however, there were scattered large diameter tolerant hardwood trees with decay features that may provide suitable habitat adjacent to the study area. American Marten have not been reported by the ACCDC within 100 kilometers of the quarry, and fisher have been reported approximately within 7 kilometers of the study area. No indications of predators such as Bobcat (*Lynx rufus*) were observed. Bobcat generally prefer mature softwood cover at lower elevation; wet areas frequented by Snowshoe Hare. Even though Snowshoe Hare were present at the study site, the general elevation of the site and absence of good prey species habitat suggests that bobcat would not be common.

Rodents and other small mammals potentially utilizing the area include White-Footed Mouse (*Peromyscus leucopus*), and Deer Mouse (*Peromyscus maniculatus*). The absence of larger mature trees with cavities and cracks in the bole would likely preclude the presence of Northern Flying Squirrel (*Glaucomys sabrinus*) on site but the presence of these habitat features in adjacent forest stands suggests that the species may be present off-site. The lack of abundant coarse woody material and late seral conditions would suggest that the Red-Backed Vole (*Myodes gapperi*) and Woodland Jumping Mouse (*Napaeozapus insignis*) are not present, or not present in any significant numbers. Insectivores such as shrews (*Blarina* sp., *Sorex* spp.) are most common where there is complex ground cover and coarse woody material present. Long-Tailed Shrews (*Sorex dispar*) are uncommon to rare in Nova Scotia, and are associated with late seral-closed canopy hardwood forests on talus slopes (Woolaver and Elderkin 1998). This habitat does not exist at or adjacent to the quarry site so it is unlikely that this species occurs at this location. ACCDC records indicate one record of Long-Tailed Shrew approximately 48 km from this site. The limited occurrences of wetlands and watercourses indicates that aquatic furbearers normally associated with these habitats are not common. There was no evidence of furbearers other than Eastern Coyote within the study site however, nearby drainages, wetlands, and watercourses such as the Salmon River would provide suitable habitat for several species. Streams in the general vicinity would be used as a travel corridor for River Otter (*Lutra canadensis*), Mink (*Neovison vison*), and Raccoon (*Procyon lotor*). There are no natural waterbodies to support beaver (*Castor canadensis*), or muskrat (*Ondatra zibethica*), but beaver had been present incidentally in the pond on the northeast corner of the property. Forested upland habitats in the vicinity of the project would provide suitable habitats for Short-Tailed Weasel (*Mustela erminae*) (Appendix C).

Three endangered bat species, Little Brown Bat (*Myotis lucifugus*), Northern Myotis Bat (*Myotis septentrionalis*) and the Tri-coloured Bat (*Perimyotis subflavus*) which were formerly relatively common throughout Nova Scotia, are now federally and provincially listed as endangered due to recent population declines due to a fungus infection (White Nose Syndrome). Distributions are centred in areas where there are overwintering sites (hibernacula-where bats overwinter and raise young) which are not infected. Hibernacula are typically located in abandoned mine shafts, caves and old buildings. There are four abandoned mines within five kilometers of the quarry (Nova Scotia 2022. Bat surveys were not conducted as part of the survey protocol; however the site lacks caves or mature and old stands containing standing deadwood structures (e.g. snags and cavity trees) which could support summer roosting. The wetlands and the pond at the north end of the site, would be used by bats if they were present. ACCDC records show that none of the three endangered bat species in Nova Scotia were recorded closer than 14 kilometers from the quarry, and is very likely that bats do occur closer to where foraging and nesting sites occur (e.g. wet areas, large diameter of old and dead trees) (Appendix C). There is not likely to be a cave which can serve as a hibernaculum at the site and none were observed incidentally as part of site surveys. From hibernacula bats

range widely in the summer, localizing in areas with a good food supply. Because of low population numbers overall, occurrences of significant numbers of roosting and feeding individuals in any areas in particular are unlikely (Appendix C).

4.2.8 Reptiles and Amphibians

Some of the common Nova Scotian amphibians and reptiles are expected to occur at the Kemptown Quarry and many were observed. A site reconnaissance survey conducted on August 8, 2023 observed two Green Frog, salamander larvae and tadpoles located within the narrow elongated pond north of the quarry. As well, Northern Spring Peeper (*Pseudacris crucifer*) calls could be heard off site during the time of the survey and in the vicinity of the north pond during the owl surveys. Several provincial snake species are reported to occur in cutover areas, along roadsides, and in abandoned gravel pits (Gilhen 1984). Similar habitats at or near the quarry area would indicate the potential presence of Maritime Garter Snake (*Thamnophis sirtalis*), Northern Redbelly Snake (*Storeria occipitomaculata*), and Eastern Smooth Green Snake (*Opheodrys vernalis*) in exposed sand, gravel, and waste areas, or deciduous forest adjacent to the proposed quarry (Gilhen 1984). These areas would be used for thermoregulation (i.e., basking), while adjacent habitats with more complex vegetation structure near water could also be used for foraging. There have been no known occurrences of either Wood Turtle, Snapping Turtle, or Eastern Painted Turtle reported by the ACCDC within several kilometers of the study area. Suitable habitat conditions for these species are not present in the vicinity of the quarry site. 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 study area (Appendix C).

Figure 31. Green Frog observed in the pond located at the north side of the quarry, August 8, 2023.

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[4]. 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 land owners for working near these species.

4.2.9.2 Database 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 Kemptown Quarry site include both animals and plants (Table 5). American Beech, which is provincially listed as S3/S4 (vulnerable) occurred in regrowth at the southwest corner on the site.

No federally or provincially listed bird species of conservation concern were observed during dedicated surveys at the study site in June 2023 and June 2024.The mixed woodland and hardwood habitats within the study site potentially support many of the 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 Bobolink, Canada Warbler, Chimney Swift, Common Nighthawk, Eastern Wood Pewee, Evening Grosbeak, and Olive-Sided Flycatcher.

Of these species, Olive-Sided Flycatcher (listed as threatened under the Federal *Species at Risk Act* and provincial *Endangered Species Act,* and as special concern by *COSEWIC*); and Canada Warbler (listed as

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

threatened under the Federal *Species at Risk Act;* as endangered under the provincial *Endangered Species Act;* and as special concern by *COSEWIC*) 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, both habitats which can be found at the Kemptown Quarry site. Olive-Sided Flycatcher has been observed 4.1 kilometers from the study site while the Canada Warbler has been recorded 3.6 kilometers from the study site (ACCDC 2024), but neither species was encountered during the breeding bird surveys.

Among the other listed species, Bobolink (listed as threatened under the Federal *Species at Risk Ac,* listed as vulnerable under the provincial *Endangered Species Act* and is listed as special concern by *COSEWIC*) typically occupies open fields, marshes, swamps, etc., but there is no suitable habitat at the quarry site. Chimney Swift (listed as threatened under the Federal *Species at Risk Act* and by *COSEWIC*, and listed as endangered by the provincial *Endangered Species Act*) prefer forested habitats for feeding, including areas with large hollow trees for nesting. Common Nighthawk (listed as threatened under the Federal *Species at Risk Act* and provincial *Endangered Species Act* and is listed as special concern by *COSEWIC*) nest in open areas with little ground vegetation including logged or burned over areas, forest clearings, rocky outcrops and peat bogs. Chimney Swift have been recorded within 7.1 kilometers of the quarry and Common Nighthawk have been recorded within 12 kilometers of the study site. There was no suitable nesting habitat for Chimney Swift and Common Nighthawk and the species were not observed during bird surveys at the site.

Evening Grosbeak (listed as special concern under the Federal *Species at Risk Act* and *COSEWIC* and listed as vulnerable under the provincial *Endangered Species Act*) and Eastern Wood Pewee (listed as special concern under the Federal *Species at Risk Act* and *COSEWIC* and listed as vulnerable for the provincial *Endangered Species Act*) prefer open, mature, mixed wood forests where fir species or White Spruce are dominant, and are unlikely to occur as most areas proposed for the quarry contain 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 5.7 and 1.9 kilometers from the study site, respectively (ACCDC 2024).

Other animals of conservation concern in this part of Nova Scotia include Mainland Moose (listed Provincially as endangered) which has been observed occurring within 5.3 kilometers of the study site; however, no moose or sign were seen during the June 2023 wildlife survey (Appendix C). 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. Eastern Painted Turtle (listed as special concern by COSEWIC and SARA), Wood Turtle (listed as threatened by *COSEWIC*, *SARA*, and *ESA*), and Snapping Turtle (listed as special concern by *COSEWIC* and *SARA*, and vulnerable by the *ESA*), have been documented as occurring within 2.9, 13, and 15.5 kilometers, respectively of the quarry although they are unlikely to occur in the study area due to the distance from suitable habitat including surface waters to support them (ACCDC 2024; Appendix C). The provincially endangered Monarch butterfly (*Danaus plexippus*), has been recorded in the general area (15.9 kilometers from the quarry); however the preferred habitat (open fields and meadows of wildflowers which support common milkweed), do not occur within the study area (ACCDC 2024). The provincially vulnerable Yellow-Banded Bumble Bee (*Bombus terricola)* has been observed in the general vicinity of the study area, 2.7 kilometers from the

quarry; however, preferred habitat types for these insects (including mixed woodlands, farmlands, urban areas, meadows, grasslands and boreal habitats, respectively), do not or infrequently occur at the study site (ACCDC 2023). 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 (Appendix C).

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 (ACCDC 2023). Little Brown Myotis (listed as endangered by *COSEWIC*, *SARA*, and *ESA*) has been recorded within 14.2 kilometers of the study area, while Northern Myotis and Tri-colored Bat (listed as endangered by *COSEWIC*, *SARA*, and *ESA*) have been recorded within 43 kilometers of the study area. The absence of mature trees and snags for roosting cover, as well as open water and bog wetland types for a source of aerial insects 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 quarry, the closest being 2.5 kilometers from the center of the study area (Nova Scotia 2021). 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 number of lichen species of conservation concern occur in the Province. The quarry development is not in an area of modeled occurrence of Boreal Felt Lichen; and most original forest cover had been removed through the recent clear-cut or was regenerated from previous logging, and consequently a lichen survey was not undertaken for the site.

A list of plants and animals of concern within a 5, and 100 kilometer radius of the study site is included in Appendix C.

Table 8. Records of species of concern within a five kilometer radius of Kemptown Quarry, Colchester County, Atlantic Canada Conservation Data Centre (ACCDC) Database, May 2023.

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]
FLORA							
Peltigeraceae	*Peltigera hydrothyria*	Eastern Waterfan	Threatened	Threatened	Threatened	S1	G4
Pannariaceae	*Pectenia plumbea*	Blue Felt Lichen	Special Concern	Special Concern	Vulnerable	S3	GNR
	Fuscopannaria ahlneri	Corrugated Shingles Lichen	-	-	-	S3	G4
Liliaceae	*Lilium canadense*	Canada Lily	-	-	-	S2	G5

Table 8. Records of species of concern within a five kilometer radius of Kemptown Quarry, Colchester County, Atlantic Canada Conservation Data Centre (ACCDC) Database, May 2023.

Cyperaceae	*Eleocharis ovata*	Ovate Spikerush				S2S3	G5
Potamogetonaceae	*Potamogeton praelongus*	White-stemmed Pondweed	-	-	-	S3	G5
Lycopodiaceae	*Diphasiastrum x sabinifolium*	Savin-leaved Ground-cedar	-	-	-	S3?	G4
Fagaceae	*Fagus grandifolia*	American Beech	-	-	-	S1	G5
ANIMALS-BIRDS							
Icteridae	*Euphagus carolinus*	Rusty Blackbird	Special Concern	Special Concern	Endangered	S2B	G4
Parulidae	*Cardellina canadensis*	Canada Warbler	Threatened	Special Concern	Endangered	S3B	G5
Tyrannidae	*Contopus cooperi*	Olive-Sided Flycatcher	Threatened	Special Concern	Threatened	S3B	G4
	Contopus virens	Eastern Wood-Pewee	Special Concern	Special Concern	Vulnerable	S3S4B	G5
Paridae	*Poecile hudsonicus*	Boreal Chickadee				S3	G5
Picidae	*Picoides arcticus*	Black-backed Woodpecker				S3S4	G5
Fringilidae	*Loxia curvirostra*	Red Crossbill	-	-	-	S3S4	G5
Parulidae	*Setophaga castanea*	Bay-breasted Warbler	-	-	-	S3S4B,S4S5M	G5
ANIMALS-OTHER							
Apidae	*Bombus terricola*	Yellow-banded Bumble Bee	Special Concern	Special Concern	Vulnerable	S3	G3

[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.
[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.

Table 8. Records of species of concern within a five kilometer radius of Kemptown Quarry, Colchester County, Atlantic Canada Conservation Data Centre (ACCDC) Database, May 2023.

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).
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 9. Provincially listed species of concern with potential to occur in the vicinity of the project site (~10 kilometers). Nova Scotia Museum records (Nova Scotia Communities, Culture and Heritage 2023).

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]
Other						
Dolichonyx oryzivorus	Bobolink	Threatened	Threatened	Vulnerable	S3B	G5
Cardellina canadensis	Canada Warbler	Threatened	Special Concern	Endangered	S3B	G5
Chaetura pelagica	Chimney Swift	Threatened	Threatened	Endangered	S2S3B,S1M	G4
Chordeiles minor	Common Nighthawk	Threatened	Special Concern	Threatened	S3B	G5
Contopus virens	Eastern Wood-pewee	Special Concern	Special Concern	Vulnerable	S3S4B	G5
Coccothraustes vespertinus	Evening Grosbeak	Special Concern	Special Concern	Vulnerable	S3B, S3N, S3M	G5
Contopus cooperi	Olive-Sided Flycatcher	Special Concern	Threatened	Threatened	S3B	G4
Danaus plexippus	Monarch butterfly	Special Concern	Endangered	Endangered	S2?B,S3M	G4
Bombus terricola	Yellow-banded Bumble Bee	Special Concern	Special Concern	Vulnerable	S3	G3

[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] SRANK, Sub-National (Provincial) Rarity Rank.
[4] GRANK, Global rarity rank of species, using CDC/Nature Serve methods

4.2.10 Natural Areas & Wilderness

The Kemptown area is relatively remote and undeveloped but has some wilderness and natural areas interspersed with land developed for intensive forestry as well as small farms and cropland. The quarry is approximately 7.5 km from Highway 104 (Kemptown exit) and mid-way between that location and Earltown. Several blueberry farming operations are within 2.5 to 5 km of the site. Although several permanent homes and seasonal residences are located between the quarry and Kemptown Road, the area has been extensively logged and much of the forest is occupied by natural regeneration or plantations. Dexter Construction Ltd operates an aggregate quarry adjacent to and north of the property. The west end of the Gully Lake

Wilderness area is approximately 3 km east of the quarry and extends about 6 km east. (Figures 32 and 35). Although settlement and consequent expansion and logging in the past changed the character of the landscape, much of the land has returned to forest in most areas; however, logging activity is currently taking place in a recent stage of forest harvesting.

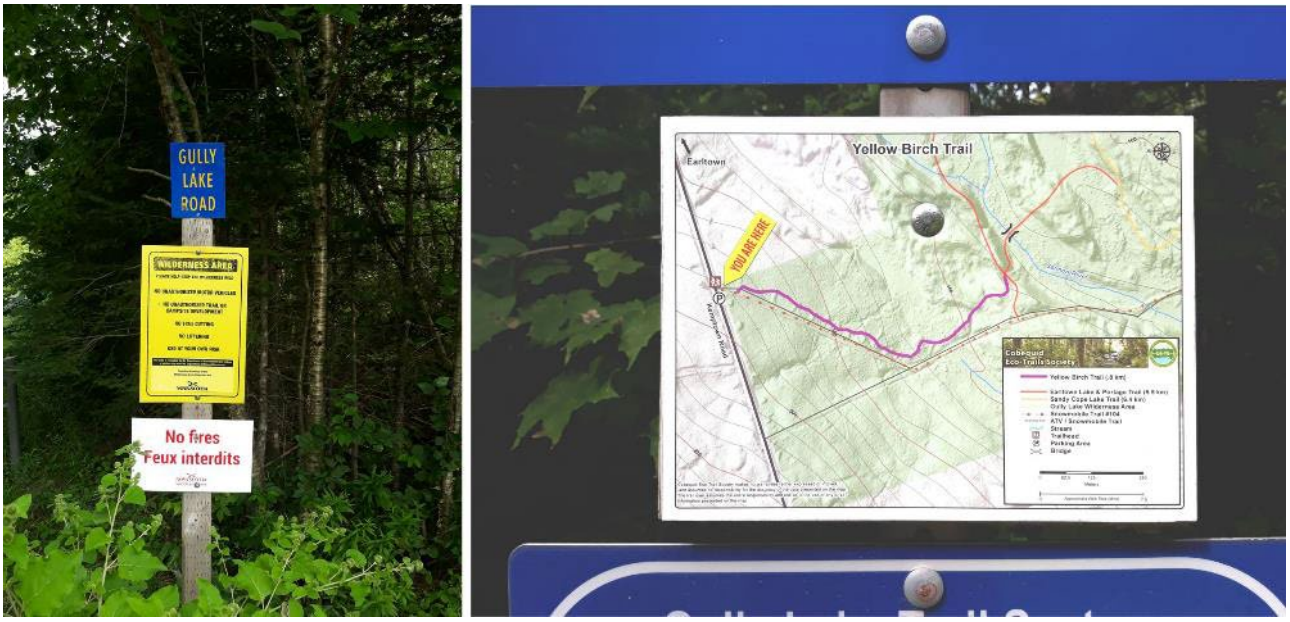


Figure 32. Gully Lake Wilderness area and Yellow Birch Trail signs along Kemptown Road near Kemptown Quarry.

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 under which proponents of industrial development projects engage with the Mi'kmaq concerning their activities. The nearest Mi'kmaq communities are Millbrook and Sipekne'katik, located near Truro and Shubenacadie and 24 km and 72 km from the quarry site respectively. Sipekne'katik is made up of five First Nations communities--Indian Brook (which is the main centre at Shubenacadie), New Ross, Pennal, Dodd's Lot, Wallace Hills and Grand Lake which are located in central Nova Scotia to the west. The Mi'kmaq Rights Initiative (Kwilmu'kw Maw-klusuaqn; KMK) represents a number of the First Nations in Nova Scotia and is based in Millbrook. Mi'Kmaq living and working in the Millbrook and Indian Brook First Nations communities are likely to be employed in businesses and general commerce and other activities which may include activities in the Kemptown area. The Nova Scotia Office of N'Lu Affairs (formerly Office of Aboriginal Affairs) is the Provincial government office which deals with Firs Nations concerns and liaison with industry and government alike. The Office estimates that approximately 35% of Mi'kmaq live off reserve.

There are no registered Mi'kmaq archaeological sites within the study area. The most important archaeological site for Mi'Kmaq in Nova Scotia is the Debert/Belmont Site located in Debert about 27 km

southwest, which first became occupied shortly after the last retreat of the glaciers in Nova Scotia, from 9000 to 13000 years ago.

Governance for the Mi'Kmaq in Nova Scotia is provided by two tribal councils: The Confederacy of Mainland Mi'kmaq (CMM) and Union of Nova Scotia Indians (UNSI). CMM is a not-for-profit organization incorporated in 1986, whose mission is to promote and assist Mi'kmaq communities. The UNSI, 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 living off reserve. The NCNS is a self-governing agency located in Truro. 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 represent a number of the First Nations in Nova Scotia. 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 whom it represents, the Province, and the Government of Canada, and operates from its main office in Millbrook. The Atlantic First Nations Environmental Network (AFNEN) is an environmental organization of Mi'kmaq communities and organizations. The CMM and UNSI are members of the AFNEN, with the Mi'kmaq Confederacy of PEI in Charlottetown 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 the Internet to discuss environmental matters or concerns. Two First Nations—Millbrook First Nation, and Sipekne'katik (Indian Brook) 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 Kemptown Quarry is located in the Municipality of the County of Colchester, the municipal unit occupying the majority of Colchester County. Colchester County had a population of approximately 51,476 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 2022). 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).

Local economies in Colchester County are tied primarily to retail sales, health care and social assistance, manufacturing, and educational services (Statistical Profile of Colchester County, 2017), but includes forestry and agriculture. Agriculture in Colchester County makes a significant component to the agricultural industry in Nova Scotia (Statistical Profile of Colchester County, 2017). In 2013, the Northern region (including Colchester, Cumberland, Pictou, Guysborough, and Antigonish) represented approximately 26% of the agricultural industry in Nova Scotia. Agriculture accounted for approximately 2.03% of all jobs in the Northern region, which is higher than the provincial average of 1.17%. Forestry is an important occupation inland, and has been for generations, employing Colchester County locals in resource harvesting, lumber production and

sawmills, and in the trucking industry. The annual median household family income of Colchester County was $66,000, lower than the median of Nova Scotia ($71,500) (Statistics Canada 2022). Communities face some of the same challenges as elsewhere in Nova Scotia, including lack of economic growth and an aging population (NSDMA 2019).

Table 10. Nova Scotia Northern Region, Total Employment by Industry, 2013.

Industry	Nova Scotia	% of Nova Scotia's Total Employment	Northern Region	% 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

Note: Adapted from Nova Scotia Federation of Agriculture (2017), Statistical Profile of Colchester County, 2013.

4.3.3 Water Supply and Residential Wells

In Colchester County, drinking water is supplied by both public and private water systems. There ae no municipal water supplies in the vicinity of the project, a small number of drilled wells in the general vicinity, and surface water wells are associated with many of the residences in the general area. There are 10 private wells within 1 km of the proposed development and the proponent has established agreements with the property owners. Two drilled wells are within 1 km of the project [https://fletcher.novascotia.ca/DNRViewer/?viewer=Groundwater](Figure 35), one belonging to the North Shore ATV Club at the clubhouse located at the southeast corner of the site, which the proponent has contacted and with which it has an informal monitoring agreement.

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 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).

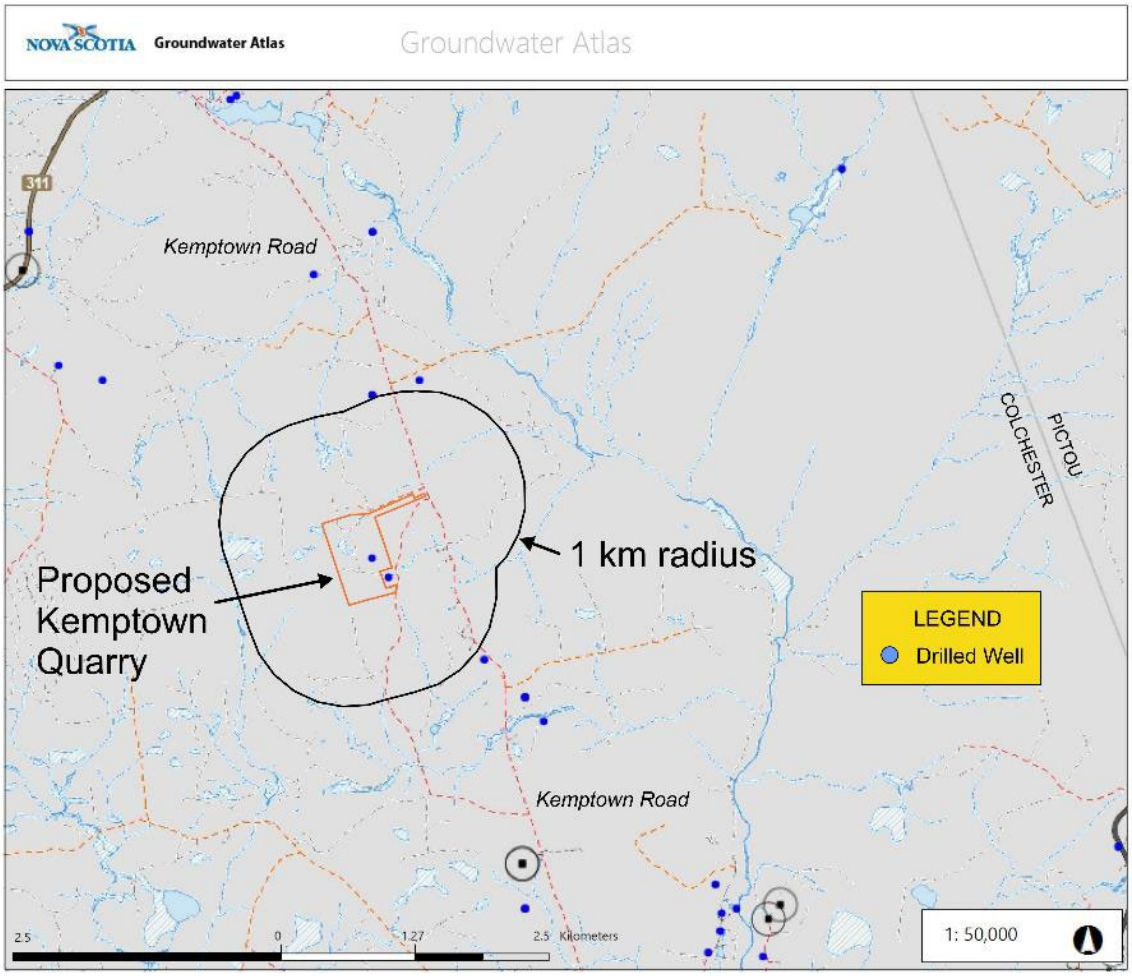


Figure 33. Drilled wells in the vicinity of the proposed Kemptown Quarry. Nova Scotia well logs database *https://fletcher.novascotia.ca/DNRViewer/?viewer=Groundwater*

4.3.4 Land Use

Land in the vicinity of the quarry is predominantly forested, of which approximately 50% is undeveloped forest land (Table 11). 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 quarry)[See Section 4.3.10]. A moderate proportion of the forest land (15.6%) is managed, which includes Xmas trees, maple syrup production and softwood plantations. The communities of Upper Kemptown and Earltown support some rural residential properties on large lots along the Kemptown and adjoining roads, and a concentration of seasonal and permanent residences is located near the proposed quarry site; about 1% of the overall area within 10 km of the Kemptown quarry is occupied by residential and industrial property. Agricultural uses including hay and livestock; and blueberry production are of some importance but occupy only about 1.5% of land area, with blueberries making up some 80% 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 29 active or inactive sites ranging in size from 0.4 to 9.4 ha (median 2.3 ha) are present within 10 km of the Kemptown Quarry. The largest is the adjacent Dexter Construction Limited Kemptown Quarry, which is on the north side of the site. The Highway 104 and Highway 4 corridors are located about 7.5 km southeast of the site is a prominent transportation feature and provide both an access point, means of transporting goods and services from the area.

Table 11. Land use within 10 km radius of the Kemptown Quarry. Based on most recent Provincial Forestry Inventory (2016) for Colchester County.

Classification	Area (ha)	% of Total
Natural Forest[1]	16,912.5	60.6
Forest, Treated[2]	4,354.8	15.6
Forest, Clear Cut or Partial Cut	3,836.6	13.8
Brush / Alders	159.5	0.6
Wetlands	694.7	2.5
Open Water	110.9	0.4
Agriculture[3]	431.0	1.5
Urban	317.4	1.1
Gravel Pit / Quarry	75.3	0.3
Industrial Corridors[4]	403.2	1.5

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 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 quarry is located approximately 28 km from the mouth of Waugh River on Tatamagouche Bay; and about 25 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 three licenses in the vicinity of Upper North River, approximately 10 km southwest of the Kemptown quarry, which are capable of growing salmonids (Rainbow Trout, Brook Trout, Atlantic Salmon, Arctic Charr), as well as Striped Bass, and American Eel; and a large Atlantic Salmon hatchery and grow-out site at Millbrook First Nation (NSDFA 2024a) (https://novascotia.ca/fish/aquaculture/site-mapping-tool/). The latter 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 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 (https://novascotia.ca/fish/aquaculture/site-mapping-tool/).

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 (https://www.dfo-mpo.gc.ca/shellfish-mollusques/cssp-map-eng.htm).

4.3.6 Hunting and Trapping

Lands in the vicinity of the Kemptown Quarry site 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 (NSDNRR 2023). 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 fur-bearers trapped in the five-year period (2018 to 2023) were muskrat, Coyote, beaver, and racoon. There were no American martin trapped in the previous five years, while only three Canada lynx were trapped, incidentally. Ruffed grouse is the most commonly hunted upland game in Colchester County (Table 12). Ruffed Grouse and Ring-Necked Pheasant are important upland game bird species.

Table 12. Five-year summary of wildlife harvested in Colchester County and Nova Scotia (NSDNRR 2023).

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%**

Table 12. Five-year summary of wildlife harvested in Colchester County and Nova Scotia (NSDNRR 2023).

Animal	Colchester County Reported Harvest	Provincial Reported Harvest	Percent (%) of total for Province

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

4.3.7 Forestry & 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 (NS Federation of Agriculture 2017, Statistical Profile of Colchester County, 2017). No specific information on forestry is available, but when combined with mining and fishing, it accounts for approximately 3.05% of the Northern Region's employment, as opposed to approximately 2.47% of the province as a whole. (NS Federation of Agriculture, 2017).

There are several commercial blueberry fields near the Kemptown Quarry (Map A-3; Figure 34) but the soil at the quarry site is not suitable for blueberry culture. Wild blueberries are the No. 1 fruit crop in the Province in terms of total acreage, export sales and total value to the provincial economy.

Figure 34. Entrance to blueberry fields off Kemptown Road, north of the Kemptown Quarry, August 8, 2023.

4.3.8 Recreational, Commercial, and Mi'kmaq Fishing

Recreational fishing provides an important 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. There are numerous rivers and lakes in the vicinity of the proposed Kemptown Quarry including upstream sections of Salmon River and tributaries of North River as well as lakes including Earltown Lake, Taylor's Lake, MacKay Lake and MacIntosh Lake. These waters ae fished recreationally during the freshwater fishing season of April 15 to September 30 but none of the lakes in the vicinity of the site are stocked. Target species include Rainbow Trout and Speckled 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. Atlantic Salmon occupy rivers in the area but are 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.

4.3.9 Historical, Archaeological and Palaeontological Resources

4.3.9.1 Introduction

The historic background study and predictive modelling done as part of the Archaeological Resource Impact Assessment (ARIA) (Davis MacIntyre and Associates 2023) have shown that the Mi'kmaq and their ancestors have lived in this part of Nova Scotia since time immemorial. Comparatively recently European settler activity is also known in the Kemptown area. However, activity within the current study area appears to have been limited, and there is no evidence of activity resulting in the formation of significant archaeological resources either Mi'Kmaq or European within the study area. The Archaeological Resource Impact Assessment (ARIA) for the site concluded that the Kemptown Quarry site exhibits low potential for encountering either Mi'kmaq (both Pre-contact and historic) and/or Euro-Canadian or African archaeological resources. No evidence of confirmed or potential archaeological resources within the study area was encountered. As such, no recommendations for further archaeological mitigation have been made (Davis MacIntyre and Associates 2023). The ARIA conclusions have been accepted by Nova Scotia Department of Communities, Culture, Heritage and Tourism (Nova Scotia Communities, Culture and Heritage 2023). The archaeological database maintained by Mi'Kmaq organization KMKNO also shows that there are no Mi'Kmaq archaeological sites within a five kilometre radius of the study area. However, this may be due to a lack of previous archaeological assessments and may not reflect a lack of Mi'kmaq archaeological sites in and around the study area.

4.3.9.2 Mi'Kmaq Occupation

Nova Scotia has been home to the Mi'kmaq and their ancestors for at least 13,000 years, beginning as the southeastern edge of the continental glaciers melted and retreated to open up the area. From the summary account of the origins of the Mi'Kmaq in the area (Davis MacIntyre and Associates 2023) the study area is located within the Mi'Kmaq territory known as Sipekne'katik meaning "wild potato area" or "place of groundnuts." Sipekne'katik encompasses parts of what today are Hants, Lunenburg, Kings, Colchester, Halifax and Cumberland Counties. Historic European records suggest there were three summer villages within the territory, located at Shubenacadie, Truro, and Tatamagouche. Several villages are also recorded in and around Kjipuktuk/Halifax. More villages were likely established throughout Sipekne'katik, but either fell outside of the knowledge of European sources or were simply not recorded. The Mi'Kmaq placename for Mount Thom [located east of Kemptown] is Kmtnuk meaning "at the chain of mountains." The name for the nearby North River is Matawipukwejk meaning "river of the fork." The Salmon River is known as Plamui-sipu which also translates to "Salmon River." Cobequid is derived from the Mi'Kmaq name We'kopekitk, meaning "end of the flow." The Cobequid Bay and Salmon River were important to the Mi'kmaq for transportation and subsistence (Davis MacIntyre and Associates 2023).

The earliest recognized period of Mi'Kmaq occupation of Nova Scotia is Saqiwe'k L'nuk (the Ancient People) or the Palaeoindian period (13,000 - 9,000 yr before present, BP).The changing ecology following deglaciation allowed the entance of wildlife, including large herds of migratory caribou into Nova Scotia, which were believed to have been followed by Indian groups which had occupied adjacent unglaciated areas to the south. A significant archaeological site in Debert is witness to this early settlement here.

In subsequent times, during the Archaic Period (9,000-3,000 yr BP), early Indians reoriented their activities to include a more maritime existence, with settlement pivoting more towards use and subsistence of coastal areas, lakes, and rivers. However many of these areas were on the continental shelf, often far from the present coast, which was then dry land above sea level. As is the case today, sea level rose steadily and flooded these offshore areas, and would have erased evidence of the presence of early inhabitants. Some evidence of occupation during this period is increasingly being discovered as more studies are conducted, in inland locations which are at a higher elevation than the current sea level.

By 3,000-550 yr BP the Kejikawe'k L'nuk (the 'Recent People') or Woodland/Ceramic period, the Mi'kmaq were a Maritime people, with known locations of occupation concentrated along coastal shorelines and navigable watercourses. There is believed to have been exchange of ideas, worldviews, and technologies with groups originating in places such as northern New England and the Great Lakes area.

From 500 yr BP to the present, European settlement introduced change and upheaval to the traditional way of Mi'kmaq life. 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. The hunting of fur-bearing mammals intensified to satisfy the mutual exchange of skins for European goods. In summer, the Mi'kmaq would camp along the shore and during the winter they would travel inland, many of them gathering at Shubenacadie and Stewiacke. However this way of life suffered continued erosion as the European settlement expanded into lands on which Mi'Kmaq traditionally existed. Inland areas, such as the vicinity of Earltown, however, had little in the way of Mi'kmaq trails and camp sites due to the area offering "a small supply of food and hunting materials." Colchester County once had numerous Mi'Kmaq campsites (Creighton 1979). Long before the Agricultural College was built on Bible Hill, "tents constructed of spruce or fir poles covered by birch bark spread over the area. Campsites extended along the shore of the Salmon River and Tatamagouche Bay in north Colchester. A campsite flourished in middle of the Town of Truro …." During the summer, the Mi'kmaq would camp along the shore and during the winter they would travel inland, many of them gathering at Shubenacadie and Stewiacke. By the 1880s, the land previously inhabited by the Mi'kmaq along the Salmon River had been sold to the Agricultural College (Creighton 1979). By the late 1890s, the traditional hunting grounds of the Mi'kmaq diminished further as new roads and railways emerged throughout the back country. The Provincial government began exerting greater control over marginalized groups, particularly the Mi'kmaq. Many of the Mi'kmaq living in Colchester County eventually found themselves living on the outskirts of Truro, where many were settled at a site known as "Christmas Crossing" on King Street near the railway tracks. After a petition for more land and resources, the federal government agreed to exchange the Christmas Crossing land for a larger plot of land on Halifax Road, which is the location of the present-day Millbrook Reserve.

4.3.9.3 European Settlement

The first European settlers were Acadians who made their way up the Bay of Fundy, settling in the Cobequid area around 1700. In 1703, there were about 140 Acadian families living in Colchester County, with settlements scattered as far south as Stewiacke, as far west as Five Islands, and as far north as Tatamagouche (Davis MacIntyre and Associates 2023). Roads were non-existent and the settlers would not likely have

passed through the Kemptown Area. Their social and religious life revolved around the chapels located in Tatamagouche and Masstown. Some of the Acadians fleeing the deportation are rumored to have gone into hiding in the Tatamagouche area and Cobequid Mountains, although likely not in the Kemptown area.

Settlers from the New England states came into the Cobequid area In the early 1760s, followed by Irish settlers and Scots who first arrived in the Colchester area in the 1770s, chiefly occupying lands around the Bay of Fundy, including Truro, Onslow, and Londonderry. An early connection road from Truro to Pictou (mid 1700s) crossed the Salmon River in the vicinity of Kemptown, later called Salmon River Crossing, by which Kemptown was early known. Industrial mills (presumably sawmills) were built before 1790 at Kemptown by David Archibald II, one of the first European settlers to the area. Kemptown was named by surveyor Alexander Miller, for Sir James Kempt, Nova Scotia's Lieutenant-Governor (Davis MacIntyre and Associates 2023). Beginning around 1820 Kemptown was settled by a combination of Lowland and Highland Scots; and Kemptown was a township within Colchester Co. by 1864. Early churches built in the community included a Presbyterian Church in 1888 and an Anglican Church in 1895. A postal way office operated in Kemptown between 1854 and 1859, with a different office being established again in 1860. Most of the current quarry property is located on land originally granted to Charles Edward Dickson. For a time in the mid-1800s coal was mined near Pictou Road (the road connecting Truro to Pictou) where a productive seam was found. The area was sparsely populated in the late 1800s and early 1900s, and became more developed as forestry became a more prominent commercial property. The nearby quarry presently operating north of the site, and several smaller pits nearby were developed in the 1970s and 1980s and were present at the site in 1994 (Davis MacIntyre and Associates 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 the general vicinity of the site; however there are no Provincial Parks or campgrounds near the Kemptown Quarry site (Figure 35). Within 10 kilometers of the Kemptown Quarry there are two Wilderness Areas and one Wilderness Area Addition (Figure 35) (NSECC 2021), including the Gully Lake Wilderness Area (0.9 kilometers northeast), and Calvary River Wilderness Area (10 km south). The Gully Lake Wilderness Area and its recent addition are the closest feature, located between Highway 4 and Kemptown Road. The closest component property of the Gully Lake Wilderness Area is located approximately 900 m northeast. Parks and protected areas in the general area are listed in Table 13, 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*.

Table 13. Parks and protected areas within a 10 kilometer radius of Kemptown Quarry in Colchester and Pictou Counties. Province of Nova Scotia, Nova Scotia Environment Database, 2023.

Name of Site	Primary Type of Protection	Protection Status	Area (ha)
Gully Lake Wilderness Area	Wilderness Area	Designated (2005)	3,816
Gully Lake Wilderness Area Addition	Wilderness Area	Pending Designation (2023)	174
Calvary River Wilderness Area	Wilderness Area	Designated (2015)	1,174

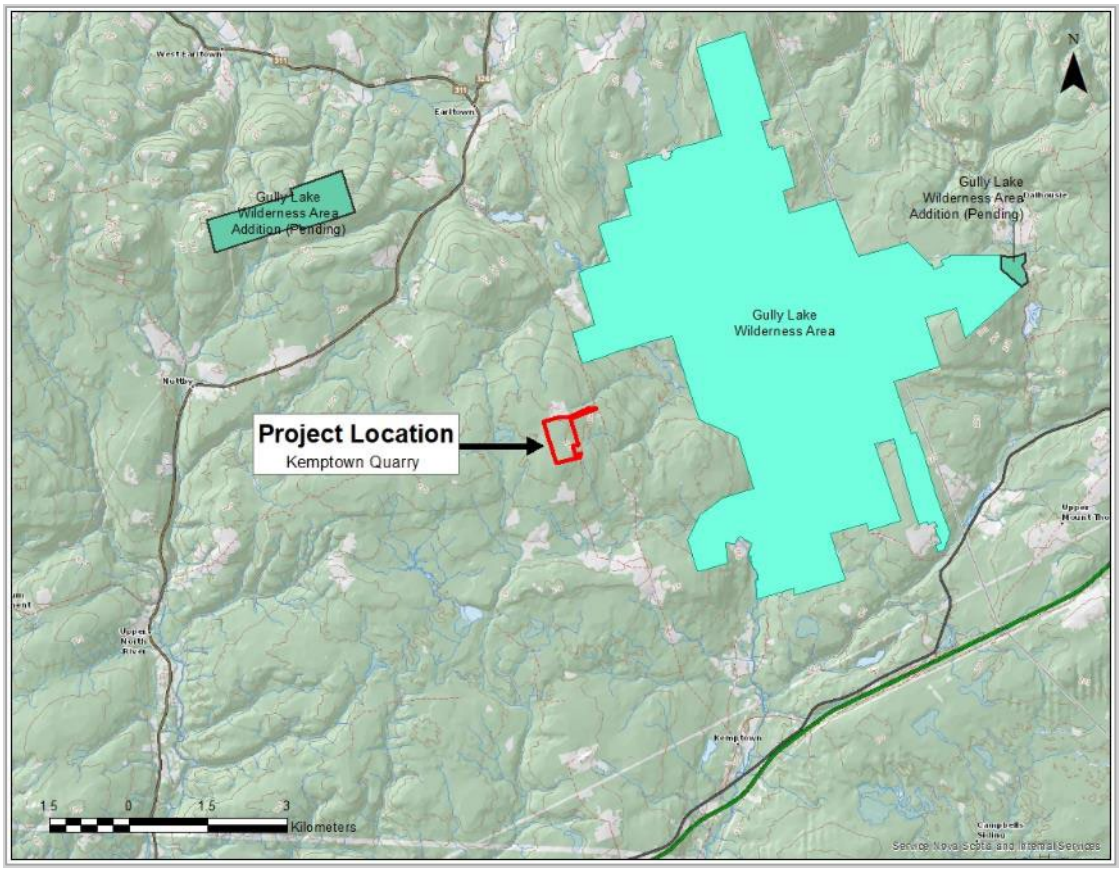


Figure 35. Parks and protected areas in the general vicinity of the Kemptown Quarry.

4.3.11 Recreational/Cultural Features

The main Kemptown Community centre on Highway 4 is a focus of local activities and includes a building which hosts community events as well as an outdoor sports court and childrens' play centre. North Shore ATV club hosts ATV events which includes the clubhouse next to the proposed quarry. Highway 4 (Pictou Road) which intersects with Kemptown Road is on The Blue Route, a province-wide project to create a continuous network of cycling infrastructure (https://blueroute.ca/). Non-organized activities include walking, fishing, hunting, and horseback riding and outdoor pursuits such as berry picking. A church and

several cemeteries in the area are an attraction to outsiders, which includes the former Kemptown United Church and cemetery, the Kemptown Anglican Cemetery.

Figure 36. Kemptown Community Centre on Highway 4.

4.3.12 Residential Use

The Kemptown area in general is rural, with no large population centres and typically with homes spread along highways and in small subdivisions. There are several permanent residences and seasonal homes in located along roads in the immediate vicinity of the proposed Kemptown Quarry along Upper Kemptown Cross Road (Map A-2). The Earltown area located to the north is a community with similar residential use and activities.

4.3.13 Commercial/Industrial Development

The general vicinity of the Kemptown Quarry is not industrialized. The site is adjacent to another aggregate quarry (Dexter Construction Earltown Quarry) on the north side, and forestry operations which surround them in the general vicinity are the only large commercial undertakings in the area. Windfarm development is common in the Cobequid Hills; the nearest wind farm is the 4.99 MW COMFIT operated by Affinity Wind LP, and a major windfarm development at Nuttby Mountain is located 8 km northwest of the proposed quarry. No small businesses are located in the immediate vicinity of the study area, but logging occurs on private properties. The nearest small businesses southeast of the quarry is Tuff Duck Trucking 457 River Road, and Hestaband Equestrian Store, 242 Loop Old Hwy 4. Unadvertised home-based businesses likely are operating in the general area as well. A general store and furniture crafting business operate in Earltown, located on Highway 311 about 8 km north of the site.

4.3.14 Tourism and Viewscape

The Kemptown area is not a particular focus for tourism except through its proximity to the Pictou Road which is a travel route for both vehicles and bicycles, and fishing in areas near the quarry site. Hikers using trails in the Gully Lake Wilderness Area would pass the quarry site. The quarry site cannot be seen from the Kemptown Road (Figure 37).

Figure 37. Entrance to the Kemptown Quarry taken from Kemptown Road, August 8, 2023.

4.3.15 Transportation

The Chapman Bros. Kemptown Quarry is situated along the Kemptown Road, a gravel-surface connector which runs from Highway 4 near Exit 18 on Highway 104, to Highway 311 south of Earltown, and passes through Upper Kemptown. Traffic volumes on Highway 4 between Exit 18 and the Mount Thom exit on Highway 104 (18A) which provides an indication of levels on Kemptown Road, were 890 vehicles per day (annual average (AADT)) in 2022 (Nova Scotia Open Data Portal 2022). Average daily traffic (ADT) in the same spring-summer period was 1,096 vehicles per day (Nova Scotia Open Data Portal 2022), of which Kemptown Road traffic is expected to represent a large proportion.

The Kemptown Quarry will contribute an increased level of truck traffic and some heavy equipment traffic (e.g., trucks, crushers, asphalt trucks, etc.), typically in the summer and fall construction seasons. All equipment leaving the quarry, and production equipment moved to the Quarry, must pass along Kemptown Road before transferring to connecting Highways 311 in the Earltown area and Highway 4, and then Highway 104. Access to the quarry from Kemptown Road is unobstructed with good sight lines and is not expected to be hazardous.

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)[5] (also known as VCs)[6], and project activities and outcomes for the proposed development of the 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 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 14. 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 15 and 16.

[5] 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.

[6] 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).

Table 14. Valued Environmental Components (VECs) for Kemptown Quarry Development

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

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. The Atlantic Coast was used by Mi'kmaq, both as a source of food and as a transportation corridor; however, there is low potential for occurrence of Mi'kmaq archaeological resources at the quarry site (Davis MacIntyre and Associates 2023).

The quarry is not near Mi'Kmaq First Nations and no First Nation activities are expected to be directly affected by activities at the Kemptown Quarry. 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 Mi'kmaq living in the area and /or other local residents 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 in scope or to increase in frequency or intensity from past use, 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 quarry, which includes use by locals of roads for walking and ATVS and road access to trails in the Gully Lake Wilderness Area. Cycling on Highway

4 (“Blue Route”) 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 and 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 and monitored 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 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 Kemptown Quarry 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. Blasting, which may be heard at greater distances, is of short duration and occurs infrequently—one to two times a year. 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 Kemptown Road, Highway 4, 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 & 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 within 1 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. 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 Nations or European archaeological resources (Davis MacIntyre and Associates 2023). 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.

5.3.6 Economy, Land Use and Value

Activities at the Kemptown Quarry do not restrict forestry in the area except by removing available forest lands on the property. During the proposed life of the quarry of 50 years, 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 quarry has been operating at the site with little to no impact, while providing economic development and a source of aggregate for local construction projects.

5.3.7 Transportation

Since beginning its operations under a temporary approval in 2023, the Kemptown Quarry has generated a moderate level of truck traffic on highways in the area, and activity levels are not expected to increase from current levels. Existing traffic volumes on the Kemptown Road are low and vehicle traffic from the Quarry would not constrain local traffic significantly. Transport of crushing and asphalt production equipment to and from the site prior to and after a production phase leads to short-term delays in traffic caused by the often slower-moving equipment; 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 far 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, will little or no change from current operations at the quarry.

5.3.8 Residential Use

Residents in the immediate vicinity of the Quarry including Upper Kemptown Cross Road and along Kemptown Road 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 effects such as shocks from blasts, as well as dust and noise from truck traffic and accidental loss of product (e.g. gravel, rock) from trucks during transport.

Quarry hours of operation will depend on contractual requirements, but typically normal daytime hours and 24/7 on occasion. The quarry includes signage with phone numbers and contact persons should any

members of the community have inquiries. A complaint resolution procedure including a Community Liaison Committee is expected to be put in place by Chapman Brothers to 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 shock from blasting received in these areas, and consequently the effects on groundwater wells or impacts of blasting on building structure are likely to be small and likely negligible. Chapman Brothers has obtained blasting waivers from property owners located within 800 m of the Quarry, as is required by the Nova Scotia Pit and Quarry Guidelines. All blasting events are monitored for concussion and ground vibration to ensure blasting limits are achieved. Blasting requires preparation of a detailed design prepared by a professional blasting operator, which includes a focus on minimizing shock felt outside the immediate blast area. Effects of blasting can be mitigated by notifying nearby residents of proposed blasting events. To assess any impacts, Chapman Brothers currently monitors for blast concussion and ground vibration within seven meters of the nearest structures, and may be required to conduct a well monitoring program.

Truck traffic generates noise, dust, and flying gravel, 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 are expected to continue at present levels, and any impact on normal activities of residents as a result of the presence of the quarry 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 and so 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/Industrial Use

The Kemptown area is not industrialized with the exception of a nearby aggregate quarry, forestry operations, and wind farm development. The quarry would not have a significant impact on the adjacent aggregate quarry operated by Dexter Construction, other than introducing competition with that quarry for supply of aggregate for projects in the general vicinity. The nearest wind farm is 2.3 km south and would not be impacted by the quarry. 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.

5.3.10 Water Supplies and Residential Wells

Surface water and drilled wells associated with residences along Kemptown Road and at the North Shore ATV Club clubhouse are in the same aquifer as the quarry, may be affected by periodic blasting. A complaint management procedure is expected to be put in place for the quarry and monitoring of wells undertaken to provide information to determine if wells have been affected. 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 reasonable impacts on aquifers at the site.

5.3.11 Parks and Protected Areas

The proposed development of the Kemptown Quarry site will increase overall levels of noise in the vicinity arising from quarry operations, by adding to the effects of an already existing quarry at the site; however the overall increase in intensity or frequency of activity at the site is not expected to be grate, and therefore the degree of any interactions with the Gully Lake Wilderness Area is not expected to change. The quarry and its expanded area will not be visible to visitors traveling by road; or to ATV enthusiasts using the wilderness area. Road traffic activity due to the quarry is expected to be higher than in recent times. Occasional blasting (one to two times a year) may be heard in 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 the Gully Lake Wilderness Area. Therefore interactions and impacts are expected to be negligible.

5.3.12 Resource Use—Forestry, Hunting & Trapping

Use of the land in the development 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.

Many aspects of modern industrial society have the potential for impacting human health. Effects range from direct toxic 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—the list goes on. Industrial operations including quarries generate low-level releases to the environment including vehicle and equipment exhaust, dust, emissions arising from associated products such as asphalt, although at typically extremely low levels, and comparable to effects of equipment use elsewhere, and which have been acknowledged and managed.

5.3.13 Human Health

Operations of Kemptown Quarry are not expected to result in impacts on human health of residents of the area. Dust, which is derived both from the source rock, aggregate and activities at the quarry, does not contain toxic components and exposure to residents in the vicinity of the quarry will be low. Residual dust associated with the quarry after control measures, will be largely localized in the immediate vicinity of the quarry. Operations of an asphalt plant which can generate volatile organic compounds, which may take place from time to time at the site is closely regulated under provincial approvals and levels of volatile emissions will be below those which could be harmful. Noise generated by quarry operations and vehicle traffic, if prolonged, is a health concern, but the degree of exposure is periodic and generally below levels which could be considered harmful. 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

Development of the Kemptown Quarry will add to traffic, noise, dust and light from operations over those experienced in the recent past due to the presence of another nearby quarry, although the overall levels will continue to be variable depending on varying demand for aggregate and other products. Operation of a quarry has the potential to generate dust, combustion emissions, noise, and light. In particular, operation of heavy equipment (e.g., earth movers, crushers), rock drilling and blasting, as well as onsite routine operations contribute to increased 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 are typically 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 arising from the Quarry along Kemptown Road and associated vehicle noise, dust, emissions and safety issues are expected to increase, due to the combined effect of the new quarry and the existing one nearby. 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 when not in use. Given the relatively small size of anticipated future annual operations 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 at the request of NSECC, in accordance with the terms and conditions of the Industrial Approval.

Noise from the quarry will 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 around 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 causing noise (e.g., dump doors on truck boxes) are secured. Chapman Brothers will ensure that heavy equipment does not exceed the noise limits specified in the Nova Scotia Pit and Quarry Guidelines. Blasting is expected to occur infrequently (1-2 times per year). All blasting events will be monitored for concussion and ground vibrations to confirm

adherence to regulated levels. Noise monitoring will be conducted at the request of NSECC, in accordance with the terms and conditions of the Industrial Approval.

Nighttime operations will only occur if necessary, and will adhere to directions in the Industrial Approval from NSECC. Light during nighttime operations— particularly during times of low-hanging cloud and fog— can attract migrating birds traveling over the Cobequid Mountains towards the rest of Nova Scotia. 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, 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. As a condition of the Industrial Approval which will govern operations at the quarry, a groundwater monitoring program will be developed which will establish baseline groundwater quality and quantity 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 at the height of land in the local catchments, the Quarry will have a negligible effect on surface waters in the general vicinity. This was shown by a Water Balance Assessment (W.G. Shaw and Associates 2023). The results of the water balance illustrates the change in surface water runoff at the discharge location of the watercourse which arises southeast of the quarry site (Note: this is given the provisional name Cross Roads Brook in the W.G. Shaw report) into Salmon River will be from -0.1% to -0.5 %. 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; water which is not absorbed into the bedrock is expected to be pumped to a point where it can be distributed to downslope areas of the watershed, ensuring that flow characteristics in downstream areas are not affected significantly. Runoff will be managed through a surface water management system to ensure that it meets acceptable environmental standards.

5.4.4 Water Quality

Water quality leaving the quarry via surface or groundwater is not expected to be impacted significantly outside the development area. No watercourses leave the site and the quality of surface water runoff is expected to be high, because of the management measures to reduce erosion and sedimentation on the quarry floor; and the low-contaminant characteristics of the bedrock and location of the site high in the local catchment area. 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 landscapes. Dust leaving the site 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 (NSECC 1988) and the Nova Scotia Pit & Quarry Guidelines (NSE 1999). 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 installed. A surface water management and monitoring program will be established as a requirement of the Industrial Approval for the quarry.

5.4.5 Freshwater Aquatic Environments and Wetlands

There are no watercourses in the proposed development area, and a single artificial pond and associated wetland occurs in the northeast corner of the site which will be included in the developed area of the quarry. Quantities of runoff arising from the site in future from the outer slopes of berms, product storage piles, and grubbings 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. Several wetlands are present, although none are significant in terms of conservation. Ponds and wetlands will be avoided; however they may be required to be removed because the location will affect practical development of the quarry, in which case appropriate regulatory approvals will be obtained prior to physical disturbance, and appropriate compensation for the loss will be arranged.

5.4.6 Terrestrial Environments

Proposed development will utilize areas which are mainly cut over or cultivated mixed or hardwood forest—types which are common in the general vicinity, and in particular locally at the site—and the quarry will not remove a large proportion of either type. No unique habitats were identified at the site. Dust from operations may affect adjacent forest communities although the impacts are likely to be negligible.

5.4.7 Fish and Fish Habitat

None of the proposed project activities will physically impact fish habitat. A permanent pond located at the northeast end of the site was the only potential fish habitat observed at the site, and it did not contain fish. The Water Balance Assessment for the project indicates that the development will not affect the supply of water to adjacent areas significantly. 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. The headwaters of the unnamed watercourse which arises approximately 150 m meters from the development area are not fish habitat. All guidelines for activities and timing of blasting in the quarry will be followed. Overall, the effects of the quarry construction and operations on fish and fish habitat are expected to be negligible.

5.4.8 Flora and Fauna and Habitat

Development of the Kemptown Quarry will remove 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 plant communities at the site are second- or third-generation, 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, through a site reclamation plan which will be established as a condition of the Industrial Approval for the quarry. 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 Kemptown Quarry 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 an important 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. The single exception was American beech, which is provincially listed as S3/S4 vulnerable, which occurred in regenerated forest in the southwest corner of the site. No fur-bearing mammals of conservation importance including American Marten or Canada Lynx (both provincially listed as Endangered) have been recorded within 25 kilometers of the site and neither have been trapped recently in the area, and therefore the quarry will not have a significant potential for impacting them or their habitat. Common Nighthawk, a ground-nesting bird species, which potentially could nest in grubbed and marginal but open areas of the quarry, were not detected at the site; periodic surveys focused on Common Nighthawk during operation of the quarry would aid in mitigating any damage if this species was to occur. 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 & 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 Kemptown Quarry 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. Chapman Bros Construction is committed to minimizing effects of the quarry. The quarry development will add to traffic, noise, dust and light from operations over those experienced in the recent past due to the presence of another nearby quarry, although 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 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 carried out (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 Kemptown Quarry will have minimal cumulative effects on the majority of the important environmental features (Valued Environmental Components, VECs), in part because of the small size of the development relative to other similar uses of the area involving development of sites for aggregate production, mining, and other industrial development; and because the pit is expected to be reclaimed at the end of its useful life. An effect which is important to local residents is that activity and truck traffic on the local population along Kemptown Road will increase, but the overall increase in relation to the current levels of activity overall will be small.

The Kemptown Quarry's proposed development of 30.6 ha is comparatively small only 0.4% of the land within 10 km, and approximately 39.8% of the 75.3 ha currently 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 cultivated forest, which will result in a reduction of about 0.1% of the approximately 25,104 ha of forest (natural and clear-cut) occurring within the same 10 km radius (NS Forest Inventory 2013). The adjacent Dexter Construction Company quarry is currently the largest quarry and alone occupies 16 ha. In comparison, land developed for agriculture, which includes blueberry fields, occupy 431 ha, and the proposed quarry development area is 7.0% of this area, not all of which will be reached initially, as it will occur over the expected 50-year life of the quarry, and the land is expected to be rehabilitated. Apart from the increase in footprint of the quarry, the combined site operations would possibly double activity levels and associated local quarry impacts on air quality, noise and traffic, experienced by the local

population on Kemptown Road, although the overall impacts in the general area will be small. Therefore the cumulative effect of the quarry and other local activity is not expected to change and will be negligible.

7 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

The Kemptown Quarry may be impacted to various degrees by weather, including high rainfall and precipitation. Surface water flow arising from extreme rainfall or meltwater events will be contained within the quarry footprint but because of level topography may result in flooding in the pit. Surface water management structures (e.g. culverts, ditches) will be designed for extreme precipitation events, and in particular a contingency plan for extreme high rainfall events will allow flows generated by extreme rainfall events to be managed. The site experiences a high incidence of fog which at times may limit operations. The site may, from time to time, experience high winds due to its elevation, and potentially wind damage to temporary buildings and structures could occur, and will be considered in contingency planning for the site. Aggregate and other rock products produced and stored at the site are stable under varying conditions of rainfall.

Table 15. Potential interactions between project activities and operations and Valued Environmental Components (VECs) for Kemptown Quarry development.

General Category of VEC	Biophysical									Socioeconomic										
Project Component (potential interactions shown by ✓)	Air Quality, Noise and Light	Groundwater & Hydrology	Water Quality	Freshwater Aquatic Environments and Wetlands	Terrestrial Environments	Natural Areas & Wilderness	Fish and Fish Habitat	Flora & Fauna Species & Habitat	Species at Risk	Mikmaq	Cultural/Historical	Recreation, Tourism & Viewscape	Residential Use	Recreational, Commercial & Mi' kmaq Fishing	Water Supplies/ Residential Wells	Economy, 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, Noise & Dust	✓			✓	✓	✓		✓	✓			✓	✓						✓	
OPERATION																				
Drilling & Blasting	✓	✓	✓			✓		✓		✓	✓	✓	✓		✓	✓				
Moving/Transporting Rock and Product	✓									✓		✓	✓			✓	✓	✓	✓	
Crushing	✓											✓	✓						✓	
Washing		✓	✓	✓			✓							✓						
Lights & Noise	✓					✓		✓	✓			✓	✓						✓	✓
Site Runoff Management		✓	✓	✓			✓							✓	✓					
Portable Asphalt Plant	✓					✓		✓					✓				✓		✓	
Onsite Materials Storage			✓															✓		
Accidents (Fires/Oil & Fuel Spills)	✓	✓	✓	✓		✓	✓	✓		✓		✓	✓		✓	✓			✓	✓

Table 16. Summary of impacts and mitigation on Valued Environmental Components, Kemptown Quarry Development.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
BIOPHYSICAL COMPONENTS						
Air Quality, Noise & Light	Construction	Noise and dust from heavy equipment during site clearing and grubbing.	Significant	Negative	Adopting measures to reduce noise sources such as engine braking. Maintain vehicles and equipment to reduce noise and emissions generated from worn parts.	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	Negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry during night operations.	Not significant.
	Operation	Noise from drilling and blasting; crusher; heavy equipment operation; dust.	Significant	Negative	Monitor noise levels and undertake to avoid exceedances of regulatory levels. Institute measures for dust control.	Not significant.
		Noise from engine braking of trucks on access road and Kemptown Road reducing enjoyment by local residents.	Significant	Negative	Instruct truck operators to avoid use engine braking approaching or leaving the quarry and in populated areas.	Not significant.
		Light from the quarry may be seen in neighbouring areas.	Significant	Negative	Avoid night operations. Use directional lighting with downward and lateral focus to minimize light escaping to nearby areas.	Not significant.
		Dust from crushing operations and site activities.	Significant	Negative	Water spray systems on crushing spreads to reduce dust. Water spray or other approved dust suppressant on quarry access road. Reduce truck speeds on Kemptown Road near adjacent residences.	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. Offsite runoff will be negligible.	Not significant.
	Operation	Blasting fractures bedrock, disturbs till, and changes groundwater flow	Significant	Negative	Analyze groundwater quality and movement to determine changes. Institute a complaint management procedure.	Not significant.

Table 16. Summary of impacts and mitigation on Valued Environmental Components, Kemptown Quarry Development.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
		patterns. Nearby wells can be disturbed				
	Operation	Quarry and work areas change surface water flows. Increased peak stormwater flows. Washing product creates silt-laden surface flows.	Significant	Negative	Most runoff stays on site. Use sedimentation ponds. Aggregate washing arranged in closed loop system to minimize water use and retain wash water.	Not significant.
	Operation	Accidental Fuel and lubricant spills and blasting residues contaminate groundwater.	Significant	Negative	Measures to minimize danger of spills; monitor and control residual nitrates from blasting; proper fuel handling strategies, onsite emergency numbers, spill kits etc.; Avoid refueling near watercourses.	Not significant.
Water Quality	Construction	Reduced surface water flows from site.	Negligible	Negative	Site makes small contribution to surface water in vicinity. Erosion and sedimentation controls in work areas. Onsite water management to moderate surface water runoff.	Not significant.
	Operation	Dust from operations potentially enters local watershed. Chemicals (e.g., nitrates) from explosives potentially entering groundwater.	Significant	Negative	Onsite dust control and water management. Erosion & sedimentation controls. Monitor chemical residues after blasting.	Not significant.
	Operation	Water chemistry changes in runoff from stockpiles stored on site.	Negligible	Negative	Best management practice allows leaving piles exposed to the environment. 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 nearby Gully Lake Wilderness Area.	Negligible	Negative	Use Best Management Practices for trucks leaving the site on Kemptown Road. Minimize noise and control releases of dust and light.	Not significant.
Freshwater Aquatic Environments	Construction	Maintain vegetated buffer around pond. Manage surface water runoff and treatment to reduce sedimentation.	Negligible	Negative	Preserve wooded buffer areas for quarry. Onsite water management and sedimentation controls to moderate surface water runoff and suspended sediment levels.	Not significant.

Table 16. Summary of impacts and mitigation on Valued Environmental Components, Kemptown Quarry Development.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
	Operation	Surface runoff with dust, nutrients and contaminants. Residues from aggregate washing.	Negligible	Negative	Maintain forested buffers. Onsite water management. Use sedimentation ponds and store wash water during off peak season. Minimize unvegetated areas.	Not significant.
	Operation	Higher peak flows during activities due to exposed surfaces.	Significant	Negative	Onsite water management to store wash water. Preserve woodland in buffer areas of quarry.	Not significant.
	Operation	Releases of chemicals from blasting and runoff from materials stored on site.	Negligible	Negative	Isolate and treat runoff from work areas and stored materials piles.	Not significant.
	Construction & Operation	Accidental spills of fuels and lubricants on site.	Significant	Negative	Provide pollution prevention and emergency measures. Have a spill contingency plan.	Not significant.
Terrestrial Environments	Construction	Grubbing, road construction, pit preparation. Damage to natural forest ecosystem, and associated species.	Significant	Negative	Maintain property boundary buffers. Conduct species specific breeding bird surveys prior to development stages. Monitor species-at-risk birds. Monitor for invasive and exotic plant species. Conduct forest removal in small stages corresponding to site development and not in breeding period for birds.	Not significant.
	Operation	Dust, nutrient inputs from runoff, changes to environment and functioning of forest communities.	Negligible	Negative	Maintain property boundary buffers. Conduct species specific breeding bird surveys prior to opening new areas. Be aware of and avoid critical times for rare species which might occur.	Not significant.
Fish & Fish Habitat	Construction	Change runoff patterns at site and in local and adjacent watersheds.	Negligible	Negative	Only a small reduction in surface and groundwater supply to local watershed.	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 avoid sudden runoff events.	Not significant.
	Construction & Operation	Small releases of fuels, lubricants and hydraulic fluids etc.	Negligible	Negative	Maintain equipment to minimize loss of lubricants and fuels. Provide	Not significant.

Table 16. Summary of impacts and mitigation on Valued Environmental Components, Kemptown Quarry Development.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
		from operating equipment. Accidental spills of hydrocarbons on site.			pollution prevention measures (e.g. spill kits) and contingency plan for emergency measures.	
	Operation	Accidental spills into watercourses due to vehicle accidents on roads in area.	Negligible	Negative	Recommend safe driving practices for truckers and staff and reduce speed in vicinity of quarry key intersections. Provide pollution prevention and emergency measures.	Not significant.
Terrestrial Flora & Fauna & Habitat	Construction	Removal of Existing Forest Communities	Negligible	Negative	Restore damaged and unused parts of the site (e.g. grubbings 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. Conduct species specific breeding bird survey prior to excavation.	Not significant.
	Construction & Operation	Accidental contaminant releases, contamination of habitat.	Significant	Negative	Provide pollution prevention and emergency measures & response capability. Remediate areas affected by spills.	Not significant.
		Artificial light from operations influences movements of birds and insects.	Significant	Negative	Use directional lighting with downward focus to minimize light leaving the quarry.	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 for nest cavities.	Not significant.
		Quarry affects wildlife movement patterns and connectivity of habitats.	Negligible	Negative.	Restoration should include consideration for wildlife movement through the restored site. Install wildlife fencing around highwalls.	Not significant.
Species at Risk	Construction	Noise can disturb species at risk in adjacent areas.	Negligible	Negative	Small area affected relative to total available. Minimize footprint of quarry.	Not significant.
	Operation	Sound from blasting can harm bats and birds.	Negligible	Negative	Minimize blasting activity and concentrate in summer (outside breeding and migratory periods for birds and bats).	Not significant.

Table 16. Summary of impacts and mitigation on Valued Environmental Components, Kemptown Quarry Development.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
		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.
		Open and revegetated areas and grubbings piles may be occupied by ground-nesting species such as nighthawks.	Significant	Negative	Educate personnel to look for birds and other wildlife prior to activities; periodically conduct nesting bird and Nighthawk survey at site to provide information for planning operations.	Not significant.
		Water quality impacts affect downstream areas in watersheds with Atlantic Salmon.	Negligible	Negative	Best management practices for management of runoff from the site.	Not significant.
SOCIOECONOMIC COMPONENTS						
Mi'kmaq	Construction and Operation	Any land use will conflict with Mi'kmaq Right to Use land	Significant	Neutral	Engage with Mi'kmaq in developing quarry.	Not significant.
		Contamination of surface waters may affect fish populations in area watercourses	Negligible	Negative	Employ surface water monitoring program. Use Best Management Practices for quarries. Avoid accidental releases of contaminants. Avoid vehicle accidents.	Not significant.
Human Health	Construction and Operation	Persistent noise from various operations can lead to hearing loss for workers; and stress and associated health effects for nearby residents	Significant	Negative	Use health and safety measures for noise effects for on-site workers. Limit activity levels and duration for operations and vehicle traffic, for example to day-time hours.	Not significant.
Archaeological, Cultural and Historical Significance	Construction	Development may affect undiscovered artifacts.	Not significant	Negligible	Unlikely that artifacts occur at site. Stop work and report discoveries. Minimize project footprint.	Not significant.
Recreation	Construction & Operation	Quarry traffic uses roads occupied by residents and ATV users. Wilderness hikers drive by the site enroute Gully Lake Wilderness Area.	Not significant	Negative	Reduce truck speeds in general vicinity. Signage to warn of truck use, dangers, and quarry activity.	Not significant.
Tourism and Viewscape	Construction & Operation	Presence of quarry affects public perception of wilderness values.	Negligible	Negative	Maintain entrances to quarry neat and in natural condition.	Not significant.
Residential Use	Construction & Operation	Noise from quarry and dust on Kemptown Road from operation of trucks and transportation of	Significant	Negative	Use best management practice. Provide community with safety information for truck traffic and quarry	Not significant.

Table 16. Summary of impacts and mitigation on Valued Environmental Components, Kemptown Quarry Development.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
		heavy equipment along highways used by locals.			operations. Set up community liaison committee and complaint resolution system.	
Recreational and Mi'kmaq Hunting and Fishing	Construction & Operation	Accidental fuel and lubricant spills and blasting residues contaminate surface waters.	Negligible	Negative	Fishing not an important local activity immediately at the site. Provide pollution prevention, emergency measures & response capability. Identify and control contaminant releases.	Not significant.
	Construction	Loss of forested area under quarry footprint.	Not significant	Negative	Small area affected and area already cut over in past. 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.	Negligible	Negative	Few wells within 1 km. Develop groundwater-monitoring plan for local well-owners in consultation with NSECC.	Not significant.
Economy, 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. Quarry is a source of materials for local projects.	Not significant.
Transportation	Operation	Wear on highway	Negligible	Negative	Although expected usage levels will be larger, they are a comparatively small component of total use of roads in the area. Contribute materials for road maintenance.	Not significant.
Industrial & Commercial Use	Operation	Competition with Other Quarries	Negligible	Neutral	Market forces will likely balance out success of quarries in the area. Maintain sustainable business plan.	Not significant.
Resource Use Forestry, Hunting & Trapping	Construction & Operation	Removes woodland game habitat.	Not significant	Negative	Relatively small area is used. Minimize footprint.	Not significant.
Parks and Protected areas	Construction & Operation	Noise and blasting likely can be heard within Gully Lake Wilderness Area.	Not significant	Neutral	Employ best management practices for all aspects of quarry operation, in particular control of noise, light, & dust. Blasting will be infrequent.	Not significant.

8 MONITORING

Operations of the Kemptown Quarry will be subject to conditions of an Industrial Approval from Nova Scotia Department of Environment and Climate Change (NSECC). Monitoring requirements are expected to include:

- Surface water quality monitoring in nearest surface waters to the site;
- Groundwater monitoring including monitoring wells and a long-term plan to monitor hydrogeological conditions and groundwater quality;
- Blast monitoring plan (noise and concussion) for all blasting events conducted at the site;
- Noise monitoring if requested by NSECC; and
- Dust monitoring if requested by NSECC.

9 PUBLIC CONSULTATION

Informing the public and Mi'kmaq about proposed industrial activities which potentially affect them is an important part of environmental and project management. Potential benefits include exposure to local knowledge, which may improve environmental performance, and overall operations of the project; and public involvement and support in subsequent operations. In addition to contacts already made in developing this assessment and in conducting operations in the area, Chapman Brothers will be undertaking consultations with the local community through public notices, contacts with municipal and provincial government officials, and engagement with the Mi'kmaq about the project and its implications; as well as the plans for using the resources at the site in an environmentally acceptable manner.

10 PERSONAL COMMUNICATIONS

Mr. Allison MacDonald, North Shore ATV Club. 2024.

11 REFERENCES

Atlantic Canada Conservation Data Centre (ACCDC) 2023. Report on database search of species of conservation status for Kemptown. Report to Envirosphere Consultants Ltd, June 2023.

Anderson, A.R. and W.A. Broughm. 1988. Evaluation of Nova Scotia's Peatland Resources. Bulletin 6. Nova Scotia Department of Mines and Energy, Halifax, Nova Scotia.

Bush, P. and C. Baldo. 2019. Ecological Landscape Analysis, Ecodistrict 340: Cobequid Hills. 2019 Update for Part 1 and 2. Nova Scotia Department of Lands and Forestry, Forestry Division. 41 p.

Canada. 2023. *Impact Assessment Act*. https://laws.justice.gc.ca/eng/acts/i-2.75/page-1.html

Canadian Council of Ministers of the Environment (CCME). 1999. Water Quality Guidelines for the Protection of Aquatic Life. http://st-ts.ccme.ca/en/index.html?chems=all&chapters=1&pdf=1

Canadian Climate Normals. 2024. Canadian Climate Normals 1981-2010 Station Data: Upper Stewiacke. Government of Canada. February 2024.

Creighton, H. 1979. Helen Creighton Nova Scotia Archives 1987-178 number 1220.

Davis MacIntyre and Associates. 2023. Kemptown Quarry Development. Archaeological Resource Impact Assessment. Heritage Research Permit A2023NS159, Category C. Davis MacIntyre Project No.: 23-054.1 October 12, 2023.

Donohoe, H.V. and Wallace, P.I. (1982) Geological Map of the Cobequid Highlands, Colchester, Cumberland, and Pictou Counties, Nova Scotia. Debert-Mt Thom Region, Sheet 4 of 4, Nova Scotia Department of Natural Resources, Map ME 1982-9, scale 1:50,000.

Environment Canada. 2013. Bird Conservation Strategy for Bird Conservation Region 14 and Marine Biogeographic Units 11 and 12 in Nova Scotia: Atlantic Northern Forest, Scotian Shelf and Bay of Fundy, and Gulf of St. Lawrence. Canadian Wildlife Service, Environment Canada. Sackville, New Brunswick, 175 pp. + appendices.

Environment and Climate Change Canada. 2016. Wind Atlas. http://www.windatlas.ca/nav-en.php?field=E1&height=50&season=ANU&no=10.

Huff, M. H., K.A. Bettinger, H.L. Ferguson, M.J. Brown, and B. Altman. 2000. A habitat-based point-count protocol for terrestrial birds, emphasizing Washington and Oregon. Gen. Tech. Rep. PNW- G T R - 5 0 1. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Portland, OR: 39 p.

Keppie, J. D. 2000. Geological Map of the Province of Nova Scotia, scale 1: 500000, digital version of Nova Scotia Department of Natural Resources Map ME 2000-1 compiled by BE Fisher and JC Poole. Scale, 1, 500,000.

Maritime Breeding Birds Atlas. 2023. Second Atlas of Breeding birds of the Maritime Provinces. Bird Studies Canada and Partners. www.mba-aom.ca.

Murphy, J. B., Pe-Piper, G., & Piper, D. J. W., Nance, R.D., and Doig, R. (2001) Geology of the Eastern Cobequid Highlands, Nova Scotia. Geological Survey of Canada Bulletin 556.

Nav Canada. 2013. The Weather of Atlantic Canada and Eastern Quebec. Chapter 4. Seasonal Weather and Local effects. Nav Canada. Ottawa.

Nova Scotia Communities, Culture and Heritage. 2023. Acceptance Letter to Davis MacIntyre and Associates Re: Heritage Research Permit Report A2023NS159 – Kemptown Quarry Development – December 2023.

Nova Scotia Department of Environment and Climate Change. 1988. Nova Scotia Sedimentation and Erosion Control Handbook. Nova Scotia Environment, Halifax.

Nova Scotia Department of Environment and Climate Change (NSECC). 2009. Nova Scotia Pit & Quarry Guidelines. Nova Scotia Environment and Labour, Nova Scotia Environment Monitoring and Compliance Division. Canada.

Nova Scotia Department of Fisheries and Aquaculture (NSDFA). 2024a. Licensed Aquaculture Sites in Nova Scotia. Information for the public. https://novascotia.ca/fish/aquaculture/public-information/

Nova Scotia Department of Fisheries and Aquaculture (NSDFA). 2024b. Nova Scotia Angler's Handbook and 2024 Summary of Regulations

Nova Scotia Department of Municipal Affairs (NSDMA). 2019. Municipal Statistics Annual Report 2017-18. https://beta.novascotia.ca/sites/default/files/documents/1-1759/municipal-statistics-annual-report-2018-en.pdf

Nova Scotia Department of Natural Resources and Renewables (NSDNRR). 2023. Wildlife Catch Statistics.

Nova Scotia Environment and Climate Change (NSECC). 2021. Protected Areas Interactive Map. Province of Nova Scotia. https://novascotia.ca/parksandprotectedareas/plan/interactive-map/

Nova Scotia Federation of Agriculture (2017). Statistical Profile of Colchester County, 2013.

Nova Scotia 2013. Forest Inventory 2013. https://novascotia.ca/natr/forestry/gis/forest-inventory.asp

Nova Scotia Open Data Portal. 2023. Traffic Volumes - Provincial Highway System. Nova Scotia Transportation and Infrastructure Renewal. https://data.novascotia.ca/. Accessed August, 2023.

Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. Handbook of field methods for monitoring landbirds. Gen. Tech. Rep. PSW-GTR-144. Albany, CA: Pacific Southwest Research Station, Forest Service, Department of Agriculture; 41 p.

Rousseu, F. and B. Drolet. 2015. Prediction of the nesting phenology of birds in Canada. In: J. Hussell and D. Lepage. 2015. Bird Nesting Calendar Query Tool. Project NestWatch. Bird Studies Canada / Études d'Oiseaux Canada. https://www.birdscanada.org/apps/rnest/index.jsp

W.G. Shaw and Associates. 2023. Proposed Kemptown Quarry. General Quarry Plan and Surface Water and Groundwater Management. Report to Chapman Brothers Construction Limited, April 2023.

Statistics Canada. 2022. Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released August 17, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed September 1, 2022).

Stea, R. R., Conley, H., & Brown, Y. 1992. Surficial Geology Map of the Province of Nova Scotia, scale 1: 500000, digital version of Nova Scotia Department of Natural Resources Map ME 2000-1 compiled by BE Fisher and JC Poole. Scale, 1, 500000.

Town of Truro. 2024. https://truro.ca/water-utility.html

Webb, K.T., R.L. Thompson, G.J. Beke & L. Nowland. 1991. Soils of Colchester County, Nova Scotia. Report No. 19. Nova Scotia Soil Survey. Research Branch, Agriculture Canada.

Woolaver, L. G., and M.F. Elderkin. 1998. *Sorex dispar* in Nova ScoBa. Northeastern Naturalist Vol. 5, No. 4, 323-330.

12 LIMITING CONDITIONS

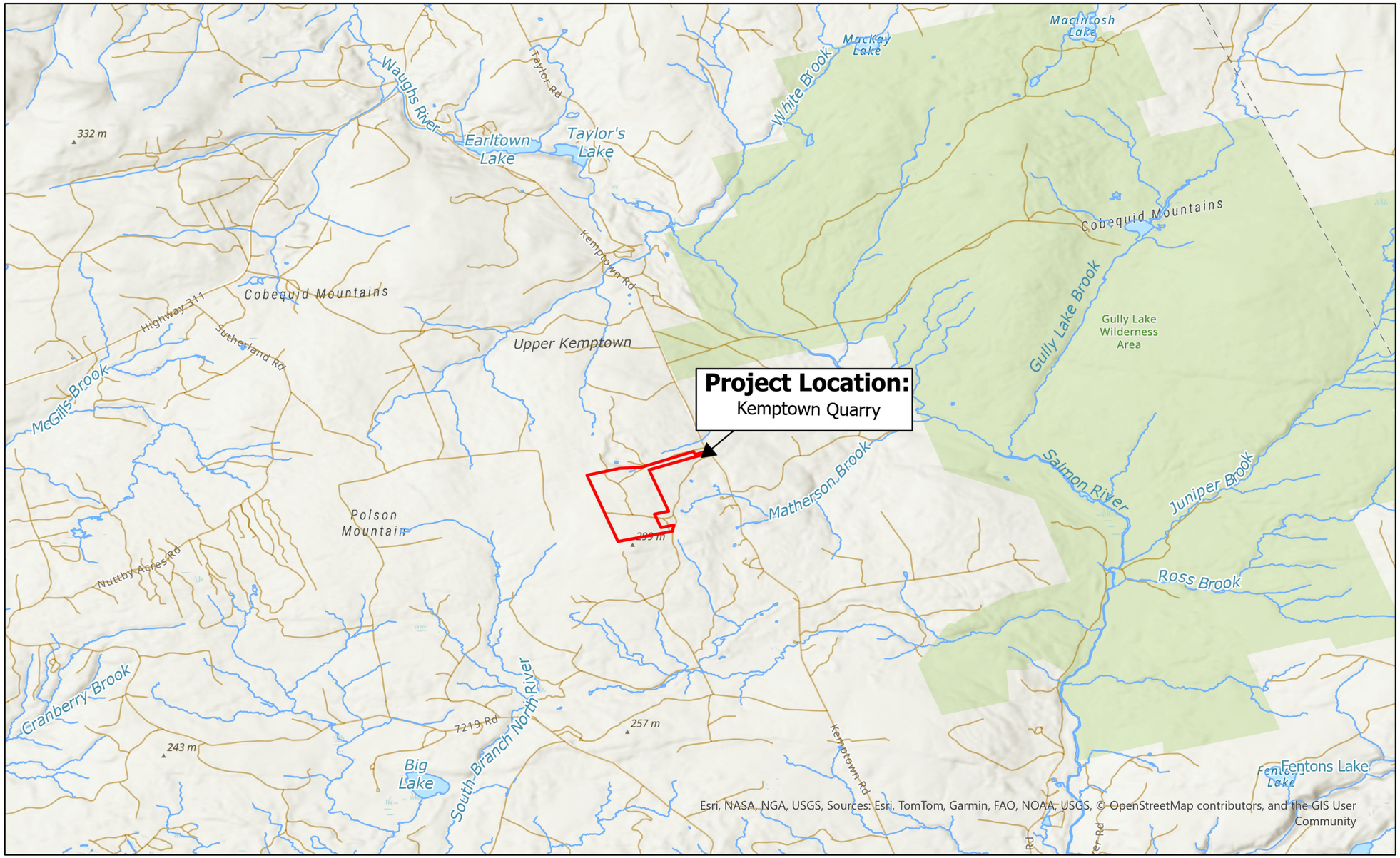
The American Society for Testing and Materials Standards of Practice and the Canadian Standards Association state that no environmental assessment can wholly eliminate uncertainty regarding the recognition of potential environmental liabilities. The intent of the assessment is to reduce, but not eliminate, 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 carried out in April 2023 – February 2025 and the generally accepted assessment practices of our industry. No other warranty is made.

APPENDIX A

MAPS



CHAPMAN BROS. CONSTRUCTION LIMITED

KEMPTOWN QUARRY DEVELOPMENT

Colchester County, Nova Scotia

Site Location
1:50,000

- Water Course
- Study Area
- Roads

Map by:
Envirosphere Consultants Limited.
Windsor, Nova Scotia, May 2024

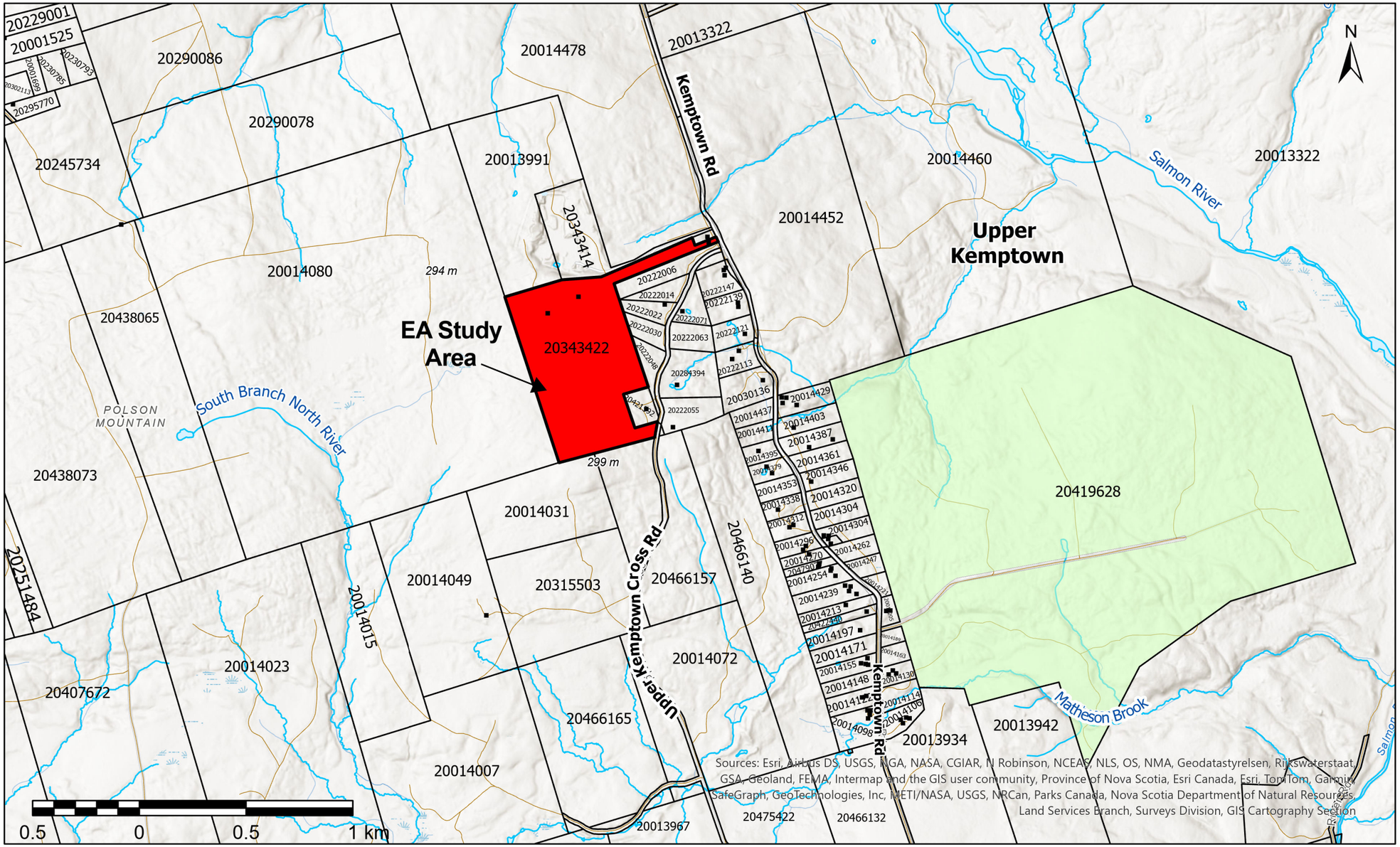
CHAPMAN BROS. CONSTRUCTION LIMITED

Map A-1

CHAPMAN BROS. CONSTRUCTION LIMITED

KEMPTOWN QUARRY DEVELOPMENT

Colchester County, Nova Scotia



Property Ownership

- Crown Land
- Study Area
- Secondary Roads & Trails
- Watercourse

Map by:
Envirosphere Consultants Limited.
Windsor, Nova Scotia, May 2024

Property Mapping: Province of Nova Scotia
Updated March 2022

CHAPMAN BROS. CONSTRUCTION LIMITED

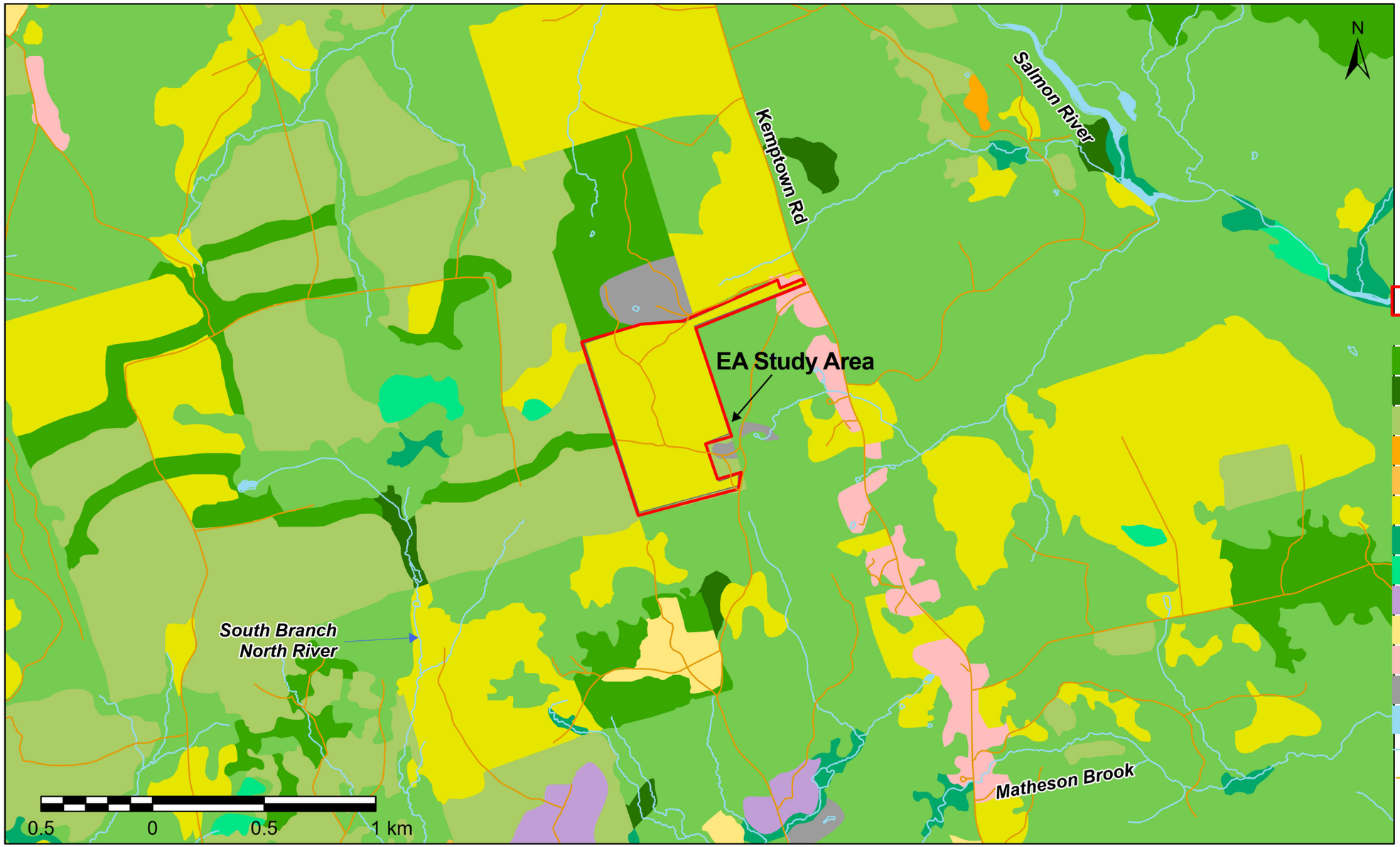
Map A-2

CHAPMAN BROS. CONSTRUCTION LIMITED

KEMPTOWN QUARRY DEVELOPMENT

Colchester County, Nova Scotia

Forest Classification



- Study Area
- Natural Stand
- Treated Stand
- Wind Throw
- Plantation
- Brush
- Alders
- Clear Cut
- Wetlands General
- Treed Bogs
- Blueberries
- Agriculture
- Urban
- Gravel Pit
- Inland Water
- Watercourse
- Road

Map by:
Envirosphere Consultants Limited.
Windsor, Nova Scotia, May 2024

CHAPMAN BROS. CONSTRUCTION LIMITED

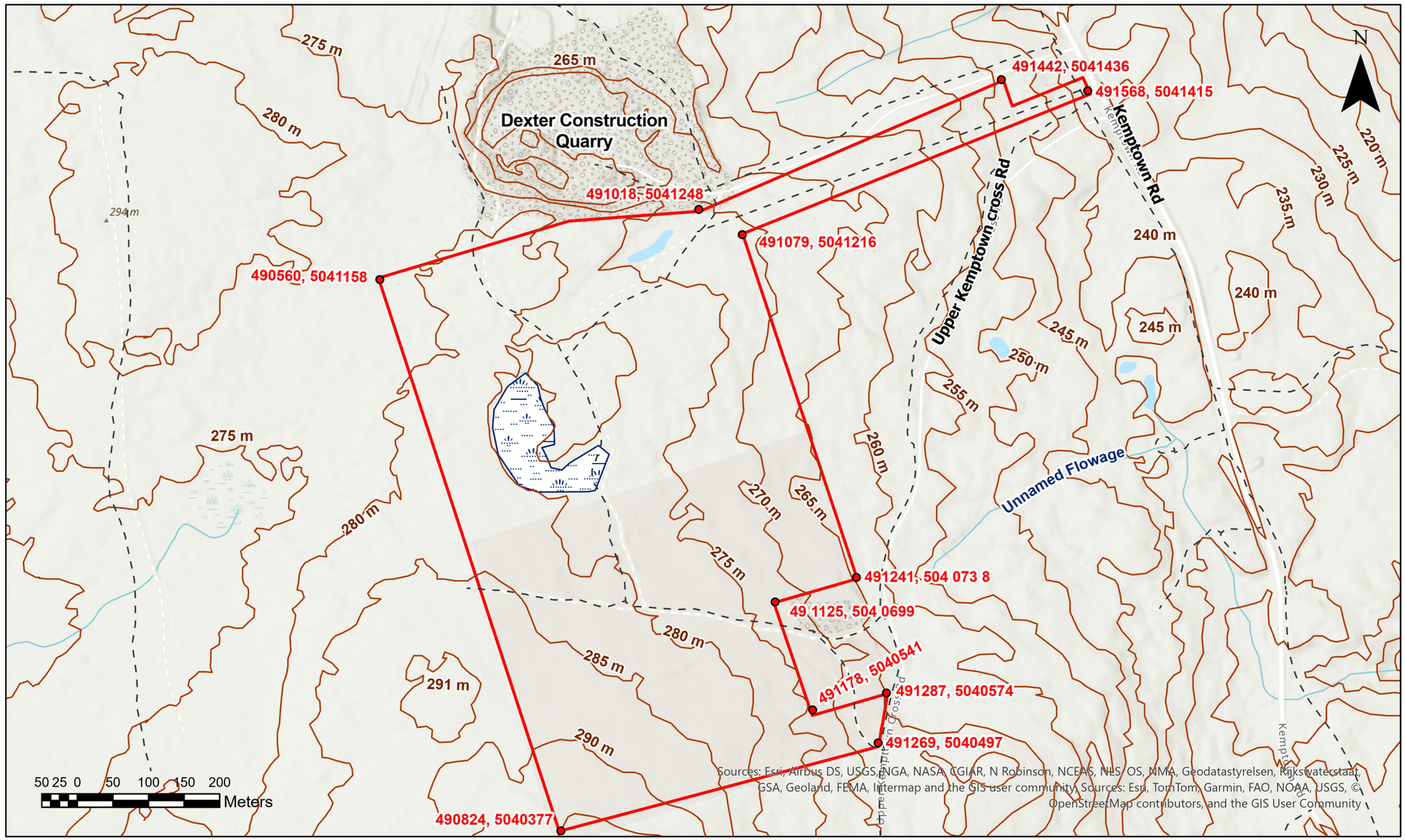
Map A-3

CHAPMAN BROS. CONSTRUCTION LIMITED

KEMPTOWN QUARRY DEVELOPMENT

Colchester County,
Nova Scotia

Site Features and Topography



- Road
- Contours (5m)
- Water Body
- Study Area
- Observed Wetland

Map by:
Envirosphere Consultants Limited.
Windsor, Nova Scotia, May 2024

CHAPMAN BROS. CONSTRUCTION LIMITED

Map A-4

APPENDIX B

BOTANICAL SURVEYS

Spring/Early Summer and Fall 2023

Spring & Fall Botanical Surveys for a Proposed Quarry Expansion in Kemptown, Colchester County, Nova Scotia

Ruth E. Newell, B.Sc. (Hons.), M.Sc.
October 29th, 2023

Spring and Fall Botanical Surveys for a Proposed Quarry Expansion in Kemptown,

Colchester County, Nova Scotia

Introduction

A Fall vascular plant survey was conducted at the site of a proposed quarry expansion in Kemptown, Colchester County, Nova Scotia, on September 13th, 2023, by botanist Ruth E. Newell, B.Sc. (Hons.), M.Sc. A Spring botanical survey was previously conducted on June 13, 2023. Observations from both surveys are presented in this report.

The area surveyed is indicated by the red boundary line shown in Figure 1. A significant proportion of the survey area has recently been clearcut. (Fig. 2).

Primary habitats present within the survey area include mixed woodland (Fig. 4), deciduous woodland (Fig. 3) and several wetlands including a treed bog (Fig. 6), a pond and several marshes (Figs. 4, 7 & 8). Some of the undisturbed perimeters of the clearcut areas were surveyed to get an idea of potential vascular plant species that might have occurred there (Fig. 5).

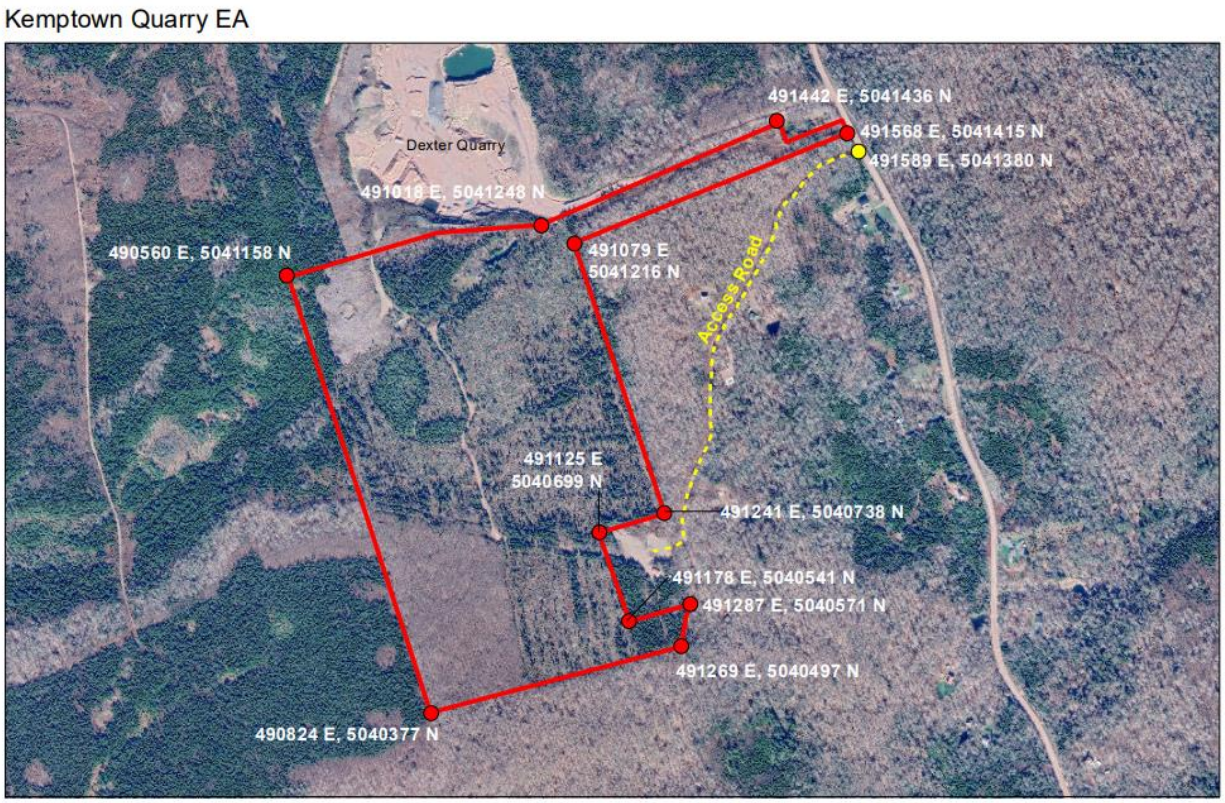


Figure 1. The survey area for the proposed Kemptown quarry operation. Borders are indicated in red.

Figure 2. One of the clearcut areas present within the survey zone.

All vascular plants observed during these surveys as well as the habitat(s) in which they occur, and both their provincial general status rank and the Atlantic Canada Conservation Data Centre (ACCDC) subnational status rank 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).