coarse particulate matter (PM_{10}), which refers to particles smaller than 10 µm in diameter, can irritate the throat, nose, and eyes, which can be especially troublesome for nearby residents or workers at the site (CDC, n.d.).

- **Nuisance and Visibility Impairment:** While not directly harmful, dust deposition on properties may be a nuisance, requiring increased cleaning and maintenance. Dust can also reduce visibility, which may create traffic hazards, especially near the site entrance or along haul routes.

EMISSIONS

- **Respiratory and Cardiovascular Risks:** Heavy equipment emissions, including NO_x, SO_2, CO, $PM_{2.5}$, PM_{10}, and VOCs, can cause significant respiratory problems if concentrated. Long-term exposure to fine particulate matter can exacerbate asthma, bronchitis, and other lung diseases (Health Canada, 2021), and is linked to an increased risk of cardiovascular diseases (US EPA, 2026).

While the Project introduces a new extraction facility to the area, it is not anticipated to generate dust or emissions at a volume that would impact human health. The operation relies on standard mobile equipment rather than heavy industrial manufacturing, and emissions will be highly localized to the active pit floor. The extensive natural forested buffers surrounding the Inglisville site will act as a physical barrier, effectively filtering fugitive dust and preventing it from migrating toward the residential receptors identified within the LAA. Furthermore, by implementing strict, proactive dust suppression techniques (such as watering active areas) and maintaining equipment to provincial standards, the Project is expected to operate well within acceptable provincial air quality limits, resulting in no measurable health impacts.

MITIGATIONS

The following mitigation measures will be implemented to minimize the potential impacts of dust and emissions on human health and well-being during the Project:

- Dust suppression techniques, including the application of water, lignin-based solutions, and/or chloride mixtures, will be used on haul roads, stockpiles, and processing areas.
- Speed limits for vehicles on-site will be implemented to reduce dust emissions.
- Stockpiles and disturbed areas will be minimized to the extent possible and progressively reclaimed to reduce the potential for dust generation.
- Enclosed or covered trucks will be used for material transport to minimize dust generation.

- Dust-generating activities will be timed to avoid periods of excessive wind, and activities will be paused when wind speeds are high.
- Heavy equipment will be maintained in accordance with manufacturer specifications, and emissions control technologies (e.g., diesel particulate filters and catalytic converters) will be used to reduce exhaust emissions.
- Storage areas and material stockpiles will be designed with prevailing wind directions in mind to reduce the potential for dust dispersion.
- Loose site materials and products will be tied down, covered, and/or stored prior to inclement weather or wind events to prevent them from becoming airborne.
- The idling of equipment will be minimized, and low-emission engines will be prioritized.
- Health and safety training on minimizing exposure to both dust and emissions will be provided.

MONITORING

A complaint response protocol, with a focus on dust- and emissions-related concerns, will be developed.

CONCLUSION

After mitigation measures, the residual effects of dust and emissions are anticipated to be:

- **Magnitude** - Low, as dust and emission effects are expected to be minor, localized, and will remain well within acceptable provincial health and air quality limits.
- **Geographic Extent** - Within the LAA, as any effects are confined to the Project Site and the immediate surrounding areas.
- **Duration** - Medium-term, as effects are expected to occur throughout the operational phase but are anticipated to diminish once operations conclude.
- **Frequency** - Intermittent, as dust and emission levels will vary depending on weather conditions and Project activities.
- **Reversibility** - Reversible, as the effects will subside after Project closure.
- **Significance** - Not significant, as the residual effects are low in magnitude, localized, and temporary, with effective mitigation measures in place.

8.4.3 EFFECTS ON SAFETY AND COMMUNITY WELL-BEING

ASSESSMENT BOUNDARIES

- **Local Assessment Area:** The LAA for safety and community well-being includes the Project Site, access roads, and nearby areas where potential safety risks may arise due to Project activities, including transportation of materials.

- **Regional Assessment Area:** The RAA for safety and community well-being is not applicable.

PROJECT INTERACTIONS

All Project activities have the potential to interact with safety and community well-being:

- Site Preparation
- Extraction Operations
- Processing
- Stockpiling
- Aggregate Quantification
- Transportation
- Site Reclamation

EFFECTS ASSESSMENT CRITERIA

The assessment criteria outlined in Table 8.1 will be used to evaluate the potential effects on safety and community well-being. The VEC-specific definition for magnitude is:

- **Negligible** - No measurable impact on safety or well-being.
- **Low** - Minor, localized safety risks, with standard safety measures in place.
- **Moderate** - Noticeable safety concerns requiring additional mitigation or monitoring.
- **High** - Significant safety risks with the potential for serious injury, requiring major intervention.

DESCRIPTION OF EFFECTS

The Project has the potential to affect worker and public safety, as well as community well-being, through:

- **Workplace Hazards:** The operation of heavy machinery, vehicle movements, and material extraction could pose safety risks to workers.
- **Public Safety Risks:** Unauthorized site access could pose risks to individuals entering active work areas.
- **Transportation:** Increased truck traffic on public roads may temporarily increase risks of vehicle collisions, particularly in areas where transport routes pass through residential or high-traffic zones.
- **Water Resources:** Accidental spills of fuel or lubricants during equipment operation and maintenance could introduce contaminants to groundwater or surface water if not properly managed.

- **Community Complaints:** Concerns related to safety, noise, or traffic could arise from community members, requiring responsive communication and mitigation.

MITIGATIONS

The following mitigation measures will be implemented to minimize potential impacts on safety and community well-being during the Project:

- Worker safety procedures will comply with the *Occupational Health and Safety Act* and industry standards.
- The site will remain secured with gated access and safety signage to prevent unauthorized entry.
- Stability measures (e.g., berms, controlled slope angles) will be maintained to reduce terrain hazards.
- Traffic safety measures will include adherence to weight and speed limits and vehicle maintenance requirements.
- Spill prevention measures will include proper fuel storage, secondary containment, and controlled refuelling procedures.
- Community concerns will be addressed through an established complaint resolution process to ensure timely responses to safety-related issues.

MONITORING

Monitoring will be conducted to ensure the effectiveness of mitigation measures and to detect any unforeseen impacts on safety and community well-being:

- Routine safety inspections will be conducted at the Project Site to ensure compliance with OHS requirements.
- Transportation-related safety measures will be reviewed regularly, including vehicle inspections and speed compliance.
- The effectiveness of site security measures will be assessed periodically to ensure public safety.
- A complaint response protocol will be implemented.

CONCLUSION

After mitigation measures, the residual effects on safety and community well-being are anticipated to be:

- **Magnitude** - Low, as the safety risks associated with the Project are expected to be minor and localized, and will be effectively managed with standard safety measures in place.
- **Geographic Extent** - Within the LAA, as safety risks are limited to the Project Site and access routes.

- **Duration** - Medium-term, as effects will last throughout the operational phase of the Project, but are expected to diminish after reclamation.
- **Frequency** - Intermittent, as safety risks may vary depending on specific Project activities.
- **Reversibility** - Reversible, as the effects are expected to diminish once operations end.
- **Significance** - Not significant, as the residual effects are low in magnitude, localized, and temporary, with minimal impact expected after operations conclude.

8.5 SUMMARY OF ENVIRONMENTAL EFFECTS ASSESSMENT RESULTS

Table 8.5 below provides a summary of the anticipated environmental effects of the Project on each VEC, based on the results of the effects assessment. This includes information on the magnitude, geographic extent, duration, frequency, reversibility, and significance of residual effects.

Table 8.5: Summary of Effects Assessment Results

VEC	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Significance	Mitigation Measures Recommended	Monitoring Recommended
Biophysical Environment								
Surface Water and Groundwater	**Low** - Minor changes to quality, quantity or hydrology expected	LAA	Short- to Medium-term	Intermittent	Reversible	Not Significant	Yes	Yes
Wetlands	**Negligible for Blocks 1-4** - No direct impacts to wetland area or function during this phase; direct alteration of one or more wetlands is reasonably foreseeable over the Project's full operational life, subject to a Wetland Alteration Approval at that time	LAA	Medium-term for Blocks 1-4; long-term if wetland alteration occurs during a future block	Intermittent	Reversible for Blocks 1-4; irreversible for any future wetland alteration, offset through compensation	Not Significant for Blocks 1-4; future alteration to be independently evaluated	Yes	No
Flora	**Low** - Minor loss of supporting habitat (e.g., American Beech); no net SOCI loss anticipated with mitigation	LAA	Medium-term	Intermittent	Partially Reversible	Not Significant	Yes	No
Fauna	**Moderate** - Habitat alteration results in localized loss of usable habitat for some species and potential sensory disturbance, but overall regional populations remain intact following mitigation	LAA	Long-term	Intermittent	Partially Reversible	Not Significant	Yes	Yes

VEC	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Significance	Mitigation Measures Recommended	Monitoring Recommended
Terrestrial Habitat	**Moderate** - Initial footprint (Blocks 1-4) is low-impact, but full operational lifespan may result in considerably larger cumulative habitat alteration; recovery of key habitat functions occurs over decades	LAA	Long-term	Intermittent	Partially Reversible	Not Significant	Yes	No
Fish and Aquatic Habitat	**Negligible** - No direct impacts to fish and aquatic habitat; no measurable effects on fish health, behaviour, or hydrology anticipated	LAA	Medium-term	Intermittent	Reversible	Not Significant	Yes	Yes
Climate Change	**Low** - GHG emissions well below federal reporting threshold; no measurable climate effects anticipated	Global	Medium-term	Intermittent	Irreversible	Not Significant	Yes	No
Air Quality and Atmospheric Conditions	**Low** - Minor and localized changes expected	LAA	Medium-term	Intermittent	Reversible	Not Significant	Yes	No
Soil and Geology	**Negligible to Low** - Minor soil disturbance, localized erosion, and manageable soil texture changes expected	LAA	Medium-term	Intermittent	Reversible	Not Significant	Yes	Yes
Socioeconomic Environment								

VEC	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Significance	Mitigation Measures Recommended	Monitoring Recommended
Local Economy, Labour Force, and Employment	**Positive** - Generates local employment and supports the local economy	LAA, potential for extension into RAA	Medium-term	Ongoing	Partially Reversible	Not Significant	No	No
Land Use and Property Values	**Negligible** - No measurable changes expected	LAA	Medium-term	Ongoing	Reversible	Not Significant	Yes	No
Transportation and Infrastructure	**Low** - Minor, localized effects with no disruption to transportation flow or infrastructure services	LAA, potential minor effects in RAA	Medium-term	Ongoing	Reversible	Not Significant	Yes	Yes
Recreation and Tourism	**Negligible** - No changes expected	LAA	Medium-term	Ongoing	Reversible	Not Significant	No	No
Cultural and Heritage Resources								
Archaeological Resources and Historical Sites	**Low** - Minimal potential to encounter archaeological resources due to prior disturbance	LAA	Medium-term	Rarely	Irreversible	Not Significant	Yes	No
Mi'kmaq Cultural Resources	**Low** - Minimal potential for effects due to prior disturbance and mitigation commitments	LAA	Medium-term	Rarely	Irreversible	Not Significant	Yes	No
Human Health and Well-Being								
Noise Levels	**Low** - Predicted combined levels (46.3-52.6 dBA) remain below the daytime Rural PSL of 53 dBA at the nearest receptor	LAA	Medium-term	Ongoing	Reversible	Not Significant	Yes	Yes

VEC	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Significance	Mitigation Measures Recommended	Monitoring Recommended
Dust and Emissions	**Low** - Minor and localized effects expected	LAA	Medium-term	Intermittent	Reversible	Not Significant	Yes	Yes
Safety and Community Well-Being	**Low** - No new hazards expected beyond standard resource extraction risks	LAA	Medium-term	Intermittent	Reversible	Not Significant	Yes	Yes

8.6 SUMMARY OF RESIDUAL EFFECTS, MITIGATIONS, AND MONITORING COMMITMENTS

Table 8.6 below provides a summary of the residual environmental effects, along with the associated mitigation measures and monitoring commitments for the Project, as identified through the effects assessment.

Table 8.6: Summary of Residual Effects, Mitigations, Monitoring, and Significance

VEC	Project Activities	Potential Effects	Mitigations	Monitoring	Significance After Mitigations
Biophysical Environment					
Surface Water and Groundwater	Site Preparation Extraction Operations Stockpiling Site Reclamation	• Surface water sedimentation • Surface water and groundwater quality and quantity changes • Localized erosion and runoff • Minor changes to surface drainage • Potential contamination from spills	• Implement an ESC Plan and Groundwater Management and Monitoring Plan • Install erosion control measures where needed • Apply progressive reclamation to reduce exposed soils • Avoid new ditches or diversions • Direct stormwater to infiltration areas • Maintain a 30 m buffer from Project watercourses; maintain a vegetated buffer around wetlands during Blocks 1-4 • Develop a Surface Water Management Plan • Follow a Spill Response and Contingency Plan • Inspect and maintain equipment regularly • Monitor TSS if effluent leaves the site • Contact NSECC if sulphide-bearing material is found • Avoid dewatering or pumping activities • Avoid excavation within 1 m of the maximum annual water table and conduct groundwater monitoring to ensure excavations do not extend lower than 1 m above the water table • Stop excavation if groundwater is encountered	• Inspect ESC measures (e.g., silt fences) quarterly and after heavy rain • Monitor sediment levels in runoff during major precipitation events • Check site drainage regularly for changes post-rainfall • Implement a Groundwater Management and Monitoring Plan to track levels and recharge over time and ensure compliance with the excavation buffer	Not Significant
Wetlands	Site Preparation Extraction Operations Processing	• Fugitive dust accumulation • Invasive species spread • Runoff into wetlands	• Use dust suppression techniques • Set restrictions on dust-generating activities (e.g. speed limits, wind-avoidance timing, etc.) • Use enclosed or covered trucks for material transport	• Inspect ESC measures (e.g., silt fences) quarterly and after heavy rain • A formal Wetland	Not Significant

VEC	Project Activities	Potential Effects	Mitigations	Monitoring	Significance After Mitigations
	Stockpiling Site Reclamation		• Minimize disturbed areas and apply progressive reclamation • Secure loose materials before storms or wind events • Design stockpiles considering prevailing wind direction • Clean and inspect vehicles to prevent invasive species spread • Maintain a 30 m buffer from Project watercourses; maintain a vegetated buffer around wetlands during Blocks 1-4 • Grade roads and pits to direct runoff away from wetlands • Implement stormwater controls to promote infiltration • Develop and follow an ESC Plan	Monitoring Plan will be developed if a future block requires wetland alteration	
Flora	Site Preparation Extraction Operations Processing Stockpiling Transportation Site Reclamation	• Dust deposition reducing photosynthesis • Direct vegetation removal from clearing • Potential growth reduction and increased plant stress or mortality due to dust • Spread and introduction of invasive species • Minor impacts on adjacent vegetation edges	• Avoid SAR and SOCI flora during clearing where feasible; use buffers where practical • Use dust suppression techniques • Set restrictions on dust-generating activities (e.g., speed limits, wind-avoidance timing, etc.) • Minimize disturbed areas and apply progressive reclamation • Use enclosed or covered trucks for material transport • Design stockpiles considering prevailing wind direction • Secure loose materials before storms or wind events • Develop and implement an ESC Plan • Restrict vehicles to designated roads and paths • Clean and inspect vehicles to prevent invasive species spread • Maintain a 30 m buffer from Project watercourses; maintain a vegetated buffer around wetlands during Blocks 1-4 • Rehabilitate pit walls with 3:1 slope, seed with native grasses	No dedicated flora monitoring program; invasive species presence will be assessed through regular site inspections, and progressive reclamation will be monitored as part of the broader site reclamation program	Not Significant
Fauna	Site Preparation	• Habitat alteration and fragmentation from vegetation	• Avoid vegetation clearing during bird breeding season; conduct nest searches and apply buffer if clearing is needed	• Develop a WMP to guide monitoring activities	Not Significant

VEC	Project Activities	Potential Effects	Mitigations	Monitoring	Significance After Mitigations
	Extraction Operations Processing Stockpiling Transportation Site Reclamation	clearing • Direct mortality or nest destruction during breeding season • Sensory disturbance (noise, vibrations, light) altering behaviour • Dust impacting wildlife foraging and respiratory health • Increased risk of wildlife-vehicle collisions • Potential disruption of species-specific behaviours	• Develop a WMP within the EPP, including Bank Swallow contingencies • Follow municipal/provincial noise and vibration guidelines • Provide wildlife awareness training to workers • Implement a Waste Management Plan to secure and dispose of waste properly • Use dust suppression techniques • Set restrictions on dust-generating activities (e.g., speed limits, wind-avoidance timing, etc.) • Set speed limits on-site to reduce wildlife collisions • Minimize disturbance and apply progressive reclamation • Inspect stockpiles and exposed soils for nests • Use enclosed or covered trucks for material transport • Design stockpiles considering prevailing winds • Secure loose materials before storms or wind events • Keep emergency spill kits on site • Maintain a 30 m buffer from Project watercourses; maintain a vegetated buffer around wetlands during Blocks 1-4 • Rehabilitate pit walls to 3:1 slopes, cover with topsoil, and seed with native grasses • Limit activities to daytime to reduce bat disturbance • Conduct visual turtle sweeps of work areas and access roads before daily operations during the nest establishment season (mid-May to mid-July)	• Implement a wildlife nesting monitoring program • Monitor nesting activity during sensitive periods to avoid disturbance	
Terrestrial Habitat	Site Preparation Extraction	• Habitat loss and fragmentation from clearing	• Avoid SOCI flora during clearing; apply appropriate buffers • Limit vegetation clearing to minimum area; prioritize	No monitoring proposed	Not Significant

VEC	Project Activities	Potential Effects	Mitigations	Monitoring	Significance After Mitigations
	Operations Processing Stockpiling Transportation Site Reclamation	• Reduction in cover, forage, and movement corridors for wildlife • Localized edge effects altering light, moisture, and microclimate • Potential facilitation of invasive species establishment • Creation of disturbed or early successional habitat used by some species	disturbed areas • Maintain a 30 m buffer from Project watercourses to protect habitat connectivity; maintain a vegetated buffer around wetlands during Blocks 1-4 • Use dust suppression techniques • Set restrictions on dust-generating activities (e.g., speed limits, wind-avoidance timing, etc.) • Implement an ESC Plan • Grade pit slopes to 3:1 and seed with native grasses after extraction • Clean equipment regularly to prevent invasive species spread • Use only native species for restoration activities • Restrict vehicles/machinery to designated roads and trails to minimize disturbance		
Fish and Aquatic Habitat	Site Preparation Extraction Operations Processing Stockpiling Transportation Site Reclamation	• Hydrological alterations • Dust accumulation in Project watercourses leading to fish behaviour and health impacts, turbidity increase, and other water quality changes • Water contamination	• Maintain a 30 m buffer from Project watercourses; maintain a vegetated buffer around wetlands during Blocks 1-4 • Implement stormwater controls to reduce runoff and sediment transport • Grade disturbed areas to direct flow away from watercourses and wetlands • Develop and follow an ESC Plan • Use dust suppression techniques • Set restrictions on dust-generating activities (e.g., speed limits, wind-avoidance timing, etc.) • Use covered/enclosed trucks to transport materials • Secure loose materials before storms or wind events	• Inspect ESC measures (e.g., silt fences) quarterly and after heavy rain • Compliance checks	Not Significant

VEC	Project Activities	Potential Effects	Mitigations	Monitoring	Significance After Mitigations
			• Design stockpiles with wind direction in mind • Store fuel and conduct site work outside 30 m buffer zones • Keep emergency spill kits on site and ready for use • Keep excavation at least 1 m above the maximum annual water table		
Climate Change	Site Preparation Extraction Operations Processing Stockpiling Transportation Site Reclamation	• GHG emissions from site machinery, transportation, and operations (CO_2, CH_4, N_2O, VOCs)	• Apply sustainable construction and operational practices • Set on-site speed limits to reduce unnecessary fuel use • Maintain heavy equipment per manufacturer specs and use emissions control technologies • Minimize equipment idling • Progressively reclaim disturbed areas to restore carbon sequestration capacity	No monitoring proposed	Not Significant
Air Quality and Atmospheric Conditions	Site Preparation Extraction Operations Processing Stockpiling Transportation Site Reclamation	• Dust and particulate matter from excavation, hauling, and site prep • Emissions from diesel equipment may degrade local air quality • Localized microclimate changes	• Set restrictions on dust-generating activities (e.g., speed limits, wind-avoidance timing, etc.) • Use dust suppression techniques • Minimize disturbed areas and reclaim progressively • Set on-site speed limits • Use enclosed/covered trucks for material transport • Secure loose materials before wind or rain events • Maintain equipment and use emissions controls • Minimize equipment idling	No monitoring proposed	Not Significant
Soil and Geology	Site Preparation Extraction Operations	• Changes to local topography impacting soil structure • Erosion and sedimentation	• Develop and implement an ESC Plan • Use progressive reclamation and sediment barriers to reduce soil loss	• Routine inspections of soil stability and erosion controls	Not Significant

VEC	Project Activities	Potential Effects	Mitigations	Monitoring	Significance After Mitigations
	Stockpiling Site Reclamation	• Contamination from ground disturbance (e.g., arsenic, radon)	• Store stockpiles in designated areas with erosion controls • Maintain ditches and erosion control structures, especially after heavy rain • Avoid unnecessary land disturbance and preserve natural drainage patterns • Report any unexpected geological risks (e.g., sulphide rock) to NSECC • Salvage topsoil and stockpile it separately for reuse in progressive reclamation and final restoration	• Monitor for sulphide-bearing material and unexpected hazards • Conduct compliance checks to ensure mitigation effectiveness	
Socioeconomic Environment					
Local Economy, Labour Force, and Employment	Site Preparation Extraction Operations Processing Stockpiling Aggregate Quantification Transportation Site Reclamation	• Create local employment opportunities • Support local businesses	No mitigation proposed	No monitoring proposed	Not Significant
Land Use and Property Values	Site Preparation Extraction Operations Processing	• Changes to property values • Restrictions on surrounding land use	• Maintain a 30 m setback from Project watercourses; maintain a vegetated buffer around wetlands during Blocks 1-4 • Install clear signage with Project contact information for landowner concerns	No monitoring proposed	Not Significant

VEC	Project Activities	Potential Effects	Mitigations	Monitoring	Significance After Mitigations
	Stockpiling Aggregate Quantification Transportation Site Reclamation		• Develop a Spill Response and Contingency Plan for quick action in the event of fuel or hazardous material spills		
Transportation and Infrastructure	Transportation	• Increased traffic • Road deterioration	• Maintain and monitor access roads throughout the Project • Mark haul routes clearly; update signage as needed • Avoid hauling during peak traffic hours if disruptive • Ensure vehicles follow speed limits • Comply with spring weight restrictions • Assess and install appropriate signage (e.g., truck entrance signs) • Haul routes will be selected to avoid populated areas and school zones to the greatest extent possible	• Develop and implement a complaint response protocol	Not Significant
Recreation and Tourism	Site Preparation Extraction Operations Processing Stockpiling Aggregate Quantification Transportation Site Reclamation	None expected	No mitigation proposed	No monitoring proposed	Not Significant

VEC	Project Activities	Potential Effects	Mitigations	Monitoring	Significance After Mitigations
Cultural and Heritage Resources					
Archaeological Resources and Historical Sites	Site Preparation Extraction Operations Site Reclamation	• Disturbance of archaeological resources	• Stop work and notify NSCCTH if archaeological resources are found • Avoid the area of high archaeological potential • Confine bridge upgrade works over Eel Weir Brook to the previously disturbed footprint to the extent possible	No monitoring proposed	Not Significant
Mi'kmaq Cultural Resources	Site Preparation Extraction Operations Site Reclamation	• Disturbance of Mi'kmaq archaeological resources • Reduced access to, or availability of, resources for hunting, trapping, fishing, and gathering	• Stop work and notify NSCCTH if archaeological resources are found • Avoid the area of high archaeological potential • Continue engagement with Mi'kmaq representatives and organizations • Confine bridge works to the disturbed footprint • Maintain 30 m watercourse buffers and wetland buffers during Blocks 1-4, with excavation 1 m above the water table • Apply noise controls and speed limits • Implement wildlife, fish and water, and flora mitigations (Sections 8.1.1, 8.1.3, 8.1.4, 8.1.6)	No monitoring proposed	Not Significant
Human Health and Well-Being					
Noise Levels	Site Preparation Extraction Operations Processing Stockpiling Aggregate	• Elevated noise from trucks, heavy equipment, and machinery during operations • Potential annoyance, sleep disturbance, and reduced quality of life for nearby residents	• Restrict production to 7:00 AM to 7:00 PM; limit holiday and weekend work to the greatest extent possible • Maintain equipment and minimize idling • Retain forest buffers • Alternate crusher duty cycles (best efforts) • Position stockpiles between equipment and receptors • Keep production equipment in the footprint	• Implement complaint response protocol for noise-related concerns	Not Significant

VEC	Project Activities	Potential Effects	Mitigations	Monitoring	Significance After Mitigations
	Quantification Transportation Site Reclamation		• Enforce site speed limits • Relocate equipment or use berms only if needed		
Dust and Emissions	Site Preparation Extraction Operations Processing Stockpiling Transportation Site Reclamation	• Dust, particulate matter, and emissions may aggravate respiratory conditions • Coarse dust may irritate the eyes, nose, and throat of workers and nearby residents • Dust deposition on nearby properties may cause nuisance and increase maintenance needs • Reduced visibility from dust may pose traffic safety risks near the site and along haul routes • Prolonged exposure to fine particulates may increase cardiovascular risks • VOCs in emissions may elevate cancer risk	• Use dust suppression techniques • Set restrictions on dust-generating activities (e.g. speed limits, wind-avoidance timing, etc.) • Minimize disturbed areas and progressively reclaim to limit dust sources • Use enclosed/covered trucks for material transport • Maintain equipment per manufacturer specs and use emissions controls • Store materials with wind direction in mind; secure loose materials • Minimize idling and prioritize low-emission engines • Provide health and safety training	• Implement complaint response protocol for dust- and emissions-related concerns	Not Significant
Safety and Community Well-Being	Site Preparation Extraction Operations Processing	• Safety risks to workers from heavy machinery and on-site activities • Public safety risks from unauthorized site access	• Follow the *Occupational Health and Safety Act* and industry standards • Secure site with gated access and safety signage • Enforce speed and weight limits; maintain vehicles	• Implement complaint response protocol • Conduct routine safety inspections and ensure OHS	Not Significant

VEC	Project Activities	Potential Effects	Mitigations	Monitoring	Significance After Mitigations
	Stockpiling Aggregate Quantification Transportation Site Reclamation	• Increased truck traffic may raise collision risks on public roads • Accidental fuel or lubricant spills may contaminate water	• Use proper fuel storage, secondary containment, and safe refuelling procedures	compliance • Periodically assess site security measures • Review transportation safety measures and vehicle inspection records	

8.7 ADAPTIVE MANAGEMENT

To ensure that the potential effects of the Project are effectively managed throughout its lifecycle, adaptive management will be implemented. This approach will involve regularly monitoring the environmental effects of the Project, as outlined in the monitoring programs for each VEC, and adjusting mitigation measures as necessary to address any emerging issues or unanticipated changes. Monitoring results will inform the ongoing implementation of mitigation strategies and will be used to revise approaches where needed, ensuring the Project's environmental impact remains within acceptable thresholds.

Examples of how monitoring results will be used to adapt Project activities include:

- **Groundwater:** Groundwater levels measured under the Groundwater Management and Monitoring Plan will be compared against the trigger levels established in the plan. If levels indicate that the separation between the excavation floor and the seasonal high water table is at risk, excavation depth or extent in that area will be adjusted, corrective actions will be implemented based on the advice of a qualified hydrologist, and the exceedance will be reported to NSECC.
- **Wildlife:** Findings from turtle sweeps and nest monitoring during the active season will be used to adjust work areas. If a turtle is found, work in that area will be paused or redirected until it can be addressed under the Wildlife Management Plan. If active Bank Swallow or Common Nighthawk nesting is confirmed in exposed pit faces, stockpiles, or bare ground, disturbance to those features will be deferred until nesting is complete.
- **Erosion and Sediment Control:** ESC inspections (quarterly and within 24 hours of precipitation events of 25 mm or more) will identify controls that have failed or are undersized. These will be repaired, upgraded, or supplemented, for example with additional silt fencing, check dams, or stabilization of exposed areas.
- **Complaints:** Noise, dust, and traffic complaints will be logged and reviewed through the complaint response protocol. Recurring concerns will be used to refine operations, for example by relocating equipment farther from the affected property, adding noise attenuation berms, restricting crusher operation to shorter hours, or increasing the frequency of dust suppression.

CHAPTER 9: CUMULATIVE ENVIRONMENTAL EFFECTS

9.1 OVERVIEW

As defined by the Government of Canada (2025a), cumulative effects generally refer to the combined effects from past, present, and reasonably foreseeable future activities and natural processes. Cumulative effects can occur when multiple activities or processes overlap in time and space, leading to effects that may accumulate or intensify beyond what would be expected from each activity or process individually.

The purpose of this cumulative effects assessment (CEA) is to evaluate the combined environmental effects of the proposed Project and other existing or foreseeable activities within the region. This assessment helps identify whether the residual effects of the Project, in combination with other regional activities, could lead to significant cumulative impacts on the selected VECs.

9.2 METHODOLOGY

9.2.1 SELECTION OF BOUNDARIES

SPATIAL BOUNDARIES

Two spatial assessment boundaries have been established for this CEA:

- **Local Assessment Area:** A 5 km buffer around the Project Site was used to assess cumulative effects on the physical and natural environment, including groundwater, surface water, air quality, noise, habitat, and wildlife. This distance reflects how far the Project's physical effects (e.g., dust and noise) could realistically travel and interact with those of other nearby activities. The Project Site is located on the South Mountain and is surrounded predominantly by Crown land and forest; therefore, the number of other industrial or extractive operations within 5 km is limited.
- **Regional Assessment Area:** A 25 km search radius was applied for the purposes of identifying other approved extractive operations in the broader region. This expanded search was conducted to address regional project alternatives and socioeconomic context – specifically, to assess whether the Project is justified given existing regional aggregate supply. This two-tier approach ensures that the biophysical assessment boundary remains defensible on the basis of realistic effect propagation distances, while the socioeconomic and alternatives analysis reflects a regionally meaningful scope.

TEMPORAL BOUNDARIES

The assessment covers the full anticipated life of the Project, approximately 20 to 30 years, from initial land clearing through operation to final decommissioning and reclamation.

9.2.2 SELECTION OF VECS

The following VECs were carried forward into the CEA because they have identified residual effects from the Project that could potentially interact with effects from other activities in the area:

- Surface Water and Groundwater
- Wetlands
- Flora, Fauna, and Terrestrial Habitat
- Fish and Aquatic Habitat
- Air Quality
- Transportation
- Noise Levels
- Dust and Emissions

VECs such as property values, recreation, cultural resources, and employment were not carried forward, as the Project's effects on these components are not expected to interact meaningfully with those of other regional activities.

9.2.3 OTHER PROJECTS AND ACTIVITIES IN THE AREA

A desktop review was conducted to identify other past, present, and reasonably foreseeable future projects and activities within the CEA boundaries. Consistent with the Cumulative Effects Assessment Practitioners Guide (Hegmann et al., 1999), this review considered not just other pits and quarries, but all major land uses and activities that could interact with the Project's residual effects.

EXTRACTIVE OPERATIONS – INDUSTRIAL APPROVALS

A review of the NSECC Industrial Approvals Online Search was conducted in June 2026 for Annapolis County and Kings County to identify active pits and quarries within approximately 25 km of the Project Site. The results, filtered to extractive operations only, are presented in Table 9.1. Other types of IAs (e.g., petroleum storage, concrete plants, rendering facilities, agricultural operations) were identified in both counties and were screened against the spatial boundaries described in Section 9.2.1. For the physical effects carried forward in this CEA (air quality, dust and emissions, noise, groundwater and surface water, and habitat), only activities within the 5 km Local Assessment Area could realistically interact with the Project's residual effects, given the distances over which dust and noise propagate. No non-extractive IAs were identified within 5 km of the Project Site. For Transportation, cumulative interactions are assessed on the local road network connecting the Project Site to the regional highways, where Project haul traffic is concentrated and shares the road with residential, agricultural, and forestry traffic. Beyond this local network, Project trucks disperse onto regional highways,

where they represent a small increment relative to existing traffic volumes (Section 7.2.3) and are not expected to interact cumulatively with the Project's effects in a meaningful way.

Table 9.1: Active Pit and Quarry Industrial Approvals Within 25 km of the Project Site

Approval Holder	Site Name	Community	Operation Type	County	Distance to Project Site (km)
Roger Parker Excavating Limited	Parker Gravel Pit	Tremont	Pit	Kings	20
Chapman Bros. Construction Ltd.	Harmony Road, Greenwood	Harmony	Quarry	Kings	24
Municipal Enterprises Limited	2855 Roxbury Road, Paradise, Annapolis County	Paradise	Pit	Annapolis	3
Rick Aldred	Unnamed Pit	Prince Albert	Pit	Annapolis	19
Prospect Industrial Equipment Sales and Rentals Limited	Hwy 362 Margaretsville, NS	Margaretsville	Pit	Annapolis	20
Chapman Bros. Construction Ltd.	Nictaux West Quarry	South Williamston	Quarry	Annapolis	6
Christopher M Hankinson	93 Wanda Lynn Drive, Nictaux, Annapolis County	Nictaux	Quarry	Annapolis	10
Municipal Enterprises Limited	Roxbury Road, Paradise	Paradise	Quarry	Annapolis	3
Rice's Contracting Company Limited	Quarry at Hampton Mountain Road	Hampton	Quarry	Annapolis	15

Source: NSECC (2026a)

EXTRACTIVE OPERATIONS – ENVIRONMENTAL ASSESSMENT APPROVALS

A review of the NSECC Environmental Assessments Map was conducted in June 2026 to identify EA-approved projects within approximately 25 km of the Project Site. Table 9.2 lists pit and quarry projects, and Table 9.3 lists other EA-approved projects found within the search area.

Table 9.2: EA-Approved Pit and Quarry Projects Within 25 km of the Project Site

Project Name	Proponent	County	EA Approval Year	Distance to Project Site (km)
Nictaux Sand Pit Expansion Project	4389818 Nova Scotia Limited	Annapolis	2025	13
Spicer North Mountain Quarry Expansion Project	B. Spicer Construction Ltd.	Annapolis	2020	19
Nictaux Quarry Expansion Project	Dexter Construction Company Limited	Annapolis	2015	10
Torbrook Gravel Pit Expansion	Ivan H. Trimper Excavating Ltd.	Annapolis	2012	14
Marshall Road Sand Pit Expansion	Scotia Aggregates Limited	Kings	2006	21
Nictaux Pit and Quarry	Ward Aggregates Ltd.	Annapolis	2005	10

Source: NSECC (2026b)

Table 9.3: Other EA-Approved Projects Within 25 km of the Project Site

Project Name	Proponent	Project Type	County	EA Approval Year	Distance to Project Site (km)
Asbestos Waste Disposal Facility Project	Arlington Heights C&D Limited	Waste Management	Annapolis	2017	13
Torbrook Disposal of Waste Dangerous Goods Facility (Asbestos)	3033869 Nova Scotia Ltd.	Waste Management	Annapolis	2012	13
Retirement Care Facility Expansion, Middleton	GEM Health Care Group	Other	Annapolis	2012	13
Hampton Mountain Wind Power Project	SP Development Limited Partnership	Energy	Annapolis	2011	12
Tower View Zeolite Mine	C2C Mining Corp.	Mining	Annapolis	2001	21

Source: NSECC (2026b)

A review of the Impact Assessment Agency of Canada (IAAC) Interactive Assessment Map (IAAC, 2026) was also conducted. The nearest current projects on federal lands are located at Canadian Forces Base 14 Wing Greenwood, in Kings County, approximately 22 km northeast of the Project Site. No federal projects were identified that are expected to interact cumulatively with the effects of the proposed Project.

SMALL PITS BELOW THE INDUSTRIAL APPROVAL THRESHOLD

Not all extractive operations in Nova Scotia require an IA or EA. Pits with an active area under 2 ha are exempt from IA requirements and are therefore not captured in the registry searches described above. A desktop review and site reconnaissance identified two small active pits – one approximately 174 m northeast of the Project Site along Inglisville Road, and one approximately 1.5 km northeast located off Highway 201. These are the closest extractive operations to the Project Site and are discussed further in Sections 9.3.5 and 9.3.7.

FORESTRY OPERATIONS

The Project Site is surrounded by a mix of Crown land and privately owned forested land, and active forestry and historical forestry operations in the area represent the most spatially proximate activity within the 5 km LAA. Forestry operations affect many of the same environmental features as the Project, including wildlife habitat, watercourses, and carbon storage in trees.

AGRICULTURAL ACTIVITIES

Agricultural land use is the dominant activity in the Annapolis Valley to the north of the Project; however, agricultural fields are not generally present within 5 km of the Project Site given its position on the South

Mountain. The primary cumulative effects pathway of relevance is surface water quality in the Annapolis River watershed, to which both agricultural nutrient and sediment loading from valley-floor operations and potential Project-related sediment inputs from the active extraction footprint and road crossings could contribute. This pathway is most relevant to aquatic habitat and water quality in Eel Weir Brook and its receiving waters rather than to the Lawrencetown Municipal Water Supply, given that the municipal supply is drawn from a deep bedrock aquifer that is hydraulically separated from the surficial drainage system. The Project's contribution to cumulative surface water quality effects is expected to be minor relative to the established agricultural land use in the broader watershed, and will be further minimized through the implementation of the ESC Plan and the 30 m watercourse buffers described in Section 8.1.1.

TRANSPORTATION INFRASTRUCTURE

Inglisville Road, Trout Lake Road, and Highway 201 are the main roads in the vicinity of the Project. Ongoing traffic on these routes already contributes to background noise, greenhouse gas emissions, and road wear, and poses an existing risk of wildlife-vehicle collisions for species such as Wood Turtle and Eastern Painted Turtle. The Project will add truck traffic to these roads, as well as surrounding roads, during operations, incrementally increasing this cumulative risk.

LAWRENCETOWN MUNICIPAL WATER SUPPLY AREA

The Project Site is located within the Lawrencetown Municipal Water Supply Area, a protected zone established to safeguard the Village's public drinking water. Other land uses within this supply area – including forestry, farming to the north, and residential development in Lawrencetown – all have some potential to affect the same groundwater system over time. The Project's water management commitments, including strict excavation depth controls and ongoing groundwater monitoring, are designed to ensure the Project does not add to this cumulative pressure.

SUMMARY

A total of nine active pit and quarry IAs were identified within approximately 25 km of the Project Site across Annapolis and Kings counties (Table 9.1), along with six EA-approved pit and quarry projects (Table 9.2). One operation, the Municipal Enterprises Limited pit and quarry at 2855 Roxbury Road, Paradise, is located within 5 km of the Project Site, approximately 3 km to the northwest. The remaining operations are all located beyond 5 km, and their physical effects are not expected to overlap spatially with those of the Project. The primary other activity within the 5 km LAA is forestry on surrounding forested land.

9.3 CUMULATIVE EFFECTS ASSESSMENT

9.3.1 SURFACE WATER AND GROUNDWATER

The Project could affect surface water and groundwater through changes to drainage patterns, sediment runoff, and water quality. An important consideration specific to the Inglisville site is its location within the Lawrencetown Municipal Water Supply Area. Forestry operations on surrounding land, farming to the north, residential development in Lawrencetown, and traffic on local highways all represent co-existing land uses within the same water supply area that could cumulatively affect groundwater quality and quantity over time.

The Project has been designed to avoid adding meaningfully to this cumulative pressure. Excavation will stay at least 1 m above the seasonal high groundwater table, no pumping or dewatering is expected to be required, and a Groundwater Management and Monitoring Plan will be in place throughout operations. The sand and gravel deposits being extracted are not identified as a major regional aquifer in the Nova Scotia Groundwater Atlas, and all 14 water wells recorded within 1 km of the site draw from deep bedrock, well below the shallow overburden the Project will be working in. The Lawrencetown municipal well, located approximately 2.9 km to the north, draws from the same deep bedrock aquifer and will not be affected by surface-level excavation at the Project Site.

A 30 m buffer will be maintained along all watercourses, including Eel Weir Brook (WC1), WC2, WC3, and WC4. Forestry operations on surrounding land may temporarily increase runoff and erosion after harvesting, but these effects are separate from and do not interact with the Project's drainage management systems.

Cumulative effects on surface water and groundwater are not anticipated to be significant.

9.3.2 WETLANDS

The Project's initial phase of development (Blocks 1-4) has been sited to avoid direct interaction with wetlands on the Project Site, with a vegetated buffer maintained around each one. Minor indirect effects from dust, invasive plants, and site runoff are possible during this phase but will be managed through the measures described in Section 8.1.2. Direct alteration of one or more wetlands is considered reasonably foreseeable over the full operational life of the Project as future blocks are developed; the specific wetland(s) and extent affected cannot be determined at this stage, and any such alteration would be subject to a provincial Wetland Alteration Approval and associated compensation plan at the time it is proposed.

Forestry harvesting on surrounding land is the main other activity that could affect wetlands in the area, through increased sedimentation, altered drainage, and the spread of invasive species. These risks are spatially separate from the Project and managed through provincial forestry regulations. Farming to the north could contribute

nutrients to wetlands draining toward the Annapolis River. While direct alteration of one or more wetlands is considered reasonably foreseeable over the life of the Project, remaining wetlands will be protected by vegetated buffers, and the Project's contribution to cumulative wetland effects, beyond any future direct alteration addressed through a Wetland Alteration Approval and compensation plan, is not expected to be significant.

Cumulative effects on wetlands are not anticipated to be significant.

9.3.3 FLORA, FAUNA, AND TERRESTRIAL HABITAT

The Project will clear approximately 4.0 ha of early successional, regenerating forest within Blocks 1-4, with additional clearing occurring progressively as future blocks are developed over the Project's operational life. Within the 5 km local assessment area, forestry on surrounding land and the Roxbury Road pit and quarry operation are the main other sources of habitat disturbance. The combined effect of these activities in this landscape is relevant for the nine priority fauna species confirmed on or near the Project Site, grouped below by shared cumulative dynamics.

Little Brown Myotis and Northern Myotis: Both bat species were detected on the Project Site during acoustic monitoring. Both have declined by more than 90% across eastern Canada, largely due to White-nose Syndrome, a fungal disease that kills bats during hibernation. On top of this disease pressure, they face ongoing loss of forest roosting trees through harvesting on surrounding land. The Project will limit its contribution to these cumulative pressures by keeping operations to daytime hours, avoiding disruption to nighttime foraging, and limiting impacts to wetland and watercourse habitats these species depend on. Furthermore, the Project site does not contain mature forest or roosting habitat for resident or migratory bats.

Wood Turtle and Eastern Painted Turtle: Suitable habitat for Wood Turtle was confirmed along Eel Weir Brook during surveys, and Eastern Painted Turtle was identified as a priority species based on the presence of suitable aquatic habitat and the potential for pit operations to create open nesting substrate over time. Road mortality is a recognized primary cumulative threat to both species in Nova Scotia. The Project will incrementally increase truck traffic on Inglisville Road, adding to the existing road mortality risk posed by forestry vehicles and general rural traffic. The Wildlife Management Plan will include daily visual checks of active work areas and the access road for nests and transient turtles during the active turtle nest establishment season (mid-May to mid-July) to reduce the Project's contribution to this cumulative risk.

Bank Swallow and Common Nighthawk: Neither species was confirmed nesting on the Project Site, which is being newly developed and does not yet have the open ground and exposed faces these species require for nesting. However, over time pit operations will create bare ground, open gravel surfaces, and steep sand faces that both species actively seek out for nesting. Bank Swallow has declined by 98%, and Common Nighthawk has

experienced significant declines across Canada, both driven in part by cumulative losses of open nesting habitat. The Project will monitor newly created surfaces for Nightjar nesting activity as part of the Wildlife Management Plan.

Eastern Wood-Pewee and Olive-sided Flycatcher: Eastern Wood-Pewee was detected during breeding bird surveys in mature forest along the eastern boundary of the Project Site. Olive-sided Flycatcher was identified as a priority species based on the presence of suitable forested wetland and edge habitat on site. Both are aerial insectivores that have experienced long-term population declines linked to the loss of mature forest habitat and reduced insect prey availability. Forestry harvesting on surrounding land that removes mature forest and open forest edges is the primary cumulative co-stressor for both species. The Project's clearing is limited to young, regenerating forest and is not anticipated to impact the mature forest habitats these species use.

Canada Warbler: Canada Warbler was identified as a priority species based on suitable riparian swamp habitat along Eel Weir Brook. The species is associated with forested wetland and riparian habitats and is declining due in part to the cumulative loss of these habitats through forestry harvesting. The Project's 30 m watercourse buffers protect the riparian habitats these species depend on from direct removal, and wetland habitat used by these species will be avoided throughout Blocks 1-4.

Across all nine priority species, the Project's contribution to cumulative habitat effects is limited by the confirmed initial footprint (Blocks 1-4, 4.0 ha), the young regenerating character of the forest being cleared, the maintenance of watercourse buffers and the minimization of impacts to wetlands, and the commitment to progressive reclamation. The Wildlife Management Plan will include seasonal vegetation clearing restrictions during the nesting bird season (April 1 to August 31), and species-specific identification and mitigation commitments for each of these species.

Considering the proposed mitigations and management measures, cumulative effects on flora, fauna, and terrestrial habitat are not anticipated to be significant.

9.3.4 FISH AND AQUATIC HABITAT

The Project's extraction footprint does not require any new watercourse crossings or alterations beyond the Project's access road, and a 30 m vegetated buffer will be maintained from all four Project watercourses. The access road requires a new bridge crossing over WC1 (Eel Weir Brook), replacing the existing bridge, designed as a clearspan structure with no contact between the structure and the bed or bank; as designed, no alteration of WC1 is anticipated. A Watercourse Alteration Approval will be obtained if removal or installation of the bridge affects the bed or bank. An existing culvert crosses WC2 and may require upgrading; any such upgrade would be assessed by a qualified professional and carried out in accordance with all applicable regulatory requirements, including a Watercourse Alteration Approval where the bed or bank is affected, and the installation of

appropriate ESCs along approaches to the watercourse, as described in Section 8.1.1. Eel Weir Brook runs northeast along the northern boundary of the Project Site and flows into the Annapolis River approximately 3.5 km away, connecting to a broader watershed that supports Brook Trout, American Eel, and the Brook Floater freshwater mussel.

Forestry operations in the surrounding area may contribute over time to increased sedimentation and warmer water temperatures in on-site watercourses by removing streamside vegetation. The Project's riparian buffer, sediment controls, and progressive reclamation will prevent the Project from contributing to these pressures. Field assessments identified Eel Weir Brook as providing suitable cold-water fish habitat for species such as Brook Trout, and WC2 was also assessed as having good fish habitat quality (Section 7.1.6); no Project activities will occur within its 30 m buffer.

Cumulative effects on fish and aquatic habitat are not anticipated to be significant.

9.3.5 AIR QUALITY

The Project will generate dust and diesel exhaust from digging, moving materials, and trucking. These emissions will be concentrated near the pit floor and haul routes. Within the 5 km local assessment area, the main other sources of air quality pressure are the Municipal Enterprises Limited pit and quarry operation at Roxbury Road approximately 3 km to the northwest, forestry equipment on surrounding land, and traffic on Highway 201 and Trout Lake Road. Despite the proximity of the Roxbury Road operation, the approximately 3 km separation distance and the intervening forested terrain are sufficient to prevent meaningful overlap of fugitive dust between the two sites.

Two small active pits operating below the IA threshold are also located along Inglisville Road, approximately 174 m and 1.5 km northeast of the Project Site, respectively. The nearest of these is the closest extractive operation to the Project Site. However, the proposed extraction area is set back from the northern Project boundary by a forested buffer, meaning the actual working face of the pit will be considerably further than 84 m from the nearest receptor. A forested buffer also separates the two nearest operations. Both the Project and the sub-IA pits are small, cyclically operated facilities driven by local construction demand, making simultaneous peak operations, and therefore meaningful cumulative overlap of dust at nearby receptors, unlikely.

Seasonal agricultural dust from the valley floor may also contribute to the broader region. Existing air quality in the area is good, based on monitoring data from Aylesford and Kentville, and the Project's combined contribution with other sources is not expected to push concentrations above provincial or federal limits.

Cumulative effects on air quality are not anticipated to be significant.

9.3.6 TRANSPORTATION

The Project will increase the number of heavy trucks using Inglisville Road, connecting roads, and regional highways during operations. This adds to the existing traffic from local residents, farmers, and forestry operations.

The main cumulative transportation concern at this site is the increased risk of wildlife-vehicle collisions, particularly for Wood Turtle and Eastern Painted Turtle, which are attracted to warm road surfaces and open gravel areas. Forestry trucks and Project haul trucks together raise the overall collision risk for these species in this area. Daily site inspections, enforced speed limits on Project roads, and wildlife awareness training for workers will help reduce the Project's contribution to this risk.

Cumulative effects on transportation are not anticipated to be significant.

9.3.7 NOISE LEVELS

The Project will bring new noise from equipment and trucks to a currently quiet rural area. Noise monitoring at the Project Site showed that existing sound levels are well below acceptable limits in all time periods; for example, the average daytime level measured was 36.8 dBA, compared to the permitted maximum of 53 dBA for rural areas (Section 7.4.1). Other noise sources in the area include the Municipal Enterprises Limited pit and quarry operation at Roxbury Road approximately 3 km to the northwest, traffic on Highway 201 and Trout Lake Road, and occasional forestry machinery. The 3 km separation between the Roxbury Road operation and the Project Site, combined with the attenuation provided by intervening forest cover, means that noise from the two operations is not expected to meaningfully combine at any sensitive receptor.

The two small sub-IA pits along Inglisville Road are the closest operations to the Project Site and the nearest receptor. However, the proposed extraction area is set back from the northern Project boundary by a forested buffer, meaning the actual working face will be considerably further from the nearest receptor than the 84 m boundary distance suggests. A forested buffer also separates the two nearest operations from each other. Noise attenuates significantly over distance and through forest cover, and both operations are small and cyclically active. Predicted combined levels at the nearest receptor during production are 46.3-52.6 dBA (Section 8.4.1), below the 53 dBA Rural PSL. The nearby operations are small, cyclically active, and separated from this receptor by distance and forest, and are not expected to contribute meaningfully to noise there.

Cumulative effects on noise levels are not anticipated to be significant.

9.3.8 DUST AND EMISSIONS

The Project will add some dust and vehicle emissions to an area that already experiences low levels of background particulate matter from road traffic, farming, and forestry. The Project's total estimated greenhouse gas emissions of approximately 1,087.5 tonnes of CO_2e per year (Section 7.1.7) are well below the 10,000-tonne threshold at which federal reporting to ECCC's GHGRP is required, and represent less than 0.008% of Nova Scotia's total annual GHG emissions of approximately 13.69 Mt CO_2e in 2024 (ECCC, 2026b). Dust suppression measures, regular equipment maintenance, and speed limits will further limit the Project's contribution to local air quality.

Cumulative effects on dust and emissions are not anticipated to be significant.

9.4 CONCLUSION

The CEA found that the Project, when considered alongside other existing and foreseeable activities in the region, is not expected to result in significant cumulative environmental effects.

The Project Site is on the South Mountain, surrounded predominantly by forested land. A search of the NSECC Industrial Approval database and EA Project Registry identified nine active pit and quarry IAs and six EA-approved pit and quarry projects within approximately 25 km of the Project Site across Annapolis and Kings counties (Tables 9.1 and 9.2). One operation, the Municipal Enterprises Limited pit and quarry at Roxbury Road, Paradise, is located within 5 km of the Project Site, approximately 3 km to the northwest. The approximately 3 km separation distance and the intervening forested terrain are sufficient to prevent meaningful overlap of dust, noise, or groundwater effects between the two sites. All remaining operations are beyond 5 km, and no spatial overlap of physical effects is anticipated with those facilities. Two small active pits operating below the Industrial Approval threshold were also identified, the nearest approximately 174 m northeast of the Project Site on Inglisville Road. The proposed extraction area is set back from the Project boundary by a forested buffer, and both operations are small and cyclically active, making meaningful cumulative overlap of dust or noise at nearby receptors unlikely. Aggregate pit operations are also typically cyclic rather than continuous, making it unlikely that any of these operations would be simultaneously operating at peak capacity and generating overlapping effects.

The most meaningful cumulative interaction at this site is between the Project and forestry operations on surrounding land, which share several of the same VECs, including terrestrial habitat for SAR such as Wood Turtle, Little Brown Myotis, Northern Myotis, Eastern Wood-Pewee, Canada Warbler, and Bank Swallow. The Project's contribution to cumulative habitat loss is limited by the confirmed initial footprint (Blocks 1-4, 4.0 ha), the young regenerating character of the forest being cleared, the maintenance of watercourse buffers and the

minimization of impacts to wetlands and the commitment to progressively reclaim disturbed areas. The Wildlife Management Plan will include species-specific commitments for each of these species.

A feature unique to the Inglisville Project is its location within the Lawrencetown Municipal Water Supply Area. Multiple land uses, including forestry, farming, residential development, and the proposed pit, all operate within this supply area and have some potential to affect the same groundwater system. The Project has been specifically designed to avoid contributing to any cumulative pressure on this drinking water source, through strict excavation depth controls, no dewatering, and ongoing groundwater monitoring.

Finally, while other pits and quarries operate in the broader region, this does not reduce the need for the Inglisville Project. The cost and environmental impact of transporting aggregate makes local and regional supply essential. Operating a pit close to where materials are needed keeps truck trips short, reduces fuel use and road wear, and supports local employment, which are all positive contributions to the region.

CHAPTER 10: EFFECTS OF THE ENVIRONMENT ON THE PROJECT

The environment surrounding the Project Site can influence pit operations, particularly through climate change, extreme weather, and natural hazards. Recognizing these factors is essential for understanding potential vulnerabilities and implementing necessary mitigation measures.

10.1 CLIMATE CHANGE AND EXTREME WEATHER

Climate change is projected to impact Nova Scotia through increased temperatures, shifting precipitation patterns, and more frequent and severe extreme weather events. As detailed in the baseline assessment (Section 7.1.8), historical climate data from the Greenwood A Meteorological Station establishes the local climatic baseline for the Project Area. Average annual temperatures in Nova Scotia are expected to rise by 2.6°C by mid-century and by up to 4.5°C by the end of the century under high-emission scenarios (NSECC, 2022a). Locally, these projected changes may contribute to heavier and more intense rainfall events, stronger storms, and an increased risk of localized flooding and erosion.

At the Project Site, these climate trends may occasionally disrupt operations through localized erosion or storm-related impacts. Warmer temperatures and fluctuating freeze-thaw cycles may also influence soil stability, particularly in erosion-prone or steep areas of the site. Short-duration rain or snow events may pause operations, while heavier storms could cause surface runoff, localized erosion, or sediment movement. However, the well-drained sandy soils and internal grading of the pit are expected to direct water to the pit floor, limiting the potential for off-site impacts. High winds may generate fugitive dust; however, this risk will be mitigated through the use of dust control measures to reduce the potential for off-site transport.

10.2 FLOODING AND HYDROLOGICAL HAZARDS

Heavy rainfall and snowmelt can cause inland flooding in Nova Scotia, particularly in low-lying areas (Bush & Lemmen, 2019). Baseline field assessments identified four permanent watercourse segments (WC1/Eel Weir Brook, WC2, WC3, and WC4) and nine delineated wetlands (WL1 through WL9) within the Project Site. The Project will maintain at least a 30 m buffer from all watercourses in accordance with provincial guidelines, minimizing flood vulnerability and hydrological impacts within the operational area.

While the Project footprint itself is not located within a floodplain, localized ponding and surface runoff during intense storm events may still occur. This could result in short-term disruptions to site access or equipment. These impacts are expected to be short-term and manageable through general stormwater management practices and erosion control measures implemented as part of the Project's environmental protection planning.

The wetlands on the Project Site, as well as the four watercourses, would likely see changes in hydrology. Increased frequency and intensity of precipitation, coupled with prolonged dry spells, will likely lead to more extreme hydrological conditions. This could manifest as more severe swings between drought and flood conditions in both the wetlands and the watercourses. While the permanent watercourses on site may offer some drought resilience to their contiguous wetlands (such as WC1 maintaining a baseline water supply for the floodplain of WL1), the wetlands are simultaneously crucial for the watercourses' flood resilience, providing stormwater attenuation and erosion resistance.

10.3 SLOPE STABILITY

Extreme weather events, including heavy precipitation and freeze-thaw cycles, can influence soil stability and increase the risk of localized slumping or slope failure, particularly on the active pit faces or overburden stockpiles. To mitigate this risk, the pit development will be staged, and final pit walls will be progressively rehabilitated to a stable 3:1 slope to minimize the surface area of exposed, unstable soils.

10.4 WILDFIRES

Climate change projections indicate that the risk of wildfires in Nova Scotia will increase by mid-century due to warmer temperatures and prolonged dry periods. Given the forested nature of the undisturbed portions of the Project Site, a wildfire could pose a significant safety risk to workers and equipment. Fire risks will be managed through strict adherence to provincial burn restrictions, the maintenance of clear access roads for emergency vehicles, and the implementation of a site-specific Emergency Response Plan.

10.5 MITIGATIONS

The following measures will help minimize potential environmental effects from extreme weather events, natural hazards, and climate change:

- Erosion control measures (e.g., silt fences) will be used where necessary to reduce runoff and sedimentation risks during severe storms.
- A minimum 30 m setback from all identified watercourses (WC1 through WC4) will be maintained to reduce hydrological and ecological impacts. A vegetated buffer will be maintained around wetlands, as described in Section 8.1.2.
- Runoff will be directed toward infiltration areas where feasible, and existing drainage patterns will be preserved. Stormwater management practices will help reduce erosion and localized flooding.
- Site activities may temporarily pause during extreme weather events (e.g., heavy rainfall, high winds) to protect workers and equipment. Operations will resume once conditions stabilize.

- During high winds, dust will be managed using the application of water, lignin-based solutions, and/or chloride mixtures to minimize off-site transport.
- Severe weather forecasts will be monitored, and site-specific response measures will be implemented as needed.

10.6 CONCLUSION

The Project is designed to minimize the potential impacts of climate change, extreme weather events, and hydrological hazards. By implementing the outlined mitigation measures, including erosion control, stormwater management, and dust suppression, the Project is prepared to manage these environmental challenges. These strategies will help ensure that any residual risks are effectively managed, maintaining operations throughout all phases of the Project while protecting the surrounding environment.

CHAPTER 11: EMERGENCY AND RISK MANAGEMENT

The Project will involve low-risk activities typically associated with pit operations, including excavation, stockpiling, and hauling of aggregate material. However, potential risks will be addressed through a combination of mitigation measures, emergency response planning, and adherence to applicable regulatory frameworks.

11.1 IDENTIFIED RISKS

Several potential risks are associated with the operation of the pit, including:

Fires

Fires may occur due to equipment malfunction, dry conditions, or human error during operation or refuelling activities. Risk is higher during dry periods, and fire may be exacerbated by the presence of combustible materials on-site (e.g., fuel, lubricants).

Sedimentation and Soil Erosion

Disturbance of soil during excavation activities may lead to sediment runoff, particularly during rainfall events, potentially affecting nearby watercourses.

Fuel and Hazardous Substance Leaks

Fuel or oil leaks from machinery or during refuelling present a risk of contaminating soil and surface water. Incidents may also involve unintended discharge of hydraulic fluids or lubricants during equipment malfunctions.

Surface Water Contamination

Spills of hazardous substances or poor management of stormwater runoff can lead to contamination of local waterbodies, including nearby streams or groundwater sources.

Vehicle Accidents

Accidents involving transport vehicles, such as trucks carrying sand, can pose risks to workers and nearby road users, especially if they occur on local or regional roads.

11.2 MITIGATIONS

To manage the identified risks, the following mitigation measures will be implemented:

Fire Prevention and Control

- Fire extinguishers will be available at key locations, particularly near fuel storage and refuelling areas.
- Workers will be trained in fire prevention and basic response procedures.

Erosion and Sediment Control

- Measures such as silt fences will be installed to prevent sediment from reaching nearby watercourses.
- ESCs will be inspected regularly and after significant precipitation events.
- Disturbed areas will be stabilized as soon as practicable, especially ahead of rainfall events.

Spill Prevention and Containment

- Fuel and oil storage will include secondary containment (e.g., spill trays or berms).
- Equipment will be regularly maintained and inspected for leaks.
- Spill kits (e.g., absorbent pads, booms) will be available on-site to contain and clean up minor spills. Larger spills will be managed with support from an external environmental response contractor.

Surface Water Contamination

- Equipment will be refuelled away from waterbodies and runoff paths.
- Stormwater management practices will be in place to divert clean water away from work areas and to manage runoff from disturbed areas.

Vehicle Safety

- Drivers will follow site speed limits and haul route protocols.
- Signage warning of truck traffic will be installed at the site entrance.
- Regular maintenance and inspections of vehicles will be conducted to reduce mechanical failure risks.

11.3 EMERGENCY PLANNING, CONTINGENCY MEASURES, AND COMMUNICATION

An Emergency Response Plan will be developed prior to operations. This plan will outline roles and responsibilities, emergency procedures, and communication protocols to ensure a rapid and coordinated response in the event of a fire, hazardous substance spill, vehicle accident, or other incidents, and will incorporate the Spill Response and Contingency Plan described in Section 8.1.1 for quick action in the event of spills of fuel or hazardous material. The plan will align with provincial requirements and industry best practices and will be developed in consultation with the appropriate regulatory authorities.

In the event of an emergency, the site supervisor or designated on-site lead will coordinate communication with local emergency services, regulators, and nearby residents as appropriate. Updates may be shared via direct outreach or local communication channels, depending on the nature and severity of the event.

These plans will be reviewed and updated as needed throughout the life of the Project to reflect operational changes or evolving best practices.

CHAPTER 12: ADDITIONAL APPROVALS, AUTHORIZATIONS, AND FUNDING SOURCES

The following additional approvals and authorizations will be required prior to proceeding with the Project:

- **Industrial Approval:** The Project will require an Industrial Approval under the *Environment Act,* S.N.S. 1994-95, c. 1, prior to the commencement of extraction operations.
- **Municipal Requirements:** No municipal development or building permits are required for this type of operation, as no structures are anticipated. The Proponent will continue to comply with all applicable municipal bylaws and land use regulations.
- **Other Permitting Requirements:** A Watercourse Alteration Approval will be obtained where an upgrade to the existing WC2 culvert or replacement of the existing WC1 bridge affects the bed or bank, as described in Section 8.1.1. A Wetland Alteration Approval, including a compensation plan, would be required should direct alteration of a wetland be necessary to support future operational blocks, as described in Section 8.1.2. No water withdrawal approvals are anticipated, as the Project does not propose pumping or dewatering.

No public funding or government grants will be sought for this Project. The Project will be fully funded through private investment by the Proponent.

CHAPTER 13: CONCLUSION

The objective of the Project is to establish a new sand and gravel extraction operation on Inglisville Road, West Inglisville, Annapolis County, to support regional infrastructure and development needs. The Project will be developed progressively in 1-hectare operational blocks over an anticipated operational lifespan of 20 to 30 years, beginning with an initial 4.0 ha footprint (Blocks 1-4) and extending to a maximum of 36 ha of extraction area, while helping to meet local and regional demand for aggregate and maintaining compliance with environmental regulations and best practices in pit operations and progressive reclamation.

This EA considered the potential effects of the Project on a range of biophysical, socioeconomic, cultural, and human health VECs. No significant adverse residual environmental effects are anticipated for any VEC assessed. While minor to moderate residual effects may occur for some VECs, such as fauna and terrestrial habitat, these are expected to be localized, reversible or partially reversible, and manageable through the implementation of appropriate mitigation and monitoring measures, including a Wildlife Management Plan and progressive reclamation.

Engagement with the Mi'kmaq of Nova Scotia, government departments and regulatory agencies, and the public and other stakeholders informed Project planning throughout the EA process. Feedback received, including from the Blomidon Naturalists Society and the Lawrencetown SWPP Committee, raised considerations related to habitat, hydrology, groundwater protection, haul route safety, and noise. These concerns have been carefully considered and addressed in this document through the baseline assessment, effects assessment, and proposed mitigation measures described herein.

The CEA concluded that the Project, in combination with other existing and reasonably foreseeable activities in the region, is not expected to result in significant cumulative impacts on the selected VECs. The Project's contribution to cumulative effects is limited by its confirmed initial footprint, the commitment to progressive reclamation, and the implementation of standard mitigation measures to manage potential interactions with other land uses in the area.

Environmental factors such as climate change, extreme weather, flooding, and wildfire are not expected to pose a substantial risk to Project operations, and emergency and risk management procedures will be in place to respond to unforeseen events, as described in Chapters 10 and 11.

In summary, with the implementation of proposed mitigation and monitoring measures, the Project is expected to proceed in an environmentally responsible manner that supports regional aggregate demand and local economic interests while minimizing environmental impact.

CHAPTER 14: CLOSURE

This Report has been prepared by the Consultant, Fraxinus Environmental & Geomatics Limited, for the Proponent, 3341581 Nova Scotia Limited, solely for the purpose of supporting the environmental assessment applications for the Project, the Inglisville Road Pit Project. It reflects the Consultant's professional judgment, exercised in accordance with guidance provided by the Government of Nova Scotia and the Government of Canada, and reflects the standard of care ordinarily practiced by environmental professionals in Nova Scotia under similar circumstances, at the time the services were performed and the observations were made. The findings, opinions, and recommendations are based on observed site conditions and information provided by others, which have not been independently verified unless expressly stated. The Consultant makes no warranty, express or implied, and has no obligation to update this Report if conditions, regulations, or available information change after the date of issue. The Consultant is not liable for errors, omissions, or discrepancies arising from changed, concealed, or different environmental conditions or from reliance on information provided by others.

In preparing this Report, the Consultant has relied in part on datasets, research projects, models, and other information cited herein and/or provided by third parties (including the Proponent, regulators, and public databases), which the Consultant has not independently verified except where expressly stated. The Consultant's analyses, findings, and conclusions are contingent upon the accuracy, completeness, and currency of such information and assumptions. To the fullest extent permitted by law, the Consultant disclaims responsibility for, and shall have no liability arising from or related to, errors, omissions, or discrepancies resulting from false, incomplete, outdated, or otherwise inaccurate information supplied by others.

The Consultant's role is limited to providing environmental science services and advisory support. The Proponent is solely responsible for obtaining and maintaining approvals, implementing mitigation and monitoring measures, and ensuring the Project's compliance with all applicable laws, permits, and conditions. The Consultant does not control and is not responsible or liable for the Proponent's decisions, construction means and methods, site operations, or compliance performance, and nothing in this Report creates any duty on the Consultant to monitor, direct, or enforce compliance on behalf of the Proponent or any regulator.

PROJECT TEAM

A list of Project Team members and their roles is provided below. Curricula vitae for contributing team members are included in Appendix L.

- **Ian Bryson, MSc** – President & Senior Scientist
- **Scott Dickey, MREM** – Senior Scientist
- **Cuun Niesink, MREM** – EA & Permitting Specialist
- **Zacharye Simai, BSc** – Environmental Scientist
- **Jason Astels, Dipl** – Environmental Technician
- **Darcy Kavanagh, MREM** – Environmental & Regulatory Specialist

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