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FIGURE 6.8-3

Turtle Habitat Transects

Antrim Gypsum Project

Cooks Brook, Nova Scotia

- NSTDB Mapped Watercourse
- Field Delineated Watercourse
- Wood Turtle Transects
- Field Delineated Wetland
- Open Water
- WL Mosaic
- NSECC Wetland Inventory
- Mapped Lake
- Project Area

Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
Units: Meter

0 0.25 0.5 1 km

1:16,500 Scale when printed @ 11" x 17"

Drawn By: EH
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Project #: 24-9991
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6.8.3.4 Avifauna

The PA provides a range of habitats suitable for a variety of bird species with different habitat requirements. There are expansive open and forested areas that provide foraging and breeding habitat for certain species (e.g., raptors and passerines). Forests and shrub-dominated areas with stand heterogeneity (i.e., stands with different height classes) provide suitable habitat for foraging and breeding for many passerine species. Open habitat transitioning into forested habitat also provides edges that various species use for foraging (e.g., swallows and flycatchers). The PA consists of a variety of forest types (i.e., softwood, mixedwood, and hardwood), with the majority being softwood and mixedwood, that vary in hydrology and age (disturbed and regenerating/young to mid-aged and mature forest). The southern half of the PA contains larger tracts of undisturbed forest while the northern half of the PA (private land) has more clear-cutting forestry activity (recent and historic).

Avian biophysical surveys resulted in the observation of 4,782 individuals, representing 98 bird species.

The most abundant bird group observed (calculated by number of individuals per bird group) were passerines accounting for 81.28% of the species observed, followed by other landbirds (10.14%), waterfowl (6.88%), other waterbirds (0.65%), diurnal raptors (0.5%), shorebirds (0.33%), and nocturnal raptors (0.15%). These percentages include unknown individuals that were able to be identified to the level of bird group (e.g., passerines) and do not include unknown individuals that could not be identified to the level of bird group (0.06%). These percentages represent species diversity within the PA. The most observed species was the American robin and black-capped chickadee.

Overall, survey locations with different forms of edge habitat (e.g., open wetland surrounded by forest, clearcut/disturbed areas surrounded by forest, and a watercourse with riparian wetland surrounded by forested and field habitats) had the highest individual and species counts. The variety in habitat and variation in vegetation structure (e.g., height) would attract a higher number and variety of birds (e.g., all bird groups – passerines, waterfowl, shorebirds, other landbirds, other waterbirds, and diurnal/nocturnal raptors). Edge habitat and open areas can also serve as areas for species that tend to gather in groups (e.g., swallows and goldfinches) or staging areas for birds to gather and prepare for migration.

Several large groups of Canada geese (*Branta canadensis*) (e.g., 60 to 70 individuals per group) were observed in the PA during the spring migration season (i.e., either heard or observed flying overhead). During the fall migration season, there were two occasions where large groups of birds (e.g., chickadees, goldfinches, flycatchers, vireos, and warblers) were observed showing signs of migration preparation. No other migratory behaviour or general migratory patterns were observed (e.g., specific direction or migratory areas/corridors).

No common nighthawk (*Chordeiles minor*) or Eastern whip-poor-will (*Antrostomus vociferus*) were observed during the nightjar surveys. Common nighthawks were only observed incidentally during wetland and watercourse delineation surveys. In total,5 avian SAR and 8 avian SOCI were observed. The 5 avian SAR species observed were as follows:

– Barn swallow (*Hirundo rustica*)
– Canada warbler (Cardellina canadensis)
– Common nighthawk
– Eastern wood-pewee
– Olive-sided flycatcher (*Contopus cooperi*)

The eight avian SOCI species observed were as follows: black-billed cuckoo (*Coccyzus erythropthalmus*), blackpoll warbler (*Setophaga striata*), boreal chickadee (*Poecile hudsonica*), Canada jay (*Perisoreus canadensis*), pine siskin (*Spinus pinus*), red crossbill (*Loxia curvirostra*), spotted sandpiper (*Actitis macularius*), and Wilson's snipe (*Gallinago delicata*).

6.8.3.4.1 Species at Risk

Methodology and field results can be referred to in full in the Avifauna Biophysical Baseline Report (Appendix I.2), as well as further information regarding desktop review, regulatory context, and more information regarding priority (SAR and SOCI) species.

Barn swallow

The barn swallow (listed as Threatened by SARA, Special Concern by COSEWIC, Endangered by NSESA, and ranked by ACCDC as S3B) is a small-sized bird belonging to the passerine group. Although breeding habitat for this species is not prevalent within the PA, there is suitable foraging habitat for this species. Nesting habitat for this species includes horizontal and vertical structures that are either natural (e.g., cliffs, rock overhangs, and caves) or anthropogenic structures (e.g., bridges, abandoned barns/houses/sheds, boats, wells, mine shafts, and culverts). Barn swallows forage over open and semi-open habitats such as grasslands, meadows, agricultural lands, open wetlands/waterbodies, shorelines, tundra, sand dunes, wooded clearings, parks, roads, and cleared right-of-ways (e.g., highways and transmission lines; COSEWIC, 2021). Nesting sites are selected with foraging habitat nearby as well as a source of water and/or mud for nest construction. Barn swallows avoid heavily forested areas as well as high mountainous areas. Despite the barn swallow being known to adapt and nest within anthropogenic structures and activities, the most significant threat to this species is the loss and/or degradation of habitat and the decrease in insect populations (COSEWIC, 2021).

Barn swallows were observed during spring migration 2023 and breeding bird 2023 surveys (Figure 6.8-2).

Eleven barn swallows were observed foraging around wetland WL51 which was a complex wetland of swamp and fen. The barn swallows were foraging over this wetland and the Gays River, as well as the field/meadow portion of the property along Lake Egmont Road. There are several structures including old barns on this property that the barn swallows were observed flying into and leaving. This barn is a probable nesting habitat as evidenced by frequent flights from this site out to the surrounding foraging areas. Barn swallow observations were only in the small portion of PA on the northern side of Lake Egmont Road. The rest of the PA would contain suitable foraging habitat for barn swallow (e.g., open wetlands) but the northern side of Lake Egmont Road was the only area where potential barn swallow nesting habitat was observed.

Canada warbler

The Canada warbler (listed as Threatened by SARA, Special Concern by COSEWIC, Endangered by NSESA, and ranked by ACCDC as S3B) is a small-sized bird belonging to the passerine group. There is suitable foraging and breeding habitat for this species within the PA. The Canada warbler prefers wet, coniferous, and mixedwood forests with a thick shrub layer. Canada warblers are typically found in treed and shrub swamps (COSEWIC, 2020). This species can also be found in woody thickets and shrubby riparian areas within forests on the edges of watercourses and ravines, and in regenerative growth within natural and anthropogenic disturbed areas. Nests are built on or close to the ground for cover. The most significant threat to this species is the loss and/or degradation of habitat (COSEWIC, 2020).

Canada warblers were observed during spring migration 2022, breeding bird 2022/2023, and fall migration 2023 surveys as well as incidentally during wood turtle 2022 surveys and wetland/watercourse delineation 2022/2023 surveys.

A total of 28 Canada warblers were observed within various wetland habitats (primarily swamps) or wetter areas with wetlands nearby within the PA (Figure 6.8-2).

Wetlands that Canada warbler were observed in include:

– WL6 (complex of swamp and fen with discontinuous throughflow of watercourses)
– WL34 (swamp)
– WL35 (swamp)
– WL41 (complex of swamp and fen)
– WL44 (swamp)
– WL47 (swamp)
– ·WL51 (complex of swamp and fen)
– WL67 (swamp).

Common nighthawk

The common nighthawk (listed as Special Concern by SARA/COSEWIC and Threatened by NSESA), is a medium-sized bird belonging to the nocturnal raptor group (specifically the nightjar family). There is suitable foraging and breeding habitat for this species within the PA (e.g., open wetlands and clearcuts). Despite the common nighthawk being known to adapt to anthropogenic structures activities, the most significant threat to this species is the loss and/or degradation of habitat and the decrease in insect populations (COSEWIC, 2018a).

A total of two common nighthawks were observed incidentally during wetland/watercourse delineation surveys in 2022 (Figure 6.8-2). The common nighthawks were observed foraging over open areas, which include WL23 (fen).

Eastern wood-pewee

The eastern wood-pewee (listed as Special Concern by SARA/COSEWIC, Vulnerable by NSESA, and ranked by ACCDC as S3S4B) is a small-sized bird belonging to the passerine group. There is suitable foraging and breeding habitat for this species within the PA. The species is known to nest and forage at high canopy level in areas associated with clearings and forest edges. Eastern wood-pewees are mostly associated with mid-canopy layer of forest clearings and edges of wetlands and deciduous and mixed forests. They are most abundant in intermediate age and mature forest stands (COSEWIC, 2012). Preferred habitats include riparian areas by rivers, open/semi-open mature forest, treed swamps, bogs, meadows, cutblocks, quarries, transmission lines, barrens, and burned forests. The preference of edge habitat is strongly associated with their foraging needs and behaviour. The most significant threat to this species is the loss and/or degradation of habitat (COSEWIC, 2012).

Eastern wood-pewees were observed during breeding bird 2022 and fall migration 2023 surveys, as well as incidentally during wetland/watercourse delineation 2022/2023 and fish habitat 2023 surveys.

A total of 33 eastern-wood peewee were observed, all of which were associated with forested edge habitat like open wetlands, clearcuts, and the right-of-way for the natural gas line (Figure 6.8-2).

Wetlands that eastern wood-pewee were observed in include:

– WL6 (complex of swamp and fen with discontinuous throughflow watercourses)
– WL28 (swamp)
– WL34 (swamp)
– WL35 (swamp)
– WL41 (complex of swamp and fen)

Olive-sided flycatcher

The olive-sided flycatcher (listed as Special Concern by SARA/COSEWIC, Threatened by NSESA, and ranked by ACCDC as S3B) is small to medium-sized bird belonging to the passerine group. There is suitable foraging and breeding habitat for this species within the PA. The olive-sided flycatcher is typically found in edge habitat within softwood and mixedwood forests for breeding habitat. This species inhabits open forest, often near water or wetlands that contain tall snags or trees (COSEWIC, 2018b). This species prefers areas with tall trees or snags adjacent to or within open areas to perch on for foraging. Preferred habitats include riparian areas by rivers, open/semi-open mature forest, treed swamps, bogs, cutblocks, barrens, meadows, and burned forests. The most significant threat to this species is the loss and/or degradation of habitat (COSEWIC, 2018b).

Olive-sided flycatchers were observed during breeding bird 2022/2023 surveys, as well as incidentally during wood turtle 2022 surveys and wetland/watercourse delineation 2022 surveys

A total of 10 olive-sided flycatchers were observed (Figure 6.8-2), all of which were associated with forested edge habitat of open wetlands. Wetlands that olive-sided flycatcher were observed in include:

– WL6 (complex of swamp and fen with discontinuous throughflow of watercourses)
– WL41 (complex of swamp and fen)
– WL51 (complex of swamp and fen)

6.8.4 Effects Assessment Methodology

6.8.4.1 Boundaries

The scope of the environmental effects assessment is defined by spatial (i.e., geographic extent of Project effects), temporal (i.e., the timing of potential effects), administrative, and technical boundaries. Spatial boundaries were defined based on the expected maximum extent of direct and indirect impacts to the terrestrial environment. Temporal boundaries are based on the anticipated duration and timing of Project activities. The assessment boundaries are described below.

Spatial Boundaries

– The following spatial boundaries were used to evaluate Project effects and interactions, including residual effects to the terrestrial environment. The PA encompasses the immediate area in which Project activities may occur and are likely to cause direct and indirect effects to VCs.

– The LAA encompasses adjacent areas outside of the PA where Project related direct and indirect effects to VCs are reasonably expected to occur. The LAA encompasses a 3 km buffer surrounding the PA. The LAA boundaries were defined based on the expected maximum extent of direct and impacts to the terrestrial environment. The LAA extends farther than noise levels are expected to travel in order to include the Gays River, Ervin Brook, and the associated systems to the north, northeast, and northwest of the PA (i.e., to include the provincial core habitat for wood turtle) as well as the Lake Egmont Significant Ecological Area/International Biological Program candidate area to the east of the PA. The 3 km LAA was designed to include maximum extent of impacts as well as important areas documented in the desktop review of the terrestrial biophysical baseline reports.

  - Note that the LAA does extend farther south from the infrastructure compared to the north due to the PA boundaries. The Project infrastructure is situated towards the north of the PA and extends close to the PA boundaries on the west and east sides (e.g., a maximum of 25-30 m from the PA boundary on the west and east sides). Overall, the impacts to the southern part of the LAA are expected to be less than the northern, western, and eastern sides due to the location of the infrastructure, as shown in Figure 6.8-4. A 3 km buffer was maintained around the PA to provide consistent coverage.

A RAA has not been defined for this VC as the maximum extent of indirect impacts is expected to be within the LAA. The spatial boundaries described above are shown in Figure 6.8-4.

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FIGURE 6.8-4

Terrestrial Spatial Boundaries

Antrim Gypsum Project
Cooks Brook, Nova Scotia

Project Infrastructure
Project Area
Terrestrial LAA

Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
Units: Meter

0 500 1,000 2,000 m

1:42,000 Scale when printed @ 11" x 17"

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Temporal Boundaries

The temporal boundaries for the terrestrial environment effects assessment are defined by the construction, operation, and closure phase of the Project.

Technical Boundaries

Prediction of habitat availability and loss within the LAA was limited by the accuracy of the Strum habitat model developed for the effects assessment methodology. Habitats identified in these models were at a coarse scale and did not include other factors that could influence a species inhabiting an area (e.g., habitat adjacent to active quarries, roads, cutovers, or areas subject to sensory disturbance). The model may overpredict or underpredict habitat types within the LAA, notably forest type and forested swamps/wet areas. Other technical boundaries include constraints associated with publicly available provincial government GIS layers that were used in predicting and mapping potential habitat for SAR and the general difficulty in predicting habitat and sampling for SAR.

Administrative Boundaries

Administrative boundaries for the evaluation and management of the terrestrial environment include the Canada *Migratory Bird Convention Act* (MBCA), *Migratory Bird Regulations,* and *Species at Risk Act* along with the NS *Wildlife Act, Endangered Species Act,* Nova Scotia *Wetland Conservation Policy* (NSECC, 2019), and *At-Risk Lichens – Special Management Practices* (NSDNRR, 2018). Nova Scotia species at risk recovery plans and special management practices for SAR were also reviewed.

6.8.4.2 Thresholds for Determination of Significance

Significance of Project related impacts to wetlands were determined as presented in Table 6.8-2 below.

Table 6.8-2 Characterization Criteria for Environmental Effects

Characterization	Quantitative Measure or Definition of Qualitative Categories
Magnitude	**N** – the Project is predicted to result in: – less than 1% direct loss of vegetation and wildlife habitat (inclusive of terrestrial fauna and avifauna) within the LAA – no loss of SAR or SOCI Habitat within the LAA – no direct loss of SAR or SOCI individuals **L** –the Project is predicted to result in: – 1-5% direct loss of vegetation and wildlife habitat (inclusive of terrestrial fauna and avifauna) within the LAA – no loss of SAR or SOCI Habitat within the LAA – no direct loss of SAR or SOCI individuals – loss of habitat is mitigated through reclamation planning and other mitigation measures as determined to be necessary based on flora or wildlife species present. **M** –the Project is predicted to result in: – 5-25% direct loss of vegetation and wildlife habitat (inclusive of terrestrial fauna and avifauna) within the LAA – loss of SAR or SOCI Habitat within the LAA – direct loss of SOCI individuals – loss of habitat is mitigated through reclamation planning and other mitigation measures as determined to be necessary based on flora or wildlife species present. **H** – the Project is predicted to result in: – greater than 25% direct loss of vegetation and wildlife habitat (inclusive of terrestrial fauna and avifauna) within the LAA – loss of SAR or SOCI Habitat within the LAA – direct loss of SAR individual – loss of habitat is not mitigated through reclamation planning and other mitigation measures as determined to be necessary based on flora or wildlife species present.
Geographic Extent	**PA** – direct and indirect effects from Project activities are restricted to the PA. **LAA** – Residual effects extend into the LAA. **RAA** – not defined for this assessment.
Timing	**A**— seasonal aspects may affect VCs.
Duration	**ST** – effects are limited to occur from as little as 1 day to 12 months. **MT** – effects can occur beyond 12 months and up to 3 years. **LT** – effects extend beyond 3 years. **P** – valued component unlikely to recover to baseline conditions.
Frequency	**O** – effects occur once. **S** – effects occur at irregular intervals throughout the Project. **R** – effects occur at regular intervals throughout the Project. **C** – effects occur continuously throughout the Project.
Reversibility	**RE** – terrestrial environment will recover to baseline conditions before or after Project activities have been completed. **PR –** mitigation cannot guarantee a return to baseline conditions. **IR** – effects to VCs are permanent and will not recover to baseline conditions.

A significant adverse effect on the terrestrial environment from the Project is defined as:

– A Project-related effect that is likely to cause a permanent, unmitigated, alteration to habitat that supports flora and fauna species.

– A Project related direct loss of a SAR individual.

An effect that does not cause a permanent alteration to habitats, species distribution, or permanent loss to habitat is not considered a significant adverse effect. Sessile species such as vascular and non-vascular plants and lichens do not have the ability to avoid direct and indirect impacts from the Project. For these species, the loss of an individual or individuals of a SAR species that is important in the context of the province, or that species' overall abundance or distribution, may be considered significant, if appropriate mitigation measures are not implemented. Mortality of a single SAR could, under some circumstances, be considered a significant effect unless adequately mitigated to preserve the integrity of that individual. The loss of an individual SAR due to an accident or malfunction (i.e., wildlife collision) is not incorporated into the magnitude threshold or overall significance of Project activities.

6.8.4.3 Fauna, Lichens, Flora, and Habitat Effects Methodology

As discussed in the biophysical baseline reports, a wide variety of flora, lichen, avifauna, mammal, and herpetofauna, as well as various habitat and vegetation types were observed within the PA. This diverse assemblage of flora and wildlife represents a variety of habitat requirements across species and groupings. The Project impact within the LAA was analysed to identify loss of habitat since it was not feasible to assess every species identified within the LAA or every species that has potential to be observed within the LAA. Although specific analyses were completed for certain SAR, effects are represented by describing impacts to overall habitat for flora, lichens, fauna within the PA and LAA.

The predictive habitat model was extended to the LAA to allow for comparison to be made between the PA and surrounding lands. Following the same methodology as was provided for the modelling within the PA, a layer was made based on the forest inventory GIS database (NSDNRR, 2021), a Canopy Height Model from GeoNOVAs Elevation Explorer (GeoNOVA, 2019), and the Wet Areas Mapping database (NSECC, 2022). First, three proxy layers were created: the Nova Scotia Forest Inventory layer was re-classified into ten categories based on the "FORNON" attribute, four height classes from the Canopy Height Model were defined as proxies for tree age (0-1 m, 1-6 m, 6-11 m, and >11 m), and the Depth to Water model was used to predict wet areas with <0.5 m considered wet, and >0.5m considered dry. Those three layers were rasterized and combined, then turned into polygons using the "Majority Filter" tool on QGIS. Results were adjusted based on aerial imagery to best reflect current conditions. This predictive habitat layer was then used for the following effects assessment on vegetation communities.

6.8.5 Project Interactions and Potential Effects

Potential Project interactions with the Terrestrial Environment are presented in Table 6.8-3 below.

Table 6.8-3 Terrestrial Environment Interactions

Project Phase	Relevant Project Activity
Construction	Clearing, grubbing, and grading Topsoil, overburden, and waste rock management Surface infrastructure installation and construction Haul road construction Collection ditch and settling pond construction General waste management
Operation	Gypsum management (extraction, loading, hauling, screening) Topsoil, overburden, and waste rock management Water management Haul road construction and maintenance Petroleum products management General waste management
Closure	Demolition Earthworks

Project Phase	Relevant Project Activity
	Water management General waste management

The Project is expected to interact with the terrestrial environment through several pathways. The potential effects were grouped into two major categories: changes in habitat types and changes in wildlife species usage of the PA. Project related effects can influence the terrestrial environment either directly or indirectly and adversely or positively. A direct effect is defined by interactions that have no intermediates (e.g., mortality by vehicular collision, vegetation community loss) and indirect effects are interactions that have intermediate steps such as edge effects associated with vegetation clearing or changes in predatory-prey dynamics associated with access road/trail development.

These interactions have the potential to the terrestrial habitat from baseline conditions as outlined below.

– Changes in vegetation and vegetation communities due to the direct loss of habitat and vegetation, indirect loss of habitat due to edge effects and dust, potential introduction of invasive species due to construction activities and increased traffic, vegetation community shifts due to groundwater drawdown effects and adjustments in surface water catchments from the Project.
– Changes in wildlife usage including SAR and SOCI due to direct and indirect habitat loss and habitat fragmentation due to Project footprint and sensory disturbance, mortality risk due to vehicle collisions or other human-wildlife interactions, rehabilitation and reclamation of habitats during the closure phase.

As described in the Flora, Fauna, and Habitat Biophysical Baseline Report (Appendix I.1), there is a variety of habitat types (e.g., variety of forest (softwood, hardwood, and mixedwood) and open and forested wetland types) within the PA that support a variety of fauna. Fauna observed within the PA include American beaver, porcupine, snowshoe hare, white-trailed deer, raccoon, American red squirrel, Eastern chipmunk, American black bear, and an unknown mouse species. Other species with the potential to use the PA, as per the baseline report, include the red fox, deer mouse, Eastern coyote, red-backed vole, as well as various bat species. Herpetofauna species observed within the PA include the Eastern American toad, snapping turtle, wood turtle, bullfrog, green frog, Northern leopard frog, wood frog, maritime garter snake, Eastern red-back salamander, and spring peeper. A large variety of flora, lichen, and avifauna species were observed as per the biophysical baseline reports.

Interior forests are defined as forested areas that are sheltered from edge effects. Forest edges (usually adjacent to clearings or disturbances) are exposed to higher winds, with sunnier and dryer conditions and are often subject to both natural and anthropogenic disturbances. These conditions result in different vegetative structure and composition then the forest interior. The forest interior provides shelter from these conditions and refuge for many species dependent on these habitats. The PA has a mix of disturbance regimes with edge habitat due to clear-cutting forestry activity.

6.8.5.1 Impacts to Vegetation Communities, Flora, and Lichens

The Project is expected to result in changes in habitat types (vegetation communities and vegetation) and priority species via direct and indirect Project related impacts. Direct and indirect impacts to habitat types and flora priority species are described in the following sections.

6.8.5.1.1 Direct Impacts

Direct loss to habitat, vascular and non-vascular plants, and priority species, including lichens due to the Project are described below.

Alder-leaved buckthorn was observed in WL62 which will be completely impacted by proposed Project infrastructure. An estimated 50+ individuals were observed in this treed swamp and will be lost to Project development. All other observations of SOCI flora and lichens fall outside of the proposed Project infrastructure. Direct and indirect impacts to SAR flora and lichens are discussed below in Sections 6.8.5.2.3 and 6.8.5.2.4.

Direct loss to wetland and upland vegetation, vegetation communities and habitat are expected to occur primarily during the construction phase of the Project. The PA consists of fragmented habitats and historical and current timber harvesting, roads and industrial activities. Habitat loss and direct impacts to flora species is expected.

It is expected that a total loss of 170 ha (28.4% of the PA, 2.5% of LAA) of habitat (including urban/developed) will be directly impacted by Project infrastructure (Table 6.8-4), with a predicted magnitude of effect of negligible to moderate depending on the habitat type (Figure 6.8-5). These habitat types consist of mature softwood and hardwood forests, forested wetlands, cutovers, and anthropogenic and disturbed landscapes, all of which provide habitat for multiple species. No rare or uncommon vegetation communities were identified in the baseline surveys. The largest direct impact from the Project is expected to be to softwood forests (49.3 ha) which is the most common vegetation community within the LAA (1607.6 ha). The greatest percentage of impact to a habitat type within the LAA is hardwood forests at 15.6% (40.2 ha of 257.8 ha in the LAA). Considering the abundance of conifer dominant and mixedwood forests within the LAA, the overall magnitude of impacts to vegetation communities is considered low (2.5% loss). Table 6.8-4 summarizes habitat types identified in the LAA and expected direct impacts of the Project.

Table 6.8-4 Predicted Habitat Types and Impacts within the Project AreaPA

Habitat Type	Hectares within Project Area*	Percentage of Project Area	Hectares of Impact from Infrastructure *	Percentage Impact of total Habitat type available in PA	Hectares within LAA*	Percentage Impact of total Habitat type available in LAA
Agriculture	12.8	2.1%	1.5	11.7%	356.6	0.4%
Cutover	8.2	1.4%	0	0%	540.1	0%
Cutover swamp	2.2	0.4%	0	0%	239.1	0%
Hardwood forested swamp	27.8	4.6%	13.1	47.1%	95.8	13.7%
Hardwood forest	70.1	11.7%	40.2	57.3%	257.8	15.6%
Mixedwood forested swamp	38.7	6.4%	9.6	24.8%	504.2	1.9%
Mixedwood forest	107.5	17.9%	28.1	26.1%	1349.7	2.1%
Softwood forested swamp	105.3	17.5%	25.0	23.7%	869.2	2.9%
Softwood forest	193.6	32.2%	49.3	25.5%	1607.6	3.1%
Open wetlands	28.7	4.8%	3.1	10.8%	463.1	0.7%
Urban/ Developed	5.3	0.9%	0.0057	0.1%	282.3	0.002%
Waterbodies	0.3	0.1%	0	0%	169.6	0%
Total	602	-	170	28.4%	6735	2.5%

Note: *These habitat types and area calculations are from the publicly available databases and have not been updated to match current land conditions if they have changed since the layer was released (i.e. - does not account for recent forestry)

This habitat loss can result in indirect impacts such as habitat fragmentation, edge effects and changes in wildlife movement as discussed below.

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FIGURE 6.8-5
Terrestrial LAA and Habitat Impacts

Antrim Gypsum Project
Cooks Brook, Nova Scotia

- Agriculture
- Cutover
- Cutover Swamp
- Hardwood Forested Swamp
- Hardwood Forests
- Mixedwood Forested Swamp
- Mixedwood Forests
- Open Wetlands
- Softwood Forested Swamp
- Softwood Forests
- Urban/developed
- Waterbodies
- Terrestrial LAA
- Project Infrastructure
- Project Area

Coordinate System: NAD 1983 CSRS UTM Zone 20N
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6.8.5.1.2 Indirect Impacts

Removal of vegetation and habitat loss during the construction and operation of the Project can result in indirect effects through edge effects. The effects include changes in microclimate, increased light availability and changes in vegetation communities. Clearing of habitats could also result in the potential of invasive plant species to establish an area.

Lichens and non-vascular plants are notably sensitive to edge effects and air quality due to being poikilohydric organisms with an inability to regulate and maintain their water content (Boudreault et al, 2008; Nash III, 2008). Edge effects can result in the desiccation and death of lichen species and is one of the biggest threats to SAR and SOCI lichens. The extent in which lichens and plants are impacted by edge effects (referred as depth of influence) have been well documented, however, the depth of influence is context-dependent (e.g., dependent on size of the clearings, substrate, type of climate etc.). Multiple studies show depth of influence can vary from 60 m to 80 m and for some species greater than 240 m (Gauslaa, Bartemucci & Solhhaug, 2018). For simplicity, and consideration that not all lichens respond the same to edge effects, a conservative depth of influence of 250 m was chosen. Observed priority lichen species within the depth of influence by edge effects, has potential for adverse effects from the Project, and will be considered when developing the Lichen Monitoring Plan.

Studies, such as Neitlich et al. (2017), Naeth and Wilkinson (2008), and Farmer (1993), present the primary drivers of atmospheric contamination to lichen from Project activities: sulfur dioxide and nitrous oxide emissions, metal mobilization and dust generation. The Project is predicted to result in localized particulate and metal mobilization through dust generation during construction and operations (i.e., digging and hauling). Dust deposition may result in increased alkalinity in substrate pH composition (e.g., bark of host tree) and bioaccumulation in lichen tissue which can impact lichen health and species richness (Degtjarenko, 2016; Naeth and Wilkinson 2008; Farmer, 1993). Farmer (1993) observed that bryophytes and lichens along a gravel road (traffic and distance unknown) were unaffected within two years of operation. Significant changes to the communities were noted after 10 years. Species decline was noted at dust deposition levels of 1.0-2.5 g/m^2/day. Effects to lichens were still observed at levels 0.07 g/m^2/day. In general, edge effects are expected to be the primary driver to negative impacts to lichens and encompass modelled dust deposition extents.

Vascular plants could also be affected by dust deposition onto vegetation, which can cover the leaves, block stomata and cellular respiration and reduce the overall efficiency of photosynthesis (Farmer, 1993). Dust can be absorbed through the soil resulting in overall decline in plant health and even lead to necrosis (Hosker & Lindberg, 1982).

Reduction or adjustments to surface water catchments and groundwater drawdown from the operation and closure phase can have impacts on vegetation communities, notably communities with a high-water table (i.e., wetlands). These reduction and drawdown effects could result in a hydrophytic community shift to an upland community. These changes in communities could have a secondary effect and result in changes to lichens and wildlife species that are dependent on wetland conditions for their survival.

Additional indirect impacts to native plant communities include the potential for introduction of invasive species to the PA. Seeds and roots of invasive species can be transferred from construction equipment, transportation vehicles, or workers (footwear and clothing) into adjacent habitats during construction and operational activities. Introduction of invasive species can occur when equipment or people enter vascular plant communities, or indirectly via runoff or dust from the roads. Invasive species, inclusive but not limited to purple loosestrife (*Lythrum salicaria*), Japanese knotweed (*Fallopia japonica*), common reed (*Phragmites australis*) and glossy buckthorn (*Frangula alnus*) can severely degrade habitat quality and outcompete many native species, particularly along roadsides. Impacts to the PA and surrounding area by the possible introduction of invasive species during construction and operation is planned to be reduced by implementing mitigation measures that will be include in the Wildlife Management Plan which will be developed for the Project at the permitting stage.

Contamination of vegetation and habitat can occur during all Project phases by accidental spills involving the deposition of deleterious substances, including fuel, lubricants, and engine oils. This could result in altering vegetation communities and death of certain plant species.

During the operation phase, a portion of the open pit to be progressively backfilled by placing overburden, topsoil and revegetated. The progressively reclaimed areas will be sloped to re-establish natural drainage to adjacent wetland habitats In the reclamation phase, a positive effect to the terrestrial environment may occur, and the revegetation and rehabilitation may result in increased habitat availability compared to the operation phase. Although the habitat will differ from baseline conditions, useable habitat for a variety of lichens and plants will be present. Shortly after closure, the landscape will likely be open, with low lying vegetation, primarily herbaceous and shrubs. Due to the absence or lack of trees in this stage, the reclaimed PA would be devoid of epiphytic lichens dependent on mature tree species for survival, although, some corticolous lichen species could exist on shrubs. Habitat for terricolous lichen species (e.g., cladonia) would be present in this stage. Over time, the landscape will also likely consist of shrubs and trees and there may be more stand heterogeneity to provide habitats for flora and fauna species. Mature forested landscapes would take much longer to develop (50-70 years), and it is unlikely reclamation will result in the complete reversal of some of the Project effects. Wetlands impacted by the Project, such as bogs and fens which are characterized by the slow accumulation of peat, will not be able to be fully restored to baseline conditions.

6.8.5.1.3 Impacts to Flora and Lichen Species at Risk

Flora Species at Risk

Black ash is a slow-growing species of broad-leaved deciduous tree found primarily in moist habitats, including riparian areas adjacent to watercourses and within wetlands that have poorly drained peat or muck soils such as swamps, floodplains, and fens. Black ash is a facultative wetland species, it occurs in wetlands with an estimated probability between 67-99% of the time (NSECC, 2024). A key threat to this species is habitat loss and the alteration of wet habitats causing hydrological changes. Research and data in NS shows that a portion of the decline in black ash in the province can be attributed to habitat destruction, disease, and changes in environmental conditions (e.g., climate change and storms causing excessive flooding conditions) and moisture levels (COSEWIC, 2018c; NSDNRR, 2015; Zinck 1998). The species was designated as Threatened under the NSESA in 2013.

The species is tolerant of short-term seasonal or annual hydrological fluctuations, however periods of extended change in conditions can negatively impact survival by causing the roots to dry out or allowing competing vegetation to establish (COSEWIC, 2018c; Tardif and Bergeron,1992; Tardif and Bergeron,1999). Periods of extended drought can result in severe dieback, due to shallow root systems, and cause a successional shift in canopy composition towards more upland species which outcompete black ash (NSDNRR, 2015). Although black ash tolerate semi-stagnant conditions, habitats with moving water are preferred (COSEWIC, 2018c; NSDNRR, 2015; Zinck,1998). Habitat requirements of black ash, therefore, are characterized by a consistent hydrological regime that experiences short-term seasonal or annual fluctuations.

Black ash habitat represents a specific, narrow niche where individuals will not be out-competed by either more flood-tolerant species (e.g., alders (*Alnus* spp.)) or upland species (e.g., red maple (*Acer rubrum*)). Although black ash are tolerant to fluctuations in hydrology, there is stability at the temporal scale at which they occur. The primary threat resulting from sustained changes to hydrological conditions is the potential successional shift which favours species that out-compete black ash. Forestry activity within areas of organic, hydric soils will often result in the poor regeneration of black ash due to rising water tables and competition by early successional shrubs and herbaceous species (COSEWIC, 2018c; Erdmann *et al*., 1987; Tardif and Bergeron,1992; Tardif and Bergeron, 1999; Denneler *et al*., 1999; Denneler *et al*., 2008). Despite initial rapid growth rates, black ash seedlings are poor competitors and must overcome this competition to become established (Carmean, 1978). When black ash is not hindered by faster-growing competition, they exhibit rapid early growth on well-drained sites (Levy, 1970; Carmean, 1978).

Habitat requirements, therefore, are defined by a stable hydrological regime averaged over years that provides adequate soil moisture and conditions where competition is limited. A stable hydrological regime will experience short-term, seasonal, or annual fluctuations which differs substantially compared to a long-term consistent or permanent change to the hydrology in an area (e.g., impacts from a 23-year mine operation and the resulting reduction in the

surface and groundwater inputs). Stand regeneration requires short-term fluctuations in hydrology with some drier periods that facilitate seedlings to establish roots combined with the wetter spring season when black ash will not be out-competed by species that are less flood-tolerant (COSEWIC, 2018c). Overall, the black ash life cycle involves a variety of interactions, including hydrological fluctuations and species competition, that contribute to its sensitivity and tolerance levels (COSEWIC, 2018c). Ecosystems experience natural fluctuations in hydrology across seasons and years. However, the initial unmitigated projected reductions in water predicted at assessment points 5, 6 and 17 within the PA exceed both the amplitude and temporal scale seen in these natural fluctuations tolerated by black ash (refer to Section 6.5.5.1) for projected baseline changes to hydrology). Groundwater drawdown from the open pit development was included in the water balance modelling exercise. Long term changes in hydrology outside the normal range of variability due to the Project are likely to impact black ash by reducing available soil moisture and encouraging competition with upland species.

The northern cluster of black ash trees within the PA are associated with WLs 34, 35, 43, 67, and 72 or in adjacent upland. WL43 will be directly impacted, which is where one black ash tree that is proposed to undergo transplantation is located. The southern portion of WL34 will be directly impacted by the pit development. The black ash occurrence is within the northern portion of this wetland which will remain intact. Significant micrositing of Project infrastructure was conducted to eliminate all direct effects to the remaining wetlands and black ash and maintain the existing hydrological regime (refer to Section 6.8.6).

Lichen Species at Risk

Many of the rare lichens in NS have an association with mature forested communities, often associated with wetlands, lakes, and watercourses. The habitat that provided the greatest potential to support lichen rarities was WL41, located in the central portion of the PA. This wetland and adjacent upland habitat provided mature forested communities consisting of softwood and hardwood species. The appropriate tree maturity, bark texture, and pH provided habitat for a suite of rare cyanolichens and calicioids including blue felt lichen, frosted glass-whiskers, and fringe lichen (*Heterodermia neglecta*).

One observation of blue felt lichen was made on the northeastern boundary of WL41. There were four observations of frosted glass-whiskers lichen in the PA. One observation of abundant stalks was made on the eastern side of WL41. Two observations were made in WL44, one occurring on yellow birch on the WL edge. The fourth observation was incidental during wetland delineation surveys. This occurrence was found on a red maple snag in mature hardwood upland northwest of WL41.

Placement of Project infrastructure allows for the maintenance of a 100 m buffer of the two observations of frosted glass whiskers in WL44. During detailed design to support permitting, CertainTeed will evaluate options to reduce the footprint of the overburden stockpile and design the water management infrastructure to maintain the 100 m recommended buffer. on the one observation of blue felt lichen and one observation of frosted glass whiskers in WL41. Additionally, this micrositing of the stockpile will also seek to stabilise hydrological inputs to WL41 and, therefore, maintain suitable habitat for SAR lichens.

No direct impacts to the northernmost observation of frosted glass whiskers will occur but proposed Project infrastructure does fall within the recommended 100 m buffer. Potential indirect impacts to this observation could include changes to habitat, such as drops in humidity, as a result of edge effect due to forest clearing.

6.8.5.2 Impacts to Wildlife

The Project is expected to result in changes in wildlife and priority species usage within the PA and LAA via direct and indirect Project related impacts. Wildlife and priority species could experience direct and indirect impacts through mortality, habitat alteration, and sensory disturbance.

6.8.5.2.1 Direct Impacts

Direct mortality of wildlife species could result from Project activities, particularly due to the increase in traffic during construction and operation of the Project. Increased traffic within the PA could potentially increase the risk of wildlife and vehicle collisions.

According to Fahrig and Rutwinski (2009), road construction can have greater impacts on amphibians and reptiles, and large mammals, compared with small mammals and birds. Road infrastructure and traffic have a negative impact on those species which are attracted to roads but lack the speed or reaction time to avoid traffic (e.g., turtles attracted to gravel roadsides for nesting). Small mammals and birds are generally able to avoid collisions with vehicles. Amphibians can benefit from culvert installation where wetlands and watercourses intersect roads, as an alternative to crossing the roads, because this group can experience high mortality (Bouchard et al. 2009).

There is potential that Project infrastructure may attract certain species for nesting. Barn swallows often construct nests in anthropogenic structures such as buildings and under bridges, and bank swallows may nest along soil stockpiles with steep slopes. Generalist bird species such as crows and ravens may nest on structures and equipment not being used. The changes in the overall landscape and habitat can result in changes in wildlife patterns and increased risk in mortality. In the closure phase, avifauna species which have utilized structures for nesting may result in direct mortality.

For some species (e.g., porcupine), the construction can be beneficial by providing new foraging opportunities, while species that rely on interior forest conditions (e.g., fisher) are likely to avoid areas with new construction in favour of more undisturbed habitats. Local level changes in abundance and distribution of species may occur as the result of Project activities.

6.8.5.2.2 Indirect Impacts

Habitat Alteration

The Project will result in direct and indirect impacts to habitat used by terrestrial fauna within the PA. Vegetation clearing, including both upland forested and wetland habitats, of the proposed Project infrastructure footprint will account for the loss of 170 ha of habitat. During operations, which will occur gradually as the Project progresses, digging and stockpiling of materials will alter habitat. Habitat alteration will increase progressively over the PA, as the Project expands, although CertainTeed is also committed to completion of progressive reclamation of the open pit, reducing the overall spatial and temporal impact of the Project. Overall effects to fauna habitat as a result of the Project is limited due to the relatively small geographic extent of alteration (170 ha), when compared to the vast expanse of available habitat in the vicinity.

Linear features such as roads, trails and transmission corridors have the potential to influence wildlife movement patterns. They create a barrier to movement for certain species, may act as a conduit to movement for other species and the types of human activity can influence wildlife movement. Bears are tolerant of some human activity but will avoid features when human frequency is high (Jalkotzky et al. 1997).

Studies completed by Buckmaster et al. (1999) indicate that wildlife populations may be expected to disperse from the area during periods of construction. Based upon the vegetation characteristics in adjacent areas, and the conclusions of Buckmaster et al. (1999), it is expected that displacement of wildlife will be temporary.

Overall effects to fauna habitat as a result of the Project are limited due to the relatively small geographic extent of alteration (170 ha) when compared to the vast expanse of available habitat in the vicinity. The habitat present in the PA footprint is common to the regional area and alternate habitat for wildlife exists on adjacent undeveloped lands, therefore, changes in abundance and distribution could be expected, but overall fauna population changes are not expected as a result of the Project.

Wildlife species that currently use the habitat within the PA will be displaced during the initial stages of the Project from changes in habitat availability and associated sensory disturbances. This could potentially cause direct mortality of species if individuals are unable to relocate to alternate suitable habitat. However, there are areas of suitable nesting habitat in adjacent lands and the regional area in general. The proposed Project is located in a rural, relatively untouched setting, surrounded by forested landscape that may provide alternative suitable habitat.

The Project is likely to result in an increase in habitat fragmentation and an increased amount of forest edges. This may lead to decreased forest quality for species that rely on interior forest conditions (i.e., areas within a forest sheltered from edge effects). Habitat fragmentation and increased edge areas may lead to increased predation. A study by Manolis, Andersen, and Cuthbert (2002) found that distance to nearest clear-cut was the best predictor of

nest predation in multiple ground laying birds. The Project will alter habitat within the PA; alterations will have both negative and positive effects depending on the species. Not all alteration will be permanent, a relatively small area is being lost and furthermore, alterations will not have a significantly negative impact on local habitat as similar habitat for fauna is present in the surrounding landscape.

The closure phase of the Project will result in a positive effect on fauna habitats through the reclamation of land and re-establishment of vegetation across disturbed portions of the PA. Reclamation will aim to progressively restore areas of the PA throughout the operations phase to reduce open or disturbed areas and restore the site as best as possible to baseline conditions.

Sensory Disturbance

The indirect effects of the Project to wildlife can largely be attributed to decreased habitat quality through sensory disturbance, especially noise and light. Sensory disturbance will result from rock excavation (and blasting if required), clearing and grubbing, infrastructure construction, lighting and operations. This along with other construction, operational and closure activities will increase sensory disturbance and will reduce the habitat quality for some species. It should be noted that the operational hours are 7:00 am to 5:30 pm with limited activities during the night to limit the noise and light emitted by the Project.

Sensory disturbance will likely result in the localized wildlife avoidance of the PA. Overall, Project activities will likely cause a change in usage of the PA by wildlife, with some species tending to avoid the area, while others may be attracted to the increased activity, including opportunistic species such as coyotes, raccoons, skunks, or black bears.

Changes to ambient noise levels and presence of periodic vibrations from blasting have the potential to adversely affect wildlife migration patterns and behaviour. Modelling completed (Section 6.2) predicted noise levels of 45 dBA up to about 700 m distance from the western side of the PA. Zones within noise of 45 dBA are areas with a higher likelihood to impact wildlife and their habitat (Figure 6.8-6). This area may observe a change or decline in wildlife throughout the life of the Project due to elevated noise levels.

Noise above 55 dBA during the day and 45 dBA at night-time have been shown to cause physiological stress and behavioural changes to wildlife (ECCC, 2012). Changes in avifauna song characteristics, reproduction, abundance, stress levels and species richness when sound levels commenced at greater than 45 dBA have been documented. Noise pollution from the Project can result in behavioural changes, lead to changes in wildlife communities and alter species interactions (Francis et al, 2009; Patthey et al, 2008). It was also found that noise tolerant species had increased avifauna nest success through decreasing nest predation (Francis et al, 2009). Conversely, noise can affect the efficiency of landbirds to find breeding partners (Barber et al. 2010).

Impacts can also differ between acute and chronic noise sources. Chronic exposure may degrade auditory cues, feedback, and vocal development over time, which is important for predator/prey detection, communication and orientation (Shannon et al., 2016; Bickley and Patricelli, 2010; Marler et al., 1973). A direct physiological impact causing a temporary decrease in auditory sensitivity can occur at acute noise levels above 93 dBA, while permanent damage to avian auditory systems is not recorded until 125 to 140 dBA (Bickley and Patricelli, 2010). Routine Project operations are not predicted to reach these noise levels. Flydal et al. (2001) observed that sounds at 46 dBA and 60 dBA elicited responses in caribou and reindeer, respectively. While Drolet et al. (2016) report no changes to density of white-tailed deer when a simulated drilling noise was played at 55 to 65 dBA. A literature review conducted by Shannon et al. (2016) found that an increase in stress and decrease in reproductive success in terrestrial mammals has the potential to occur at noise levels ranging from 52 to 68 dBA.

Light is another source of sensory disturbance that can impact wildlife (fauna and birds) by potentially causing disorientation or by causing attraction or avoidance behaviour (Longcore and Rich, 2004). In turn, these behavioral changes can affect the success of foraging, reproduction, and communication of wildlife (Longcore and Rich, 2004) and can disrupt habitat connectivity (Bliss-Ketchum et al., 2016). Lighting will be associated with administrative buildings and where needed for safety purposes. Light is not expected to extend because of the maintenance of forested areas and limited clearing to only necessary areas within the PA. . The Project will only operate from 7:00 am to 5:30 pm and thus, will only work in darkened conditions at the beginning and end of each day in the winter season.

In summary, sensory disturbance (noise and light) to wildlife is expected to occur by the Project, however, how a species may respond to this disturbance is often species or species group specific. An overall negative effect to wildlife by the Project is expected to occur as species approach the PA. This sensory disturbance could result in behavioural changes and changes in wildlife movement. Due to the proportion of the habitats proposed to be impacted by the Project and habitat availability in the LAA, available suitable habitat for many species is present. Although movement of species may change, habitats required for their survival are present within the LAA. Wildlife corridors would still exist and movement of species from north, south, east and west are present. The overall magnitude of impact to wildlife from sensory disturbances is predicted to be low and are temporary in nature.

Prepared For:

GHD

FIGURE 6.8-6
Terrestrial Impacts from Noise

Antrim Gypsum Project
Cooks Brook, Nova Scotia

- Modelled Noise in Phase 2 (45dBA)
- Modelled Noise in Phase 1 (45dBA)
- Project Infrastructure
- Project Area
- Terrestrial LAA

Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
Units: Meter

0 500 1,000 2,000 m

1:42,500 Scale when printed @ 11" x 17"

Drawn By: LP
Reviewed By:

Project Number: 24-9991
Date: 7/25/2024

strum CONSULTING

Document Name: Antrim Terr Noise

6.8.5.2.3 Impacts to Wildlife Species at Risk

Herpetofauna Species at Risk

Transect 2 and 4 of the wood turtle transects with potential suitable habitat for snapping and wood turtle will be directly impacted by the Project footprint. The pond where the one incidental wood turtle was observed will not be directly impacted but may be indirectly impacted due to groundwater drawdown and hydrology changes. Mitigation measures will be implemented to reduce the risk of impacts to this pond.

Wood turtle and snapping turtle habitat is described in the Flora, Fauna, and Habitat Biophysical Baseline Report (Appendix I.1).

Table 6.8-5 Impacts to SAR Turtle habitat identified within the PA

Transect	Associated Watercourses	Presence of Potential Wood Turtle Habitat	Presence of Potential Snapping Turtle Habitat	Presence of Potential Eastern Painted Turtle Habitat	Impact from Project Infrastructure
T2	WC 11 and WC 12	Marginal Nesting Habitat	Marginal Nesting Habitat and suitable general habitat Several short reaches (<3 m) along 50 m of WC12	No	Yes - partial direct loss of WC11, and direct loss of WC12 Indirect impact to WC11 downstream
T4	WC 24	Marginal Nesting and general habitat	Marginal Nesting and general habitat Single short reach (<3 m)	No	Yes - direct loss of WC 24 under stockpile
T5	WC 1 (downstream)	No	General suitable habitat	No	No
T6	WC1 (upstream)	No	Marginal general habitat	No	No
T7	WC 32 (Gays River)	Suitable overwintering and general habitat	Suitable overwintering and general habitat	Suitable overwintering and general habitat	No

Note: Full descriptions of transects found in Appendix I.1

Transect 2 along WC11 and WC12 contained short stretches (<3m in length) of sand-gravel-cobble riparian edge, with full sun exposure. Several of these observations were made along a 50 m reach which coincided with the observation of the snapping turtle in this system (Figure 6.8-2). This area will be impacted by the open pit. Transect 4 along WC24 also contained one location of sand-gravel along a riparian edge with sun exposure, however, it was located at a road crossing, which may be an ecological trap for turtles (Appendix I.1). Transect 4 may also provide habitat for turtle movement, however, it exhibited a mucky substrate makeup, which may inhibit its use by wood turtle (Appendix I.1).

Avian Species at Risk

In total, 11 barn swallows, 28 Canada warblers, 2 common nighthawks, 33 Eastern wood-pewees, and 10 olive-sided flycatchers were observed during biophysical surveys for the Project. Out of all the avian SAR observed, many observations were associated with wetland habitats within the PA, either for mating or foraging purposes. Barn swallows and Eastern wood-pewees observations included a variety of open and forested edge habitats including open wetlands, forested swamps, open fields, clear-cuts, and a natural gas line right-of-way. Despite most of these species, except for Canada warbler, being habitat generalists depending on life stages and various habitat requirements (as described in the priority species list and the Avifauna Biophysical Baseline Report; Appendix I.2), almost all avian SAR observations associated with the Project were in wetlands.

A more in depth discussion of avian SAR observations where breeding habitat was also determined to be present follows below. Observations of common nighthawk were not associated with breeding habitats and thus are not expected to be impacted as they are not known to be breeding within the PA.

Barn swallow

Barn swallow breeding habitat is not prevalent within the PA as there are only a few standing structures providing the suitable conditions for nesting. CertainTeed acquired 1480 Lake Egmont Road (PID 41152893) to support Project activities. The property has several, older dilapidated and open barns where barn swallow were observed transiting between and foraging habitat in the surrounding area.

Existing infrastructure on this property is in a poor state of repair and presents both a risk to personal safety as well as a fire hazard. Structure maintenance or removal will occur as needed which could result in the elimination of breeding habitat for barn swallow.

Canada warbler

Three Canada warbler observations occur within the Project infrastructure footprint (Figure 6.8-2). One observation, in the east, occurred in upland habitat and this bird was not observed to be associated with a wetland that would provide suitable breeding habitat. Average Canada warbler territory size is 1 ha (ECCC, 2016b) and no wetlands with suitable breeding habitat were identified within that proximity to this observation. This observation occurred during fall migration surveys and the individual was part of a large group of birds - primarily vireos, other warblers, American goldfinches, and black-capped chickadees - in a clearcut area that were showing signs of migration preparation

Two observations occurred in the southern portion of WL34 within Project infrastructure where direct impacts to wetland habitat are anticipated. A reduction of 31.1 percent (7,771 m^2) of total area (2.5 ha) is expected in WL34 due to Project activities which will result in a loss of breeding habitat for this species.

One observation occurred on the western boundary of WL6 outside Project infrastructure but within a wetland expected to be impacted by Project activities. This wetland will see a 28.87 percent reduction of total area, 45,211 m^2 of 156,602 m^2, in the northern portions.

All other Canada warbler observations associated with wetland breeding habitat occurred in wetlands that will not be significantly impacted by Project activities. Wetland 41 had the highest proportion of Canada warbler observations in the PA. This wetland was microsited in the Project design phase to avoid observations of SAR lichens and Canada warbler habitat will also be maintained as a result.

Olive-sided flycatcher

One Olive-sided flycatcher observation occurred within the Project infrastructure footprint (Figure 6.8-2). The observation occurred in upland habitat and this bird was not observed to be associated with a wetland that would provide suitable breeding habitat. Olive-sided flycatcher average territory size ranges from 10-20 ha (COSEWIC, 2018b) resulting in identification of associated breeding habitats for an observation difficult. However, WL6, 41, and 51 were identified as potential suitable breeding habitat for this species and the bulk of Olive-sided flycatcher observations were recorded in the southern portions of WL41 to the immediate east. WL65 to the west is a closed, shrub swamp that would not provide suitable breeding habitat. It is reasonable to conclude that this bird would also be associated with WL41.

One observation occurred on the western boundary of WL6 outside Project infrastructure but within a wetland expected to be impacted by Project activities. This wetland will see a 28.87 percent reduction of total area, 45,211 m^2 of 156,602 m^2, in the northern portions.

All other Olive-sided flycatcher observations associated with wetland breeding habitat occurred in wetlands that will not be impacted by Project activities.

Eastern wood-pewee

Twelve eastern wood-pewee observations occurred within the Project infrastructure footprint (Figure 6.8-2). These observations occurred in upland habitats and not associated with wetlands that would provide suitable breeding

habitat. Eastern wood-pewee average territory size ranges from 2-10 ha (McCarthy, 1996) resulting in identification of associated breeding habitats for an observation difficult. Two observations occurred in the southern portion of WL34 within Project infrastructure where direct impacts to wetland habitat are anticipated. A reduction of 31.1 percent (7,771 m^2) of total area (2.5 ha) is expected in WL34 due to Project activities which will result in a loss of breeding habitat for this species.

One observation occurred on the western boundary of WL6 outside Project infrastructure but within a wetland expected to be impacted by Project activities. This wetland will see a 28.87 percent reduction of total area, 45,211 m^2 of 156,602 m^2, in the northern portions.

All other Eastern wood-pewee observations associated with wetland breeding habitat occurred in wetlands that will not be impacted by Project activities.

Summary of Impacts

Direct

A direct loss of 50+ individuals of SOCI alder-leaved buckthorn will occur in WL62. A direct loss of one SAR black ash will occur in WL43. Project activities during development and operation could pose a mortality risk to wildlife primarily through road building and increased traffic, or attracting nesting of wildlife to inappropriate areas.

It is expected that a total loss of 170 ha (28.4% of the PA, 2.5% of LAA) of habitat will be directly impacted by Project infrastructure. The greatest percentage of impact to a habitat type within the LAA is hardwood forest at 15.6% (40.2 ha of 257.8 ha in the LAA - a predicted magnitude of effect of moderate). An overall magnitude of impact for direct habitat loss within the LAA is low (2.5%).

Indirect

The buffer of one observation of SAR frosted glass whiskers will be infringed, however, the dwelling tree will be maintained. Several short stretches (<3m in length) of marginal wood turtle nesting habitat along a 50 m reach within WC12 will be lost to Project infrastructure. A structure supporting a barn swallow roost may be removed or require maintenance, so as to no longer support nesting. Wetlands with suitable Canada warbler and eastern wood-pewee habitat will be impacted. Wetland 34 will experience a reduction of 31.1 percent (7,771 m^2) of total area (2.5 ha) WL34 and a reduction of 28.87 percent (45,211 m^2) of total area (15.7 ha) is expected in WL6. Olive-sided flycatcher habitat in WL6 will also be impacted.

6.8.6 Mitigation

Several management plans addressing standard mitigation measures and common practices as it relates to the terrestrial environment will be provided prior to commencement of the Project. Table 6.8-6 lists the proposed specific terrestrial environment mitigation measures to reduce overall direct and indirect impacts from the Project.

Table 6.8-6 Mitigation Measures of the Terrestrial Environment

Project Phase	Mitigation Measure
Construction, Operation	Provide wildlife awareness training to site personnel to reduce interactions between site personnel and wildlife.
	Avoidance of SAR lichen occurrences and where possible maintain 100 m setback
	Intact forest stands and wetlands will be avoided wherever possible during detailed Project planning and design in favor of previously disturbed areas (e.g., stands disturbed by timber harvesting, roads, or other development).
	Where natural, intact habitat cannot be avoided, maintain existing vegetation cover whenever possible and minimize overall areas of disturbance.

Project Phase	Mitigation Measure
	Clearing of vegetation will occur outside the breeding bird window (April 15th – August 31st) where possible. If this is not possible, then nest sweeps will be completed by a qualified biologist prior to clearing. CertainTeed will work with NSNRR and NSECC to develop nest sweep protocols.
	For those species reliant on wetland habitat, a wetland alteration application will be submitted during Project planning and design to request an authorization to alter wetland habitat and to address loss of wetland function, specifically lost wetland function for species at risk.
	Compensation for permanent loss of wetland function will be completed through wetland restoration activities to support no net loss of wetland function, subject to NSECC approval, specifically lost wetland function for species at risk.
	Alternatives to traditional hydroseeding methods will be reviewed to advance vegetation re-establishment and reclamation methods. Consideration will be given to native species with Indigenous significance.
	Employ measures to reduce the spread of invasive species (particularly by vehicles) into wetlands and retain habitat integrity. Inspect vehicles regularly, particularly vehicles arriving from outside the PA. If necessary, cleaning will be undertaken at a designated cleaning station, away from wetlands and watercourses.
	Monitor dust conditions and implement dust suppression mitigation (refer to air mitigation) when normal precipitation levels are not enough to suppress fugitive dust.
	Vehicles will yield to wildlife on roads.
	Install signage where specific wildlife concerns have been identified.
	Monitor and manage road conditions through dust suppression and traction control (sand on icy roads) to reduce potential for collisions with wildlife.
	Turtle exclusion fencing should be erected where identified potential turtle areas and based on site observations of turtles. Fencing or other appropriate barriers will be maintained on-site during nesting season (April to late-July) and kept in effective working condition. During the nesting season Project personnel will conduct a visual inspection of stockpiles before handling to ensure no nests are present. These details will be WMP in consultation with NRR
	ESC planning will be completed to ensure site runoff is not directed towards unaltered habitat. Implement ESC Plan.
	Implement Environmental Emergency Response and Spill Contingency Plans to protect fauna and their habitat from accidental spills.
	Store hazardous and non-hazardous waste in designated locations, in appropriate containers to reduce potential for spills, and to prevent attracting wildlife (e.g., food waste in bear proof containers).
	Limit use of lights to the amount necessary to ensure safe operation within the PA, with the recognition that excessive lighting can be disruptive to wildlife. Install lights facing downward and wherever practicable using motion-sensing lights.
	Implement Wildlife Management Plan and best management practices
Closure	Implement remediation plans to restore natural habitat to support fauna

Black ash

The Project has been developed to avoid 98 of the 100 black ash trees located in the northern part of the PA and suitable wetland habitat surrounding the black ash observations. The sole black ash observation near the far south boundary of the PA will also be avoided. During micro-siting, CertainTeed maintained a minimum 195 m buffer from the nearest black ash occurrences from Project infrastructure (within WL34).

The projected baseline reductions in hydrology at AP 5, 6 and 17 (refer to Figure 6.5-3 in Section 6.5) within the PA exceed both the amplitude and temporal scale seen in these natural fluctuations tolerated by black ash. Long term changes in hydrology outside the normal range of variability due to the Project are likely to impact black ash by reducing available soil moisture and encouraging competition with upland species. To mitigate these indirect changes, pumping will occur during operations into these systems to mimic natural hydrology and maintain the flow through WL67, WL72 and WL35. There is direct impact to WL34 from the open pit development, but water inputs to the portion of remaining wetland that supports the black ash will be maintained through pumping. This pumping has been modelled in the water balance and reached a 0% change in flow on an annual basis. Exact pumping schedule and outlet design will consider the requirements of these systems to mimic natural regimes and will be designed to support subsequent permit applications (see Section 6.5.5.1). In addition, the open pit will be progressively backfilled to limit the temporal scale of the impacts. The backfilled open pit will be graded and contoured to reinstate the surface water runoff once the area is reclaimed to the wetland habitats that support the black ash.

The single black ash individual that is proposed to be impacted by the development is located within WL43. The exact coordinates of black ash observations have not been included in this report, as it is considered to be a location-sensitive species by NSDNRR.

The overall health among individuals of black ash observed was considered good relative to the season surveyed (late summer). All trees showed a degree of insect damage to foliage which is common for the time of year (fall) and did not appear to result in decreased live crown ratio, with the exception of isolated tree in WL43. Ash beetle burrows were observed on the bark of several individual black ash in WL72 in low densities and did not appear to impact crown health.

The lone individual black ash in WL43 was observed to be hosting large colonies of Eastern tent caterpillar (*Malacosoma Americanum*) that covered approximately 10% of the remaining crown and had caused significant defoliation. At least five primary branches were observed as dead and the remaining crown was thin. Recent forest activity (within last five years – prior to the purchase of the property by CertainTeed) has significantly impacted site conditions surrounding this observation with changes in hydrology indicated by a succession towards a more graminoid dominated species composition. Forest harvesting has occurred in the area immediately adjacent tothis tree which removed the overstory and has exposed this tree to full sun conditions. It is likely that stress from these changes to forest overstory and local hydrology caused increased vulnerability to insect infestation. In general, juvenile black ash exhibit a high degree of shade tolerance that gradually diminishes as the tree moves towards maturity (COSEWIC, 2018b). Due to the rapid exposure to full sun caused by overstory removal to forestry activities, this tree has undergone this process at an unnatural rate as opposed to what would normally take decades of slow, incremental change. This may be contributing to the stress observed in this individual.

Historic forestry activity in the immediate vicinity of the individual black ash observation will continue to drive succession shifts in the wetland vegetation community away from the narrow and specific niche occupied by black ash. Drier conditions will promote upland pioneer forest species, such as red maple, which are certain to outcompete this individual (NSDNRR, 2015). The shallow root systems of black ash also make the species prone to desiccation when hydrological regimes shift ground water deeper beyond their reach (COSEWIC, 2018b; Tardif and Bergeron, 1992; Tardif and Bergeron, 1999). For these reasons, the current environment surrounding this observation is unlikely to provide continued suitable habitat for black ash due to the heavy disturbance caused by forest harvesting.

The Recovery and Action Plan for black ash in Nova Scotia (2015) provides statistics on population and distribution trends as well as information on species demographics in the province. The numbers presented in this report have been used as the benchmark for weighing significance of recent observations, yet are from the early 2000s and are in need of updating to incorporate knowledge gained over the last decade since the publishing of the report. It has been

the experience of Strum Consulting and McCallum Environmental that identified populations, and specifically known seed-bearing trees, have been steadily increasing as focused survey efforts have yielded many new observations over the past several years. One such PA that was surveyed resulted in several hundred individuals identified and 20+ seed bearing trees located. This observation alone nearly doubles the known seed-bearing trees in the province as identified in the recovery strategy. Relative comparisons of new data points to information presented in the recovery strategy no longer reflect current conditions and an amalgamation of recent data sets seems necessary to accurately assess the magnitude of impact from Project activities as they relate to black ash.

Several management options exist for propagating this individual elsewhere within the PA, or other suitable sites in the province, and a detailed salvage plan would be developed in consultation with NSNRR and with the Mi'kmaq of Nova Scotia. Fruit could be collected during a mast year for a seed bank to preserve genetic diversity and to also establish a seedling transplant propagation program, modelled on successful First Nation led initiative in New Brunswick. A transplantation program would provide a means of replacing this tree to other wetlands in the PA and enhance overall recruitment of this black ash population by supplementing natural regeneration with transplants. A seedling replanting program would result in the replacement of this individual many times over and could be expanded to seed collection from other trees on site to promote genetic diversity. Species of *Fraxinus* are not known to propagate readily from cuttings but do sprout prolifically from stumps when cut (Hartman et al. 2002, NSDNRR 2015). The tree stump could be transplanted to an adjacent wetland to allow for stump sprouts to regenerate and preserve this individual within the PA. This wetland was identified as suitable by KMNKO during a site visit in spring of 2024 and could be easily accessed through existing road networks. The relatively small size of the proposed take tree makes transplantation feasible with the use of appropriate heavy equipment and careful preparations of the specimen. Lastly, a harvest of this tree could also provide materials for local Mi'kmaw communities for traditional uses.

An initial field visit has been completed with the Mi'kmaq of Nova Scotia to review the location of the single black ash that is proposed for transplantation. The Mi'kmaq of Nova Scotia (representatives from CMM and KMNKO) provided CertainTeed with positive feedback on the initial salvage plan. The detail salvage plan will be developed during the permitting process, in conjunction with the Mi'kmaq of Nova Scotia and NSDNRR. Mi'kmaq knowledge of black ash ecology in NS precedes western experience and offers an important resource for collaboration on conservation issues. This collaboration would satisfy the aim of action plan item 1.4 to "facilitate a) knowledge sharing across generations and sectors, b) training, and c) mentorship of future generation of stewards" from the Recovery Strategy (NSDNRR, 2015).

A comprehensive monitoring program will be established to support Project development which will act as a research project relating to the required hydrological regime required for the remaining black ash (all but one tree) that will be avoided by the Project.

Lichens

Two SAR lichen species were identified at the Project during baseline surveys: Blue felt lichen (*Pectenia plumbea*, SARA Special Concern, NSESA Vulnerable, S3) and Frosted Glass-whiskers (*Sclerophora peronella,* SARA Special Concern). No direct impacts to thalli of observations of either species are anticipated as a result of Project activities and CertainTeed has committed to adjusting the boundary of the overburden rock stockpile to allow for maintenance of buffers for SAR lichens identified within WL41. A monitoring program will be implemented to assess any potential indirect impacts. Monitoring is proposed for the northmost observation of frosted glass-whiskers located east of the open pit and the 2 observations of SAR lichens in WL41 adjacent to the proposed stockpile. The Lichen Monitoring Plan will aim to monitor SAR lichen health to detect any change to the observed lichen (ie – due to edge effects or changes in air quality from dust from Project activities).

Indirect impacts to lichens from dust will be mitigated through the Fugitive Dust Management Plan. Dust conditions will be monitored and dust suppression will be implemented when normal precipitation levels are not enough to suppress fugitive dust.

Barn swallow

Several abandoned barns where barn swallow were observed to be utilizing may be removed or modified by CertainTeed due to safety concerns or Project needs. The Wildlife Management Plan should incorporate minimizing impacts to barn swallow for all maintenance activities and Project development in this area.

Canada warbler

Two Canada warbler observations occur within the Project infrastructure footprint where breeding habitat will be impacted (Figure 6.8-2). The two observations occurred in the southern portion of WL34 where direct impacts to wetland habitat are anticipated due to open pit development, but water inputs to the portion of remaining wetland that supports Canada warbler will be maintained through pumping. Project activities will result in a 31.1 percent reduction (7,771 m^2) of total area (2.5 ha) of this wetland where breeding habitat is present for the Canada warbler.

One observation occurred on the western boundary of WL6 outside Project infrastructure but within a wetland expected to be impacted by Project activities. This wetland will see a 28.87 percent reduction of total area, 45,211 m^2 of 156,602 m^2, in the northern portions. Hydrological inputs to this wetland flow from the south and are not expected to undergo reductions. The northern portions of the wetland will be mitigated to maintain hydrologic flow to the wetland at the interface to Project infrastructure to prevent excessive draining and changes to breeding habitat identified in the southern areas of the wetland.

Eastern wood-pewee

Two eastern wood-pewee observations occurred within the proposed Project infrastructure footprint where breeding habitat will be impacted (6.8-2). The two observations occurred in the southern portion of WL34 where direct impacts to wetland habitat are anticipated due to open pit development, but water inputs to the portion of remaining wetland that supports eastern wood-pewee will be mitigated to maintain hydrologic flow to the wetland. Project activities will result in a 31.1 percent reduction (7,771 m^2) of total area (2.5 ha) of this wetland where breeding habitat is present for the eastern wood-pewee.

One observation occurred on the western boundary of WL6 outside proposed Project infrastructure but within a wetland expected to be impacted by Project activities. This wetland will see a 28.87 percent reduction of total area, 45,211 m^2 of 156,602 m^2, in the northern portions. Hydrological inputs to this wetland flow from the south and are not expected to undergo reductions. The northern portions of the wetland will be mitigated to maintain hydrologic flow to the wetland at the interface to Project infrastructure to prevent excessive draining and changes to breeding habitat identified in the southern areas of the wetland.

Herpetofauna

Appropriate measures must be taken to exclude herpetofauna SAR from interacting with Project infrastructure and activities. Turtles may be attracted to exposed gravel areas for nesting during clearing, grubbing, road building and other Project activities. Other Project infrastructure, such as the pit, can present hazards or barriers to movement and efforts should be made to exclude turtles from these areas. The following mitigation measures will be included in the design of the Project to minimize effects:

– Wildlife awareness training will be provided to Project personnel.
– Vehicle speed limits established on Project roads and signage posted in areas of potential turtle crossing.
– Project staff will be made aware of wildlife potential in the PA and on roads especially for Project traffic/transportation. Specifically, signage will be posted to indicate turtle presence where previously identified and at any future observation locations.
– Turtle exclusion fencing should be erected where identified potential turtle areas and based on site observations of turtles. and kept in effective working condition. During the nesting season Project personnel will conduct a visual inspection of stockpiles before handling to ensure no nests are present.
– Follow Pit and Quarry Guidelines to reduce impact of noise and vibration on wildlife.
– Implement reclamation program to re-establish habitat to support fauna.

– The Project will typically operate during daylight hours to prevent nighttime disturbance. If nighttime activities are required, temporary, downward directional lighting will be used.
– A Wildlife Management Plan will be developed with methods by which the Project can take place while minimizing interactions with wildlife.

6.8.7 Monitoring and Follow-up

Several monitoring and management Plans will be developed to assess the accuracy of the predicted environmental effects and effectiveness of the mitigation measures. The management and monitoring Plans are subject to modifications after consultation with NSDNRR and NSECC. The following Plans will be developed as part of the Project's commitment to monitoring and mitigation of adverse effects to the Terrestrial Environment:

– **Wildlife Management Plan –** The primary goals of this Plan is to provide strategies in reducing human-wildlife interactions, promote safety of both wildlife and site personnel and best management practices for vegetation management including invasive species management. This Plan will occur during the duration of the construction, operation and reclamation phase of the Project.
– **Black Ash Monitoring Plan –** the purpose of this Plan is to monitor the occurrences of black ash within the PA and the hydrology in the wetlands they were found in to monitor and mitigate indirect impacts to the trees from the Project. The Plan will be developed in consultation with NSECC and NSDNRR and CertainTeed will adjust the specifics of the plan if necessary.
– **Lichen Monitoring Plan –** The purpose of this Plan is to monitor occurrences of SAR lichens surrounding Project infrastructure to monitor potential indirect effects to lichens from the Project. The Plan will be developed in consultation with NSECC and NSDNRR and the Proponent will adjust the specifics of the Plan if necessary.
– **Fugitive Dust Management Plan** – Provides details about best management practices to control potential fugitive dust emissions, as well as planned strategies for dealing with potential fugitive dust issues.
– **Wetland Monitoring Plan** – The monitoring of vascular plants will occur during the Wetland Monitoring Plan program. Monitoring of select wetlands proposed to be partially altered will occur during baseline/pre-construction conditions and continue through operation and closure phases (if required). The monitoring program will be focused on wetland vascular plant communities and document if any shifts in vascular plant communities or introduction of invasive species occur.

6.8.8 Residual Effects and Significance

The predicted residual environmental effects of the Project on the Terrestrial Environment are assessed to be adverse, but not significant. The overall residual effect of the Project on the Terrestrial Environment is assessed as not likely to have significant adverse effects after appropriate mitigation measures have been implemented as summarized in Section 6.8-6.

A significant adverse effect on the terrestrial environment from the Project is defined as:

– A Project-related effect that is likely to cause a permanent, unmitigated, alteration to habitat that supports flora and fauna species.
– A Project related direct loss of a SAR individual.

Vegetation clearing and grubbing during the construction phase will result in the direct loss of habitat. The magnitude of habitat loss varies by species and their habitat requirements. However, the overall magnitude for direct loss of habitat and habitat for species is estimated to be low (<5% direct habitat loss). Direct loss of a SOCI species (50+ stems of alder-leaved buckthorn) results in an assigned magnitude of moderate (direct loss of SOCI individuals). A direct loss of one SAR black ash will result in an assigned magnitude of high (direct loss of SAR individuals). It is expected that a total loss of 170 ha (28.4% of the PA, 2.5% of LAA) of habitat will be directly impacted by Project infrastructure. The greatest percentage of impact to a habitat type within the LAA is Hardwood forest at 15.6% (40.2 ha of 257.8 ha in the LAA - a predicted magnitude of effect of moderate). An overall magnitude of impact for

direct habitat loss within the LAA is low (2.5%). Habitat loss for SAR wildlife, flora, and lichens results in an assigned magnitude of moderate (loss of SAR or SOCI habitat within the LAA).

The Project infrastructure design was developed will avoid impact to 99 of the 100 observed black ash and maintain hydrological inputs to wetlands of suitable black ash habitat. Project development will result in the loss of one black ash individual in WL43. This individual resides in a wetland that was heavily impacted by recent forestry activities and was observed to be in a state of poor health as a result. Successional shifts in WL43 due to this disturbance will result in reduced available water resources as well an increased prevalence of competitor species such as red maple, birches, poplars, and balsam fir. Conservation management options, such as seed collection and stump transplant, provide potential options for preserving genetic diversity from this individual and, thus, mitigating a degree of this impact.

A significant adverse environmental effect for the terrestrial environment has not been predicted for the Project for the following reasons, with consideration of the ecological and social context of the LAA surrounding the Project and the results of modelling:

– During Construction:
  - Direct impacts on the terrestrial environment are expected but will be minimized through on-going Project design and micro-sighting of infrastructure footprints wherever practicable.
  - Based on conservative modelling, less than 5% of the suitable habitat for wildlife in the LAA will be directly impacted by Project development. Habitat loss will be mitigated in the long term through reclamation planning.
  - Construction work will be considerate of the breeding bird season wherever possible.
– During Operation:
  - Noise will be elevated above baseline during this period and may cause a displacement of wildlife species.
  - Mitigation measures as described will be implemented to reduce wildlife-Project interactions. A Wildlife Management Plan will be developed and implemented throughout the life of the Project.
  - The open pit will be progressively backfilled during the operation phase to reduce the temporal scale of the impact on hydrology. The backfilled open pit will be graded and contoured to promote surface water flow to mimic baseline conditions to the extent possible.
– During Closure:
  - During closure, a positive effect to the terrestrial environment may occur, as revegetation and rehabilitation may result in increased habitat availability and could result in wildlife using and moving through the PA. Although the habitat quality and quantity will differ from baseline conditions, valuable habitat for a variety of fauna species may be available. CertainTeed is committed to working with local community groups, Mi'kmaq of Nova Scotia, and other interested parties to explore reforestation opportunities during active reclamation.

Residual effects to the Terrestrial Environment are summarized in Table 6.8-7.

Table 6.8-7 Residual Effects on the Terrestrial Environment

Project Phase – VC interaction	Mitigation and Compensation Measures	Nature of Effect	Residual Effects Characteristics						Residual Effect	Significance
			Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility		
Construction – Habitat loss from clearing and grubbing)	Limit habitat disturbance and minimize Project footprint during detailed design Maintain SAR lichen setbacks as per the At-risk Lichens SMP where practicable Re-establish habitat and associated vegetation communities during closure. Wetland Alteration Permitting and associated restoration/compensation	A	L <5% direct loss of habitat types observed in the LAA	LAA Potential adverse effects to vegetation and vegetation communities outside the PA	A Although clearing and grubbing will occur outside the sensitive species for wildlife, other activities will not	LT Effects occur beyond 3 years	O Effects occur once during the construction phase	PR Mitigation and reclamation cannot guarantee a return to baseline conditions.	Disturbance, habitat loss	Not Significant
Construction – Loss of Black ash (single tree)	Stump transplantation Collection of seeds Salvage of materials for Mi'kmaw traditional use	A	H Direct loss of SAR individual	PA	N/A	P Permanent	O Effects occur once during the construction phase	IR Loss of a SAR	Individual SAR loss	Significant
Construction – Loss of alder-leaved buckthorn (50+ stems)	N/A	A	M Direct loss of SOCI individuals	PA	N/A	P Permanent	O Effects occur once during the construction phase	IR Loss of a SOCI	Species loss	Not Significant
Construction – Loss of marginal turtle nesting habitat and breeding bird habitat for several SAR birds Buffer infringement of frosted glass whiskers	Wildlife Management Plan and turtle exclusion fencing to reduce impact to turtles Reduce speed limit and implement dust control measures	A	M Loss of SAR habitat within the LAA	PA	A Although clearing and grubbing will occur outside the sensitive species timing window for wildlife, other activities will not	LT Effects occur beyond 3 years	O Effects occur once during the construction phase	IR Habitat will be lost	Habitat loss	Not Significant

Project Phase – VC interaction	Mitigation and Compensation Measures	Nature of Effect	Residual Effects Characteristics						Residual Effect	Significance
			Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility		
Construction – Sensory disturbance [noise, light, dust deposition] and wildlife vehicle collisions from construction activities)	Limit habitat disturbance and minimize Project footprint during detailed design Implement speed limits and minimize lighting, best management practices and spill preparedness	A	M	LAA Potential adverse effects to wildlife outside the PA	A Although clearing and grubbing will occur outside the sensitive species timing window for wildlife, other activities will not	MT Effects occur within 2 years of the construction period	R Effects occur at regular intervals during the construction phase	R VC will recover to baseline conditions	Disturbance	Not Significant
Operations – Sensory disturbance (noise, light, dust deposition) and wildlife vehicle collisions from Project activities	Reduce speed limit and implement dust control measures Minimize lighting Implement WMP and associated monitoring Plans	A	M	LAA Potential adverse effects to wildlife outside the PA	A Although clearing and grubbing will occur outside the sensitive species timing window for wildlife, other activities will not	LT Effects may extend beyond 3 years	R Effects occur at regular intervals during the construction phase	R VC will recover to baseline conditions	Disturbance	Not Significant
Closure – Reclamation, re-vegetation	N/A	P	L Minor change from baseline conditions.	LAA Potential effects beyond the PA.	N/A VC is not expected to be affected by timing.	LT Effects extend beyond active closure phase.	O Effects occur once during the closure phase.	PR Mitigation and reclamation cannot guarantee a return to baseline conditions.	Habitat Reclamation	Not Significant
Legend (refer to Table 6.8-2 for definitions)										
Nature of Effect A – Adverse P – Positive	Magnitude N – Negligible L – Low M – Moderate H – High	Geographic Extent PA – PA LAA – Local Assessment Area RAA – Regional Assessment Area	Timing N/A – Not Applicable A – Applicable	Duration ST – Short-Term MT – Medium-Term LT – Long-Term P – Permanent	Frequency O – Once S – Sporadic R – Regular C – Continuous	Reversibility R – Reversible IR – Irreversible PR – Partially Reversible				

6.9 Socioeconomic Conditions

The NSECC requires proponents to provide information on current socioeconomic conditions that could potentially be affected by the Project and an assessment of potential effects and proposed mitigations to address identified issues. The following section provides that information for the Project.

6.9.1 Rationale for Valued Component Selection

The rationale for inclusion of various socioeconomic conditions included in this VC follow:

– **Economy and Employment**: The Project will contribute to the local and provincial economies resulting from employment and business activity throughout all phases.
– **Land and Resource Use**: Lands and resources within and near the PA may be zoned for other purposes. Development of the Project will require access to Crown land.
– **Traffic**: Development activities will result in changes (e.g., increased traffic or changes to traffic patterns) that may result in concerns about public safety and disruptions to travel and/or access.

Various aspects of the Project that may also affect human communities (dust, noise, water resources, are discussed in other VC chapters that address related topics such as changes to air, light, noise, groundwater, and surface water. In addition, human activities may be affected directly or indirectly by the effects of development on fish, animals, birds, or plants and the habitats that support these species. These related effects are not repeated in this VC.

The results of consultation and engagement were considered in planning of the Project and the effects assessment. Specific to the Socioeconomic Conditions VC, these include CertainTeed's commitment to ongoing consultation and engagement with Rightsholders and stakeholders. Engagement with Indigenous organizations including Mi'kmaq of Nova Scotia is described in Section 4.

6.9.2 Baseline Program Methodology

The Socioeconomic Conditions VC includes data and information obtained through desktop research and analysis. Data related to population, employment and income were obtained from the Statistics Canada 2021 census[1]. As no census data are available for Cooks Brook, HRM data are used. Land use zoning information was obtained from HRM's website.

Griffin was engaged to prepare a traffic impact assessment for this Project (Appendix J.1). This work included recording traffic volume and speed data from January 4-6, 2024 using an automatic traffic recording (ATR) unit. The study was also important for planning safe vehicular access for the Project.

6.9.3 Baseline Conditions

In 2021, the population of HRM had increased over the previous census (Table 6.9-1). Population gain was experienced in the province generally and the data indicate that HRM NS had an overall lower median age than NS.

Table 6.9-1 Population

Jurisdiction	Population			Median Age (2021)
	2016	2021	Change (%)	
Halifax Regional Municipality	403,131	439,819	9.1	40.4
Nova Scotia	923,598	969,383	5.0	45.6

Statistics Canada 2024

[1] 2021 census data may be affected by the results of the COVID-19 pandemic and related restrictions.

6.9.3.1 Economy and Employment

Like many jurisdictions in Canada, and particularly rural areas, NS has experienced outmigration, population ageing, and low birth rate, which affect labour availability and economic productivity. In 2014, the NS Commission on Building Our New Economy released the report: “Now or Never: An Urgent Call to Action for All Nova Scotians” a 10-year action plan identifying goals aimed at economic renewal (One Nova Scotia, 2024). This report emphasizes the importance of increasing population, improving labour force participation by underrepresented groups, enhancing new business start-ups and capitalization, improving research and development, and reducing debt. Focus industries included tourism, fisheries, and agriculture. A key goal is to increase export activity and value, which is critical for bringing new money into an economy. While the number of NS firms participating in export trade had increased, the value of exports fell short of objectives.

6.9.3.1.1 Economic Sectors

The North American Industry Classification Systems (NAICS) is used to categorize business activity in Canada, the United States, and Mexico. The 2021 census data (Statistics Canada, 2024) shows that in HRM, the largest numbers of individuals were employed in the following NAICS sectors: “Health Care and Social Assistance”, “Retail Trade”, “Public Administration, “Professional, Scientific and Technical Services”, “Educational Services”, “Construction”, “Accommodations and Food Services” and “Finance and Insurance” (Table 6.9-2). For both HRM and the province, “Construction was among the largest sectors. The classification showing the largest employment for women[2] in HRM and NS in 2021 was “Health Care and Social Assistance”. For men[3] in HRM and NS, the “Construction” classification was one of the largest employers.

Table 6.9-2 Employment by Industry

North American Industry Classification System (NAICS) 2012	Halifax Regional Municipality (%)			Nova Scotia (%)		
	Total	Men+ [4]	Women+	Total	Men+	Women+
Agriculture, Forestry, Fishing and Hunting	0.7	1	0.4	3.4	4.7	2
Mining, Quarrying, and Oil and Gas Extraction	0.3	0.6	0.1	0.7	1.3	0
Utilities	0.8	1	0.6	0.6	1	0.2
Construction	6.7	11.4	1.7	9.6	16.3	2.7
Manufacturing	4.2	5.9	2.4	9.7	13.1	6.3
Wholesale Trade	2.6	3.6	1.5	4.1	6.1	1.9
Retail Trade	11.2	10.3	12	15.8	13.8	17.8
Transportation and Warehousing	4.4	6.7	1.9	4.1	6.5	1.5
Information and Cultural Industries	2.4	2.8	2	0.8	0.7	0.9
Finance and Insurance	5	4.2	5.8	2	2	2
Real Estate and Rental and Leasing	1.7	1.8	1.6	0.8	1	0.5
Professional, Scientific and Technical Services	9.1	10.2	8	3.8	3.1	4.4
Management of Companies and Enterprises	0.2	0.2	0.2	0.2	0	0.3
Administrative and Support, Waste Management and Remediation Services	4.8	5.7	3.8	2.7	3.5	1.9
Educational Services	8.3	5.1	11.6	8	5	11.1
Health Care and Social Assistance	13.4	5.3	21.9	13.7	3.3	24.4

[2] "Women+" includes women (and/or girls), as well as some non-binary persons (Statistics Canada 2024).
[3] "Men+" includes men (and/or boys), as well as some non-binary persons (Statistics Canada 2024).
[4] "Men+" includes men (and/or boys), as well as some non-binary persons (Statistics Canada 2024). "Women+" includes women (and/or girls), as well as some non-binary persons.

North American Industry Classification System (NAICS) 2012	Halifax Regional Municipality (%)			Nova Scotia (%)		
	Total	Men+ [4]	Women+	Total	Men+	Women+
Arts, Entertainment and Recreation	2	1.9	2.1	1.7	1.7	1.7
Accommodation and Food Services	6.2	5.6	6.8	5.6	5.3	5.9
Other Services (except public administration)	3.8	3.4	4.3	3.8	3.2	4.3
Public Administration	10.3	11.4	9	7.1	6.1	8

Statistics Canada 2024

6.9.3.1.2 Employment and Income

Labour force participation (i.e., those actively seeking employment and/or employed), employment and unemployment rates are metrics of economic vitality. This section examines labour indicators for HRM and NS. Where disaggregated data are available, this analysis includes information on women+ and men+.

In 2021, labour force participation and employment were higher in HRM than NS (Table 6.9-3). In HRM, men+ and women+ had higher median employment income in comparison to NS in 2020. Labour market outcomes in both jurisdictions appear to have been generally less favourable for women+.

Table 6.9-3 Employment and Income by Gender

Indicator	Halifax Regional Municipality			Nova Scotia		
	Total	Men+	Women+	Total	Men+	Women+
Participation Rate (2021)	65.5%	69.4%	61.9%	59.5%	63.1%	56.1%
Employment Rate (2021)	58.1%	62.2%	54.2%	51.9%	55.3%	48.7%
Unemployment Rate (2021)	11.4%	10.4%	12.4%	12.7%	12.3%	13.1%
Median Employment Income (2020)	$ 38,000	$43,200	$33,600	$33,200	$ 38,000	$29,200

Statistics Canada 2024

In 2021, the employment rate First Nations (42.8%) and African Nova Scotians (46.1%) was lower than that of NS (51.9%) generally (One Nova Scotia, No Date). These gaps increased between 2011 and 2016 and decreased between 2016 and 2021 but the latter may have been affected by pandemic economic trends.

6.9.3.2 Land and Resource Use

The following sections describe land and resource use including land use planning and property ownership. The surrounding communities are within the jurisdiction of HRM for land use planning. Should EA approval be granted, CertainTeed will work with the appropriate municipal, regional and/or provincial authorities to ensure compliance with land use zoning and permitting requirements.

6.9.3.2.1 Land Use Planning

Cooks Brook is within the Musquodoboit Valley/Dutch Settlement Area under the HRM Municipal Planning Strategy. The area is zoned Mixed Use (MU), which includes Residential, Institutional, Commercial, Industrial and Resource Uses (HRM, 2023). Resource Uses encompass the following:

– Agricultural uses
– Intensive livestock operations
– Greenhouses and nurseries
– Forestry uses
– Extractive facilities

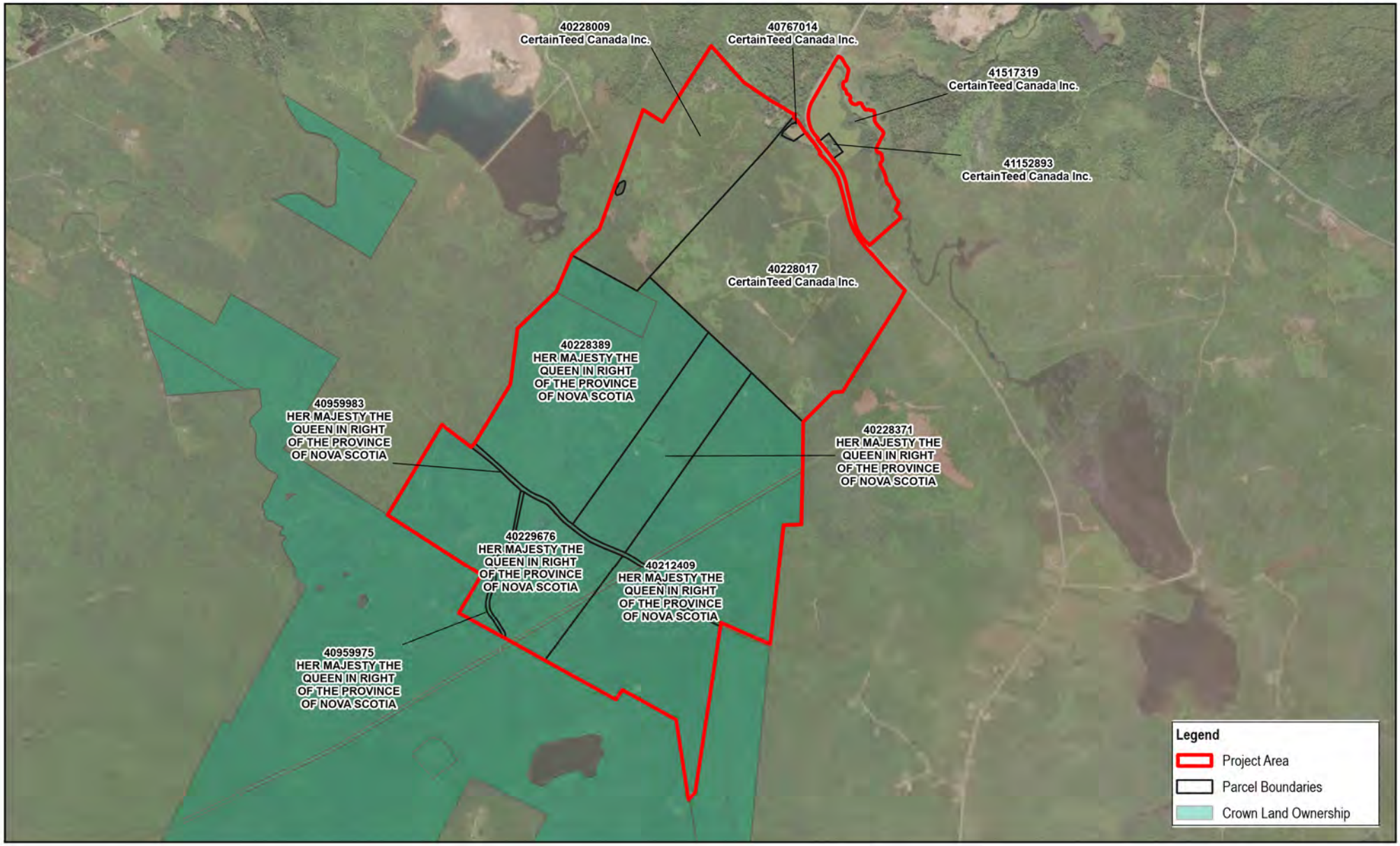
– Existing extractive facilities
– Composting operations
– Uses accessory to the foregoing uses

Extractive facilities refer to buildings, aggregate plants, material storage areas and weight scales associated with extractive uses that involve blasting or crushing, but do not include structures or storage areas for mining or extraction (HRM, 2023).

It is assumed that with provincial approval and the requirements stated above, a plan or zoning amendment will not be required for the Project. Land use planning and other permitting requirements will be discussed with HRM.

6.9.3.2.2 Property Ownership

CertainTeed has purchased private lands to facilitate development of the Project. The company will also require access to Crown lands held by the Province of Nova Scotia (Figure 6.9-1).



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CERTAINTEED CANADA INC.
LAKE EGMONT, HALIFAX CO, NOVA SCOTIA
ANTRIM GYPSUM PROJECT

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PROPERTY OWNERSHIP

FIGURE 6.9-1

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6.9.3.3 Traffic

Lake Egmont Road is a two-lane rural road with relatively low traffic – average daily traffic (ADT) of about 230 vehicles. The 85th percentile operating speed was calculated to be 90 km/h. As no speed limit signs were observed during the study, the regulatory speed limit was assumed to be 80 km/h following typical Nova Scotia Department of Public Works (NSDPW) procedures for rural low volumes roads where there are no speed limit signs. More information is included in Appendix J.1.

6.9.4 Effects Assessment Methodology

6.9.4.1 Boundaries

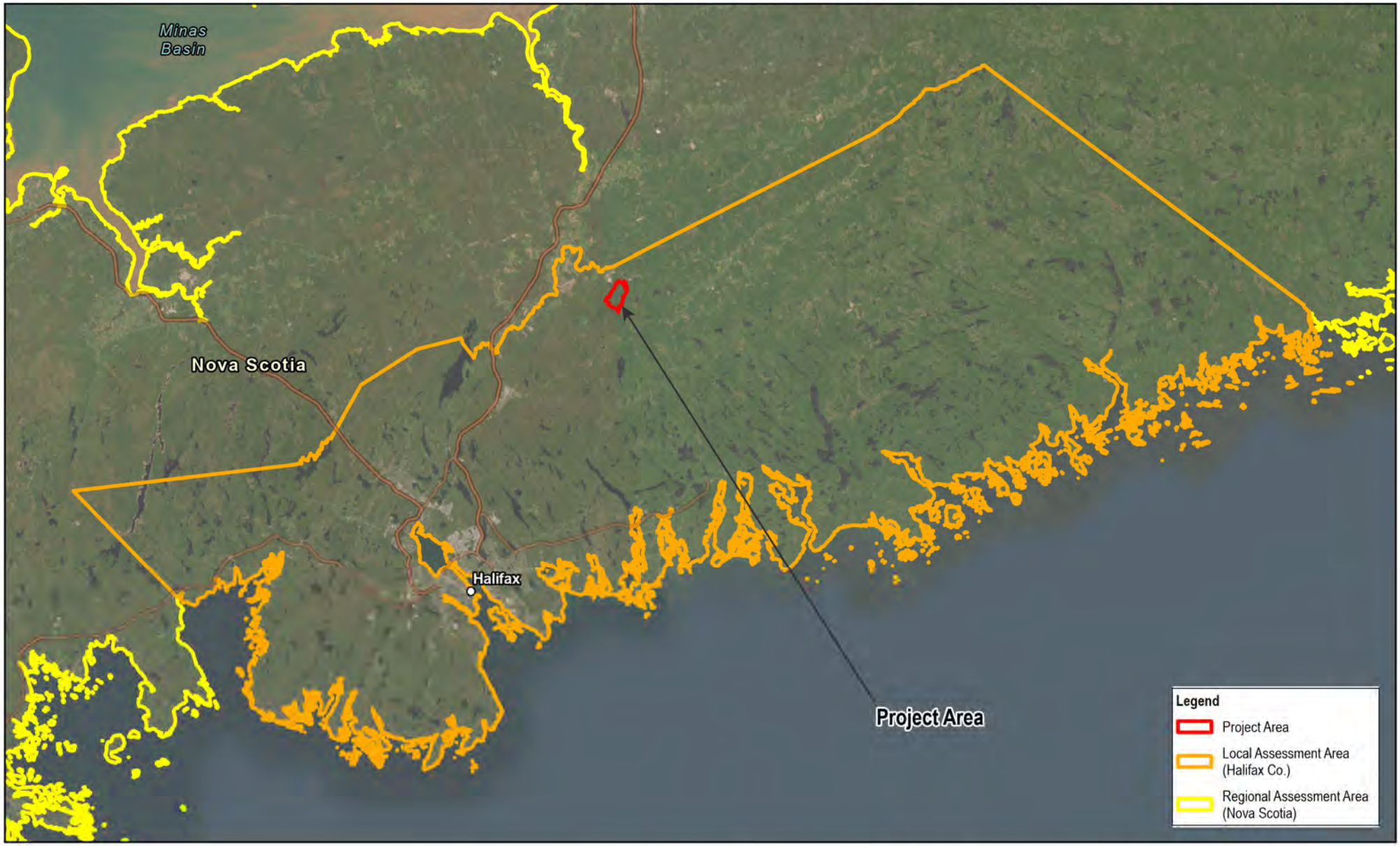
The assessment of Project effects requires consideration of various boundaries: spatial, temporal, administrative and technical. The spatial boundaries for assessment of potential effects of the Project includes the PA, LAA and RAA.

Spatial Boundaries

The following spatial boundaries were used to evaluate Project effects and interactions, including residual effects to Socioeconomic Conditions.

– The PA encompasses the immediate area in which Project activities may occur and are likely to cause direct and indirect effects to VCs.
– The LAA encompasses adjacent areas outside of the PA where Project related effects to VCs are reasonably expected to occur. For the purposes of determining effects on Socioeconomic Conditions, the LAA is HRM.
– The RAA encompasses all Project and VC interactions including diffuse or longer-range effects such as those from Project activities on socioeconomic environments. The RAA for this VC is NS as economic effects and employment will be experienced more broadly.

The spatial boundaries described above are shown in Figure 6.9-2.



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ANTRIM GYPSUM PROJECT

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SOCIOECONOMIC CONDITIONS EFFECTS ASSESSMENT BOUNDARIES

Figure 6.9-2

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Temporal Boundaries

The temporal boundaries used for the assessment of effects on the socioeconomic components of the Project includes the construction, operation and closure phases.

Administrative Boundaries

Administrative boundaries represent the regulatory, public policy and/or economic limitations placed on the execution of the Project and in this case are regional and provincial. Cooks Brook is with the HRM planning area of Musquodoboit Valley/Dutch Settlement. Lake Egmont Road is a public road under the jurisdiction of the NSDPW.

Technical Boundaries

HRM data are used to describe Cooks Brook as no census data are available for the community.

6.9.4.2 Modelling

CertainTeed has undertaken various studies that include modelling relevant to the Socioeconomic Conditions VC. The traffic impact study included modelling for new access visibility to determine the best location for safe vehicular access to and from the Project.

6.9.4.2.1 Traffic Impact Study

The traffic impact study evaluated the proposed trucking route from the PA to the Port of Sheet Harbour and included modelling to prepare a preliminary estimate of additional (e.g., large trucks, employee vehicles and service vehicles) that would be added due to the Project (Appendix J.1). A visibility assessment was prepared for a road with 90 km/h vehicle operating speed to identify a reasonable location for new access (Appendix J.2). The visibility assessment was completed following TAC's *Geometric Design Guide for Canadian Roads* (2017) as well as NSDPW's field measurement best practices for stopping sight distance (SSD) – minimum requirement for new access points. Adequate SSD ensures motorists on main roadways have sufficient forward visibility to identify hazards and stop if needed. Multiple measurement locations were used to identify a suitable opportunity along Lake Egmont Road for haul truck access. Haul trucks will stop and yield the right of way to local traffic along Lake Egmont Road so no changes are anticipated as a result of the Project.

6.9.4.3 Thresholds for Determination of Significance

Table 6.9-4 provides quantitative measures or definition of qualitative categories for assessment of residual effects on Socioeconomic Conditions.

Table 6.9-4 Characterization Criteria for Environmental Effects

Characterization	Quantitative Measure or Definition of Qualitative Categories
Magnitude	**N** – no detectable direct or indirect adverse effects. **L** – short or medium-term effects within the context of mitigations and consultation with appropriate regulators, communities, and user groups. **M** – long-term effects within the context of mitigations and consultation with appropriate regulators, communities, and user groups. **H** –permanent effects within the context of mitigations and consultation with appropriate regulators, communities, and user groups.
Geographic Extent	**PA** – direct and indirect effects from Project activities are restricted to the PA **LAA** – direct and indirect effects from Project activities are restricted to the LAA **RAA** – direct and indirect effects from Project activities are restricted to the RAA
Timing	**N/A** – seasonal aspects are unlikely to affect VCs **A** – seasonal aspects may affect VCs
Duration	**ST** – effects are limited to occur from as little as 1 day to 12 months

Characterization	Quantitative Measure or Definition of Qualitative Categories
	MT – effects can occur beyond 12 months and up to 3 years **LT** – effects extend beyond 3 years **P** – valued component unlikely to recover to baseline conditions
Frequency	**O** – effects occur once **S** – effects occur at irregular intervals throughout the Project **R** – effects occur at regular intervals throughout the Project **C** – effects occur continuously throughout the Project
Reversibility	**RE** – socioeconomic conditions will recover to baseline conditions before or after Project activities have been completed **PR** – mitigation cannot guarantee a return to baseline conditions **IR** – effects to VCs are permanent and will not recover to baseline conditions

A significant adverse effect to Socioeconomic Conditions from the Project is defined as:

– A Project related effect that results in permanent uncompensated loss of lands and resources used by other industry sectors or residential to commercial users.
– A Project related effect that results in permanent adverse health or safety conditions for relevant communities.

6.9.5 Project Interactions and Potential Effects

Socioeconomic Conditions have the potential to be adversely affected by mining and related activities. This includes those Project activities listed in Table 6.9-5.

Table 6.9-5 Project Activities and Socioeconomic Conditions Interactions

Project Phase	Relevant Project Activity
Construction	Clearing, grubbing, and grading Topsoil, overburden, and waste rock management Surface infrastructure installation and construction Haul road construction Collection ditch and settling pond construction General waste management
Operation	Gypsum management (extraction, loading, hauling, screening) Topsoil, overburden, and waste rock management Water management Haul road construction and maintenance Petroleum products management General waste management
Closure	Demolition Earthworks Water management General waste management

6.9.5.1 Economy and Employment

All phases of the Project will provide employment and procurement opportunities, as well as make positive contributions to gross domestic product (GDP), royalties, and taxes for municipal, provincial and federal governments. The total value of spending in each phase is estimated to be:

– Construction – $65M of capital spending

– Operations – $14M - $16M of annual operating expenditures
– Closure – presently estimated between $5M-$10M based on other similar mine projects

An estimated 65 fulltime positions are anticipated during operations with 17 construction jobs and 8 during the closure phase. Forecasted construction and / or operations positions include:

– Mine Manager
– Project Manager
– Mine Superintendent
– Mine Engineers
– Surveyor / Mining Technician
– Mine Geologist
– Quality Testers
– Mine Shift Lead
– Mine Equipment Operators
– Rock Processing Operators
– Loader Operators
– Human Resources Coordinator
– Health and Safety Manager
– Office Administrator
– Security Guards
– Environmental Coordinator
– Environmental Technicians
– Training Coordinator
– Logistics Coordinator
– Shipping Clerks
– Maintenance Manager
– Maintenance Planner
– Electricians
– Mechanics
– Lube & Refill Operators

The Project is expected to also create indirect and induced economic value via contractor, service, consulting procurement and employment opportunities during pre-engineering, construction, and operations, including job opportunities at Sheet Harbour. For instance, in 2021, the NS mining industry employed 2,187 individuals directly and 841 indirectly meaning for every three jobs in the mining industry, another position was created indirectly in the mining supply sector (MANS, 2024). Employment in the Canadian mining supply sector includes miners, geoscientists, transport truck drivers, drillers and blasters, construction trades helpers and labourers (MIHR, 2024).

The Project will have a positive impact in this rural area due to employment opportunities and the possibility of retaining and/or gaining new population. Due to labour shortages, the construction and mining industries may face challenges with recruitment and retention. In this environment, the Project may present an opportunity to employ those normally underrepresented (e.g., women, people of colour, Indigenous people and immigrants) in the construction and mining industries in NS.

6.9.5.2 Land and Resource Use

Land use requirements may affect the configuration of the Project. The overview in Section 6.9.3.2 indicates the Project is likely compatible with current land use zoning, but this should be reviewed with planning staff at HRM. A Crown Land Lease will be required before the Project can proceed to construction on Crown land.

Some land use activities occur in the PA. During field work, off-road vehicle use was noted, especially in the southern portion of the PA. No parks intersect the PA or are within a 2 km radius of the PA. Lake Egmont Nature Reserve and Dollar Lake Provincial Park are within a 5 km radius of the PA. Lake Egmont Nature Reserve includes a forest of large old hardwood and red spruce trees (Government of NS, nd). The Nature Reserve's gypsum sinkholes, vernal pools and talus slopes are representative of NS's gypsum habitats (which have limited protection) and overwintering habitat for bats. Dollar Lake Provincial Park offers facilities and services to support camping, boating, canoeing, fishing and water-skiing (Province of NS, nd).

6.9.5.3 Traffic

Construction will require mobilization of heavy equipment for earthworks and site preparation, as well as mobilization of site infrastructure. Similarly, during closure the infrastructure will be removed resulting in a second period of increased activity. All phases will include use of large trucks and passenger vehicles. It is expected during operations, additional traffic (i.e., large trucks, employee vehicles and service vehicles) will be experienced. The number of truck trips per hour traveling to and from the Port of Sheet Harbour are estimated at 28. The preliminary estimate of additional traffic during operations indicates 78 vehicles per hour (VPH) in both the peak AM (67 inbound, 39 outbound) and peak PM (39 inbound, 67 outbound) periods. This includes traffic associated with new employees, trucks, and service vehicles associated with the Project.

6.9.6 Mitigation

CertainTeed has considered the beneficial and adverse effects of the Project on Socioeconomic Conditions and designed the Project to avoid adverse issues wherever possible. CertainTeed has also developed mitigations to minimize any effects. The following sections outline mitigations to reduce potential adverse effects from the Project and measure to enhance benefits.

6.9.6.1 Economy and Employment

CertainTeed is committed to maximizing local recruitment and employment, local labour market training, procurement and service opportunities throughout all Project phases. CertainTeed is an equal opportunity employer to providing a safe, healthy, and rewarding workplace where employees are treated fairly and given opportunities to improve their skills. Local trucking companies meeting requirements (e.g., capacity, vehicles, insurance, safety, driver training) will be contracted to transport gypsum to Sheet Harbour.

6.9.6.2 Land and Resource Use

CertainTeed will comply with all regulations and permitting requirements for the Project in all phases as identified by HRM. Private land parcels have already been purchased for the Project. CertainTeed submitted a Crown Land Lease application on January 19, 2023 to ensure permitted access to lands prior to initiation of Project works.

6.9.6.3 Traffic

CertainTeed is planning the Project to help ensure public and worker safety. The visual assessment in the traffic study determined there is sufficient visibility for site access over a 29 m long section opposite a barn structure at civic #1480 Lake Edgemont Road. Detailed design will determine the exact location and configuration of the access.

CertainTeed acknowledges that an increase in traffic above current conditions is inevitable due to the Project. Recognising the potential challenges of increased traffic, CertainTeed is limiting truck traffic to the port facility from 7:00 AM to 8:00 PM, Monday to Friday. All haul truck drivers will be licensed to drive B-train double trucks, will adhere

to speed limits and other road laws, and will drive to the changing road conditions. Prior to operating equipment or vehicles for construction of the Project, CertainTeed will meet NSDPW requirements and employ traffic management standards (e.g., signage) to identify any risks and appropriate policies and programs to ensure public and worker safety. It is anticipated that the NSDPW will require Project specific signage and upgrades to the bridge across Gays River at Lake Egmont Road.

6.9.7 Monitoring and Follow-up

It is not anticipated that ongoing monitoring will be required for Socioeconomic Conditions such as economy and employment, land use and traffic. CertainTeed's policies and programs for wellness and safety will help address traffic issues. Offsite traffic management is regulated and monitored by provincial and/or regional authorities. CertainTeed will maintain open lines of communication (via a CLC and Project website) with local residents and the broader community so as to be made aware of future concerns and work to mitigate or eliminate issues.

6.9.8 Residual Effects and Significance

The predicted residual effects of the Project on the Socioeconomic Conditions are assessed to be both positive and adverse, but not significant. The overall residual effect of the Project on the Socioeconomic Conditions is assessed as not likely to have significant adverse effects after appropriate mitigation measures have been implemented as summarized in Section 6.9 6.

A significant adverse effect on the Socioeconomic Conditions VC was defined in Section 6.9.4 as:

– A Project related effect that results in permanent uncompensated loss of lands and resources used by other industry sectors or residential or commercial users.
– A Project related effect that results in permanent adverse health or safety conditions for relevant communities through increased traffic.

This Project will make a strong contribution to the economy of this area of HRM and NS. It will generate new employment in all Project phases (and related income and taxation benefits). Contracting and sub-contracting for required goods and services (i.e., equipment and supplies) and associated expenditures will provide business opportunities for qualified firms. Creation of new employment will benefit businesses through Project-related spending. Project benefits are not considered in evaluation of adverse residual effects.

CertainTeed will comply with all regulations and permitting requirements for land use planning and access to Provincial Crown lands. Private lands have already been purchased for the Project. Traffic management measures will reduce the effects of increased traffic due to the Project. Residual effects of the Project on traffic after mitigation are likely to be moderate, long term, within the LAA (as traffic extends beyond the PA) and continuous throughout all Project phases. Traffic is anticipated to return to baseline conditions after completion of the Project.

Table 6.9-6 Residual Effects on Socioeconomic Conditions

Project Phase	Mitigation and Compensation Measures	Nature of Effect	Residual Effects Characteristics						Residual Effect	Significance
			Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility		
Construction, operation and closure – economy and employment	CertainTeed is committed to maximizing local recruitment and employment, local labour market training, procurement and service opportunities.	P Beneficial effects are anticipated from direct and indirect employment opportunities. Tother positive benefits for local, regional, and provincial economies from procurement, taxes, and royalties	M	RAA	N/A	LT Occurs for all phases of the Project.	C	RE	Direct and indirect employment opportunities and other positive benefits for the local, regional, and provincial economies.	Primarily positive and beneficial to the economy No significant adverse residual effects
Construction, operation and closure – land and resource use.	CertainTeed will restrict assess only where it is unsafe for land users to access.	A Access will be restricted in and around the Project infrastructure.	M	PAA	N/A	LT Occurs for all phases of the Project.	C	RE Access will be gradually restored in the area of the Project infrastructure as the area is reclaimed during closure.	Recreational users will lose access to a portion of the PA during the life of the Project.	Not significant
Construction, operation, and closure - traffic	CertainTeed will limit trucking hours from 7:00 am to 8:00 pm, Monday to Friday. All haul truck drivers will be licensed to drive B-train double trucks, will adhere to speed limits and other road laws, and will drive to changing road conditions as appropriate. CertainTeed will develop a Traffic Management Plan. A clear line of communication for traffic complaints to be recorded and addressed.	A Increased traffic associated with trucking to the port facility.	M	LAA	A Seasonal road restrictions may apply to this Project. Consultation with NSDPW is required.	LT Occurs for all phases of the Project with the largest increase in traffic volumes during the operation phase.	R Trucking hours between 7 am to 8 pm, Monday to Friday.	RE	Increased traffic volumes on public roads.	Not significant

Legend (refer to Table 6.9-4 for reference definitions)

Nature of Effect	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
A – Adverse P – Positive	N – Negligible L – Low M – Moderate H – High	PA – Project Area LAA – Local Assessment Area RAA – Regional Assessment Area	N/A – Not Applicable A – Applicable	ST – Short-Term MT – Medium-Term LT – Long-Term P – Permanent	O – Once S – Sporadic R – Regular C – Continuous	RE – Reversible IR – Irreversible PR – Partially Reversible

6.10 Mi’kmaq of Nova Scotia

6.10.1 Rationale for Valued Component Selection

Assessment of the potential of the Project to affect the Mi’kmaq of Nova Scotia is included as a VC due to the following:

– The historic presence of the Mi’kmaq throughout NS.
– Recognition of established Aboriginal and Treaty Rights.
– Canada’s Duty to Consult with Indigenous Peoples.
– Reconciliation with Indigenous Peoples.
– The potential for the Project to affect the Mi’kmaq’s ability to access some lands and/or to alter the presence or availability of animals or plants the Mi’kmaq rely upon for traditional purposes.

In 2004 and 2005, the Supreme Court of Canada (SCC) passed three landmark decisions, which established the Crown’s Duty to Consult with Indigenous Peoples as outlined in the *Updated Guidelines for Federal Officials to Fulfill the Duty to Consult* (Government of Canada, 2011). In 2007, the governments of NS, Canada and the Mi’kmaq of Nova Scotia established the *Mi’kmaq Canada Nova Scotia Consultation Terms of Reference*, which establishes the process to resolve issues related to Aboriginal Rights and Treaty Rights (Union of Nova Scotia Mi’kmaq (UNSM), 2021). As outlined in the *Proponents' Guide: Engagement with the Mi'kmaq of Nova Scotia*, the NS Environmental Assessment Regulations require proponents to identify the concerns of the Mi’kmaq of Nova Scotia regarding potential Project effects and to describe steps taken or proposed to address issues. While the Crown may delegate aspects of consultation to project proponents, it maintains the duty to consult and decision-making authority.

Various aspects of this EA that may affect the Mi’kmaq of Nova Scotia are discussed in other VC chapters that address related topics such as air, light, noise, groundwater, surface water, socioeconomic conditions and cultural and heritage resources. In addition, Indigenous activities may be affected directly or indirectly by the effects of a project on species of fish, animals, birds, or plants on which they rely for food or cultural significance and the habitats that support relevant species. These related effects are not repeated in this VC

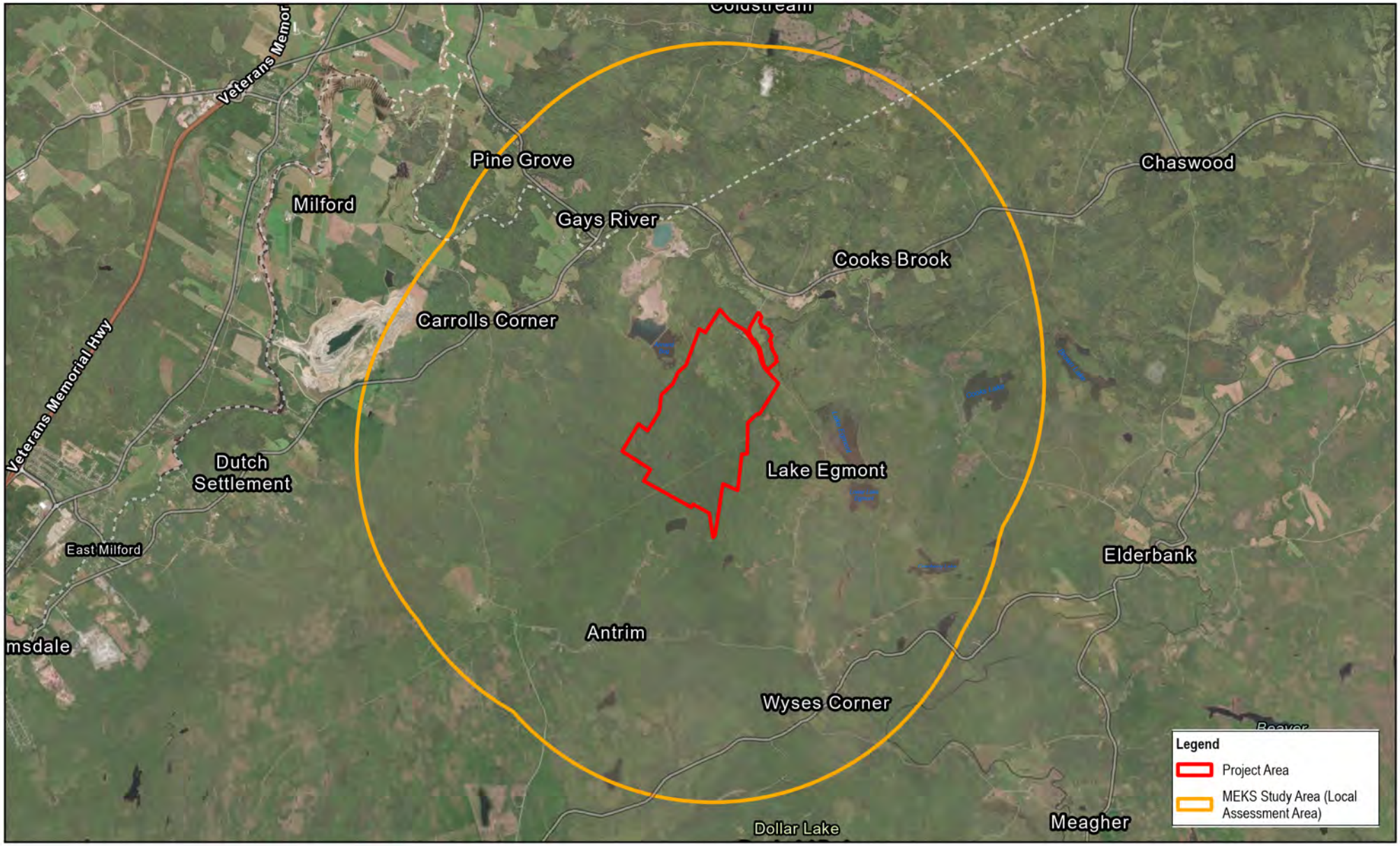
CertainTeed recognizes the Mi’kmaq of Nova Scotia’s Indigenous Rights, including confirmed and asserted Aboriginal, and Treaty Rights in relation to the lands and natural resources that may be affected by the Project. CertainTeed’s engagement program with the Mi’kmaq of Nova Scotia, stakeholders, regulators and the public is described in Section 4.3. This engagement program has resulted in a solid understanding of concerns relative to the Project and CertainTeed has used this information to design the Project with the least impact to the Mi’kmaq as possible.

6.10.2 Baseline Program Methodology

CertainTeed commissioned MGS to prepare a MEKS for the Project, which was conducted in accordance with the Mi’kmaq Ecological Knowledge Study Protocol, 2nd edition, on an area defined as the MEKS Study Area (i.e., the PA plus a five km buffer), which is shown on Figure 6.10-1. The purpose of a MEKS was to identify and document land and resource use. Historical review and research of the MEKS Study Area was conducted to identify any areas of significance to the Mi’kmaq people. In addition, this research and review allowed MGS to gain an understanding of Mi’kmaq use of the lands. The MEKS included:

– Interviews (November 2023 to March 2024) with 21 members of Sipekne’katik First Nation, Millbrook First Nation and Glooscap First Nation to identify traditional land use activities.
– Background research, literature review and archival research to gather information on past or present Mi’kmaq use or occupation in the PA and MEKS Study Area to identify areas of historic significance to Mi’kmaq communities.

- A field program (November 2023), with a Mi'kmaq knowledge holder, to document plants, trees, animal signs for the Mi'kmaq Significant Species Survey, which determines the presence of plant and animal species of importance to the Mi'kmaq community.
- The MEKS was submitted to KMKMO for protocol review on May 1, 2024. Approval was received on May 22, 2024 and the final MEKS is provided in Appendix K.



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LAKE EGMONT, HALIFAX CO, NOVA SCOTIA
ANTRIM GYPSUM PROJECT

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MI'KMAQ ECOLOGICAL KNOWLEDGE STUDY AREA

FIGURE 6.10-1

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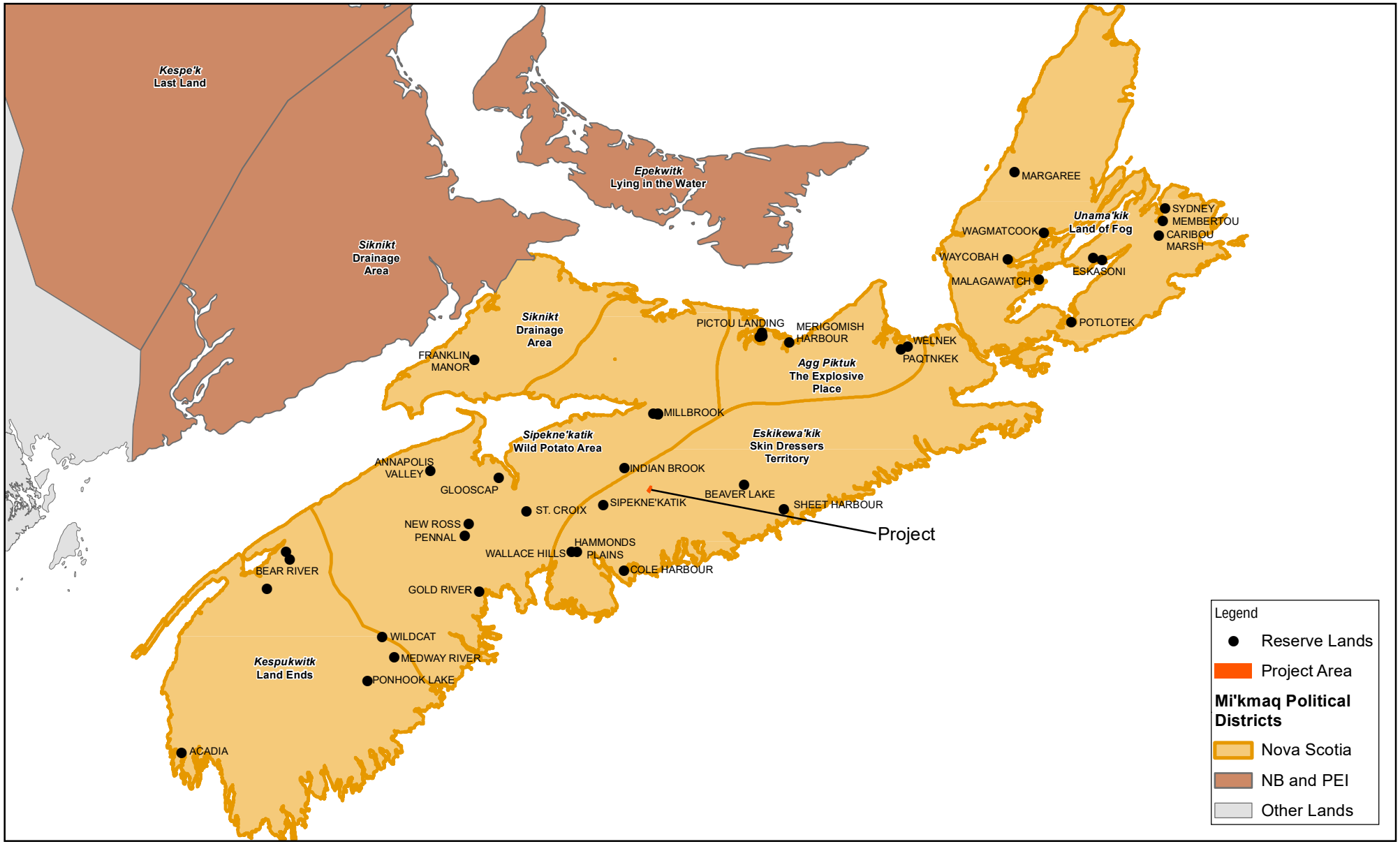
6.10.3 Baseline Conditions

The present day provinces of, NB and Prince Edward Island, as well as the Gaspé Peninsula, are founded on land historically occupied by the Mi'kmaq. As indicated in Section 6.11.3, Indigenous peoples have a minimal 11,000-year history in NS.

6.10.3.1 Mi'kmaq of Nova Scotia

Beginning in the 19th century, reserves were established throughout Atlantic Canada mainly on lands that were frequented by Indigenous groups (CIRNAC, 2013). NS has 13 Mi'kmaq First Nation communities occupying one or more parcels of reserve lands (CIRNAC, 2024). The locations of Mi'kmaq communities and reserve lands are shown in Figure 6.10-2 in relation to historic Mi'kmaq political districts. Various organizations support Mi'kmaq individuals and First Nations in NS. The KMKNO reports to the Association of Nova Scotia Mi'kmaq Chiefs (ANSMC), which provides governance for the Mi'kmaq of Nova Scotia, oversight for decision-making on common issues, and direction to KMKNO on the Made-in-Nova Scotia process concerning implementation of Mi'kmaq Aboriginal and Treaty Rights (KMKNO, 2024). The KMKNO represents 10 NS Bands in consultation matters with the exceptions of Sipekne'katik First Nation, Millbrook First Nation and Membertou First Nation. The UNSM provides governance capacity services to member groups to improve economic and social conditions of the Mi'kmaq of Nova Scotia (UNSM, 2021). Mi'kmaw Kina'matnewey (MK) delivers education to Mi'kmaq communities (MK, 2024). The CMM, which is the Tribal Council, has a mission "to proactively promote and assist Mi'kmaw communities' initiatives toward self- determination and enhancement of community" (CMM, 2024).



Data Disclaimer

Territorial boundaries are approximate and based on several sources of information

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Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: North American Datum of 1983 (CSRS) version 6
Grid: NAD 1983 (CSRS) v6 UTM Zone 20N

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LAKE EGMONT, HALIFAX CO, NOVA SCOTIA
ANTRIM GYPSUM PROJECT

FIRST NATIONS RESERVE LANDS IN NOVA SCOTIA

Project No. 12601021
Revision No. -
Date 23/07/2024

FIGURE 6.10-2

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6.10.3.1.1 Indigenous Rights

Between 1726 and 1779, the British government formed Peace and Friendship Treaties with Mi'kmaq, Maliseet and Passamaquoddy Indigenous groups to facilitate trade of goods and solidify strategic alliances (CIRNAC, 2013). Generally, the Mi'kmaq agreed to accept established colonial settlements and the British agreed to ongoing Indigenous use of traditional fishing, hunting and planting grounds. As settlement increased and competition for resources grew, Indigenous groups began to petition government to uphold the Treaties especially around harvesting.

Since 1973, Canada has signed 26 modern land claims and four self-government agreements with Indigenous groups (CIRNAC, 2021). No comprehensive land claims have been established in NS. The Government of Canada has committed to settling specific claims, which relate to administration of land and other First Nation assets as well as fulfilment of historic treaties and other agreements. Based on the MEKS, no specific land claims are in the Project Area or MEKS Study Area.

Indigenous Rights include Aboriginal Rights to hunt, fish and gather for food, social and ceremonial (FSC) or traditional purposes and Treaty Rights to harvest for a moderate livelihood. These Rights were confirmed and upheld in various decisions of the SCC. For instance, in September 1999, the SCC issued an historic decision based on the Treaties of 1760-1761 (UNSM, 2021). In R. v. Marshall, the SCC affirmed the Right of Mi'kmaq people in NS, NB and parts of Québec, to fish commercially and attain a "moderate livelihood".

6.10.3.1.2 Historic and Current Use of Land and Resources for Traditional Purposes

The MEKS highlights the Mi'kmaq's long-standing relationship with, and attachment to, lands and resources. This relationship is demonstrated through extensive knowledge of flora and fauna including many culturally significant species of plants, fish, and game used by the Mi'kmaq people and their ancestors. Based on the MEKS, historic records show past Mi'kmaq occupation in the MEKS Study Area. The MEKS reported some use by Mi'kmaq people in the Project Area.

The PA and MEKS Study Area are within and near the far west limits of Eskikewa'kik (Skin Dressers) Political/Traditional Territory and share a boundary with Sipekni'katik (Wild Potato Area). No current reserves are within the PA or MEKS Study Area. The nearest Indigenous community, Sipekne'katik First Nation, is about 12 km to the southeast of the PA.

As discussed in the MEKS, no Traditional Hunting Territories (as identified in 1922) or Specific Land Claims are within the PA or MEKS Study Area. However, the Shubenacadie River and Gays River watersheds surround an important historical travel route from the Bay of Fundy to the Atlantic Ocean with connections to other areas. Additionally, the lands and waters between Snides Lake and the Shubenacadie River are important to the Mi'kmaq, particularly to members of Sipekne'katik First Nation.

Based on interviews with Mi'kmaq knowledge holders, and as reported in the MEKS, the PA has been used by the Mi'kmaq for many years primarily for fishing (mainly for trout but also bass, perch, pickerel, salmon and small mouth bass). The southwestern half of the PA is used for deer hunting. Black ash is the only plant species reportedly to be harvested in the PA. The time periods for these uses are reported as 47% in the historic past (previous to 25 years ago), 40% in the recent past (11 to 25 years ago) and 13% current use (within the last 10 years).

Mi'kmaq land and resource use in the PA is less intense in comparison with the broader MEKS Study Area. Concentrated areas of fishing, hunting and gathering were reported throughout the MEKS Study Area, notably around Gays River, Pine Grove, Carrolls Corner and Elderbank. Harvesting in these areas includes all resources identified in the PA and others. Fishing also includes eel, shad, striped bass, gaspereaux and smelt. Interviewees also identified hunting pheasant, rabbit and porcupine in the MEKS Study Area. Gathering also includes sweet grass, alder, apple, blackberry, flag root, gold thread, juniper and medicine. Current use (36.7%) is higher than recent past (32.1%) and historic past (31.2%) in the MEKS Study Area.

Mi'kmaq Significance Species Analysis considers types of use, availability and importance of resources. Significant species to the Mi'kmaq connect to food/sustenance, medicinal/ceremonial and tools/art. The number of areas and resources noted for the three types of use are summarized in Table 6.10-1, based on work completed for the MEKS.

Table 6.10-1 Significant Species in the MEKS Study Area

Type of Use	Number of Areas	Number of Species
Food / Sustenance	35	43
Medicinal / Ceremonial	11	6
Tools / Art	4	2

Based on the baseline studies, a stand of black ash has been identified in the northeast portion of the PA (Section 6.8). Due to its porous quality, black ash wood absorbs water and splits into thin sheets when pounded (UINR, 2020). Also known as Wisqoq, it holds a special place in Mi'kmaq culture as it is used to make items such as baskets, chair seats, snowshoe frames and canoe ribs.

6.10.4 Effects Assessment Methodology

6.10.4.1 Boundaries

The assessment of Project effects requires consideration of various boundaries: spatial, temporal, administrative and technical. The spatial boundaries for assessment of potential effects of the Project includes the PA, LAA and RAA.

Spatial Boundaries

The spatial boundaries used for the assessment of effects to the Mi'kmaq of Nova Scotia are defined below.

– The PA encompasses the immediate area in which Project activities may occur and are likely to cause direct and indirect effects to VCs.
– The LAA is the MEKS Study Area, the PA plus a 5 km buffer area.
– The RAA is defined as the province of NS as Mi'kmaq confirmed and asserted Rights encompass the whole province.

The spatial boundaries described above are shown in Figure 6.10-3.

Temporal Boundaries

The temporal boundaries used for the assessment of effects of the Project includes the construction, operations and closure phases.

Administrative Boundaries

Indigenous rights are protected by Section 35 of the *Constitution Act, 1982*. The *Updated Guidelines for Federal Officials to Fulfill the Duty to Consult* outlines the Crown's (i.e., Canada and provincial / territorial governments and agencies) duty to consult with Indigenous Peoples regarding decisions, or taking actions, that might adversely affect their established or potential Aboriginal rights and treaty rights. *The Mi'kmaq Canada Nova Scotia Consultation Terms of Reference* establishes the process to resolve issues related to Aboriginal rights and Treaty Rights between the Mi'kmaq of Nova Scotia and the governments of NS and Canada (more information is included in Section 6.10.1).

Technical Boundaries

The limited evidence to establish historic occupation of the PA by the Mi'kmaq of Nova Scotia may be the result of lack of historical documentation though little archaeological evidence was identified in the PA (Section 6.11). The lack of evidence did not impact the assessment methodology as the PA is currently used for harvesting.

Paper Size ANSI A

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 20N

N

GHD

CERTAINTEED CANADA INC.
LAKE EGMONT, HALIFAX CO, NOVA SCOTIA
ANTRIM GYPSUM PROJECT

Project No. **12601021**
Revision No. **-**
Date **August 14, 2024**

MI'KMAQ OF NOVA SCOTIA EFFECTS ASSESSMENT BOUNDARIES

FIGURE 6.10-3

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6.10.4.2 Modelling

No specific modelling was conducted for the assessment of Project effects on the Mi'kmaq of Nova Scotia. The assessment of potential effects on Rights (e.g., traditional land and resource use) is based on information from the MEKS. Other VCs discuss potential impacts for any land users, Mi'kmaq or otherwise.

6.10.4.3 Thresholds for Determination of Significance

Table 6.10-2 provides quantitative measures or definition of qualitative categories for assessment of residual effects on the Mi'kmaq of Nova Scotia.

Table 6.10-2 Characterization Criteria for Environmental Effects

Characterization	Quantitative Measure or Definition of Qualitative Categories
Magnitude	**N** – no detectable direct or indirect effects on the Mi'kmaq of Nova Scotia. **L** – short or medium-term effects on traditional land use areas within the context of mitigations and consultation with appropriate regulators and Indigenous groups. **M** – long-term effects on traditional land and resource use within the context of mitigations and consultation with appropriate regulators and Indigenous groups **H** – permanent effects on traditional land and resource use or adverse effects on Indigenous communities without mitigations and consultation with appropriate regulators and Indigenous groups.
Geographic Extent	**PA** – direct and indirect effects from Project activities are restricted to the PA **LAA** – direct and indirect effects from Project activities are restricted to the LAA **RAA** – direct and indirect effects from Project activities are restricted to the RAA
Timing	**N/A** – seasonal aspects are unlikely to affect VCs **A** – seasonal aspects may affect VCs
Duration	**ST** – effects are limited to occur from as little as 1 day to 12 months **MT** – effects can occur beyond 12 months and up to 3 years **LT** – effects extend beyond 3 years **P** – valued component unlikely to recover to baseline conditions
Frequency	**O** – effects occur once **S** – effects occur at irregular intervals throughout the Project **R** – effects occur at regular intervals throughout the Project **C** – effects occur continuously throughout the Project
Reversibility	**RE** – Mi'kmaq of Nova Scotia will recover to baseline conditions before or after Project activities have been completed **PR** – mitigation cannot guarantee a return to baseline conditions **IR** – effects to VCs are permanent and will not recover to baseline conditions

A significant adverse effect on the Mi'kmaq of Nova Scotia is defined as:

– A Project related effect that results in adverse socioeconomic conditions in an Indigenous community, or
– A Project related effect that results in permanent loss of lands and resources relied upon for traditional use.

6.10.5 Project Interactions and Potential Effects

The various activities listed in Table6.10-3 as physical works for construction, operation, and closure may affect Indigenous Rights such as access to lands, traditional harvesting and other cultural activities.

Table 6.10-3 Project Activities and Mi'kmaq of Nova Scotia Interactions

Project Phase	Relevant Project Activity
Construction	Clearing, grubbing, and grading Topsoil, overburden, and waste rock management Surface infrastructure installation and construction Haul road construction Collection ditch and settling pond construction General waste management
Operations	Gypsum management (extraction, loading, hauling, screening) Topsoil, overburden, and waste rock management Water management Haul road construction and maintenance Petroleum products management General waste management
Closure	Demolition Earthworks Water management General waste management

All phases of the Project will provide direct and indirect employment and procurement opportunities for the Mi'kmaq of Nova Scotia. Benefits arising from construction and operational spending that accrue to the Mi'kmaq of Nova Scotia will depend on factors including any agreements between the Mi'kmaq of Nova Scotia and CertainTeed, Project-related opportunities for Mi'kmaq-owned businesses, the capacity of Mi'kmaq owned enterprises to provide services needed and the availability of the Mi'kmaq labour force.

Findings of the MEKS revealed that some Mi'kmaq traditional land use activities (fishing, hunting and gathering) occur within the PA though currently more extensively in the LAA. Thus, there is potential for the Project to affect Mi'kmaq traditional land and resource use. The habitat and wildlife species observed within the LAA are consistent with conditions present in the adjacent regional landscape. No unique habitats were identified in the LAA though several species (e.g., Atlantic salmon, American eel, striped bass, black ash) identified as important to the Mi'kmaw and present in the PA or LAA have conservation interest in NS or other jurisdictions. For more information on Project effects on these resources, refer to the appropriate Sections of 6.7 and 6.8.

Based on the information presented, effects on land and resource use are anticipated to be limited to temporary loss of access to the PA during all Project phases and restoration of access following closure when it is safe to do so. Continued engagement and discussions with the Mi'kmaq of Nova Scotia and consideration of Indigenous Rights in decision-making regarding the Project will aid in minimizing, and where possible, eliminating effects on traditional land and resource use.

6.10.6 Mitigation

As outlined in Section 4, CertainTeed is engaging with Mi'kmaq Bands and organizations. CertainTeed's discussions with Mi'kmaq organizations include employment/training and procurement opportunities. Engagement with the Mi'kmaq of Nova Scotia is ongoing to minimize, and where possible, eliminate any potential adverse effects such as removal of the single Black Ash tree. Mitigation measures are identified in Table 6.10-4.

The presence of the Black Ash stand was shared with Mi'kmaq organizations (KMKNO and CMM) in April 2024. Correspondence and information sharing resulted in a site visit in May 2024 to view the wetlands and black ash and to discuss potential mitigations. More information on black ash can be found in Section 6.8, Terrestrial Environment.

Table 6.10-4 Mi'kmaq of Nova Scotia Mitigation Measures

Project Phase	Mitigation Measure
Construction, Operations, and Closure	Ongoing engagement with relevant Mi'kmaq First Nations.
	Monitoring Programs Black Ash Management Plan Wildlife Management Plan

6.10.7 Monitoring and Follow-up

Discussion and engagement with relevant Mi'kmaq organizations will continue through the life of the Project. CertainTeed acknowledges the importance and value of effective engagement and envisions an ongoing relationship with the Mi'kmaq of Nova Scotia.

6.10.8 Residual Effects and Significance

The predicted residual effects of the Project on the Mi'kmaq of Nova Scotia are assessed to be both positive and adverse, but not significant. The Project is not likely to result in significant adverse residual effects on the Mi'kmaq of Nova Scotia following implementation of mitigation and enhancement measures (Table 6.10-3). CertainTeed is also committed to ongoing engagement with the Mi'kmaq of Nova Scotia to discuss any arising issues of the Project on Indigenous Rights.

A significant adverse effect on the Mi'kmaq of Nova Scotia VC was defined in Section 6.10.4 as:

– A Project-related effect that results in permanent loss of lands and resources relied upon for traditional use.
– A Project-related effect that results in adverse socioeconomic conditions in an Indigenous community.

Adverse residual effects on traditional land and resources are predicted to be of moderate magnitude, long term and continuous within the PA as access to the site will be controlled throughout the life of the Project. These effects are likely to be reversible with the restoration of lands and future access to the PA. Sections 6.6 and 6.7 discuss effects on animal and plant life in the PA.

The Project will generate new opportunities for employment, training, contracting and sub-contracting for the Mi'kmaq of Nova Scotia. Increased employment and business revenue will benefit socioeconomic conditions generally through indirect and/or induced effects. Project benefits are not considered in evaluation of adverse residual effects.

Residual effects to Mi'kmaq of Nova Scotia are summarized in Table 6.10-5.

Table 6.10-5 Residual Effects on Mi'kmaq of Nova Scotia

Project Phase	Mitigation and Compensation Measures	Nature of Effect	Residual Effects Characteristics						Residual Effect	Significance
			Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility		
Construction, Operation, Closure	CertainTeed is committed to ongoing engagement with Mi'kmaq organizations and communities. Monitoring plans will be implemented throughout the life of the Project. Significant species management including Black Ash.	P/A Both positive and adverse effects are anticipated associated with the Project. Land access will be restricted in and around the Project infrastructure. The Project will result in employment and economic benefits for the Mi'kmaq of Nova Scotia.	M	PA	N/A	LT	C	RE Land access will be gradually restored in the area of the Project infrastructure as the area is reclaimed during closure.	Limited access throughout the life of the Project.	Not significant
Legend (refer to Table 6.10-2 6.10-2 for definitions)	Characterization Criteria for Environmental Effects									
Nature of Effect A – Adverse P – Positive	Magnitude N – Negligible L – Low M – Moderate H – High	Geographic Extent PA – Project Area LAA – Local Assessment Area RAA – Regional Assessment Area	Timing N/A – Not Applicable A – Applicable		Duration ST – Short-Term MT – Medium-Term LT – Long-Term P – Permanent	Frequency O – Once S – Sporadic R – Regular C – Continuous	Reversibility RE – Reversible IR – Irreversible PR – Partially Reversible			

6.11 Cultural and Heritage Resources

6.11.1 Rationale for Valued Component Selection

Much of our knowledge of the past is based on historical documentation. However, a full appreciation of human history and culture is dependent on learning from materials and artifacts that can be used to conceptualize and better understand older civilizations. In Canada, cultural and heritage resources provide information on Indigenous peoples and their connection to the land and environment in which they lived prior to European contact (pre-Contact). Post-Contact history and associated imprint on lands and the environment by non-Indigenous people is discussed in this section along with relevant Mi'kmaq related aspects.

Cultural and heritage resources are identified as a VC due to societal value placed on them and for regulatory reasons. Site preparation and construction activities for the Project have the potential to affect cultural and heritage resources through damage or removal. Physical and cultural heritage are protected through the NS *Special Places Protection Act*, which supports the preservation, regulation, and study of archaeological, historical, and paleontological sites, and artifacts deemed to be important to the natural or cultural heritage of NS.

6.11.2 Baseline Program Methodology

For the Project, an archaeological resource impact study (ARIA) was conducted by Cultural Resource Management Group Limited (CRM Group) to identify any known cultural and heritage resources and areas of resource potential in the PA:

– Antrim Gypsum Project Archaeological Resource Impact Assessment Screening & Reconnaissance 2023, Heritage Research Permit #A2023NS027

The work included background research on Indigenous cultural heritage and historical land use from Kwilmu'kw Maw-klusuaqn Archaeological Research Division (KMK-ARD), historical records and previous archaeological studies. Information on known heritage resources was obtained from the Maritime Archaeological Resource Inventory (MARI). In addition, CertainTeed commissioned a MEKS, which included research on traditional land use, which may inform the potential for cultural and heritage resources (Section 6.10).

For the ARIA, areas of archaeological resource potential were identified using topographic maps and aerial photographs, along with satellite and LiDAR Digital Elevation Models (DEM). The resulting information was used to identify environmental and topographic features, any remains of historic resources or areas (e.g., navigable water bodies) that may have influenced the location of past human settlement and resource exploitation.

Field work (in April and December 2023) included visual inspection of the ground surface and vegetation cover while walking transects spaced suitably for comprehensive examination. The inspection was designed to delineate any areas of archaeological potential (low, moderate and high) based on direct field observations, building on the results of Mi'Kmaq engagement, background review and examination of landscape features. Based on this examination, the field investigators identified three areas for shovel testing to evaluate surficial geology and archaeological potential. No artifacts or cultural materials (modern, historic, or Pre-contact) were recovered during the fieldwork portion of the ARIA; therefore, no further analysis was required or undertaken.

6.11.3 Baseline Conditions

As presented in the MEKS, the earliest documented archaeological evidence of Indigenous peoples in the Maritimes is encampment site near present-day Debert, NS, which is dated as at least 11,000-year-old.

6.11.3.1 Historic Resources

Background research determined that the PA encompasses one previously registered historic site (BfCu-06) and an unregistered historic cultural feature (Feature 1) consisting of a cellar and a well (Table 6.11-1). Also, three other

registered heritage sites (two of Mi'kmaq origin) are within 3 km of the PA. The registered Mi'kmaq heritage sites (i.e., BgCu-05 and BgCu-06) may be connected to a larger pattern of occupation as a multitude of known traditional use sites (including resource acquisition and ceremony sites) were identified near the PA.

Table 6.11-1 Known Archaeological Resources in and Near the Project Area

ID #	Name/Description	Location
BfCu-06	McWilliams Cellar is the structural remains of a stone and brick central chimney and a stone lined well near a nineteenth century cellar. Logging activity may have impacted outlying aspects of the site.	Within the PA
BgCu-05	An isolated quartz flake along a navigable section of Gays River, a known Mi'kmaw portage route between the Shubenacadie and Musquodoboit Rivers. The item was recovered during shovel testing, but further test pits yielded no other artifacts.	Within a 3 km radius of the PA
BgCu-06	Lithic material potentially associated with the Ceramic Period. The site was fully excavated in 2007 with evidence of substantive presence spanning separate occupation periods.	Within a 3 km radius of the PA
BgCu-07	An historic farm including a cellar feature and a linear alignment of stone piles. The site underwent testing in 2006 and 2008.	Within a 3 km radius of the PA

6.11.3.2 Areas of Elevated Archaeological Potential

Archaeological field reconnaissance determined that the PA is primarily comprised of variably dense, mixed forest with shallow and wet soils. The slope of the terrain ranges from a gentle grade on previously farmed land to steep areas particularly around karst sinkholes. These factors would have been a deterrent to both wildlife habitation and human occupation of the area.

Three areas were determined to have high archaeological potential. These include areas around the two historic features (BfCu-06 and Feature 1) and an area in the northernmost section of the PA identified as likely suitable for human use and occupation. This area on the southern bank of Gays Brook is in proximity to the navigable water of Gays River (Kjipuktuk/We'kopekwitk), a Mi'kmaw portage route between the Shubenacadie and Musquodoboit River systems. This history suggests the potential for resource gathering and concentrated use in Pre-contact and historic times. As a result, this area is ascribed high archaeological resource potential while the remainder of the PA is ascribed low archaeological resource potential.

6.11.4 Effects Assessment Methodology

6.11.4.1 Boundaries

The assessment of Project effects requires consideration of various boundaries: spatial, temporal, administrative and technical. The spatial boundaries for assessment of potential effects of the Project includes the PA, LAA and RAA.

Spatial Boundaries

The spatial boundaries used for the assessment of effects to the Cultural and Heritage Resources are defined below.

– The PA encompasses the immediate area in which Project activities may occur and are likely to cause direct and indirect effects to VCs.

An LAA or RAA have not been identified for the Cultural and Heritage Resources VC, as damage or removal of cultural or heritage resources related to this Project could only occur within the PA.

Spatial boundaries for cultural and heritage resources are shown on Figure 6.11-1.

Temporal Boundaries

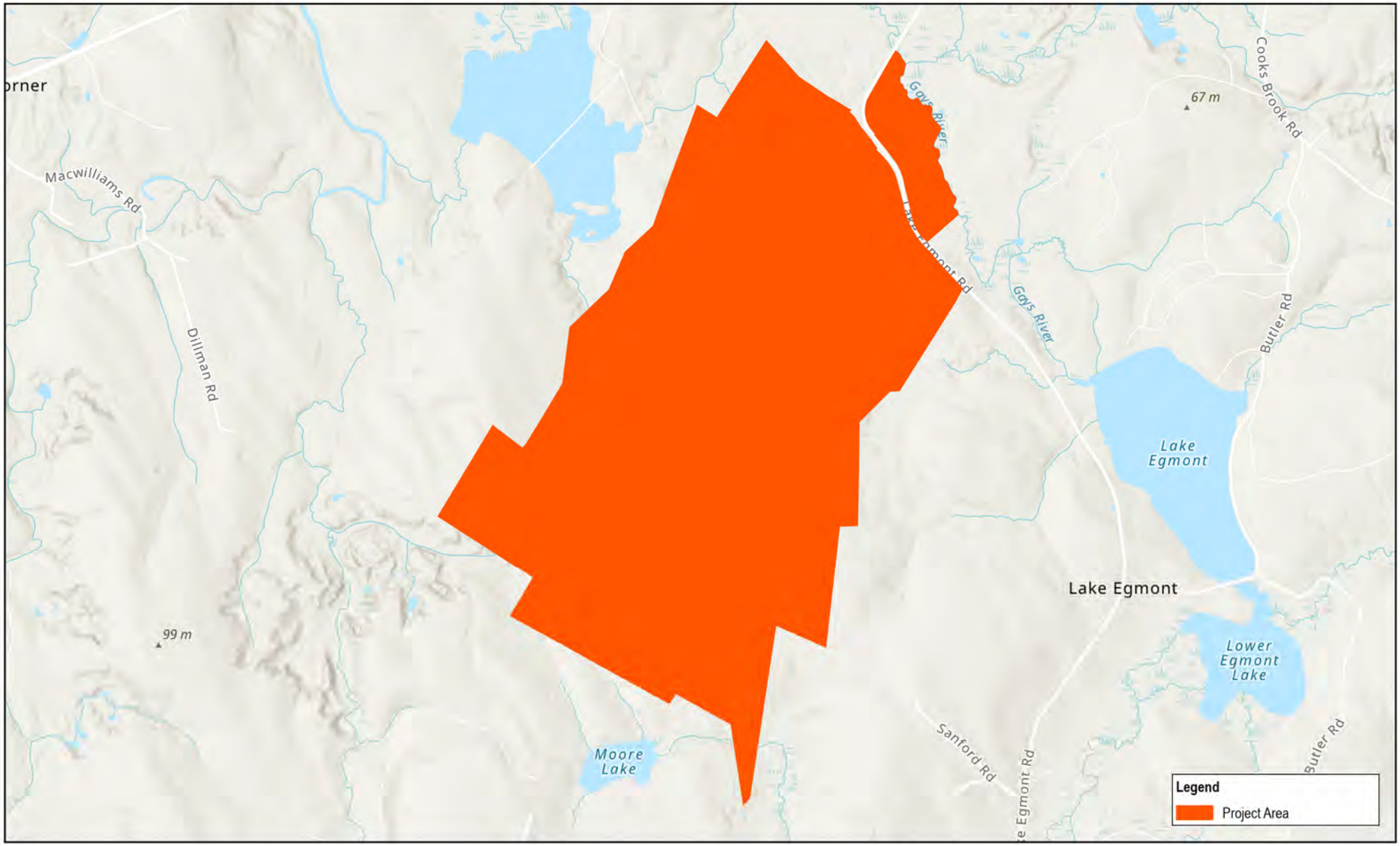
The temporal boundaries used for the assessment of effects to cultural and heritage resources are limited to the construction phase of the Project.

Administrative Boundaries

Cultural and Heritage Resources are provincially regulated through the *Special Places Protection Act*. This legislation provides protection to both known and unknown cultural and heritage resources. Unknown resources are identified through potential mapping and assessment.

Technical Boundaries

The limited known archaeological evidence to indicate the presence of early peoples in the PA may be the result of lack of investigation and / or few accidental archaeological finds, rather than lack of use or occupation of the area. The lack of evidence did not impact the assessment methodology as it is assumed to have been used for centuries or millennia.



Paper Size ANSI A

0 375 750

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 20N

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GHD

CERTAINTEED CANADA INC.
LAKE EGMONT, HALIFAX CO, NOVA SCOTIA
ANTRIM GYPSUM PROJECT

Project No. **12601021**
Revision No. **-**
Date **22/07/2024**

CULTURAL AND HERITAGE RESOURCES EFFECTS ASSESSMENT BOUNDARIES

FIGURE 6.11-1

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6.11.4.2 Modelling

This assessment is based on the results of the ARIA prepared in 2023-2024.The archaeologists used predictive modelling to identify patterns of spatial relationships between known heritage resources and the physical environment to identify potential locations of past human activities and associated features.

6.11.4.3 Thresholds for Determination of Significance

Table 6.11-2 provides quantitative measures or definition of qualitative categories for assessment of residual effects on Cultural and Heritage Resources.

Table 6.11-2 Characterization Criteria for Environmental Effects on Cultural and Heritage Resources

Characterization	Quantitative Measure or Definition of Qualitative Categories
Magnitude	**N** – no direct or indirect effects on cultural and heritage resources. **L** – effects on historic features within the context of mitigations and consultation with regulators and no effects on Indigenous cultural or heritage resources. **M** – direct effects on cultural and/or heritage resources in the context of mitigations and consultation with appropriate regulators and Indigenous groups. **H** – direct effects on cultural and/or heritage resources without mitigations and consultation with appropriate regulators and Indigenous groups.
Geographic Extent	**PA** – direct and indirect effects restricted to the PA.
Timing	**N/A** – seasonal aspects are unlikely to affect VCs **A** – seasonal aspects may affect VCs
Duration	**ST** – effects are limited to occur from as little as 1 day to 12 months **MT** – effects can occur beyond 12 months and up to 3 years **LT** – effects extend beyond 3 years **P** – valued component unlikely to recover to baseline conditions
Frequency	**O** – effects occur once **S** – effects occur at irregular intervals throughout the Project **R** – effects occur at regular intervals throughout the Project **C** – effects occur continuously throughout the Project
Reversibility	**RE** – Cultural and Heritage Resources will recover to baseline conditions before or after Project activities have been completed. **PR** – mitigation cannot guarantee a return to baseline conditions **IR** – effects to VCs are permanent and will not recover to baseline conditions

A significant adverse effect on cultural and heritage resources is defined as:

– A Project related effect that results in unauthorized disturbance or destruction of an archaeologically, culturally, or historically important resource, within the context of the *Special Places Protection Act*, that cannot be mitigated.

6.11.5 Project Interactions and Potential Effects

Mining activity has the potential to result in adverse effects on cultural and heritage resources. This includes the types of activities listed in Table 6.11-3 as physical works for construction and operation may result in disturbance or removal of cultural and heritage resources. No Project interactions are predicted after preparation of the PA and construction.

Table 6.11-3 Project Activities and Cultural and Heritage Interactions

Project Phase	Relevant Project Activity
Construction	Clearing, grubbing, and grading Topsoil, overburden, and waste rock management Surface infrastructure installation and construction Haul road construction Collection ditch and settling pond construction
Operation	Gypsum management (extraction, loading, hauling, screening) Topsoil, overburden, and waste rock management Water management Haul road construction and maintenance
Closure	N/A

Based on the current configuration, no Project infrastructure intersects known cultural or heritage resources or areas of elevated potential for archeological resources. Project related activities involving ground disturbance have the potential to interact with previously undiscovered cultural and heritage resources, which are protected through the *Special Places Protection Act*. No effects on cultural and heritage resources are anticipated from closure as no new ground disturbance will occur.

6.11.6 Mitigation

CertainTeed will comply with the NS *Special Places Protection Act* for management of cultural and heritage resources. If previously unidentified archaeological resources are encountered, all work in the associated area(s) will be halted. CertainTeed officials will contact the Coordinator of the Special Places Program of the NS Department of Communities, Culture, Tourism and Heritage to determine next steps.

CertainTeed will follow the recommendations provided in the ARIA (Table 6.11-4). Archaeological resources and areas of potential can be avoided in Project design and construction. If ground disturbance is planned in the vicinity of identified archaeological resources or areas of potential, mitigation measures will be employed to eliminate or reduce potential adverse Project effects on cultural and heritage resources.

Table 6.11-4 Cultural and Heritage Resources Mitigation Measures

Project Phase	
Construction and Operation	Areas of high archaeological potential (BfCu-06, Feature 1 and Area 1) should be avoided.
	If the area of high archaeological potential (Area 1) cannot be avoided, any ground disturbance should be preceded by a program of shovel testing (in advance of development) at five-metre intervals to search for archaeological resources.
	If the areas of high archaeological potential (Bf-Cu-06 and Feature 1) cannot be avoided, they should be subjected to a program of shovel testing (in advance of development) to further assess and delineate cultural heritage resource potential.
	The remainder of the Project may be cleared of requirements for further archaeological investigation.
	If any further changes are made to the layout of the Project (following this report), additional development areas should be subjected to assessment and a possible ARIA.

6.11.7 Monitoring and Follow-up

Based on the ARIA, it has been determined that monitoring by a registered archaeologist may be required in areas where archaeological resources were identified and ground disturbance is planned. In the unlikely event that an archaeological resource is encountered during Project activities, provincial regulations (as identified above) will apply.

6.11.8 Residual Effects and Significance

The predicted residual effects of the Project on Cultural and Heritage Resources are assessed to be adverse, but not significant. The Project is not likely to result in significant adverse residual effects on the Cultural and Heritage Resources following implementation of mitigation and enhancement measures (Table 6.11-5-4).

A significant adverse effect on the Cultural and Heritage Resources VC was defined in Section 6.11.4 as:

– A Project-related effect that results in unauthorized disturbance or destruction of an archaeologically, culturally, or historically important resource, within the context of the *Special Places Protection Act*, that cannot be mitigated.

The ARIA identified one registered archaeological site and three areas of high elevated archaeological potential within the PA. CertainTeed will comply with all requirements of the appropriate legislation (Section 6.11.6) and will design the Project to avoid cultural and heritage resources and areas of elevated potential to the extent possible. By complying with regulations and implementing mitigation measures such as conducting additional archaeological testing if required, residual effects of the Project on cultural and heritage resources (including areas of high elevated potential) are predicted to be not significant. This is based on known information about cultural and heritage resources in the PA and configuration of the Project.

Table 6.11-5 Residual Effects on Cultural and Heritage Resources

Project Phase	Mitigation and Compensation Measures	Nature of Effect	Residual Effects Characteristics						Residual Effect	Significance
			Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility		
Construction and Operation	Avoidance of areas of known archaeological and areas of elevated potential Conducting additional testing if required	A Project has the potential to disturb cultural and heritage resources and areas of elevated potential	L	PA	N/A	P If a resource is destroyed due to the Project	O	IR	Project designed to avoid cultural and heritage resources and areas of elevated potential	Not significant
Legend (refer to Table 6.11-2 for definitions)										
Nature of Effect A – Adverse P – Positive	Magnitude N – Negligible L – Low M – Moderate H – High	Geographic Extent PA – Project Area LAA – Local Assessment Area RAA – Regional Assessment Area	Timing N/A – Not Applicable A – Applicable	Duration ST – Short Term MT – Medium Term LT – Long Term P – Permanent	Frequency O – Once S – Sporadic R – Regular C – Continuous	Reversibility RE – Reversible IR – Irreversible PR – Partially Reversible				

7. Other Undertakings in the Area

Existing or proposed projects within 15 km of the PA are identified and described below. This includes aggregate and sand quarries, mineral exploration licenses, and mines which carry out large scale operations.

M&NP: Enbridge Inc./Emera Inc./ExxonMobil Canada Properties

The M&NP was designed to deliver natural gas from the United States to both NS and New Brunswick. It spans approximately 880 km from Maine to Port Hawkesbury, NS, and has been operational since 1999.

A length of approximately 2 km of the M&NP crosses the southern portion of the PA, with a buffer of 300m from the nearest Project infrastructure: the overburden stockpile. Should blasting activities occur, the Project will comply with the National Energy Board *Regulations for Pipeline Damage Prevention*, and the NS *Blasting Safety Regulations* made under the *Occupational Health and Safety Act* to ensure the M&NP is not impacted.

Scotia Mine: Scotia Mine Limited

The SML is located west of the Project, with SML infrastructure within 250 meters of the PA. It has a mining history that includes various degrees of exploration and former mining and milling operations that date back to the 1970s. The site has been in care and maintenance since 2009. Existing facilities on the site include a road transportation system, mine offices, remnant underground workings, a flooded open pit, a mill and associated loading facilities, TMF, wastewater collection and disposal system, solid and hazardous waste management systems, and utilities. The TMF drains into Annand Brook which flows to the Gays River and is within the same watershed as the Project. The north settling pond discharges into Annand Brook south of the SML polishing pond. The Project water management infrastructure was designed in consideration of the downstream polishing pond.

Cooks Brook Sand and Gravel Pit: Gallant Aggregates Limited (Gallant)

Located 1 km northeast of the Project, the Cooks Brook Sand and Gravel Pit has been operated by Gallant since 2004. Following the depletion of the deposit within the permitted boundaries, an EA was approved by NSECC in 2007 to expand the pit (Conestoga-Rovers & Associates, 2012). While there are no mapped watercourses within the project boundaries, it is located within the same watershed as the PA and drains to the Gays River located immediately south of the pit. The Cooks Brook Sand and Gravel Pit is not anticipated to impact the Project as it is located downstream on the Gays River from the PA.

National Gypsum Mine Extension: Gold Bond Canada

The National Gypsum Mine (NGM) has been operational 1954 and is known as one of the largest gypsum mines in the world with an open pit spanning 301 ha (Stantec Consulting Inc., 2015). It is located approximately 6 km west of the Project, and transports ore daily via train to the Halifax Port for further shipping. Mining facilities include crushing equipment, a rail yard, various stockpiles, an open pit, sedimentation ponds, and a TMF. While an expansion was approved with the submission of an EA in 2015, it is not anticipated that the NGM will impact the Project.

Three Corners Materials Management Facility: Halifax Construction and Debris Recycling Ltd.

The Three Corners Materials Management Facility, located 7.5 km southwest of the Project, operates as a landfill, accepting a variety of construction and demolition material waste. Waste is sorted and disposed of within the landfill, which is then capped with overburden and aggregate. As there is no processing of waste at the location, it is not anticipated that the facility will impact the Project.

Coldstream Sand and Gravel Pit: Gallant

Operated by Gallant since 1997, the Coldstream Sand and Gravel Pit is located 9.5 km from the PA. Product is sourced from multiple pits, which were flooded and not operational as of early 2024. An IA application was approved on October 5, 2022 (NSECC, 2022a), indicating Gallant's intent to restart operations following proposed pit

dewatering. Where the flooded pits are relatively small and not located nearby the PA, dewatering and subsequent operations are not anticipated to impact the Project.

Shaw Brick: The Shaw Group Ltd.

The Shaw Group Ltd. operates four facilities within a property located 10.5 km from the Project, in the nearby community of Lantz. According to the NPRI, the property contains the following facilities- pipe plant, embers plant, sand and gravel processing, and block plant (ECCC, 2024a). All facilities contribute to the creation of clay brick, concrete block, and natural stone products, with Shaw Brick being the only manufacturer of clay building products (Shaw Brick, 2024). Emissions from the Shaw Brick property are not anticipated to impact the Project as it is located downwind of the PA.

Elmsdale Quarry: Gallant

The Gallant Elmsdale Quarry is located 12 km from the Project. It has been operational since 1986 and produces a variety of quartzite aggregates. Material is stockpiled on site until they are purchased, at which point they are transported via truck to the consumer. The primary market for aggregate produced at the Gallant Elmsdale Quarry are local roadbuilding and construction projects within the HRM. While an expansion was approved with the submission of an EA in 2007 (Jaques Whitford, 2007), it is not anticipated that the Elmsdale Quarry will impact the Project.

Elmsdale Asphalt Plant: Martell's Contracting Ltd.

Sharing a property with the above Elmsdale Quarry, the Elmsdale Asphalt Plant is operated by Martell's Contracting Ltd. under the supervision of Gallant. Material from the Elmsdale Quarry provides the basis for asphalt production, which is distributed for local use during road construction and repairs. As with the Elmsdale Quarry, it is not anticipated that the Elmsdale Asphalt Plant will impact the Project.

Halifax Stanfield International Airport (Halifax Airport): Halifax International Airport Authority

The Halifax Airport is located approximately 15 km to the southwest of the Project. While the Halifax Airport emits noise and air emissions during flight arrivals and departures, environmental impacts sourced from the Halifax Airport are not anticipated to impact the Project as it is located downwind of the PA. In addition to the above industrial projects, the land within and surrounding the PA has repeatedly been cut by forestry operations, as evidenced by the patchwork cut patterns visible in aerial and satellite photos.

In summary, the M&NP overlies the PA, and there are several other industrial projects within a close radius. SML and the Gallant Sand and Gravel Pit are both within 1 km of PA and share a drainage basin with the Project, however as both sites are downstream of the PA on the Gays River, there are no anticipated adverse effects to be sourced from them. Communication with the operating companies of nearby industrial projects has been continuous and ongoing to ensure that the Project does not trigger impacts to other projects.

8. Accidents and Malfunction

Accidents and malfunctions are events that occur outside of planned Project activities and operations. Despite efforts to prevent them via the implementation of best management practices and preventative measures, they have the potential to adversely impact the environment and employee safety. Accidents and malfunctions can be avoided, or their impact lessened by careful planning, creating Environmental Emergency Response and Contingency Plan, and integrating mitigation measures into standard procedures. By identifying potential worst-case scenarios and their effects, CertainTeed can develop strategies to prevent, minimize, or manage the consequences of accidents and malfunctions.

8.1 Structural Failures

All phases of the Project have the potential for structural failures. The potential structural failures are as follows:

– Failure of overburden slopes caused by erosion from vegetation stripping and surface water runoff.
– Failure of overburden and bedrock caused by sinkhole development.
– Failure of bedrock faces caused by improperly designed benches and erosion/fracturing from groundwater inflow.
– Failure of overburden, process rejects, and topsoil stockpile slopes caused by improperly designed lifts and erosion from surface water runoff.
– Failure of sediment settling ponds, either via berm overflow or berm structure failure.

The worst-case scenario for the failure of slopes, including those of stockpiles and pit walls, would be the collapse of areas and ground surface slump affecting Project infrastructure. Potential risk areas are dependant of Project phase, with slope failure risk limited to overburden during the construction phase and expanding to include stockpiles and the pit during operations and closure. Erosion via vegetation stripping and surface water runoff, in addition to blasting and material removal, are the most likely conductors of slope failure. As with slope failure, the worst-case scenario for sinkhole development would the collapse of areas leading to impacts to Project infrastructure. Karst features such as sinkholes and collapse zones are found variably across the PA as they are common within the local evaporitic Windsor Group bedrock.

Slope failures will be reduced by the phased backfilling of the pit through the operations phase, as progressive infilling will both cover pit slopes, and reduce the need for additional stockpiles. Should a sinkhole form during the lifespan of the Project, a buffer will be erected around the collapse zone to reduce risk to personnel. Where practical, sinkholes which form during the Project will be infilled with material. Infilling sinkholes both reflects natural geologic processes and mitigates risk to personnel and infrastructure. Building infrastructure near sinkholes may require foundations to be extended and reinforced.

The worst-case scenario for the failure of the settling ponds, either due to pond overflow or berm structure failure, would be an uncontrolled release of sediment laden water to the environment. The capacity demand of the ponds will be variable depending on operational activities and weather events.

Settling ponds will be equipped with emergency overflow spillways, used to channel and direct flows in the event of an unplanned release. Effluent from the north settling pond, installed during Phase 1 of the Project, will be discharged to wetlands and tributaries located in the northwestern portion of the PA, maintaining surface water balances in the area. Once installed during Phase 2, the south settling pond will discharge effluent towards Annand Brook located near the western boundary of the PA. Settling pond management and monitoring procedures will be detailed in the IA application following EA release.

All banks, berms, slopes, and faces will be monitored for indicators of potential failure on a regular basis. Indicators of failure may include cracking, slumping, unanticipated groundwater discharge, seeping, and erosion.

8.2 Accidents

All phases of the Project have the potential for accidents. The below accidents have the highest risk of occurring:

– Fuel and chemical spills
– Unplanned explosive event
– Mobile equipment accident

The risk of fuel spills is highest during vehicle refueling, filling of on-site fuel storage tanks, maintaining mobile equipment, and operations of vehicles and heavy equipment. A worst-case scenario would be a transportation collision resulting in the entire amount of material being transported to be spilled into a water body. The impact of such a spill would vary depending on the type of material. For instance, diesel fuel and gasoline are toxic to aquatic life and could cause environmental damage. The risk of fuel spills will be mitigated by ensuring fuel dispensing and storage

systems are installed and maintained according to manufacturer specifications and regulatory requirements. Spill kits will be available at all storage and fueling stations, in addition to being placed throughout the PA for easy access regardless of incident location.

Chemical spills can occur due to storage tank or tote failures, improper transfer procedures, or vehicle accidents. All hazardous materials and dangerous goods associated with the Project will be carefully managed in accordance with *Nova Scotia Dangerous Goods Management Regulations*. Individuals handling or using these materials will undergo comprehensive training. Safety data sheets will be available, and all hazardous materials will be clearly identified within the Environmental Emergency Response and Contingency Plan. Regular inspections of hazardous materials and dangerous goods storage will be conducted by qualified personnel to ensure compliance and safety.

While material extraction will be primarily conducted via excavation, blasting will occur on an as-needed basis when excavation is not feasible. The worst-case scenario would be bodily harm as a result of improperly handling explosives. Blasting materials, including explosives, will be stored in the southwestern portion of the PA. Only designated individuals will have access to the blasting storage location and materials, with the designated personnel undergoing background checks prior to being given authority to carry and use access keys. The necessary size of the magazine will abide by the *Nova Scotia Blasting Regulations* as well as the *Canadian Federal Explosives Regulations* regarding quantity-distance requirements and construction parameters, and transportation of blasting materials will be completed under the *Nova Scotia Blasting Safety Regulations*, as well as the *Canadian Federal Explosives Regulations.*

All phases of the Project will have the potential for vehicular accidents to occur. In a worst-case scenario, a severe accident could cause significant injury or death. To mitigate these risks, guided traffic patterns, speed limits, right-of-way signage, and thorough training will be implemented. Structural roadway designs will enhance mitigation measures, with road widths accommodating multiple vehicle types depending on road usage, safety berms being constructed where there is increased risk of vehicles leaving the roadway, and reduced road slope grades where possible.

8.3 Malfunctions

Throughout every stage of the Project, there is a risk of erosion and sediment control installation measures such as silt fencing, check dams, and ditches failing. In a worst-case scenario, such failures could lead to the uncontrolled discharge of sediment-laden water into adjacent watercourses and wetlands. Routine monitoring and maintenance will be conducted in areas with exposed soils, erosion and sediment control structure installations, as well as near receiving wetlands and watercourses to ensure sediment releases do not occur. Monitoring will occur before and after significant rain events, and during periods of high melt.

9. Effects of the Environment on the Project

The Project has the potential to be impacted by factors sourced from the local environment. The Guide to Preparing an EA Registration Document for Mining Developments in Nova Scotia (NSECC, 2023b) lists climate and meteorological conditions as being predicted impacts to mining developments, however CertainTeed has expanded upon this to include climate change, extreme weather, slope stability, and earthquakes as having predicted impacts to the Project. These hazards have the capacity to impact the Project through all phases and activities, from construction to closure. Substantial adverse effects of the listed potential environmental factors were reduced though thorough Project design. Where climate change and extreme weather impacts may be amplified by human activity, mitigation measures to reduce amplification of impacts are presented in Section 6.

9.1 Climate Change

In NS, climate changes are anticipated to include warmer temperatures, a reduction of total snowfall in favour of higher volumes of rain, increased frequency and intensity of storms, rising ocean levels, and changing ocean oxygen and acidity levels. Climate change modelling projections were conducted by NSECC, which are variable to the 18 provincial census divisions. These projections divide future risk into intervals, with historic climate conditions being considered between 1981 - 2010. The Project is located within the Halifax division, which is listed as one of seven census divisions with the highest need to adapt to climate changes. By 2030, the highest ranked climate hazard will be flooding risk, shifting to wildfires as the highest rank by 2050, and insecurities to food production, infrastructure, human health, and ecosystems by 2080 (NSECC, 2022b).

Intense storms which deposit high volumes of precipitation pose a risk to the Project in the form of creating flood conditions. Additionally, high velocity water runoff events could escalate the risk of sediment and soil erosion. Taking these risks into account, the Project will be designed to withstand increased intensity storm systems and their effects. Precipitation modelling completed by the Project has taken in to account the likelihood of increased frequency and intensity of storms, with modelling outputs to be used in the detailed design stage to reduce impacts to the Project.

Table 9.1-1 below presents NSECC projected average annual temperatures, annual total precipitation, and total annual days with rain for the Halifax census division (NSECC, 2023c).

Table 9.1-1 Historic and Projected Climate Data, Halifax Region

Metric	Historical (1981-2010)	Projected (2015-2045)	Projected (2035-2065)	Projected (2065-2095)
Average Annual Temperature (°C)	6.7	8.1	9.2	11.2
Annual Precipitation (mm)	1,377.7	1,441.1	1,468.5	1,527.1
Annual Days with Rain	108.6	114.7	119.6	125.9

While climate change is anticipated to have significant local and global impacts, the Project will be designed to withstand the various projected effects. Extensive modelling of climate related parameters including temperature, precipitation, storm frequency and intensity has resulted in a thorough understanding of future climate risks and offers the ability to adjust infrastructure designs and create contingency plans. Response to isolated climate change events such as storms may include temporary operational closures and activity delays as to prioritize employee and Project safety.

9.2 Extreme Weather

Extreme weather events may result in either drought or surplus of water conditions. The effects of a drought on the Project may include increased dust causing reduced visibility and decreased availability of water for Project activities. Potential effects of extreme precipitation include damage to Project infrastructure and production delays in the event the pit becomes flooded. The haul roads could also become flooded or eroded and the transportation of material may temporarily be suspended. The Project is up-gradient of the nearby Gays River, and is unlikely to be affected by seasonal flooding events. While flooding events may not be anticipated to have effects within the PA, the trucking haul route travels through a number of low elevation areas which have higher potential to be impacted by flooding. In the event that the trucking haul route is interrupted by road flooding, hauling will be paused until the route is deemed safe and passable again.

9.3 Slope Stability

Poor slope stability may result in mass wasting movements such as landslides, rockfalls, subsidence, and creep. Areas which have the potential for slope failure at the Project include the pit and overburden and topsoil material stockpiles. As stockpiles can place a heavy burden on the ground surface, short-term ground subsidence is

anticipated, however NSECC suggests that variable terrain is beneficial for long-term stability during reclamation (NSECC, 2009). Where erosion of slopes is a possibility due to storm and flooding events, the climate change-based modelling outputs will additionally be taken into consideration when finalizing slope grade designs. Additionally, by introducing a staged pit expansion, coupled with ongoing pit backfilling, there is a reduction of both pit wall and overburden and topsoil stockpile failure, as the total surface area of slopes present at the Project are minimized.

9.4 Wildfires

Drought conditions induced by climate change and extreme weather may induce an increased risk of wildfire, as vegetation dries out and increases flammability. Wildfires have become increasingly commonplace across Canada and NS as climate change progresses, burning large swaths of land and consuming residences and habitats. In 2023, NS experienced its largest wildfire to date, with the Barrington wildfire consuming 23, 525 hectares in the span of a month (NSDNRR, 2023). If a fire were to occur on-site, impacts could include risk to human and animal health and safety, loss of vegetation and habitat, and/or loss of infrastructure.

Wildfires are typically caused by two broad categories: lightening and human activity. While lightening induced forest fires and human activities occurring outside of the PA cannot be mitigated against, human activities within the PA can be controlled as to minimize the risk of a fire being started. Written prior to construction commencement, the Environmental Emergency Response and Contingency Plan will detail fire prevention measures, including guidance related to smoking, restricted activities during high fire index periods, and fire fighting planning and procedures.

9.5 Earthquakes

Earthquakes are largely caused by movement at tectonic plate boundaries, resulting in seismic waves travelling across the earth's crust and occasionally creating a shaking movement at the surface. The intensity of the earthquake is dictated primarily by the degree of tectonic shift that has occurred, and is measured on the Richter scale from 1 to 10. Generally, earthquakes which measure at magnitude 3 or above can be felt in the area local to the earthquake epicenter, and a magnitude of 5 is the threshold of damage occurring. Where NS, and subsequently the Project, is located within the inner continental region of the North American tectonic plate, there is a low rate of earthquake frequency, and they are of low intensity when they do arise. On average, 450 earthquakes occur annually in Eastern Canada, which comprises of Ontario, Quebec, and the Atlantic Provinces. Of these 450 earthquakes, an estimated 30 will register as exceeding a magnitude of 3 (NRCAN, 2021), and the majority of epicenters are not located within the Northern Appalachian Seismic Zone where the Project is located. No significant earthquakes (greater than or equal to a magnitude of 5) were recorded in NS between 1600 and 2006 (Lamontagne et all., 2008). Given that there were no earthquakes of significant magnitude recorded within Nova Scotia over the last 425 years, it is not anticipated that the Project is at risk of adverse effects related to earthquakes.

10. Environmental Assessment Summary and Conclusions

CertainTeed proposes to develop the Antrim Gypsum Project located near Gays River, along Lake Egmont Road in Cooks Brook, NS. The Project consists of a conventional mining operation including an open pit, co-placed overburden stockpile, topsoil stockpiles, processing plant, and water management infrastructure. The average rate of production for crushed gypsum and anhydrite is estimated to be in the range of 2.0 million tonnes per year (t/y), with an estimated marketable rate of production of 1.5 million t/y. The gypsum and anhydrite will be transported via trucks to the Port of Sheet Harbour for shipment to manufacturing facilities in eastern North America, reducing the need for CertainTeed to ship gypsum and anhydrite overseas, to continue to meet the demand of their gypsum plants and reduce their global carbon footprint through the reduction of GHG from marine transportation This Project provides

opportunity for CertainTeed to secure a strategic source of natural gypsum to supply the Canadian and US gypsum building material market, required for residential and commercial construction.

This EARD has been prepared to facilitate the Project's review as a Class I Undertaking in accordance with the Environmental Assessment Regulations made under the *Nova Scotia Environment Act*. The EA process was used as a planning tool to help shape the Project to reduce potential impact to the environment. The economic viability of the resource originally supported the open pit developed in one area; however, baseline studies identified 100 black ash, a species designated as Threatened under the NSESA, which resulted in the open pit undergoing several re-designs. Based on the sensitivities of the black ash, additional modelling was completed, and multiple iterations of the Project water management infrastructure and approach was considered to mitigate potential impacts. A Black Ash Management Plan will be developed for this Project. One individual black ash tree is located within the extents of the proposed open pit. This tree is proposed to be transplanted, in collaboration with the Mi'kmaq of Nova Scotia, in keeping with several other recent projects where transplantation of black ash has been allowed to support industrial and infrastructure development projects. Several management options exist for propagating this individual black ash elsewhere within the PA, or other suitable sites in the province, and a detailed salvage plan would be developed in consultation with NSDNRR and with the Mi'kmaq of Nova Scotia. Other Project components have also been micro-sited to avoid watercourses, wetlands, SAR as well as identified registered archaeological sites, wherever possible.

CertainTeed has undertaken community and Mi'kmaq engagement and is committed to maintaining ongoing engagement throughout the life of the Project as documented throughout this EARD.

CertainTeed has collected baseline environmental data to support an EA for this Project since 2022 and has completed multiple iterations of modelling and other analyses to support effects predictions. The predicted residual effects of the Project on all VCs selected were assessed to be not significant following the implementation of mitigation measures outlined throughout the EARD. Monitoring and follow-up programs will be implemented to confirm the predicted effects and determine if the proposed mitigation measures are effective at reducing or eliminating those effects. Further, the phased development of the Project also provides opportunity to assess the implementation and effectiveness of mitigation, and to adaptively manage any Project related effects throughout the lifetime of the Project.

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