Chapman Bros Construction Limited

Kemptown Quarry Development Project
Upper Kemptown, Colchester County, Nova Scotia

Environmental Assessment Registration Document for a Class 1 Undertaking – Section 9 (1) of the Nova Scotia Environment Assessment Regulations

February 2025

Chapman Bros Construction Limited
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Minimum Submission Requirements

Requirement	Location in Document
(i) the name of the proposed undertaking.	Page 1, Section 1.1
(ii) the location of the proposed undertaking.	Page 1, Section 1.2
(iii) the name, address and identification of the proponent.	Page 1, Section 1
(iv) a list of contact persons for the proposed undertaking and their contact information.	Page 1, Section 1
(v) the name and signature of the Chief Executive Officer or a person with signing authority, if the proponent is a corporation.	Page 37, Section 11
(vi) details of the nature and sensitivity of the area surrounding the proposed undertaking.	Pages 12-35, Sections 5 & 6
(vii) the purpose and need for the proposed undertaking.	Page 3, Section 2.1
(viii) the proposed construction and operation schedules for the undertaking.	Page 10, Section 4.2
(ix) a description of the proposed undertaking.	Pages 8-12, Section 4
(x) environmental baseline information.	Pages 12-35, Sections 5 & 6, Appendix A
(xi) a list of the licences, certificates, permits, approvals and other forms of authorization that will be required for the proposed undertaking.	Page 6, Section 2.4
xii) all sources of any public funding for the proposed undertaking.	Page 36, Section 10
(xiii) all steps taken by the proponent to identify the concerns of the public and aboriginal people about the adverse effects or the environmental effects of the proposed undertaking.	Page 7, Section 3.1
(xiv) a list of all concerns expressed by the public and aboriginal people about the adverse effects or the environmental effects of the proposed undertaking.	Page 7, Section 3.2, Appendix G
(xv) all steps taken or proposed to be taken by the proponent to address concerns of the public and aboriginal people.	Page 8, Section 3.3, Appendix G

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1 PROJECT INFORMATION

Chapman Bros Construction Ltd. (Chapman Brothers) is a construction company which operates aggregate quarries in Nova Scotia, which are an important source of aggregate material for many road construction projects in Nova Scotia and the Maritimes. Kemptown Quarry, located at 1417 Kemptown Road, in the community of Upper Kemptown, Colchester County, is a temporary aggregate quarry established in 2023 to supply Nova Scotia Department of Public Works (NSPW) highway projects. Chapman Brothers is seeking an Industrial Approval from Nova Scotia Environment and Climate Change (NSECC), which will allow it operate a quarry larger than 4.0 ha, eventually to occupy 30.6 ha, and operate over several decades. To do so requires an Environmental Assessment Registration approval under Part IV of the *Environment Act*. Chapman Brothers is an extra-provincial corporation registered under the Nova Scotia Corporations Registration Act. A copy of Chapman Brothers Joint Stock Registry Certificate is provided in Appendix D.

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1.1 PROJECT NAME

Kemptown Quarry Development Project

1.2 GEOGRAPHIC LOCATION

Chapman Bros Construction Limited Kemptown Quarry (Kemptown Quarry) in Colchester County is located at 1417 Kemptown Road (PID 20343422) in the community of Upper Kemptown, in the Cobequid Mountains about 15 km southeast of the community of Tatamagouche and 25 km northeast of Truro, at approximately UTM Zone 20, NAD83, Easting 0490970 and Northing 5041031.The site is shown in Google Earth satellite imagery from August 21, 2023. The focus area for the assessment is shown on Figures 1 & 2, and Map A-1, Appendix A. The quarry is shown in Figures 1 and 2. The proposed expansion area will be located entirely within the EA study area, and is shown in the project site plan (Appendix C).

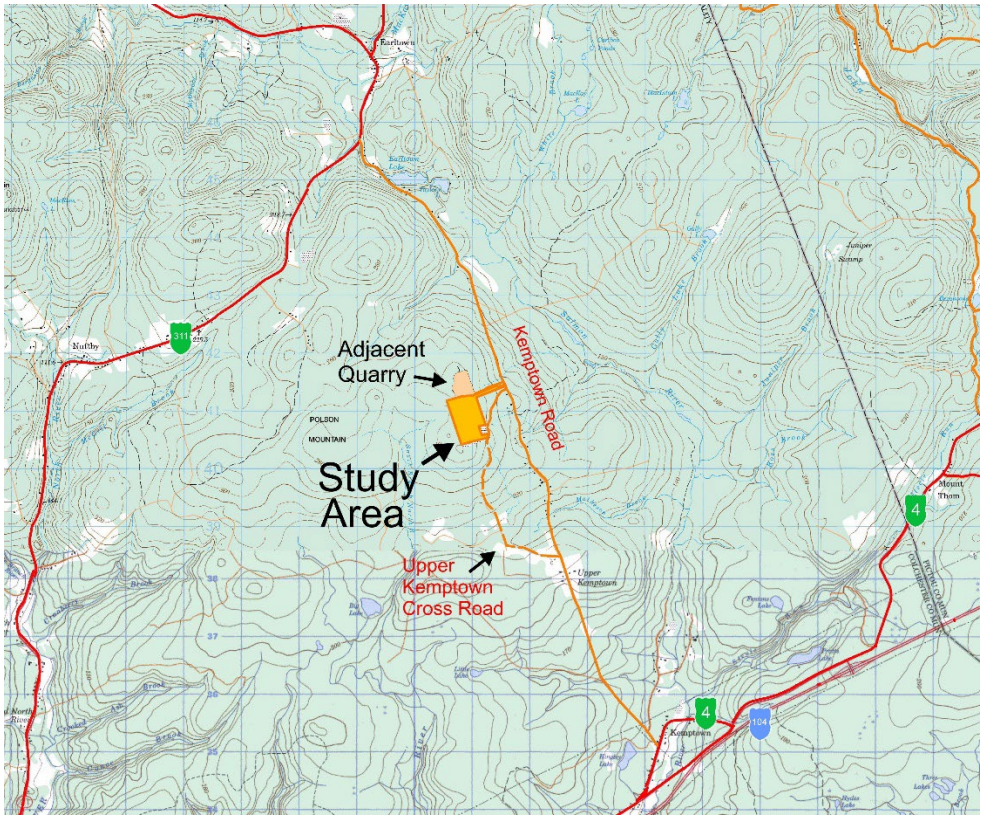

Figure 1. Project location shown on NTS 1:50,000.

2 SCOPE OF THE UNDERTAKING

Chapman Bros Construction Ltd. (Chapman Brothers) owns and operates the Kemptown Quarry located near the community of Upper Kemptown, Colchester County, Nova Scotia. The existing quarry has been in operation since the spring of 2023 and is currently operating as a temporary quarry to supply Nova Scotia Department of Public Works projects. It is located in a rural area surrounded by forest, rural residential properties.

Operations include a mobile crushing plant, weigh scale and scalehouse / testing lab, portable asphalt plant and heavy equipment such as front end loaders, excavators, back hoes, bulldozers etc. for clearing and grubbing the site and move rock and aggregate. Aggregate is stored on site to be used exclusively for provincial (NS Department of Public Works) projects. Aggregate is transported by truck along adjacent roads and the Provincial Highway network which includes Hwy 104. In 2023, approximately 50,000 tonnes of aggregate were extracted from the quarry.

The quarry will operate entirely above the deep bedrock water table at approximately the same base level as at present (275 m above mean sea level). The site will be developed from the north to the south over the course of 50 years.

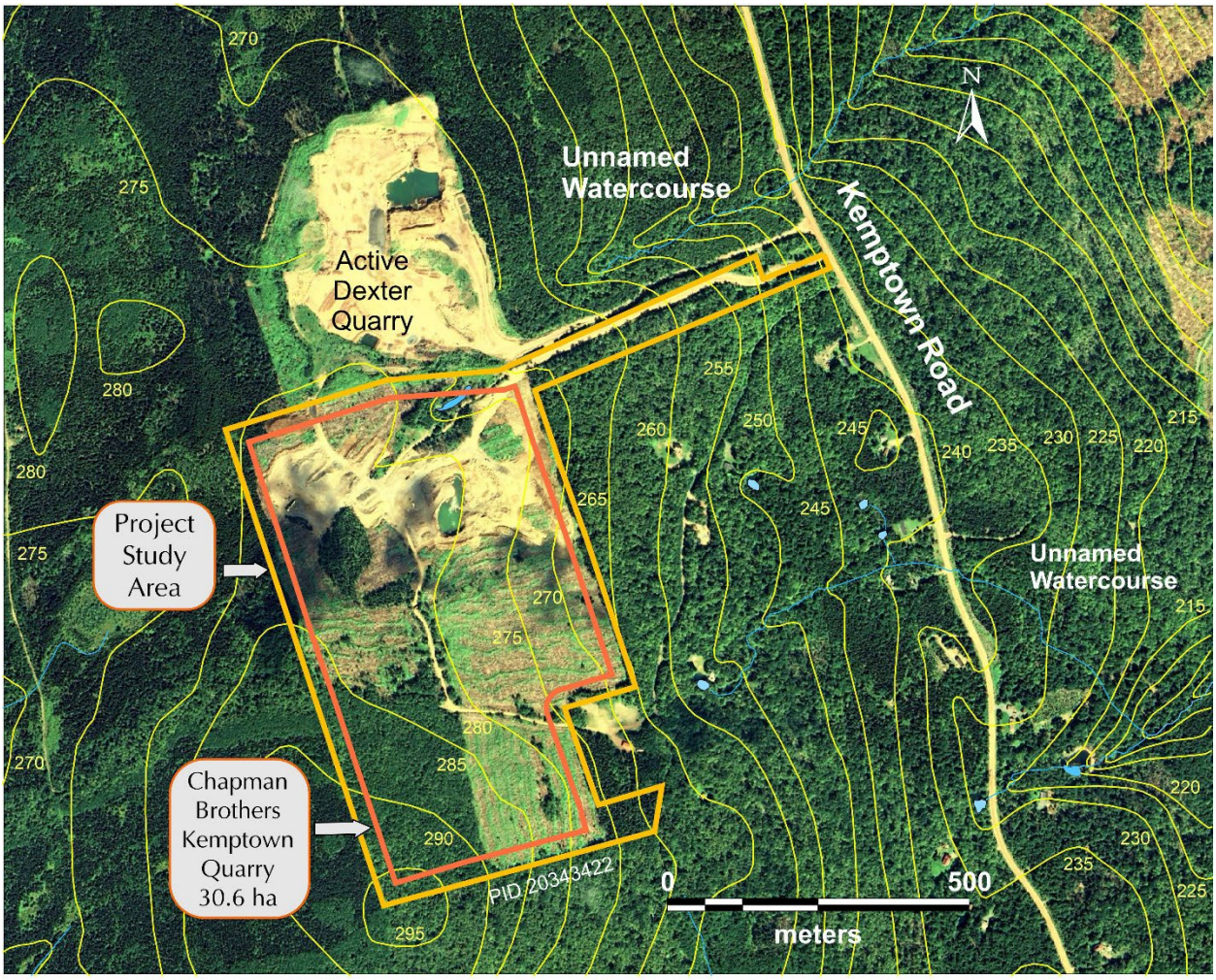

Figure 2. Proposed development area, site features and adjacent properties. Air photo from August 21, 2023.

Chapman Brothers intends to continue quarry operations on the property using existing infrastructure as the quarry expands over the next several decades. It is anticipated that future production will supply 50,000 to 100,000 tonnes of aggregate per year, for 50 years or more. The annual quantity may vary depending on local demand and associated project requirements. The maximum resource available is estimated to be approximately 25 million tonnes.

2.1 Purpose / Need for the Undertaking

Kemptown Quarry is needed to produce aggregate at to supply Nova Scotia highway construction projects with locally-sourced aggregate and associated rock products. The primary benefit will be to supply market demands for aggregate in Nova Scotia. Availability of high quality aggregate at competitive prices is important for further economic development in Nova Scotia.

2.2 CONSIDERATION OF ALTERNATIVES

Chapman Brothers operates several rock quarries throughout Nova Scotia and Atlantic Canada and uses modern industry standard methodologies in all phases of extraction, processing and delivery. Availability of a network of quarries within short trucking distances of projects is important. Alternatives to existing approaches are always being considered in terms of their efficiency, cost effectiveness and environmental mitigation advantages. Continuing operations of the Kemptown Quarry will be assessed on an on-going basis to ensure that the best available techniques are being utilized in all phases of operations.

2.3 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

Registration for an environmental assessment of the proposed quarry development project as a Class I Undertaking is necessary under the Environmental Assessment Regulations of the Nova Scotia *Environment Act*. This report provides information necessary to meet the primary requirements for project registration under this legislation, including descriptions of the human use and biophysical features of the local area, as well as an overview of the key Valued Environmental Components (VECs) and proposed mitigation measures for these components (Section 6.0). A summary of the interactions of the project with the local environment during all phases of the proposed undertaking is also provided.

The environmental assessment follows the Nova Scotia Environment guideline document, *Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia* (NSECC 2008), and has been prepared in consultation with Envirosphere Consultants Limited, the principal environmental consultant for the project. It relies on the environmental consultant's experience and professional judgement of the scope of the proposed undertaking in relation to specialized knowledge, results of field studies, consultation with relevant regulatory authorities and government departments, and other desktop research on the biophysical environment. Identification, evaluation and recommended mitigation measures of the VECs for this project are with respect to all phases and activities of the project.

Figure 3. Panoramic view of work areas at Kemptown Quarry, facing southeast, August, 2023.

2.4 Regulatory Considerations

All activities at the Chapman Brothers Kemptown Quarry will be carried out according to an industrial approval for operating a quarry of this size, and to the Nova Scotia Pit and Quarry Guidelines (2003). The quarry is currently operating as a temporary quarry to supply aggregate exclusively for Nova Scotia Department of Public Works projects, for which adherence to the Pit and Quarry Guidelines apply. The Guidelines set out appropriate limits to operations of the quarry to reduce interference with land uses on adjacent properties; includes setbacks from property lines, watercourses and wetlands; sets allowable noise levels, airborne emissions levels, and blasting limits; and requires rehabilitation of the site at project completion. Equipment which may be operated at the site, such as an asphalt plant and crushing equipment, will have approvals specific to those operations regarding air quality and noise limits from Nova Scotia Environment and Climate Change. Operation of a quarry of the proposed maximum size of the Kemptown Quarry is permitted with approval of the Minister of Environment after an environmental assessment; however the quarry will be too small to require a federal approval under the *Impact Assessment Act (2019).* Regulatory considerations are presented in Table 1.

Several wetlands will be disturbed by the project, and therefore the project will require wetland alteration approvals under Activities Designation Regulations of the Nova Scotia *Environment Act*. No Species at Risk

or species of conservation concern occur in the proposed study area and therefore the project will not require consideration by the Nova Scotia *Endangered Species Act*. The site has been deemed unlikely to contain archaeological artifacts; however if artifacts are discovered during expansion the appropriate measures such as stop work and notification of the Province as per the Nova Scotia *Special Places Protection Act* will be undertaken. Activities have been described to the Mi'Kmaq community to support both good relations and to support the Provincial government responsibility to consult the Mi'Kmaq on matters which concern lands in Nova Scotia.

Operation of quarries in general and the Kemptown Quarry in particular is not covered in the Municipal Land Use Bylaws for Central Colchester County, which is zoned as "Rural General" under the Colchester County Land Use By-Law (Municipality of the County of Colchester 2002).

Table 1. Regulatory considerations, Kemptown Quarry Development, 2024.

Jurisdiction	Nature of Authorization	Responsible Agency	Comments
Federal	Fish Habitat, *Fisheries Act*	Fisheries and Oceans Canada	Not required. Fish habitat not present
	Species at Risk, *Species at Risk Act*	Environment and Climate Change Canada	Not required. No listed species present.
	Migratory Birds Convention Act	"	Not required. Any potential impacts on migratory birds will be mitigated.
Provincial	Wetland and Watercourse Alteration Permits	Nova Scotia Environment and Climate Change (NSECC)	Several small wetlands to be impacted and compensated
	Endangered Species Act (*ESA*)	NS Natural Resources and Renewables (NSNRR)	Not required, no listed species are present.
	Notification of blasting (if required)	NSECC	To be specified in Industrial Approval
	Archaeology Field Research Permit	NS Communities, Culture, Tourism and Heritage (NSCCTH)	Study completed and approved, December, 2023.
Municipal	Municipal Planning Strategy and Land use By-law	Municipality of the County of Colchester	Not included.

3 PUBLIC INVOLVEMENT

3.1 METHODS OF INVOLVEMENT

Information from the general public has been sought at various stages of the project. Personnel from Chapman Bros. Construction (Chapman Bros.) have spoken individually with adjacent landowners and received comments over operations and concerns over the 2023-2024 period. In particular, with regards

to wells, the company indicated they are required to do blast monitoring near structures and offered nearby residents the opportunity to test water quality of wells.

In early 2023 Chapman Bros representatives contacted nearby residents to discuss the project and offer to test well water, and has maintained ongoing communication. In early December 2024, letters and a handout describing the project with an invitation to a public information session (see Appendix G) was distributed to residents of Kemptown Road within 1 km of the quarry. The public information session was held on December 11, 2024 in the Kemptown Area Community Centre at which comments from attendees were solicited. The meeting was attended by 31 individuals from the area, including the local MLA, representatives from the municipality, and other users as well as project personnel.

Letters and a project description were also sent to the local MLA, the Mayor of the Municipality of the County of Colchester and councillors for adjacent districts, the KMKNO, the Chief of Millbrook First Nation, which is nearest the quarry, the Sipekne'katik First Nation, and the Nova Scotia Office of L'Nu Affairs. Millbrook indicated that further consultation over the project was not necessary; and Chapman Bros. decided not to further engage with Sipekne'katik as the project location was outside the area occupied by their component reserves.

A summary of public and Mi'Kmaq consultation activities is presented in Appendix G.

3.2 PUBLIC COMMENTS

Public concerns expressed directly to Chapman Bros. during 2023 and 2024, including the information session, were typical of those found in situations where residential properties are in the general vicinity of aggregate quarries. Concerns which were raised included:

- background noise;
- daily schedule of operations;
- dust from transport trucks along Kemptown Road;
- noise and odours from asphalt plants when operating;
- road safety through vehicle speeds both of dump trucks and other vehicles;
- poor condition of Kemptown Road;
- concern over potential of impacts of blasting on wells; disturbance from and need for notification for blasting; and
- concerns over the impact of quality of life and enjoyment of residential properties, which are mostly located along Kemptown Road.

Also at the information session, a member of the public suggested that the quarry use dust suppression along the road. It was suggested that a list of commitments from Chapman Bros. be prepared to answer the issues and allow progress to be assessed. A representative of an area ATV operators association which has a club-house adjacent to the quarry and had been consulted earlier by Chapman Bros., in contrast, did not have issues with operations there.

3.3 STEPS TAKEN TO ADDRESS PUBLIC CONCERNS

Chapman Bros. has always indicated it is open to addressing public concerns up to the limit imposed by normal operations of a quarry. It is acknowledged that quarries are industrial scale operations which require heavy equipment including trucks and generate noise. Chapman Bros. operates within environmental limits imposed by permissions from Nova Scotia Department of Public Works (NSDPW) and Nova Scotia Department of Environment and Climate Change (NSECC) and adherence to the *NS Pit and Quarry Guidelines*.

Although the Kemptown Quarry is the second quarry operating in the general vicinity, the two are unlikely to be operating at the same time, and therefore the quarry is not adding significantly the impacts experienced near the quarry. Following a complaint to NSPW about 24-hr operations, and 7 days-a-week operations, the quarry has recently operated from 6 AM to 9 PM during peak periods and seasons. However operation 24/7 may still be required from time to time to meet future contract obligations and the company proposes to advise homeowners of its proposed activities.

Although Kemptown Road is in poor condition, maintenance of the road is under the jurisdiction of NSDPW and Chapman Bros. is not allowed to maintain it. Paving of Kemptown Road would improve conditions for residents, but it is unlikely that it would ever be paved due to the normal traffic volumes. NSDPW has a complaints system, and the public can be encouraged to log comments on road condition with them. Chapman Bros. routinely reports the activity status and schedule of the quarry to NSDPW, and has requested dust suppression treatments.

As a result of the 2024 consultation, the company has proposed that it will post a notice on the access road visible to trucks leaving the site, requesting adherence to speed limits and a reduction in speed near residential properties near the quarry. Company vehicles should also adhere to posted speed limits. The installation of sound-deflection berms along the quarry property boundary is planned. Blast testing has been done by Chapman Bros. near homes with wells in the area. As a result of the Public Meeting, several residents offered to participate in a Community Liaison Committee, which is currently (February 2025) being set up.

4 DESCRIPTION OF THE UNDERTAKING

4.1 EXISTING QUARRY SITE COMPONENTS

The quarry is located at 1417 Kemptown Road, PID 20343422 in the community of Upper Kemptown, Colchester County. It is located in a rural area surrounded mainly by forest, and rural residential properties. Physical, biological and social features of the environment in which the quarry is located are presented in a biophysical assessment presented in Appendix A. The quarry is operated as a temporary quarry to exclusively supply projects for Nova Scotia Department of Public Works. The quarry operates in accordance with the Nova Scotia Pit and Quarry Guidelines, which apply to all pit and quarry operations in the Province and which provide separation distances for operations, including blasting, liquid effluent discharge limits, suspended particulate matter limits, sound level limits and requirements for a reclamation plan and security bond. Chapman Brothers uses Best Management Practices in all phases of their operations, including the on-site management of air quality, greenhouse gas emissions, noise, dust, and water quality and operates in accordance with applicable Federal and Provincial legislation and

standards. The existing quarry operations involve blasting, crushing, and stockpiling of aggregate and associated trucking on an as required basis. In addition, a portable asphalt plant may occasionally be situated on the property. Blasting is done an average of one to two times per year when the site is active. Surface water controls are currently in place and associated surface water monitoring will be implemented to ensure that surface water leaving the site meets all applicable water quality guidelines

Rock quarried at the site is non-acid-generating based on the sulphur content. Sulphur concentration of a sample was 0.044 % (1.33 kg H_2SO_4/tonne), which is below the minimum (0.4 % S; 12.51 kg H_2SO_4/tonne) defined by NSECC as sulphide bearing material and is therefore not acid producing. The laboratory results are included in Appendix F.

Figure 4. Kemptown Quarry, August, 2023.

4.2 Future Quarry Site Preparation and Construction

Chapman Brothers wishes to develop and maintain operations of the Kemptown Quarry to continue to meet the ongoing demand for aggregate in the area. It is seeking an Environmental Assessment Registration approval under the *Environment Act* for a maximum area of approximately 30.6 ha, which includes a production and operational footprint, storage (stockpiles) and provision for surface water control.

Although future production will depend on demand, it is anticipated that in future the quarry will produce from 50,000 to 100,000 tonnes of aggregate per year, with a life expectancy of 50 years. The quarry would be initially occupy the north end of the property and advance to the south (Appendix C).

Quarry operations will generally coincide with the road construction season; therefore it is reasonable to anticipate seasonal operations within a similar time frame (April – December). The quarry would normally operate from 7AM to 8PM, Monday to Friday; however under rare circumstances from time to time, the quarry may be required to operate 24 / 7. Chapman Brothers is committed to use Best Management Practices in all phases of their operations, including the on-site management of air quality, greenhouse gas emissions, noise, dust and water quality, and will operate in accordance with applicable Federal and Provincial legislation and standards.

Future activities at the Kemptown Quarry would include drilling and blasting, utilizing a qualified blasting contractor to conduct this work. The blasting contractor would be responsible for blast designs and methods in accordance with the General Blasting Regulations contained in the Nova Scotia Occupational Health and Safety Act, 1996. Blasting would also be conducted in accordance with the Pit and Quarry Guidelines. Blasting and noise level guidelines respecting the time of day/day of the week will be followed and blast monitoring will be conducted for every blast event. It is expected that these blasting control and monitoring requirements will be stipulated in the Industrial Approval for the project.

The blasted rock will be excavated with an on-site excavator, forwarded using heavy equipment such as front-end loaders, and processed by portable crushing equipment. Excavation will not take place below the deep bedrock water table. In addition, there will be no pumping of groundwater and therefore no dewatering of associated bedrock aquifer. The various aggregate products will be stockpiled in designated areas within the quarry. Product will be transported from the quarry via tandem and tractor trailer trucks via the Kemptown Road, Highway 311, the old loop Highway 4 and Highway 104 as necessary to meet project demands. Traffic volumes generated by the quarry are expected to be similar to those in 2023, and stable in the longterm, and the pattern of road use (i.e. time of day, seasonal timing) is not expected to change. Portable equipment such as crushers and asphalt plants will be moved to the site from time to time over the existing road network. Employment numbers and patterns are also not expected to change significantly.

4.3 Operation and Maintenance

The Kemptown aggregate quarry will be typical of aggregate quarries in Nova Scotia. Initial development has taken place but growth will take place in various stages. First, a network of operational roads will be developed to connect work areas. Much of the proposed area has been logged, but in future some logging and removal of forest cover will be carried out by logging crews and harvesting machines. After forest removal, heavy equipment will be used to manage residual surface material including tree waste and overburden, an activity known as grubbing. Removed surface material will be placed in berms or distributed around the margins of the operational footprint of the quarry. A 30-m buffer zone or separation of disturbed land surfaces from the property line will be maintained around the quarry. After drilling and placing of explosives, blasting by licensed blasters will initially open the site and then expand the quarry after it has been developed to the finished floor level. Surface water runoff and water quality

will be managed or controlled through placement of retention ponds and treatment areas. Water if any accumulating in the quarry pit will be pumped to surface settling ponds and dispersed.

Aggregate is produced from blasted rock using portable crushing equipment such as jaw or cone crushers for reducing larger rocks to suitable grades, screeners and conveyor plants, and mobile asphalt plants may be used from time to time. Heavy equipment including excavators, loaders, bulldozers etc. are used in removing overburden and for moving and stock-piling product. Blasting takes place infrequently, from less than once per year to one to two times per year depending on demand for aggregate. Aggregates of various grades as well as other materials are likely to be stored at the quarry from time to time. Typical types of material expected to be produced include Type 1 & 2 gravel, clear stone, environmental rock, and armour rock. Material will be laid down on the floor of the quarry to provide a work surface and control drainage once it has been opened sufficiently.

In the course of operations, environmental management activities such as environmental monitoring for water quality, dust and noise levels may be put in place at a site. Monitoring wells which will be drilled into the bedrock at several locations around the active area, will measure groundwater level and quality. The project will have contingency plans for hazardous materials spills, fires, accidents and emergencies and management of harmful substances at the site.

4.4 Decommissioning and Reclamation

Parts of the quarry which have reached capacity will be reclaimed by restoring slopes to a minimum of 1:1 and terracing the bedrock and revegetating, following a rehabilitation plan developed in consultation to NSECC. It is expected that in future the land will be returned to a natural vegetated state.

4.5 Summary of Activities at the Kemptown Quarry

Activities anticipated for expansion and operation of the Kemptown Quarry have been described in Sections 4.2 and 4.3 and are summarized in Table 2. Generalized groups of activities are used in the environmental assessment, to determine interactions of the project with the environment at the site.

Activities involved in ***developing the site*** are those which modify or change the existing environment, such as forest clearing, removal of overburden, building of access roads, excavation and development of a working quarry area, installation of infrastructure such as weigh-scales and buildings, constructing and maintaining work and laydown areas, and constructing surface water management structures. New development will consist mainly of forest removal, clearing, grubbing of the unused parts of the site, and expansion of the existing work areas and quarry. ***Operations*** or the ***operational phase*** of the project are

Table 2. Categories of activities for Kemptown Quarry.

Construction and Development Phase
• Site Access - access roads, drainage, ditching • Site Clearing/Grubbing • Overburden Removal • Drilling & Blasting

- Excavation and Work Areas

Operational and Reclamation Phase

- Drilling and Blasting
- Moving/Transporting Rock and Product
- Crushing
- Washing
- Lights
- Site Runoff Management
- Portable Asphalt Plant
- Onsite Materials Storage
- Accidents (Fires/Oil & Fuel Spills)

the day-to-day activities at a typical quarry, including periodic blasting, removal of the blasted rock, and activities involved in production of aggregate such as crushing, stockpiling, loading of product, trucking, dust control, work area maintenance and site management. In addition, at the completion of stages in the useful life of the quarry, **reclamation** of the site with activities such as restoration of slopes with overburden and re-seeding, being carried out.

5 ENVIRONMENTAL ASSESSMENT APPROACH AND METHODS

5.1 DESCRIPTION OF THE ENVIRONMENT

The environment in the vicinity of the Kemptown Quarry has been reviewed and is presented primarily in two reports—a *Biophysical Environmental Assessment* and an *Archaeological Resource Impact Assessment* (ARIA) for the project (Davis MacIntyre and Associates 2023). The *Biophysical Environmental Assessment* which is presented in Appendix A contains a summary of the ARIA results. Additional information relevant to the environmental assessment and to other requirements of the environmental assessment registration for the project are presented in other Appendices.

Information for the assessment was obtained from specialized knowledge and experience of consultants, field studies of the study site, reviews of available biophysical information, consultations with relevant government departments, authorities and the local public, 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, September 2009) and uses assessment methodology typical for environmental assessment screenings of this kind.

Field studies for this assessment included a walkover and review of archaeological resources conducted by Davis MacIntyre and Associates in 2023; site visits by a hydrogeology consultant (W.G. Shaw and Associates, Antigonish in 2023 and 2024), and biological and environmental studies (breeding bird and owl survey; fish and fish habitat, terrestrial habitat, wildlife, wetland and aquatic environment surveys, and spring and fall botany surveys) by Envirosphere Consultants and subcontractors in 2023 and 2024. A desktop assessment of species at risk, wildlife (mammals, amphibians and reptiles), significant habitat, and special management and protected areas was conducted in 2023 based on database searches from

the Atlantic Canada Conservation Data Center (ACCDC), the Nova Scotia Museum of Natural History, and contacts with Nova Scotia Department of Natural Resources and Renewables, and Nova Scotia Department of Environment and Climate Change, also conducted by Envirosphere Consultants.

Figure 5. Landscape on north side of Kemptown Quarry, August 2023.

5.2 VALUED ENVIRONMENTAL COMPONENTS

To carry out the environmental assessment, a list of valued environmental components (VECs)[1] (also known as VCs)[2], was developed based on the field and desktop studies (Table 2); and situations in which project activities would interact with VECs were identified (Table 3). Where interactions were identified,

[1] 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.

[2] Valued Environmental Components (VECs) and Valued Components (VCs) are equivalent. Use of the acronym VC is occurring more commonly as a result of its use in environmental assessments carried out under the federal environmental assessment process under the Canadian Environmental Assessment Act (2012).

and there was potential for significant impacts if mitigation was not undertaken, mitigating actions or activities were suggested that would avoid the impact or reduce it to acceptable levels (see Section 6 and Table 4). The process ensures that all potentially significant impacts of the project on VECs are identified and all potential impacts on them have been considered, and sufficient mitigation planned.

The list of Valued Environmental Components considered for the assessment is presented in Table 3. The environmental effects and potential impacts of the project along with their significance and suggested mitigations are outlined in Section 6, and summarized in Table 4.

Table 3. Valued Environmental Components (VECs) for the Kemptown Quarry Development, Colchester County.

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	Land Use and Value
Wetlands	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
	Human Health

Figure 6. Typical mixed forest on the west side of the Kemptown Quarry, June 2023.

6 ASSESSMENT OF ENVIRONMENTAL IMPACTS, SIGNIFICANCE, AND MITIGATION

6.1 OVERVIEW

This assessment of environmental impacts of the project is based on various studies conducted for the project, and summarized in the following sections. These included the Biophysical and Socioeconomic Environmental Assessment (Appendix A); and a hydrogeology / water balance assessment (Appendix B). In particular the Biophysical Environmental Assessment identified Valued Environmental Components (VECs). The studies determined there were no significant negative impacts which could not be mitigated, and no residual potential impacts of the project on social or biophysical features of the environment in the vicinity of the Kemptown Quarry.

Table 4. 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	Human Health	Cultural/Historical	Recreation, Tourism & Viewscape	Residential Use	Recreational, Commercial & Mi' kmaq Fishing	Water Supplies/ Residential Wells	Land Use and Value	Transportation	Commercial /Industrial Use	Parks & Protected Areas	Forestry Hunting /Trapping
Construction																					
Site Acquisition, Use/Removal of Resources	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓				✓	✓	✓	✓	✓	✓
Site Clearing/Grubbing	✓	✓	✓	✓	✓			✓	✓			✓	✓	✓	✓	✓				✓	✓
Drilling	✓	✓	✓			✓		✓			✓			✓						✓	
Blasting	✓	✓	✓			✓	✓	✓			✓		✓	✓		✓				✓	
Lights, Noise & Dust	✓			✓	✓	✓		✓	✓		✓		✓	✓						✓	
Operation																					
Drilling & Blasting	✓	✓	✓			✓		✓		✓	✓	✓	✓	✓		✓	✓				
Moving/Transporting Rock and Product	✓									✓	✓		✓	✓			✓	✓	✓	✓	
Crushing	✓										✓			✓						✓	
Washing		✓	✓	✓			✓								✓						
Lights	✓					✓		✓	✓				✓	✓						✓	✓
Site Runoff Management		✓	✓	✓			✓								✓	✓					
Portable Asphalt Plant	✓					✓		✓						✓				✓		✓	
Onsite Materials Storage			✓																✓		
Accidents (Fires/Oil & Fuel Spills)	✓	✓	✓	✓		✓				✓	✓		✓	✓		✓	✓				

6.2 Assessment of Socioeconomic Impacts

6.2.1 Mi'kmaq

The Mi'kmaq maintain a general interest in all lands in Nova Scotia and claim they have never surrendered, ceded nor sold the Aboriginal title [for detailed information on this topic, refer to Appendix A, Sections 4.3.1 and 5.3.1]. 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. In more recent times, treaties made with the British and continued through Canadian law have maintained the legal status of their rights. The location of the quarry, which is inland in Colchester County in the Cobequid Hills, in the headwaters of important rivers leading to coasts of the Bay of Fundy, would have been used by the Mi'kmaq, both as a source of food and as transportation corridors. Today, the land occupied by the Kemptown Quarry has been modified by past forestry, historical land clearing, and trails for access to the area, and is not likely to be used by Mi'kmaq traditional or modern uses.

The Archaeological Resource Impact Assessment (ARIA) for the project (Davis MacIntyre and Associates 2023), concluded that there is low potential for occurrence of archaeological resources at the quarry site. If artifacts or significant features are discovered during operation and development of the quarry, appropriate officials in the Nova Scotia government, Nova Scotia Museum, and the Mi'Kmaq community will be contacted. Activities will be stopped pending investigation of the discovery.

6.2.2 Recreational Activities

Property owners along Kemptown Road and contacts made during field surveys indicated that lands near the quarry are used for walking and ATVS and road access to trails in the Gully Lake Wilderness Area. Cycling is encouraged on Highway 4 ("Blue Route"). 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 [for detailed information on this topic, refer to Appendix A, Sections 4.3.10 and 5.3.2]. Operations at the quarry would be cyclic, however, likely occupying several months during the construction season when the site is active. The principal effects of the quarry on locals using the area for recreation would be from truck traffic and noise associated with the operations of the quarry—however these interactions would only be a small contribution compared to existing industrial and residential uses of the area, including road traffic, operations of an adjacent quarry, transport and use of agricultural equipment, and logging trucks. 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. There is a general public acceptance in rural areas such as this one, of heavy industry such as quarrying, agriculture, trucking and logging, which are important economic generators. Although quarry operations would interfere with recreational uses around the quarry, the frequency and scope of operations at 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 expansion are expected to be negligible.

6.2.3 Tourism and Viewscape

The Kemptown Quarry would have little influence on tourism and viewscape [for detailed information on this topic, refer to Appendix A, Sections 4.3.13 and 5.3.3]. The quarry cannot be seen from roads in the area. 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 is expected to result in an increase in annual and daily activity along Kemptown Road; however the change is not expected to be significant. 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.

Figure 7. Entrance to Kemptown Quarry from Kemptown Road, August 2023.

6.2.4 Recreational, Commercial & Mi'kmaq Fishing

Recreational fishing provides an important resource and pastime for residents and visitors to Colchester County [for detailed information on this topic, refer to Appendix A, Sections 4.3.8 and 5.3.4]. There are no watercourses on the Kemptown Quarry site and therefore no fish habitat used for fishing. Although there are numerous rivers and lakes in the vicinity of the proposed Kemptown Quarry—including the headwaters of Salmon River and tributaries of North River as well as lakes including Earltown Lake, Taylor's Lake, MacKay Lake and MacIntosh Lake—none are close enough (i.e. within 1 km of the site) to be impacted by normal quarry activities including blasting. Vehicle accidents along roads in the area pose a small potential risk where roads cross over watercourses, which will be mitigated by safe driving practices of truck and equipment operators; and 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.

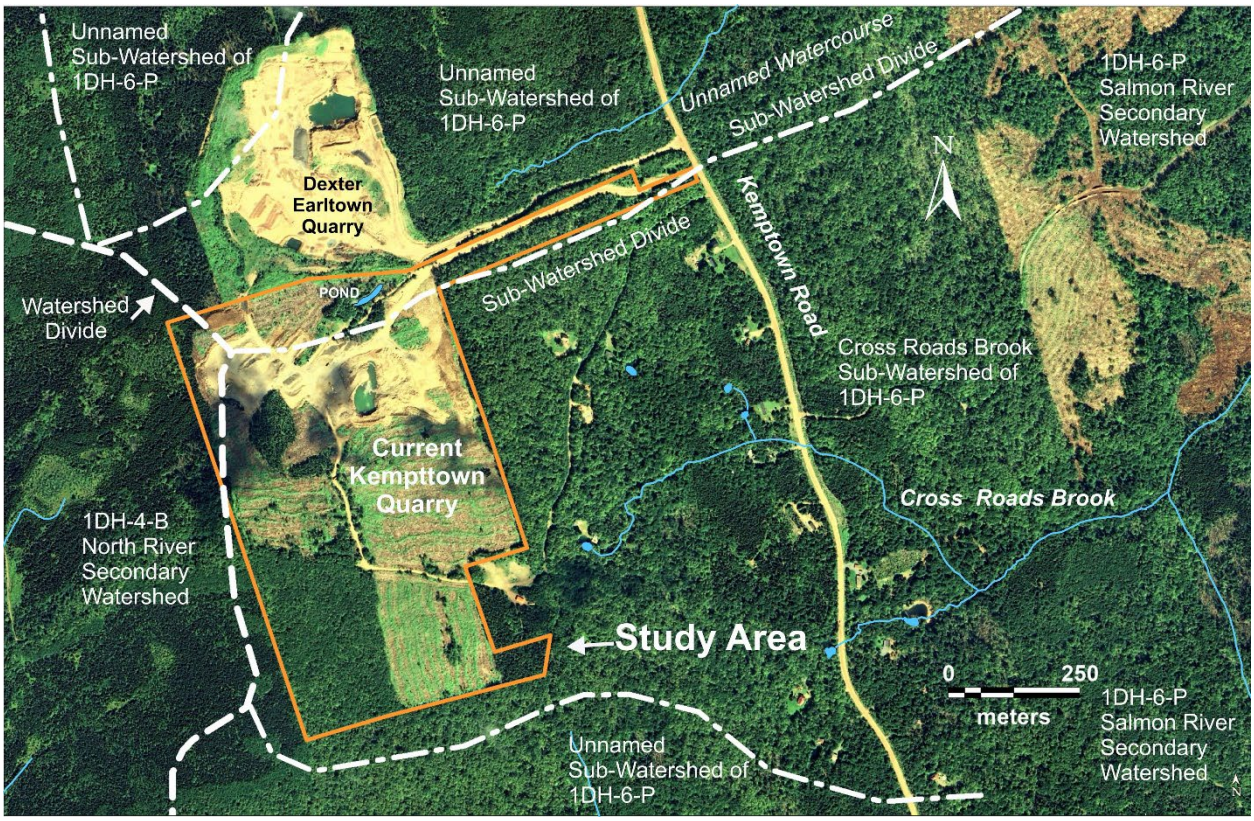

Figure 8. Study area in relation to surface waters and watersheds in a 2023 satellite image. Cross Roads Brook is a provisional name used in the Water Resources Report (see Appendix B).

6.2.5 Archaeological/Cultural/Historical

The Kemptown Quarry site has low potential for pre-contact and/or early historic Mi'kmaq or European archaeological resources (Davis MacIntyre and Associates 2023) [for detailed information on this topic, refer to Appendix A, Sections 4.3.9 and 5.3.5]. The project is not likely to discover or disturb cultural/historical/archaeological features. The area was not settled by Europeans until late in the 17th century and not intensely settled until more recently. 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.

6.2.6 Land Use and Value

Forestry, mixed agriculture and blueberry farming, aggregate production, wildlife resources for hunting and trapping, as well as small rural-residential properties, are the major land uses in area [for detailed information on this topic, refer to Appendix A, Sections 4.3.4 and 5.3.6]. The land on the site is not good for agriculture, and aggregate production, forestry and blueberry production are among the only potential commercial uses of the area. 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. Areas not required for the quarry will be preserved if possible to assist in maintaining forest ecosystems for forestry production, and to buffer adjacent areas from quarry activities. Quarry activities are not expected to impact existing residential, agricultural, industrial or conservation use of nearby areas. The quarry will provide economic development in the area, a source of aggregate for local construction projects, and will generate tax revenue. The quarry will likely intensify the competitive environment for aggregate provided by other quarries in the vicinity, which may lead to locally lower prices. Best management practices will reduce any potential impacts quarry activities may have on water quality and quantity and the site will be restored after use. The land area affected is small in relation to the available wildlife and forestry resource, and consequently the cumulative effects of land use at the site will be small.

6.2.7 Transportation

The Kemptown Quarry generates truck traffic on highways in the area; however activity levels are not expected to increase significantly from the present. Existing local traffic volumes on the Kemptown Road are low and vehicle traffic from the Quarry would not constrain local traffic significantly. [for detailed information on this topic, refer to Appendix A, Sections 4.3.15 and 5.3.7]. Transport of crushing and asphalt production equipment to and from the site prior to and after a production phase may lead 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. 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.

6.2.8 Residential Use

Quarry activities can potentially interfere with normal use and enjoyment of nearby residential properties by creating background noise (truck and heavy equipment engines, back-up signals, engine brakes, generators, crusher operations); noise and ground vibration from periodic blasting; through the generation of dust, flying stones and loss of product from trucks along Kemptown Road; and through truck and equipment traffic which creates a safety concern [for detailed information on this topic, refer to Appendix A, Sections 4.3.12 and 5.3.8].

Effects on residential use will be mitigated by best management practices for quarry operations. 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 required to be put in place by Chapman Bros Construction to address complaints and concerns. 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. Truck operators will be instructed to maintain reduced speeds in the vicinity of residences near the Quarry. Although quarry operations could likely be heard near the quarry and residents would experience truck traffic and other effects of quarry operations, the frequency and scope of activities at the quarry is expected to continue at or below present levels, and any impact on normal activities of residents as a result of the proposed quarry expansion are expected to be negligible. Sky-shine from the quarry, on rare occasions when the quarry may be operated at night, will likely not be seen by local residents, but would be controlled by proper environmental management practices such as use of downward directional lighting at the site. The Quarry occupies a small area in relation to the local groundwater aquifer and will have negligible impact on groundwater supply to local residences.

6.2.9 Commercial/Industrial Use

The Kemptown Quarry is located adjacent to the Dexter Construction Limited Earltown Quarry. Presence of the Quarry maintains competition in the aggregate industry for supply of aggregate for projects in the general vicinity. There are no other businesses in the vicinity of the Kemptown Quarry which could be affected. The nearest wind farm to the quarry is the Kemptown COMFIT project operated by Affinity Wind LP, which is 2.3 km to the south, which will not be affected by quarry activities. 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, as well as supporting the maintenance of the Nova Scotia highway system.

6.2.10 Water Supplies and Residential Wells

Permanent homes and seasonal residences in the vicinity of the Kemptown Quarry typically have dug wells or transport water, and occasionally have drilled wells [for detailed information on this topic, refer to Appendix A, Sections 4.3.3 and 5.3.10]. Only two drilled wells in the immediate vicinity of the quarry were identified in the Nova Scotia well logs database and through conversations with landowners. Surface water and drilled wells associated with residences along Kemptown Road and at the North Shore ATV Club clubhouse which are in the same aquifer as the quarry, may be affected by periodic blasting. The quality of groundwater is expected to be unaffected by Quarry operations. 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.

6.2.11 Parks and Protected Areas

The quarry site is sufficiently distant from local Wilderness areas—the Gully Lake Wilderness Area and Addition, and the Calvary River Wilderness Area—as to not be affected by quarry operations. These areas are not in the same sub-watershed, the former located approximately 1 km from the site and the latter at 10 km [for detailed information on this topic, refer to Appendix A, Sections 4.3.10 and 5.3.11]. The quarry does not interfere with access to either site. It is unlikely that noise from the quarry will reach these sites. There are no other parks or protected areas in the vicinity of the site.

6.2.12 Resource Use—Forestry, Hunting & Trapping

Use of land for a quarry will remove the potential for logging, hunting and trapping at the site for many years. After the quarry is closed and the land rehabilitated, forest communities are expected to re-establish [for detailed information on this topic, refer to Appendix A, Sections 4.3.6, 4.3.7 and 5.3.12]. There are no areas of mature forest in the proposed expansion area which will be altered as the result of the expansion; forests there are in various stages of regeneration and fragmentation after previous logging activity. Maintenance of forested buffers around the quarry will assist in maintaining some wildlife habitat and in minimizing effects on adjacent areas. Most of the site has been previously logged and the overall impact of the project on potential future economic returns from logging in the area is expected to be small.

6.2.13 Local Economy

Chapman Bros Construction employs local contractors and workers, and proceeds of sales of aggregate help support the Provincial economy, having an overall positive benefit [for detailed information on this topic, refer to Appendix A, Sections 4.3.2, 5.3.6]. The quarry will likely intensify the competitive environment for aggregate provided by other quarries in the vicinity, which may lead to locally lower prices.

6.2.14 Human Health

Operations of Kemptown Quarry are not expected to result in impacts on human health [for detailed information on this topic, refer to Appendix A, Section 5.3.13]. Dust, which is derived both from the source rock, aggregate and activities at the quarry, does not contain toxic components and exposure to residents along Kemptown Road will be low. Residual dust associated with the quarry after control measures, will be largely localized in the immediate vicinity of the quarry and along Kemptown Road. Operations of an asphalt plant which may take place from time to time at the site will be localized and are 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 Kemptown Road.

6.3 ASSESSMENT OF BIOPHYSICAL IMPACTS

6.3.1 Air Quality, Noise, and Light

Development of the Kemptown Quarry will add to noise, dust and light from operations over those experienced in the recent past, although the overall levels will continue to be variable depending on varying demand for aggregate and other products [for detailed information on this topic, refer to Appendix A, Sections 4.1.3 and 5.4.1]. 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, operation of an asphalt plant, as well as onsite routine operations contributing to increased dust and particulate levels. Trucks from the quarry traveling along the gravel surface of Kemptown Road raise dust and may be controlled through voluntarily reducing speed of trucks from the quarry in the vicinity of residences. Noise levels can impact human use and enjoyment of the environment. Dust emissions from the quarry are expected, but will be mitigated by use of particle separators on equipment and use of water sprays on exposed working and laydown areas. Monitoring of airborne particulate emissions will be conducted at the request of NSECC and in accordance with the Pit and Quarry Guidelines and the Nova Scotia Air Quality Regulations. An environmental protection plan is expected to be put in place and followed during all phases of operations.

Exhaust emissions will be generated from 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 of the quarry, compared to even forestry and other vehicle traffic along Kemptown Road, 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 recent operations. An asphalt plant may generate air-borne odours that can be detected at a distance from the site; however given the scope of the planned operations, 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. Ambient air quality monitoring will be conducted at the request of NSECC, in accordance with the terms and conditions of the Industrial Approval.

Noise levels from the Kemptown Quarry are expected to be similar to those already produced at the site, since the operations are expected to be similar in size at a given time, and the company will ensure that they do not exceed those specified in the Nova Scotia Pit and Quarry Guidelines. Blasting is expected to occur infrequently (1-2 times per year).

Light during nighttime operations particularly during times of low-hanging cloud and fog, can attract migrating birds traveling overland over the Cobequid Hills, but is unlikely to be seen by local property owners. Measures can be taken to ensure use of directional lighting, which minimizes emanation of light upward and laterally over the horizon.

6.3.2 Groundwater

Activities associated with the project including forest clearing, grubbing and removal of overburden, and blasting, may influence groundwater flow locally in the vicinity of the quarry, but are not expected to

influence groundwater aquifers in adjacent areas [for detailed information on this topic, refer to Appendix A, Sections 4.1.2, 4.1.5 and 5.4.2 and Appendix B]. The site is at the height of land in upper reaches of the local watersheds and contributes little to recharge of the local aquifer, and the effect on overall groundwater flow patterns will be small. Bedrock is close to surface over much of the site, and the quarry will not be excavated below the bedrock water table. 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.

6.3.3 Hydrology

Expansion of the quarry will result in an artificial and managed regime of surface water movement and runoff at the site, mainly near the quarry and entering the nearby watersheds [for detailed information on this topic, refer to Appendix A, Sections 4.1.4 and 5.4.3]. There are no watercourses on the quarry site, and the results of a water balance assessment (see Appendix B) showed that the change in surface water runoff in nearby brooks (which are tributaries of Salmon River) will be small—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. Surface runoff from the quarry will be managed through a surface water management system that includes settling ponds to ensure that it meets acceptable environmental standards. Exposed surfaces on the quarry and on access roads lead to more sudden, 'flashy' runoff patterns during rainfall events and retention ponds will be included in the surface water drainage design.

6.3.4 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 management measures to reduce erosion and sedimentation on the quarry floor; the low-contaminant characteristics of the bedrock; and the location of the site which is high in the local catchment area [for detailed information on this topic, refer to Appendix A, Sections 4.2.3 and 5.4.4]. Quality of water leaving the site and entering surface or groundwater is generally high, due to the low-contaminant characteristics of the bedrock, which is mainly granite; and rock is within acceptable limits for sulphur and acid-generating potential. Blasting is not expected to result in groundwater quality changes and potential impacts such as release of nitrates from explosives will be mitigated by adherence to standard practices. 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 no surface water flow from grubbed areas is expected off the site in part due to the small area involved, and suspended sediment will be removed during flow through the adjacent landscapes. All activities will conform to the Nova Scotia Erosion and Sedimentation Control Handbook (NSECC 1988) and the Nova Scotia Pit & Quarry Guidelines (NSECC 2003).

6.3.5 Freshwater Aquatic Environments

The Kemptown Quarry will not impact freshwater environments at the site; there are no watercourses in the proposed development area, and a single artificial pond and associated wetland occurring in the northeast corner of the site will not be included in the developed area of the quarry [for detailed information on this topic, refer to Appendix A, Sections 4.2.2 and 5.4.5]. The quarry is unlikely to generate significant quantities of contaminants or suspended sediments that could impact any freshwater habitat.

6.3.6 Wetlands

Several wetlands are present, although none are significant in terms of conservation [for detailed information on this topic, refer to Appendix A, Sections 4.2.4 and 5.4.5]. A pond and wetlands will be avoided; however they may be required to be removed because the location will affect practical development of the quarry. Prior to physical disturbance, appropriate regulatory alteration approvals will be obtained and appropriate compensation for the loss will be arranged.

6.3.7 Fish and Fish Habitat

An artificial 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 [for detailed information on this topic, refer to Appendix A, Sections 4.2.5 and 5.4.7]. The nearest watercourse to the site (the headwaters of an unnamed brook which is tributary to Salmon River, see Appendix B where it is referred to as Cross Roads Brook) originates approximately 150 m from the proposed developed area, and it is not fish habitat. Blasting at the site will be an acceptable distance to avoid harm if fish were present. Water quality in runoff from the quarry will be monitored and is expected to meet guidelines for maintenance of Freshwater Aquatic Life. 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 habitat are expected to be negligible.

Figure 9. Treed bog at Kemptown Quarry Site, June 2023.

6.3.8 Flora and Fauna and Habitat

The existing terrestrial ecosystem (plants and animals) will be removed in areas covered by the footprint of the quarry [for detailed information on this topic, refer to Appendix A, Sections 4.2.6, 4.2.7, 4.2.8 and 5.4.8]. Removal of forest cover is a feature that quarry development shares with industrial activities such as logging and agriculture, which affects local ecosystems to a moderate degree.

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-growth, having previously experienced stages of logging, and no terrestrial habitats which have conservation significance occur at the site. With time, areas affected by quarry operations will be remediated, according to agreements made with the Nova Scotia government as a condition of quarry approval. Plant and animal communities that arise in remediated areas will likely differ to some degree from those at present; however a goal of reclamation will be to ensure that conditions (e.g. soil types and topography) are restored to pre-existing conditions.

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. Chapman Brothers is expected to avoid night operations and consequent use of lights which disturb movement patterns of insects which are globally in decline and are important food items for species such as birds and bats. Migrating birds can also be diverted by lights 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.

6.3.9 Species at Risk

The acknowledgement that plant and animal species are significant for both their importance and rarity is an important value of modern society, expressed in both Federal and Provincial laws. No plants or animals identified as Species at Risk in federal or provincial legislation occur at the site or were identified as potentially occurring in the study area [for detailed information on this topic, refer to Appendix A, Sections 4.2.9 and 5.4.9]. The single exception was American Beech, a tree which is provincially listed as S3/S4 vulnerable, which occurred in regenerated forest in the southwest corner of the site. This species has a comparatively wide distribution and its status is not sufficient to require special management measures by the quarry. Management of quarry activities to promote awareness of, and establishment of routine surveys for rare species such as Common Nighthawk which potentially could nest on open surfaces around the quarry, are likely to be required for future operations of the Kemptown Quarry as well as other quarry operations. Overall the development of the Kemptown Quarry will have a negligible impact on Species at Risk.

6.3.10 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, while forests at the site are important in supporting wildlife populations. These areas are appreciated by society as a whole, evidenced by their designation for parks and protected areas [for detailed information on this topic, refer to Appendix A, Sections 4.2.10, and 5.4.10]. 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. Although development of the quarry will add to traffic,

noise, dust and light from operations over those experienced in the recent past, impact on natural areas and wilderness is expected to be low.

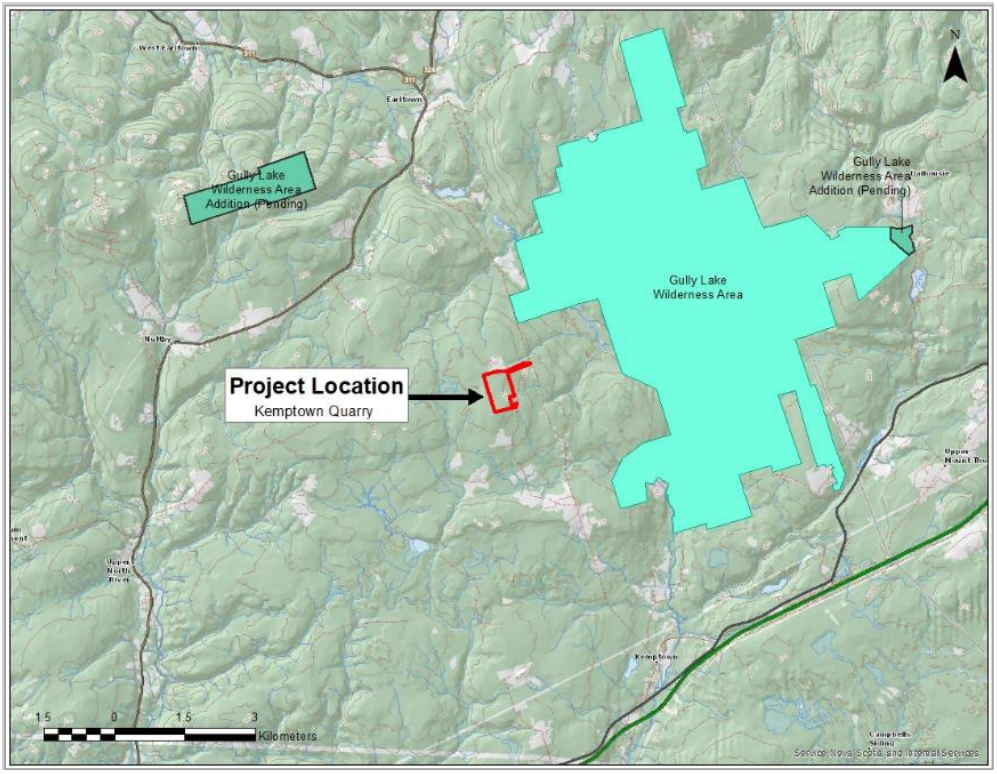

Figure 10. Parks and protected areas in the vicinity of Kemptown Quarry.

Table 5. 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	Take steps 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;	Significant	Negative	Monitor noise levels and undertake to avoid	Not significant.

Table 5. 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 operation; dust.			exceedances of regulatory levels. Institute measures for dust control.	
		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 patterns. Nearby wells can be disturbed	Significant	Negative	Analyze groundwater quality and movement to determine changes. Institute a complaint management procedure.	Not significant.
	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	Not significant.

Table 5. 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
					controls in work areas. Onsite water management to moderate surface water runoff.	
	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.
	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.

Table 5. 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
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. from operating equipment. Accidental spills of hydrocarbons on site.	Negligible	Negative	Maintain equipment to minimize loss of lubricants and fuels. Provide pollution prevention measures (e.g. spill kits) and contingency plan for emergency measures.	Not significant.
	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	Not significant.

Table 5. 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
					specific breeding bird survey prior to excavation.	
	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.
	Construction & 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.
		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						

Table 5. 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
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 heavy equipment along highways used by locals.	Significant	Negative	Use best management practice. Provide community with safety information for truck traffic and quarry operations. Set up community liaison committee and complaint resolution system.	Not significant.
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.	Not significant.

Table 5. 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
					Minimize cutting outside quarry footprint.	
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.

7 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

The Kemptown Quarry will be affected principally by extreme weather, in particular occurrence of high rainfall and snow melt events leading to erosion and high flows in adjacent watercourses; high winds leading to movement of dust and interference with activities; and high temperatures. The Cobequid Mountains are especially susceptible to thunder storms and heavy rainfall events as well as fog. Runoff management is thus an important consideration in site design. Aggregate and other rock products stored at the site are stable under varying conditions of rainfall and wind. Integrity of any runoff management

structures at the site must be maintained and appropriately designed to remove the possibility of catastrophic failure. Changing climate may increase the operating season for transportation projects, and the need for aggregates produced by the quarry.

8 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. However the overall increase in relation to the current levels of activity and impact of the quarry 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) (NS Forest Classification 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 Classification 2013). The adjacent Dexter Construction Company quarry is currently the largest quarry within 10 km, and alone occupies 16 ha. In comparison, land developed for agriculture, which includes blueberry fields, occupy 431 ha and will likely expand. The proposed quarry development area is 7.0% of the area occupied by agriculture, and will be achieved gradually, as it will occur over the expected 50-year life of the quarry, and parts will be progressively rehabilitated to forest land. Apart from the increase in footprint of the quarry, the combined site operations would increase by a small fraction the activity levels and associated local quarry impacts on air quality, noise and traffic, experienced by the local population on Kemptown Road. Therefore the cumulative effect of the quarry and other local activity is not expected to change and will be negligible.

9 OTHER APPROVALS REQUIRED

The process of registering the development of the Kemptown Quarry requires an environmental assessment and the granting of an Industrial Approval for a quarry larger than 4 ha. Chapman Bros

Construction Limited will summarily apply for the required approval after receiving an approval of its environmental assessment under the Environmental Assessment Regulations of the *Environment Act*.

10 FUNDING

Chapman Bros Construction Limited is a privately owned incorporated company and is solely supporting all its operations. No government or public funding is involved.

11 CORPORATE AUTHORIZATION

This registration document for the Kemptown Quarry is submitted as authorized by James C. Chapman, Registered Agent, Chapman Bros Construction Limited.

March 4/25

Date

James C. Chapman, Registered Agent
Chapman Bros Construction Limited

12 REFERENCES

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.

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Municipality of the County of Colchester. 2002. Central Colchester Municipal Planning Strategy.

Nova Scotia Environment. 1988. Nova Scotia Sedimentation and Erosion Control Handbook. Nova Scotia Environment, Halifax.

Nova Scotia Environment. 2003. Nova Scotia Pit & Quarry Guidelines. Nova Scotia Environment, Halifax.

APPENDIX A
BIOPHYSICAL ASSESSMENT REPORT
(Envirosphere Consultants Limited, 2025)

Environmental Assessment Registration Document:
Kemptown Quarry Development
Upper Kemptown, Colchester County
Nova Scotia

Biophysical Assessment: Kemptown Quarry Development Upper Kemptown, Colchester County, Nova Scotia – 1417 Kemptown Road, PID 20343422

February 2025

Prepared for:

Chapman Bros. Construction Ltd.
New Glasgow, Nova Scotia

Prepared by:

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1 INTRODUCTION

Chapman Bros Construction Ltd, New Glasgow, Nova Scotia (Chapman Brothers), is seeking an Industrial Approval to operate a 30.6 ha quarry in the Kemptown area—between Kemptown and Earltown in Colchester County. The proposed quarry will be entirely within PID 20343422 with a 30 m property line buffer. A small quarry is presently operating at the site under a temporary permit from Nova Scotia Department of Public Works (NSDPW). An approval to continue to operate the quarry is required as a Class I undertaking under the Environmental Assessment Regulations of the Nova Scotia *Environment Act.* Chapman Bros Construction Ltd. contracted Envirosphere Consultants Limited of Windsor, Nova Scotia, to prepare a biophysical and socio-economic overview and assessment of the proposed quarry development in support of the Environmental Assessment Registration for the project. This report contains the results of the overview and assessment. It presents a description of the methodology and scope, existing environment, environmental effects, cumulative effects, discussion, and conclusions. The assessment provides a sufficient level of detail to ensure that all information necessary to allow adequate review of the project is provided, to demonstrate how the assessment was conducted, and to document the information on which the conclusions were based.

2 INFORMATION SOURCES

Information for the biophysical and socio-economic overview and assessment was collected from various sources, including:

- Interviews with representatives of the Nova Scotia Department of Natural Resources and Renewables (NSNRR)
- Contacts with organizations, businesses and individuals in the area
- A review of published information including soil surveys, reports on geology, archaeology, and natural history (e.g. *Natural History of Nova Scotia*)
- Relevant websites and databases including Nova Scotia Open Data Portal, NSNRR Significant Habitat and Wetland Databases, Atlantic Canada Conservation Data Centre, and Nova Scotia Museum of Natural History
- Maps, digital data on land use and property ownership, aerial photos, and 1:50,000 topographic maps.

Site visits and walkovers by project personnel were carried out on:

- August 8, 2023 and June 18-19, 2022: Ruth Newell, M.Sc. for fall and late spring/early summer botany surveys.
- May 21-22, 2023 and May 13, 2024 (Owl Surveys); and June 13, 2023 and June 23, 2024 (Breeding Bird Surveys): Fulton Lavender and Richard Hatch.
- May 18, 2022: Mark Pulsifer, M.Sc. for a wildlife survey
- August 8, 2023: Heather Levy (B.Sc. Hons. Environmental Science), Sean Timpa (M.Sc. Geology) and Kyra Scott (B.Sc. Biology); and July 14, 2023 Patrick Stewart, M.Sc., for site reconnaissance.

3 SITE LOCATION AND STUDY AREA

The Kemptown Quarry in Colchester County is located approximately 6.8 kilometers north of the community of Kemptown and 8.0 kilometers south of Earltown, Colchester County, Nova Scotia at approximately UTM Easting 0490970 and Northing 5041031, Zone 20, NAD83, and PID 20343422. The quarry is accessed by a gravel lane leading off the Kemptown Road, which connects to Highway 104 via the Loop Old Hwy 4 and

Pictou Road. The study area for the assessment is shown on Figure 1; and illustrated in Figures 2 to 4. The proposed quarry development area will be located entirely within the EA study area (i.e. PID 20343422).

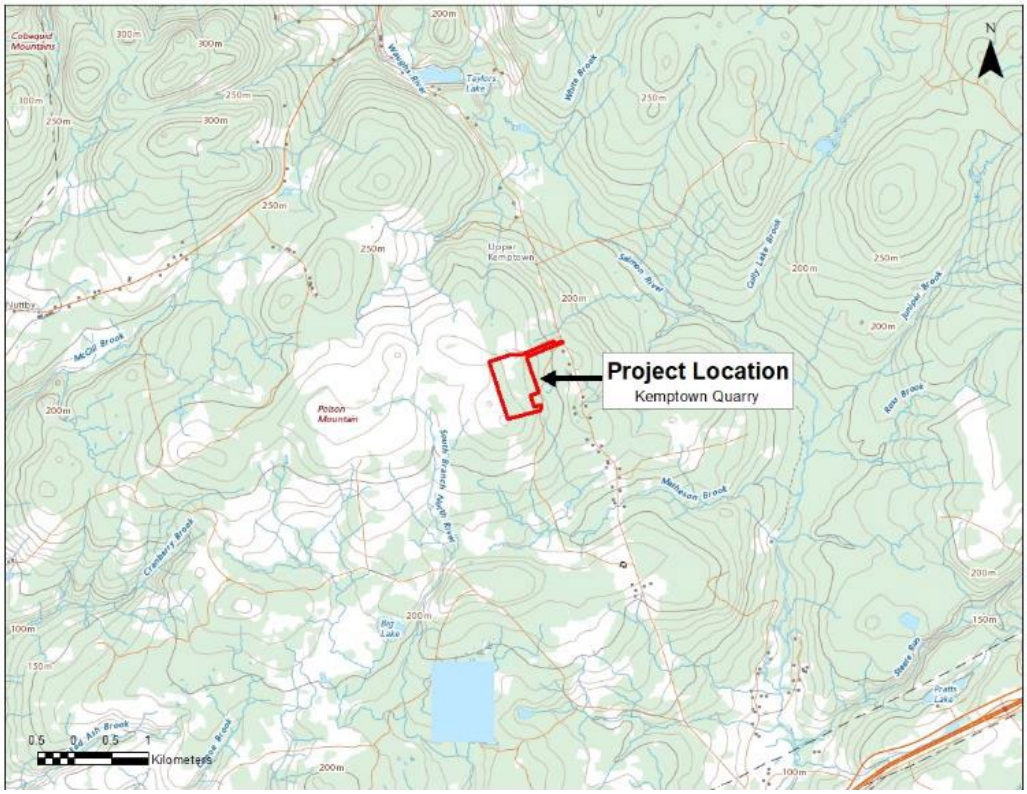

Figure 1. Project location shown on NTS 1:50,000 mapping (11E06).

Figure 2. View of the Kemptown Quarry, August 8, 2023.

Figure 3. View of the Kemptown Quarry asphalt plant, August 8, 2023.

Figure 4. Stockpile area on the north end of the quarry, August 8, 2023.

4 EXISTING ENVIRONMENT

4.1 PHYSICAL ENVIRONMENT

4.1.1 Climate and Winds

The Kemptown Quarry is located in inland Nova Scotia, at an elevation of approximately 255 to 295 metres above sea level. The site is thus expected to experience high winds associated with weather systems due to its elevation, and as well as a severe climate due to its distance from the coast. The site is located in the Cobequid Hills Ecodistrict 340 (Bush and Baldo, 2019) which has the highest mean annual snowfall in mainland Nova Scotia (300 cm) but the lowest mean annual precipitation within the Nova Scotia Upland Ecoregion (1200 mm). Average daily temperatures are moderate, ranging from a low of -7.7 °C in January to 18.6 °C in July and an annual average of 5.7 °C (Canadian Climate Normals 2024) (Figure 5). The Cobequid Hills Ecodistrict has a high annual average precipitation of 1455 mm (measured at Jackson), about 23% coming as snow, mainly in December through March (Canadian Climate Normals 2024). Rainfall is heaviest from September to November. Frequency and severity of extreme weather events are expected to increase as a result of effects of global warming on weather systems. Extreme daily precipitation events can be expected associated with thunderstorms due to the elevation, which forces winds upward, and consequently areas like the Cobequid Hills are prone to local cloud and thunderstorm formation and shower activity (NavCan 2013). Wind patterns are similar to other locations in central Nova Scotia—generally strongest in winter, predominantly from the southwest to northwest (December-February), shifting to southwest for the remainder of the year (Environment and Climate Change Canada 2016). Although winds are generally lower during the summer months, summer winds from the southwest are the strongest of the year.

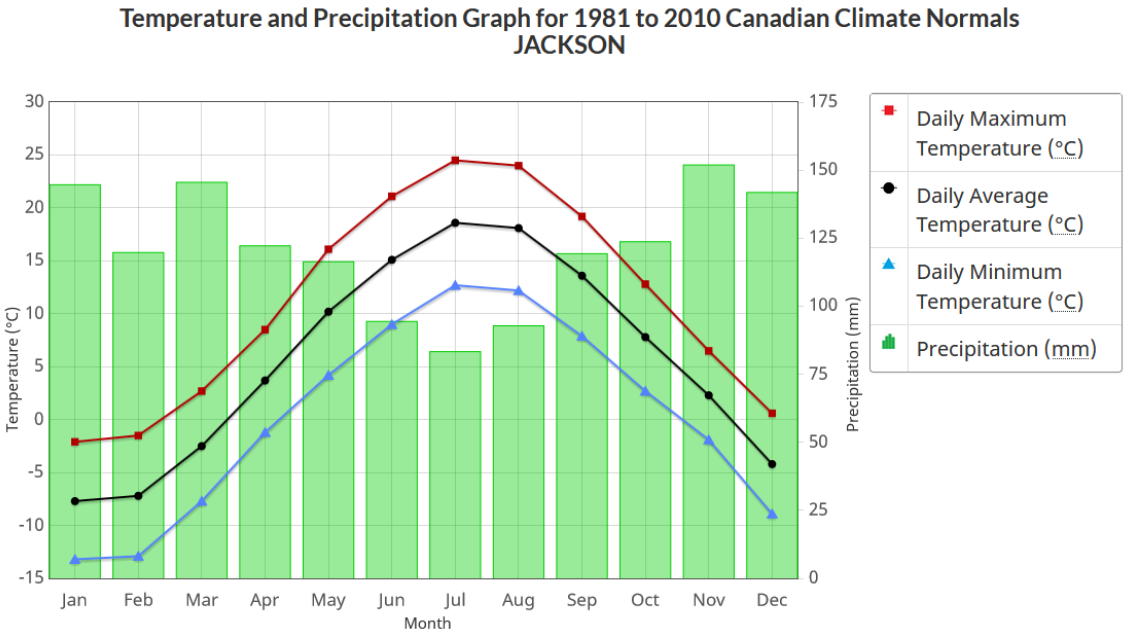

Figure 5. Annual precipitation and temperature cycle, Jackson (1981-2010) (Canadian Climate Normals 2024).

4.1.2 Topography and Geology

4.1.2.1 Landscape

The Kemptown Quarry and associated study area for the environmental assessment are located in the Cobequid Hills, a prominent landscape feature which forms the focal point of Ecodistrict 340— a roughly 150 km long northwest-southeast oriented ellipsoid stretching from west of Pictou to near Cape Chignecto (Bush and Baldo 2019). Physiographic conditions tend to be similar within the ecodistrict, including a gently-rolling to steeply-sloped terrain and soils which provide good to moderate drainage. Elevations are generally 200 to 300 m above sea level, including one of the highest points in mainland Nova Scotia, Nuttby Mountain at 360.6 m located approximately 9.3 km northwest of the quarry. Wetlands occupy only 1.5% of the area, due to the lower precipitation, generally well-drained soils, and steep topography (Bush and Baldo 2019). Hardwood forest cover predominates (about 66%), with smaller amounts of mixed forest and softwood forest and a small proportion (1.5%) occupied by wetlands. Predominant hardwoods are Sugar Maple, Yellow Birch, White Ash, and American Beech on hilly topography and slopes with well-drained soils (Bush and Baldo 2019). Softwood dominants are Red Spruce and Black Spruce on hummocky terrain and plateaus with imperfectly drained soils. Mixed woods include all of the species present in the hardwood and softwood forests and typically occupy hummocky uplands.

Topography at the Kemptown Quarry site is comparatively level, sloping gradually (~ 5% slope) from southwest to northeast in the southern part; and east to southeast in the northern part. The typical landscape at the quarry is illustrated in Figures 6 and 7). Most of the site was previously regenerated mixed forest which had been clearcut in early 2023. This area is comparatively level (5.5% slope southeast). Much of the rest of the site which previously had been regenerated mixed or coniferous forest was cut at the same

time[1]; however a small stand of regenerated deciduous forest remains at the southwest corner of the property (Figure 8). Several wetlands occurring in the northern half of the site (see Section 4.2.4) include a treed swamp / bog along the western edge of the property, and localized marshes and swamp which have been largely disturbed by recent and perhaps also by past tree harvesting operations. A natural pond and associated riparian marsh occur near the northern boundary of the site. Soil on the quarry site is shallow, stony and well-drained with limited use for agriculture, although more fertile soils occur immediately to the south of the quarry (Stea *et al.* 1992). Hardwood forest and mixed forest (Figures 8 and 9) forms the land cover in the general of the study site, and recent logging in the surrounding area of the quarry has reduced overall natural forest cover there.

Figure 6. South view of the development area, taken from the approximate middle of the study area, August 8, 2023.

1 . The property owner had conducted a salvage operation on the stands, which had been blown down during Hurricane Juan.

Figure 7. North view of the study area from the approximate middle of the study area. Present quarry shown in the distance. August 8, 2023.

Figure 8. Deciduous forest in the southwest corner of the site, Kemptown Quarry, August 8, 2023.

Figure 9. Typical mixed forest west of the study area, Kemptown Quarry, August 8, 2023.

4.1.2.2 Bedrock Geology

The Kemptown Quarry is located over granite bedrock of the Salmon River Pluton (Donohoe and Wallace, 1982; Murphy et al. 2001) (Figure 10). The granite intrudes Neoproterozoic gabbro and diorite and is in faulted contact with the sedimentary rocks of the Pictou and Mabou groups to the south and the Nuttby and Boss Point formations to the east. A currently unnamed geological unit has been broken out of the Nuttby Formation to the west of the granite (Murphy *et al.* 2001) and, depending on the interpretation of the granite's age, this unit either overlies or is intruded by the granite. To the northwest the granite intrudes the volcanic rocks of the Byers Brook Formation and the sedimentary rocks of the Diamond Brook Formation (Keppie 2000).

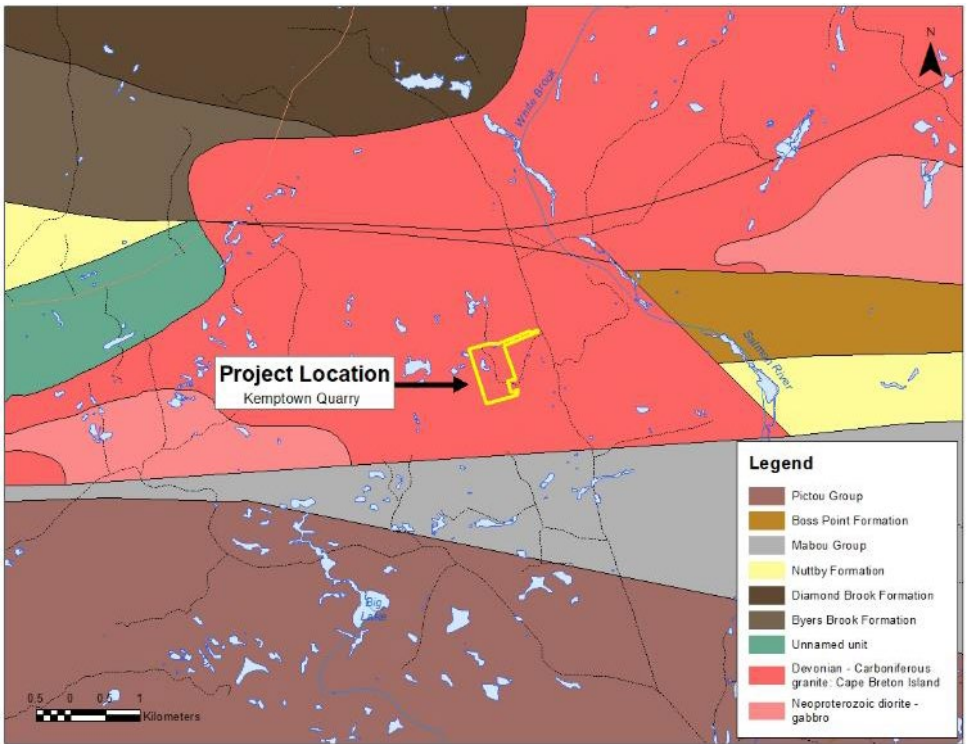

Figure 10. Bedrock geology in the vicinity of the Kemptown Quarry (Keppie 2000).

4.1.2.3 Surficial Geology

The landscape near the Kemptown Quarry is gently rolling with moderate elevation. A shallow layer of silty basal till overburden covers the granite bedrock, with bedrock exposures occurring in the vicinity, especially to the north (Figure 11). A deeper layer of silty basal till occupies most adjacent areas (Stea *et al.* 1992). To the north and south, surficial deposits are dominated by glacially-derived material, in the north consisting largely of stony basal till and material characteristic of moraine deposits; and similar morainic deposits to the south. Coarser, well-sorted deposits are associated with flows during glaciation including kame and esker deposits, also occur in the area, some of which have been reworked by the Salmon River to yield more recent alluvial sediments. Small deposits of organic material such as peat or gyttja occur near lakes or large wetlands.

Of all these deposits only the silty basal till has significant agricultural potential, with the other sediments being nutrient-poor, stony, and either too poorly-drained or too well-drained. The glaciofluvial sediments have the potential to be sources of aggregate (Stea et al. 1992).

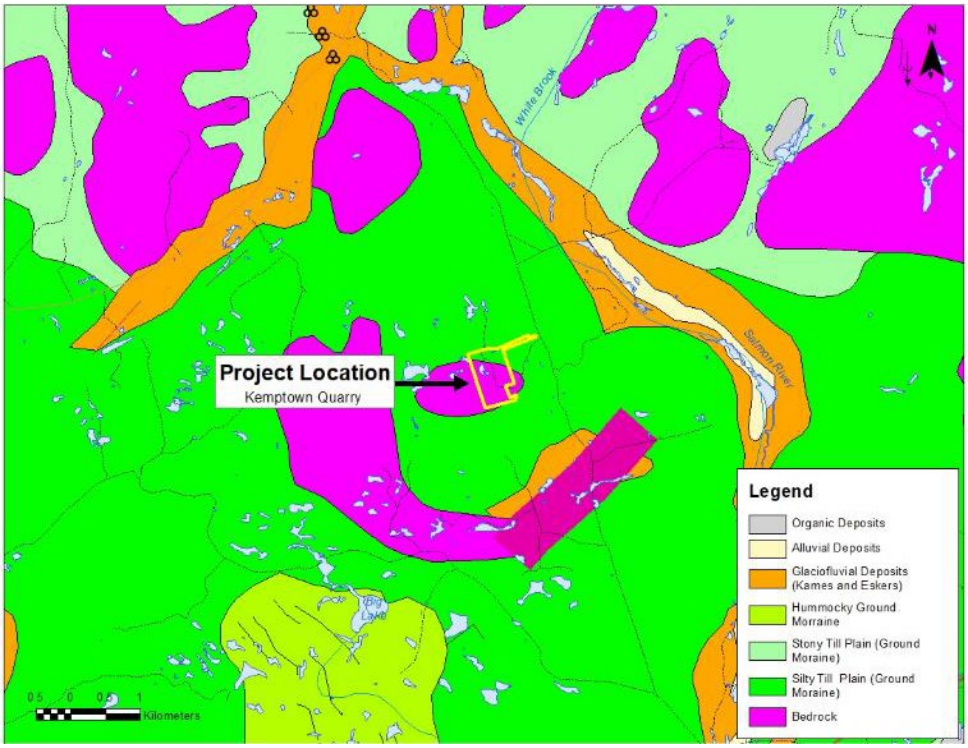

Figure 11. Surficial geology in the vicinity of the Kemptown Quarry (Stea et al. 1992).

4.1.3 Air Quality, Noise & Light

The Kemptown area experiences low levels of artificial light, ambient noise, and high air quality. No large urban centres occur in the area which could be a source of artificial light. Ambient noise levels at the quarry reflect traffic noise along the Kemptown Road, as well as noise from traffic and operations of the quarry. Air quality is expected to be good due to the remote rural location and predominantly natural setting.

Vehicle lights from Highway 104 and Pictou Road, and yard lights from residences in the vicinity, would be the main sources of artificial light at the site, and due to the low population density, light levels are expected to be low. If lighting was used at the quarry for nighttime operations, 'skyshine' from operations when low clouds occur might be seen from adjacent communities of Kemptown and Earltown.

The vicinity of the Quarry is expected to have relatively high natural baseline air quality typical of areas with a high proportion of natural landscapes such as neighbouring forested wilderness areas. Low levels of human activity, including vehicle traffic along Highway 104, Pictou Road, and Kemptown Road, as well as that associated with quarry activities, have little impact on overall air quality at the site. Dust and vehicle exhaust emissions from quarry activities as well as regular residential vehicle traffic are the main contributors to particulates and exhaust emissions, which are expected to be at moderate levels as a result of these activities.

The quarry and associated movement of trucks and equipment would continue to provide a minor and periodic source of noise in the area. Operations at the quarry are periodic in response to demand for product and are likely one of the main noise sources in the area. Operational noise would not be heard in the closest

communities to the site—Kemptown and Earltown. Blasting occurs typically one to two times per year during years in which the quarry is active. Operation of a portable crusher, asphalt plant, and heavy equipment may take place periodically and temporarily add to noise levels when the quarry is in operation. Trucks are used to transport product and move the portable equipment as required. Typical noise includes blasting and sounds from the crusher, asphalt plant and other heavy equipment operations (e.g. motors, generators, back-up signals etc.). As it is a new development, the scope of operations, including annual production, for the quarry is presently unknown, but will likely add to noise levels combined with levels from an adjoining active quarry. Ambient noise levels in general are expected to be localized to the vicinity of the quarry. All trucks leaving the site are required to follow best operational practices established by Truckers Association of Nova Scotia (TANS) and the Nova Scotia Road Builders Association (NSRBA), to minimize emissions. Noise levels arising from the quarry in the future will continue to meet the limits established in the Nova Scotia Pit and Quarry Guidelines (NSECC 2009) and are expected to be consistent with those produced by the existing quarry operations at the site.

4.1.4 Hydrology

The Kemptown Quarry is located on the divide between the 1DH-6 and 1DH-4 secondary watersheds that drain into Salmon River to the east and North River to the west, respectively, and then into Minas Basin of the Bay of Fundy (Figure 12). Both secondary watersheds are a part of the greater Salmon River primary watershed. Uplands have shallow to non-existent overburden and occasional bedrock exposures, leading to rapid runoff after precipitation events overland; into ditches; or through intermittent flowages. There are no watercourses on the site; however some runoff is expected to follow ditches along the main access road; and within the quarry property.

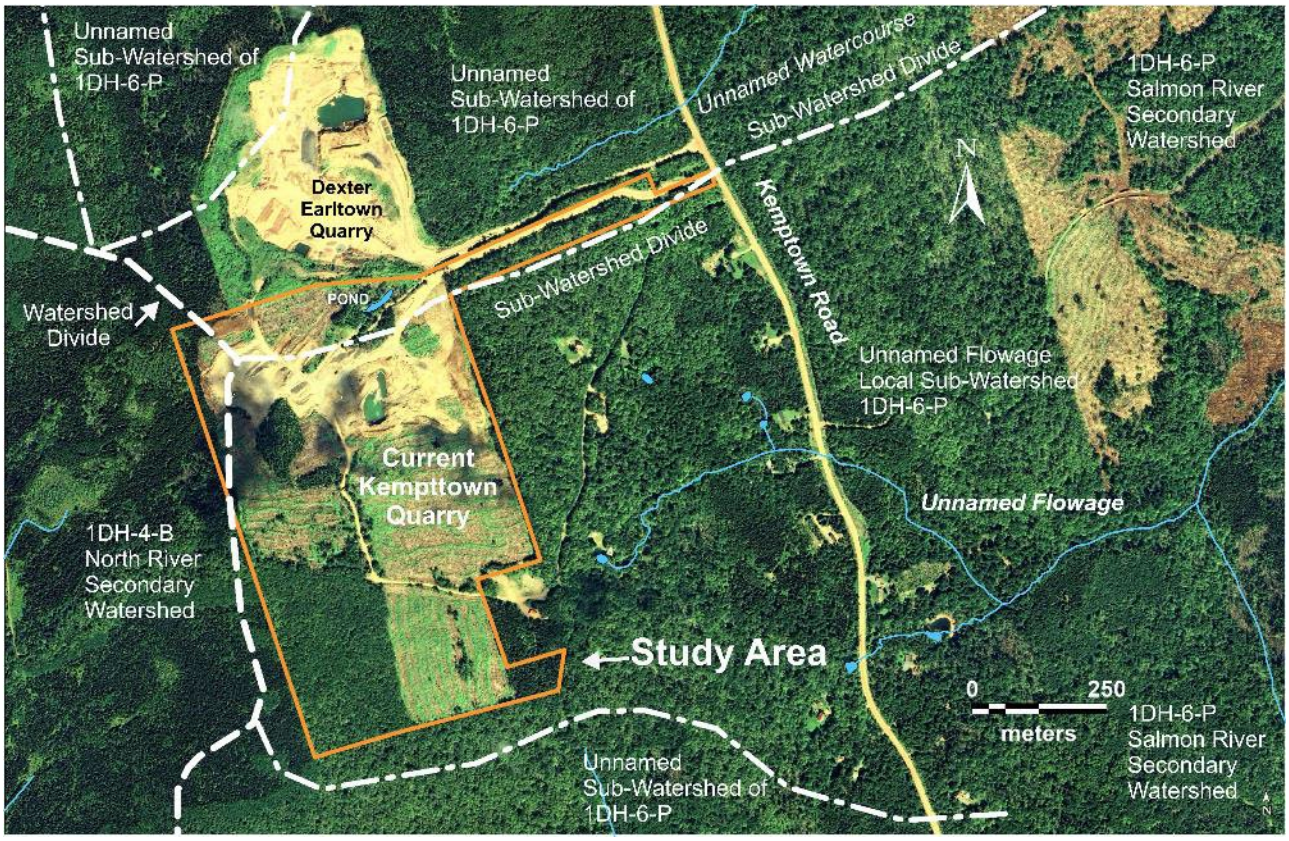

Figure 12. Surface waters in the vicinity of Kemptown Quarry and watersheds.

A small artificial pond and marsh occurs at the northeast corner of the property, and is not connected with any surface watercourse. An unnamed flowage originates off-site southeast of the Quarry (Figure 12). Surface flow away from the eastern side of the quarry was noted to be evenly distributed where the slope meets the Upper Kemptown Cross Road. Flow toward the west is likely to be negligible due to the level topography and the position along the 1DH-4 watershed boundary (Figure 12) that intersects the property.

Flows in watercourses in the vicinity of the site are expected to follow a seasonal pattern, with highest flows in the fall (October-December), declining during the winter as snow accumulates, peaking after snow melt in spring (April) and dropping to low, or non-existent levels in summer (July-September)—which is the pattern shown by the Salmon River (Figure 13). Much of the Salmon River watershed is forested and flows are expected to be moderated from sudden precipitation events, the occurrence of which is increasing overall due to patterns of climate change. Although increased flashiness of flows leaving the quarry may be expected, the Kemptown Quarry development area (30.6 ha) occupies only 0.30% of the 1DH-6 secondary watershed (10,119.4 ha) and 0.59% of the 1DH-4 secondary watershed (5112.0 ha), and therefore is not expected to impact flows to a significant degree. Impermeable surfaces such as access roads tend to channel some of the flow into ditches which will be dissipated passing downslope towards the surrounding watercourses.

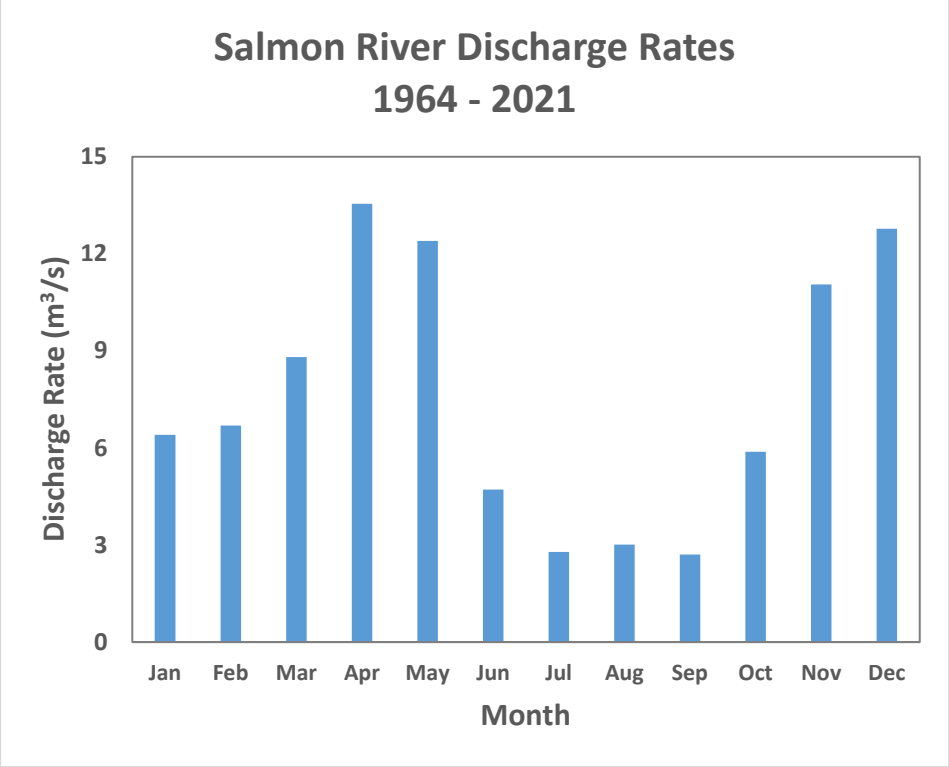

Figure 13. Seasonal pattern of streamflow in the vicinity of the site represented by average monthly discharge, Salmon River at Murray, 1964 to 2021 (watershed area = 390 km2). Salmon River is located approximately 3 km east of the quarry.

4.1.5 Hydrogeology

The site is underlain predominantly by granite bedrock, with a thin veneer of glacial till and surface soil, and groundwater develops mainly in cracks and fractures, on horizontal surfaces between strata in bedrock, as well as in shallow till at the site. The deep bedrock water table at the site will be below the floor of the quarry based on current understanding of drainage characteristics of the study area. The actual depth of the bedrock water table at the quarry site is not known, but it was not encountered during initial quarry operations, and it is not anticipated that the quarry development will reach the bedrock water table. Surficial and shallow groundwater flow is anticipated to mirror the topographic slope, which although disorganized, flows predominantly east.

Slight depressions in level, near-surface bedrock at the site has resulted over time in the accumulation of surface water, resulting in the development of wetlands which occur in parts of the property at the site. Most precipitation entering these wetland areas would flow off-site rather than being absorbed into the bedrock system underlying the site.

Precipitation reaching the quarry footprint is expected to infiltrate the quarry floor as seepage through cracks and fractures. Occasionally, retained surface water may accumulate on exposed bedrock, although it is not an expression of the groundwater table.

4.1.6 Soils

The parent material for soils is a sandy glacial till, and soils which have developed at the site are characterized as Wyvern Unit—a rapidly to well-drained yellowish-brown gravelly sandy loam over compact dark yellowish brown gravelly sandy loam derived from shallow, stony till (Webb *et al.* 1991). The coarse fraction is derived predominantly from local granite. The soils are usually thin and have negligible capability for agriculture. Low hydraulic conductivity of the shallow bedrock below in some areas with negligible to gradual slope near the site leads to retention of water in perched water tables in some locations, leading to occurrence of wetlands some peat accumulation. Wetlands in the vicinity are underlain by peat but not deep enough for commercial use (Anderson and Broughm 1988).

4.2 Biological Resources and Habitat

4.2.1 Terrestrial Environment

Primary terrestrial habitats within the study area include mixed woodland, deciduous woodland and several wetlands including a treed bog, a pond and several marshes (Figures 14 and 15). Most areas have been recently cut over, with the exception of a treed bog on the west side of the property. The southwest corner of the proposed development supports a natural stand of predominantly shade-tolerant deciduous forest that are regenerating (Map A-3). The study area is bordered by tolerant mixed woodland, which appears to have occupied much of the property prior to clear cutting.

No invasive species were found at the site, and the majority consisted of both native species with secure populations in Nova Scotia, as well as exotic species. The single exception was American Beech, which is provincially listed as S3/S4 vulnerable, which occurred in regenerating forest at the southwest corner. Plant species found at the site during June 13, 2023 and September 13, 2023 (late spring/early summer and fall) botany surveys, are presented in the survey report (Appendix B).

A large proportion of the woodland at this site has recently been clearcut. It is believed that much of the site was composed of mixed and/or coniferous woodland prior to clear-cutting. Remaining small patches of mixed woodland (20T 0490908 5040807) adjacent to the clearcut include various tree species: white spruce (*Picea glauca*), balsam fir (*Abies balsamea*), yellow birch (*Betula alleghaniensis*), trembling aspen (*Populus tremuloides*), white birch (*Betula papyrifera*), wire birch (*Betula populifolia*) and red maple (*Acer rubrum*). Herbaceous species present include wood aster (*Oclemena acuminata*), bluebead lily (*Clintonia borealis*), wild-lily-of-the-valley (*Maianthemum canadense*), wild sarsaparilla (*Aralia nudicaulis*), Northern starflower (*Lysimachia borealis*), lady fern (*Athyrium filix-femina*), northern beech fern (*Phegopteris connectilis*), and spinulose woodfern (*Dryopteris carthusiana*).

Figure 14. Remnant patch of woodland between quarry access road and edge of large clearcut. Photos by R. Newell, June 13, 2023 botany survey (*left*); Heather Levy August 8, 2023 (*right*).

Figure 15. Cutover/grubbing in proposed development area located to the south of the active quarry pit.

Mostly undisturbed, scattered small stands of mixed woodland occur in the vicinity of a pond at the north end of the property (Figure 16). Tree species present within this habitat include wire birch (*Betula populifolia*), white birch (*B. papyrifera*), trembling aspen (*Populus tremuloides*), large-toothed aspen (*P. grandidentata*), red maple (*Acer rubrum*), White Spruce (*Picea glauca*), and balsam fir (*Abies balsamea*). Shrub and herbaceous species present include lowbush blueberry (*Vaccinium angustifolium*), bunchberry (*Cornus canadensis*), Northern starflower (*Lysimachia borealis*), wild lily-of-the-valley (*Maianthemum canadense*), red elderberry (*Sambucus racemosa*), rough goldenrod (*Solidago rugosa*), common speedwell (*Veronica officinalis*) and hay-scented fern (*Dennstaedtia punctiloba*).

Figure 16. Mixed woodland around the edges of a pond at the north end of the survey area. Photo by R. Newell, June 13, 2023 botany survey.

A relatively rich, deciduous woodland occurs in the southwest corner of the proposed development are (Figures 8 and 17). It appears to have been clearcut at some point in the not too distant past but has since regrown considerably. Tree species found here include balsam fir (*Abies balsamea*), mountain maple (*Acer spicatum*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*). Shrub species present include hobblebush (*Viburnum lantanoides*) and red elderberry (*Sambucus racemosa*). Herbaceous species present include yellow trout lily (*Erythronium americanum*), Carolina spring beauty (*Claytonia c*aroliniana), nodding trillium (*Trillium cernuum*), rose twisted stalk (*Streptopus lanceolatus*) and large false Solomon's-seal (*Maianthemum racemosum*). Several sedge species are also present including black sedge (*Carex arctata*), finely-nerved sedge (*Carex leptonervia*), fibrous-root sedge (*Carex communis*) and brownish sedge (*Carex brunnescens*). American beech (*Fagus grandifolia*) was the only vascular plant species of conservation concern observed in this habitat during this survey. American beech is an S3S4/vulnerable to apparently secure/(yellow) species.

Figure 17. Deciduous woodland occurring along the south and southwest corner of development area of the quarry property. Photo by R. Newell, spring botany survey, June 13, 2023.

Several wetlands also occur within the study area, predominantly occurring near the north and northeast boundary of the study area. Wetlands include two more or less intact marshes, a highly disturbed marsh, and a treed bog. Refer to Section 4.2.4 Wetlands for detailed descriptions of wetlands within the Kemptown Quarry study area.

4.2.2 Freshwater Aquatic Environment

The only surface water features on the site include an artificial pond located on the northeast corner (Figure 16 and Figure 18, Left); and a dugout on the eastern edge of the treed bog (Figure 18, right). Several smaller areas of open water occur as the result of depressions created by recent or past logging activity at the edges of wetlands (Figures 19 and 20). There are no watercourses on site. The nearest watercourses occur off-site as intermittent streams, one of which originates at the entrance to the adjacent quarry north of the site and flows east; and a second (an unnamed flowage which is a tributary of Salmon River) which arises in a small permanent pond east of the site, and flows east (Figure 12).

The northeast pond is a remnant of a dugout which was reported by the property owner as having been created during early logging activities. It is an estimated 3 m deep, 70 m long and ~9 m wide (0.06 ha total area). It is surrounded by a mixed woods and has shrub swamp and graminoid marsh components. The pond may have been occupied periodically by beavers, as felled trees near the shore were present. Nearshore sediments of the pond are predominately soft with occasional cobble and boulder and emergent and submergent vegetation, woody debris and some leaf litter. Aquatic animals found in the pond during reconnaissance survey include green frog, salamander larvae, and tadpoles (Figure 31).

Figure 18. Left: Pond located in the northeast corner of the study area: Right: Dugout. August 8, 2024.

Figure 19. Intermittent open water areas resulting from recent and past disruption of drainage at the Kemptown Quarry site, August 8, 2023.

4.2.3 Water Quality

Water samples and water quality measurements were taken at three locations where standing water was present on August 8, 2023 (Figure 20). Temperatures were warm and characteristic of the time of year (16.6 – 20.0°C). Specific conductivity at all sites was low and ranged from 20.7 – 36.0 µS/cm. Water was clear and Total Suspended Solids (TSS) levels were low (Table 1) ranging from <0.5 mg/L to 21.5 mg/L the latter with high levels of natural organic particulate matter present. pH values were low and ranged from 4.1 to 6.6 with the most acid conditions occurring in wetland or wetland-influenced areas, as is typical for such areas. Bolded values indicate where the CCME Guidelines for Protection of Freshwater Aquatic Life (CCME 1999) were exceeded. Locations for water quality measurements are shown in Figure 21.

Table 1. Water quality measurements in surface waters at the Kemptown Quarry August 8, 2023. Locations are shown in Figure 21.

Bolded values exceeded the Freshwater Aquatic Life Guidelines.

Site Location & Date	August 8, 2023					Freshwater Aquatic Life Guidelines
	Kemptown Quarry					
	P-DS	P-US	CA-US	CA-DS	CB-US	
Site Description	Pond Downstream	Pond Upstream	Culvert A Upstream	Culvert A Downstream	Culvert B Upstream	--
Temperature °C	19.2	20.0	19.7	20.0	16.6	<20[1]
Conductivity (µS/cm)	30.6	36.0	23.8	20.7	30.4	--
Specific Conductivity (25°) (µS/cm)	34.8	40.4	26.4	22.8	36.2	--
pH	6.6	6.6	**6.1**	6.5	**4.1**	6.5 to 9.0[3]
TSS (mg/L)	<0.5	11.5	21.5	10.0	1.5	>25 mg/L[4]
Appearance	Clear	Clear	Clear, Organic matter present	Clear	Clear	--

Note: TSS = Total Suspended Solids.

1. **Thresholds of 20° C are used as indicators of stress to aquatic species, particularly salmonids (DFO 2012).**
2. **CCME, Canadian Council of Ministers of the Environment. 1999. >9.5 mg/L early life stages; >6.5 mg/L other, cold water ecosystems.**
3. **CCME, Canadian Council of Ministers of the Environment. 1999.**
4. **Exceedance of normal level.**

Figure 20. Photos of open water along the access road sampled for water quality. Locations are shown in Figure 21.

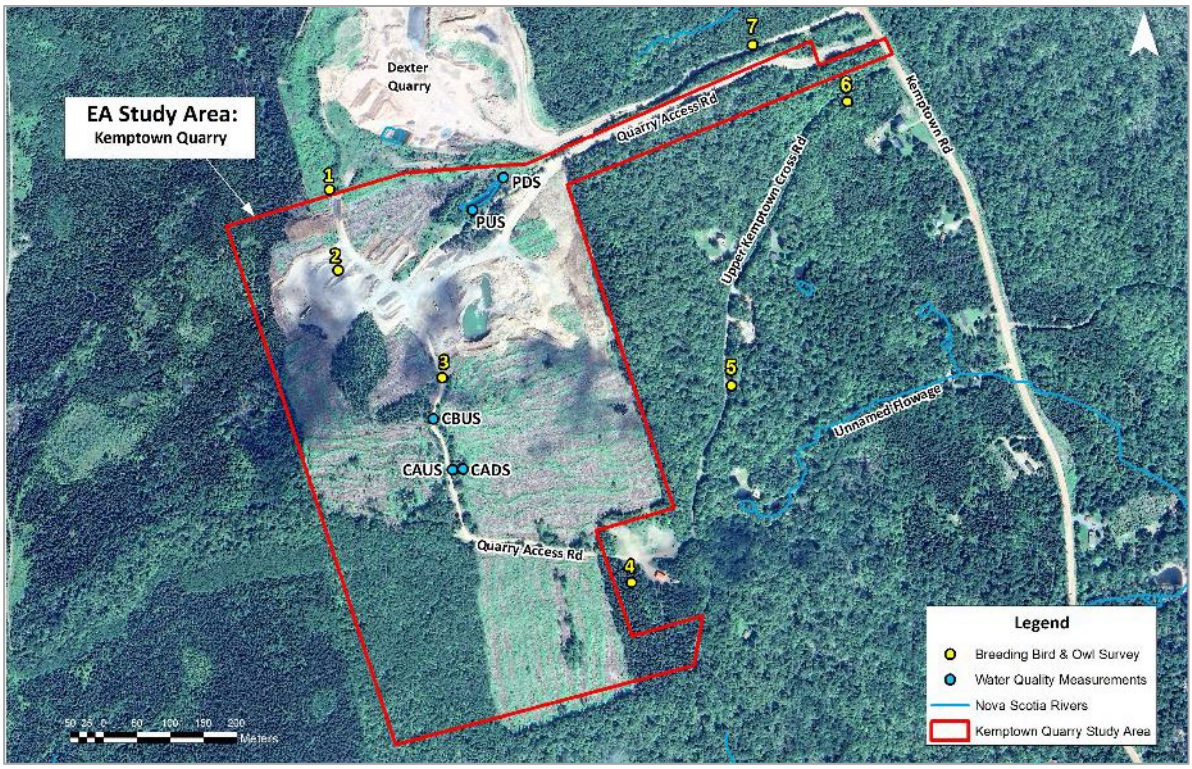

Figure 21. Survey locations for water quality (2023).

4.2.4 Wetlands

Wetlands are areas of land that are periodically or permanently flooded, have characteristic soils, and support particular types of vegetation which are adapted to life in such environments. The quarry property and proposed development area are largely level to slightly sloping and wetlands have developed in shallow depressions, in particular where shallow surface soil conforms to the features of the bedrock closely beneath. Locations of wetlands are shown in Figure 25. A wetland complex (W1, Figures 16 and 27) which includes a graminoid marsh and shrub swamp surrounds the pond at the northeast corner of the property; two small marshes (WL3 and WL4); a recently logged area with marsh-like features due to disturbance from equipment (WL5)(Figures 22 to 24); and a treed bog (WL2) (Figure 26; Table 2). The area where WL5 is located has most recently been a second growth red spruce plantation, and therefore had experienced disturbance from earlier logging activity. Plant species found in these areas are presented in the Botany Survey Report, Appendix B.

Figure 22. Small treed sphagnum swamp in southeastern section of WL2 (Figure 22) (left); graminoid marsh in WL1 (right) at Kemptown Quarry, August 8, 2023.

Figure 23. Treed wetland (WL5) disrupted by logging activity (right). Kemptown Quarry, August 8, 2023.

Figure 24. Disturbed area containing marsh vegetation adjacent to a large clearcut. Photos by R. Newell, June 13, 2023.

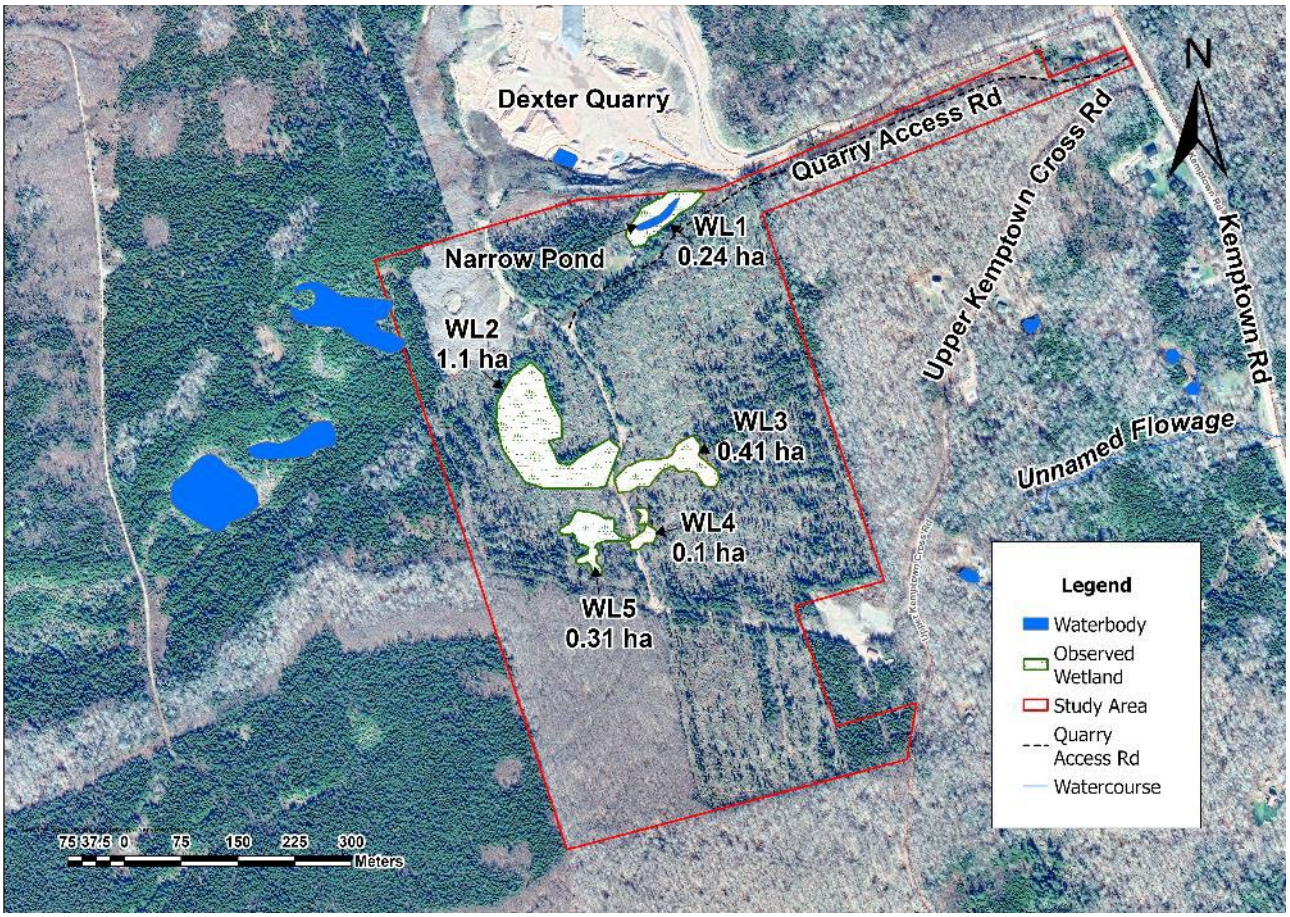

Figure 25. Wetlands at Kemptown Quarry.

Table 2. Wetlands, Kemptown Quarry Development. Locations shown in Figure 22. Areas presented are for the entire wetland.

Wetland	Area (ha)	Wetland Type and Comments
WL1	0.24	Graminoid Marsh / Shrub Swamp
WL2	1.1	Treed Bog / Sphagnum Swamp
WL3	0.41	Disturbed Marsh
WL4	0.1	Disturbed Marsh
WL5	0.31	Disturbed Marsh

Figure 26. Treed bog (WL2) located in the northwest quadrant of the survey area. See WL2, Figure 22. Photo by R. Newell, June 13, 2023.

Figure 27. Graminoid marsh in wetland complex (WL1, Figure 22) around pond associated with permanent pond at north end of study area. Photo by R. Newell, June 13, 2023.

4.2.5 Fish & Fish Habitat

The permanent pond at the north end of the study area was the only potential location for the occurrence of fish, but no fish were seen at the time of the survey[2]. There was no downstream connection found this pond. There are no watercourses on site which could support fish and there are no connections with the unnamed flowage which arises southeast of the site. Precipitation is the primary sources of surface water and is seasonally intermittent. Surface water small ponds in wetlands are connected by a culvert under the central access road on the property where water quality sampling was conducted (Figure 21). No fish were captured in the located within the study area.

4.2.6 Birds

4.2.6.1 Background and Methods

Birds are one of many animal groups which live in the natural environments at the site and which contribute to the functioning of the terrestrial and wetland ecosystems in the vicinity of the Kemptown Quarry. Occurrence of birds was assessed by means of reviews of available literature; as well as standard surveys for owls and breeding birds.

Owl surveys following the Birds Canada Nocturnal Owl Survey Protocol were conducted by birders Fulton Lavender and Richard Hatch on May 21-22, 2023[3] and May 13, 2024 at pre-selected locations on the site (Figure 28). Breeding bird surveys took place on June 13, 2023 from 0500 hrs to 0710 hrs; and on June 23, 2024 from 0500 to 0743 hrs. While birders were on site they listened for the presence of Common Nighthawk, a species of conservation concern may occur in the area. Observers were at the quarry within the breeding window for Common Nighthawk (June 15 and July 15) and observations were made when the conditions were considered suitable according to the protocol (i.e. winds less than 3 Beaufort scale and no precipitation).

The purpose of the breeding bird and owl survey is to provide a 'snapshot' at one point in time of birds using the forests and other areas adjacent to the quarry. Bird populations in terms of their characteristic species and abundance, vary significantly in time and environmental conditions. Consequently the species list and approximate abundance which use the major habitats in the vicinity of the quarry or pit, is intended to provide a general, not absolute, indication of local occurrences of birds. When used with additional confirmatory information to that available from other sources as done here such as the Maritime Breeding Birds Atlas (https://www.mba-aom.ca/) and conservation databases such as the Atlantic Canada Conservation Data Centre (ACCDC), the breeding bird survey can provide a good overview of species

2 A GoPro video camera was deployed in the pond for the duration of the site visit.

3 The owl survey could not be conducted earlier in the season in 2023 (e.g. April – early May) because of late timing of initiation of the project. Owls were surveyed by a combination of both taped playback and silent listening at the quarry in the late evening to early morning hours.

presence for environmental assessment purposes. Conditions at the time of the surveys were suitable to achieve the purpose of the surveys including low winds and no precipitation.

Owls were surveyed by a combination of both taped playback and silent listening at the quarry from 2100 hours to 2300 hrs at points on roads (Figure 28). A standard tape recording of Barred Owl, followed by Boreal Owl, was played, followed by a listening period. After the call survey, the observers drove to the observation points and listened until past midnight for any additional owls which might be present.

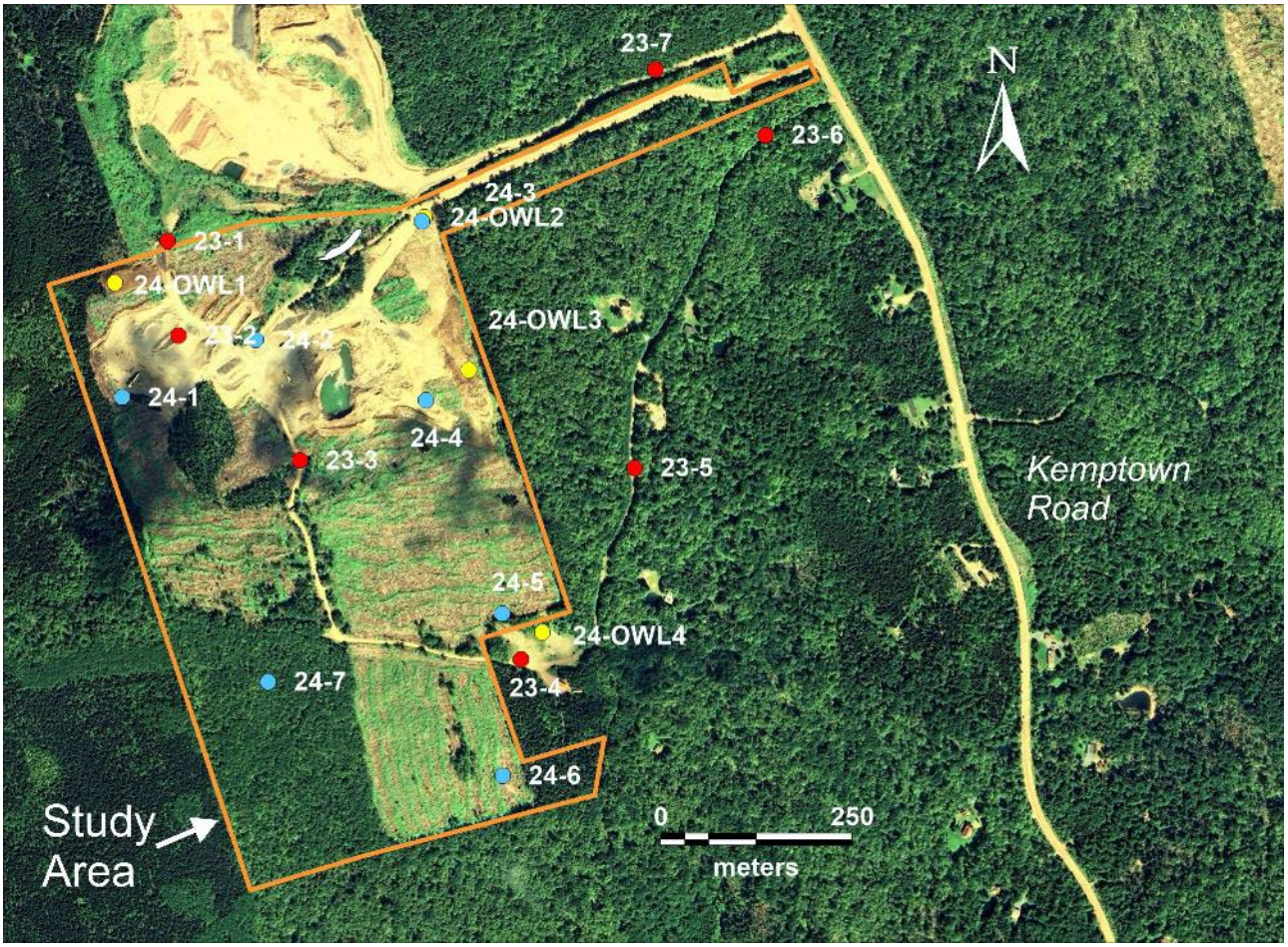

Figure 28. Surveys for owls and breeding birds, 2023 and 2024. In 2023, the same points were used for both owl and breeding bird surveys.

The breeding bird survey used a generalized point-count protocol comparable to other surveys of its kind (e.g. Huff *et al.* 1993; Ralph *et al.* 2000)(Figure 28). For the breeding bird surveys, the observers visited the pre-selected survey points, which were a similar distance apart; were representative of adjacent forest communities; and which would have minor overlap in calls heard. The forest at the quarry had been recently clear-cut which allowed maximal hearing range. The surveys began approximately at dawn—on June 13, 2023 from 0500 hrs to 0710 hrs; and on June 23, 2024 from 0500 to 0743 hrs. At each site, the principal observer listened for 10-minutes, and the assistant noted all birds heard by the observer, or seen (e.g.

flyovers) recording observations in distance ranges of 0-50m, 50-100 m and >100 m; and approximate direction. Surveys were conducted when weather conditions were calm; in the absence of fog; and in the absence of rain, which both interferes with hearing and diminishes songbird activity. In addition to standard surveys, birders conducted a reconnaissance walkover of the quarry site in the evening, and thus were prepared to identify species including Common Nighthawk. The Canadian Nightjar Survey protocol (https://wildresearch.ca/) was used as guidance; however it focuses on road transect surveys with locations 1.6 km (1 mile) apart, and therefore the quarry would constitute only a single point. Common Nighthawk are most vocal in the early evening (from slightly before sunset into the night).

4.2.6.2 Bird Species of Conservation Concern

No species of conservation concern listed in federal or provincial legislation were found in either the owl survey or breeding bird surveys. American Woodcock were numerous when observed during the May 2024 owl survey. The site doesn't have suitable habitat for the species and they were not recorded again at the site. The species is of national / continental concern due to low population numbers in North America (Environment Canada 2013). It typically occurs in mixed wood and early successional forests but not in either coniferous or deciduous forests, although it is found in shrub habitat. The species has been affected by pesticides, habitat loss, and shifts due to climate change (Environment Canada 2013). No nighthawks were detected during the surveys although it may be present in the area. The species is (*Threatened)* both federally and Provincially (conservation status S2B)

4.2.6.3 Breeding Birds

Various species of birds occur in the general vicinity of the site, documented by the Maritime Breeding Bird Atlas and summarized for the area in Table 7. Dominant bird species (those occurring most frequently and generally in greatest abundance in point-count surveys) which were found in the June breeding bird surveys at the Kemptown Quarry site include: American Robin, White-throated Sparrow, Red-eyed Vireo, Swainson's Thrush, Common Raven, Hermit Thrush, American Redstart, Mourning Warbler, Dark-Eyed Junco and Black and White Warbler, which occurred at 10 or more of the 14 sites overall. Other species occurring at 6 to 8 sites and which were relatively abundant were: Ovenbird, Common Yellowthroat, Black-Throated Green Warbler, Blue-headed Vireo, Magnolia Warbler, Blue Jay and Yellow-Rumped Warbler. Bird communities found in different habitat types at the site are summarized in Table 3 and occurrences in Tables 4 and 5.

American Woodcock were numerous when observed during the May 2024 owl survey. The site doesn't have suitable habitat for the species and they were not recorded again at the site. One raptor species – Broad-Winged Hawk—was seen at the site and believed to be nesting in the mature deciduous woods east of the quarry; a Ruffed Grouse was observed; and a Belted Kingfisher flew over during one of the surveys (Tables 4 & 5). A Pileated Woodpecker was heard at one location in 2023. The species will not be nesting on the site, as there are no large trees which would be suitable for nesting cavities.

Table 3. Breeding bird communities in habitats at Kemptown Quarry site. Surveys were conducted on June 13, 2023 and June 23, 2024. Locations of observation points are shown in Figure 1.

Habitat	Year	Points	Dominant Species and Community Measures
Recently Cutover and Developed	2023	23-1 to 23-3	Dominants: American Robin, Common Raven, Swainson's Thrush, Hermit Thrush, Mourning Warbler, and White-Throated Sparrow, [all sites and moderate abundance]. Secondary: Common Yellowthroat, Ovenbird, American Redstart, Dark-Eyed Junco, Purple Finch, Magnolia Warbler, Black and White Warbler, Yellow-Rumped Warbler, Blue-Headed Vireo, Alder Flycatcher, Winter Wren, and Nashville Warbler. Moderate abundance (38.7 birds /10 min) and diversity (15.7 species per site).
	2024	24-1, 24-5 and 24-6	Dominants: American Robin, Red-eyed Vireo, Mourning Warbler, and Black and White Warbler [all sites]. Secondary: White-Throated Sparrow, Common Yellowthroat, American Redstart, Blue Jay, Song Sparrow and Yellow-Rumped Warbler [two sites]. Moderate abundance (average 37.3 birds/10 min) and diversity (28 species per site).
Mature Hardwood	2023	23-5 to 23-7	Dominants: American Redstart, Common Raven, Swainson's Thrush, American Robin and Blue Jay [all sites, moderate abundance]. Secondary: Black-Capped Chickadee, Red-Eyed Vireo, White-Throated Sparrow, Ovenbird, Black-Throated Green Warbler, Black and White Warbler, Hermit Thrush, Blue-Headed Vireo, Dark-Eyed Junco, Yellow-Rumped Warbler, and Mourning Warbler [all sites, lower numbers]. High abundance (average 50.3 birds /10 min) and diversity (18.3 species per site). A Broad Winged Hawk seen on the quarry site 1n 2024 is thought to nest in this area.
	2024	24-7	Dominants: American Redstart, Red-eyed Vireo, Hermit thrush, Least Flycatcher [abundances of 5 or more per 10 minutes]. Secondary: Black and White Warbler, Dark-eyed Junco Mourning Warbler and Hairy Woodpecker. Highest overall abundance (56.0 birds/ 10 minutes and moderate diversity (16 species).
Clearcut Hardwood	2024	24-4	Dominants: Red-eyed Vireo, Hermit Thrush, Common Raven and Dark-Eyed Junco [abundances of 4 or more per 10 minutes]. Secondary: Two each of Common Grackle, Swainson's Thrush and White-Throated Sparrow. Moderate abundance (44.0 birds / 10 minutes) and low diversity (13 species). A Broad Winged Hawk seen here, is thought to be nesting in the mature hardwood forest east of these sites.
Mixed Forest /Developed	2024	24-2 and 24-3	Dominants: Red-eyed Vireo, White-Throated Sparrow, Dark-Eyed Junco, American Robin at abundances of 2 or more per 10 minutes. Secondary: Single Mourning Warbler and Ruby-Throated Hummingbird occurred at both sites. The site had a low abundance and the lowest of any sites (21.5 birds / 10 minutes) and a moderate diversity (17 species).
Softwood Plantation	2023	23-4	Dominants: Swainson's Thrush, American Robin, Common Raven and White-throated Sparrow [4 or more per site]; Secondary: Blue-headed Vireo, Magnolia Warbler and Ovenbird. Moderate abundance (46 birds / 10 minutes and diversity (17 species per site).

Table 4. Bird species heard or observed during dawn bird surveys conducted June 13, 2023, and June 23, 2024 at the Kemptown Quarry study site (Part A). Locations are shown in Figure 1.

	Cutover Softwoods / Developed				Mature Hardwood			
	2023 (Sites 1, 2, & 3)		2024 (Sites 1, 5, & 6)		2023 (Sites 5, 6, 7)		2024 (Site 7)	
	No. of sites	Average/ 10 mins	No. of sites	Average/	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins
PASSERIFORMES								
Alder Flycatcher	2	1.00	0	0.00	0	0.00	0	0.00
American Goldfinch	0	0.00	0	0.00	1	0.67	0	0.00
American Redstart	3	1.67	2	1.33	3	6.00	1	11.00
American Robin	3	5.67	3	4.67	3	4.33	1	1.00
Bay-Breasted Warbler	0	0.00	1	0.33	1	0.33	0	0.00
Black-and-White Warbler	2	0.67	3	1.67	3	1.33	1	4.00
Black-capped Chickadee	1	0.67	1	0.33	3	3.00	0	0.00
Black-Throated Green Warbler	0	0.00	1	1.33	3	2.00	1	2.00
Blue-Headed Vireo	0	0.33	0	0.00	2	2.00	0	0.00
Blue Jay	0	0.00	2	0.67	3	2.67	0	0.00
Common Grackle	1	0.33	0	0.00	0	0.00	0	0.00
Common Raven	3	3.00	1	0.33	3	6.33	1	1.00
Common Yellowthroat	3	2.00	2	2.67	0	0.00	1	2.00
Dark-Eyed Junco	2	1.33	1	1.67	2	2.00	1	4.00
European Starling	0	0.00	1	2.00	0	0.00	0	0.00
Golden-Crowned Kinglet	0	0.00	0	0.00	1	1.33	0	0.00
Hermit Thrush	3	7.33	1	1.67	3	1.00	1	6.00
Least Flycatcher	0	0.00	1	0.33	0	0.00	1	5.00
Lincoln's Sparrow	0	0.00	0	0.00	1	1.00	0	0.00
Magnolia Warbler	2	0.67	1	1.00	1	0.67	0	0.00
Mourning Dove	0	0.00	0	0.00	1	0.33	0	0.00
Mourning Warbler	3	2.33	3	3.00	2	0.67	1	4.00
Nashville Warbler	1	0.33	0	0.00	1	0.33	0	0.00
Northern Parula	1	0.33	1	0.33	0	0.00	0	0.00
Ovenbird	2	2.00	1	0.33	3	2.33	1	2.00
Purple Finch	3	1.00	0	0.00	1	0.33	0	0.00
Red-eyed Vireo	0	0.00	3	4.00	3	2.33	1	8.00
Rose-Breasted Grosbeak	1	0.33	0	0.00	0	0.00	0	0.00
Ruby-Crowned Kinglet	0	0.00	1	0.33	0	0.00	0	0.00
Ruby-Throated Hummingbird	0	0.00	0	0.00	1	0.33	0	0.00
Song Sparrow	0	0.00	2	0.67	0	0.00	1	1.00
Swainson's Thrush	2	3.67	1	3.00	3	5.00	1	1.00
White-Throated Sparrow	2	2.00	2	3.00	3	2.00	1	1.00
Winter Wren	2	0.67	1	0.33	0	0.00	0	0.00
Yellow-Bellied Flycatcher	0	0.00	1	0.33	0	0.00	0	0.00
Yellow-Rumped Warbler	2	0.67	2	0.67	2	1.33	0	0.00
FALCONIFORMES								
Broad-Winged Hawk	0	0.00	1	0.33	0	0.00	0	0.00
GALLIFORMES								

Table 4. Bird species heard or observed during dawn bird surveys conducted June 13, 2023, and June 23, 2024 at the Kemptown Quarry study site (Part A). Locations are shown in Figure 1.

	Cutover Softwoods / Developed				Mature Hardwood			
	2023 (Sites 1, 2, & 3)		2024 (Sites 1, 5, & 6)		2023 (Sites 5, 6, 7)		2024 (Site 7)	
	No. of sites	Average/ 10 mins	No. of sites	Average/	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins
Ruffed Grouse	1	0.33	0	0.00	0	0.00	0	0.00
PICIFORMES								
Hairy Woodpecker	0	0.00	2	0.67	0	0.00	1	3.00
Northern Flicker	0	0.00	1	0.33	0	0.00	0	0.00
Pileated Woodpecker	0	0.00	0	0.00	1	0.33	0	0.00
Yellow-Bellied Sapsucker	1	0.33	0	0.00	1	0.33	0	0.00
SUMMARY								
Average Abundance	**38.70**		**37.33**		**50.33**		**56.00**	
Total Species per Habitat	**24**		**28**		**27**		**16**	
Average Species/Site	**15.70**		**14.00**		**18.33**		**16.00**	

Table 5. Bird species heard or observed during dawn bird surveys conducted June 13, 2023 and June 23, 2024 at the Kemptown Quarry study site (Part B). Locations are shown in Figure 1.

	Clearcut Hardwood		Mixed Forest		Softwood Plantation	
	2024 (Site 4)		2024 (Sites 2 and 3)		2023 (Site 4)	
	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins
PASSERIFORMES						
Alder Flycatcher	0	0.00	1	0.50	0	0.00
American Redstart	1	1.00	1	0.50	0	0.00
American Robin	1	1.00	2	1.50	1	8.00
Black-and-White Warbler	0	0.00	1	1.50	1	1.00
Black-Throated Green Warbler	0	0.00	0	0.00	1	3.00
Blue-Headed Vireo	1	1.00	0	0.50	1	2.00
Blue Jay	0	0.00	1	0.00	1	1.00
Common Grackle	1	3.00	1	1.00	0	0.00
Common Raven	0	5.00	0	0.50	1	4.00
Dark-Eyed Junco	1	4.00	2	1.50	1	1.00
Hermit Thrush	1	9.00	1	2.00	1	1.00
Lincoln's Sparrow	0	0.00	0	0.00	1	1.00
Magnolia Warbler	1	0.00	1	1.00	1	2.00
Mourning Warbler	1	0.00	2	1.00	1	1.00
Nashville Warbler	0	0.00	0	0.00	1	1.00
Ovenbird	0	0.00	0	0.00	1	2.00
Red-eyed Vireo	1	12.00	2	3.50	1	1.00
Ruby-Throated Hummingbird	0	0.00	2	1.00	0	0.00
Song Sparrow	1	1.00	1	0.50	0	0.00
Swainson's Thrush	0	3.00	1	2.00	1	12.00

Table 5. Bird species heard or observed during dawn bird surveys conducted June 13, 2023 and June 23, 2024 at the Kemptown Quarry study site (Part B). Locations are shown in Figure 1.

	Clearcut Hardwood		Mixed Forest		Softwood Plantation	
	2024 (Site 4)		2024 (Sites 2 and 3)		2023 (Site 4)	
	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins
White-Throated Sparrow	1	2.00	2	2.50	1	4.00
Yellow-Bellied Flycatcher	0	0.00	0	0.00	1	1.00
CORACIIFORMES						
Belted Kingfisher (flyover)	1	1.00	0	0.00	0	0.00
FALCONIFORMES						
Broad-Winged Hawk	1	1.00	0	0.00	0	0.00
PICIFORMES						
Downy Woodpecker	0	0.00	1	0.50	0	0.00
SUMMARY						
Average Abundance	**44.00**		**21.50**		**46.00**	
Total Species per Habitat	**13**		**17**		**17**	
Average Species/Site	**13.00**		**11.50**		**17.00**	

4.2.6.4 Owls

Three owl species—Saw Whet Owl, Barred Owl and Great Horned Owl—were heard off site during evening and midnight surveys conducted in May 2023 and May 2024 (Table 6). Barred Owl was most common and numerous, heard at 9 survey points over both years with up to 2-3 individuals recorded during an observation period--generally occurring 500 to 1000 m from the site property. One Great Horned Owl was heard not far (300+ m) north of the site in 2024; and Saw Whet Owl was heard in the distance, 1 – 1.5 km east (i.e. beyond the Kemptown Road) in 2023. One Barred Owl was heard in the woods just east of the quarry site (Point 3, Figure 28) responded to the playback calls and may be occupying a territory there. Two Saw Whet Owls were heard on the north edge of the quarry property on June 11, 2023 during site reconnaissance visit. Eight Barred Owls were heard in the far distance in forested areas southeast and northwest of the site during the reconnaissance.

Table 6. Owl observations at Chapman Brothers Kemptown Quarry, 2023 and 2024. Locations are shown in Figure 29.

Point	Species	Time Period	Direction	Distance (m)	#	Coordinates	Comment
Survey on May 21, 2023 [1]							
1	Barred Owl	2100-2115	--	> 1 km	1	490721E, 5041209N	
	Saw Whet Owl	"	--	> 1 km	1	"	
Survey on May 22, 2023 [2]							
2	Barred Owl	2300-0000	W	< 500	1	490734E, 5041085N	American Woodcock, Kildeer Plover
	Barred Owl	"	"	> 500	2	"	

Table 6. Owl observations at Chapman Brothers Kemptown Quarry, 2023 and 2024. Locations are shown in Figure 29.

Point	Species	Time Period	Direction	Distance (m)	#	Coordinates	Comment
3	Barred Owl	2136-2150	W	> 1500	1	490890E, 5040927N	
	Saw Whet Owl	"	E	> 1500	1	"	
	Barred Owl	2300-0000	SW	> 500	2	"	
4	Barred Owl	2155-2210	E & SE	< 500	2	491175E, 5040670N	
	Barred Owl	"	E & SE	> 500	3	"	
	Great Horned Owl	2300-0000	SE	< 500	1	"	
5	Barred Owl	2215-2230	S	> 500	1	491325E, 5040915N	
6	Barred Owl	2235-2250	SE	> 500	1	491499E, 5041341N	
Survey on May 13, 2024 [4] [5]							
1	Great Horned Owl	1950	N	> 300	1	490652E, 5041156N	American Woodcock numerous (12 counted)
	Barred Owl	"	E	> 500	1	"	
3	Barred Owl	2207	E	< 100	1	491111E, 5041042N	Individual defending
4	Barred Owl	2225	N	250 m	1	491203E, 5040705N	Same individual as at Point 3

1. Wind 20-30 kph, overcast. Single location completed before weather deteriorated due to wind and fog.
2. Wind 5-15 kph, no owls detected during Birds Canada Survey protocol at points 1, 2 and 7.
3. No owls detected at points 1 and 5-7 during normal listening (i.e. without call playbacks).
4. No owls detected during Birds Canada Survey protocol at points 1 and 2.
5. American Woodcock heard at nearly all sites during evening Birds Canada Survey protocol for owls.

Table 7. Birds potentially breeding in the Kemptown area of Colchester County (Maritime Breeding Bird Atlas-Online 2023). Map 20MR94.

SWANS, GEESE & DUCKS (ANSERIFORMES: ANATIDAE)	
Ring-necked Duck	Common Merganser
Hooded Merganser	
PHEASANTS, GROUSE, TURKEYS & LOONS (GALLIFORMES, PHASIANIDAE)	
Ring-necked Pheasant	Spruce Grouse
Ruffed Grouse	
RAILS, GALLINULES & COOTS (GRUIFORMES, RALLIDAE)	
Sora ‡	
HAWKS & FALCONS (FALCONIFORMES: ACCIPITRIDAE, FALCONIDAE)	
Bald Eagle ‡¤	Sharp-shinned Hawk
Northern Harrier	Red-tailed Hawk
SHOREBIRDS PLOVERS, SANDPIPERS, SNIPES & GULLS (CHARADRIIFORMES, SCOLOPACIDAE)	

Wilson's Snipe	American Woodcock
PIGEONS, DOVES & CUCKOOS (COLUMBIFORMES: COLUMBIDAE, CUCULIFORMES)	
	Mourning Dove
OWLS (STRIGIFORMES)	
Great-horned Owl	North Saw-whet Owl
Barred Owl	
SWIFT (APODIFORMES, APODIDAE) AND HUMMINGBIRDS (APODIFORMES, TROCHILIDAE)	
Ruby-throated Hummingbird	
KINGFISHERS (CORACIIFORMES, ALCEDINIDAE)	
Belted Kingfisher	
WOODPECKERS (ORDER PICIFORMES, PICIDAE)	
Yellow-bellied Sapsucker	Black-back Woodpecker ‡
Downy Woodpecker	Northern Flicker
Hairy Woodpecker	Pileated Woodpecker
SONGBIRDS (PASSERIFORMES)	
Olive-Sided Flycatcher †	Black-and-white Warbler
Eastern Wood-Pewee	Nashville Warbler
Yellow-bellied Flycatcher	Mourning Warbler
Alder Flycatcher	Common Yellowthroat
Least Flycatcher	American Redstart
Eastern Phoebe ‡	Northern Parula
Great Crested Flycatcher	Magnolia Warbler
Blue-headed Vireo	Bay-breasted Warbler
Red-eyed Vireo	Blackburnian Warbler
Gray Jay	Yellow Warbler
Blue Jay	Chestnut-sided Warbler
American Crow	Black-throated Blue Warbler
Common Raven	Palm Warbler
Tree Swallow	Yellow-rumped Warbler
Bank Swallow §	Black-throated Green Warbler
Cliff Swallow §	Canada Warbler
Barn Swallow	Chipping Sparrow
Black-capp Chickadee	Vesper Sparrow †
Boreal Chickadee	Savannah Sparrow
Red-breast Nuthatch	Song Sparrow
White Breast Nuthatch ‡	Lincoln's Sparrow ‡
Winter Wren	Swamp Sparrow
Golden-crown Kinglet	White-throat Sparrow
Ruby-crown Kinglet	Dark-eyed Junco
Swainson's Thrush	Rose-breast Grosbeak ‡
Hermit Thrush	Rusty Blackbird †
Wood Thrush †	Common Grackle
American Robin	Purple Finch
European Starling	White-winged Crossbill
Cedar Waxwing	Pine Siskin
Ovenbird	American Goldfinch
Northern Waterthrush	Evening Grosbeak
This list includes all species found during the Maritimes Breeding Bird Atlas (1st atlas: 1986-1990, 2nd atlas: 2006-2010) in the region #18 (Shelburne County). Rare/Colonial Species Report Forms should be completed for species marked: § (Colonial), ‡ (regionally rare), † (rare in the Maritimes) or ¤ (rare in the Maritimes, documentation only required for confirmed records). Current as of 16/05/2022. 20PR49.	

Most bird species common to the area can be observed from March to September in open, forested and wetland habitats (Figure 29). Nesting for other bird species of conservation concern that have been observed within a five kilometer radius of the site, is primarily between early-May to late-August (Figure 30).

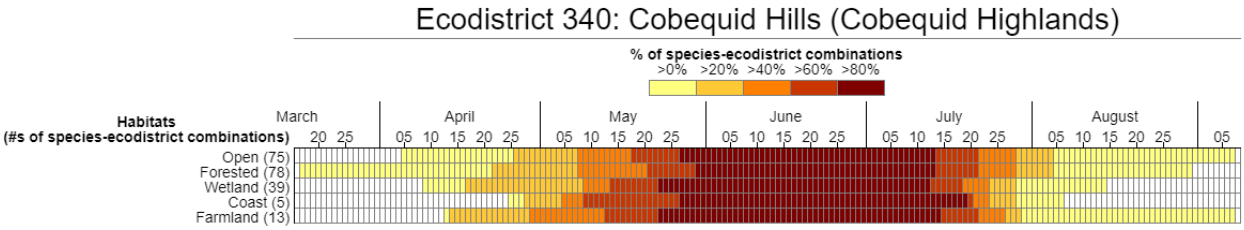

Figure 29. Nesting periods for various habitats in the larger Cobequid Hills Ecodistrict (340), formerly known as the Cobequid Highlands Ecodistrict (530) (Rousseu and Drolet 2015).

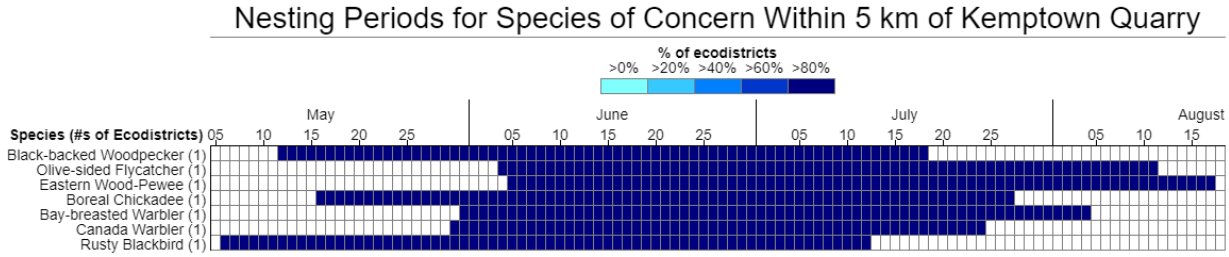

Figure 30. Nesting periods for bird Species of Concern found within five kilometers of Kemptown Quarry. Source: Rousseu and Drolet (2015).

4.2.7 Mammals

Various mammal species, both large and small, including game and furbearing species, are found in Colchester County and may occur periodically at the quarry site. Mammals expected to occur regularly or occasionally reflect the dominant terrestrial habitat in the surrounding area, which includes a mix of cutovers with immature mixed wood and mature tolerant hardwood with pockets of mature soft woods and wet treed areas. White-Tailed Deer (*Odocoileus virginianus*), Eastern Coyote (*Canis latrans*), Snowshoe Hare (*Lepus americanus*), and Red Squirrel (*Tamiasciurus hudsonicus*) occur at the site based on observations during the designated mammal survey (Appendix C). No sign of Black Bear (*Ursus americana*) was observed; however, the heterogeneity and distribution of suitable bear habitats near the quarry site would indicate the potential for Black Bear to be in the area. The study area provides a variety of habitat types what could provide Mainland Moose (*Alces alces*) with foraging and cover opportunities over short term, and may be possible that the study area could include a portion of moose home range. Although important moose habitats including wetlands and both mature and regenerating forest and riverine habitats, are not a dominant feature of this site, these habitats can be found within a kilometer of the center of the study area. Moose have also been reported in the general area of the study site, the closest record being 5.3 kilometers from the property, and the area is located within a moose concentration area and identified core moose habitat (NSNRR 2024). Other mammals that may occur in the general area include American Fisher (*Martes pennanti*) and American Marten (*Martes americana*), who prefer mature and late seral forests with large diameter of trees. With recent salvage harvest of blow downs, there was no evidence of these habitats on the study site;