The existing pit is a highly disturbed area and many of the vascular plant species present are non-native (Figure 14). Plant species observed here include Sticky Ragwort (*Senecio viscosus*), Pearly Everlasting (*Anaphalis margaritacea*), Poverty Oat Grass (*Danthonia spicata*), Common Speedwell (*Veronica officinalis*), White Clover (*Trifolium repens*), Rabbit's-foot Clover (*Trifolium arvense*), Colt's Foot (*Tussilago farfara*), Tall White Aster (*Doellingeria umbellata*), Red Elderberry (*Sambucus racemosa*), a morning glory (*Calystegia* sp.), Wild Raspberry (*Rubus idaeus ssp. strigosus*), Oxeye *Daisy (Leucanthemum vulgare*) and Common St. John"s-wort (*Hypericum perforatum*).

It is believed that much of the clearcut at the western end of the site had a similar species complement to that in the mostly intact woodland remaining on site.

Figure 14. The north edge of the existing New Annan Pit.

4.2.2 Aquatic Environment

The study area supports two freshwater marshes (WL1 and WL2, Figure 16), a marsh swamp complex (WL4), and a small open water pond (WL3) which is located on the headwater stream to Fourmile Brook (Figure 16). The marshes are seasonal and were observed to be full in May 2024 (as shown on aerial photography, Figure 15) with water levels significantly reduced in fall surveys in October 2023 and August 2024 when they have nearly 100% cover of marsh vegetation. The most northerly marsh (WL1, Figure 16) retained a small open water pond (10 m x 10 m) near the south end (Figure 17, right photo) where water sampling was conducted. The pond on the headwater stream to Fourmile Brook (WL3, Figure 16) is permanent and berms and a gravel ramp connecting with the work area have been constructed on the west side. A shallow swale on the southwest side (WL5, Figure 6) has been flooded as the result of a logging road without a culvert, but it has too small a catchment to have sustained a flowage or watercourse.

There were no indications of surface flow over the floor of the existing pit and only minimal channeling observed. Presumably most precipitation is absorbed directly in the porous pit floor.

4.2.3 Water Quality

Water samples and water quality measurements were taken at locations where standing or flowing water was present on August 13-14, 2024 (Figure 15). Temperatures were warm and characteristic of the time of year (16.4 – 22.3°C). Specific conductivity at all sites was low and ranged from 18.0 – 72.1 µS/cm. Water was clear, and Total Suspended Solids (TSS) levels were low (Table 1) ranging from <1.0 mg/L to 12.0 mg/L the latter with elevated levels of natural organic particulate matter present. pH values were slightly below neutral and ranged from 6.1 to 6.9 with the lower values (i.e., most acid conditions) occurring in wetland or more wetland-influenced areas, as is typical for such areas. Bolded values indicate where the CCME Guidelines for Protection of Freshwater Aquatic Life were exceeded.

Table 1. Water quality measurements in surface waters located at or near the New Annan Pit, Colchester County. August 13-14, 2024.

Site Name & Coordinates	WS-1 (Wetland 2) 476694E N5047481N	WS-2 (Drainage ditch) 476820E 5047438N	WS-3 (Wetland 1) 476763E 5047552N	WS-4 (Wetland 5) 476717E 5047283N	WS-5 (Wetland 3, stream) 476904E 5047316N	WS-6 (Wetland 3) 476916E 5047321N	WS-7 (Wetland 3) 476938E 5047299N	WS-8 (Stream above WL3) 476961E 5047275N	WS-9 (Wetland 4) 476963E 5047364N	WS-10 (Culvert on access road) 476933E 5047418N	WS-11 (Truro Road stream) 477008E 5047484N	WS-12 (Truro Road bridge) 477008E 5047484N	CCME Freshwater Guidelines
Temperature (°C)	**22.2**	17.9	**22.3**	17.0	16.4	17.2	18.4	--	--	--	--	--	<20°C*
Dissolved Oxygen (%)	56	96	49	8	90	94	66	--	--	--	--	--	-
Dissolved Oxygen (mg/L)	**4.9**	9.2	**4.3**	**0.8**	8.8	9.1	**6.3**	--	--	--	--	--	>6.5; >9.5 mg/L†
Conductivity (µs/cm)	26.3	25.2	17.1	61.1	23.2	25.3	25.3	--	--	--	--	--	-
Specific Conductivity (25°) (µs/cm)	27.7	29.2	18.0	72.1	27.8	29.7	28.9	--	--	--	--	--	-
pH	**6.3**	**6.4**	**6.2**	**6.1**	6.7	6.9	6.8	6.7	6.5	**6.2**	--	--	6.5 to 9†
TSS (mg/L)	6.5	<1	4.0	12.0	<1	-	-	2.5	1.5	6.0	<1	<1	<25 mg/L†
Appearance	clear	clear	clear	clear	clear	clear	clear	clear	clear	clear	clear	clear	

* Thresholds of 20° C are used as indicators of stress to aquatic species, particularly salmonids (DFO 2012). † CCME, Canadian Council of Ministers of the Environment. 1999.

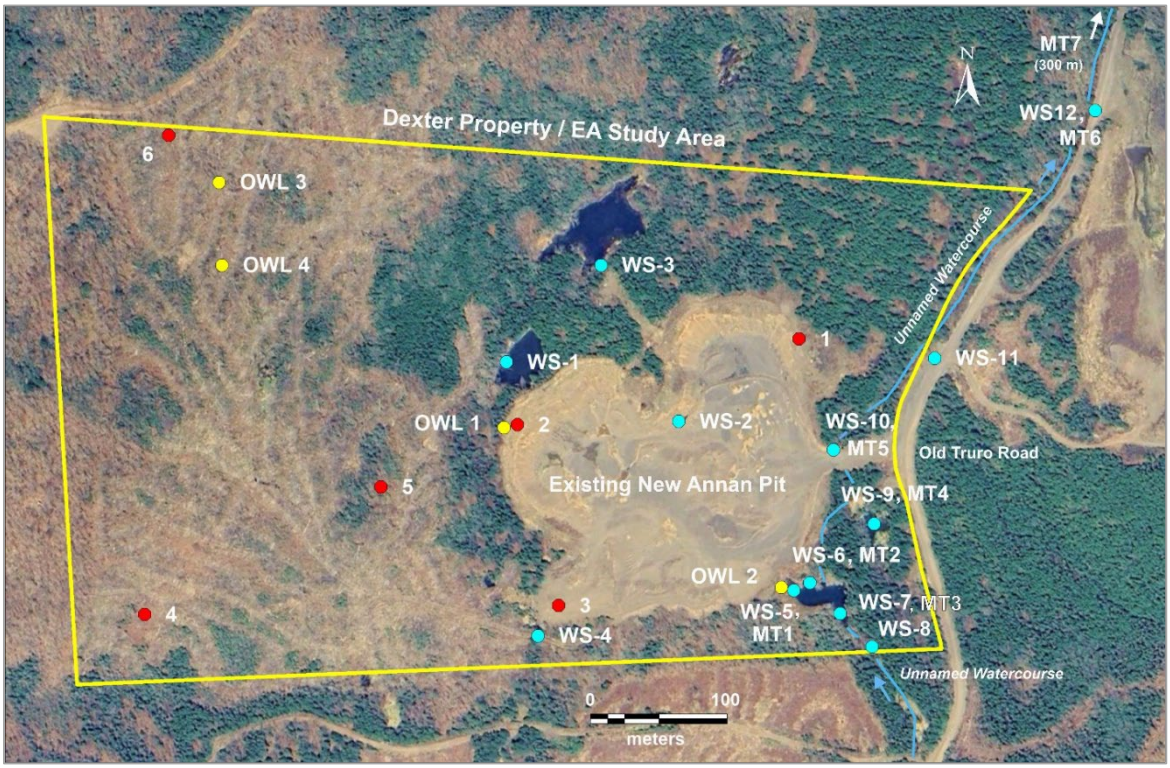

Figure 15. Locations for biological and water quality sampling, 2024. Red Dots = Breeding Bird survey; Yellow Dots = Owl Survey; WS=Water sample and measurements; MT = Minnow Trap.

4.2.4 Wetlands

Wetlands are areas of land that are periodically or permanently flooded, have characteristic soils, and support particular types of vegetation which are adapted to life in such environments. The existing gravel pit and proposed development area are largely level to slightly sloping from the northwest to the south and southeast, and only slightly undulating corresponding to surface water drainage patterns. Soils are well to moderately-well drained and several wetlands have developed in shallow depressions in the north side of the existing pit and in the southeast corner along the headwater stream of Fourmile Brook. Locations of wetlands are shown in Figure 16. Five wetlands were identified on the study site (Figure 16, Table 2). One invasive plant species was identified on a disturbed bank of Wetland 3 (west side of pond) during botany surveys (Glossy Buckthorn, *Frangula alnus*) (R. Newell, personal communication 2024).

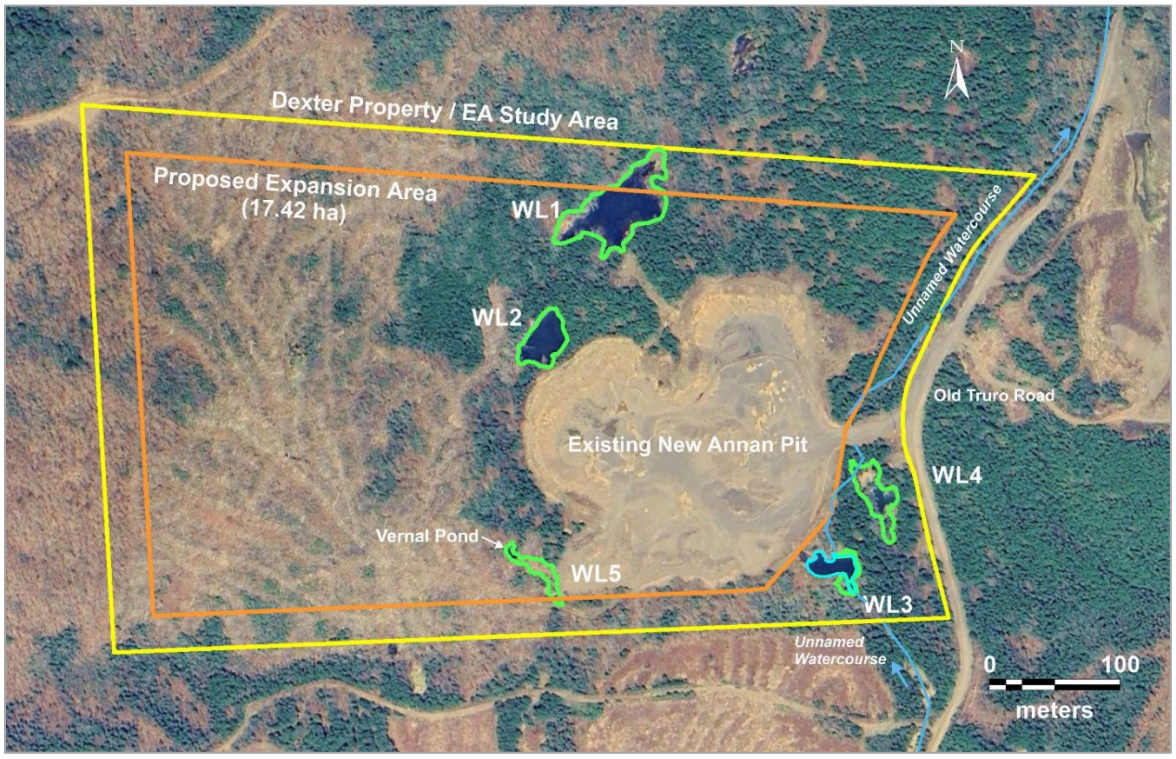

Figure 16. Wetlands at the Dexter Construction Limited, New Annan Pit.

Wetland 1 is an 0.3 ha isolated, seasonally flooded graminoid marsh. It occupies a shallow basin supplied primarily from precipitation and groundwater. No watercourses enter the marsh although small intermittent local inflow channel was traced on the north side, and the wetland is sharply confined by the adjacent upland and forest. The marsh includes a small permanent pond near the south end which may have been man-made (Figures 16 & 17). The shoreline supports patchy occurrence of Canada Holly (*Ilex verticillata*) on the north and east side as well as sphagnum in shaded areas on the south, and sensitive fern on the west side. Plant species observed along the shoreline and within the pond include Common Woolly Bulrush (*Scirpus cyperinus*), Sensitive Fern (*Onoclea sensibilis*), Red Maple (*Acer rubrum*), Cinnamon Fern (*Osmundastrum cinnamomeum*), Canada Manna Grass (*Glyceria canadensis*), Crested Wood Fern (*Dryopteris cristata*), willows (*Salix* spp.) and Common Winterberry (Ilex *verticillata*),Marsh Skullcap (*Scutellaria galericulata*), Nodding Sedge (*Carex gynandra*), Inflated Sedge (*Carex vesicaria*), and Harlequin Blue Flag (*Iris versicolor*).

Figure 17. *Left Photo*, Northwest corner of Wetland 1. *Right Photo*, Pond near the south end of Wetland 1. August 13, 2024.

Wetland 2 is an isolated seasonally flooded graminoid marsh. It occupies a shallow basin of 0.10 ha. Aerial photographs in early spring show that it floods, and gradually dries out although not completely, shown by field observations, by the fall. The pond has no inlets or outlets, and water supply is primarily from precipitation and groundwater. Plant species observed along the shoreline and/or within the pond include Blue Joint Reed Grass (*Calamagrostis canadensis*), Red Maple (*Acer rubrum*), Royal Fern (*Osmunda regalis*), Sensitive Fern (*Onoclea sensibilis*), Canada Manna Grass (*Glyceria canadensis*), Northern Water Horehound (*Lycopus uniflorus*), New York Fern (*Amauropelta noveboracensis*), Mad-dog Skullcap

Figure 18. Wetland 2, a graminoid marsh. August 13, 2024.

(*Scutellaria lateriflora*) and Rough-Stemmed Goldenrod (*Solidago rugosa*), Fringed Sedge (*Carex crinita*), Northern Long Sedge (*Carex folliculata*), Old Field Cinquefoil (*Potentilla simplex* var. *calvescens*), Black

Sedge (*Carex arctata*), Fringed Black Knotweed (*Falopia cilinodis*), Evergreen Wood Fern (*Dryopteris intermedia*), Mountain Wood Fern (*Dryopteris camplyoptera*) and Harlequin Blue Flag (*Iris versicolor*) (Figure 18).

Wetland 3 is a small pond with a narrow marsh / swamp wetland riparian zone that occupies an area of 0.02 ha in area. It may be partially artificial as has been modified by the placement of berms on both north and south sides, and a ramp constructed to access the pond on the northwest side. The pond is located along the headwater tributary of Fourmile Brook. Downstream the stream has been re-directed by a berm along the straight edge of the work area for the pit (Figure 19) before returning to a natural course upstream of Wetland 4. Plant species observed in Wetland 3 include Northern Water Horehound (*Lycopus uniflorus*), Swamp Yellow Loosestrife (*Lysimachia terrestris*), Woolly Bulrush (*Scirpus cyperinus*), Canada Manna Grass (*Glyceria canadensis*), American Water Horehound (*Lycopus americanus*), Mad-dog Skullcap (*Scutellaria lateriflora*), White Meadowsweet (*Spiraea alba* var. *latifolia*), White Turtlehead (*Chelone glabra*) and Fowl Blue Grass (*Poa palustris*), Fringed Sedge (*Carex crinita*), Northern Long Sedge (*Carex folliculata*), White Meadowsweet (*Spiraea alba* var. *latifolia*), Harlequin Blue Flag (*Iris versicolor*), Sensitive Fern (*Onoclea sensibilis*), Rough Goldenrod (*Solidago rugosa*) and New York Fern (*Parathelypteris noveboracensis*). Rosy Sedge (*Carex rosea*), a species with S3/vulnerable /yellow species (Nova Scotia General Status Ranks and S3/vulnerable (Atlantic Conservation Data Centre) was observed in Wetland 3 during the August botany survey.

Table 2. Wetlands, New Annan Quarry Development. Locations shown in Figure 16. Areas presented are for the entire wetland.

Wetland	Area (ha)	Wetland Type and Comments
WL1	0.31	Graminoid Marsh
WL2	0.10	Graminoid Marsh
WL3	0.018	Riparian Shrub Swamp
WL4	0.09	Shrub Swamp/Graminoid Marsh Complex
WL5	0.05	Swamp / Marsh Complex

Figure 19. Left Photo, Pond at Wetland 3, showing berms in foreground and background. Right photo, Riparian swamp adjacent to inflowing watercourse. August 13, 2024.

Wetland 4 is a shrub swamp / graminoid marsh complex 0.09 ha in area, which supports areas of open water and associated plant communities, as well as associated shallower marsh and swamp areas. It is formed in a basin and potentially is self-supporting on groundwater and precipitation, as no natural inlets were found; however, the stream arising in Wetland 3 and diverted past the work areas enters the northwest corner of Wetland 3 before draining out of the north end and likely overflows into Wetland 4 from time to time. This wetland supports a high biomass of plants and is likely highly productive. Tree species around the pond edges include Balsam Fir (*Abies balsamea*), Red Maple (*Acer rubrum*) and Paper Birch (*Betula papyrifera*). The dominant herbaceous species within the pond is Bitter Dock (*Rumex obtusifolius*), a non-native vascular plant. Other wetland species present include Bluejoint Reed Grass (*Calamagrostis canadensis*), Sensitive Fern (*Onoclea sensibilis*), Creeping Buttercup (*Ranunculus repens*), Rough Goldenrod (*Solidago rugosa*), Swamp Yellow Loosestrife (*Lysimachia terrestris*), Common Water Parsnip (*Sium sauve*) and Fowl Manna Grass (*Glyceria striata*), Tall Meadow-rue (*Thalictrum pubescens*), Swamp Gooseberry (*Ribes hirtellum*), Awl-fruited Sedge (*Carex stipata*), Rough Bedstraw (*Galium asprellum*), Common Marsh bedstraw (*Galium palustre*) and brownish Sedge (*Carex brunnescens*)(Figures 20 & 21). Blunt Broom Sedge (*Carex tribuloides*), a species with S3/vulnerable /yellow species (Nova Scotia General Status Ranks and S3/vulnerable (Atlantic Conservation Data Centre) was observed in Wetland 4 in the August botany survey.

Figure 20. Wetland 4. Wetland complex consisting of clockwise from upper left: north end; open central section; mixed open water and marsh; and marsh-swamp at south end. August 13, 2024.

Figure 21. Central section of Wetland 4 in June 2024.

Wetland 5 is a small marsh-swamp complex occupying 0.05 ha that has developed in the base of a shallow swale at the edge of the work area. The wetland is fed by local surface runoff, groundwater and precipitation; and at the head of the swale, is a vernal pond (8 m diameter) (Figure 22). Conditions for wetland development were created by ponding caused by blockage of a forestry road which accesses the western parts of the property. Common species included Bulrushes (*Scirpus cyperinus* and *S. microcarpus*), Cinnamon Fern (*Osmundastrum cinnamomeum*), Manna Grass (*Glyceria spp*), Soft Rush (*Carex effusus), sedges (Carex crinita*), and Sensitive fern (*Onoclea sensibilis)*.

Figure 22. Wetland 5: *Top left and right*, swamp at south end near forestry road; *Middle left and right*, Sedge and Cinnamon fern meadows; *Bottom left,* flooded Cinnamon Fern and sedges; and *Bottom right,* vernal pond at head of wetland. All photos were taken on August 13, 2024.

4.2.5 Fish and Fish Habitat

The unnamed headwater tributary stream of Fourmile Brook which flows along the southeast edge of the existing pit and the pond (Wetland 3) (Figure 16), supports Brook Trout which were captured during field surveys. Brook Trout were captured in the pond, as well as downstream of Fourmile Brook along the Truro Road (Figure 23, Table 3); and several fish seen jumping in the pond at Wetland 3 were likely Brook Trout which were shown to be present there. An 0.5 m barrier to fish passage which was observed upstream of the inflow to the pond at Wetland 3, may prevent fish from moving further upstream. The watercourse was flowing at the time of the survey, which was after a dry period, and it is suggested to be spring fed.

Fourmile Brook (Map A-1) is a tributary of Waughs River which discharges into Northumberland Strait. Waughs River and tributaries are typical of waters which flow down the north slope of the Cobequid Mountains. Brook Trout are common in upstream areas, while Atlantic Salmon Parr, minnows including Common Shiner (*Luxilus cornutus*), Northern Redbelly Dace (*Phoxinus eos*), and Creek Chub (*Semotilus atromaculatus*), and other freshwater species such as juvenile White Sucker (*Catostomus commersoni*), and Threespine Stickleback (*Gasterosteus aculeatus*), occur in downstream areas. Black-Nose Dace (*Rhynichthys atratulus*), a minnow species with a localized distribution in first order headwater streams draining watersheds on the Cobequid Mountains, has been captured in Fourmile Brook and is also found in adjacent watersheds of French River, Donaldson Mill Brook (which is a tributary of French River), and in Waughs River (Gilhen and Hebda 2002).

Table 3. Fish species, number and size based on set minnow traps in surface waters for <24 hrs, at or near the New Annan Pit, Colchester County. August 13-14, 2024. Locations of Minnow Traps are shown in Figure 15.

Location	Species	Total Length (cm)	Number of individuals
Unnamed Watercourse (in Wetland 3 Pond)			
Minnow Trap 1	No fish caught		
Minnow Trap 2 (pond outlet)	Brook Trout	13	1
Minnow Trap 3 (pond inlet)	No fish caught		
Wetland 4			
Minnow Trap 4	No fish caught		
Unnamed Watercourse (downstream of Quarry)			
Minnow Trap 5 (culvert on access road)	Brook Trout	8	2
		11	1
Minnow Trap 6 (stream along Truro Road)	Brook Trout	10	1
		11	2
Minnow Trap 7 (Truro Road Bridge)	No fish caught		
Total			**7**

Figure 23. One of several Brook Trout that were captured in minnow traps, August 14, 2024.

4.2.6 Birds

4.2.6.1 Background

The field survey for owls was conducted on May 12, 2024, and the survey for breeding birds on June 5, 2024, and June 22, 2024, by birders Fulton Lavender and Richard Hatch[1]. Conditions during the time of the owl survey were calm and clear, with air temperatures ranging between 3°C to 5°C. Conditions during both breeding bird surveys were overcast and calm with no precipitation and with air temperatures ranging between 8°C to 9°C, although a light fog was experienced during the second breeding bird survey.

Owls were surveyed by a combination of both a taped playback of owl calls and silent listening at the site, in the late evening and early morning hours. The Birds Canada Nocturnal Owl Survey Protocol for Atlantic Canada (Birds Canada 2024) was employed from 2130 hours to 2247 hrs on May 12, 2024, at four points within the study area (Figure 15). This protocol involves playing a standard tape-recording containing calls of Barred Owl, followed by Boreal Owl. A listening period is included following the taped calls. The observers also listened for owls incidentally in the early morning while on site for approximately 2 hours before the breeding bird surveys during which any additional owls and species of interest, including Common Nighthawk, which might be present, would be detected.

Breeding bird surveys were conducted on June 5, 2024 (from 0505 to 0803 hrs) and on June 22, 2024 (from 0500 to 0755 hrs)[2]. The survey team was typically on site 1.5 to 2 hrs before the start of the surveys. A focus of the study was listening for Common Nighthawks, which would have been heard in this early morning period, as well as during daytime reconnaissance of the site, which was undertaken on both

1 Surveys were consistent with protocols for point-count surveys in Ralph et al. (1993) and Huff et al (2000).

surveys. The species potentially would be heard or seen during site reconnaissance and point count surveys.

4.2.6.2 Bird Species of Conservation Concern

No species of conservation concern were found in either the owl survey or breeding bird surveys. Common Nighthawk were not observed during surveys, which would have detected them. American Woodcock were heard and were relatively numerous during the owl survey reconnaissance at the site on May 12, 2024 but the species was likely to be migrating through the area and is not likely to be nesting at the site. American Woodcock is a species of national / continental concern but is not listed in federal or provincial legislation. The species is at low population numbers in North America (Environment Canada 2013). American Woodcock typically inhabits mixed woods and early successional forests but typically is not found in either coniferous or deciduous forests which are the primary habitat types within the Study Area, although it is found in shrub habitat. The species has been affected by pesticides, habitat loss, and shifts in habitat due to climate change (Environment Canada 2013).

4.2.6.3 Owl Survey

Observation conditions for the May 12, 2024 owl survey were ideal, including negligible winds, clear skies and an air temperature of 5°C. During the survey two owl species were observed: Barred Owl and Great Horned Owl. Barred Owl were heard from all observation sites, were drawn to the taped calls, and in some cases were defending territories. One pair occupied the northwest corner (Owl 3) and the second the vicinity of two large vernal pond/marsh wetlands on the site (near Site OWL1) (Figure 15)[2]. Once attracted to the calls at OWL1, a pair of Barred Owls followed the observers to OWL2 and OWL 3 (Figure 15). The Great-Horned Owl was heard 200-300 m south of OWL4 in the southwest corner of the study area (Figure 15). A single Barred Owl was heard in the morning of June 22, 2024 near Site 1 (Figure 15).

4.2.6.4 Species Composition of Bird Communities

Various species of birds occur in the general vicinity of the site, documented by the Maritime Breeding Bird Survey and summarized for the study area in Table 4. The songbird community in clearcut mixed forest areas at the quarry[3] during the June 5, 2024 survey (Sites 4, 5, and 6, Figure 15)[4] was dominated by Mourning Warbler, Red-Eyed Vireo, American Redstart, and Hermit Thrush, each of which occurred at all three sites and were moderately abundant. Common Yellowthroat, Magnolia Warbler, Black-Throated Blue Warbler, Ovenbird, Northern Parula Warbler, Blue-Headed Vireo and American Robin were also important, occurring at two sites each (Table 5).

The June 22, 2024 survey at the same locations (Sites 4, 5, and 6) showed a bird community which was dominated by Hermit Thrush, Red-Eyed Vireo, White-Throated Sparrow, American Robin, and Mourning Warbler which each appeared at all three sites and were moderately abundant. Dark-Eyed Junco, Ovenbird, Common Yellowthroat, Swainson's Thrush, Alder Flycatcher, Black-Throated Green Warbler,

2 Barred Owl, 1 pair 300 m southwest of OWL1 and 1 pair ~100 m northeast (Figure 1); 1 pair ~200 m north of OWL 2 (Figure 1); 1 individual >500 m NE and 1 individual >500 m NW of OWL3 (Figure 1); 1 pair 200 m north of OWL4; and 1 Great-Horned Owl 200-300 m south of both OWL3 and OWL4 (Figure 1).

3 The clearcut had been recent (within the past 1-2 years) and was predominantly vegetated with a cover of short sprouting deciduous trees, Rose bushes and early successional herb and shrub species.

4 All birds heard in a 10-minute period, and approximate distance (0-50, 50-100 and > 100m) and direction, were noted.

Northern Flicker, Blue-Headed Vireo, Downy Woodpecker, Least Flycatcher, Black and White Warbler, and Magnolia Warbler were also important, occurring at two sites each.

The remaining parts of the proposed expansion area contain open mixed forest (Sites 1, 2, and 3, Figure 15). On June 5, 2024, these sites were occupied by a bird community dominated by Swainson's Thrush, American Robin, White-Throated Sparrow, Common Yellowthroat, and Hermit Thrush which occurred at all sites; and Magnolia Warbler, Red-Eyed Vireo, Mourning Warbler, Ovenbird, Yellow Bellied Flycatcher, American Redstart, Song Sparrow, and Ruby-Crowned Kinglet which each occurred at two sites. Swainson's Thrush and American Robin were most abundant, averaging up to 7.7 and 10 individuals /10 minute observation period respectively at the sites where they were most abundant.

On June 22, 2024, dominant bird species in the open mixed forest areas (Sites 1, 2, and 3) were White-Throated Sparrow, Swainson's Thrush, American Robin, Red-Eyed Vireo, Alder Flycatcher, Dark-Eyed Junco, Magnolia Warbler, and Yellow-Rumped Warbler which all were moderately abundant at all sites. Common Yellowthroat, Downy Woodpecker, Hermit Thrush, Mourning Warbler, Song Sparrow, Ruby-Crowned Kinglet, Common Grackle, Black and White Warbler, Blue Jay, Ovenbird, and Northern Flicker each occurred at two sites. The highest abundance of birds was 83 individuals per 10 min survey, at Site 1 on June 5, 2024 (Figure 15), which included highest abundances of individual species, including Swainson's Thrush (20 individuals per 10-min), American Robin (16), Magnolia Warbler (14), and White-Throated Sparrow (10). Mourning Warbler was also relatively abundant at Site 4 on June 5, 2024 (13 individuals/10 min) and White-Throated Sparrow occurred at an abundance of 10 individuals /10-min) at Site 1 on June 22, 2024.

Incidentals observed during reconnaissance or outside of standard survey periods included Belted Kingfisher (a pair was observed during owl survey and an individual on June 5, 2024, and are believed to have been nesting near OWL1, Figure 15). Bald Eagle was seen as a flyover; a distant American Bittern was heard; and a Yellow-Bellied Sapsucker was observed as incidentals during the Owl Survey. Numerous American Woodcock migrating through the site were observed during the owl survey and an individual was heard on June 5, 2024.

4.2.6.5 Diversity

Total number of species (Species Richness) at the New Annan Pit ranged from low (10 species at Site 6 on June 5, 2024) to moderate (21 at Site 2 on June 22, 2024)—and 42 species overall. The open mixed forest sites were higher in total abundance, although the number species per habitat, and average species per site were similar in both habitats and on both survey dates (Table 5).

Table 4. Birds potentially breeding in the East New Annan area of Colchester County (Maritime Breeding Bird Atlas-Online 2023). Map 20MR74.

SWANS, GEESE & DUCKS (ANSERIFORMES: ANATIDAE)	
Ring-necked Duck	Common Merganser
Hooded Merganser	Canada Goose
Wood Duck	Gadwall ‡
Eurasian Wigeon ‡	American Wigeon
American Black Duck	Mallard
Blue-winged Teal	Northern Shoveler ‡
Northern Pintail	Green-winged Teal
Greater Scaup †	Common Eider ‡§
Red-breast Merganser	
PHEASANTS, GROUSE, TURKEYS & LOONS (GALLIFORMES, PHASIANIDAE)	

Table 4. Birds potentially breeding in the East New Annan area of Colchester County (Maritime Breeding Bird Atlas-Online 2023). Map 20MR74.	
Ring-necked Pheasant	Spruce Grouse
Ruffed Grouse	Common Loon
Gray Partridge	Pie-billed Grebe
Double-crest Cormorant §	American Bittern
Great Blue Heron §	
RAILS, GALLINULES & COOTS (GRUIFORMES, RALLIDAE)	
Sora ‡	Virginia Rail †
Common Gallinule †	American Coot †
HAWKS & FALCONS (FALCONIFORMES: ACCIPITRIDAE, FALCONIDAE)	
Bald Eagle ‡¤	Sharp-shinned Hawk
Northern Harrier	Red-tailed Hawk
Turkey Vulture ‡¤	Osprey
Northern Goshawk	Broad-winged Hawk
American Kestrel	Merlin
SHOREBIRDS PLOVERS, SANDPIPERS, SNIPES & GULLS (CHARADRIIFORMES, SCOLOPACIDAE)	
Wilson's Snipe	American Woodcock
Piping Plover †	Semipalmated Plover †
Killdeer	Spotted Sandpiper
Greater Yellowlegs †	Willet
Ring-billed Gull ‡§	Herring Gull §
Great Black-backed Gull §	Common Tern §
Artic Tern ‡§	Black Guillemot ‡§
PIGEONS, DOVES & CUCKOOS (COLUMBIFORMES: COLUMBIDAE, CUCULIFORMES)	
Rock Pigeon	Mourning Dove
Black-billed Cuckoo	
OWLS (STRIGIFORMES)	
Great-horned Owl	North Saw-whet Owl
Barred Owl	Short-eared Owl
SWIFT (APODIFORMES, APODIDAE) AND HUMMINGBIRDS (APODIFORMES, TROCHILIDAE)	
Ruby-throated Hummingbird	Chimney Swift †
Common Nighthawk †	
KINGFISHERS (CORACIIFORMES, ALCEDINIDAE)	
Belted Kingfisher	
WOODPECKERS (ORDER PICIFORMES, PICIDAE)	
Yellow-bellied Sapsucker	Black-back Woodpecker ‡
Downy Woodpecker	Northern Flicker
Hairy Woodpecker	Pileated Woodpecker
American Three-toed Woodpecker	
SONGBIRDS (PASSERIFORMES)	
Olive-Sided Flycatcher †	Black-and-white Warbler
Eastern Wood-Pewee	Nashville Warbler
Yellow-bellied Flycatcher	Mourning Warbler
Alder Flycatcher	Common Yellowthroat
Least Flycatcher	American Redstart
Eastern Phoebe ‡	Northern Parula
Great Crested Flycatcher	Magnolia Warbler
Blue-headed Vireo	Bay-breasted Warbler
Red-eyed Vireo	Blackburnian Warbler
Gray Jay	Yellow Warbler

Table 4. Birds potentially breeding in the East New Annan area of Colchester County (Maritime Breeding Bird Atlas-Online 2023). Map 20MR74.	
Blue Jay	Chestnut-sided Warbler
American Crow	Black-throated Blue Warbler
Common Raven	Palm Warbler
Tree Swallow	Yellow-rumped Warbler
Bank Swallow §	Black-throated Green Warbler
Cliff Swallow §	Canada Warbler
Barn Swallow	Chipping Sparrow
Black-capped Chickadee	Vesper Sparrow †
Boreal Chickadee	Savannah Sparrow
Red-breast Nuthatch	Song Sparrow
White Breast Nuthatch ‡	Lincoln's Sparrow ‡
Winter Wren	Swamp Sparrow
Golden-crown Kinglet	White-throat Sparrow
Ruby-crown Kinglet	Dark-eyed Junco
Swainson's Thrush	Rose-breast Grosbeak ‡
Hermit Thrush	Rusty Blackbird †
Wood Thrush †	Common Grackle
American Robin	Purple Finch
European Starling	White-winged Crossbill
Cedar Waxwing	Pine Siskin
Ovenbird	American Goldfinch
Northern Waterthrush	Evening Grosbeak
Willow Flycatcher †	Eastern Kingbird
Philadelphia Vireo ‡	Horned Lark †
Brown Creeper	Eastern Bluebird †
Veery	Bicknell's Thrush †
Gray Catbird	Northern Mockingbird †
Bohemian Waxwing ‡	Tennessee Warbler
Cape May Warbler	Blackpoll Warbler
Wilson's Warbler	Nelson's Short-tail Sparrow
White-crown Sparrow ‡	Scarlet Tanager †
Northern Cardinal ‡	Indigo Bunting ‡
Bobolink	Red-wing Blackbird
Brown-head Cowbird	Baltimore Oriole
Pine Grosbeak	House Finch †
Red Crossbill †	House Sparrow
This list includes all species found during the Maritimes Breeding Bird Atlas (1st atlas: 1986-1990, 2nd atlas: 2006-2010) in the region #18 (Shelburne County). Rare/Colonial Species Report Forms should be completed for species marked: § (Colonial), ‡ (regionally rare), † (rare in the Maritimes) or ¤ (rare in the Maritimes, documentation only required for confirmed records). Current as of 16/05/2022. 20PR49.	

Table 5. Bird species heard or observed during dawn bird surveys conducted June 5, 2024, between 0505 and 0803 hrs; and June 22, 2024, between 0500 hrs and 0755 hrs at the Dexter New Annan study site. For locations of observation points, see Figure 15.

	Clearcut Mixed Forest (Sites 4, 5, 6)				Open Mixed Forest (Sites 1, 2, 3)			
	June 5, 2024		June 22, 2024		June 5. 2024		June 22, 2024	
	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins
PASSERIFORMES								
Alder Flycatcher	0	0.00	2	1.00	1	0.33	3	2.67
American Redstart	3	3.33	1	0.33	2	2.00	1	1.00

Table 5. Bird species heard or observed during dawn bird surveys conducted June 5, 2024, between 0505 and 0803 hrs; and June 22, 2024, between 0500 hrs and 0755 hrs at the Dexter New Annan study site. For locations of observation points, see Figure 15.

	Clearcut Mixed Forest (Sites 4, 5, 6)				Open Mixed Forest (Sites 1, 2, 3)			
	June 5, 2024		June 22, 2024		June 5. 2024		June 22, 2024	
	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins
American Robin	2	0.67	3	2.00	3	7.67	3	5.33
Bay-Breasted Warbler	0	0.00	1	0.67	0	0.00	0	0.00
Black-and-White Warbler	0	0.00	2	0.67	0	0.00	2	0.67
Blackburnian Warbler	1	0.33	1	0.33	0	0.00	0	0.00
Black-capped Chickadee	0	0.00	1	0.33	0	0.00	0	0.00
Black-Throated Blue Warbler	2	1.00	1	0.33	0	0.00	0	0.00
Black-Throated Green Warbler	1	0.33	2	0.67	1	0.33	0	0.00
Blue-Headed Vireo	2	0.67	2	0.67	1	0.33	1	0.33
Blue Jay	1	0.67	1	1.33	0	0.00	2	0.67
Cedar Waxwing	0	0.00	1	0.33	0	0.00	1	8.00
Chestnut-Sided Warbler	0	0.00	0	0.00	0	0.00	1	0.33
Common Crow	0	0.00	0	0.00	1	0.33	0	0.00
Common Grackle	0	0.00	1	0.33	0	0.00	2	1.00
Common Raven	0	0.00	0	0.00	1	0.33	1	0.33
Common Yellowthroat	2	2.33	2	1.00	3	3.33	2	2.33
Dark-Eyed Junco	1	0.33	2	1.33	0	0.00	3	2.33
Hermit Thrush	3	2.67	3	4.67	3	1.00	2	1.33
Least Flycatcher	1	0.33	2	0.67	0	0.00	1	0.33
Lincoln's Sparrow	0	0.00	1	0.33	1	0.67	0	0.00
Magnolia Warbler	2	1.33	2	0.67	2	5.33	3	1.67
Mourning Dove	0	0.00	0	0.00	0	0.00	1	1.33
Mourning Warbler	3	7.67	3	1.67	2	1.67	2	2.00
Northern Parula	2	0.67	0	0.00	0	0.00	1	1.00
Olive-Sided Flycatcher	0	0.00	0	0.00	0	0.00	1	0.33
Ovenbird	2	1.00	2	1.00	2	1.33	2	0.67
Purple Finch	0	0.00	0	0.00	1	0.67	1	0.67
Red-Breasted Nuthatch	0	0.00	0	0.00	0	0.00	1	0.33
Red-eyed Vireo	3	5.33	3	3.33	2	2.00	3	3.67
Ruby-Crowned Kinglet	0	0.00	0	0.00	2	0.67	2	1.00
Song Sparrow	1	0.33	1	0.67	2	1.67	2	1.00
Spotted Sandpiper	0	0.00	0	0.00	1	0.33	0	0.00
Swainson's Thrush	0	0.00	2	1.00	3	10.00	3	7.00
Veery	0	0.00	0	0.00	1	0.33	0	0.00
White-Throated Sparrow	1	0.67	3	3.67	3	4.33	3	7.33
Winter Wren	0	0.00	0	0.00	1	0.33	0	0.00
Yellow-Bellied Flycatcher	0	0.00	0	0.00	2	1.00	0	0.00
Yellow-Rumped Warbler	1	0.33	1	0.33	1	1.67	3	1.33
PICIFORMES								
Downy Woodpecker	1	0.33	2	0.67	1	0.33	2	2.33
Hairy Woodpecker	1	0.33	1	0.33	0	0.00	0	0.00
Northern Flicker	1	0.33	2	0.67	1	0.33	2	0.67

Table 5. Bird species heard or observed during dawn bird surveys conducted June 5, 2024, between 0505 and 0803 hrs; and June 22, 2024, between 0500 hrs and 0755 hrs at the Dexter New Annan study site. For locations of observation points, see Figure 15.								
	Clearcut Mixed Forest (Sites 4, 5, 6)				Open Mixed Forest (Sites 1, 2, 3)			
	June 5, 2024		June 22, 2024		June 5. 2024		June 22, 2024	
	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins
Pileated Woodpecker	0	0.00	1	0.33	0	0.00	0	0.00
SUMMARY								
Average Abundance	31.00		31.33		48.33		59.00	
Total Species per Habitat	22		30		26		30	
Average Species/Site	12.33		17.33		14.67		19.00	

Most bird species common to the area can be observed from March to September in open, forested and wetland habitats (Figure 24). Nesting for other bird species of conservation concern that have been observed within a five-kilometer radius of the site, is primarily between early-May to late-August (Figure 25).

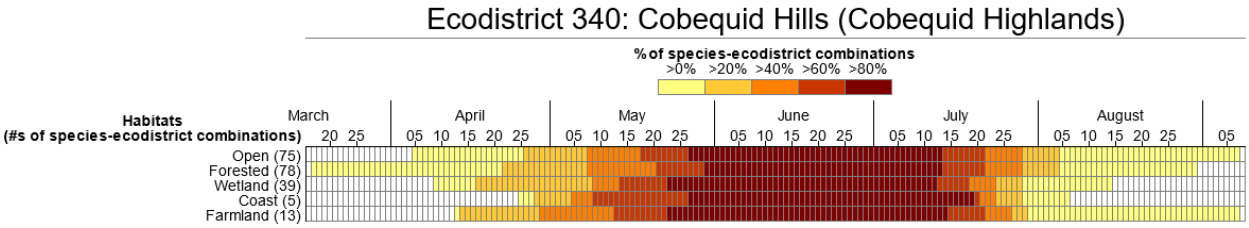

Figure 24. Nesting periods for various habitats in the larger Cobequid Hills Ecodistrict (340), formerly known as the Cobequid Highlands Ecodistrict (530) (Rousseu and Drolet 2017).

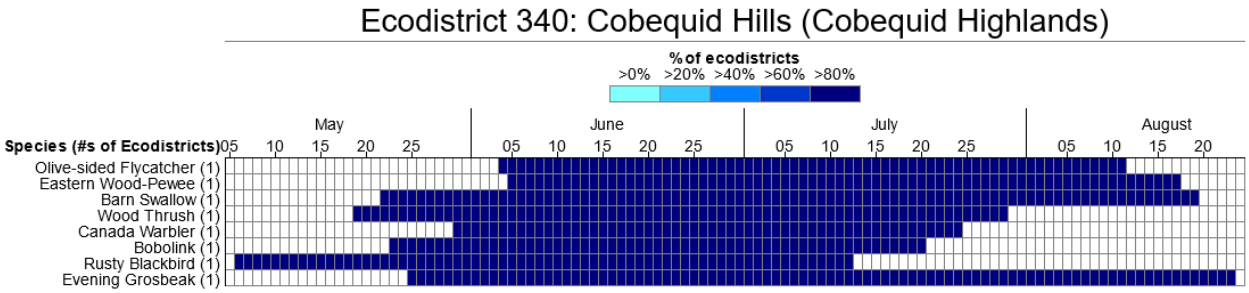

Figure 25. Nesting periods for bird Species of Concern found within five kilometers of New Annan Pit (Rousseu and Drolet 2017).

4.2.7 Mammals

Various large and small mammals, including game and furbearing species, are found in the general vicinity of the site. Mammal species occurring regularly or occasionally at the site are expected to reflect the community of the surrounding areas which includes coniferous, deciduous and mixed woodlands. A wildlife assessment was conducted by Edgewood Environmental Services on May 22nd, 2024, to investigate signs of animal activity in the assessment area (Appendix C)

White-tail Deer (*Odocoileus virginianus*) signs were observed during both Edgewood and Envirosphere site visits. Evidence of deer activity included browse, scat, and tracks. The study area is in a Special

Management Practice Zone for Mainland Moose (*Alces alces*) (NSDNR 2012, NS Significant Species & Habitats Database 2021). A moose track was observed during the owl survey on May 12, 2024, crossing the access road at the gate and following the adjacent road; there are 2 records of moose occurring within 5 km of the New Annan Pit. ACCDC reports confirm the presence of Fisher within approximately 20 km of the pit property. Edgewood Environmental Services did not observe any habitat on site, however, did confirm habitat adjacent to site. Similarly, some scattered larger diameter tolerant hardwood trees with decay features in stands adjacent to the study area may provide suitable denning habitat for American Marten, though there are no ACCDC observations of the species within 100 km of the site (Appendix D). Other animals confirmed on site include Snowshoe Hare (*Lepus americanus*), Red Squirrel (*Tamiasciurus hudsonicus*), Meadow Vole (*Microtus pennsylvanicus*), and Beaver (*Castor Canadensis*).

During this assessment, no evidence of bear activity was directly observed however the habitat in the surrounding area would be compatible with and create potential for bear presence. The forum iNaturalist reports two American Black Bear sightings within a 3.5 km radius of the New Annan Pit. Likewise, no evidence was observed to confirm the presence of Eastern Coyote, however due to their abundance in Nova Scotia their presence in the study area is very likely. None of the three endangered bat species in Nova Scotia have been observed closer than 21 km from the study site (Appendix D 2023) but bats may occur closer, where there are foraging and roosting habitats present (i.e., wet areas, large diameter old and dead trees) (Appendix C). Other animals which would find compatible habitat on or near the site, however, were not visually confirmed include: Deer Mouse *(Peromyscus maniculatus*), White-footed Mouse (*Peromyscus leucopus*), River Otter (*Lontra canadensis*), Mink (*Neovison vison*), Raccoon (*Procyon lotor*), and Short-tailed Weasel (*Mustela erminae*). A Meadow Jumping Mouse (*Zapus hudsonius*) was sighted on the edge of Wetland 1 during the field survey on August 13, 2024.

Long-tailed Shrew (*Sorex dispar*) have been reported approximately 35 km from the pit site; however, the direct vicinity does not support effective habitat for populations, as the Long-tailed Shrew is quite uncommon in Nova Scotia. Other species which are unlikely to occur due to insufficient habitat include: Red-backed Vole (*Myodes gapperi*), Woodland Jumping Mouse (*Napaeozapus insignis*), Flying Squirrels (*Glaucomys spp.)*, and Bobcat (*Lynx rufus*).

4.2.8 Reptiles and Amphibians

Several snake species are known to occur in cutover areas, along roadsides, and in abandoned gravel pits within the province and such habitats are present in or near the study area. Maritime Garter snake (*Thamnophis sirtalis*), Northern Redbelly snake (*Storeria occipitomaculata*), and Eastern Smooth Green snake (*Opheodrys vernalis*) would potentially occur in sand, gravel, and waste areas, or deciduous forest adjacent to the proposed quarry, basking or foraging for food (Gilhen 1984, in Appendix C). A juvenile Maritime Garter Snake was observed at the gate, and another unidentified snake (possibly a garter snake) was noted in the cutover area during the August 13 reconnaissance survey. ACCDC reports Wood Turtle, Eastern Painted Turtle, and Snapping Turtle observations at a distance of 10, 18, and 19 km from the study area, respectively. Habitat within the study area is not suitable for Wood Turtle; however Snapping Turtle and Eastern Painted turtles might occur occasionally in open water ponds in the vicinity such as WL3 should connectivity routes from existing populations be present (Appendix C). WL3 is outside the proposed expansion area and would not be affected by the project.

It is likely that the wet areas within the study area contains some common amphibian species. Wood Frog (*Lithobates sylvaticus*) and Northern Spring Peeper are likely present in the study area where there is flowing or standing water. Green Frog (*Rana clamitans*) and American Toad (*Bufo americanus*) are

ubiquitous and likely to be found wherever there are streams, or ponds. Red-Backed Salamander (*Plethodon cinereus*) are common in deciduous forests similar to those occurring adjacent to the proposed expansion site (Appendix C). During the wildlife survey in May, Northern Spring Peeper (*Pseudacris crucifer*) were heard vocalizing around Wetlands 1 and 2, and a Green Frog (*Rana clamitans*) was sighted. During the reconnaissance survey on August 13-14, 2024, an adult American Toad was sighted near the entrance and a juvenile was seen in Wetland 2.

4.2.9 Species at Risk

4.2.9.1 Background

Species at Risk are plants or animals whose existence is threatened, or which are in danger of being threatened, by human activities or natural events. The Canadian Committee on the Status of Endangered Wildlife in Canada (COSEWIC) presently recommends species to be listed for legal federal protection under the federal *Species at Risk Act* (SARA). At the provincial level, the Nova Scotia Species at Risk Working Group completes assessments and recommendations for a species' status. Nova Scotia maintains a list of legally protected species under the *Nova Scotia Endangered Species Act* (ESA). A third status list is the *sub-national ranks* (S-ranks), which is a provincial system used for ranking species rarity or conservation status as a tool for identifying gaps in knowledge for species for which occurrence data are maintained. S-ranks are specific to a province and consider a variety of factors including number of occurrences, distribution, population size, abundance trends, and threats. Species listed as "S1" (any species known to be or believed to be critically imperiled due to extreme rarity or steep declines), and "S2" (any species known to be, or believed to be, imperiled due to restricted ranges, few populations, or steep declines) are considered priority species[5]. Species that may be at risk of extirpation or extinction are candidates for a detailed risk assessment by COSEWIC, or provincial or territorial equivalents. The Nova Scotia *Biodiversity Act* sets guidelines for activities in the vicinity of species at risk on Crown Land and also provides guidance for private landowners for working near these species.

4.2.9.2 Results

The Atlantic Canada Conservation Data Centre (ACCDC) maintains a database of records of species of conservation concern listed under federal or provincial legislation, as well as with general status. Species of conservation concern in the database that occur within five kilometres of the New Annan Pit site include both animals and plants (Table 6).

Two plant species of conservation concern were observed during botanical surveys: Rosy Sedge (*Carex rosea*) was observed in Wetland 3 and Blunt Broom Sedge (*Carex tribuloides*) was observed in Wetland 4 (Figure 26). Both observations were made during the Fall botanical survey and both species are listed as a S3/vulnerable (yellow) species (Nova Scotia General Status Ranks) and a S3/vulnerable species (Atlantic Conservation Data Centre Subnational Status Rank) (Appendix B). Wetlands 3 and 4 are both located outside of the proposed expansion area, and neither will be physically altered.

A number of lichen species of conservation concern occur in the province. The New Annan Pit study area is not in an area of modeled occurrence of Boreal Felt Lichen (a federally and provincially listed species); and most original forest cover at the site had been removed or too young to host lichen species of conservation concern through clear-cut or logging activities. Only two species of conservation concern

[5] Definitions of all S-Ranks are presented in Table 5.

were noted on the suitable trees remaining within the property. Powdered Fringe Lichen (*Heterodermia speciosa*) was found on one American Beech and Acadian Jellyskin Lichen (*Leptogium acadiense*) was found on two Sugar Maple boles in close proximity (C. Pepper 2024). Both species are listed as S3S4 in the ACCDC conservation ranks (Figure 26). Other lichen species observed during the July lichen survey which can sometimes indicate the presence of species of concern include included Mealy-rimmed Shingle Lichen (*Pannaria conoplea*), Brown-eyed Shingle Lichen (*Pannaria rubiginosa*) and Black-bordered Shingles Lichen (*Parmeleilla tryptophylla*). Overall, lichen diversity was low mostly due to lack of suitable habitat (C. Pepper 2024).

No federally or provincially listed bird species of conservation concern were observed during dedicated surveys at the study site in May and June 2024. American Woodcock, a species of national/continental concern, but not listed in federal or provincial legislation, were heard and were relatively numerous during the owl survey reconnaissance at the site but the species was likely to be migrating through the area and not likely to be nesting at the site. The mixed woodlands within the study site potentially support many bird species of conservation concern from time to time. Federally listed bird species of conservation concern occurring within five kilometers of the study site include: Evening Grosbeak (*Coccothraustes vespertinus*), Barn Swallow (*Hirundo rustica*), Rusty Blackbird (*Euphagus carolinus*), Bobolink (*Dolichonyx oryzivorus*), Canada Warbler (*Cardellina canadensis*), Wood Thrush (*Hylocichila mustelina*), Olive-Sided Flycatcher (*Contopus cooperi*), and Eastern Wood-Pewee (*Contopus virens*) (Appendix D).

Of these species, Olive-Sided Flycatcher and Canada Warbler typically are associated with wetland habitats. In particular, treed and shrubby grassy swamps around bog/fen wetlands are preferred by Canada Warbler and treed (Black Spruce) sphagnum bogs for Olive-Sided Flycatcher; shrubby swamps are present within the study area but not bogs/fen wetlands. Olive-Sided Flycatcher and Canada Warbler have been observed 3.0 kilometers from the study site (Appendix D), but neither species was encountered during the breeding bird surveys. Canada Warbler may occasionally be found within the property within swampy wetland areas.

Among the other listed species, Bobolink and Barn Swallow typically occupy open fields, marshes, swamps, etc. and may be found occasionally at the site in suitable habitat. Both species have been observed approximately 3.0 kilometers from the site (Appendix D). Evening Grosbeak and Eastern Wood Pewee prefer open, mature, mixed wood forests where fir species or White Spruce are dominant and may occasionally occur in the area but would be limited within the study area due to the proposed expansion area largely containing cutover previously mixed or hardwood stands. Evening Grosbeak and Eastern Wood Pewee were not found in the breeding bird survey and have otherwise been observed approximately 3.0 and 2.3 kilometers from the study site, respectively (Appendix D). Wood Thrush prefer habitat in moist deciduous hardwood forests or mixed stands, that have often previously been disturbed by small scale logging or ice storms, and therefore may be present within the site. Rusty Blackbird are typically associated with forest wetlands such as slow-moving streams, peat bogs, sedge meadows, marshes, swamps, beaver ponds and pasture edges during breeding season, and may occur within wetland areas within the study area.

Other bird species reported to potentially use areas within 10 km of the site include Common Nighthawk and Bank Swallow (Table 7). Common Nighthawk may be found nesting in open areas with little ground vegetation including logged or burned over areas, forest clearings, rocky outcrops and peat bogs. Bank Swallow requires exposed banks, in low areas along rivers and streams and ocean coasts and would not typically be found at the study site. Neither species were observed during breeding bird surveys or are known to be within 5 kilometers of the study site.

Other animals of conservation concern in this part of Nova Scotia include mainland moose (listed Provincially as endangered) which have been observed occurring within 4.6 kilometers of the study site (Appendix C). The New Annan Pit is situated within a Special Management Practice Zone for moose (i.e., a moose concentration area and area of core moose habitat). Though no moose or sign of were seen during the May 2024 wildlife survey, a moose track was observed during the owl survey in spring 2024 (Figure 26). Moose home ranges generally cover tens of square kilometers, and encompass both mature and regenerating forest, wetlands, and riverine habitats. The study area contains habitat types that could provide moose with foraging and cover opportunities, and moose may use this area to meet some of their seasonal life-history needs. Wood turtle (listed as threatened by COSEWIC, SARA, and ESA), Eastern painted turtle (listed as special concern by COSEWIC and SARA), and snapping turtle (listed as special concern by COSEWIC and SARA, and vulnerable by the ESA), have been documented as occurring within 10, 18, and 19 kms, respectively of the site (Appendix C). Of these species, Eastern painted and snapping turtles could occur in the study area, as marginal habitat is present; wood turtle are unlikely to be in the area as no suitable habitat is present (Appendix C). American Marten, currently listed as endangered under the NS Endangered Species Act, have not been observed within 100 kilometers of the study site. And no indication of the species was found on the wildlife survey of the site, aside from potential suitable denning habitat in stands adjacent to the property (Appendix C).

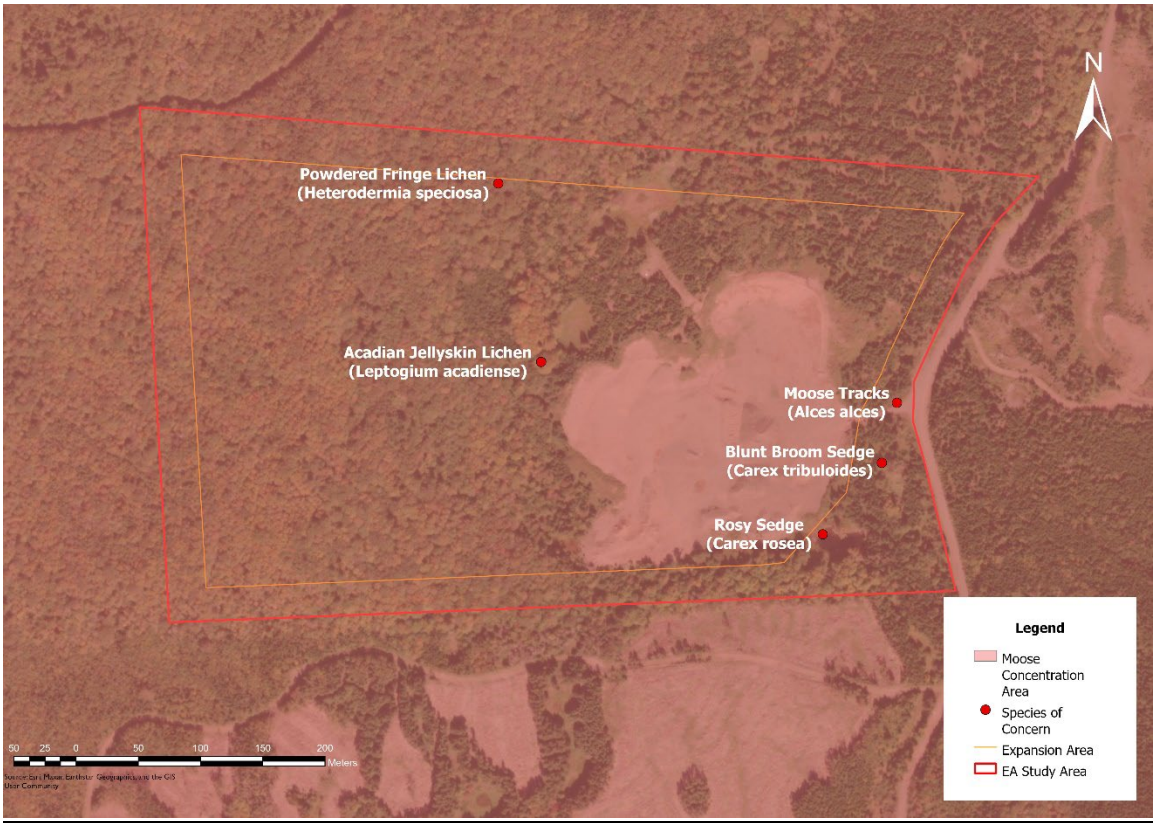

Figure 26. Species of conservation concern observed at the New Annan Pit, 2023 and 2024.

Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-Colored Bat (*Perimyotis subflavus*) (all federally and provincially listed as endangered) are species of concern potentially occurring in Nova Scotia, although none of the three endangered bat species have been recorded in the general vicinity of the site (Appendix D). Little Brown Myotis (listed as endangered by

COSEWIC, SARA, and ESA) has been recorded within 21.2 kilometers of the study area, while Northern Myotis and Tri-colored Bat (listed as endangered by COSEWIC, SARA, and ESA) have been recorded within 30 and 39.4 kilometers of the study area. The absence of old stands, with abundance standing deadwood structures (i.e., snag and cavity trees) suggests the species is not common or present at the study site; however, it is very likely that bats do occur closer where there are foraging and roosting habitats (e.g., wet areas, large diameter old or dead trees). Bats typically overwinter in abandoned mine shafts, natural caves, and old buildings, but no abandoned mines occur in the immediate vicinity of the property, the closest being 5.0 kilometers from the center of the study area (Nova Scotia 2024). Numbers of bats are exceedingly low in most areas of Nova Scotia due to the White-Nose Syndrome, and occurrences are extremely unlikely at the quarry site due to the low overall numbers, but they may occur incidentally. Natural caverns were not noted during the site reconnaissance, so the occurrence of a hibernaculum at the site is unlikely.

A list of plants and animals of concern within a 5, and 100 kilometer radius of the study site is included in Appendix D. No location sensitive species were identified for the area (Appendix D).

Table 6. Records of species of concern within a 5 km radius of the New Annan Pit, Colchester County. Atlantic Canada Conservation Data Centre (ACCDC) Database, March 2024.

			Status/Rank				
Family/Scientific Name		**Common Name**	**SARA**	**COSEWIC (NPROT[1])**	**NS ESA (SPROT[2])**	**SUB-NATIONAL RARITY RANK (SRANK)[3]**	**GLOBAL RARITY RANKING OF SPECIES (GRANK)[4]**
FLORA							
Equisetaceae	*Equisetum pratense*	Meadow Horsetail	-	-	-	S3S4	G5
Fagaceae	*Fagus grandifolia*	American Beech	-	-	-	S3S4	G5
Lycopodiaceae	*Huperzia appressa*	Mountain Firmoss	-	-	-	S3S4	G5
Orchidaceae	*Neottia bifolia*	Southern Twayblade	-	-	-	S3	G4
Orchidaceae	*Platanthera orbiculata*	Small Round-leaved Orchid	-	-	-	S3S4	G5
Physciaceae	*Heterodermia speciosa*	Powdered Fringe Lichen	-	-	-	S3S4	G5?
Physciaceae	*Anaptychia palmulata*	Shaggy Fringed Lichen	-	-	-	S3S4	G3G5
FAUNA-BIRDS							
Accipitridae	*Accipiter gentilis*	Northern Goshawk	-	Not at Risk	-	S3S4	G5
Cardinalidae	*Pheucticus ludovicianus*	Rose-breasted Grosbeak	-	-	-	S3B	G5
Corvidae	*Perisoreus canadensis*	Canada Jay	-	-	-	S3	G5
Falconidae	*Falco sparverius*	American Kestrel	-	-	-	S3B,S4S5M	G5
Fringillidae	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern	Special Concern	Vulnerable	S3B,S3N,S3M	G5
	Spinus pinus	Pine Siskin	-	-	-	S3	G5

Table 6. Records of species of concern within a 5 km radius of the New Annan Pit, Colchester County. Atlantic Canada Conservation Data Centre (ACCDC) Database, March 2024.

Family/Scientific Name		Common Name	Status/Rank				
			SARA	COSEWIC (NPROT[1])	NS ESA (SPROT[2])	SUB-NATIONAL RARITY RANK (SRANK)[3]	GLOBAL RARITY RANKING OF SPECIES (GRANK)[4]
	Pinicola enucleator	Pine Grosbeak	-	-	-	S3B,S5N,S5M	G5
Hirundinidae	*Hirundo rustica*	Barn Swallow	Threatened	Special Concern	Endangered	S3B	G5
	Petrochelidon pyrrhonota	Cliff Swallow	-	-	-	S2S3B	G5
Icteridae	*Euphagus carolinus*	Rusty Blackbird	Special Concern	Special Concern	Endangered	S2B	G4
	Dolichonyx oryzivorus	Bobolink	Threatened	Special Concern	Vulnerable	S3B	G5
Laridae	*Rissa tridactyla*	Black-legged Kittiwake	-	-	-	S2S3B	G5
Paridae	*Poecile hudsonicus*	Boreal Chickadee	-	-	-	S3	G5
Parulidae	*Cardellina canadensis*	Canada Warbler	Threatened	Special Concern	Endangered	S3B	G5
	Setophaga pinus	Pine Warbler	-	-	-	S2S3B,S4S5M	G5
	Setophaga castanea	Bay-breasted Warbler	-	-	-	S3S4B,S4S5M	G5
	Leiothlypis peregrina	Tennessee Warbler	-	-	-	S3S4B,S5M	G5
Picidae	*Picoides arcticus*	Black-backed Woodpecker	-	-	-	S3S4	G5
Scolopacidae	*Gallinago delicata*	Wilson's Snipe	-	-	-	S3B,S5M	G5
Turdidae	*Hylocichla mustelina*	Wood Thrush	Threatened	Threatened	-	SUB	G4
Tyrannidae	*Contopus cooperi*	Olive-sided Flycatcher	Special Concern	Special Concern	Threatened	S3B	G4
	Contopus virens	Eastern Wood-Pewee	Special Concern	Special Concern	Vulnerable	S3S4B	G5
	Tyrannus	Eastern Kingbird	-	-	-	S3B	G5
FAUNA-OTHER							
Cervidae	*Alces americana*	Moose	-	-	Endangered	S1	G5
Nymphalidae	*Boloria chariclea*	Arctic Fritillary	-	-	-	S1S2	G5
Salmonidae	*Salvelinus fontinalis*	Brook Trout	-	-	-	S3	G5

[1] NPROT, National conservation status of species, as designated by COSEWIC.
Extinct (X) - A wildlife species that no longer exists.
Extirpated (XT) - A wildlife species that no longer exists in the wild in Canada but exists elsewhere.
Endangered (E) - A wildlife species facing imminent extirpation or extinction.
Threatened (T) - A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern (SC) - A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.

Table 6. Records of species of concern within a 5 km radius of the New Annan Pit, Colchester County. Atlantic Canada Conservation Data Centre (ACCDC) Database, March 2024.

		Status/Rank				
Family/Scientific Name	**Common Name**	**SARA**	**COSEWIC (NPROT[1])**	**NS ESA (SPROT[2])**	**SUB-NATIONAL RARITY RANK (SRANK)[3]**	**GLOBAL RARITY RANKING OF SPECIES (GRANK)[4]**

Data Deficient (DD)- A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
Not at Risk (NAR) - A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

[2] SPROT=Provincial Rank/Status of Taxon.

[3] SRANK, Sub-National (Provincial) Rarity Ranks

S1 Extremely rare throughout its range in the province (typically 5 or fewer occurrences or very few remaining individuals). May be especially vulnerable to extirpation.

S2 Rare throughout its range in the province (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation due to rarity or other factors.

S3 Uncommon throughout its range in the province, or found only in a restricted range, even if abundant in at some locations (21 to 100 occurrences).

S4 Usually widespread, fairly common throughout its range in the province, and apparently secure with many occurrences, but the Element is of long-term concern (e.g. watch list). (100+ occurrences).

S5 Demonstrably widespread, abundant, and secure throughout its range in the province, and essentially ineradicable under present conditions.

S#S# Numeric range rank: A range between two consecutive numeric ranks. Denotes range of uncertainty about the exact rarity of the Element (e.g., S1S2).

SH Historical: Element occurred historically throughout its range in the province (with expectation that it may be rediscovered), perhaps having not been verified in the past 20 - 70 years (depending on the species) and suspected to be still extant.

SU Unrankable: Possibly in peril throughout its range in the province, but status uncertain; need more information.

SX Extinct/Extirpated: Element is believed to be extirpated within the province.

S? Unranked: Element is not yet ranked.

SA Accidental: Accidental or casual in the province (i.e., infrequent and far outside usual range). Includes species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range; a few of these species may even have bred on the one or two occasions they were recorded.

SE Exotic: An exotic established in the province (e.g., Purple Loosestrife or Coltsfoot); may be native in nearby regions.

SE# Exotic numeric: An exotic established in the province that has been assigned a numeric rank.

SP Potential: Potential that Element occurs in the province, but no occurrences reported.

[4] GRANK, Global rarity rank of species, using CDC/NatureServe methods

G1 **Critically Imperiled**—At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.

G2 **Imperiled**—At high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

G3 **Vulnerable**—At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

G4 **Apparently Secure**—At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

G5 **Secure**—At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

GU **Unrankable**—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible (when the range of uncertainty is three consecutive ranks or less), a range rank (e.g., G2G3) should be used to delineate the limits (range) of uncertainty.

GNR **Unranked**—Global rank not yet assessed.

G#G# **Range Rank**—A numeric range rank (e.g., G2G3, G1G3) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).

Q **Questionable taxonomy that may reduce conservation priority**—Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The "Q" modifier is only used at a global level and not at a national or subnational level.

C **Captive or Cultivated Only**—Taxon or ecosystem at present is presumed or possibly extinct or eliminated in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population or ecosystem restoration, not yet established. The "C" modifier is only used at a global level and not at a national or subnational level. Possible ranks are GXC or GHC. This is equivalent to "Extinct" in the Wild (EW) in IUCN's Red List terminology (IUCN 2001).

Table 6. Records of species of concern within a 5 km radius of the New Annan Pit, Colchester County. Atlantic Canada Conservation Data Centre (ACCDC) Database, March 2024.

		Status/Rank				
Family/Scientific Name	**Common Name**	**SARA**	**COSEWIC (NPROT[1])**	**NS ESA (SPROT[2])**	**SUB-NATIONAL RARITY RANK (SRANK)[3]**	**GLOBAL RARITY RANKING OF SPECIES (GRANK)[4]**

T **Infraspecific Taxon** (trinomial)—The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T subrank cannot imply the subspecies or variety is more abundant than the species. For example, a G1T2 subrank should not occur. A vertebrate animal population, (e.g., listed under the U.S. Endangered Species Act or assigned candidate status) may be tracked as an infraspecific taxon and given a T-rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status.

SR Reported: Element reported in the province but without persuasive documentation, which would provide a basis for either accepting or rejecting (e.g., misidentified specimen) the report.

SRF Reported falsely: Element erroneously reported in the province and the error has persisted in the literature.

SZ Zero occurrences: Not of practical conservation concern in the province, because there are no definable occurrences, although the species is native and appears regularly. An NZ rank will generally be used for long distance migrants whose occurrences during their migrations are too irregular (in terms of repeated visitation to the same locations) or transitory. In other words, the migrant regularly passes through the province, but enduring, mappable Element Occurrences cannot be defined.

Table 7. Provincially listed species of concern with potential to occur in the vicinity of the project site (~10km). Communities, Culture, Tourism and Heritage, Special Places Protection (J. Cormier, Coordinator, 2024).

Scientific Name	Common Name	SARA	COSEWIC (NPROT[1])	NS ESA (SPROT[2])	General Status of Wild Species Rankings[3]	Sub-National and Global Rarity Rank (GRANK[4], SRANK[5])
FLORA						
Boechera stricta	Drummond's Rockcress	-	-	-	N5	G5, S2S3
Campanula aparinoides	Marsh Bellflower	-	-	-	N5	G5, S3
Dryopteris fragrans	Fragrant Woodfern	-	-	-	N5	G5, S3
Tiarella cordifolia	Heart-leaved Foamflower	-	-	-	N5	NSR, S2S3
ANIMALS-BIRDS						
Riparia	Bank Swallow	Threatened	Threatened	Endangered	N4B, N5M	G5, S2
Hirundo rustica	Barn Swallow	Threatened	Special Concern	Endangered	N4N5B	G5, S3
Wilsonia canadensis	Canada Warbler	Threatened	Special Concern	Endangered	N4N5B	G5, S3
Chordeiles minor	Common Nighthawk	Special Concern	Special Concern	Threatened	N4N5B, N5M	G5, S3
Contopus virens	Eastern Wood-Pewee	Special Concern	Special Concern	Vulnerable	N4B	G5, S3
Coccothraustes vespertinus	Evening Grosbeak	Special Concern	Special Concern	Vulnerable	N4N5	G5, S3
Contopus cooperi	Olive-sided Flycatcher	Special Concern	Special Concern	Threatened	N4B	G4, S3
Euphagus carolinus	Rusty Blackbird	Special Concern	Special Concern	Endangered	N4B, NUN	G4, S2

Table 7. Provincially listed species of concern with potential to occur in the vicinity of the project site (~10km). Communities, Culture, Tourism and Heritage, Special Places Protection (J. Cormier, Coordinator, 2024).

Scientific Name	Common Name	SARA	COSEWIC (NPROT[1])	NS ESA (SPROT[2])	General Status of Wild Species Rankings[3]	Sub-National and Global Rarity Rank (GRANK[4], SRANK[5])

[1] NPROT, National conservation status of species, as designated by COSEWIC.
Extinct (X) – A wildlife species that no longer exists.
Extirpated (XT) - A wildlife species that no longer exists in the wild in Canada but exists elsewhere.
Endangered (E) - A wildlife species facing imminent extirpation or extinction.
Threatened (T) - A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern (SC) - A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Data Deficient (DD)- A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
Not At Risk (NAR) - A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
[2] SPROT=Provincial Rank/status of taxon & Provincial GS Rank.
[3] General Status of Wild Species in Canada: N=National; S=Subnational; X=Presumed Extirpated; H=Possibly Extirpated; 1=Critically Imperiled; 2=Imperiled; 3=Vulnerable; 4=Apparently Secure; 5=Secure; U=Unrankable; NR=Unranked; NA=Not Applicable; ?= Inexact Numeric Rank; B= Breeding; N= Non-Breeding; M=Migrant.
[4] SRANK, Sub-National (Provincial) Rarity Rank.
[5]GRANK, Global rarity rank of species, using CDC/Nature Serve methods

4.2.10 Natural Areas and Wilderness

The New Annan area was occupied first by the Mi'kmaq of Nova Scotia and then by settlers of European and American origin, the latter who developed the landscape, establishing communities based on agriculture and logging. Much of the local landscape has been modified by these activities, and remaining parcels of original forest are fragmented through the area. There is a substantial piece of crown land south of the study site, as well as various pieces of protected land in the surrounding area (see section 4.3.10). The only significant piece of protected old growth forest in the area is Staples Brook Nature Reserve (13.52 km southwest), which is currently listed with a status of 'pending.' Most woodland present in the area is early mature. Multi aged old forests, and late mature forests are present, however are largely fragmented.

4.3 HUMAN USES OF THE ENVIRONMENT

4.3.1 Mi'kmaq

The Mi'kmaq maintain Aboriginal claim to all of the landmass of Nova Scotia and the Province of Nova Scotia maintains a policy requesting that proponents of industrial development projects consult with the Mi'kmaq concerning proposed industrial projects and activities. Municipal Enterprises Limited has contacted First Nations representatives concerning the present New Annan Quarry expansion project. The nearest Mi'kmaq community to the study area is the Millbrook Reserve No. 27 which is part of Millbrook First Nation. The reserve comprises of a community approximately one thousand people and is located about 25.7 km south of the study area (CRM Group 2023). Among various community activities and pastimes are hunting and fishing, and harvesting wild foods for sustenance and traditional ceremonial activities.

The New Annan Pit is located along the border between the greater Mi'kmaw territories of *Piktuk*, meaning "at the explosions," *and Sipekne'katik*, meaning 'area of wild potato/turnip' (Sable & Francis, 2012, p. 21; Ta'nWeji-sqalia'tiek Mi'kmaw Place Names Digital Atlas, 2022 *in* CRM Group 2023). These traditional Mi'kmaw place names reflect resources available and landscape features in the area. The study area is located 20.4 kilometers northeast from the present-day community of Debert, site of the earliest known evidence of people on the land in Mi'kma'ki (CRM Group 2023). Here habitation sites clustered along the edge of a sandy plateau south of the Cobequid Mountains, which attracted Palaeo Period habitation.

There are no registered Mi'kmaq archaeological sites within the study area perimeter, however one registered archaeological site has been identified, approximately 4.9 kilometers southeast of the study site: Mac Rae Site (BjCt-01) (CRM 2023). This site is a historic site with known features such as fieldstone footings of outbuildings and a fieldstone foundation for a house (CRM Group 2023). In relation to the study area, the closest cemetery is about 4.8 kilometers north of the area, National Historic Site (the Debert Paleo-Indian Site) approximately 20 kilometres to the southwest, protected lands (the Cook Conservation Lands) approximately 3.1 kilometers west and crown land about 850 metres to the south (CRM Group 2023).

There are two Mi'kmaq tribal councils in Nova Scotia: the Confederacy of Mainland Mi'kmaq (CMM) and Union of Nova Scotia Mi'kmaq (UNSM). CMM is a not-for-profit organization incorporated in 1986, whose mission is to promote and assist Mi'kmaq communities. The UNSM, created in 1969, was formed to provide a cohesive political voice for Mi'kmaq people. The Native Council of Nova Scotia (NCNS) represents Mi'kmaq people living off reserve. The NCNS is a self-governing agency located in Truro. The Office of L'nu Affairs in Nova Scotia estimates that approximately 35% of Mi'kmaq live off reserve. The goal of NCNS is "to operate and administer a strong and effective Aboriginal Peoples Representative Organization that serves, advocates and represents our community."

The Mi'kmaq Rights Initiative (Kwilmu'kw Maw-klusuaqn; KMK) also represents Mi'kmaq. The mission of KMK—whose name means, "we are seeking consensus"—is "to address the historic and current imbalances in the relationship between Mi'kmaq and non-Mi'kmaq people in Nova Scotia and secure the basis for an improved quality of Mi'kmaq life." KMK's objective is to negotiate between the Mi'kmaq of Nova Scotia, the province of Nova Scotia, and the Government of Canada, and operates from its central office in Millbrook. The Atlantic First Nations Environmental Network (AFNEN) is an environmental organization of Mi'kmaq communities and organizations. The CMM and UNSM are members, and the Mi'kmaq Confederacy of PEI in Charlottetown is currently the acting coordinator. The AFNEN includes a representative from each Mi'kmaq organization and community interested in environmental issues. The Network meets regularly during the year through meetings, conferences, and online platforms to discuss environmental matters or concerns. Two First Nations—Millbrook First Nation, and Sipekne'katik (Indian Brook) First Nation operate independently of these organizations. Millbrook is situated outside Truro and includes activities in Cole Harbour, Sheet Harbour, and Beaver Dam. Sipekne'katik First Nation is one of 13 First Nations and is the second largest Mi'kmaq band in Nova Scotia. Sipekne'katik First Nation includes the communities of Indian Brook, New Ross, Pennal, Dodd's Lot, Wallace Hills and Grand Lake.

4.3.2 Population and Economy

The East New Annan Pit is located in Colchester County, which occupies North Central Nova Scotia. Colchester County had a population of approximately 51,276 in 2021, one that has been slowly increasing—overall 1.8% positive population percentage change since 2016 when the population was

approximately 50,585 (Statistics Canada 2024). There are four First Nation reserves within Colchester County (Millbrook 27, Truro 27A, Truro 27B, and Truro 27C), all belonging to the Millbrook First Nation, and combining for a population of 921 (Wikipedia 2024).

In 2013, the Northern region (including Colchester, Cumberland, Pictou, Guysborough, and Antigonish) represented approximately 26% of the agricultural industry in Nova Scotia. Although, an estimate for Colchester County is not specifically given, the data indicates that its geographic region is a significant component to the agricultural industry in Nova Scotia. (NSFA, Statistical Profile of Colchester County 2017).

In comparison to the other industries in the Northern region, agriculture accounted for approximately 2.03% of all jobs in the region, which is higher than the provincial average of 1.17%. The industries with the highest employment in the Northern region were trade, health care and social assistance, manufacturing, and educational services (NSFA, Statistical Profile of Colchester County 2017).

Table 8. Northern Region, Total Employment by Industry, 2013. *Note:* Adapted from Statistics Canada, 2013. (NSFA, Statistical Profile of Colchester County 2017).

Industry	Nova Scotia	% of Nova Scotia's Total Employment	Northern	% of Northern Region's Total Employment
Total employed, all industries	453,800	100	68,800	100
Agriculture	5,300	1.17	1,400	2.03
Forestry, fishing, mining, etc.	11,200	2.47	2,100	3.05
Utilities	4,600	1.01	600	0.87
Construction	33,500	7.38	4,900	7.12
Manufacturing	30,600	6.74	7,200	10.47
Trade	73,000	16.09	13,000	18.9
Transportation and warehousing	19,600	4.32	3,600	5.23
Finance, insurance, real estate, and leasing	22,100	4.87	2,000	2.91
Professional, scientific, and technical services	27,800	6.13	2,100	3.63
Business, building, and other support services	23,500	5.18	2,500	3.63
Educational services	36,700	8.09	5,400	7.85
Health care and social assistance	69,400	15.29	11,400	16.57
Information, culture, and recreation	19,300	4.25	2,100	3.05
Accommodation and food services	29,000	6.39	4,400	6.4
Other services	18,600	4.1	2,800	4.07
Public administration	29,400	6.48	3,200	4.65

4.3.3 Water Supply and Residential Wells

Permanent homes and seasonal residences in the vicinity of the current New Annan Pit typically have drilled wells, dug wells, or transport water to the site. There are no drilled wells within 800 meters of the pit (Kennedy and Fisher 2013); and within 5 km, there are only 10 drilled wells. The nearest structure potentially having a well is a seasonal residence located at approximately 520 m, but there is no evidence of a well on the property. The closest wells in the database associated with occupied dwellings are about 3 km north, one at 4639 Truro Rd; and the second in woodland not associated with a dwelling. Several small cabins and camps are located along Truro Road south of the quarry, but the drinking water source if present is not known.

The Municipality of the County of Colchester operates water utilities in Debert and Tatamagouche, producing 630 m^3/day and 290 m^3/day, respectively (Municipality of the County of Colchester 2024). The Tatamagouche Water Supply Area extends to within 1 km of the New Annan Pit to the northwest (Figure 27). The Town of Truro operates the Lepper Brook reservoir dam and water treatment facility, providing the town with an average of 13,800 m^3/day of potable water (Town of Truro 2024).

4.3.4 Land Use

Land in the vicinity of the quarry is predominantly forested, of which approximately 73% is undeveloped forest land (Table 9). Some undeveloped land is in wilderness areas, the largest of which is Gully Lake Wilderness Area at 3,990 ha (14.4% of land area within 10 km of the study area) [See Section 4.3.10]. A small proportion of the forest land (8.6%) is managed, which includes Xmas trees, maple syrup production and softwood plantations. The communities of Middle and East New Annan support some rural residential properties on large lots along the Truro Road and adjoining roads. A concentration of seasonal and permanent residences are located near the proposed quarry site and about 1% of the overall area within 10 km of the New Annan Pit is occupied by residential and industrial property. Agricultural uses including hay and livestock; and blueberry production are of some importance but occupy only about 5 % of land area, with blueberries making up a small percentage (10.1 %) of the area occupied by present or former agricultural production. Logging roads, and accessory roads, have been used, and are currently used for logging. Trails in the vicinity were actively used by locals year-round for activities such ATV and snowmobiling and some recreational hiking is associated with trails within the wilderness area. The underlying bedrock is favourable to development of pits and quarries, and 26 active, inactive, and historically abandoned sites ranging in size from 0.3 to 17.5 ha (median 1.6 ha) are present within 10 km of the New Annan Pit. The largest is an abandoned pit on Balmoral Road located about 8 km northeast of the site. Balmoral Road and Highway 311 corridors cut through the northern and eastern sections, and both provide access and the means of transporting goods and services from the area.

Table 9. Land use within 10 km radius of the New Annan Pit. Based on most recent Provincial Forestry Inventory (2016) for Colchester County.

Classification	Area (ha)	% of Total
Natural Forest[1]	23145.1	72.5%
Forest, Treated[2]	2757.5	8.6%
Forest, Clear Cut or Partial Cut	2689.0	8.4%
Brush / Alders	592.3	1.9%
Wetlands	594.3	1.9%
Open Water	164.3	0.5%
Agriculture[3]	1625.0	5.1%
Urban	183.4	0.6%
Gravel Pit / Quarry	70.3	0.2%
Industrial Corridors[4]	116.3	0.4%
Miscellaneous	5.0	< 0.1%

1. Includes natural, dead and windthrow. 2. Xmas trees, Sugar Bush, Plantation, Other. 3. Old Field, Blueberries, Other. 4. Pipelines, Powerlines, Roads.
Source: https://novascotia.ca/natr/forestry/gis/forest-inventory.asp

4.3.5 Hunting and Trapping

Lands in the vicinity of the New Annan Pit support many of the common game and fur-bearing species found elsewhere in Nova Scotia. Hunting or trapping activity may take place in the general vicinity of the site, although trapping statistics indicate that Colchester County has a low harvest of most species (NSDLF 2021). White-tailed deer are common in the general vicinity, although the county typically ranks moderate

for deer harvest in Nova Scotia; and bear are also hunted in the area. The main furbearers trapped in the five-year period (2018 to 2023) were muskrat, coyote, beaver, and racoon. There were no American Marten trapped in the previous five years, while only three Canada Lynx were trapped, incidentally. Ruffed Grouse is the most hunted upland game in Colchester County (Table 10). Ruffed Grouse and Ring-Necked Pheasant are important upland game bird species.

Table 10. Five-year summary of wildlife harvested in Colchester County and Nova Scotia (NSDLF 202).

Animal	Colchester County Reported Harvest	Provincial Reported Harvest	Percent (%) of total for province
LARGE MAMMALS			
Deer (Zone 108)	1,951	38,006	5.13%
Bear	171	1,734	9.86%
UPLAND GAME			
Snowshoe Hare	454	15,651	2.90%
Ruffed Grouse	1,092	11,373	9.61%
Ring-necked Pheasant	151	1,470	10.27
FUR HARVEST			
Beaver	489	7,193	6.80%
Muskrat	1,109	12,081	9.18%
Otter	64	1,286	4.98%
Mink	60	1,127	5.32%
Bobcat	362	3,408	10.62%
Fox	224	1,206	18.57%
Racoon	377	3,381	11.15%
Skunk	8	107	7.48%
Squirrel	19	1,512	1.26%
Weasel	23	601	3.83%
Coyote	984	9,467	10.39%
Canadian Lynx*	3	16	18.75%
American Marten*	0	9	0.00%
Fisher	25	517	4.84%
Total Furbearers	**3,747**	**41,911**	**8.94%**

*Trapped incidentally. Trappers Association of Nova Scotia prepares incidental pelts for auction and all proceeds go to the NS Species at Risk Conservation Fund.

4.3.6 Forestry and Agriculture

Forestry and farming contribute to the mix of industries in the study area, with a higher-than-average impact when compared to the rest of the province. Main agricultural activities in Colchester County include cattle ranching, farming for crops and other animal production, and although these farm types dominate in Colchester County, the number of farms has decreased over the years (NSFA, Statistical Profile of Colchester County 2017). Forestry, mining and fishing, accounts for approximately 3.05% of the Northern Region's employment, as opposed to approximately 2.47% of the entire province (NSFA, Statistical Profile of Colchester County 2017).

4.3.7 Aquaculture and Shellfish Harvesting

Colchester County borders on two marine coasts—Northumberland Strait, Southern Gulf of St. Lawrence, in the Tatamagouche area, and the Inner Bay of Fundy. The New Annan Pit is located approximately 17 kilometers from the mouth of Waughs River on Tatamagouche Bay; and about 28 km from the head of Cobequid Bay on the Bay of Fundy.

Licensed aquaculture operations in southern Colchester County are limited to land-based finfish cultivation operations, with two licenses in the vicinity of Upper North River approximately 11 km southeast of the present New Annan Pit. These operations are capable of growing salmonids (Rainbow Trout, Brook Trout, Atlantic Salmon, Arctic Char), as well as Striped Bass, and American Eel. A large Atlantic Salmon hatchery and grow-out site at Millbrook First Nation is approximately 27 km south of the New Annan study area (NSDFAa 2024). It was a former Arctic Charr farming operation which is being converted into an Atlantic Salmon hatchery with a capacity to grow 450,000 salmon smolt to supply sea farming operations of Kelly Cove Salmon Ltd, a subsidiary of Cooke Aquaculture.

In the Tatamagouche to Malagash area, there are approximately ten active and 2 pending commercial marine shellfish and seaweed leases, and one land-based shellfish aquaculture site in the Malagash area. Species cultivated include American and European Oyster, Blue Mussel, Bay Quahaug, and Softshell Clam; and several kelp species (NSDFAa 2024).

The mouths of all major rivers in the study area including the Salmon River (Cobequid Bay) and the Waugh River in Tatamagouche Bay are permanently closed to shellfish harvesting due to fecal coliform contamination, but other nearby coastal areas such as Tatamagouche Bay are typically open (DFO 2024).

4.3.8 Recreational, Commercial, and Mi'kmaq Fishing

Recreational fishing provides a valuable resource and pastime for residents and visitors to Colchester County. Recreational fishing is managed through a system of six Recreational Fishing Areas (RFAs) currently determined by County boundaries, with Colchester County forming RFA 6 (NSDFA 2024b). Species, catch limits, and seasons are set for each RFA. Several small lakes and brooks occur in the immediate vicinity, including Gards Pond located about 1 km east and draining through Cavanaugh Brook to the Waughs River; Silica Lake located about 1 km south on the watershed of North River; and Clear Lake, Black Lake and Whippey Lake located 3, 2.5 and 1.5 km to the west respectively, all of which are located in the Chiganois River watershed. Larger lakes located to the northeast in the Earltown area include Earltown Lake, Taylor's Lake, MacKay Lake and MacIntosh Lake. Brooks in the area are fished recreationally during the freshwater fishing season of April 15 to September 30 and possibly the smaller lakes as well. Target species in the Earltown area include Rainbow Trout and Brook Trout, White and Yellow Perch, and Smallmouth bass (NSDFA 2024). Rainbow Trout, Brook Trout and Smallmouth Bass are the most popular species in accessible lakes in Colchester County. Both Chiganois and North River are in the Bay of Fundy watershed; and French River and Waughs River which flow towards the North Shore of Nova Scotia, have supported Atlantic Salmon but the species is at historically low abundance and catch is not permitted. Mi'kmaq residing in the area likely use the recreational fishing resource as well, and the Mi'Kmaq Conservation Group Netukulimk in Nova Scotia actively monitors and restores fish habitat, particularly that which supports Atlantic Salmon, in rivers in Colchester County. No commercial fisheries for freshwater fish occur in the area.

Colchester County lakes including Irwins Lake, Brookfield Pond, Deyarmont Lake, and Kennedy Lake are stocked with Brook Trout and Rainbow Trout, with Kennedy Lake the closest at 16 km away. The popular

online fishing forum Fish Brain has catches of Atlantic Salmon at Drysdale Falls, 7.2 km away. Recreational fishing was observed during the site visit on August 14, 2024, on Highway 256 with locals fishing in Baileys Brook, and hiking down to fish at Drysdale Falls. Mi'kmaq may use the fishery resource as well from time to time, in particular in downstream areas, although no specific information on local fishing activity was identified. There are no commercial fisheries in the vicinity of the New Annan Pit. The closest commercial fishery operations are marine and based in Tatamagouche Bay (20-30 km north).

4.3.9 Historical, Archaeological, and Paleontological Resources

4.3.9.1 Background and Summary

The East New Annan area of Nova Scotia in which the study area is located was used by Mi'Kmaq pre-contact, and by both Mi'Kmaq and European colonists in the historic era. However, the area does not have special significance for archaeology resources. The Archaeological Resource Impact Assessment (ARIA) conducted for the project (CRM Group 2023) concluded that the study area had no significant pre-contact Mi'Kmaq use, no notable historical activity, and low potential for encountering archaeological resources; therefore, it recommended that the site should be cleared of the requirement for further archaeological investigation.

The ARIA involved consultation with Mi'Kmaq and review of databases concerning known activities by the Kwilmu'kw Maw-klusuaqn's (KMK) Archaeological Research Division, a review of MARI (the archaeological database maintained by the Nova Scotia Museum), review of records in the Nova Scotia Archives, the Nova Scotia Crown Land Information Management Centre, the Department of Natural Resources and Renewables Natural Sciences Library, the Nova Scotia Registry of Deeds, Nova Scotia Property Online, and the Nova Scotia Crown Land Information Management Centre. It also examined land grant records, legal survey and historic maps, local and regional histories, previous ARIAs in the vicinity, previous archaeological reports, topographic maps and aerial photographs, and LiDAR Digital Elevation Model (DEM) data. Valuable information generated included proximity of the site to existing registered archaeological sites, heritage properties, cemeteries, First Nation Lands, Crown land parcels, and Nova Scotia Protected Areas.

The field survey conducted in 2023 involved a visual reconnaissance of the entire undeveloped site proposed for expansion, and a soil profile and shovel test in a section of the site which was relatively undisturbed. Site reconnaissance revealed no trace of previous agricultural use of the site; areas not already disturbed by the existing pit were all heavily impacted by recent forestry, leaving only a small section in the northeast undisturbed. This area, which has a steep slope, swampy conditions, and lack of recorded evidence of activity, has low archaeological potential. No evidence of on-site Pre-contact cultural resources were identified during the reconnaissance and there were no watercourses within or adjacent to the Study Area which were large enough to have been important to the Mi'Kmaq and to be likely to have archaeological resources. Further, the review of MARI, the archaeological database maintained by the NS Museum, determined that there are no pre-contact registered archaeological sites in the immediate vicinity of the site.

The Study Area straddles the border between the greater Mi'kmaw territories of *Piktuk,* meaning "at the explosions," and *Sipekne'katik,* meaning 'area of wild potato/turnip'. Mi'kmaw placenames often highlight cultural elements such as local historic events, key resources, and essential meaning. Several known Mi'kmaw place names near the Study Area include *Matawipukwejk* (River of the Fork) referring to North River, 1.5 km south; *Qapskw* (Waterfall) referring to The Falls, located 6.5 km northeast; and *Taqamiku'jk*

(A little crossing place), referring to Tatamagouche, 14.8 km north. The nearest contemporary First Nations communities are Millbrook, located near Truro Heights, approximately 26 kms south; and Sipekne'katik located near Shubenacadie.

4.3.9.2 Pre-Contact

First Nations' activity follows the earliest recorded occupation of the general vicinity of the site by Mi'Kmaq, which was the early pre-contact First Nations' site in Debert located about 20 km south southwest of the New Annan Pit, which occurred during the *Saqiwe'k L'nuk*, meaning the "Ancient People" or Palaeo Period (13,000 to 9,000 years BP). Activities in more recent Archaeic period (8,000 to 3000 BP) are not understood due to the absence of archaeological sites in that period, but a clearer idea of Mi'Kmaq presence and activities emerged from archaeological material representing the *Kejikawe'k L'nu'k* (the Recent People), also known as the Woodland/Ceramic Period, which extends from 3,000 to 500 BP. In that period the Mi'kmaq are known to have inhabited the territory known as Mi'kma'ki, which included all of Nova Scotia and Cape Breton, Prince Edward Island, New Brunswick (north of the Saint John River), southwestern Newfoundland, the Gaspé region of Quebec, and part of Maine. During this period, they were primarily a maritime people typically concentrated along coastal shorelines and navigable watercourses (CRM Group 2023).

European arrival in the 1500s and settlement in the early 1600s introduced change and upheaval to the traditional way of Mi'kmaq life. Although mobile hunting and gathering still defined Mi'kmaq life, with identity residing within family households, trading posts and fishing villages became intersections of European and Mi'kmaq interaction, affecting traditional seasonal movements and access to land. This way of life suffered continued erosion as the European settlement expanded into lands on which Mi'Kmaq traditionally existed. By the late 1890s, the traditional hunting grounds of the Mi'kmaq diminished further as new roads and railways emerged throughout the back country.

In the Woodland Ceramic period, Mi'Kmaq had travel routes between Cobequid Basin of the Bay of Fundy and Northumberland Strait, along portage routes centred, in particular, on the Chiganois River, branches and tributaries of which pass in the general vicinity of the New Annan pit and lead to the headwaters of the French River and Waughs River which discharge on Northumberland Strait in the Tatamagouche area. Later, European settlers—first the Acadians and later Scots and Planters—used these routes, and subsequently expanded them to more overland travel ways aligned north-south and occupying valleys of other rivers (e.g. North River) in the area. The New Annan Pit is located on the Old Truro / Old Tatamagouche Roads which runs in part along West Branch North River, which marked one of the early connections between upper Onslow (east of Truro) and the Tatamagouche area. Roads through the general vicinity of New Annan were not heavily used or well-maintained in the 1800s until recent times (CRM Group 2023).

4.3.9.3 European Settlement

European settlement and development in the general vicinity of the site began with the French and the Acadians in the late 1600s, followed by waves of settlers following the Expulsion of the Acadians in 1755. Settlement reached the vicinity of the New Annan Pit in the early 1800s when the area was used for agriculture, forestry and milling. The nearest registered historical archaeological site, in the archaeological database maintained by the NS Museum, is a farmstead, is located approximately 4.9 kilometres southeast from the Study Area (CRM Group 2023). The nearest recorded cemetery is the Tatamagouche Mountain Cemetery, located approximately 4.8 kilometres north of the Study Area. The nearest National Historic Site (NHS) is the Debert Paleo-Indian Site, located approximately 20 kilometres to the south-southwest.

The first documented visit by Europeans to the Minas Basin and Cobequid region was by Samuel de Champlain in 1606, and a French seigneury was established at the head of Cobequid Bay in 1689, with its headquarters at 'La Paroisse' (the present-day community of Masstown) (CRM Group 2023). By 1703, approximately 90 Acadians lived in the area, and around the year 1710, Acadian settlers began to occupy the Tatamagouche area on Northumberland Strait. The two areas were connected by a trail, likely following a Pre-contact Mi'kmaq route, which appears to have passed in the general vicinity of the Study Area (CRM Group 2023). This trail is thought to have become the main commercial route for the Acadian settlers after 1713 when the Treaty of Utrecht gave control of mainland Nova Scotia to the British, giving the Acadians a less-obstructed pathway to Louisbourg. This overland route was called "Isgonish – French River Portage", connecting with the headwaters of French River, one of the main rivers together with Waughs River draining the Cobequid Mountains into Northumberland Strait (CRM Group 2023).

After the expulsion of the Acadians in 1755, land in the area was largely abandoned by Europeans until the arrival of Planter settlers in the 1760s and a British blockhouse (Fort Belcher) was constructed near the mouth of Chiganois River to secure the southern end of the Cobequid to Tatamagouche trail (CRM Group 2023). Presbyterian immigrants from Northern Ireland arrived in 1761 in the Londonderry area; and Onslow was settled by Scots Irish Planter families in the same period (CRM Group 2023). Other waves of settlers followed through the late 1700s together with increasing development of roads, although a serviceable connection with the Tatamagouche area was not established until the early 1800s (CRM Group 2023).

Inland settlements were gradually established in Colchester County by successive waves of immigrants. By 1809, settlement had begun along the Onslow to Tatamagouche road at what would become New Annan. These immigrant farmers began moving far inland from Tatamagouche as it took them outside the boundaries (CRM Group 2023). The small communities established south of Tatamagouche were named New Annan at a public meeting in 1820. New Annan expanded quickly into three communities – East, Central, and West – all of which focused on farming, lumbering, and milling as their primary industries (CRM Group 2023).

4.3.10 Parks and Protected Areas

Both the Province of Nova Scotia and the Government of Canada, as well as private conservation organizations, actively protect natural environments in Colchester County. Within 20 kilometers of the study area there are numerous wilderness or protected areas, including: French River Conservation Lands (3.5 km west), Cook Conservation Lands (3.7 km west), Gully Lake Wilderness Area (8.1 km east), Balmoral Mills Provincial Park (10.5 km northeast), Staples Brook Nature Reserve (13.5 km southwest), Tatamagouche Provincial Park (13.9 km northeast), Wentworth Valley Wilderness Area (14.7 km east), Douglas Meadow Brook Wilderness Area (15.8 km northwest), Mattatall Lake Conservation Lands (18.7 km northwest), Wentworth Conservation Lands (19.9 and 20.2 km northeast), and the Tatamagouche Municipal Water Supply (2 km northwest) (Figure 27). Parks and protected areas in the general area are listed in Table 11, and include:

Wilderness Areas are provincially significant areas that protect representative examples of natural landscapes, native biological diversity, and outstanding natural features of Nova Scotia. They are used for scientific research, education and a variety of recreation and nature-tourism related activities such as hiking, canoeing, sea-kayaking, sport-fishing and hunting. These areas are designated under Nova Scotia's Wilderness Areas Protection Act.

Nova Scotia Nature Trust's Conservation Lands are protected areas that are safeguarded and stewarded for the purposes of nature conservation. The properties have come under the care of the Nature Trust through donation, part-donation, purchase, or conservation easement, and protect Nova Scotia's rare, outstanding and unique natural areas while fulfilling landowner wishes to permanently protect the natural legacy that so many of them have proudly stewarded for generations.

Nova Scotia Nature Reserves are established to preserve and protect areas representative of natural ecosystems and associated plant and animal species. Scientific research and education are the primary uses of nature reserves and recreation is generally restricted. These areas are protected under the Special Places Protection Act.

Provincial Parks protect provincially or regionally significant natural heritage values such as coastlines and beaches, scenic views, diverse landscapes, forests, and lakes and rivers, for recreational use and general enjoyment by residents and tourists. Provincial Parks are important in conserving biodiversity as well as contributing to a high-quality nature experience for users of the parks and economic development for nearby communities. Provincial Parks are established under the Provincial Parks Act.

Table 11. Parks and protected areas within a 20-kilometer radius of New Annan Pit in Colchester County. Province of Nova Scotia, Nova Scotia Environment Database 2021.

Name of Site	Primary Type of Protection	Protection Status	Area (ha)	Distance (km)
French River Conservation Lands	Land Trust or Conservation Easement	Considered protected	267	3.5
Cook Conservation Lands	Land Trust or Conservation Easement	Considered protected	230	3.8
Gully Lake Wilderness Area	Wilderness Area	Designated	3,990	8.1
Balmoral Mills Provincial Park	Provincial Park	Pending Designation	8	10.5
Staples Brook Nature Reserve	Nature Reserve	Pending Designation	1,066	13.5
Tatamagouche Provincial Park	Provincial Park	Designated	6	13.9
Wentworth Valley Wilderness Area	Wilderness Area	Designated	9	14.7
Douglas Meadow Brook Wilderness Area	Wilderness Area	Designated	638	15.8
Mattatall Lake Conservation Lands	Land Trust or Conservation Easement	Considered protected	37	18.7
Wentworth Conservation Lands (1)	Land Trust or Conservation Easement	Considered protected	41	19.9
Wentworth Conservation Lands (2)	Land Trust or Conservation Easement	Considered protected	46	20.2
Tatamagouche Municipal Water Supply	Protected Water Area	Designated	15,351	0.6

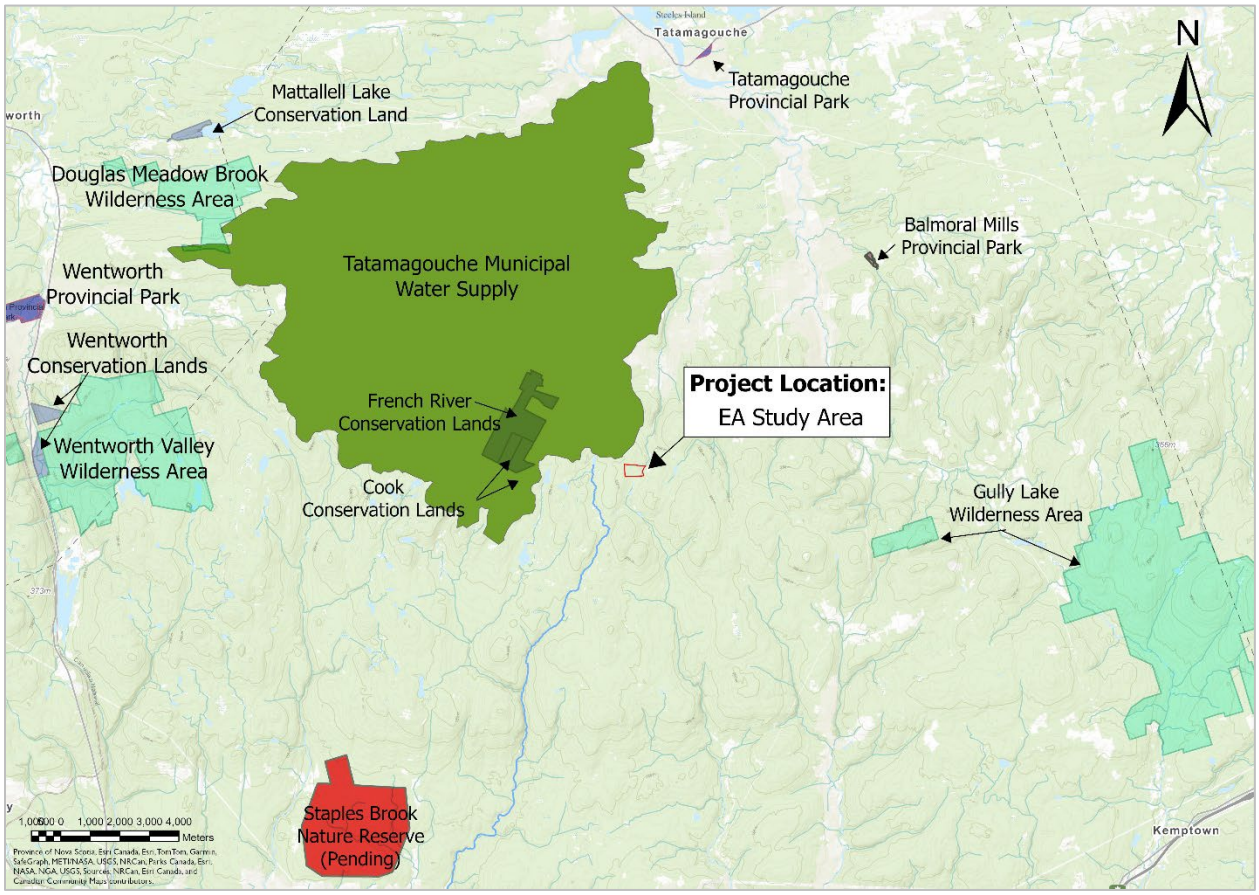

Figure 27. Parks and protected areas in the general vicinity of the New Annan Pit and proposed expansion area.

4.3.11 Recreational and Cultural Features

Residents and visitors to Colchester County access the surrounding forest, lakes and rivers within the vicinity of the study site for outdoor activities including camping, hiking and snowshoeing, swimming, as well as hunting and fishing. Hunting for recreation is supported in the area by a shooting range 12 km from the New Annan Pit; Belmont Mountain Range (852 Upper Belmont Rd, Debert, NS B0M 1G0). Existing woods roads, small side roads, and ATV trails allow access for outdoor activities. Due to a concentration of residences north of the study area there are some well-maintained gravel roads throughout the general vicinity, including Truro Road which is the main entry point to the New Annan Pit. Nearby areas such as Cook Conservation Lands (3.8 km west), French River Conservation Lands (3.5 km west), and Gully Lake Wilderness area (8.1 km southeast) provide outdoor recreation opportunities (Figure 26). Farming appears to be prevalent in the area, by the presence of local u pick blueberry farms and a property with signage for “Big D’s Ranch.”

Neighboring wilderness areas and trail systems within emphasize the importance of outdoor recreation and nature appreciation for the area and in Nova Scotia. The Snowmobilers Association of Nova Scotia maintains trails both near the property, and in the general area. During the site visit on August 14th, 2024, numerous ATV trails were seen. Other observed outdoor activity included locals recreational fishing both along the Truro Road and in other areas.

4.3.12 Residential Use

The area surrounding the New Annan Pit is rural. The closest population centers would be the Village of Tatamagouche (14.5 km north) and the Town of Truro (20 km south). Various homes are visible alongside Highway 256 and on many of the gravel roads surrounding the study area. Most residential properties were present north of the study site on Truro Road or on adjacent roads. South of the area contained some seasonal cabins and camp properties, including five locations surrounding Silica Lake. It is possible that some "camps" may be used at all times of the year, in particular for summer and winter recreation, and during the hunting season. The nearest building to the site is a camp 520 meters south on Truro Road (3480 Truro Road). The nearest fulltime residence was observed 3.3 km north on Truro Road (4680 Truro Road). Moderate amounts of road traffic observed during the site visit August 13th-14th, 2024 indicate that locals are active in the area.

4.3.13 Commercial and Industrial Development

Aggregate and asphalt from the New Annan Pit is used locally, in particular for local highway maintenance as well as for projects further afield. The Cobequid Mountains are suitable for wind energy development and one of the larger developments— the Nuttby Mountain Wind Farm—is located approximately 6 km southeast of the site. The wind farm, which is owned by Nova Scotia Power Inc., has 22 turbines and generates 50.6 MW. Higgins mountain wind farm, located 24 kilometers west of the study area has been recently approved to have 17 wind turbines.

Businesses in the general vicinity of the study area are sparse. Directly on Truro Road are various logging properties, and another aggregate pit (Ian Sinclair Contracting). Businesses within 10 km of the pit include the following:

- Kanine Klips Dog Groomer (8063 NS-311, Tatamagouche, NS B0K 1V0)
- Dorje Denma Ling Retreat Center (2280 Balmoral Rd, The Falls, NS B0K 1V0)
- Shambhala Sun Summer Camp (311 Willow Church Rd, Tatamagouche, NS B0K 1V0)
- B & B Family Farm Inc. and Elsie's 2.0 Corner Store (1204 Kennedy Hill Rd, Tatamagouche, NS B0K 1V0)
- Aitchison Enterprises Truck Repair (179 Marshall Rd, Tatamagouche, NS B0K 1V0)
- Alternative Approach Massage (Hwy 246 West New Annan, Tatamagouche, NS B0K 1V0)
- Romero Alvarez Family Architect (3896 NS-31f1, Nuttby, NS B6L 6J2)
- Dream Acres MX Park (123 Ferguson Brook Rd, Tatamagouche, NS B0K 1V0)
- Waugh River Stables (10 Dan MacKay Rd, Tatamagouche, NS B0K 1V0)
- Swan's Maple Products (416 Grist Mill Rd, Tatamagouche, NS B0K 1V0)
- Otter Plumbing and Heating (7037 NS-311, Tatamagouche, NS B0K 1V0)
- Sweet Earth Farm (81 Spiddle Hill Rd, Tatamagouche, NS B0K 1V0)
- Troyan Schloss German Shepherds (6452 NS-311, Tatamagouche, NS B0K 1V0).

4.3.14 Tourism and Viewscape

The East New Annan area is not a particular focus for tourism except through its proximity to secondary highways (i.e., 256 and 311) which are travel routes for both vehicles and bicycles. Hikers using trails in adjacent areas go to places such as Drysdale Falls, Nuttby Falls, Gully Lake Wilderness Area and nearby conservation lands, in the surrounding area of the study site. The North Shore Snowmobile Club is based out of New Annan, and the Snowmobilers Association of Nova Scotia shows many maintained trails throughout the area surrounding the study site making it a popular area for ATV and snowmobile

recreation in the summer and winter months. The New Annan Pit site is immediately adjacent to and can be seen from the Truro Road, but most of the expanded area will not be visible, due to the low slopes and view planes of the land surface.

4.3.15 Transportation

Vehicle traffic from the New Annan Pit uses a woods road which intersects with Highway 256, which is the main east-west secondary highway between New Annan and the intersection with Highway 311 at the Falls. Traffic volume in that section is low compared with other highways in the province, with an annual average daily traffic (AADT) of 210 vehicles in 2022 (Nova Scotia Open Data Portal 2022). Average daily traffic (ADT) in the same spring-summer period of the same year is higher (227 vehicles per day) (Nova Scotia Open Data Portal 2022). Traffic volume between Earltown and The Falls on Highway 311, which is the main north-south route between Truro and the north shore at Tatamagouche, is higher, with an annual average daily traffic (AADT) of 1,140 vehicles in 2022 (Nova Scotia Open Data Portal 2022), and an average spring-summer daily traffic (ADT) of 1,264 vehicles.

4.3.16 Human Health

For most people, their health and their ability to live healthy lives, is one of their most important values. Activities associated with a wide variety of human undertakings often have impacts on human health. It is important to consider these impacts in the context of environmental assessment and manage them to limit the potential effects to a low level. Many aspects of modern industrial society have the potential for impacting human health. Effects range from impacts of contaminants in the food supply, trace metals and organic pollutants in water, pesticides in the working environment and on food, atmospheric emissions of smoke and volatile organic compounds, wood preservatives in everyday use, fuels, flame retardants, etc. Industrial operations, including quarries, generate low-level releases to the environment including vehicle and equipment exhaust, dust, and emissions, although at typically extremely low levels, and comparable to the effects of heavy equipment use elsewhere, and which have been acknowledged and managed.

The main potential human health effects of quarry operations are noise, and the occurrence of potentially hazardous materials in bedrock removed during quarrying. Noise can be experienced at or near the quarry, and along roadways used to transport product. Prolonged exposure to frequent or continuous noise from quarry operations can be harmful to human health, and have subtle effects such as causing stress and associated health effects, disruption of sleep, and general annoyance (Health Canada 2024). Hazardous materials present in the bedrock geological formations may lead to exposures if dust generated during quarrying and processing is inhaled; or when groundwater which has been exposed to rock containing hazardous materials is consumed. Dust from road traffic will typically not contain hazardous materials, so the main exposure route of hazardous materials arising from bedrock is through drinking water.

Quarry rock rarely contains hazardous materials which could have health effects. The potential presence of uranium has been noted in some rock formations in the area (See Geology Section 4.1.2). Uranium is a heavy metal which has the potential to cause health effects. Rock from the proposed expansion area has been tested and does not contain uranium or radioactivity which is often associated with uranium deposits. Geological surveys within the project site found the potential for encountering uranium to be low (Mercator Geological Services 2024). As the project proceeds, regular testing of the rock and groundwater at the site will confirm the continued suitability of the quarried rock in terms of human health. It should be noted that even if uranium is found to be present in the future, the overall risk to project personnel and the general public will be low. The main routes for human exposure to uranium are through inhaled dust; and through prolonged exposure to high concentrations in drinking water. Naturally

occurring uranium typically has a low level of radioactivity which does not lead to significant health problems, and the health concern from radioactivity is negligible (Brugge and Buchner 2011). In contrast, the main health concern is exposure through drinking water where it may lead to accumulation in kidneys and associated complications similar to those experienced by exposure to other heavy metals such as lead (Brugge and Buchner 2011; Zhang *et al.* 2022).

5 Environmental Impacts, Significance, and Mitigation

5.1 Assessment, Approach, and Methods

Information for the assessment was obtained from consultants' personal knowledge, from reviews of available information, and knowledge of the purpose and proposed design of the project. The environmental assessment follows *Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia* (NSECC 2009) and uses assessment methodology typical for environmental assessment screenings of this kind. For this assessment, a list of valued environmental components (VECs)[6] (also known as VCs)[7] (Table 12) and project activities and outcomes for the proposed development of the

Table 12. Valued Environmental Components (VECs) for the New Annan Pit Development.

Biophysical	Socio-economic
Air Quality, Noise and Light	Mi'kmaq
Groundwater	Human Health
Hydrology	Recreational Activities
Water Quality	Tourism and Viewscape
Freshwater Aquatic Environments	Recreational, Commercial & Mi'kmaq Fishing
Wetlands	Archaeological, Cultural and Historical
Fish & Fish Habitat	Land Use
Flora, Fauna & Habitat	Transportation
Species at Risk	Residential Use
Natural Areas & Wilderness	Commercial /Industrial Use
	Water Supplies & Residential Wells
	Parks & Protected Areas
	Resource Use- Forestry, Hunting & Trapping

existing quarry were developed, and the potential for interactions of these activities with VECs was identified. Where interactions were identified, and there was potential for significant impacts if mitigation was not undertaken, mitigating actions or activities have been suggested that will avoid the impact or reduce it to acceptable levels before the project proceeds. The process ensures that potentially significant

[6] Valued Environmental Components (VECs) are features or things in the environment, which are particularly important either ecologically, socially, economically, or culturally. The environmental assessment addresses potential interactions of the project with each VEC identified and assesses potential impacts. The process followed involves identifying all the activities or outcomes of the project, which interact with each VEC, and then determining and rating the magnitude of the impact in a standard way, in this case in a manner guided by standard approaches that have been developed for environmental assessments.

[7] Valued Environmental Components (VECs) and Valued Components (VCs) are equivalent. Use of the acronym VC was used in environmental assessments carried out under the federal environmental assessment process under the Canadian Environmental Assessment Act (2012) and is recommended to be used in assessments carried out under its replacement, the federal Impact Assessment Act (IAA) (2019).

impacts on VECs are identified and potential impacts on them have been considered, and sufficient mitigation planned.

5.2 VALUED ENVIRONMENTAL COMPONENTS

The list of Valued Environmental Components considered for the assessment, and interactions with project components, are presented in Table 12. The environmental effects and potential impacts of the project along with their significance and suggested mitigations are outlined in the following and are summarized in Tables 13 and 14.

5.3 SOCIOECONOMIC IMPACTS

5.3.1 Mi'kmaq

The Mi'kmaq maintain a general interest in all lands in Nova Scotia which they claim to have never surrendered, ceded, or sold the Aboriginal title. As co-owners of the land and its resources, they expect that any potential impacts to rights and title be addressed. Mi'kmaq occupied much of Nova Scotia prior to European contact, and lands were used to varying degrees for habitation, hunting and fishing, as noted in Sections 4.3.1 and 4.3.8. In more recent times, treaties made with the British and continued through Canadian law have maintained their rights. Mi'kmaq used the Atlantic Coast and large waterways, both as a source of food and as a transportation corridor, none of which are within the immediate vicinity of the study site. Overall, there is low potential for occurrence of Mi'kmaq archaeological resources at the site (CRM Group 2023).

The study area is not near Mi'Kmaq First Nations and no First Nation activities are expected to be directly affected by activities at the New Annan Pit development. Best management practices used at the site will reduce any potential impacts quarry activities may have on water quality and quantity and fish habitat. The Industrial Approval granted to the project is expected to include measures to manage and monitor quality of surface waters in the vicinity of the site. Land around the Quarry may be used by for nature-based activities such as walking, ATV use, bird watching, and hunting or fishing (either recreationally or for subsistence). The land area affected is small in relation to the available wildlife habitat in the area, and would not likely affect wildlife or fish populations, potentially used by Mi'kmaq. Activities are seasonal and therefore would not interfere with other uses such as hunting, trapping and snowmobile and recreational vehicle use during the winter and spring. Since quarry operations are not expected to change significantly in scope or to increase in frequency or intensity from past levels, there is unlikely to be a change in the cumulative effects of other activities in the area; consequently, none of these effects are considered significant.

5.3.2 Recreational Activities

There is limited recreational use of the environment in the vicinity of the study area, which includes use by locals of roads for walking and ATVS and road access to trails in the Gully Lake Wilderness Area and other protected areas. Cycling on highways 256 and 311 would interact with truck traffic originating in and destined to the Quarry but would likely be only a small proportion of traffic already present. Residents of the area also have the opportunity to live in a relatively untouched natural environment with a low population density leading to local uses such as hunting and fishing, walking/hiking and home-based recreation (e.g., gardening) concentrated around roads in the area.

The principal effects of the quarry on locals using the area for recreation would be from truck, vehicle traffic, and noise associated with the operation of heavy equipment—however these interactions are a

small part of other industrial activities including logging trucks and equipment. Unlike the other activities, the effects of the quarry would occur principally when the quarry is operating, while other activities in the area could occur year-round. Operations at the quarry would be cyclic, likely occupying several weeks to months during the construction season during the years in which the site is active, and the site is regulated through an Industrial Approval issued by the province. Although quarry operations could likely be heard near the quarry and residents would experience truck traffic and other effects of quarry operations, the frequency and scope of the quarry is not expected to increase significantly from past use, and any impact on normal activities of residents as a result of the proposed quarry development are expected to be negligible.

5.3.3 Tourism and Viewscape

Development of the New Annan Pit is not expected to have a significant impact on tourism and viewscape. The principal interactions would be noise, and truck traffic transporting aggregate to job sites. Some operations at the quarry may be heard at the nearby Gully Lake Wilderness Area or other protected areas. Blasting, which may be heard at greater distances, is of short duration and will occur infrequently—one to two times a year, during years in which the site is active. The development will not result in a change in annual or daily activity, or visibility. Truck and equipment traffic accessing and exiting the site onto Truro Road, Highway 256, Highway 311 and Highway 104 is expected to be the main interaction with tourists. This traffic is expected be seasonal and occasional, will be similar now as in the future, and would likely be only a minor impediment to tourist vehicle traffic in the area. Overall, the impacts on viewscape and tourism are expected to be negligible.

5.3.4 Recreational, Commercial, and Mi'kmaq Fishing

Recreational fishing in watercourses near the Quarry is not expected to be affected by activities at the quarry. There are no major watercourses except Fourmile Brook within 2 km of the site, and the amount of runoff from the quarry is small and high quality and will have a negligible impact on local surface waters. Surface waters at the site have high quality, including low turbidity and neutral pH, which would lead to good quality of waters downstream for fish. Vehicle accidents along roads in the area pose a small potential risk in the vicinity of road crossings, which will be mitigated by safe driving practices of truck and equipment operators. In addition, the presence of the quarry will not result in reduced flows in local watercourses based on a Water Balance Assessment (Fraser 2024). Overall, a negligible impact of the quarry on recreational, commercial, and Mi'Kmaq fishing is expected.

5.3.5 Archaeological / Cultural / Historical

The land proposed for the quarry development has low potential for pre-contact and/or early historic First Nation or European archaeological resources. The site is not expected to have been a prime area used by Mi'Kmaq pre-contact. If an archaeological feature of significance is encountered during quarry activities, particularly evidence of Mi'kmaq occupation, operations will be stopped, and experts in the field will be consulted to ensure the artifact or feature is not disturbed and is adequately documented and preserved. Overall, the proposed quarry expansion project is expected to have a negligible impact on archaeological, cultural, and historical resources.

5.3.6 Land Use and Value

Activities at the New Annan Pit do not restrict forestry in the area except by removing available forest lands on the property. During the proposed life of the quarry, most of the existing forest and plantations will be harvested at least once if not more, and the rehabilitated parts of the quarry will also allow

replanting and future harvesting. Aggregate from the quarry is used in projects in the area at a competitive cost due to the proximity of the quarry. The quarry will likely intensify the competitive environment for aggregate provided by other quarries in the vicinity, which may lead to locally lower prices. The quarry provides employment for locals and generates tax revenue. The existing pit has been operating at the site with little to no impact, while providing economic development and a source of aggregate for local construction projects. Overall the proposed quarry expansion project is expected to have a negligible impact on land use and value.

5.3.7 Transportation

During its previous operations, the New Annan Pit, has generated a moderate level of truck traffic on highways in the area, and activity levels are not expected to increase from current levels as the expanded operation will be servicing approximately the same level of demand for aggregate as in past. Existing traffic volumes on the Truro Road are low and vehicle traffic from the Quarry would not constrain local traffic significantly. Transport of production and mobile equipment to and from the site prior to and after periods of site activity may lead to short-term delays in traffic caused by the often slower-moving transport trucks; however, the duration will be less than experienced during typical roadwork projects and will be therefore insignificant. Heavy trucks moving through the area and trucks turning can be a hazard to local traffic. The entrance road has good sightlines but long stretch of highway on either side which do not have significant on-turning traffic; this effect can be mitigated by applicable warning signs placed in advance of the access road to indicate the likely presence of heavy equipment and trucks turning. Safe use of the road and avoidance of accidents is essential, both for human impacts and the potential impacts of vehicle accidents and spills on the local watercourses and environments. Equipment and truck operators for the quarry will be given instruction on safe and environmentally acceptable procedures. With suitable foresight and care, the impact of the project on transportation and safety is expected to be minimal, with little or no change from current operations at the quarry. Overall the proposed quarry expansion project is expected to have a negligible impact on transportation.

5.3.8 Residential Use

Residents in the immediate vicinity of the Quarry including Truro Road and along Highway 256 would be affected by noise from quarry operations, principally noise from heavy equipment operation such as loaders and trucks and periodic blasting; operation of crushers; and ground vibrations from blasts, as well as dust and noise from truck traffic and accidental spillage of aggregate product (e.g. gravel, rock) from trucks during transport.

The quarry includes signage with phone numbers and contact persons should any members of the community have inquiries. A complaint resolution will be established to document and address complaints and concerns.

Blasting will be heard by local residents, but would be instantaneous and infrequent (e.g., one to two times per year during years in which the quarry is active). Increasing distance from residences reduces the noise and ground vibration from blasting received in these areas, and consequently the potential effect on groundwater wells or impacts of blasting on building structure are likely negligible. There are no permanent residents within 800 m of the study area, and one seasonal residence located approximately 520 m from the site. Blasting authorization has been obtained from the owner of the seasonal residence. Blasting follows conditions set forth in the Industrial Approval issued by the Province: a blasting contractor prepares a detailed blast design for every blast, and all blasting events are monitored for concussion and ground vibration at the nearest residence to ensure blasting limits are achieved.

Truck traffic generates noise and dust, and increases the potential for vehicle accidents, and accidental loss of product (e.g. gravel, rock) from trucks during transport and which can be hazardous. Proper loading and covering of loads to avoid spillage can mitigate the release of these materials. Truck operators will be instructed to maintain reduced speeds in the vicinity of residences near the Quarry. Although quarry operations could likely be heard near the quarry and residents would experience truck traffic and other effects of quarry operations, the frequency and scope of activities at the quarry is expected to continue at present levels, and any impact on normal activities of residents as a result of the proposed quarry expansion are expected to be negligible.

Sky-shine from the quarry, on rare occasions when the quarry may be operated at night, will likely not be seen by local residents, but would be controlled by proper environmental management practices such as use of downward directional lighting at the site. The effects of the quarry would occur principally when the quarry is operating in the April to November period, not year-round. Operations at the quarry would be cyclic, likely occupying several weeks to months during the construction season during the years in which the site is active.

The Quarry occupies a small area in relation to the local groundwater aquifer and will have negligible impact on groundwater supply to local residences.

5.3.9 Commercial and Industrial Use

The existing New Annan Pit and expansion area is located adjacent to a gravel pit operated by another contractor. The proposed quarry will introduce competition for supply of aggregate for projects in the general vicinity. The Nuttby Mountain Wind Farm is located 6 km from the quarry and is accessed by other road networks and would not be impacted. Otherwise, there are no other businesses in the vicinity of the Quarry which could be affected. The quarry contributes to net economic benefit in the community through supporting local trucking operations and providing local access to aggregate and other quarry products. Overall the proposed quarry expansion project is expected to have a negligible impact on commercial and industrial use in the general area.

5.3.10 Water Supplies and Residential Wells

Surface water and drilled wells associated with residences along Truro Road in the same aquifer as the Quarry, may be affected by periodic blasting. A complaint management procedure will be put in place for the quarry and groundwater monitoring wells installed around the site to provide information to determine if impacts to groundwater resources occur. Groundwater recharge generated by the quarry is likely to be of high quality (low conductivity and dissolved solids and neutral in pH). Best management practices surrounding blasting will be followed, established operational procedures for fueling will be followed, and a contingency plan will be maintained to mitigate potential impacts from spills and releases that may occur at the site. Overall the proposed quarry expansion project is expected to have a negligible impact on water supplies and residential wells in the area.

5.3.11 Parks and Protected Areas

Other than the addition of blasting and the gradual increase in the total operational footprint of the site, site activities are not planned to change in scope or increase in frequency from past use. The proposed New Annan Quarry expansion will not increase overall levels of noise beyond those historically experienced during periods of site activity. The degree of any interactions with the Gully Lake Wilderness Area or other nearby protected areas are not expected to change. The Pit and its expanded area will not be visible to visitors traveling by road; or to ATV enthusiasts using parks and protected areas. Road traffic

activity associated with the quarry is expected to be consistent with historic levels. Occasional blasting (one to two times a year, during years in which the quarry is active) may be heard as far as the Gully Lake Wilderness Area, but noise levels generated from routine operations at the quarry are not expected to be heard. Occurrences of blasting are brief and infrequent, and not likely to be a significant concern to visitors/users of those areas. The quarry will be reclaimed at the end of its useful life, and development of the quarry will not affect the integrity of nearby protected areas. Therefore, interactions and impacts on parks and protected areas are expected to be negligible.

5.3.12 Resource Use – Forestry, Hunting, and Trapping

The proposed quarry expansion is located on private lands. Use of the land in the expansion area will partially remove the potential for future forestry use of the site, at least until after the quarry is closed and rehabilitated in future; however, the area occupied by the quarry is relatively small in relation to the available forest resources in the area, and the overall impact on economic return is expected to be small. The quarry will occupy a relatively small area of habitat for furbearing and game species and will not have a significant impact on hunting and trapping.

Industrial operations, including quarries, generate low-level releases to the environment including vehicle and equipment exhaust and dust, although at typically low levels, and comparable to effects of equipment use elsewhere, and which have been acknowledged and managed.

5.3.13 Human Health

Many aspects of modern industrial society have the potential for impacting human health. Effects range from impacts of contaminants in the food supply, trace metals and organic pollutants in water, pesticides in the environment and on food, atmospheric emissions of smoke and volatile organic compounds, wood preservatives in everyday use, fuels, flame retardants, etc. Industrial operations, including quarries, generate low-level releases to the environment including vehicle and equipment exhaust, dust, and emissions, although at typically extremely low levels, and comparable to the effects of heavy equipment use elsewhere, and which have been acknowledged and managed.

Operations of New Annan Quarry are not expected to result in impacts on human health. Dust, which is derived both from the source rock, aggregate and activities at the quarry, does not contain toxic components and exposure to residents along the Old Truro Road will be low. Rock and groundwater at the site is monitored for hazardous components. Residual dust associated with the quarry after control measures, will be largely localized in the immediate vicinity of the quarry. Operation of an asphalt plant which may take place from time to time at the site is regulated under provincial approvals. Noise from activities at the quarry and transport of product may disturb residents, which if prolonged could be considered a health concern, but MEL will undertake to minimize noise levels. Other air-borne emissions such as vehicle exhaust are not unique to quarry activities and would also be derived from other traffic along roads in the area.

5.4 Biophysical Impacts – Impacts of the Project on the Environment

5.4.1 Air Quality, Noise, and Light

Other than the addition of blasting and the gradual increase in the total operational footprint of the site, site activities are not planned to change in scope or increase in frequency from past use. Development of the New Annan Quarry area is not expected to result in an increase to traffic, noise, dust and light from operations over those previously experienced at the site. Operation of a quarry has the potential to

generate dust, combustion emissions, noise, and light. The operation of heavy equipment (e.g., earth movers, crushers), rock drilling and blasting, as well as onsite routine operations contribute to dust and particulate levels. Dust management will be undertaken, including use of water spray and covering working and laydown areas with blasted rock, dust suppression systems on crushing equipment, reducing vehicle speeds, and using tarpaulins on truck boxes. Airborne particulate emissions will be monitored in accordance with the site Industrial Approval, the Pit and Quarry Guidelines, and the Nova Scotia Air Quality Regulations. Industry standards and best practices will be followed during all phases of operations.

Traffic along Truro Road and associated vehicle noise, dust, emissions and safety concerns are expected to be similar to those experienced in the recent past. Exhaust emissions are generated by the operation of vehicles and equipment. Vehicles and heavy equipment are expected to follow efficient operating procedures such as not idling unnecessarily. Given the relatively small size of anticipated future operations at the quarry, these emissions will be minimal (i.e., restricted to several pieces of heavy equipment, earth movers, trucks etc. as well as operation of crushers and asphalt plant) and will be localized and similar in type and amount to those produced during previous operations. Ambient air quality monitoring will be conducted in accordance with the terms and conditions of the Industrial Approval awarded to Dexter for the site.

Noise from the Quarry may be experienced by locals living in the general vicinity and by wildlife. Noise mitigation will include maintaining vehicles and heavy equipment in proper working order; planning traffic flow patterns on the site to reduce the need for heavy equipment to back up (thus reducing the frequency of backup signals); and ensuring that parts of equipment capable of generating noise (e.g. tailgates on truck boxes) are secured. Dexter will ensure that site operations do not exceed the noise limits specified in the site Industrial Approval or the Nova Scotia Pit and Quarry Guidelines. Blasting is expected to occur infrequently (1-2 times per year, during years in which the site is active). All blasting events will be monitored for concussion and ground vibrations to confirm adherence to regulated levels. Noise monitoring will be conducted in accordance with the terms and conditions of the Industrial Approval.

Nighttime operations will only occur if necessary. Light during nighttime operations— particularly during times of low-hanging cloud and fog—can attract migrating birds. If nighttime operations are required, then directional lighting will be used to minimize emanation of light upward and laterally over the horizon.

5.4.2 Groundwater

Activities associated with the project including forest clearing, grubbing and removal of overburden, and blasting, may influence groundwater flow locally in the vicinity of the quarry, but are not expected to influence groundwater aquifers over a broader area. The amount of recharge area involved in project activities is small in relation to the overall size of the aquifers in the general vicinity; the water table in bedrock below the quarry floor will continue to recharge at approximately the same rate as at present. A contingency plan will be established to manage emergency response in the unlikely event of spills or releases of fuels or hazardous chemicals potentially impacting groundwater in the area. A groundwater monitoring program will be developed and implemented as a requirement of the Industrial Approval awarded by the Province which will establish baseline groundwater quality prior to the quarry development and, will provide regular monitoring to ensure that any potential impacts associated with the quarry development are identified. Overall, the effect on overall groundwater distribution and flow are expected to be negligible.

5.4.3 Hydrology

Due to the relatively small area of the expanded quarry, and its position in the local catchments, the expanded quarry is expected to have a negligible effect on surface waters in the general vicinity. This was shown by a Water Balance Assessment which estimates the change in surface water flows resulting from the proposed expansion project (Fraser 2024). The water balance estimates that the change in surface water runoff in Fourmile Brook, which is the watercourse fed by the catchment, will be from 0 % to 5.2 %. Surface water runoff from the quarry is inherently intermittent due to the dominance of precipitation in water balance, and most is expected to enter the water table directly through percolation through cracks and fissures in the bedrock; runoff from the quarry floor will be managed through a surface water management system to ensure that it meets site discharge limits established in the site Industrial Approval.

5.4.4 Water Quality

Due to the location of the site being high in the local catchment area and the low-contaminant characteristics of the bedrock, the quality of water leaving the quarry via surface or groundwater is not expected to be impacted significantly. Water quality in the headwater tributary of Fourmile Brook at the site will not be impacted. No new development in the vicinity of this brook will occur and management measures will be in place to reduce erosion and sedimentation on the quarry floor. Quarry rock is within acceptable limits for sulphur and acid-generating potential. Blasting is not expected to result in groundwater quality changes. Forest clearing and grubbing activities can lead to releases of fines (silt and clay) from the soil, resulting locally in elevated suspended sediment levels but little surface water flow from grubbed areas is expected off the site in part due to the small area involved, and sediments will be removed during flow through the adjacent vegetated landscapes. Dust can enter the local environment and potentially affect water quality offsite but will be mitigated by dust control measures. Possible release of other contaminants such as oils and lubricants from operating equipment; and nitrates from blasting, is expected to be mitigated by normal precautions, including equipment operations and fuelling locations. All activities will conform to the Nova Scotia Erosion and Sedimentation Control Handbook (NSE 1988) and the Nova Scotia Pit & Quarry Guidelines (NSE 2003). Runoff from road surfaces and exposed surfaces potentially can lead to temporarily elevated suspended sediment levels in flows in ditches adjacent to them, although effects would be short term, and sedimentation control structures such as sedimentation ponds will be implemented as needed. A surface water management and monitoring program, and erosion and sediment control plan will be developed to meet expected conditions of the Industrial Approval.

5.4.5 Freshwater Aquatic Environments

A small headwater tributary of Fourmile Brook is present along the eastern boundary of the current development area, and several ponds and associated wetlands occur in the eastern portion of the site (surrounding the current gravel pit). The stream and associated wetland areas are outside the present and future proposed developed area and these areas will be left as is. Quantities of runoff arising from the site in future from the outer slopes of berms, product storage piles, and grubbing piles will be approximately the same as at present and will remain in the same watershed. The quarry is unlikely to generate significant quantities of contaminants or suspended sediments that could impact any freshwater habitat.

5.4.6 Wetlands

Several wetlands are present, two of which (Wetland 3 and Wetland 4) contain plant species of conservation concern. Both are located outside of the proposed expansion area and will not be altered by the project. A surface water management plan will be developed to meet requirements for the Industrial

Approval to ensure runoff from the pit does not contribute to indirect impacts to these wetlands. Two marsh wetlands northwest of the existing gravel pit (Wetland 1 and Wetland 2) and small swamp / marsh wetland west of the existing pit are within the proposed expansion area and may need to be removed to facilitate practical development of the quarry. Prior to physical disturbance, separate wetland alteration approvals will be obtained for each wetland that will be impacted, and appropriate compensation for the loss will be arranged.

5.4.7 Fish and Fish Habitat

None of the proposed project activities will physically impact fish habitat. The headwater tributary of Fourmile Brook located east of the existing gravel pit and an associated pond, is the only potential fish habitat at the site, and these areas are outside of the proposed development area. Most precipitation is expected to infiltrate the quarry floor and not directly reach the watercourse as runoff. The Water Balance Assessment for the project indicates that the development will not affect the supply of water to adjacent areas significantly (Fraser 2024). Water quality typically found in runoff from the quarry will be monitored and is expected to meet NSECC guidelines and limits stipulated in the Industrial Approval. All guidelines for activities and timing of blasting in the quarry will be followed. Overall, the effects on fish and fish habitat are expected to be negligible.

5.4.8 Flora and Fauna and Habitat

Development of the New Annan Quarry will remove some existing terrestrial forest ecosystem in the footprint of the quarry. The quarry footprint is relatively small in relation to large surrounding forested areas, and the effect on the overall distribution and quality of forests will be minor. Most of the area proposed for the quarry has been recently clear-cut, while other parts have second- or third-generation forest, having previously experienced stages of logging, and no terrestrial habitats which have conservation significance occur at the site. With time, areas no longer suitable for quarry operations will be remediated. A site reclamation plan which will be established as a requirement of the Industrial Approval. Plant and animal communities that arise in remediated areas will likely differ to some degree from those at present; however, a goal of reclamation will be to ensure that conditions (e.g., soil types and topography) are reasonably restored to pre-existing conditions, to allow natural communities to re-establish.

During recovery and revegetation of abandoned areas, the seeding in and succession of local forest species will provide habitat for a moderate diversity of animal species which will change with time. Preferred wildlife management practices regarding forest clearing which is required to develop the quarry, such as avoidance of cutting or major clearing activities during critical breeding periods of songbirds from mid-April to mid-September, will reduce harm to nesting birds in forest areas. Development of the New Annan Pit expansion area will result in only a comparatively small loss of coverage of natural and mature forest stands in the area, spread over many years, and is expected to have comparatively small impact on interior forest birds and wildlife. During normal operations, modified areas of the quarry offer potential nesting sites for certain species of birds and other wildlife, including hunting spaces for species such as owls and nesting for ground nesting birds such as nighthawks. Quarry employees will be educated on the need to check areas for activity and nests including both ground- and tree-nesting birds, before undertaking activities which would disturb established surfaces. Night operations and use of lights have various effects, including attracting insects which otherwise would need darkness to mate and reproduce; light pollution is considered to be a principal factor globally in decline of songbird populations, through declines in populations of some insects. Migrating birds are expected to pass over the site on their southward

migration; if night-time operations are required, directional lighting will be used which focuses downward and below the normal horizon, to limit visibility by birds and insects from a distance.

5.4.9 Species at Risk

No federally or provincially-listed species at risk, or species more sensitive than S3 ranking (vulnerable), were found in the study area. Two provincially listed S3 plant species (Rosy Sedge and Blunt Broom Sedge) were present in wetland areas within the property but outside the current developed area and the area proposed for quarry development; and two lichen species with a conservation status of S3S4. No fur-bearing mammals of conservation importance have been recorded within the vicinity of the site although Canada Lynx (Provincially listed as endangered) has been trapped incidentally in the broader, Colchester County area. The quarry is not expected to have a significant potential for impacting fur-bearing mammals or their habitat. One exception is Mainland Moose (listed Provincially as endangered) which have been observed occurring within 4.6 kilometers of the study site and a track observed during the one of the surveys in May. The study area is within a Special Management Practice Zone for moose (i.e., a moose concentration area and area of core moose habitat). A Wildlife Management Plan – including mitigation for mainland moose – will be developed as part of the subsequent Industrial Approval process.

Common Nighthawk, a ground-nesting bird species, which potentially could nest in grubbed and marginal but open areas of the quarry, was not detected at the site; periodic nighthawk surveys during operation of the quarry would aid in mitigating potential impacts. Activities such as logging and site clearing if scheduled outside the April to mid-September nesting period for breeding birds would lessen potential impact on bird species. Lights if used during night operations during nesting and migration periods would attract various bird species and insects, which could include species at risk. Lighting used at the site will focus downward and below the normal horizon, to limit visibility from a distance, and lessen the impact on migrating birds.

5.4.10 Natural Areas and Wilderness

Natural areas in the vicinity of the site such as the Gully Lake Wilderness Area are appreciated by locals and tourists alike. The proposed development of the New Annan Quarry is located on private lands, and will affect a small proportion of the natural landscape at the site, in an area that has been actively logged, and is not in any protected area. Consequently, it will have a negligible effect on visitors to the area who are looking for nature experiences and on the perception of wild, untouched landscapes such as the Gully Lake Wilderness area. Dexter is committed to minimizing effects of the quarry. The proposed quarry expansion is not expected to result in increases to traffic, noise, dust and light over those experienced during past use. The impact on natural areas and wilderness is expected to be low. Normal procedures such as dust control and light management will help to minimize impacts on natural and wilderness values at the site.

6 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

The New Annan Quarry will be affected principally by extreme weather, in particular occurrence of high rainfall and snow melt events leading to erosion and high flows in adjacent watercourses; high winds leading to the resuspension of dust; and elevated temperatures.. An erosion and sediment control plan will be developed as part of the subsequent Industrial Approval process. Aggregate and other rock products stored at the site are stable under varying conditions of rainfall and wind. Integrity of any runoff management structures at the site will be maintained and appropriately designed to reduce the likelihood

of catastrophic failure. Changing climate may increase the operating season for transportation projects, and the need for aggregates produced by the quarry.

7 CUMULATIVE EFFECTS

Cumulative effects are effects of a project that are likely to result in combination with other physical activities that have been or will be conducted (IAA 2023). Relative importance of particular cumulative effects is determined using similar criteria to those of individual impacts of projects, which are often socially perceived limits, such as acceptable geographic extent of the effect relative to available land or habitat type in a particular area.

Development of the New Annan Quarry will have minimal cumulative effects on most environmental features (Valued Environmental Components, VECs), in part because of the small size of the development relative to other similar uses of the area, and because the pit is expected to be reclaimed at the end of its useful life. One other aggregate pit operates occasionally on Old Truro Road near the New Annan Quarry site. Other than the addition of blasting and the gradual increase in the total operational footprint of the site, site activities are not planned to change in scope or increase in frequency from past use. Considering the limited aggregate demand within the local market, it is expected that although both sites could be active to supply local market needs at various times, it is unlikely that both would be active at the same time. Reduction in forest cover at the site will compound the overall effects of forestry and land-clearing for the area. Planned restoration of the quarry site to natural conditions after the useful life of the quarry will, in the long term, counteract the effect of present forest loss.

At the proposed 17.42 ha maximum size of New Annan Quarry, it will occupy less than 0.1% of the land within 10 km, and approximately 21% of the 84.7 ha already developed for gravel pits and quarries within a 10 km radius of the site (e.g. gravel pits, quarries, gypsum mines or other areas which involve modifying the landscape for industrial development) (Nova Scotia Forest Inventory. 2013). The development area would remove previously clear-cut and regenerating forest, which will result in a reduction of about 0.1% of the approximately 22,779 ha of forest (natural and clear-cut) occurring within the same 10 km radius (NS Forest Inventory 2013). Together the adjacent gravel pit and several other abandoned gravel pits along the Old Truro Road within 1 km, occupy 5.6 ha and the combined total is small overall. In comparison, land developed for agriculture, which includes sugar bush, old field, and blueberry fields, occupy 474 ha, and the proposed quarry development area is 3.7% of this area. Apart from the increased footprint of the quarry, the combined operations would be at current activity levels and associated impacts on air quality, noise and traffic, experienced by residents on Old Truro Road and Balmoral Road, will be small. Therefore, the cumulative effect of the quarry and other local activity is not expected to change and will be negligible.

Table 13. Potential interactions between project activities and operations and Valued Environmental Components (VECs) for New Annan Quarry.

General Category of VEC	Biophysical								Socioeconomic											
Project Component (potential interactions shown by ✓)	Air Quality, Noise and Light	Groundwater & Hydrology	Water Quality	Aquatic Environments and Wetlands	Natural Areas & Wilderness	Fish and Fish Habitat	Flora & Fauna Species & Habitat	Species at Risk	Mi' Kmaq	Human Health	Cultural/Historical	Recreation, Tourism & Viewscape	Residential Use	Recreational, Commercial & Mi' kmaq Fishing	Water Supplies/ Residential Wells	Land Use and Value	Transportation	Commercial /Industrial Use	Parks & Protected Areas	Forestry Hunting /Trapping
Construction																				
Site Acquisition, Use/Removal of Resources	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓		✓
Site Clearing/Grubbing	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓			✓				✓	✓
Drilling	✓	✓			✓			✓	✓			✓			✓				✓	
Blasting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓				✓	
Lights	✓				✓		✓	✓	✓	✓		✓	✓						✓	
Operation																				
Moving/Transporting Rock and Product	✓				✓		✓		✓	✓		✓	✓			✓	✓	✓	✓	
Crushing	✓				✓				✓	✓		✓	✓						✓	
Washing		✓	✓	✓		✓			✓											
Lights	✓				✓		✓	✓	✓	✓		✓	✓						✓	
Site Runoff Management		✓	✓	✓		✓			✓					✓	✓					
Portable Asphalt Plant	✓				✓		✓		✓	✓		✓	✓						✓	
Onsite Materials Storage			✓	✓					✓						✓					
Accidents (Fires/Oil & Fuel Spills)	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓		✓				✓	✓

Table 14. Summary of impacts and mitigation on Valued Environmental Components, New Annan Quarry.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
BIOPHYSICAL COMPONENTS						
Air Quality, Noise & Light	Construction	Noise and dust from heavy equipment during logging and grubbing.	Significant	Negative	Schedule activity to avoid peak periods of use by residents in the local community. Take steps to reduce noise sources such as engine braking.	Not significant.
		Drilling and blasting.	Significant	Negative	Monitor noise levels and undertake to avoid exceedances of regulatory levels.	Not significant.
		Light from the quarry can be seen in neighbouring areas.	Significant	Slight, negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry during night operations.	Not significant.
	Operation	Drilling and blasting; equipment for moving rock; crusher; heavy equipment operation; air-borne emissions from asphalt plant.	Significant	Negative	Monitor noise levels and undertake to avoid exceedances of regulatory levels. Institute measures for dust control. Monitor and maintain asphalt plant to minimize emissions.	Not significant.
		Light from the quarry can be seen in neighbouring areas.	Significant	Slight, negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry at night.	Not significant.
		Dust from trucks on Truro Road	Significant	Slight, negative	Consider use of dust suppressant surfacing of Truro Road in vicinity of seasonal residences.	Not significant.
		Noise from trucks on Truro Road	Significant	Slight, negative	Instruct truck drivers to avoid use of engine braking on Truro Road.	Not significant.
Groundwater/ Hydrology	Construction	Forest and soil removal changes surface and ground water flow levels and patterns.	Negligible	Negative	Use site runoff management to minimize impacts. Likely changes in groundwater and runoff patterns will be small.	Not significant.
	Operation	Blasting fractures bedrock, disturbs till, and changes groundwater flow patterns.	Significant	Negative	Drilled wells in bedrock and surface wells can be disturbed. Monitor groundwater quality and movement to determine changes.	Not significant.
	Operation	Quarry and work areas change surface water flows. Increased peak stormwater flows. Washing product creates silt-laden surface flows.	Significant	Negative	Onsite water management to moderate extreme surface water runoff and suspended sediment levels; measures to maintain normal flow regime.	Not significant.

Table 14. Summary of impacts and mitigation on Valued Environmental Components, New Annan Quarry.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
	Operation	Accidental Hydrocarbon spills and blasting residues contaminate groundwater.	Significant	Negative	Measures to minimize danger of spills; onsite emergency numbers, spill kits etc. Avoid refueling near watercourses.	Not significant.
Water Quality	Construction	Altered surface water flows and turbidity, hydrocarbons from heavy equipment in watershed flowages.	Negligible	Negative	Erosion and sedimentation controls in work areas. Onsite water management to moderate surface water runoff and suspended sediment levels.	Not significant.
	Operation	Dust & suspended sediment from operations; hydrocarbons from vehicles, potentially enters local watershed. Chemicals (e.g. nitrates) from explosives entering runoff.	Significant	Negative	Onsite dust control and water management to moderate surface water runoff and suspended sediment levels. Erosion & sedimentation controls. Plan and BMP for hydrocarbon management at site. Closely monitor chemical residues after blasting.	Not significant.
	Operation	Water chemistry changes in runoff from materials stored on site. Erosion of stored materials.	Negligible	Negative	Control types of materials stored at site. Monitor settling ponds; storm-water management.	Not significant.
Natural Areas & Wilderness	Construction & Operation	Presence of quarry, emissions, dust etc., detracts from public perception of wild quality of area.	Negligible	Negative	Area affected is small in relation to remaining natural areas, although previous forestry has diminished value of natural areas and wilderness. Attempt to minimize footprint. Manage releases of dust and light, and control noise.	Not significant.
Freshwater Aquatic Environments	Construction	Potential for occurrences of high suspended sediments and nutrient levels in runoff from the site.	Negligible	Negative	Preserve wooded buffer areas adjacent to wetlands and watercourses. Onsite water management and sedimentation controls to moderate surface water runoff and suspended sediment levels.	Not significant.
	Operation	Some of the runoff from the area is retained for site operations; or lost through evaporation.	Negligible	Negative	Maintain forested buffers. Onsite water management to stabilize flow pattern. Minimize unvegetated areas.	Not significant.

Table 14. Summary of impacts and mitigation on Valued Environmental Components, New Annan Quarry.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
	Operation	Higher peak flows and suspended sediment during activities.	Significant	Negative	Onsite water management. Preserve woodland in buffer areas of quarry.	Not significant.
	Operation	Runoff from access roads.	Negligible	Negative	Use of ditching and artificial channels, to carry peak flows and additional site runoff. Sedimentation controls.	Not significant.
	Operation	Releases of chemicals from blasting; accidental releases of lubricants etc.; and runoff from materials stored on site.	Negligible	Negative	Isolate and treat runoff from work areas and stored materials. Lubricant management on site.	Not significant.
	Construction & Operation	Routine releases and accidental spills of hydrocarbons on site.	Significant	Negative	Provide pollution prevention and emergency measures.	Not significant.
Wetlands	Construction	Potential for some surface runoff to enter wetlands on the headwater tributary of Fourmile Brook	Significant	Negative	Onsite runoff management to minimize suspended sediment and releases of contaminants.	Not significant.
	Operation	Dust, nutrient inputs from runoff, changes to hydrology, changes to forest communities.	Negligible	Negative.	Maintain a significant forest buffer; maintain hydrological regime, employ site water management.	Not significant.
Fish & Fish Habitat	Construction	Change runoff patterns at site in local and adjacent watersheds.	Negligible	Negative	Avoid the headwater tributary of Fourmile Brook at the site. Maintain forested buffer around wetlands and streams.	Not significant.
	Operation	Site runoff management and water use affects hydrological and groundwater regime.	Negligible	Negative	Ensure the runoff from the site is managed to moderate flow and minimize downstream impacts on fish habitat.	Not significant.
	Construction & Operation	Nominal releases of oils, hydraulic fluids etc. from operating equipment. Accidental spills of hydrocarbons on site.	Negligible	Negative	Maintain equipment to minimize loss of lubricants and fuels. Provide pollution prevention and emergency measures.	Not significant.
	Operation	Accidental spills into watercourses from truck highway accidents.	Negligible	Negative	Recommend truck traffic use safe driving practices and reduce speed in vicinity of quarry and along Truro Road. Provide suitable pollution prevention and emergency measures.	Not significant.
Terrestrial Flora & Fauna & Habitat	Construction	Removal of Existing Communities	Negligible	Negative	Communities removed have all been previously developed / modified. Restore damaged and	Not significant.

Table 14. Summary of impacts and mitigation on Valued Environmental Components, New Annan Quarry.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
					unused parts of the site (e.g. grubbing's and waste rock piles) as soon as possible. Long-term site rehabilitation plan developed with NSECC. Cut forest short term only as needed to expand quarry.	
	Construction & Operation	Accidental releases, contamination of habitat.	Significant	Negative	Provide pollution prevention and emergency measures & response capability. Remediate any areas affected by spills.	Not significant.
		Artificial light from operations influences movements of birds and other animals	Significant	Negative	Avoid night operations. If necessary to work at night, use directional lighting with downward focus to minimize light leaving the quarry. Avoid migratory periods for bird	Not significant.
		Removal of potential forest and wildlife resource (i.e. wildlife habitat)	Negligible	Negative	Small area affected relative to total available. Minimize footprint of quarry. Restore and rehabilitate areas not used. Leave mature standing trees where possible as nest cavities.	Not significant.
		Quarry affects wildlife movement patterns and connectivity of habitats.	Significant	Negative.	Restoration should include consideration for wildlife movement through the restored site.	Not significant.
Species at Risk	Construction	Water quality impacts affect downstream areas in watersheds with Atlantic salmon and Black-Nose Dace.	Significant	Negative	Best management practices for management of runoff from the site.	Not significant.
	Operation	Sound from blasting can harm bats and birds.	Negligible	Negative	Minimize blasting activity and concentrate in spring and fall (outside breeding and migratory periods) when species are absent.	Not significant.
		Light influences movements of species at risk birds migrating overland.	Significant	Negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry.	Not significant.
		Moose may encounter highwalls and steep slopes	Significant	Negative	Provide wildlife fencing to isolate active areas. Monitor moose activity.	Not Significant
		Increased risk of vehicle collisions with Moose	Significant	Negative	Post roads in the area with warning signs for moose.	Not Significant

Table 14. Summary of impacts and mitigation on Valued Environmental Components, New Annan Quarry.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
					Warn truck operators of potential Moose activity.	
		Open areas and grubbing piles occupied by nesting species such as nighthawks.	Significant	Negative	Educate personnel to look for bird life prior to activities; periodically conduct nesting bird survey at site to identify bird issues.	Not significant.
SOCIOECONOMIC COMPONENTS						
Mi'kmaq	Construction and Operation	Any land use conflicts with Mi'kmaq Right to Use Land	Significant	Neutral	Consult with Mi'kmaq in developing quarry.	Not significant.
		Contamination and alteration of flow regime of streams may affect fish populations potentially used by Mi'kmaq.	Negligible	Negative	Employ surface water monitoring program. Use Best Management Practices for quarries. Avoid accidental releases of contaminants. Avoid vehicle accidents.	Not significant.
Archaeological, Cultural and Historical Significance	Construction	Expansion may affect undiscovered artifacts.	Not significant	Negligible	Unlikely that artifacts occur at site. Minimize project footprint. Halt operations and notify NS Department of Communities, Culture, Tourism & Heritage if artifacts found.	Not significant.
Recreation	Construction & Operation	Quarry traffic interacts with local recreational use of roads and trails by ATVs and snow- mobiles.	Not significant	Negative	Users will be aware of activity at quarry but will not be otherwise impacted. Access roads gated to prevent unauthorized use. Post signage indicating site hazards and private property restrictions.	Not significant.
Tourism and Viewscape	Construction & Operation	Presence of quarry affects public perception of landscape character.	Negligible	Negative	Quarry is remote and cannot readily be seen from road. Maintain a clean operation. Rehabilitate areas no longer needed for activity and future development.	Not significant.
Residential Use	Construction & Operation	Noise; light pollution; dust; operation of trucks and transportation of heavy equipment on Truro Road.	Significant	Negative	Use best management practices to reduce disturbance. Inform residents about quarry operations. Provide community with safety information and signage for truck traffic.	Not significant.
Recreational and Mi'kmaq	Construction & Operation	Accidental hydrocarbon spills and blasting residues contaminate surface waters.	Negligible	Negative	Provide pollution prevention, emergency measures & response capability. Identify and	Not significant.

Table 14. Summary of impacts and mitigation on Valued Environmental Components, New Annan Quarry.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
Hunting and Fishing					control contaminant releases.	
	Construction	Loss of forested area under quarry footprint.	Not significant	Negative	Rehabilitate areas no longer needed for activity and future development. Minimize cutting outside quarry footprint.	Not significant.
Water Supplies & Residential Wells	Construction and Operation	Blasting potentially impacts local aquifers.	Not significant	Negative	Develop groundwater-monitoring plan in consultation with NSECC. Consult with residents on Truro Road concerning water supply issues.	Not significant.
		Tatamagouche Water Supply Watershed	Not Significant	Negative	Quarry is in separate watershed and aquifers likely not connected. No mitigation needed.	Not significant.
Land Use and Value	Construction & Operation	Removal of potential forest and wildlife resource (e.g. forestry & trapping).	Not significant	Negative	Small area affected relative to total land available. Minimize footprint of quarry. Restore and rehabilitate areas not used.	Not significant.
Transportation	Operation	Wear on Truro Road	Negligible	Negative	Assist in road maintenance.	Not significant.
	Operation	Collisions with trucks and equipment on adjacent roads & highways.	Significant	Negative	Set low speed limit for trucks on Truro Road to avoid collisions with vehicles of seasonal residents. Use good directional signs for slow moving vehicles, and speed policy in vicinity of quarry. Safety training for truck drivers.	Not significant
Industrial & Commercial Use	Operation	Competition with other quarries.	Negligible	Neutral	Quarry operations are in a competitive environment; cooperate if possible.	Not significant.
		Blasting on Wind turbines	Not significant	Negative	Sufficient separation from Nuttby Mountain to have no effect. No mitigation needed	Not significant.
Resource Use Forestry, Hunting & Trapping	Construction & Operation	Removes woodland; game habitat.	Not significant	Negative	Relatively small area is used.	Not significant.

Table 14. Summary of impacts and mitigation on Valued Environmental Components, New Annan Quarry.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
Parks and Protected areas	Construction & Operation	Gully Lake Wilderness Area	Not significant	Neutral	Employ best management practices for all aspects of quarry operation, in particular control of noise, light, dust and particulate emissions, and odours leaving the site.	Not significant.
Human Health	Construction	Release of dust containing hazardous materials.	Significant	Potentially impacts worker health.	Monitor rock for occurrence of hazardous materials, in particular uranium, and do not operate in, or avoid, areas if uranium is detected. Implement Health and Safety Limits for dust exposure.	Not Significant.
		Noise from operations and vehicle traffic may impact workers and the general public.	Significant	Potentially impacts worker health. Health effects to public through long-term exposure to noise.	Employ Health and Safety measures such as hearing protection. Place limits on operating hours, vehicle speeds, engine braking etc.	Not Significant.
	Operation	Release of dust containing hazardous materials. Hazardous materials reaching groundwater.	Significant	Potentially impacts worker health; levels in product impacts health of users. Contamination of groundwater.	Monitor rock for occurrence of uranium and do not use if detected. Monitor groundwater and institute treatment if necessary to reduce levels.	Not Significant.
		Noise impacts workers and the general public.	Significant	Potentially impacts worker health. Health effects through long-term exposure to noise.	Health and Safety measures such as hearing protection. Place limits on operating hours, vehicle speeds, engine braking etc.	Not Significant.

8 MONITORING

Environmental Assessment approval for the proposed expansion will result in monitoring and environmental management requirements being placed in the amended Industrial Approval. Monitoring programs are intended to validate the environmental mitigation strategies which will be developed by Dexter and implemented at the site. Monitoring programs will include:

- Surface water monitoring for water quality in local water resources which may be impacted by the quarry;

- Groundwater monitoring of hydrogeological conditions and groundwater quality;
- Blast monitoring (noise and concussion) for all blasting events conducted at the site;
- Noise monitoring (at NSECC request through Industrial Approval);
- Dust monitoring (at NSECC request through Industrial Approval); and
- Additional monitoring for select species and/or other environmental features (as necessary).

9 PUBLIC CONSULTATION

In addition to contacts with members of the community already made by Envirosphere in developing this assessment, the Proponent will be consulting with elected government officials, and engaging with the Mi'kmaq of Nova Scotia about the project and its implications, and about plans for development at the site.

10 PERSONAL COMMUNICATIONS

Ruth Newell, Botanist, October 11, 2024 | email correspondence.

Chris Pepper, Lichenologist, August 12, 2024 | email correspondence.

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12 LIMITING CONDITIONS

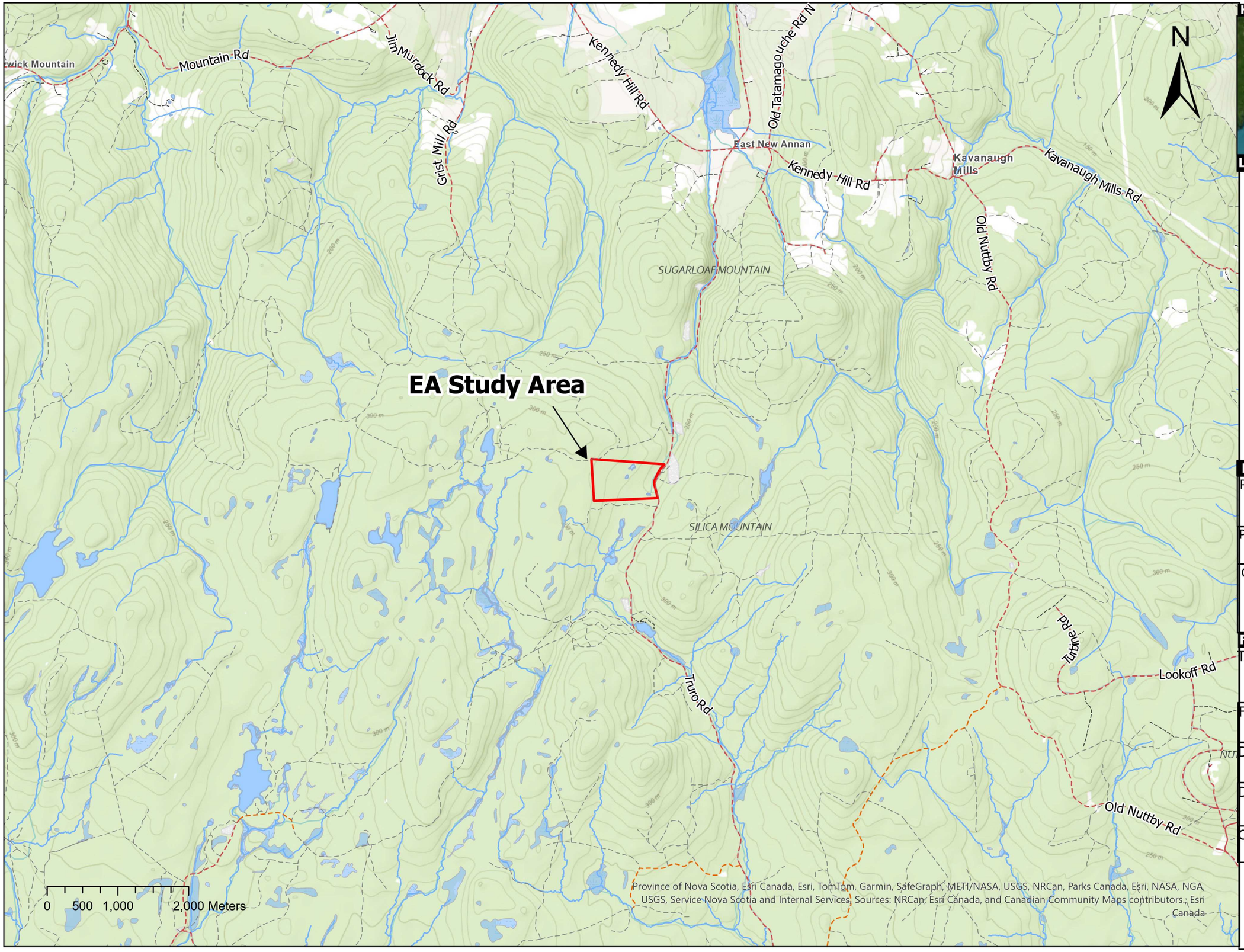
The American Society for Testing and Materials Standards of Practice and the Canadian Standards Association state that no environmental assessment can wholly eliminate uncertainty regarding the recognition of potential environmental liabilities. The intent of the assessment is to reduce, but not eliminate, uncertainty regarding projects, giving reasonable limits of time and costs.

The conclusions of this report are based in part on the information provided by others, which is assumed to be correct. The potential exists that unexpected environmental conditions may be encountered at the site and with the project, not specifically investigated. Should this occur, the proponent and regulatory authorities must be notified so that we may decide if modifications to our conclusions are necessary.

The findings of this investigation are based on research and investigations conducted in October 2023-October 2024 and the generally accepted assessment practices of our industry. No other warranty is made.

APPENDIX A

MAPS



Legend:

- Local roads
- Seasonal
- Resources Access Road
- Waterbody
- Watercourse
- Study Area

Project:

Project:
New Annan Quarry Expansion

Project No.:
23-004

Client:
Municipal Enterprises Limited

Figure:

Title:
Topography

Figure No.:	Revision No.:
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Drawn By: **K. Scott**	Checked By: **H. Levy**
Created Date: **2024-10-30**	Revision Date: **2024-10-30**

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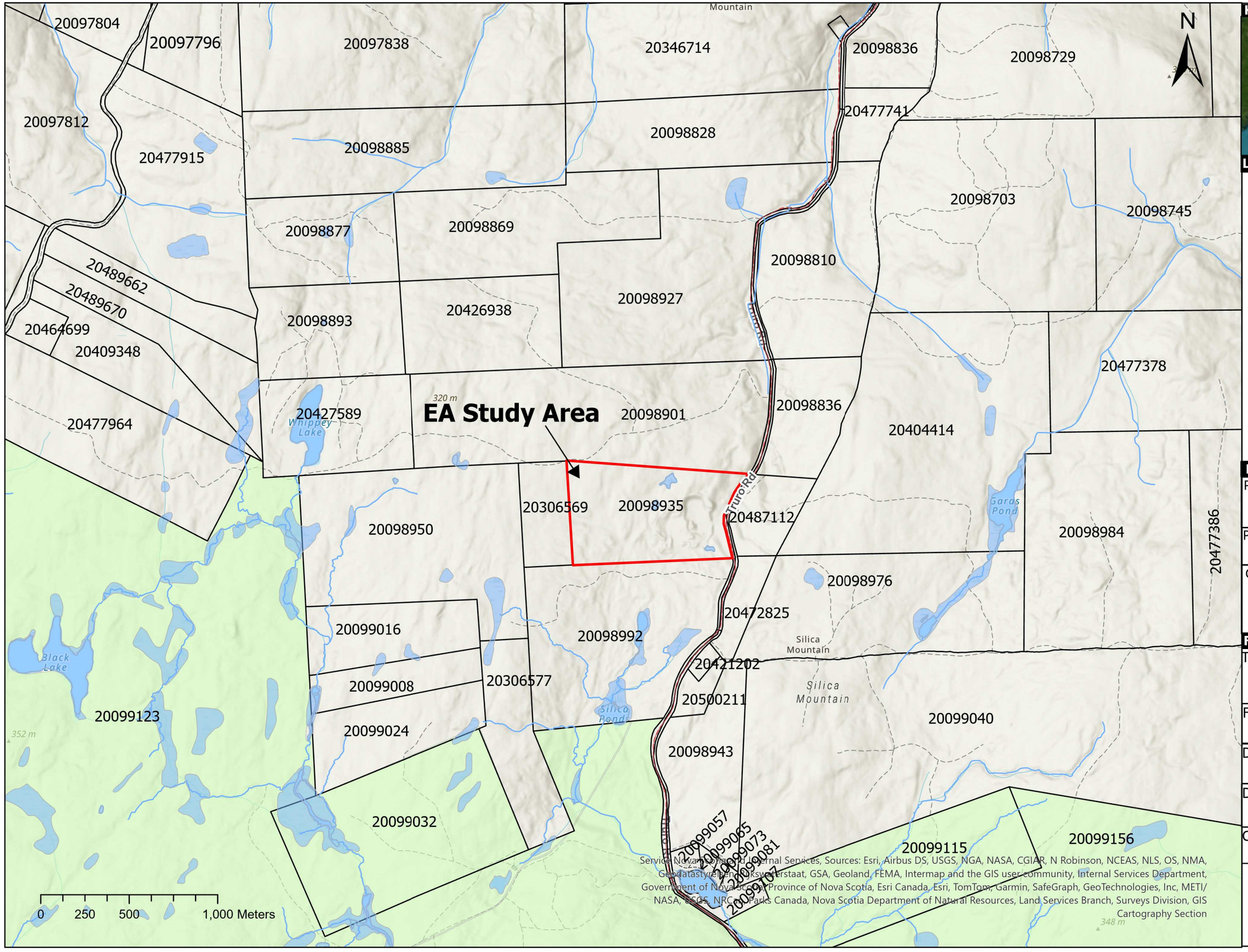


Project:

Project:
New Annan Quarry Expansion

Project No.:
23-004

Client:
Municipal Enterprises Limited

Figure:

Title:
Property

Figure No.:	Revision No.:
A-2	**0**
Datum: **NAD 83 CSRS**	Projection: **UTM Zone 20 North**
Drawn By: **K. Scott**	Checked By: **H. Levy**
Created Date: **2024-10-30**	Revision Date: **2024-10-30**

MUNICIPAL ENTERPRISES LTD

Envirosphere CONSULTANTS LIMITED

EA Study Area

Truro Rd

Truro Rd

N

0 275 550 1,100 Meters

Service Nova Scotia and Internal Services, Internal Services Department, Government of Nova Scotia, Maxar

Key Map:

Legend:

- Study Area
- Local Road
- Seasonal
- Natural Stand
- Treated Stand
- Wind Throw
- Plantation
- Brush
- Alders
- Clear Cut
- Wetlands General
- Open Bogs
- Treed Bogs
- Old Field
- Urban
- Gravel Pit
- Rail Corridor
- Lake Wetland
- Inland Water

Project:

Project:
New Annan Quarry Expansion

Project No.:
23-004

Client:
Municipal Enterprises Limited

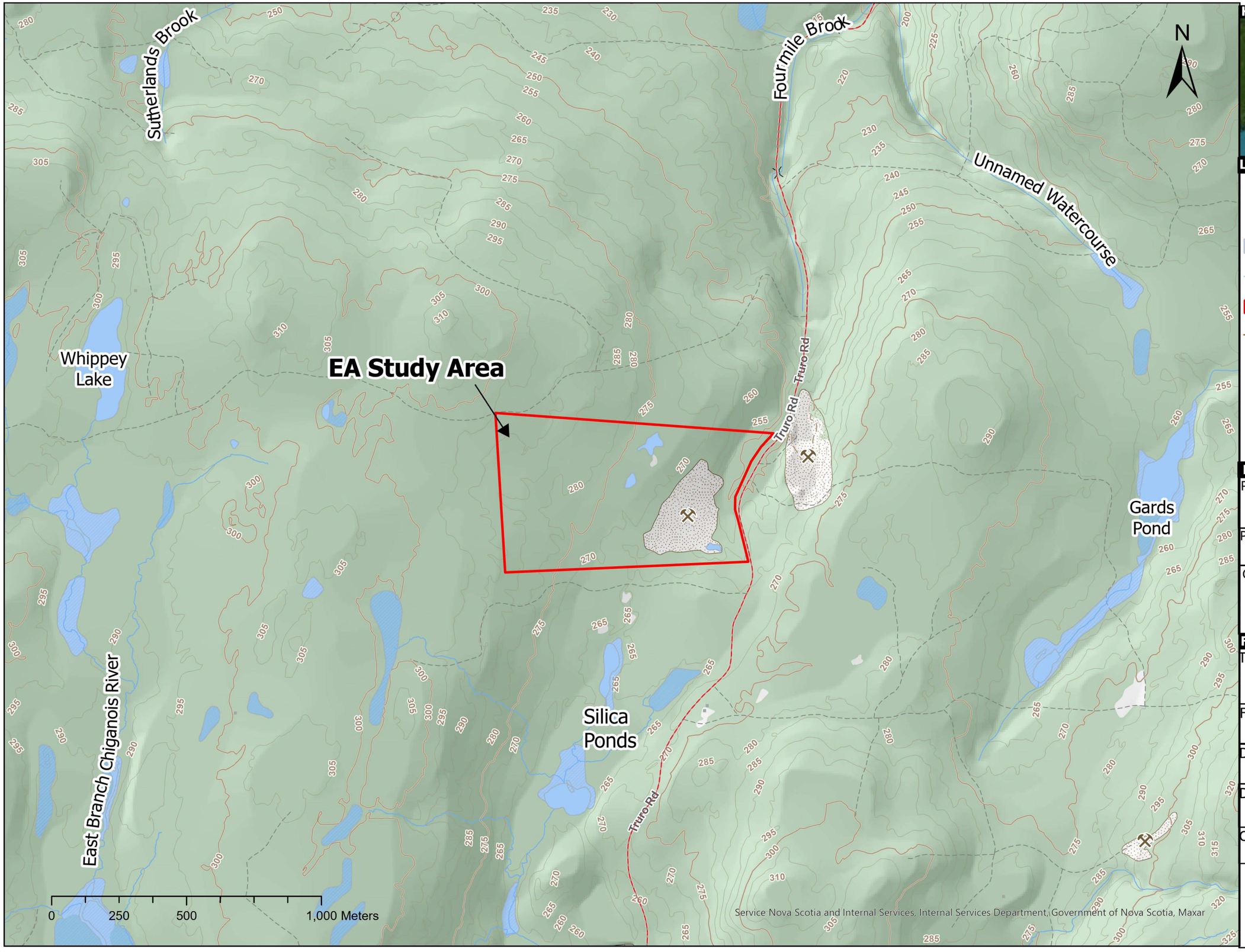
Figure:

Title:
Forestry

Figure No.:	Revision No.:
A-3	**0**
Datum: **NAD 83 CSRS**	Projection: **UTM Zone 20 North**
Drawn By: **K. Scott**	Checked By: **H. Levy**
Created Date: **2024-10-08**	Revision Date: **2024-10-08**

MUNICIPAL GROUP OF COMPANIES

Envirosphere CONSULTANTS LIMITED



Key Map:

Legend:

- Local Road
- Seasonal
- Waterbody
- Watercourse
- EA Study Area
- Contour (5m)

Project:

Project:
New Annan Quarry Expansion

Project No.:
23-004

Client:
Municipal Enterprises Limited

Figure:

Title:
Site Features

Figure No.:	Revision No.:
A-4	**0**
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Drawn By: **K. Scott**	Checked By: **H. Levy**
Created Date: **2024-10-31**	Revision Date: **2024-10-31**

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APPENDIX B

BOTANICAL SURVEYS

Fall and Spring Botanical Surveys for a Proposed Quarry Expansion in East New Annan, Colchester County, Nova Scotia

Ruth E. Newell, B.Sc. (Hons.), MSc.

August 7, 2024

Introduction

Fall and spring vascular plant surveys were conducted at the site of a proposed quarry expansion in East New Annan, Colchester County, Nova Scotia, on October 3rd, 2023, and June 19th, 2024, by botanist Ruth E. Newell, B.Sc. (Hons.), M.Sc. Observations from these surveys are presented in this report.

The survey area is indicated by the yellow boundary line shown in Figure 1.

Primary habitats present within the survey area include (1) four wetlands, all consisting of relatively small ponds and associated marshes (Figs. 1, 2, 3, 4, 5, 6, 7, 8 & 9, (2) woodland, including primarily mixed woodland (Fig. 10), coniferous woodland (Fig. 11) and deciduous woodland (12) and the open quarry pit (Fig. 13).

A large clearcut is present at the west end of the survey area (Fig. 1). This highly disturbed area was not examined during this survey but is assumed to have had a similar species complement to the mostly intact woodland remaining on site.

Figure 1. The East New Annan Quarry property showing the currently existing quarry pit and a large clearcut area west of the quarry).

All vascular plants observed during this survey as well as the habitats in which they occur and both their provincial general status ranks and the Atlantic Canada Conservation Data Centre (ACCDC) subnational status ranks are provided in APPENDIX 1 at the end of this document. Information on these status ranks including status rank definitions can be found on the Wild Species 2015, The General Status of Species in Canada website

(https://www.wildspecies.ca/) and the Atlantic Canada Conservation Data Centre (ACCDC) website (http://www.accdc.com).

Results

Habitat Descriptions

Wetlands

Locations of ponds and their associated marshes: (20T 0476764 5047554; 20T 0476700 5047474; 20T 0476885 5047318; 20T 0476958 5047374)

Four ponds were observed on the quarry property, two north of the open pit, one southeast of the pit and one east of the pit (Fig. 1).

The largest pond/wetland present within the survey area is located north of the quarry pit near the northern boundary line (20T 0476764 5047554) (Figs. 2 & 3). Vascular plant species observed along the shoreline and within the pond during the Fall survey include Common Woolly Bulrush (*Scirpus cyperinus*), Sensitive Fern (*Onoclea sensibilis*), Red Maple (*Acer rubrum*), Cinnamon Fern (*Osmundastrum cinnamomeum*), Canada Manna Grass (*Glyceria canadensis*), Crested Wood Fern (*Dryopteris cristata*), willows (*Salix* spp.) and Common Winterberry (Ilex *verticillata*).

Additional species observed during the Spring survey included Marsh Skullcap (*Scutellaria galericulata*), Nodding Sedge (*Carex gynandra*), Inflated Sedge (*Carex vesicaria*), and Harlequin Blue Flag (*Iris versicolor*).