Chapman Brothers Construction Limited

Westchester Quarry Expansion Project
Rose, Cumberland County, Nova Scotia

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

November 2021

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1 PROJECT INFORMATION

Chapman Brothers 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 local and regional projects in Nova Scotia and the Maritimes. Westchester Quarry, located at 2327 Westchester Road, in the community of Rose, Cumberland County, is an approved quarry under 4 ha which has been operated by Chapman Brothers for 4 years and has reached its maximum size. The company is applying for approval from the Province of Nova Scotia to increase the maximum allowed extent of the quarry to 40.36 ha allow the company to continue its operations over the next 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 F.

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1.1 PROJECT NAME

Westchester Quarry Expansion Project

1.2 GEOGRAPHIC LOCATION

Chapman Brothers Construction Limited Westchester Quarry (Westchester Quarry) in Cumberland County is located at 2327 Westchester Road (PID 25090887) in the community of Rose, about 19 km south of the community of Oxford, at approximately UTM Zone 20, NAD83, Easting 441571 and Northing 5048554. The site is shown in Nova Scotia Air Photos 2014 0905-0240 & 0908-0109, September 5 & 8, 2014 respectively; and Google Earth satellite imagery from September 23, 2014. 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 E).

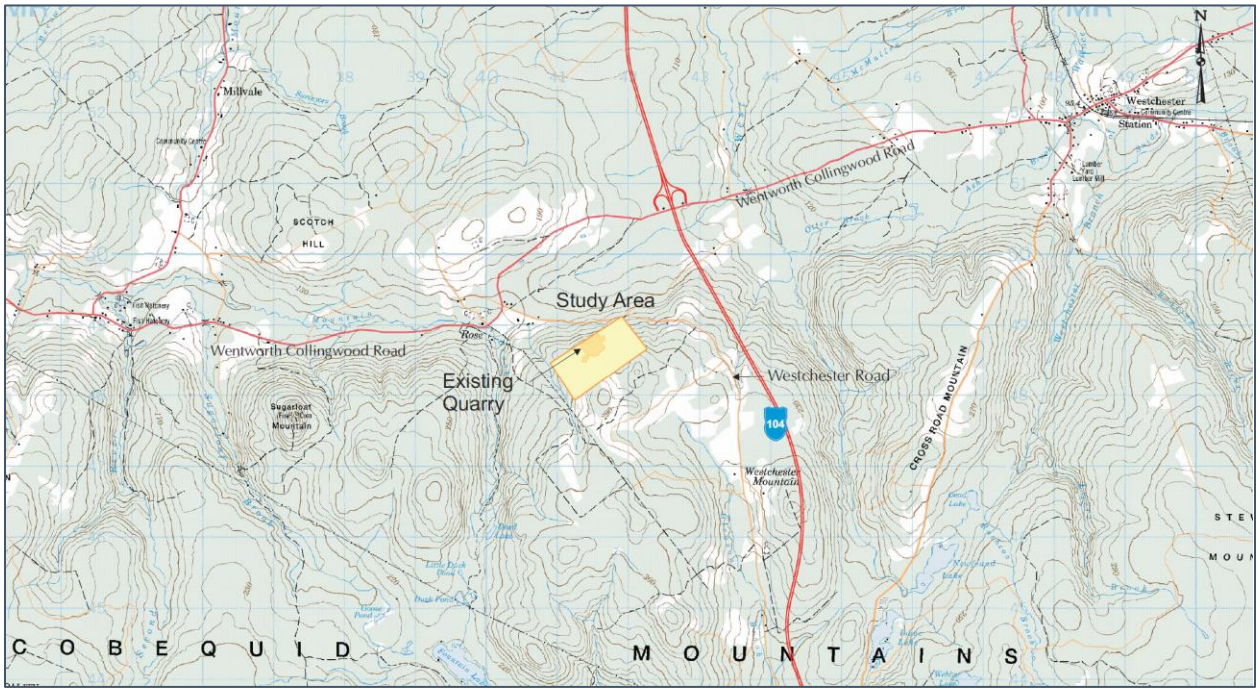

Figure 1. Project location shown on NTS 1:50,000.

2 SCOPE OF THE UNDERTAKING

Chapman Brothers Construction Ltd. (Chapman Brothers) owns and operates the Westchester Quarry located near the community of Rose, Cumberland County, Nova Scotia. The existing quarry has been in operation for 4 years and is currently operating under a Nova Scotia Environment and Climate Change (NSECC) Industrial Approval (2014-088699) for a quarry than four hectares in area. It is located in a rural area surrounded by forest, rural residential properties, and blueberry fields and farms. Westchester Quarry has an approved area of 3.88 ha.

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 for local private and commercial use, and provincial (NS Public Works) highways projects, and some is exported to Prince Edward Island. Aggregate is transported by truck along adjacent roads and the Provincial Highway network which includes Hwy 104. During past operations (i.e. from 2016 onward), an average of approximately 25,000 tonnes of aggregate has been extracted per year from the quarry.

The quarry will operate entirely above the deep bedrock water table at approximately the same base level as at present (220 m above mean sea level), from which it will access successive upslope source material in stages.

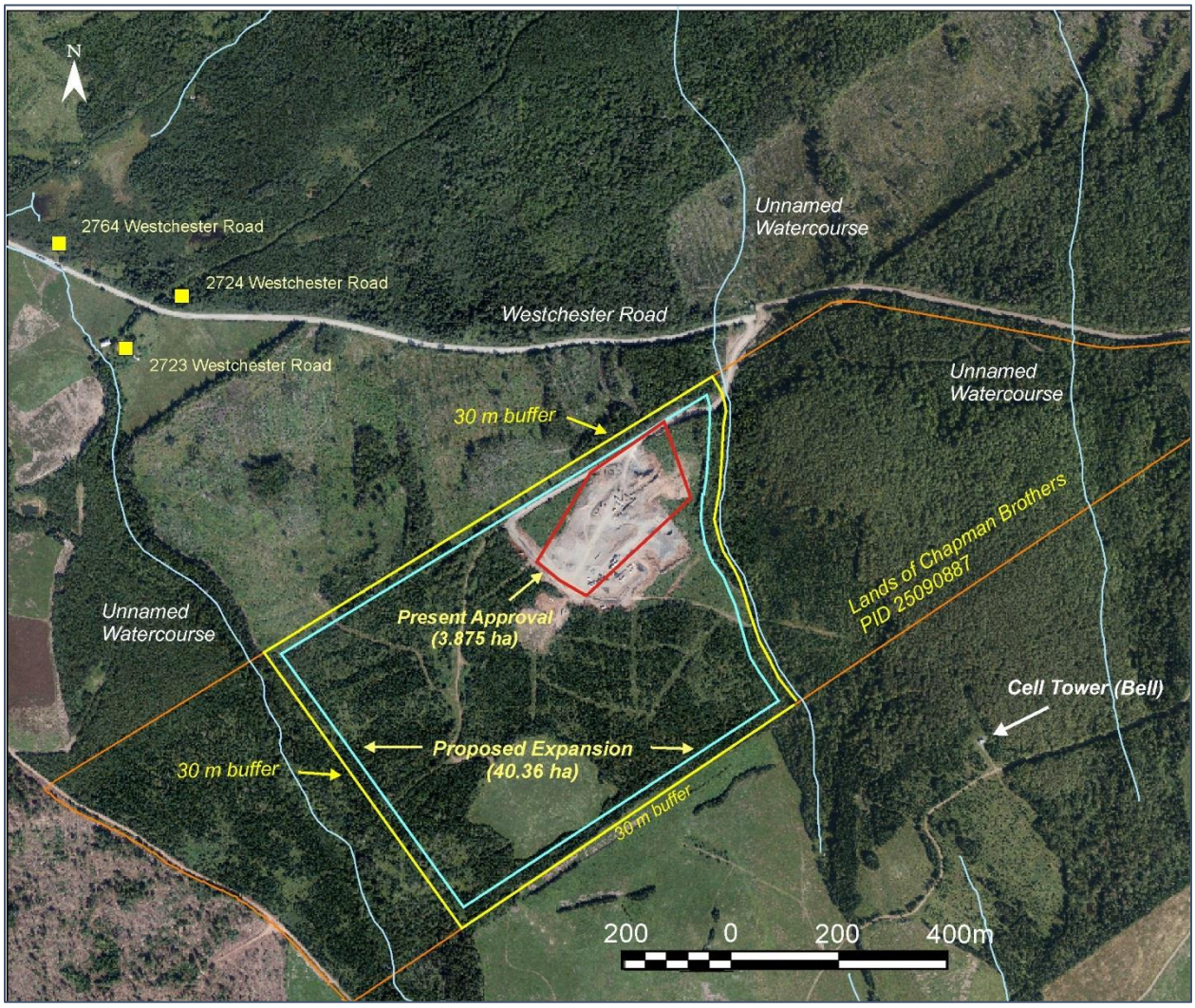

Figure 2. Proposed expansion area, site features and adjacent properties. Air photo from 2017.

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 25,000 to 100,000 tonnes of aggregate per year, for 50 years or more, as a result of the quarry expansion. 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

Expansion of Westchester Quarry is needed to produce aggregate to supply construction industries with locally-sourced aggregate and associated rock products. The primary benefit will be to supply market demands for aggregate in Nova Scotia and Prince Edward Island. 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 Westchester 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 Expansion 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 interaction 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 (NSEL 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 of 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 Westchester Quarry, facing north, September 1, 2017.

2.4 Regulatory Considerations

All activities at Westchester Quarry will be carried out according to Chapman Brothers approval for operating a quarry under 4 ha, and to the Nova Scotia Pit and Quarry Guidelines (2003). The approval is presented in Appendix G. 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; set blasting limits; and require execution of 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. Operation of a quarry of the proposed expanded size is permitted with approval of the Minister of Environment after an environmental assessment; however the quarry is too small to require a federal approval under the *Impact Assessment Act.*

No watercourses or wetlands will be disturbed the project, and therefore the project will not require approvals under Activities Designation Regulations of the Nova Scotia *Environment Act*. No Species at Risk or species of 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 artefacts; however if artefacts 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 the Provincial government assurance a duty to consult the Mi'Kmaq on matters which concern lands in Nova Scotia.

Operation of Westchester Quarry is an allowed use in the area, which is zoned as "Rural Resource" under the Cumberland County Municipal Planning By-Law (Cumberland Municipality 2018).

3 Public Involvement

3.1 Methods of Involvement

Information from the general public has been sought over the 2017 to 2021 period during which the environmental assessment was conducted. Residents in the vicinity of the Westchester Quarry were contacted by telephone in 2017 to provide background information on local land use and concerns, and interactions with the quarry. Field personnel visiting the site in both 2017 and May 2020 spoke to various individuals from the area, including locals and workers at the quarry. In early November 2020, letters and a handout describing the project were sent to the local MLA, to the Mayor of the Municipality of the County of Cumberland and councillors for adjacent districts, to the main Mi'kmaq groups (Native Council of Nova Scotia (NCNS) and KMKNO); the Chief of Millbrook First Nation, which is nearest the site; and the Nova Scotia Office of Aboriginal Affairs. Conference calls were held with a representative of Millbrook and with the Chief of NCNS in mid-November. In mid-November, an in-person meeting was held with the Mayor and two councillors of Cumberland County, and Chapman Brothers met the MLA for the area. The proponent received comments from a local blueberry grower and landowner in January 2021. Letters are planned to be re-sent and contacts re-established in parallel with the current submission in November 2021. A summary of public and Mi'Kmaq consultation activities is presented in Appendix I.

3.2 Public Comments

No unsolicited comments from the public have been received and an inquiry from a local individual was taken and responded to. Following in person meetings with Cumberland County Municipality, the project received a letter of support from the Mayor. Discussions with Councillors and the Mayor at the November meeting indicated that quarries in general are a good fit for predominantly rural areas such as Cumberland County, being one of many activities which contribute to and support economic development. Discussions although broad, were centred on operations and interactions with the local community along roads leading from the site; environmental issues such as noise from trucks transporting aggregate; local employment and relative use of company-owned trucks versus hiring of locals; and improvements that could be made to infrastructure, including cooperation on road improvement. Upgrading of the Westchester Road would allow earlier operation of the quarry, which is now limited by spring weight restrictions. The local MLA supported quarries as sustainable businesses which are valuable to the local economy. A local blueberry grower and landowner with farm buildings at 2723 Westchester Road, approximately 800 m from the quarry, insisted that an 800 m buffer set out in the NS Pit and Quarry Guidelines in respect of blasting be strictly adhered to. The same individual expressed a similar concern over the blasting separation to a telecommunications tower located south of the quarry on land he owns.

3.3 Steps Taken to Address Public Concerns

Chapman Brothers 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 Brothers operates within environmental limits imposed by its industrial approval from Nova Scotia Environment and Climate Change (NSECC). Blasting at the quarry will be restricted to areas of the expanded site which are further than 800 m from the buildings at 2723 Westchester Road; and a letter of consent to allow blasting within 800 m of the telecommunications tower south of the site was obtained by the proponent.

4 Description of The Undertaking

4.1 Existing Quarry Site Components

The quarry is located at 2327 Westchester Road, PID 25090887 in the community of Rose, Cumberland County. It is located in a rural area surrounded mainly by forest, rural residential properties, blueberry farms and woodlots in the vicinity. 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 in accordance with an existing Industrial Approval (Approval No. 2014-088699), for a quarry under 4 ha in area, which was issued on February 18, 2014. A copy of the Industrial Approval is found in Appendix G. The quarry and associated activities such as aggregate storage until recently had expanded beyond the maximum area allowed under the Approval, and the company worked with Nova Scotia Environment and Climate Change (NSECC) in 2021 to re-establish compliance to the original approved footprint during the Environmental Assessment Registration for a proposed expansion. The proposed maximum area for which the proponent is seeking an approval is 40.36 ha. 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 NSECC approved 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 0.075 % (2.30 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 of this sample, and an associated lab duplicate, are included in Appendix H.

Figure 4. Westchester Quarry, May 2020.

4.2 Future Quarry Site Preparation and Construction

Chapman Brothers needs to expand the permitted area of Westchester Quarry to allow continued operation and allow it to continue to meet the ongoing demand for aggregate. It is seeking an Environmental Assessment Registration approval under the *Environment Act* for a maximum area of approximately 40.36 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 25,000 to 100,000 tonnes of aggregate per year, with a life expectancy of 50 years. The quarry would be initially advanced in a south to southwest from the existing face (Appendix E).

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). 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 Westchester 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. The existing Industrial Approval stipulates blasting control and monitoring requirements.

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 current quarry floor elevation and therefore will not intercept 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 Westchester Road, Wentworth-Collingwood Road and Highway 104 as necessary to meet project demands. Traffic volumes generated by the quarry are expected to be stable in the longterm, and the level and pattern of road use is not expected to increase from past levels. 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 expanded Westchester aggregate quarry will be typical of aggregate quarries in Nova Scotia. Development will take place in various stages. First, access roads will be developed, and logging and removal of forest cover will be carried out by logging crews and harvesting machines. 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 expanding quarry. A 30-m buffer zone 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.

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 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. The project will have contingency plans for spills 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 with NSECC. It is expected the land will be returned to a natural state.

4.5 Summary of Activities at the Westchester Quarry

Activities anticipated for expansion and operation of the Westchester Quarry have been described in Sections 4.2 and 4.3. 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. These have been completed for the existing under 4 ha quarry at the site. 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 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.

The activities are typical of quarry projects in general, and are summarized in Table 1. Generalized groups of activities are used in the environmental assessment, to determine interactions of the project with the environment at the site.

Table 1. Categories of activities for Westchester Quarry.

CONSTRUCTION AND DEVELOPMENT PHASE	OPERATIONAL AND RECLAMATION PHASE
Site Access - access roads, drainage, ditching	Drilling and Blasting
Site Clearing/Grubbing	Moving/Transporting Rock and Product
Overburden Removal	Crushing
Drilling & Blasting	Washing
Excavation and Work Areas	Lights
	Site Runoff Management
	Portable Asphalt Plant
	Onsite Materials Storage
	Accidents (Fires/Oil & Fuel Spills)

5 ENVIRONMENTAL ASSESSMENT APPROACH AND METHODS

5.1 DESCRIPTION OF THE ENVIRONMENT

The environment in the vicinity of the Westchester Quarry has been reviewed and is presented primarily in a *Biophysical Environmental Assessment* and *Archaeological Resources Impact Assessment* for the proposed expansion, which are presented in Appendices A and B respectively. 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 Associates in 2017; site visits by a hydrogeology consultant (William Shaw and Associates, Antigonish), and biological and environmental studies (breeding bird and owl survey; fish and fish habitat, terrestrial, wetland and aquatic environment surveys, and spring and fall botany surveys) by Envirosphere Consultants in 2017. A breeding bird survey and a site visit were conducted in 2020 to update information and conditions and document any overall changes (presented in an update report in Appendix D). A desktop assessment of species at risk, wildlife (mammals, amphibians and reptiles), significant habitat, and special management and protected areas was conducted in 2017 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 Nova Scotia Environment, also conducted by Envirosphere. On consultation with ACCDC it was determined that the database of records had not changed in the interim, and an updated database search for species at risk would not be useful. Also, at the time of both the 2017 and 2020 surveys, the site had been prepared for the subsequent uses such as an asphalt plant, aggregate storage, and fines storage, and consequently the baseline studies reflected current conditions and no additional field surveys were considered necessary.

Figure 5. North view of landscape at Westchester Quarry, May 2020.

5.2 VALUED ENVIRONMENTAL COMPONENTS

To carry out the environmental assessment, a list of valued environmental components (VECs)[1] (also known as VCs)[2], has been developed based on the field and desktop studies (Table 2); and the potential for interactions between project activities and VECs was identified (Table 3). Where interactions were identified, 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, and interactions with project components, are 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.

[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).

Table 2. Valued Environmental Components (VECs) for the Westchester Quarry Expansion, Cumberland 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. Westchester Quarry as seen from Westchester Road at Wentworth-Collingwood Road, looking southeast, May 21, 2017.

Table 3. Potential interactions between project activities and operations and Valued Environmental Components (VECs) for Westchester Quarry expansion.

GENERAL CATEGORY OF VEC	BIOPHYSICAL								SOCIOECONOMIC										
Project Component (potential interactions shown by ✓)	Air Quality, Noise and Light	Groundwater & Hydrology	Water Quality	Aquatic Environments and Wetlands	Natural Areas & Wilderness	Fish and Fish Habitat	Flora & Fauna Species & Habitat	Species at Risk	Mikmaq	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 Access (Access Roads, Ditching)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓
Site Clearing/Grubbing	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓				✓	✓
Overburden Removal	✓	✓	✓		✓			✓	✓		✓	✓		✓				✓	
Drilling & Blasting	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓				✓	
Excavation and Work Areas	✓				✓		✓	✓	✓		✓	✓						✓	
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 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 the Archaeological Resources Impact 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 Westchester Quarry.

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 or sold the Aboriginal title, and that they claim all of Nova Scotia [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 their rights. The location of the quarry, which is inland in Cumberland County along the north slope of the Cobequid Hills, in the headwaters of important rivers leading to coasts of both the Northumberland Strait and the Bay of Fundy, would have been used by the Mi'kmaq, demonstrated by the finding of an ancient Mi'kmaq projectile point not far from the study site.

The Archaeological Resources Impact Assessment (ARIA) for the project (Davis McIntyre Associates (2017), Appendix B) concluded that there is low potential for occurrence of archaeological resources at the quarry site itself. If artefacts or significant features are discovered during expansion or continued operation 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.

The land proposed to be used for expansion of the Westchester 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 existence of the off-reserve community of Springhill Junction was identified during Mi'Kmaq consultation and although some distance from the site, would be part of the group hunting and fishing, and potentially using lands in the general vicinity for traditional foods and medicines.

6.2.2 Recreational Activities

Several property owners along Westchester Road and contacts made during field surveys indicated that lands near the quarry were used for private outdoor recreational activities, in particular use of ATVs, snowmobiling, hunting and fishing, as well as walking [for detailed information on this topic, refer to Appendix A, Sections 4.3.10 and 5.3.2]. Recreational use may consist of enjoyment of properties used as summer cottages and camps and general enjoyment of home-based recreation (e.g. gardening). Noise, traffic, and associated vehicle safety concerns and dust could interfere with enjoyment of residents in the area. Operations at the quarry would be cyclic, however, likely occupying several months during the construction season when the site is active. There is a general public acceptance in rural areas such as this one, of heavy industry such as quarrying, 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 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 property is located approximately one km from the Wentworth-Collingwood Road, and is not prominently visible from the highway or from the Westchester Road. Truck and equipment traffic on Westchester Road and on the Wentworth-Collingwood Road leading to Highway 104 is expected to be the main interaction with tourists, and levels of tourist traffic are expected to be small. Traffic from the Westchester Quarry is expected to be occasional, will be similar now as in the future, and would likely be only a minor impediment to tourist vehicle traffic in the area. The quarry access road entrance on the Westchester Road has good sightlines. Overall the impacts on viewscape and tourism are expected to be negligible.

Figure 7. View of Westchester Quarry from Wentworth-Collingwood Road, May 2020.

6.2.4 Recreational, Commercial & Mi'kmaq Fishing

Small permanent streams at the site are in the headwaters of Mountain Brook and Otter Brook where recreational fishing and potentially Mi'kmaq fishing for Brook Trout take place, but do not themselves have suitable fish habitat or support fish populations [for detailed information on this topic, refer to Appendix A, Sections 4.3.7 and 5.3.4]. There are no commercial fisheries in the general area of the quarry. Quarry operations have the potential to impact water quality and indirectly affect recreational fishing; however water quality arising from quarry operations is generally good, Chapman Brothers will have surface water management and monitoring in place to avoid sedimentation as per operating approvals. Dust from vehicles operating along Westchester Road could also impact water quality at road crossings, although to a minor degree. Motor vehicle accidents are possible sources of contamination which also potentially impacts waters supporting fish in the area; however all efforts will be made to avoid such accidents. The quarry expansion will avoid the two streams originating there through a 30 m buffer; however quarry development may lead to slightly reduced flows in the streams due to capture on the quarry floor, which in turn would impact fish and fishing returns. The quarry project will not directly affect fish habitat or fishing activities of residents and Mi'kmaq at the site.

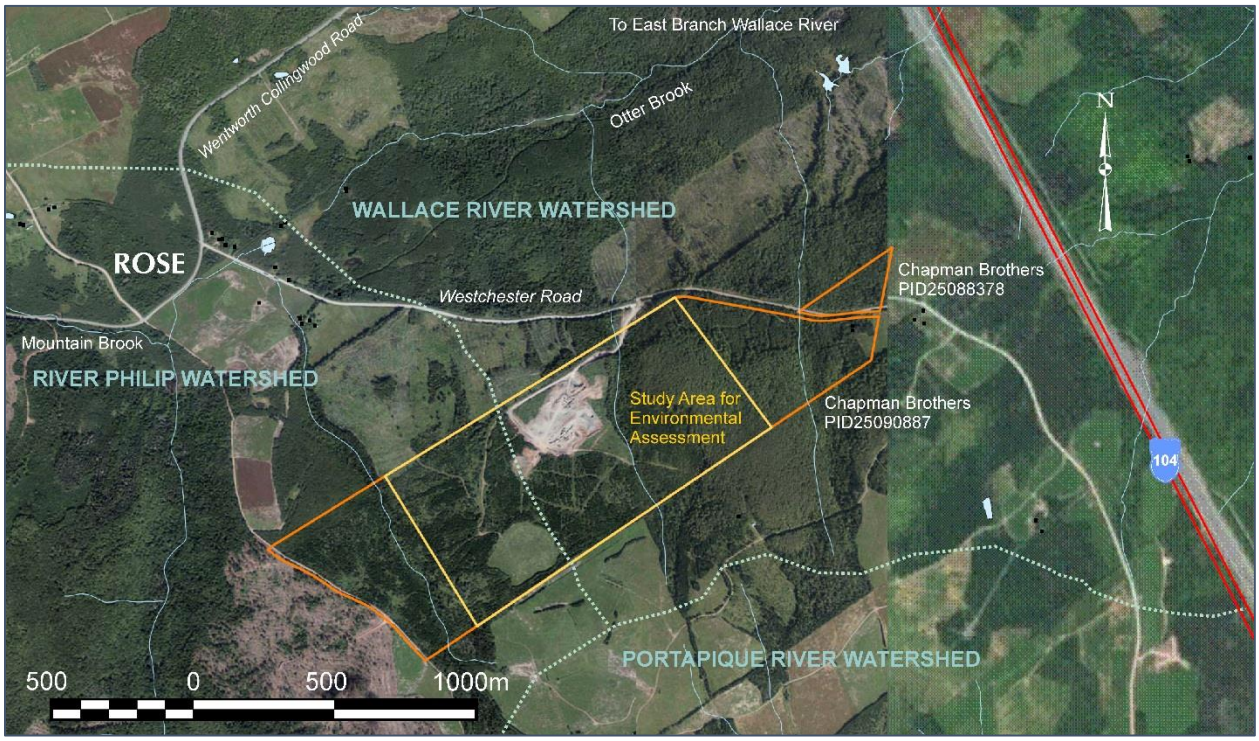

Figure 8. Study area in relation to watersheds in a 2014 air photo.

6.2.5 Archaeological/Cultural/Historical

The land proposed for the quarry expansion has low potential for pre-contact and/or early historic Mi'kmaq or European archaeological resources [for detailed information on this topic, refer to Appendix A, Sections 4.3.8 and 5.3.5]. The area was not settled by Europeans until late in the 17th century and not intensely settled until more recently. Features of early European settlement found in the archaeological survey of the site (Davis MacIntyre and Associates (2017), Appendix D) were not considered to have archaeological significance except west of the quarry where an unspecified site of possible interest was found; however the quarry expansion would not include the area of concern. Consequently the project is not likely to discover or disturb cultural/historical/archaeological features.

6.2.6 Land Use and Value

Forestry, mixed agriculture, 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. The existing quarry does not interfere with access to adjacent blueberry fields and does not interfere with production. The area has a moderate value for wind energy extraction but the two uses could be accommodated, particularly after site restoration has been completed. 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. As there are few properties in the vicinity of the quarry and they are some distance away, there are not expected to be impacts on residential property values. The quarry will provide economic development in the area and a source of aggregate for local construction projects. 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 agricultural land resource, and consequently the cumulative effects of land use at the site will be small.

6.2.7 Transportation

The quarry generates a fluctuating moderate level of truck traffic on highways in the area, but activity levels are not expected to increase as the result of the expansion, and consequently the quarry is not expected to change the existing traffic volumes significantly [for detailed information on this topic, refer to Appendix A, Sections 4.3.14 and 5.3.7]. Transport of crushing and asphalt production equipment to and from the site prior to and after a production phase leads to short-term delays in traffic caused by the often slower-moving equipment. Heavy trucks moving through the area and trucks turning can be a hazard to local traffic. Existing traffic volumes on the Westchester Road and Wentworth-Collingwood Roads are low. Suitable advance signage along the highway (e.g." trucks turning") to alert the general public and local farm operators, as well as the surrounding communities, would help avoid dangerous situations. Trucks leaving the quarry and traveling along Westchester Road pose a safety hazard for seasonal residents and appropriate signage should be placed, and speed limits recommended between the quarry and the Wentworth-Collingwood Road intersection. Overall, however, the impact of the project on transportation and safety is expected to be minimal. Although movement of heavy equipment to the site for aggregate and asphalt production may lead to short-term delays, the duration will be less than experienced during typical roadwork projects and will be therefore insignificant.

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); through the generation of dust along Westchester Road; and through truck and equipment traffic, which some residents may find objectionable and a safety concern [for detailed information on this topic, refer to Appendix A, Sections 4.3.11 and 5.3.8]. The property is located approximately 1 km from the nearest permanent residences, and noise from the quarry would reach them. Truck traffic from the quarry would also create noise levels which would impact local residents. Activities at the quarry would be limited in time seasonally (approximately March to November) typically during the day, although nighttime operations are also likely. Traffic volumes from the site would be moderate, and high frequency of truck traffic would be an irregular occurrence, depending on the supply requirements for particular projects. Dust from operations is unlikely to reach residential areas except from that generated along Westchester Road. Quarry activities such as blasting, are not expected to impact residential wells, as they are located at a significant distance from the site, and the quarry affects a small surface area relative to the overall water table in the area. Nighttime activities will involve minimal additional lighting and noise, and will be unlikely to be a significant disturbance to local residents.

6.2.9 Commercial/Industrial Use

The nearest commercial operations / businesses are quarries in the Jackson area, a blueberry warehouse near the junction of Hwy 104, and several businesses in the Westchester Station area [for detailed information on this topic, refer to Appendix A, Sections 4.3.12 and 5.3.9]. Activities at the quarry site will contribute to traffic in the area but will not likely affect other operations to a significant degree. Blueberry operations including trucking and movement of agricultural equipment will encounter increased truck traffic along the Wentworth-Collingwood Road and congestion when the quarry is operating at peak capacity. Vibration from occasional blasting will not significantly impact the communications tower located southeast of the site. The quarry contributes to net economic benefit in the community through supporting local trucking operations and providing 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 Westchester 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 general vicinity of the quarry were identified in the Nova Scotia well logs database and through conversations with landowners. One at 2723 Westchester Road is slightly more than 800 m and a second on North Road, about 1.8 km from the quarry. Parts of the expanded quarry (i.e. the northwest corner) will, however, be closer than 800 m to the first well and it is expected that water quality in the well will be monitored. Quarry activities are not expected to impact residential wells, in particular occasional blasting, as they are located at a sufficient distance. Groundwater recharge generated by the quarry is of high quality (low conductivity and dissolved solids and neutral in pH). The footprint of the quarry and the proposed expansion involves a small part of the watershed and near-surface groundwater reserves that would serve dug wells for residences along Westchester Road, and dug wells are not expected to be affected. Best management practices for operations will be undertaken to eliminate the potential for any contamination of aquifers at the site. There are no municipal water supplies in the area.

6.2.11 Parks and Protected Areas

The quarry site is sufficiently distant from Wilderness Areas in the Cobequid Hills (Portapique River and Economy River Wilderness areas) and is not within their watersheds [for detailed information on this topic, refer to Appendix A, Sections 4.3.9 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 the 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 4.3.5, 4.3.6 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 Brothers 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, Section 4.3.2].

6.2.14 Human Health

Operations of Westchester Quarry are not expected to result in impacts on human health. Dust, which is derived both from the source rock, aggregate and activities at the quarry, does not contain toxic components and exposure to residents along Westchester 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 Westchester Road. Operations of an asphalt plant which may take place from time to time at the site is closely regulated under provincial approvals and levels of volatile emissions will be below those which could be harmful. Activity levels of the quarry may include periodic operations at night which potentially would disturb the sleep of residents, which could if prolonged could be considered a health concern. However this effect was not noted as a concern in conversations conducted with locals. Other air-borne emissions such as vehicle exhaust are not unique to quarry activities and would also be derived from other traffic along Westchester Road and Wentworth-Collingwood Road.

6.3 Assessment of Biophysical Impacts

6.3.1 Air Quality, Noise, and Light

The size of the quarry and magnitude of activities are not expected to change as the quarry expands; the level of activity depends on demand for aggregate and other products, which is expected to remain relatively stable over the lifetime of the quarry [for detailed information on this topic, refer to Appendix A, Sections 4.1.1, 4.1.3 and 5.4.1]. Various activities at Westchester Quarry have 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 contribute to increased dust and particulate levels. Trucks from the quarry traveling along (the unpaved) Westchester Road raise dust and may be controlled through voluntarily reducing speed and possibly use of dust suppressant in the vicinity of seasonal 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 will be put in place and followed during all phases of operations.

Exhaust emissions will be generated from the operation of vehicles and equipment. 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.

Noise levels from the expanded 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. 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, 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]. Bedrock is close to surface over much of the site. The expansion area crosses the topographic divide between Wallace River and River Philip watersheds, and therefore the amount of recharge area involved in project activities is extremely small in relation to the overall size of the aquifers in the area; and for the same reason, the effect on overall groundwater flow patterns will be small. The overall impact on hydrogeology at the site is therefore 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]. The amount of runoff is not expected to change significantly. Runoff from the quarry will be managed 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 drainage design to reduce downstream flashiness resulting from the expanded quarry. Buffers and surface water management should ensure that flows in nearby watercourses are not affected.

6.3.4 Water Quality

Water quality downstream of the site is important for fish habitat in the lower watersheds, which includes Mountain Brook, Otter Brook and West Branch Wallace River [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 conglomerate, metamorphic rocks, and basalt. Dust and suspended sediment, as well as incidental and accidental releases of lubricants from vehicles operating on the site at low levels may enter surface water runoff—efforts should be made to manage these releases. Quarry rock from Westchester Quarry is within acceptable limits for sulphur and acid-generating potential and will not result in acidic runoff. Blasting is not expected to result in minimal groundwater quality changes, particularly with efforts to reduce releases of other chemicals such as nitrates used in blasting and lubricants from equipment operations. Forest clearing and grubbing activities can lead to releases of fines from the soil, resulting locally in elevated

suspended sediment levels. Release of contaminants during operations, while expected to be at low levels, will be mitigated by normal precautions on equipment operations and fuelling locations, and measures to manage runoff. 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

Impact of the quarry on water quality in adjacent streams and other waters is expected to be negligible [for detailed information on this topic, refer to Appendix A, Sections 4.2.2 and 5.4.5]. The expanded quarry will avoid existing streams on both sides, including a 30 m buffer. Future runoff from the quarry is expected to be diverted towards the stream located to the east, and to be in the same watershed as at present (Wallace River watershed). The stream located immediately west of the study area is expected to be impacted only marginally, through loss of a small portion of its drainage area. Quantities of runoff and suspended sediments arising from the site overall in future will be approximately the same as at present, and will remain the same watershed. The effects of changes in flow in local headwater streams are expected to be small and would be unlikely impact any downstream habitat.

6.3.6 Wetlands

There are no wetlands in the study area to be impacted by the expansion project, and no wetlands were identified in downstream areas which will be impacted by changes in flow regime in streams originating at the quarry [for detailed information on this topic, refer to Appendix A, Sections 4.2.4 and 5.4.6].

6.3.7 Fish and Fish Habitat

The expanded quarry is not expected to physically impact fish habitat [for detailed information on this topic, refer to Appendix A, Sections 4.2.5 and 5.4.7]. Watercourses in the vicinity of the project are not suitable for fish and will be left intact. Forested buffers will be left in place to help to maintain temperatures, inputs of nutrients, and provide a source of leaves and woody debris. Blasting occurs infrequently at the site and is sufficiently separated from areas of watercourses with fish habitat to result in a negligible likelihood of incurring harm to fish. 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. Small stream and ravine along west edge of undisturbed deciduous woodland on the property, June 28, 2017.

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]. 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 remediation will be to ensure that conditions (e.g. soil types and topography) are restored to pre-existing conditions. During recovery and revegetation, the forest succession will provide habitat for a moderate diversity of species. 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. Several species of migratory birds are in decline in Nova Scotia, in particular interior forest birds, which rely on large expanses and continuity of intact forest; the study area is not part of a large expanse of old forest and the impact on interior forest birds is expected to be small to negligible. Other wildlife species need large areas of undisturbed forest to live and reproduce naturally. Temporary loss of forest through site development is not expected to affect the occurrence of moose at the site, due to a comparatively small project footprint in relation to available habitat in the area. During 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 sites for birds such as Common Nighthawk; employees should be educated on the need to check areas for activity and nests before undertaking activities which would disturb established surfaces. Night operations and use of lights have various effects, including attracting insects which otherwise would need darkness to mate and reproduce; light pollution is considered to be an important factor globally in decline of songbird populations, through declines in populations of some

insects. Night operation lighting during migration periods (August-September) would attract migrating birds. If possible, 24-hour operations in August to early September should be avoided and lighting used at the site should focus downward and below the normal horizon, to limit visibility by birds and insects from a distance.

6.3.9 Species at Risk

No plant or animal species at risk have been found at the site or 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 study area is located in the large special management area for moose found in the Cobequid Hills, which has special forestry practices assigned to reduce the impacts of forestry activities on moose. Expansion of the quarry will reduce habitat slightly; however no high quality moose habitat and wetlands are found at the site, so the impact is expected to be negligible. Common Nighthawk, a ground-nesting endangered bird species, potentially could nest in grubbed and marginal areas of the quarry; employees should be made aware of the need to check areas for activity and nests before undertaking activities which would disturb established surfaces. Lights used for night operations during migration periods (May-June and August-September) would attract various bird species and insects, which could include species at risk. If possible, 24-hour operations during migrations should be avoided and lighting used at the site should focus downward and below the normal horizon, to limit visibility from a distance.

6.3.10 Natural Areas & Wilderness

Natural areas in the vicinity of the site are appreciated by locals and tourists alike, while forests at the site are important in supporting wildlife populations, and nearby undeveloped 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]. Agricultural development, in particular lands in blueberries, are a familiar landscape feature to visitors to the area. The immediate vicinity of the Westchester Quarry is not pristine, having been used for agriculture, forestry, and aggregate extraction as part in the mix of activities in the area. Two Provincial Wilderness areas are relatively close to the site. Efforts should be made to minimize the footprint and effects of the quarry—in particular to reduce traffic, noise, dust and light from quarry operations—to reduce interference with natural conditions in these areas. Activities at the quarry will be carried out with a view to minimizing impacts on the adjacent environments and ensuring that as much as possible of the quarry is restored in the future. Restoration should also consider values important in conservation of biological communities and ecosystems, as well as changes in physical conditions that could affect those communities. Normal procedures such as dust control and light management will help to minimize impacts on natural and wilderness values at the site.

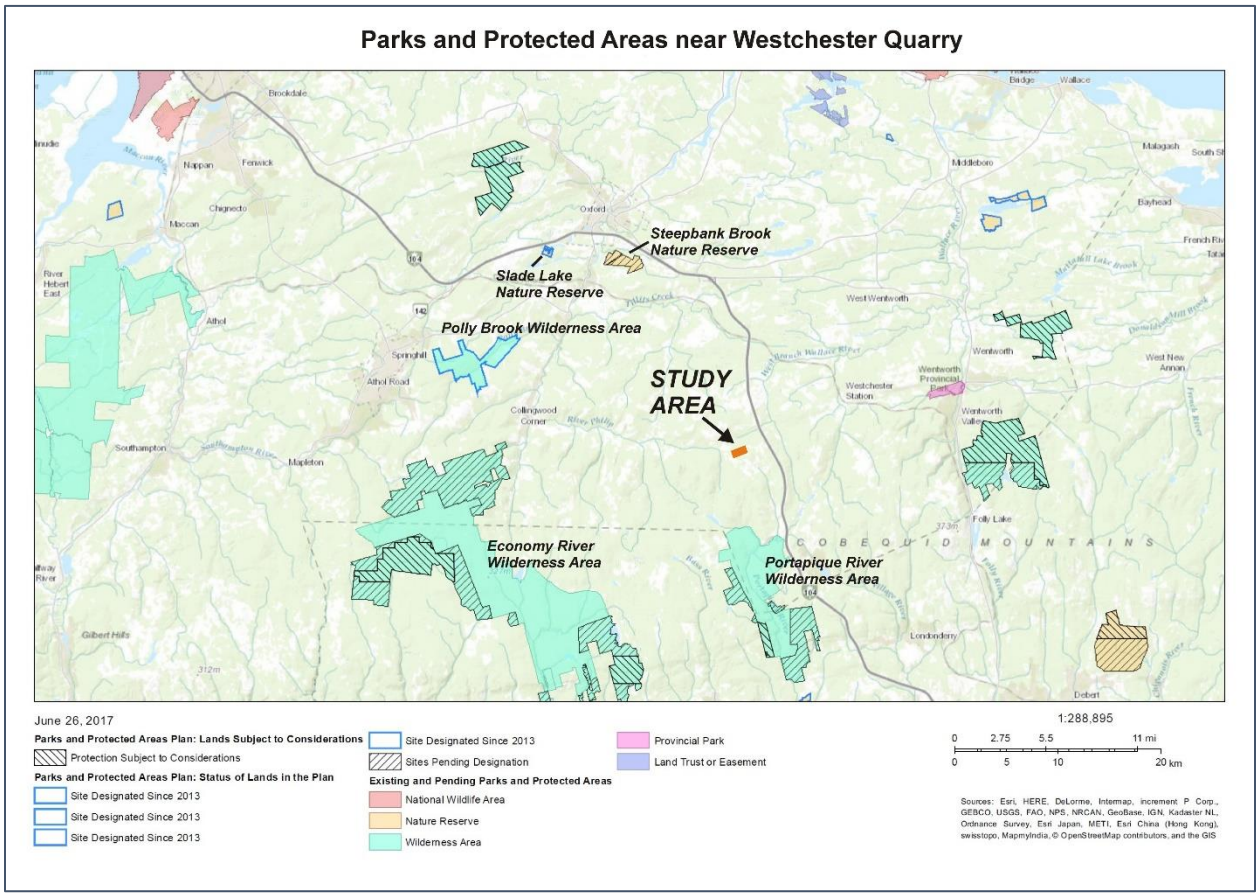

Figure 10. Parks and protected areas in the vicinity of Westchester Quarry.

Table 4. Summary of impacts and mitigation on Valued Environmental Components, Chapman Brothers Construction Limited, Westchester Quarry Expansion.

VEC	PROJECT COMPONENT	NATURE OF EFFECT	SIGNIFICANCE	NATURE OF IMPACT	MITIGATION	SIGNIFICANCE AFTER MITIGATION
BIOPHYSICAL COMPONENTS						
Air Quality, Noise & Light	Construction	Noise and dust from heavy equipment during logging, grubbing and overburden removal.	Significant	Negative	Schedule activity to avoid peak periods of use by residents in the local community. Take steps to reduce noise.	Not significant.
		Drilling and blasting.	Significant	Negative	Monitor noise levels and avoid exceedences of regulatory levels.	Not significant.
	Operation	Drilling and blasting; equipment for moving rock; crusher; heavy equipment operation; air-borne emissions from asphalt plant.	Significant	Negative	Monitor noise levels and undertake to avoid exceedences of regulatory levels. Institute measures for dust control. Monitor and maintain asphalt plant to minimize emissions.	Not significant.
		Light from the quarry can be seen in neighbouring areas.	Significant	Slight, negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry during night operations.	Not significant.
		Dust from trucks on Westchester Road	Significant	Slight, negative	Consider use of dust suppressant surfacing of Westchester Road in vicinity of seasonal residences.	Not significant.
		Noise from trucks on Westchester Road	Significant	Slight, negative	Instruct truck drivers to avoid use of engine braking on Westchester Road.	Not significant.
Groundwater/ Hydrology	Construction	Forest and soil removal changes surface and ground water flow levels and patterns.	Negligible	Negative	Use site runoff management to minimize impacts. Likely changes in groundwater and runoff patterns will be small.	Not significant.

Table 4. Summary of impacts and mitigation on Valued Environmental Components, Chapman Brothers Construction Limited, Westchester Quarry Expansion.

VEC	PROJECT COMPONENT	NATURE OF EFFECT	SIGNIFICANCE	NATURE OF IMPACT	MITIGATION	SIGNIFICANCE AFTER MITIGATION
	Operation	Blasting fractures bedrock, disturbs till, and changes groundwater flow patterns.	Significant	Negative	Drilled wells in bedrock and surface wells can be disturbed. Monitor groundwater quality in local wells to determine changes.	Not significant.
	Operation	Quarry and work areas change surface water flows. Increased peak stormwater flows. Washing product creates silt-laden surface flows.	Significant	Negative	Onsite water management to moderate extreme surface water runoff and suspended sediment levels; measures to maintain normal flow regime.	Not significant.
	Operation	Accidental Hydrocarbon spills and blasting residues contaminate groundwater.	Significant	Negative	Measures to minimize danger of spills; onsite emergency numbers, spill kits etc. Avoid refueling near watercourses. Blasting plan to minimize explosives residues.	Not significant.
Water Quality	Construction	Altered surface water flows and turbidity, hydrocarbons from heavy equipment in watershed flowages.	Negligible	Negative	Erosion and sedimentation controls in work areas. Onsite water management to moderate surface water runoff and suspended sediment levels.	Not significant.
	Operation	Dust & suspended sediment from operations; hydrocarbons from vehicles, potentially enter local watershed. Chemicals (e.g. nitrates) from explosives entering runoff.	Significant	Negative	Onsite dust control and water management to moderate surface water runoff and suspended sediment levels. Erosion & sedimentation controls. Plan and BMP for hydrocarbon management at site. Closely monitor chemical residues after blasting.	Not significant.

Table 4. Summary of impacts and mitigation on Valued Environmental Components, Chapman Brothers Construction Limited, Westchester Quarry Expansion.

VEC	PROJECT COMPONENT	NATURE OF EFFECT	SIGNIFICANCE	NATURE OF IMPACT	MITIGATION	SIGNIFICANCE AFTER MITIGATION
	Operation	Water chemistry changes in runoff from materials stored on site. Fines washed out of stored materials.	Negligible	Negative	Control types of materials stored at site. Monitor settling ponds; storm-water management.	Not significant.
Natural Areas & Wilderness	Construction & Operation	Presence of quarry, emissions, dust etc. detracts from public perception of wild quality of area.	Negligible	Negative	Area affected is small in relation to remaining natural areas, and much of the adjacent land is in agricultural development and has been used for forestry. Attempt to minimize footprint. Manage releases of dust and light, and control noise. Reclaim at end of project.	Not significant.
Freshwater Aquatic Environments	Construction	Occurrences of high suspended sediments and nutrient levels in runoff from the site.	Negligible	Negative	Preserve buffer areas around quarry adjacent to wetlands and watercourses. Onsite water management and sedimentation controls to moderate surface water runoff and suspended sediment levels.	Not significant.
	Operation	Some of the runoff from the area is retained for site operations, or lost through evaporation.	Negligible	Negative	Maintain forested buffers. Onsite water management to stabilize flow pattern. Minimize unvegetated areas.	Not significant.
	Operation	Higher peak flows and suspended sediment during activities.	Significant	Negative	Onsite water management. Preserve woodland in buffer areas of quarry.	Not significant.

Table 4. Summary of impacts and mitigation on Valued Environmental Components, Chapman Brothers Construction Limited, Westchester Quarry Expansion.

VEC	PROJECT COMPONENT	NATURE OF EFFECT	SIGNIFICANCE	NATURE OF IMPACT	MITIGATION	SIGNIFICANCE AFTER MITIGATION
	Operation	Runoff from access roads.	Negligible	Negative	Use ditching to carry peak flows and additional site runoff. Sedimentation controls.	Not significant.
	Operation	Releases of chemicals from blasting; accidental releases of lubricants etc.; and runoff from materials stored on site.	Negligible	Negative	Isolate and treat runoff from work areas and stored materials. Lubricant management on site.	Not significant.
	Construction & Operation	Incidental releases from power equipment and accidental spills of hydrocarbons.	Significant	Negative	Provide pollution prevention equipment and emergency measures.	Not significant.
Wetlands	Construction	Grubbing, road construction, pit preparation. Water quality changes may affect downstream riparian wetlands on Mountain Brook and West Branch, Wallace River	Significant	Negative	Onsite runoff management to minimize suspended sediment and releases of contaminants.	Not significant.
	Operation	Dust, nutrient inputs from runoff, changes to hydrology, changes to forest communities.	Negligible	Negative.	Maintain a significant forest buffer; maintain hydrological regime, employ site surface water management.	Not significant.
Fish & Fish Habitat	Construction	Change runoff patterns at site in local and adjacent watersheds.	Negligible	Negative	Avoid the major watercourses. Maintain forested buffer around wetlands and streams.	Not significant.

Table 4. Summary of impacts and mitigation on Valued Environmental Components, Chapman Brothers Construction Limited, Westchester Quarry Expansion.

VEC	PROJECT COMPONENT	NATURE OF EFFECT	SIGNIFICANCE	NATURE OF IMPACT	MITIGATION	SIGNIFICANCE AFTER MITIGATION
	Operation	Site runoff management and water use affects hydrological and groundwater regime.	Negligible	Negative	Ensure the runoff from the site is managed to moderate flow and minimize downstream impacts on fish habitat.	Not significant.
	Construction & Operation	Incidental releases of oils, hydraulic fluids etc. from operating equipment. Accidental spills of hydrocarbons on site.	Negligible	Negative	Maintain equipment to minimize loss of lubricants and fuels. Provide pollution prevention and emergency measures.	Not significant.
	Operation	Accidental spills into watercourses from truck highway accidents.	Negligible	Negative	Recommend truck traffic use safe driving practices and reduce speed in vicinity of quarry and intersection of Westchester Road and Wentworth-Collingwood Road. Provide suitable pollution prevention and emergency measures.	Not significant.
Terrestrial Flora & Fauna & Habitat	Construction	Removal of existing communities.	Negligible	Negative	Communities removed have all been previously developed / modified. Restore damaged and 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.	Not significant.
	Construction & Operation	Accidental releases of hydrocarbons, contamination of habitat, dust.	Significant	Negative	Provide pollution prevention and emergency measures & response capability.	Not significant.

Table 4. Summary of impacts and mitigation on Valued Environmental Components, Chapman Brothers Construction Limited, Westchester Quarry Expansion.

VEC	PROJECT COMPONENT	NATURE OF EFFECT	SIGNIFICANCE	NATURE OF IMPACT	MITIGATION	SIGNIFICANCE AFTER MITIGATION
					Remediate any areas affected by spills.	
		Artificial light from operations influences movements of birds and other animals	Significant	Negative	Avoid night operations. If necessary to work at night, use directional lighting with downward focus to minimize light leaving the quarry. Avoid migratory periods for birds.	Not significant.
		Removal of potential forest and wildlife resource (i.e. wildlife habitat)	Negligible	Negative	Small area affected relative to total available. Minimize footprint of quarry. Restore and rehabilitate areas not used. Leave mature standing trees where possible as nest cavities.	Not significant.
		Quarry affects wildlife movement patterns and connectivity of habitats.	Significant	Negative.	Rehabilitation should include consideration for wildlife movement through the restored site.	Not significant.
Species at Risk	Construction	Water quality impacts affect downstream areas in watersheds with Atlantic salmon and Blacknose Dace.	Significant	Negative	Best management practices for management of runoff from the site.	Not significant.
	Operation	Sound from blasting can harm bats and birds.	Negligible	Negative	Minimize blasting activity and concentrate in spring and fall (outside breeding and migratory periods) when species are absent.	Not significant.
		Light influences movements of species at risk birds migrating overland.	Significant	Negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry.	Not significant.

Table 4. Summary of impacts and mitigation on Valued Environmental Components, Chapman Brothers Construction Limited, Westchester Quarry Expansion.

VEC	PROJECT COMPONENT	NATURE OF EFFECT	SIGNIFICANCE	NATURE OF IMPACT	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		Open areas and grubbings piles occupied by nesting birds.	Significant	Negative	Educate personnel to look for bird life prior to activities; periodically conduct nesting bird survey at site to identify bird issues.	Not significant.
SOCIOECONOMIC COMPONENTS						
Mi'kmaq	Construction and Operation	Any land use conflicts with Mi'kmaq Right to Use Land	Significant	Neutral	Consult with Mi'kmaq in developing quarry.	Not significant.
		Contamination and alteration of flow regime of streams may affect fish populations potentially used by Mi'kmaq.	Negligible	Negative	Employ surface water monitoring program. Use Best Management Practices for quarries. Avoid accidental releases of contaminants. Avoid vehicle accidents.	Not significant.
Archaeological, Cultural and Historical Significance	Construction	Expansion may affect undiscovered artifacts.	Not significant	Negligible	Unlikely that artifacts occur at site. Minimize project footprint. Halt operations and notify NS Dept. of Culture & Heritage if artifacts found.	Not significant.
Recreation	Construction & Operation	Quarry traffic interacts with local recreational use of roads and trail use by ATVs and snow-mobiles.	Not significant	Negative	Users will be aware of activity at quarry but will not be otherwise impacted. Access roads gated to prevent unauthorized use. Post signage indicating site hazards and private property restrictions.	Not significant.
Tourism and Viewscape	Construction & Operation	Presence of quarry affects public perception of landscape character.	Negligible	Negative	Quarry cannot readily be seen from road. Maintain a clean operation. Rehabilitate areas no longer needed for activity and future development.	Not significant.
Residential Use	Construction & Operation	Noise; light pollution; dust; operation of	Significant	Negative	Use best management practices to reduce disturbance to nearby	Not significant.

Table 4. Summary of impacts and mitigation on Valued Environmental Components, Chapman Brothers Construction Limited, Westchester Quarry Expansion.

VEC	PROJECT COMPONENT	NATURE OF EFFECT	SIGNIFICANCE	NATURE OF IMPACT	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		trucks and transportation of heavy equipment on Westchester Road.			residents. Inform residents about quarry operations. Provide community with safety information for truck traffic on Westchester Road.	
Recreational and Mi'kmaq Hunting and Fishing	Construction & Operation	Accidental hydrocarbon spills and blasting residues contaminate surface waters.	Negligible	Negative	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	Rehabilitate areas no longer needed for activity and future development. Minimize cutting outside quarry footprint.	Not significant.
Water Supplies & Residential Wells	Construction and Operation	Blasting potentially impacts local aquifers.	Not significant	Negative	Develop groundwater-monitoring plan in consultation with NSECC. Consult with residents on Westchester Road concerning water supply issues.	Not significant.
Land Use and Value	Construction & Operation	Removal of potential forest and wildlife resource (e.g. forestry & trapping); and blueberry field.	Not significant	Negative	Small area affected relative to total land available. Minimize footprint of quarry. Restore and rehabilitate areas not used.	Not significant.
Transportation	Operation	Wear on Westchester Road and Wentworth-Collingwood Road.	Negligible	Negative	Current traffic levels due to quarry are low and will not increase. Industrial transportation is one of the main purposes of NS highway network.	Not significant.
	Operation	Collisions with trucks and equipment on	Significant	Negative	Set low speed limit for trucks on nearby roads to reduce likelihood of	Not significant.

Table 4. Summary of impacts and mitigation on Valued Environmental Components, Chapman Brothers Construction Limited, Westchester Quarry Expansion.

VEC	PROJECT COMPONENT	NATURE OF EFFECT	SIGNIFICANCE	NATURE OF IMPACT	MITIGATION	SIGNIFICANCE AFTER MITIGATION
		adjacent roads & highways, in particular Westchester Road.			collisions with local vehicles. Use good signage for trucks turning and slow moving vehicles. Safety training for truck drivers.	
Industrial & Commercial Use	Operation	Competition with other quarries	Negligible	Neutral	Quarry operations are in a competitive environment; cooperate if possible.	Not significant.
		Vibration from blasting on cell tower.	Not significant	Negative	Liaise with operator over issues.	Not significant.
Resource Use Forestry, Hunting & Trapping	Construction & Operation	Removes woodland; game habitat.	Not significant	Negative	Relatively small area is used compared to remaining habitat.	Not significant.
Parks and Protected areas	Construction & Operation	Economy River Wilderness Area and Portapique River Wilderness Area are in general vicinity.	Negligible	Negative	No interference likely. Employ best management practices for all aspects of quarry operation, in particular control of noise, light, dust and particulate emissions, and odours leaving the site.	Not significant.

7 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

The Westchester Quarry will be affected principally by extreme weather, in particular occurrence 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 north slope of the Cobequid Mountains is especially susceptible to thunder storms and heavy rainfall events. 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

There are no quarries or similar industrial operations in the immediate vicinity of the quarry, and the activities of which will add to the local effects of the quarry operation which include dust, noise, lights, blasting, and increased traffic volume. Reduction in forest cover at the site will compound the overall effects of forestry and land-clearing for blueberry production in the area. Planned restoration of the quarry site to natural conditions after the useful life of the quarry will, in the long term, counteract the effect of present forest loss.

9 Other Approvals Required

The process of registering an expansion of the Westchester Quarry requires an amendment to the current Industrial Approval for a quarry under 4 ha. Chapman Brothers Construction Limited will summarily apply for the required amendment upon approval.

10 Funding

Chapman Brothers 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 Westchester Quarry is submitted as authorized by James C. Chapman, Registered Agent, Chapman Brothers Construction Limited.

Nov. 5/21

Date

James C. Chapman, P. Eng. Registered Agent
Chapman Brothers Construction Limited

12 REFERENCES

Cumberland Municipality. 2018. Plan Cumberland. Land Use Planning Report for the Municipality of Cumberland. Prepared by UPLAND Planning and Design and the Municipality of Cumberland, in association with CBCL Limited and AGRG Consultants. 193 p

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

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