



**MUNICIPAL  
ENTERPRISES LTD**

**MUNICIPAL ENTERPRISES LIMITED  
SEABROOK QUARRY EXPANSION,  
SEABROOK, DIGBY COUNTY, NOVA SCOTIA**

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

**March 2016**

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- Appendix A** Property Information
- Joint Stock Certificate
  - Existing Industrial Approval
  - Quarry Survey Plan
- Appendix B** Drawings
- Appendix C** Rock Sulphur Content Analysis Results
- Appendix D** Biophysical Assessment Report (Envirosphere, 2015)
- Appendix E** Cultural Resource Management Report (CRM, 2015)
- Appendix F** Public Consultation Documentation

## 1.0 INTRODUCTION

To better serve local market needs, Municipal Enterprises Limited (herein after referred to as “Municipal”) of Bedford, Nova Scotia is proposing to expand an existing quarry located on Highway 217, Seabrook, Digby County, Nova Scotia. An approval to expand the quarry is required under the Nova Scotia Environmental Assessment Regulations. The registration of this Environmental Assessment (“EA”) is in response to Schedule A of the Environmental Assessment Regulations, Undertaking B.2., “*A pit or quarry that is larger than 4 ha. in area for extracting building or construction stone.*”

Municipal is a private Canadian company. It is incorporated under the laws of Nova Scotia and registered to do business in Nova Scotia under the Nova Scotia Corporations Registration Act. Municipal’s Registry of Joint Stock Certificate is attached in **Appendix A** “Property Information.” It is important to note that Municipal Enterprises Limited is the parent company of Dexter Construction Company Limited, which may be referred to within the appendices.

### **Address:**

927 Rocky Lake Drive,  
P.O. Box 48100  
Bedford, NS, B4A 3Z2  
Phone: 902-835-3381

### **Proponent Contact:**

Gary Rudolph, P. Eng.  
927 Rocky Lake Drive,  
P. O. Box 48100  
Bedford, NS, B4A 3Z2  
Phone: 902-835-6346

### **Consultant Contact:**

Mr. J. H. Fraser, M. A. Sc., P. Geo.  
H2O GEO Environmental Services Inc.  
Phone: 902-443-4227 (Office); 902-497-5597 (Cell)

It is noted that the quarry operates under an existing Industrial Approval (Approval No. 2010-071335-A01), which was first issued in May, 2010, and subsequently amended by Nova Scotia Environment, as attached to a letter dated October 19, 2015, received by Mr. Carl B. Potter (Dexter Construction Company Limited) from Ms. Paddy-Joe MacMillan, District Manager, Nova Scotia Environment. This letter and Approval (NSE File # 92100-30) is also attached in **Appendix A** “Property Information”.

## 2.0 THE UNDERTAKING

### 2.1 Description of the Undertaking

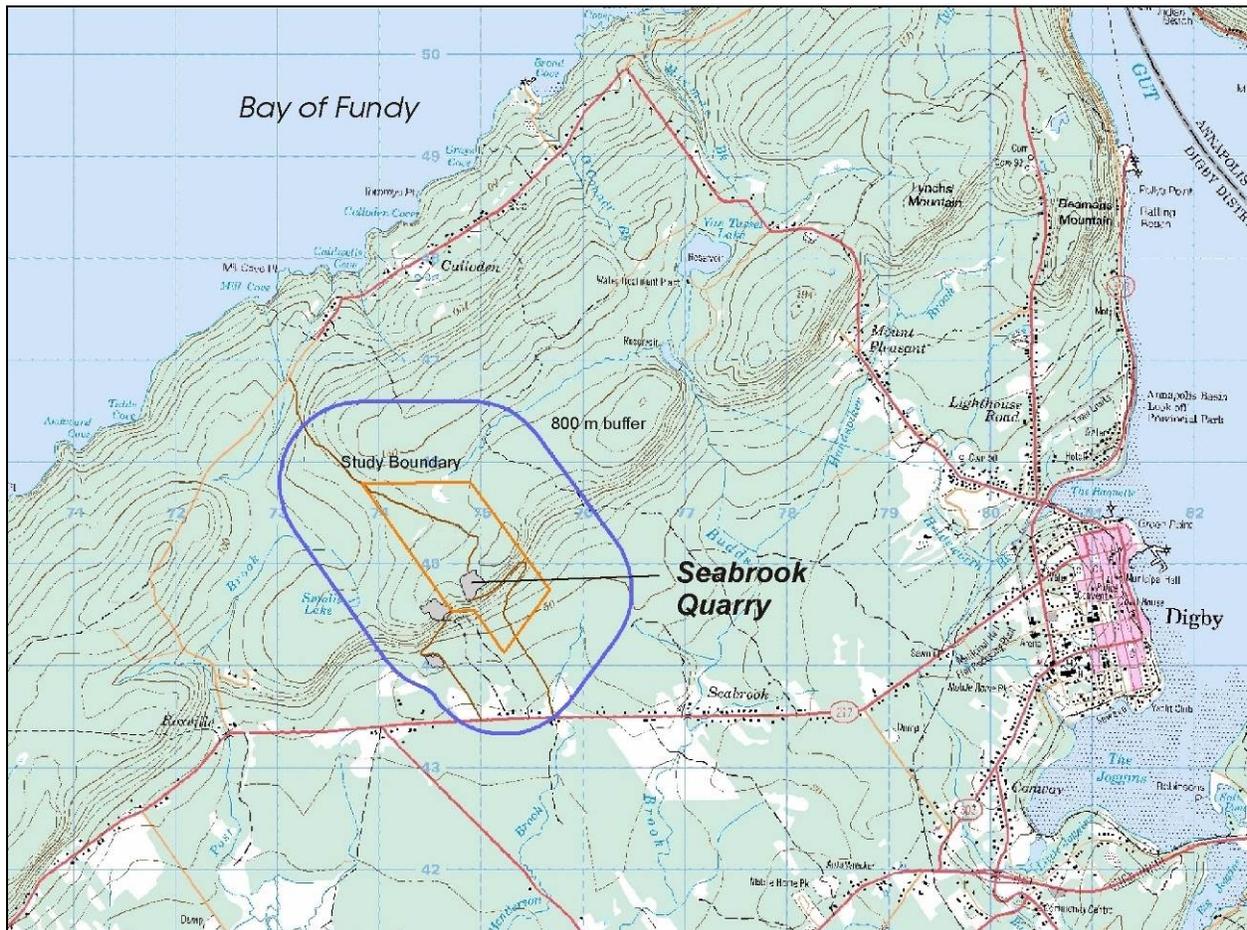
Municipal proposes to expand its existing Seabrook quarry for the production of aggregate, primarily used in the road and local construction industry. The proposed undertaking (“*the quarry*”) encompasses a total area of approximately 90.5 hectares, of which approximately 53.5 hectares is the expanded active quarry, and the remainder encompasses the access road and future stockpile areas. A plan showing the dimensions of the existing quarry is included in **Appendix A**. The proposed quarry boundaries are illustrated in **Appendix B**.

## 2.2 Location

The site is located on 11621 Highway 217, in Seabrook, Nova Scotia (PID #'s 30284483 (partial), 30192975 (entire property) & 30132740 (partial)) in Digby County, Nova Scotia, 1:50000 NTS 21A12, 4944797 Northing, 274889 Easting, UTM Zone 20, Air Photo 301-102 & 302-064, July 11 2012 (**Figures 1 & 2 (below) and Drawing 1, Appendix B**). The site is positioned within an un-zoned area west of Digby and north of Highway 217. The quarry site that is being expanded has previously been developed as a result of quarrying and construction material processing activities.

The properties are wholly owned by Municipal Enterprises Limited. The quarry property encompasses a total of approximately 225 hectares; however it is important to note that the EA document study area encompasses an area of approximately 135 hectares and the proposed quarry expansion area is 90.5 hectares (**Drawing 2, Appendix B**).

**Figure 1 – Project Location**



**Figure 2 – Site Location and Adjacent Land Uses**



### **3.0 SCOPE OF THE UNDERTAKING**

As noted previously, Municipal intends to expand the existing Seabrook quarry for the continuing purpose of extracting and supplying aggregate for the road and local construction industry. The existing quarry has been in operation since 2010 and encompasses an area of approximately 3.95 hectares, of which 3.76 hectares has been actively developed. This EA covers an area of 90.5 hectares and includes this existing operational area. The existing quarry face is between approximately 10 and 15 meters (m) in height and the disturbed area includes on-site related facilities including a scale house, sedimentation infrastructure, as well as an occasional portable asphalt plant, crushing, washing and stockpiling areas. During past operations, Municipal has extracted an average of approximately 25,000 to 50,000 tonnes of aggregate per year from the quarry when active. There are no off-site related support facilities, other than Highway 217, Middle Cross Road to Highway 101 and the rear access road to Culloden Road.

It is Municipal's intent to continue quarry operations on the property, using existing infrastructure. It is anticipated that future operations will involve the extraction of approximately 25,000 to 50,000 tonnes/year for the foreseeable future. However, the annual quantity will vary depending on local demand and associated project requirements.

#### **3.1 Purpose/Need of the Undertaking**

Municipal proposes to expand the existing Seabrook quarry for the production of aggregate, primarily used in the road and local construction industry. The primary benefit will be to the people of Nova Scotia via the continued construction and maintenance of the Provincial highway system.

#### **3.2 Consideration of Alternatives**

Municipal operates rock quarries throughout Nova Scotia and Atlantic Canada and uses modern industry standard methodologies in all phases of the extraction, processing and delivery

processes. Alternative processes are always being considered in terms of their efficiency, cost effectiveness and environmental mitigation advantages. Continuing operations of the Seabrook quarry expansion will be assessed on an on-going basis to ensure that the best available techniques are being utilized in all phases of day to day operations.

### **3.3 Scope of the Environmental Assessment**

The scope of the environmental assessment is in keeping with the Nova Scotia Environment document entitled "Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia" as well as Municipal's experience with respect to similar projects over the past several decades. The scope also takes into consideration that the quarry is, at present, operational, and subject to an existing Industrial Approval. The following sections of this document provide a description of the project and an overview of the human uses and biophysical features of the local environment; outlines the key "Valued Environmental Components" addressed by the EA document; and presents an evaluation and summary of the benefits and potential drawbacks to the environment during all phases of the proposed undertaking.

## **4.0 PUBLIC INVOLVEMENT**

### **4.1 Methods of Involvement**

Municipal has engaged various public entities, as outlined below, and as the EA requirements do not include a direct public involvement program, public notification to date has focussed on notifying local officials of Municipal's intent to file an EA application to expand the existing Seabrook quarry. In this regard, the following persons have been briefed regarding the intent of this EA document:

Mr. Gordon Wilson; MLA Digby Co.

Warden Linda Gregory, Councillor, District # 3

Chief Carol Dee Thompson, L'sitkuk First Nation (Bear River)

Mr. Roger Hunka, Native Council of Nova Scotia

Twila Gaudet, KMKNO

Heather MacLeod-Leslie, KMKNO

Beata Dera, Office of Aboriginal Affairs

With respect to the First Nations Community, Municipal has followed the Proponent's Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia. In this regard Municipal has advised Chief Carol Dee Thompson of the L'sitkuk First Nation of Municipal's intent to file the Registration Document for a Class 1 Undertaking Under Section 9 (1) of the NS Environmental Assessment Regulations in a letter dated September 28, 2015. This letter includes all relevant information including:

- the proponents' name and representatives,

- the project location,
- the type of work to be carried out,
- any potential short and long term impacts,
- project and regulatory timelines,
- an offer to provide all relevant reports, studies and reviews, and
- an offer to meet and discuss the project.

Municipal also copied this letter to Twila Gaudet and Heather MacLeod-Leslie of the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO), Mr. Roger Hunka of the Native Council of Nova Scotia and Beata Dera of the Office of Aboriginal Affairs. This letter is included in **Appendix F**. Municipal is continuing the liaison process with the First Nations representatives, and will follow up with Chief Thompson regarding the newspaper announcement and viewing locations for the full EA document, once they become available. As well, a follow up meeting was held with the Office of Aboriginal Affairs, on February 23, 2016. Municipal will provide any responses received from these agencies to NSE. No response was forthcoming from either the L'sitkuk First Nation or the KMKNO, regarding our invitation to meet and discuss the contents of the EA document.

#### **4.2 Public Concerns**

During the five plus years in which the quarry has operated, no public concerns regarding the project have been received. Municipal will document any concerns received during the public consultation portion of the EA process, and provide a copy to NSE.

#### **4.3 Future Steps**

The public will be notified of the EA Registration by an advertisement in the Chronicle Herald and the Digby Courier on March 8, 2016. A copy of the newspaper advertisement is included in **Appendix F**. During the development of the EA Registration, Municipal has been in contact with the L'sitkuk First Nations, KMKNO, Office of Aboriginal Affairs and the Native Council of Nova Scotia. Follow up was undertaken, and any comments or concerns noted have been addressed in this final EA document. Nova Scotia MLA, Mr. Gordon Wilson; and Warden/Councillor (District # 3) Linda Gregory have also been contacted, advising of the upcoming newspaper advertisements and indicating that the EA document is available for review at the associated viewing locations.

### **5.0 DESCRIPTION OF THE UNDERTAKING**

#### **5.1 Existing Quarry Operations**

The existing quarry operations involve blasting, crushing, washing, stockpiling of aggregate and associated trucking on an as required basis. In addition, a portable asphalt plant is occasionally situated on the property. The quarry has operated in accordance with an existing Industrial Approval (Approval No. 2010-071335-A01), which was first issued in May 2010, and subsequently amended by Nova Scotia Environment, as attached to a letter dated October 19, 2015, received by Mr. Carl B. Potter (Dexter Construction Company Limited) from Ms. Paddy-Joe MacMillan, District Manager, Nova Scotia Environment. This letter and Approval (NSE File

# 92100-30) is also attached in **Appendix A**. The quarry also operates in accordance with the Nova Scotia Pit and Quarry Guidelines. These Guidelines apply to all pit and quarry operations in the Province and 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. Municipal is committed to the utilization of 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.

Blasting, crushing, washing and trucking have occurred on an as required basis, however it is noted that blasting has occurred on an average of one to two times per year. Surface water management at the site involves the following: Site runoff resulting from precipitation events and spring runoff that does not permeate through the gravelled quarry floor and/or working areas, at present, flows directly to the surrounding vegetated environment. In addition, there are several rock check dams in place along the site access road ditch, which are located on the lowest portion of the access road prior to the steep slopes. Current monitoring requirements include sampling the site discharge at the request of NSE (IA Permit) for TSS and pH. The results of the surface water monitoring, and regular inspection of the drainage controls will be used to verify if/when site drainage controls need to be upgraded.

Municipal has also initiated surface water sample collection in June 2015, (which is on-going) involving grab sampling for hydrogen ion concentration (pH) and Total Suspended Solids (TSS) at a Downstream location, the results of which are outlined in **Table 1**.

<b>Table 1. Seabrook Surface Water Sampling Results (2015)</b>		
	<b>ACCESS ROAD CULVERT</b>	
<b>Sampling Date</b>	<b>pH (units)</b>	<b>TSS (mg/L)</b>
24-June-15	7.60	1.0
20-July-15	7.63	1.8
19-Aug.-15	7.61	2.6
30-Sept.-14	7.89	ND

**Site Discharge Limits – Seabrook Ind. Waste Discharge Permit App. # 2010-071335:**

- 1 – pH Grab Sample 5-9 units/pH Monthly Mean 6-9 units
- 2 – TSS Short Term Increase 25 mg/L/Long Term Increase 5mg/L

In addition to the above noted data, Municipal also arranged for the collection and analysis of a rock sample for sulphur content to determine if the material was sulphide bearing. The results of this analysis yielded a sulphur concentration of 0.018 % (0.05 kg H<sub>2</sub>SO<sub>4</sub>/tonne), which is well below the minimum (0.4 % S; 12.51 kg H<sub>2</sub>SO<sub>4</sub>/tonne) defined by NSE 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 C**.

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## 5.2 Future Quarry Operations

Municipal proposes to expand the Seabrook quarry for the extraction, storage and removal of aggregate, primarily used in the road and local construction industry. This EA is focussing on current needs, but also future needs; therefore Municipal is requesting the EA approval for 90.5 hectares, which includes a production and operational footprint, storage (stockpiles) and provisions for surface water control. It is noted that the land immediately to the north and south of the 90.5 hectares is also owned by Municipal and, in this regard, provides an additional total buffer zone of approximately 129 hectares.

Although totally dependent on local market conditions, it is anticipated, at this time, that future development will involve the production of approximately 25,000 to 50,000 tonnes of aggregate per year, for a period of approximately 20 to 40 years. The rock face would be initially constructed in a north westerly direction from the existing face (**Drawing # 2, Appendix B**). **Drawing # 2, Appendix B** identifies the total 90.5-hectare expansion area of which approximately 53.5 hectares will be the expanded quarry, and the remainder encompasses the access road and future stockpile areas.

For operational purposes it is important to understand that quarry operations will generally coincide with the road construction season; therefore it would be reasonable to anticipate seasonal operations within a similar time frame (April – December). The quarry will likely operate 24 hours per day when in operation and may operate for as many as 32 weeks per year, or as little as zero weeks per year, depending on local demand and project requirements. Municipal is committed to the utilization of 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.

Aggregate production would commence with drilling and blasting and is consistent with current operations. A qualified blasting contractor would 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 and submitted to NSE upon request. The existing Industrial Approval stipulates blasting control and monitoring requirements.

It is anticipated that aggregate excavation will not take place below the deep bedrock water table. A minimal amount of unconsolidated material and upper fractured bedrock water may be encountered as in previous operations; however this water, if encountered, will be directed to a surface water and sedimentation control system for treatment and controlled release.

The blasted rock will be excavated with an on-site excavator and processed by on-site portable crushing equipment. The various aggregate products will be stockpiled in designated areas within the quarry. Material, within the quarry, will be hauled and moved with a front-end loader. Products will be transported from the quarry via tandem and tractor trailer trucks along Highway 217 and other secondary roads to Highway 101, a distance of approximately four kilometers. The number of trucks hauling aggregate will be determined on a job by job basis, but currently averages approximately 2500 per year. Employment numbers are expected to remain consistent throughout the on-going operation. Drilling, blasting and trucking will require additional resources; however these activities are generally subcontracted on a job by job basis.

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## **6.0 DESCRIPTION OF THE ENVIRONMENT**

### **6.1 Human Uses of the Environment**

#### **6.1.1 Mi'kmaq**

The Bear River First Nation (L'sitkuk), established in 1830, is one of thirteen first nation communities in Nova Scotia located within the Digby and Annapolis counties. Archaeological evidence suggests Mi'kmaq have inhabited this area for nearly 4000 years. It is situated on 698 hectares of land and is comprised of three separate areas; Bear River 6, Bear River 6A, and Bear River 6B. Bear River 6 is the largest of the three areas and is approximately 21 kilometers southeast of Seabrook. A population of approximately 330 community members currently reside on the reserve.

The traditional way of life for the Mi'kmaq living in the Bear River region has included hunting and harvesting resources from the coastline and Bay of Fundy, as well as the inland forests and rivers. The Bear River band crafted canoes of birch and used these boats as a means to travel and hunt porpoise and other marine species from the Bay of Fundy.

Present day uses of the land reflect the traditional lifestyle of the Bear River inhabitants, and the community is active in a variety of educational activities directed primarily at youth and tourism. Organizations in the area include guided hikes and traditional forest harvesting activities (i.e. basket making) at the Stone Bear Tracks and Trails Retreat. The First Nations Forestry also facilitates initiatives to bring back natural diversity and ecological integrity including trail systems, silviculture treatments, maintaining wildlife habitat, brook enhancement and education.

Two tribal councils exist in Nova Scotia: the Confederacy of Mainland Mi'kmaq (CMM) and Union of Nova Scotia Indians (UNSI). CMM is a not-for-profit organization that was incorporated in 1986, and their mission is to promote and assist Mi'kmaq communities. The UNSI, created in 1969, was formed to provide a cohesive political voice for Mi'kmaq people. Bear River First Nation is a member of the Confederacy of Mainland Mi'kmaq. The Native Council of Nova Scotia (NCNS) represents Mi'kmaq people living off reserve. The NCNS is a self-governing agency located in Truro. The Office of Aboriginal Affairs in Nova Scotia estimates that approximately 35% of the Mi'kmaq populations lived off-reserve. The goal of NCNS is “to operate and administer a strong and effective Aboriginal Peoples Representative Organization that serves, advocates and represents our community.”

The Mi'kmaq Rights Initiative (Kwilmu'kw Maw-klusuaqn; KMK) also represents Mi'kmaq. The mission of KMK—whose name means, “we are seeking consensus.”— is “to address the historic and current imbalances in the relationship between Mi'kmaq and non-Mi'kmaq people in Nova Scotia and secure the basis for an improved quality of Mi'kmaq life.” The initiative is to negotiate between the Mi'kmaq of Nova Scotia, the province and the Government of Canada. KMK's main office is located in Millbrook. The Atlantic First Nations Environmental Network (AFNEN) is an environmental organization of Mi'kmaq communities and organizations. The CMM and UNSI are members and the Mi'kmaq Confederacy of PEI in Charlottetown is currently the acting coordinator. The AFNEN includes a representative from each Mi'kmaq organization and community interested in environmental issues. The Network meets regularly during the year through meetings, conferences, and the Internet to discuss environmental matters or concerns.

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### 6.1.2 Population and Economy

Digby Neck faces many of the same economic challenges of rural Nova Scotia—declines in the fishery, challenges in the fish processing sector, lack of economic growth, aging population and deteriorating service infrastructure (Gardner Pinfold 2006). Rural areas are now hard-pressed to retain youth and rejuvenate stagnating economies in the face of increasing migration to urban areas and a low birth rate (Gardner Pinfold 2006).

Population density around the project site is likely similar to the averages for Digby County, which is lower than average for Nova Scotia (7.2 and 17.4 per km<sup>2</sup>, respectively). In Digby County, the percentage of people employed<sup>1</sup> (49%) and average salaries (\$27,465) are a bit lower than the averages for Nova Scotia (57% and \$35,478, respectively; Statistics Canada, 2011a). Population in Digby County is predominantly rural (88%) and population has continued to decline both in Digby County and Digby Town in the most recent census (2011) (Nova Scotia Federation of Agriculture, 2011). The fishery, including fishing and fish processing activity, is the dominant industry in the area. In the Digby Neck and Islands area, resource industries including agriculture, forestry, fishing and hunting are important, supporting about 36% of labour force, which is comparable to service industries, and more than the tourist industry, which employed about 10% of the labour force in 2011 (Gardner Pinfold 2006). The fishery in the Digby Neck area is dominated by far by lobster, but scallops, quahaugs, sea urchin, and pelagics (herring and mackerel) and groundfish are also important in terms of landed value (Gardner Pinfold 2006).

Agriculture is also an important industry in the area. Some 150 farms operate in Digby County, the majority (two thirds) in the northwest portions of the county and the remainder in Clare. Number of farms in Digby County increased in the most recent census, attributed to the mink farming industry (32 farms). Fur farming is the largest agricultural industry sector in Digby County by number of farms (NS Dept. of Agriculture 2011). Most of the mink farming activity is located in southwest Digby County; however two mink farms are located 2.7 and 5.1 kilometers south of the existing quarry on Middle Cross Road and Marshalltown Road respectively<sup>2</sup>. Livestock raising is carried out at about 15% of farms and mixed vegetable, fruit, and horticulture another 15% (NS Federation of Agriculture 2011).

### 6.1.3 Water Supply and Residential Wells

A wellfield located northwest of the Town, and Van Tassel Lake, are the Town of Digby's public water supply. The wellfield is the primary supply and it is supplemented by flow from Van Tassel Lake (Municipality of the District of Digby, 2002). It is located approximately four kilometers from the existing quarry. A water treatment plant is located on Van Tassel Lake and the water supplies are jointly managed by the Town, Municipality of the District of Digby and the Digby Water Commission. A designated wellfield protection area (Digby Wellfield Protection Area, Figure 7, **Appendix D**) and associated Municipal Planning Strategy and Land Use By-law are in place (Municipality of the District of Digby, 2002). The purpose of the planning controls is to protect the quality of the water drawn from the Digby Wellfield Area through control of land use

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<sup>1</sup> The percentages of people employed include those people who on the census reported being aged 15 years or older, identified as being part of the labour force and also reported being employed. This is a proportion of the total population aged 15 years and older, which include the employed, the unemployed and those not in the labour force.

<sup>2</sup> . [https://www.google.com/maps/d/viewer?mid=zNSdNj3LI1MU.krmqSMvzMu\\_M](https://www.google.com/maps/d/viewer?mid=zNSdNj3LI1MU.krmqSMvzMu_M).

and development within the wellfield catchment and recharge area. The source waters in the watershed, which include North Mountain and extend to near the study area (Figure 7, **Appendix D**), have not been designated for protection as a Protected Water Area under the Environment Act; the Town and municipal authorities chose not to designate the source waters because most of the land is located outside of the Town; the level of development activity in the area is relatively modest; and the Municipality of the District of Digby has adopted land use controls specifically for the Wellfield Protection Area to promote protection of groundwater quality (Town of Digby & Digby Water Commission 2012).

The Town's current (2012) water supply system consists of nine (9) water production wells, which are supplemented by a surface water source called Van Tassel Lake Reservoir. From 2004 to 2009, the wellfield produced between 2.0 and 3.0 million litres per day (450,000 to 500,000 gpd) with minor amounts being produced from Van Tassel Lake (Town of Digby & Digby Water Commission 2012). The water system serves all of the Town, the joint Town/Municipality Industrial Park, Mount Pleasant, BelAire Drive, Pleasant Street and a portion of the Municipality along Highway 217 between the Town boundary and the community of Seabrook.

In the Seabrook area, most drinking water for residences and businesses is supplied by groundwater wells, both drilled and dug. The small area occupied by the quarry, as well as the distance from the nearest residences (no homes within 1.2 km), suggest that the quarry will not influence residential wells.

#### **6.1.4 Land Use**

The Municipality of the District of Digby has no overall area or municipality-wide planning or development control mechanisms in place; however it has Municipal Planning Strategies for specific issues, such as Drinking Water Protection and Wind Turbine development.

Land in the vicinity of the quarry is predominantly rural residential but includes forestry, agricultural and commercial use (e.g. quarry) as well as businesses operated from homes. Highway 217 in the area forms a corridor for rural residential and commercial development and is the main travel route to Digby Neck. The main agricultural use along Highway 217 in the vicinity of Seabrook is livestock and hay production (S. Ashford, property owner, personal communication 2015). A private sawmill and a vehicle maintenance and storage yard in Roxville are present in addition to residential properties. All of the land is privately owned, with no areas of Crown ownership apart from highway right-of-ways, and property owned by the Town and Municipality of Digby immediately adjacent to the Town (Map A-3, **Appendix D**).

#### **6.1.5 Hunting and Trapping**

The Seabrook Quarry site is expected to support wildlife species characteristic of Digby County. Predominant fur-bearing species reported in trapping catches for Digby are listed in **Table 7, Appendix D**, as well as in Table 2 below. Digby County reported the highest catch provincially for marten, squirrel, skunk and mink for the period between 2008-2013.

Upland game species (e.g. Snowshoe Hare, Ruffed Grouse and Ring-necked Pheasant) are harvested in Digby County, with Snowshoe Hare harvest ranking second highest for the province. However, Ruffed Grouse and Ring-necked Pheasant do not constitute a significant proportion of the total numbers harvested in Nova Scotia. Between 2008-2013, Digby County

ranked eleventh provincially for the harvest of Ruffed Grouse, and ranked seventh for the harvest of Ring-necked Pheasant, as noted in the following Table.

White-tailed Deer occur in the area, but harvest in Digby County is relatively low, representing only 3.9% of the provincial harvest between 2008-2013. Black Bear harvest values are not available by County; however, the region is expected to follow the trend of increasing abundance for the species in the province.

<b>Table 2. Summary of wildlife harvested in Digby and Nova Scotia, from 2008 to 2013.</b>			
<b>Animal</b>	<b>Calculated Harvest</b>	<b>Percent (%) of total for province</b>	<b>Provincial Calculated Harvest</b>
<b>Large Mammals</b>			
Deer	2,456	3.9	62,197
<b>Upland Game</b>			
Snowshoe Hare	29,966	8.9	454,731
Ruffed Grouse	7,215	4.2	205,815
Ring-necked Pheasant	986	4.1	29,886
<b>Fur Harvest</b>			
Beaver	1,475	5.2	28,548
Muskrat	2,521	2.9	88,186
Otter	103	3.6	2,895
Mink	2,954	28.9	10,237
Bobcat	221	3.6	6,120
Fox	82	2.4	3,475
Raccoon	1,440	8.4	17,122
Skunk	133	35.9	370
Squirrel	4,356	38.4	11,357
Weasel	610	10.4	5,861
Coyote	435	3.1	13,901
Lynx	0	0.0	49
Marten	15	38.5	39
Fisher	48	4.6	1,036
<i>Total for all Furbearers</i>	<i>14,393</i>	<i>7.6</i>	<i>189,196</i>
Source: Nova Scotia Department of Natural Resources, Wildlife Division, Harvest Statistics. <a href="http://novascotia.ca/natr/hunt/stats-index.asp">http://novascotia.ca/natr/hunt/stats-index.asp</a> ; Accessed May 2015.			

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### **6.1.6 Forestry**

Forestry is one of the main land uses in vicinity of the quarry. Digby County has the fifth highest labour force participation rates in forestry in the Province with approximately 530 individuals employed (APEC 2004). Private land holdings have been cut over extensively for timber in the past. Forest inventory data and recent aerial images show numerous clearcuts in the area.

### **6.1.7 Recreational, Commercial and Mi'kmaq Fishing**

Recreational fishing provides an important resource and pastime for residents of Digby County. The quarry is in Provincial Recreational Fishing Area 4, which supports recreational fishing primarily for Brook Trout from April 1 to September 30 (Nova Scotia Anglers' Handbook and 2015 Summary of Regulations). Larger streams in the area such as Henderson Brook, Post Brook and Budd's Brook support Brook Trout, which is the predominant species fished in the area.

Coastal waters in the area support leases for shellfish and finfish aquaculture, as well as a landbased aquaculture facility. Innovative Fishery Products Inc. holds a quahaug lease in inner St. Mary's Bay as well as several softshell clam leases in western Annapolis Basin around Digby. Kelly Cove Salmon Ltd. operates three finfish leases in the basin for Atlantic Salmon, Rainbow Trout, Atlantic Halibut, Atlantic Cod and Haddock. There is also a land-based haddock aquaculture operation at Victoria Beach on the west side of Digby Gut on the shore of Annapolis Basin. A small oyster lease is operated near the ferry terminal. A company in Gulliver's Cove, located west of the quarry, gathers, dries and sells dulse.

Mi'Kmaq hold lobster licenses and may operate along the Bay of Fundy coast in the Digby area. Recreational fishing by Mi'Kmaq in freshwaters in the greater area is likely infrequent or does not occur.

### **6.1.8 Historical, Archaeological and Paleontological Resources**

European settlers have occupied the area largely since the end of the 18<sup>th</sup> century when the area saw influxes of United Empire Loyalists as well as some returning Acadian settlers. Use of the area by Mi'Kmaq is probable but, with the exception of a screening of the site done for the quarry (Cultural Resource Management (CRM) Group Ltd. 2015, **Appendix E**), no studies have been done in the area, and there is a low likelihood of utilization of the site by Mi'Kmaq. There are no recorded archaeological sites in the vicinity of the proposed quarry expansion (S.Weseloh-Mckeane, Coordinator, Special Places, personnel communication, 2015; CRM 2015); and background research did not indicate any Euro-Canadian settlements in the development area (CRM 2015). CRM (2015) determined, based on site reconnaissance, topography and other features of the Seabrook Quarry site, that the EA Study area would have low potential for either Native (both pre-contact and historic) or Euro-Canadian archaeological resources. The site reconnaissance identified one historical feature within the EA Study area—a cellar believed to belong to the homestead of the earliest settlers (Henderson family) at the site—at the foot of the slope west of the access road (Map A-4, **Appendix D**). It was recommended that if the cellar could not be avoided during future activities at the site, further archaeological testing should be conducted within a 30-meter radius prior to development (CRM 2015, **Appendix E**). Other historically significant sites located in the general area, but not within the proposed quarry expansion area, include a possible Acadian cellar located on an adjacent property (Murray Ross property) north of Highway 217 and southwest of Municipal Enterprises

property; and the Henderson Family Cemetery, located on the southeast corner of the Municipal Enterprises property (CRM 2015, **Appendix E**).

### **6.1.9 Parks and Protected Areas**

Recreational areas in the vicinity of Seabrook include *Annapolis Basin Lookoff Provincial Park* and the *Digby Pines Resort and Spa, and Golf Course*. The provincial park—located about one kilometer north of Digby and about seven kilometers northeast of the quarry—is a small picnic park overlooking Annapolis Basin. The publically owned Digby Pines Golf Course is located north of Digby, approximately four kilometers east of the existing Seabrook Quarry and the Digby Pines Resort is near the Lookoff Park.

Mudflats, salt marshes and coastal wetlands at the head of St. Mary's Bay are important migratory bird and wildlife habitat, located approximately five kilometers southwest of the Seabrook Quarry.

All the counties of southwest Nova Scotia including Digby County are in the Southwest Nova Biosphere Reserve, a United Nations (UNESCO) designation for a conservation area, which is a means of recognizing and protecting the ecosystem of Southwest Nova Scotia. The reserve was formed with the cooperation of all counties in Southwest Nova—including Digby County—and recognizes the significance of relatively undeveloped areas, the role of the Mi'kmaq population and the overall cultural, commercial and historical importance of the area.

### **6.1.10 Recreational/Cultural Activities**

Residents in the vicinity of the quarry use woods roads and some of the small side roads for ATVs and woodland access, as well as for hunting. The road through the quarry extends beyond the west property boundary to the Culloden Road on the Bay of Fundy. Although the access road through the quarry property is gated at both entry/exit points, the northwest corner of the quarry property can be accessed by automobiles such as trucks and ATVs for recreation (e.g. hunting) via roadway along the Bay of Fundy coast. As the quarry property is privately owned by Municipal Enterprises Limited, use of the property trails, roads and woodland by neighboring residents or the general public as indicated, would be trespassing.

Seabrook Quarry is about 6.5 kilometers east of Gulliver's Cove, a community that supports a coastal walking trail and an ecotourism business (Fundy Adventures, Wanda & Calvin Van Tassell) that offers coastal tours.

### **6.1.11 Residential Use**

Seabrook is a former farming, fishing and logging community, which presently is largely residential or rural residential, with properties aligned on Highway 217. Approximately 25 single-family residences occur in the general area, including the community of Seabrook. No residential structures are found within 800 meters of the existing quarry or proposed quarry expansion area. Residents of the properties in the immediate vicinity of the quarry, interviewed during the site survey and by telephone, noted no impact from, or concern over, operations of the existing quarry.

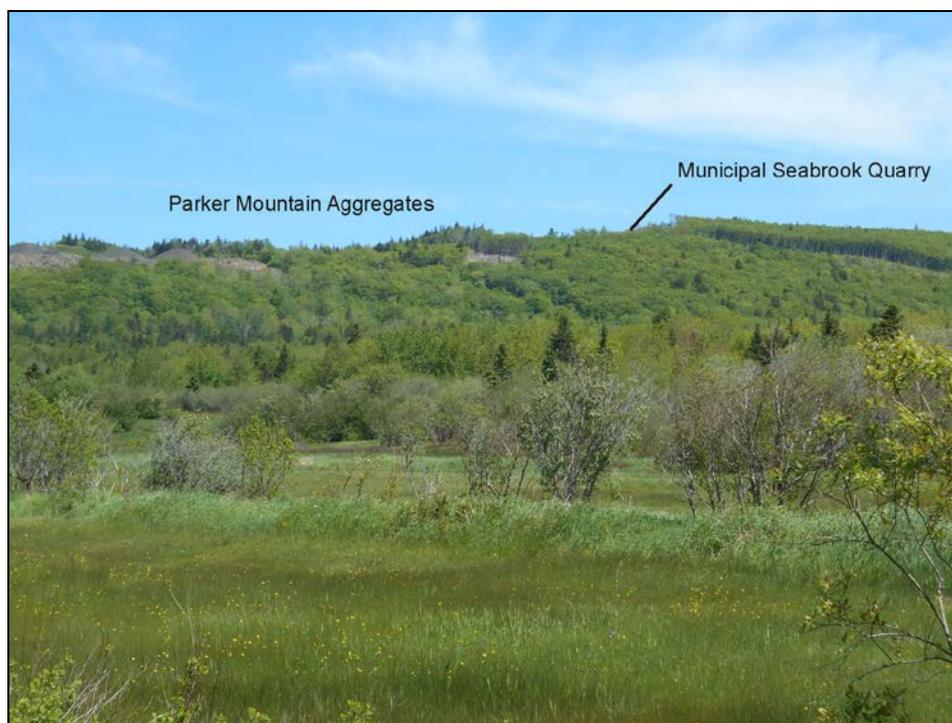
### 6.1.12 Commercial/Industrial Development

The SkyPower/Scotian Windfields wind turbine development is located approximately eight kilometers west of the study site. This site operates 20 wind turbines. The Parker Mountain Aggregates Quarry operates some 100 meters west of the existing quarry. Commercial development along Highway 217 increases in density between the community of Seabrook and Digby, which is 2.5 kilometers further east.

### 6.1.13 Tourism and Viewscape

Seabrook Quarry and the access road, and associated exposed bedrock and slopes are visible from Highway 217 (Figure 3) and can also be seen from as far away as Highway 101 near Cornwallis. The expanded quarry in late stages of development is not expected to be more visible from these locations than at present. The adjacent Parker Mountain Aggregates Quarry site is presently, and will continue to be, visible from a distance (Figure 3). Both quarries are approximately 1.2 kilometers from Highway 217.

**Figure 3 – View of site from Highway 217, June 2015.**



### 6.1.14 Transportation

Highway 217 is the only connector highway for communities on Digby Neck and is used by all local traffic to and from the rest of the Province. Traffic levels are not particularly high, with a large proportion of traffic expected to be due to local quarries when major construction projects requiring aggregate are taking place nearby. When in operation, the quarry will contribute truck

traffic in the vicinity of the site, typically in the summer fall construction season. Access to the quarry is open with good sight lines and is not expected to create safety concerns.

## 6.2 Biophysical Environment

The biophysical environment includes all the features of the environment either physical or biological, that are in the vicinity of Seabrook Quarry, and which are potentially impacted by it. Also included are impacts that physical and biological conditions can have on the project. The Biophysical Environment is summarized in *Biophysical Assessment of the Seabrook Quarry Expansion – 11621 Highway 217, Seabrook, Digby County, N.S.* (Envirosphere, 2015) found in **Appendix D**. The potential interactions of the project with the biophysical environment are outlined in Sections 7.0 & 8.0, which follow.

## 7.0 ENVIRONMENTAL IMPACTS, SIGNIFICANCE, AND MITIGATION

### 7.1 Assessment Approach and Methods

Information for the assessment was obtained from consultants' personal knowledge, from reviews of available information, and knowledge of the purpose and proposed design of the project. The environmental assessment follows *Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia* (NSE September 2009) and uses assessment methodology typical for environmental assessment screenings of this kind. For this assessment a list of valued environmental components (VECs)<sup>3</sup>, and project activities and outcomes for the expansion of the existing quarry were developed, and the potential for interactions of these activities with VECs was identified. Where interactions were identified and significant impacts were likely to occur, mitigating actions or activities have been suggested that will avoid the impact or reduce it to acceptable levels, before the project proceeds. The process ensures that all potentially significant impacts on VECs are identified and all potential impacts on them have been considered, and sufficient mitigation planned.

### 7.2 Valued Environmental Components

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 the following and are summarized in **Tables 4 & 5**.

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<sup>3</sup> Valued Environmental Components (VECs) are features or things in the environment, which are important either ecologically, socially, economically or culturally. The environmental assessment addresses potential impacts of the project on each VEC identified. To do so 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.

<b>Table 3. Valued Environmental Components (VECs) for Seabrook Quarry Expansion.</b>	
<b>Biophysical</b>	<b>Socioeconomic</b>
Air Quality, Noise and Light	Mi'Kmaq
Hydrogeology & Hydrology	Recreation, Tourism & Viewscape
Water Quality	Archaeological, Cultural and Historical
Freshwater Aquatic Environments & Wetlands	Recreational, Commercial & Mi'Kmaq Fishing
Fish & Fish Habitat	Land Use and Value
Flora & Fauna Species & Habitat	Transportation
Species at Risk	Residential Use
Natural Areas & Wilderness	Parks & Protected Areas
	Commercial /Industrial Use
	Water Supplies & Residential Wells
	Forestry, Hunting & Trapping
	Agriculture & Mink Farming

### 7.3 Impacts on Human Uses

#### 7.3.1 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. As co-owners of the land and its resources, they expect that any potential impacts to rights and title be addressed (T. Gaudet, KMKNO, personal communication 2014). Mi'Kmaq occupied much of Nova Scotia prior to European contact, and lands were used to varying degrees for habitation, hunting and fishing, as noted in Section 4.3.1. 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 on Henderson's Mountain and at the edge of the North Mountain plateau, as well as access through streams flowing off the mountain in many locations, may have attracted Mi'Kmaq to the site. No excavations or detailed searches for artefacts at the site have been undertaken (CRM 2015).

Operation of the Seabrook Quarry will use land that would otherwise be occupied by terrestrial ecosystems and might be used for human activities such as hunting or fishing, either recreationally or for subsistence; and can influence quality and quantity of surface water runoff into the headwaters of local streams, but such effects will be small. The land area affected is small in relation to the available wildlife habitat in the area, and there are no likely cumulative effects of other activities in the area, and consequently none of these effects are considered significant.

#### 7.3.2 Recreational Activities

Recreational use of the environment in the vicinity of the site consists principally of walking, gardening, enjoyment of home-based recreation, ATV use, hunting, fishing and nature appreciation. Operations at the quarry would be cyclic, likely occupying mainly the summer construction season, and the facilities are well maintained. Although the operations could likely

be heard, and residents would experience truck traffic and other effects of quarry operations, the impacts on these activities are expected to be negligible.

### **7.3.3 Tourism and Viewscape**

The quarry would have little influence on tourism and viewscape at Seabrook. The property is located some distance (approximately 1.2 kilometers) from Highway 217, from which it is visible. The combination of the Seabrook Quarry and access road, and the adjacent (to the west) Parker Mountain Aggregates Quarry, are clearly visible from Highway 217 and from beyond Digby on Highway 101. Truck and equipment traffic accessing and exiting from Seabrook Road onto Highway 217 would be occasional and would likely be only a minor impediment to tourist vehicle traffic in the area. The access road to the Quarry has good sightlines and is well maintained and not particularly noticeable from the highway. Overall the impacts on viewscape and tourism would be expected to be negligible.

### **7.3.4 Recreational, Commercial and Mi'Kmaq Fishing**

Fishing by local residents including from Mi'Kmaq communities in the area may occur from time to time in Budds Brook, Post Brook and Henderson Brook, and downstream areas. The Seabrook Quarry will not significantly change flow regime or water quality in these brooks and the overall influence will be minimal. Water quality of the runoff from the quarry is likely to be good for salmonids (versus the low pH found normally in surface waters), including low turbidity and neutral pH, which would lead to good quality of waters downstream for fish. Overall a negligible impact of the quarry on fishing is expected.

### **7.3.5 Archaeological/Cultural/Historical**

The land proposed for the quarry expansion has low potential for pre-contact and/or early historic native or European archaeological resources. The area was not settled by Europeans until late in the 18<sup>th</sup> century and not intensely settled until more recently. The Henderson family cellar will be disturbed by later development, but the site will be surveyed adequately as recommended by museum authorities prior to any disturbance. Municipal does not plan to develop parts of their properties other than those on which the assessment was done. Consequently the project is not likely to discover or significantly impact cultural/historical/archaeological features.

### **7.3.6 Land Use and Value**

Forestry, mixed agriculture, hunting and trapping, as well as small rural-residential properties, are the major land uses in the vicinity of the site, and the EA Study Area, as well as adjacent lands. The land on the site is not suitable for agriculture or subsurface mining, and aggregate production, forestry, and wind energy extraction are among the only potential commercial uses of the area. 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 uses of nearby areas for conservation and scientific use. Values for residential properties in Seabrook will likely be only minimally affected, if at all, by the presence of the quarry. The Seabrook Quarry and adjacent Parker Mountain Aggregates Quarry have been operating at the site, having little impact on the local residential and farm community, while providing economic development and a source of aggregate for local construction projects.

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### **7.3.7 Transportation**

The quarry generates a low level of truck traffic on the highways in the area, but activity levels are not expected to increase significantly, and consequently the quarry is not expected to change the existing traffic volumes significantly. Suitable safety awareness training for truck and equipment operators, as well as the Seabrook community, would help avoid dangerous situations at the intersection. Overall the impact of the project on transportation and safety is expected to be minimal.

### **7.3.8 Residential Use**

Quarry activities can interfere with normal use and enjoyment of nearby residential properties by creating background noise and through truck and equipment traffic, which some residents may find objectionable. The property is located approximately 1.2 kilometers from Highway 217 and is poorly visible. Normal traffic noise on Highway 217 would likely exceed any noise coming from the quarry for homes located nearby. Residents of homes along Highway 217 in the vicinity of the quarry indicated that there were no problems associated with the quarry. Activities at the quarry would be limited in time seasonally (approximately March to November) and during the day, although nighttime operations, but not blasting, will be required under some circumstances. 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 the operations is unlikely to reach residential areas. Dust generation could be moderate due to the exposed, high location of the site, but measures to control dust will be implemented. Quarry activities are not expected to impact residential wells, as they are located at a significant distance from the site. Most operations at the site occur during daylight hours, and on rare circumstances when they are undertaken at night, will involve minimal additional lighting and noise, which is unlikely to be a serious disturbance to local residents. The quarry will include signage with phone numbers and contact persons should any members of the community wish to register complaints or concerns. A complaint resolution procedure will be put in place by Municipal Enterprises Ltd. to address complaints and concerns.

### **7.3.9 Commercial/Industrial Use**

There are no commercial operations in the Seabrook area apart from the two quarries, and the Digby Wind Project located west of Gullivers Cove. Blasting at the quarry site will not have sufficient energy to reach the nearest turbine (eight kilometers distant) at the wind turbine site. The quarry will compete with the existing Parker Mountain Aggregates Quarry in Seabrook; however there will probably be a net economic benefit to the community in supporting local trucking operations and providing access to aggregate and other quarry product in the vicinity of Seabrook.

### **7.3.10 Water Supplies and Residential Wells**

Residents of Seabrook use wells for water supply, and the watershed for the Town of Digby drinking water supply is located adjacent to the site. Quarry activities are not expected to impact residential wells as they are located at a sufficient distance (i.e. no residences are located within 1.2 kilometers) to avoid impacts from quarry operations, in particular occasional blasting that takes place. Groundwater recharge generated by the quarry is of high quality (low conductivity and dissolved solids, and neutral in pH). Best management practices for operations will be undertaken to eliminate the potential for any contamination of aquifers at the site. The quarry is outside the water supply watershed for Digby and is too far from the wellfield protection area for

the Town to have an impact (approximately four kilometres distant). Runoff from the operational area of the quarry will be treated as per specifications under the industrial approval, and quality will be monitored under the industrial approval for the project. Overall, activities at the quarry are not expected to impact wells in the area.

### **7.3.11 Parks and Protected Areas**

The quarry site is not near to or visible from any parks or recreational areas (e.g. Digby Pines Golf Course or the Annapolis Basin Lookoff). Although all of Digby County is broadly included in the Southwest Nova Scotia Biosphere Reserve designation, the designation includes the concept of multiple uses of the landscape and management to protect various values the area. Blasting, when it occurs, can be heard at some distance from the site, and will reach the Town of Digby and the park areas; however the blasting activities will be infrequent. Light associated with nighttime operations will not add significantly to that already produced by urban development and street lighting in Digby.

### **7.3.12 Resource Use—Forestry, Hunting & Trapping**

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

### **7.3.13 Agriculture & Mink Ranching**

Mink ranching is the major sector of the agricultural economy of Digby County. Mink can be sensitive to adverse stimuli such as excessive light, loud noises, and vibrations. When choosing the location of mink farms, mink farmers ideally consider factors proximity to neighbouring activity or high traffic volumes (National Farm Animal Care Code of Practice 2013). On the other hand, a study cited recently to demonstrate the effects of noise on livestock, including mink, showed that noise levels do not have a significant impact on cattle (milk production), swine, poultry (egg hatching) or mink (kits produced) (Bond (1971) cited in US Dept. of Transportation (2015)). Occasional blasting, and equipment and truck noise likely can be heard, and lights from the quarry can be seen from the nearest mink farm on Middle Cross Road some 2.7 kilometers from the site. Mink, as do many mammal species, will likely acclimate to routine noise and light levels generated by the quarry, and they are housed indoors, which will prevent exposure to light during nighttime operations. Blasting could be heard and potentially a sudden noise could startle animals.

## **7.4 Biophysical Impacts—Impacts of the Project on the Environment**

### **7.4.1 Air Quality, Noise and Light**

Sources of ambient artificial light in the area adjacent to the quarry are generally not common, with the exception of the Digby urban centre; ambient noise levels reflect local vehicle traffic, operations of an adjacent quarry, and urban noise reaching the site from the Town of Digby. Air quality is expected to be good due to the isolated location and predominantly forested setting.

Parts of the Town of Digby are visible from the site, and lights in the urban area expose the site to nighttime illumination, particularly on nights with low cloud, and forming the main source of nighttime ambient light. Local residences are not visible from the quarry, but the site offers a panorama from the site to both the Annapolis Basin and St. Mary's Bay, and house lights, yard lights, and vehicle lights are likely to be seen from the site. When operating at night, lights from the adjacent Parker Mountain Quarry may be seen. Little light will be generated by local residences and traffic on Highway 217.

Air quality is influenced by the proximity to the Bay of Fundy and the undeveloped forests surrounding the site and is expected to be good. The lowland area below the site and extending to St. Mary's Bay is forested with residential developments broadly spaced. It is expected to have a relatively high natural baseline air quality typical of areas with low levels of human activity. Vehicle use on the highway is the main contributor to particulates and exhaust emissions, which are relatively low, contributing to low level emissions; while quarry activities can lead to periodic dust and vehicle exhaust emissions.

Ambient noise levels in general are expected to be low, but due to the position of the quarry at the top of Henderson's Mountain, with sight lines to nearby roads and the Town of Digby, ambient noise levels from outside sources reaching the quarry will be greater than in more sheltered locations. Peak vehicle noise is expected to coincide with vehicle traffic patterns.

Various project activities 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, as well as on-site routine operations contribute to increased dust and particulate levels. Noise levels can impact human use and enjoyment of the environment. Dust emissions during the construction phase will be localized and short term, and are expected to be minimal from routine operations. Dust management will be undertaken, including use of water spray and covering working and lay down areas with blasted rock. Monitoring of airborne particulate emissions will be conducted at the request of NSE and in accordance with the Pit and Quarry Guidelines and the Nova Scotia Air Quality Guidelines. 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. 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 and similar in type and amount to those produced during previous operations. Ambient air quality monitoring will be conducted at the request of NSE.

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, and can attract migrating birds, which orient to Digby Neck during their migrations. Light 'pollution' is increasingly a concern globally. Measures can be taken to ensure use of directional lighting, which minimizes emanation of light upward and laterally over the horizon. The quarry is one of several sources of light, including the Town of Digby, and the adjacent Parker Mountain Aggregates quarry, which has the potential to cumulatively affect bird movements during migration, and at other times of the year.

## 7.4.2 Geology/Hydrogeology

The location of the study area is at elevations of 130-170 meters on, and northwest of, the top of Henderson's Mountain, at the crest of the steep southern slope of the mountain. Landscape at the foot of the slope is flat to rolling where it forms the lowlands of the western Annapolis Valley. The study area includes three late Triassic bedrock units of the Fundy Group; North Mountain basalt formation (Brier Island, Margaretsville, and East Ferry members); the Middle to late Triassic Blomidon; and Wolfville formations, which underlie the lowland valley floor at the site (Figure 5, **Appendix D**) (Keppie 2000; White et al 2012). Two sedimentary formations, The Blomidon and Wolfville Formations, underlie the valley floor in Seabrook (Figure 6, **Appendix D**) (White et al 2012). The Blomidon Formation contains red-brown to locally grey-green siltstone and minor sandstone and shale. The Wolfville formation, which occurs further from North Mountain, consists of pink to red, coarse-grained sandstone and conglomerate with minor red to red-brown siltstone and shale (White et al 2012).

The upper plateau of North Mountain at the site is overlain by a thin (2-20 meters) layer of stony, sandy glacial till which conforms to bedrock features and has an undulating surface generally reflecting the topography of the bedrock (Stea et al 1992). The till tends to have abundant surface boulders, and its composition reflects that of local bedrock and till from which it was principally derived. Surface exposures of bedrock were observed at higher elevations at the site. The southeast face of the Mountain and the valley floor are formed from deeper layers of generally less stony glacial till, which are flat to rolling, have few boulders, and are deeper (3-30 meters) till (Stea et al 1992).

Groundwater develops predominantly subsurface in cracks and fractures, in horizontal surfaces between strata in bedrock, as well as in porous aquifers in rock formations on the adjacent valley floor. Till is a minor constituent of the subsurface materials, and is also a minor contributor to groundwater flow. The natural water table in the bedrock formation at the quarry is likely depressed due to the presence near the edge of steep slopes. Groundwater flow is expected to mirror topographic slope, which is away from the quarry in all directions. Potable water wells in the general vicinity of Seabrook and nearby Digby use the sandstone bedrock aquifer. Water supply wells for the Town of Digby are sourced from deeper bedrock groundwater regime. Thirty (30) wells are recorded in the NSE well log database for the Seabrook area, none of which are located within approximately 1.2 kilometers of the actual quarry.

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 elsewhere on the property, or in adjacent areas. The amount of recharge area involved in project activities is extremely small in relation to the overall size of the aquifers in the Seabrook area. The effect on overall groundwater flow patterns will be small, due to the small area of the quarry in relation to the scale of the aquifers. The overall impact on hydrogeology at the site is therefore expected to be negligible.

## 7.4.3 Hydrology

The study area for the quarry expansion includes the source and headwaters of several watercourses in the St. Mary's Bay watershed, and includes a small part of the watershed for the Town of Digby drinking water supply (**Appendix D**). The northern half of a wetland (rich bog/fen) in the northern part of the study area drains through a small permanent stream east to the Town of Digby reservoir and Budd's Brook; while the south part of the wetland drains

through a previously unmapped first order stream identified in the present study, southwest towards St. Mary's Bay.

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 watershed to the west of the site. The proposed expansion area includes a 30 meter buffer from the watershed for the Town of Digby water supply. 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. In particular, the surface of the large main access road to the existing quarry as well as the exposed slopes associated with it creates significant sudden runoff flows. Road surfaces oriented downhill are frequently rutted by downslope flow. Surface runoff from the slope crossed by the access road, as well as sheet flow from the road surface, is captured and carried by several ditches, which effectively transport and dissipate the runoff downslope into wooded areas. The flow management system in place appears to be adequate to manage the flow in a natural way and minimize damage to the local landscape, and to surface water quality, but ditches and road surfaces should be maintained regularly to prevent catastrophic failures due to sudden runoff events.

#### **7.4.4 Water Quality**

Water quality downstream of the site is important for fish habitat in the lower watersheds, which include Post Brook and Henderson Brook. Quality of water leaving the site and entering surface or groundwaters will be high, due both to the on-site flow management and the low-contaminant characteristics of the basalt bedrock. Quarry rock is within acceptable limits for sulphur and acid-generating potential. Blasting is not expected to result in groundwater quality changes, particularly with efforts to reduce releases of other chemicals such as nitrates used in blasting. Forest clearing and grubbing activities can lead to releases of fines from the soil, resulting locally in elevated suspended sediment levels. Release of other contaminants such as oils and lubricants from operating equipment, as well as contaminants which may be found in material, such as recycled asphalt, stored at the site, potentially can impact downstream areas, but is expected to be mitigated by normal precautions on equipment operations and fuelling locations, and measures to reduce runoff from storage piles, and, in any case, the concentrations of contaminants are expected to be exceedingly low. All activities will conform to the Nova Scotia Erosion and Sedimentation Control Handbook (NSE 1988) and the Nova Scotia Pit & Quarry Guidelines (NSE 2003). Impact of the quarry on water quality in adjacent streams and other waters is expected to be negligible.

#### **7.4.5 Freshwater Aquatic Environments**

Most of the permanent streams at the site are associated with the northwestern section of the study area and with the two large bog/fen wetlands found there. Surface runoff as well as some groundwater from the proposed quarry area presently is expected to provide some of the water that supports the wetlands and feeds the streams. Quarry development will respect wetland buffers and compensate for loss of wetland through a Wetland Alteration Approval, where necessary. Loss of wetlands and the streams could lead to requirements for compensation for losses of wetlands through Nova Scotia Environment and to a requirement for offsets by Fisheries and Oceans Canada under the Fisheries Act. The quarry is unlikely to generate significant quantities of contaminants or suspended sediments that could impact any downstream habitat.

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#### **7.4.6 Wetlands**

Two large bog/fens occur at the site, and potentially can be impacted by quarry activities through a reduction in water supply; as well the permanent change in temperature and hydrological conditions in the vicinity of the active quarry. Such changes have the potential to change the plant and ecosystem characteristics, through changes to nutrient input, dust, emissions, temperature regime etc. Long term gradual changes to plant communities are difficult to detect and monitor. Measures can be taken to maintain the hydrological regime, reduce nutrient inputs, and adequately buffer the wetlands, to attempt to maintain the existing wetlands.

#### **7.4.7 Fish and Fish Habitat**

None of the proposed project activities will physically impact potentially fish bearing streams on the northwest side of the project site—an area that is not expected to be developed. 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 streams leaving the site to eliminate harm to fish. All guidelines for activities and timing of blasting in the quarry will be followed. Overall the effects of the quarry construction and operations are expected to be negligible.

#### **7.4.8 Flora, Fauna and Habitat**

The existing terrestrial ecosystem (plants and animals) will be removed in areas covered by the footprint of the quarry. 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. Other wildlife species need large areas of undisturbed forest to live and reproduce naturally. Occurrence of logging activity in past and the network of woods roads and trails, not associated with the project, already influence movement patterns of wildlife. Expansion of the Seabrook Quarry will result in only a comparatively small change in the coverage of natural and mature forest stands in the area and have comparatively small impact on interior forest birds and wildlife. As the quarry expands, areas not needed will be reclaimed and revegetated, in consultation with Nova Scotia Environment and in response to likely approval requirements. Reclamation will reduce the overall impact of the project on loss of terrestrial ecosystems at the site. Grubbed and marginal areas of the quarry offer potential nesting sites for certain species of birds and other wildlife; 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.

#### **7.4.9 Species at Risk**

No species at risk were found at the site and impacts of quarry expansion as proposed, overall, will be negligible. Suitable habitat for the Northern Ribbonsnake was found in the large bog/fen wetland at the northern extent of the study area, although the species is unlikely to occur there based on its record of occurrence in the Province. A survey for northern ribbonsnake at some

point in future would establish potential further importance for the wetland, and assist in further managing the development of the site. Common nighthawk, a ground-nesting endangered bird species, potentially could nest in grubbed and marginal but open 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 during night operations during migration periods (May-June, 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.

#### **7.4.10 Natural Areas and Wilderness**

The naturalness and character of the forest landscape of North Mountain at the site is appreciated by locals and tourists alike, and regenerating forests at the site are important in supporting wildlife populations. Efforts should be made to minimize the footprint and effects of the quarry. The quarry will be visible from the populated areas of the lowland and travel routes especially when it is fully developed and uses the lower slopes of the mountain; and traffic, noise, dust and light from quarry operations contrast with the human experience of the natural character of the landscape. Activities at the quarry will be carried out with a view to minimizing impacts of the quarry and associated infrastructure, such as roads, on the adjacent natural environment at the site and ensuring that as much as possible of the quarry is reclaimed in future. The restoration should also take into consideration 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.

#### **7.5 Other Undertakings in the Area**

There are no known undertakings in the study area, with the exception of the proposed quarry expansion, as described herein. Quarries in the area include the Parker Mountain Aggregate quarry located west of the site.

<b>Table 4. Potential interactions between project activities and operations and Valued Environmental Components (VECs) for Seabrook Quarry expansion.</b>																				
<b>General Category of VEC</b>	<b>Biophysical</b>								<b>Socioeconomic</b>											
	Air Quality, Noise and Light	Hydrogeology & Hydrology	Water Quality	Aquatic Environments and Wetlands	Natural Areas & Wilderness	Fish and Fish Habitat	Flora & Fauna Species & Habitat	Species at Risk	Mi'Kmaq	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	Agriculture & Mink Ranching
Project Component (potential interactions shown by ✓)																				
<b>Construction</b>																				
Site Acquisition, Use/Removal of Resources					✓			✓	✓	✓	✓		✓	✓	✓		✓		✓	
Site Clearing/Grubbing	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓		✓				✓	✓	✓
Drilling	✓	✓	✓	✓	✓			✓			✓	✓		✓				✓		✓
Blasting	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓		✓				✓		✓
Lights	✓				✓		✓	✓			✓	✓						✓		✓
<b>Operation</b>																				
Moving/Transporting Rock and Product	✓				✓		✓				✓	✓			✓	✓	✓	✓		✓
Crushing	✓				✓						✓	✓						✓		✓
Washing		✓	✓	✓		✓														
Lights	✓				✓		✓	✓			✓	✓						✓		✓
Site Runoff Management		✓	✓	✓		✓							✓	✓						
Portable Asphalt Plant	✓				✓		✓				✓	✓						✓		✓
On-site Materials Storage			✓	✓										✓						
Accidents (Fires/Oil & Fuel Spills)	✓	✓	✓	✓	✓	✓	✓				✓	✓		✓				✓	✓	

<b>Table 5. Summary of impacts and mitigation on Valued Environmental Components, Seabrook Quarry Expansion.</b>						
<b>VEC</b>	<b>Project Component</b>	<b>Nature of Effect</b>	<b>Significance</b>	<b>Nature of Impact</b>	<b>Mitigation</b>	<b>Significance after Mitigation</b>
<b>BIOPHYSICAL COMPONENTS</b>						
Air Quality, Noise & Light	Construction	Noise & dust from heavy equipment during logging & grubbing.	Significant	Negative	Schedule activity to avoid peak periods of use by residents in the Seabrook community. Take steps to reduce noise sources such as engine braking.	Not significant.
		Light from the quarry can be seen for great distances.	Significant	Negative	Use directional lighting with downward & lateral focus to minimize light leaving the quarry during night operations.	Not significant.
	Operation	Drilling & blasting; equipment for moving rock; crusher & heavy equipment operation.	Significant	Negative	Monitor noise levels & undertake to avoid exceedences of regulatory levels. Institute measures for dust control.	Not significant.
		Light from the quarry can be seen for great distances.	Significant	Negative	Use directional lighting with downward & lateral focus to minimize light leaving the quarry.	Not significant.
Hydrogeology/ Hydrology	Construction	Forest & soil removal changes surface & ground water flow levels & patterns.	Negligible	Negative	Use site runoff management to minimize impacts. Likely changes in groundwater & runoff patterns will be small.	Not significant.
	Operation	Blasting fractures bedrock & changes groundwater flow patterns.	Significant	Negative	Bedrock not in same aquifer used in Seabrook community. Monitor groundwater hydrology to determine changes.	Not significant.
	Operation	Quarry & work areas change surface water flows. Increased peak stormwater flows. Washing product creates silt-laden surface flows.	Significant	Negative	On-site water management to moderate extreme surface water runoff & suspended sediment levels; measures to maintain normal flow regime.	Not significant.
	Operation	Accidental hydrocarbon spills & blasting residues contaminate groundwater	Significant	Negative	Measures to minimize danger of spills; on-site emergency numbers, spill kits etc. Avoid refueling near watercourses.	Not significant.
Water Quality	Construction	Altered surface water flows & turbidity in watershed flowages.	Negligible	Negative	On-site water management to moderate surface water runoff & suspended sediment levels.	Not significant.

<b>Table 5. Summary of impacts and mitigation on Valued Environmental Components, Seabrook Quarry Expansion.</b>						
<b>VEC</b>	<b>Project Component</b>	<b>Nature of Effect</b>	<b>Significance</b>	<b>Nature of Impact</b>	<b>Mitigation</b>	<b>Significance after Mitigation</b>
	Operation	Dust & suspended sediment from operations potentially enters local watershed. Chemicals (e.g. nitrates) from explosives entering runoff.	Significant	Negative	On-site dust control & water management to moderate surface water runoff & suspended sediment levels. Closely monitor chemical residues after blasting.	Not significant.
	Operation	Water chemistry changes in runoff from materials stored on site.	Negligible	Negative	Best management practice allows leaving piles exposed to the environment. Monitored settling ponds & stormwater management.	Not significant.
Natural Areas & Wilderness	Construction & Operation	Presence of the quarry affects natural wilderness values & local physical conditions.	Negligible	Negative	Area affected is small in relation to remaining natural areas, & previous development has occurred in the area, diminishing value of natural areas & wilderness. Attempt to minimize footprint & avoid damage to areas which contribute most to supporting the natural ecosystem & enhancing values. Manage releases of dust & light, & control noise.	Not significant.
Freshwater Aquatic Environments	Construction	Occurrences of high suspended sediments & nutrient levels from grubblings, road construction, & locally diverted flows.	Significant	Negative	Preserve wooded buffer areas adjacent to wetlands & watercourses. On-site water management to moderate surface water runoff & suspended sediment levels.	Not significant.
	Operation	Retention of runoff for aggregate washing. Lower normal flows in watercourses adjacent to site.	Significant	Negative	Maintain forested buffers. On-site water management to store additional wash water during off peak season.	Not significant.
	Operation	Higher peak flows & suspended sediment during activities.	Significant	Negative	On-site water management to store additional wash water during off peak season. Preserve woodland in buffer areas of quarry.	Not significant.
	Operation	Runoff from access roads.	Significant	Negative	Use of ditching & artificial channels to carry peak flows & additional site runoff.	Not significant.
	Operation	Releases of chemicals from blasting & runoff from materials stored on site.	Negligible	Negative	Isolate & treat runoff from heavy work areas & stored materials piles.	Not significant.

<b>Table 5. Summary of impacts and mitigation on Valued Environmental Components, Seabrook Quarry Expansion.</b>						
<b>VEC</b>	<b>Project Component</b>	<b>Nature of Effect</b>	<b>Significance</b>	<b>Nature of Impact</b>	<b>Mitigation</b>	<b>Significance after Mitigation</b>
	Construction & Operation	Routine releases & accidental spills of hydrocarbons on site.	Significant	Negative	Provide pollution prevention & emergency measures.	Not significant.
Wetlands	Construction	Grubbing, road construction, pit preparation	Significant	Negative	Avoid work &/or development near main wetlands in the study area. Delineate wetlands & compensate for loss. Maintain natural hydrological regime of wetlands during construction.	Not significant.
	Operation	Dust, nutrient inputs from runoff, changes to hydrology, changes to forest communities.	Significant	Negative.	Maintain a significant forest buffer; maintain hydrological regime.	Not significant.
Fish & Fish Habitat	Construction	Change runoff patterns at site in local & adjacent watersheds.	Significant	Negative	Avoid the major wetlands & associated watercourses. Maintain forested buffer around wetlands & streams.	Not significant.
	Operation	Site runoff management & water use affects hydrological & groundwater regime.	Significant	Negative	Ensure the runoff from the site is managed to maintain a supply wetlands & watercourses.	Not significant.
	Construction & Operation	Nominal releases of oils, hydraulic fluids etc. from operating equipment. Accidental spills of hydrocarbons on site.	Significant	Negative	Maintain equipment to minimize loss of lubricants & fuels. Provide pollution prevention & emergency measures.	Not significant.
	Operation	Accidental spills into Seabrook area streams from truck operations & accidents.	Negligible	Negative	Recommend truck traffic use safe driving practices & reduce speed in vicinity of quarry & intersection on Highway 217. Provide pollution prevention & emergency measures.	Not significant.
Terrestrial Flora & Fauna & Habitat	Construction	Removal of Existing Communities	Negligible	Negative	Restore damaged & unused parts of the site (e.g. grubblings & waste rock piles) as soon as possible. Long-term site rehabilitation plan developed with NSE. Cut forest short term only as needed to expand quarry.	Not significant.
	Construction & Operation	Accidental releases, contamination of habitat.	Significant	Negative	Provide pollution prevention & emergency measures & response capability. Remediate any permanent areas affected by spills.	Not significant.

<b>Table 5. Summary of impacts and mitigation on Valued Environmental Components, Seabrook Quarry Expansion.</b>						
<b>VEC</b>	<b>Project Component</b>	<b>Nature of Effect</b>	<b>Significance</b>	<b>Nature of Impact</b>	<b>Mitigation</b>	<b>Significance after Mitigation</b>
		Artificial light from operations influences movements of birds & insects, particularly birds migrating along Digby Neck.	Significant	Negative	Use directional lighting with downward focus to minimize light leaving the quarry.	Not significant.
		Removal of potential forest & wildlife resource (i.e. wildlife habitat)	Negligible	Negative	Small area affected relative to total available. Minimize footprint of quarry. Restore & rehabilitate areas not used.	Not significant.
		Quarry affects wildlife movement patterns & connectivity of habitats.	Significant	Negative.	Restoration should include consideration for wildlife movement through the restored site.	Not significant.
Species at Risk	Construction	No species at risk in the proposed footprint of the quarry.	Negligible	Negative	Minimize footprint & maintain as much natural (uncut) natural vegetation as possible. Leave mature standing trees where possible as nest cavities.	Not significant.
		Wetland at site suitable habitat for Northern Ribbonsnake	Significant	Negative.	Do not alter wetland & maintain 30 m buffer from quarry..	Not significant.
	Operation	Sound from blasting can harm bats & birds.	Negligible	Negative	Minimize blasting activity & concentrate in spring & fall (outside breeding & migratory periods) when species are absent.	Not significant.
		Light influences movements of species at risk birds migrating along Digby Neck.	Significant	Negative	Use directional lighting with downward & lateral focus to minimize light leaving the quarry.	Not significant.
		Open areas & grubblings piles occupied by nesting species such as nighthawks.	Significant	Negative	Educate personnel to look for bird life prior to activities; periodically conduct nesting bird survey at site to identify bird issues.	Not significant.
<b>SOCIOECONOMIC COMPONENTS</b>						
Mi'Kmaq	Construction & Operation	Any land use conflicts with Mi'Kmaq Right to Use Land	Significant	Neutral	Consult with Mi'Kmaq First Nations.	Not significant.
		Contamination & 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.

<b>Table 5. Summary of impacts and mitigation on Valued Environmental Components, Seabrook Quarry Expansion.</b>						
<b>VEC</b>	<b>Project Component</b>	<b>Nature of Effect</b>	<b>Significance</b>	<b>Nature of Impact</b>	<b>Mitigation</b>	<b>Significance after Mitigation</b>
Archaeological, Cultural & Historical Significance	Construction	Expansion may affect artifacts from previous activities (e.g. farming, homesteads, logging) at the site.	Not significant	Negligible	Minimize project footprint.	Not significant.
		Removal of Henderson family homestead cellar.	Significant	Negative	Conduct archaeological survey (soil test pits) & reconnaissance in a 30 m radius of site prior to development.	Not significant.
Recreation	Construction & Operation	Quarry traffic & activities affects local ATV traffic, recreational hunting.	Not significant	Negative	Users will be aware of activity at quarry but will not be otherwise impacted by it. Access roads gated to prevent unauthorized use.	Not significant.
		Truck & recreational traffic interact.	Negligible	Negative	Ensure awareness of truck operators of local traffic & uses.	Not significant.
Tourism & Viewscape	Construction & Operation	View of site & industrial character	Negligible	Negative	Maintain a clean operation. Rehabilitate areas no longer needed for activity & future development.	Not significant.
Residential Use	Construction & Operation	Noise; light pollution; operation of trucks & transportation of heavy equipment.	Significant	Negative	Use best management practices to reduce disturbance to nearby residents. Inform residents about quarry operations. Provide community with safety information for truck traffic on Highway 217.	Not significant.
Recreational & Mi'kmaq Hunting & Fishing	Construction & Operation	Accidental hydrocarbon spills & blasting residues contaminate surface waters.	Negligible	Negative	Provide pollution prevention, emergency measures & response capability. Identify & control contaminant releases.	Not significant.
	Construction	Loss of forested area under quarry footprint.	Not significant	Negative	Rehabilitate areas no longer needed for activity & future development. Minimize cutting outside quarry footprint.	Not significant.
Water Supplies & Residential Wells	Construction & Operation	Blasting potentially impacts local aquifers.	Not significant	Negative	Develop groundwater-monitoring plan in consultation with NSE.	Not significant.
	Construction & Operation	Town of Digby water supply watershed.	Not significant	Negative	A buffer zone around the quarry will avoid the wetlands & parts of the property adjacent to the Digby Watershed.	Not significant.
Land Use & Value	Construction & Operation	Removal of potential forest & wildlife resource (e.g. forestry & trapping).	Not significant	Negative	Small area affected relative to total land available. Minimize footprint of quarry. Restore & rehabilitate areas not used.	Not significant.
Transportation	Operation	Wear on highway	Negligible	Negative	Current levels low & will not increase.	Not significant.

<b>Table 5. Summary of impacts and mitigation on Valued Environmental Components, Seabrook Quarry Expansion.</b>						
<b>VEC</b>	<b>Project Component</b>	<b>Nature of Effect</b>	<b>Significance</b>	<b>Nature of Impact</b>	<b>Mitigation</b>	<b>Significance after Mitigation</b>
	Operation	Collisions with trucks & equipment on Highway 217.	Not significant	No Change	Use good directional signs, signs for slow moving vehicles, & speed policy in vicinity of quarry. Safety training for truck drivers.	Not significant
Industrial & Commercial Use	Operation	Blasting can cause shock waves in bedrock & affect foundations, including Wind Turbines	Not significant	Negative	Blasts unlikely to have sufficient force to affect existing wind farm at Gullivers Cove.	Not significant.
	Operation	Competition with other Quarries	Negligible	Neutral	Quarry operations are in a competitive environment; cooperate if possible.	Not significant.
Resource Use Forestry, Hunting & Trapping	Construction & Operation	Removes woodland; game habitat.	Not significant	Negative	Relatively small area is used.	Not significant.
Parks & Protected areas	Construction & Operation	Southwest Nova Scotia Biosphere Reserve	Not significant	Neutral	Biosphere reserve concept based on integrated & managed use of natural areas & human development. Manage quarry operations to minimize harm to the environment at the site.	Not significant.
	Construction & Operation	Changes factors affecting biological communities (e.g. connectivity, migration routes)	Negligible	Negative	Provide corridors for wildlife across restored site at project completion.	Not significant.
		Light influences movements of birds & insects from adjacent areas.	Negligible	Negative	Use directional lighting with downward focus to minimize light leaving the quarry.	Not significant.
Agriculture & Mink Ranching	Construction & Operation	Noise, lights, blasting & truck traffic potentially disturbs mink ranch on Middle Cross Road.	Significant	Negative	Consult with local mink rancher about critical times in mink rearing cycle & activities at the quarry.	Not significant.

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## **8.0 IMPACTS OF THE ENVIRONMENT ON THE PROJECT**

The operating quarry will not be impacted in general by weather, including high rainfall and precipitation, through its nature and design, which includes site water management. 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.

## **9.0 CUMULATIVE IMPACTS**

All the potential impacts of the quarry operation (dust, noise, lights, blasting, traffic volume) will be compounded by the operations of the adjacent Parker Mountain Aggregates Quarry. The two quarries are comparatively small and produce relatively small aggregate volumes, and the expected rate of production is expected to remain at current levels<sup>4</sup>. Light emitted from the two quarries is compounded by the presence of the Town of Digby, which is a major source. The quarries are close to Digby, and their combined range of influence is comparatively small compared to the large areas of undeveloped land in the adjoining landscape, so overall the cumulative effects on bird migrations, and light visibility and lightshine in the area, are expected to be negligible. In future, however, construction and operation of quarries and pits, as well as wind farm development, could take place in the vicinity of the quarry. Development of other quarries in the vicinity is possible, although there are no confirmed projects at present. The area is also suitable for windfarm development. Any developments potentially affect the ecological integrity of the area, making it less suitable for conservation purposes and affecting the value of the protected areas near the site, and all should be undertaken with a view to minimizing the impact on the local natural environment. The SkyPower/Scotian Windfields Wind project is located eight kilometres west of Seabrook Quarry. Wind turbines can impact migrating songbirds and bats, and are an added stress on these wildlife populations. Steps taken in the expansion of Seabrook Quarry to mitigate noise and light use at the site will help to minimize these potential cumulative effects.

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<sup>4</sup> Effects of operations of the Parker Mountain Aggregate Quarry were not assessed. We assumed that the production volume and longevity of the quarry would remain similar to that at present.

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## 10.0 MONITORING

Monitoring of hydrological conditions at the site, as well as water quality monitoring, may be conducted to ensure conditions have been maintained by quarry operations. Routine monitoring of noise levels will be done if required by Nova Scotia Environment. On-site groundwater monitoring may be conducted, at the request of Nova Scotia Environment.

## 11.0 PUBLIC CONSULTATION

In addition to contacts already made in developing this assessment and in conducting operations in Seabrook, the Proponent will undertake to consult with locals, municipal, and provincial government officials; and the Mi'Kmaq, about the project and its implications; and the plans for using the resources at the site in an environmentally acceptable manner.

## 12.0 PROJECT CLOSURE

Remediation of the affected environment during the closure or decommissioning phase of the quarry will involve the execution of a Rehabilitation Plan developed in consultation with the NSE.

## 13.0 APPROVAL OF UNDERTAKING

Municipal will comply with all provisions of the Nova Scotia Environment Act and Regulations. Applications for an amendment to the existing Industrial Approval will be submitted to the Yarmouth District office of Nova Scotia Environment.

## 14.0 FUNDING

No public or other government funding is involved in the execution of this undertaking. All costs are borne by Municipal.

## 15.0 SIGNATURE OF CEO AND DATE

FEB 23, 2016



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Date

David Wood – Chief Financial Officer  
Municipal Enterprises Limited