Table of Contents

List of Tables

10.0 CUMULATIVE EFFECTS

10.0.1 Introduction

Cumulative effect assessment (CEA) is defined, for the purposes of this Environmental Assessment/Impact Statement, as changes to the environment that are caused by an action in combination with other past, present, and future human actions that would result in incremental effects over space and time. In this regard, the Whites Point quarry and Marine Terminal is considered a "single-project assessment" as opposed to regional planning which may not have a single project as a focus and as a definite starting point.

The Canadian Environmental Assessment Agency's "Cumulative Effects Assessment Practitioners Guide" indicates that a project-specific cumulative effects assessment fundamentally needs to do the following:

- Determine if the project will have an effect on a VEC.
- If such an effect can be demonstrated, determine if the incremental effect acts cumulatively with the effects of other actions, either past, existing, or future.
- Determine if the effect of the project, in combination with the other effects, may cause a significant change now or in the future in the characteristics of the VEC after the application of mitigation for that project.

Therefore, for the CEA, only VECs potentially being effected at the regional scale, or at a sensitive level of concern (e.g. a species at risk), and for a long-term duration will be considered.

10.0.2 Approach

Generally, an ecosystem approach has been followed for the major environmental component categories of the physical, biological, and human environments. Valued environmental components (VECs) were identified within each of these categories. Residual effects, both positive and negative for each VEC are presented in **Table 2 – Valued Environmental Component Impact Summary,** in the preceding **paragraph 9.4.** Generally, cumulative effects would be considered as those effects of broader influence than those of the direct effects of the project "footprint". These direct effects of project development and activities are considered to be of a "local" influence and are identified in **Table 2.** Therefore for the CEA, the focus will be on influences of the project on a secondary level, the regional scale.

10.0.3 Cumulative Effects Framework

Assessment of direct effects of the proposed project at the local scale is considered to have a greater confidence level of prediction due to the greater level of supporting baseline data for decision making. Predictions for the regional scale effects inherently will have lesser confidence levels. Further, prediction into the future becomes more speculative due to uncertainties regarding implementation of planned actions. As spatial boundaries and temporal time frames are expanded, confidence levels are further reduced.

Planned undertakings or activities in Digby County are especially difficult to forecast since there is no Municipal Planning Strategy in place on Digby Neck/Islands to provide a future planning context, nor does the province of Nova Scotia have a coastal zone management plan for this area of the Bay of Fundy.

The following criteria are intended to provide a spatial and temporal framework which is considered "reasonable" and within the intent of CEA for the Whites Point quarry and Marine Terminal.

- The spatial context proposed is the "regional" scale for the CEA. This is based on the ecological regions defined in the "Spatial Boundaries" **paragraph 8.4.1.** For terrestrial systems the region is defined as the Theme Region 810 – Basalt Peninsula; marine systems as the outer Bay of Fundy; and human systems as Digby Neck and Islands/Digby County.

- The temporal context proposed is defined as the time period from the year 1995 to 2010. This time frame considers pre-project and reasonable future undertakings within the region that may contribute to incremental effects of project development and associated activities.

- Incremental effects of the proposed project in association with other undertakings in the region are considered in the context of direct human actions, in this case the construction and operation of the Whites Point quarry and Marine Terminal.

Even though the planned life of the project is expected to be 50 years and in many cases historic trends were identified in 5 to 20 year and greater increments, reasonable predictions for similar undertakings/activities within the region over a 50 year time frame is considered speculative. As indicated in **paragraph 9.3.25** "Other Undertakings in the Area", development having similar potential effects is not likely based on historic development trends, especially on Digby Neck and Islands. Digby Neck in particular is experiencing a decline in land and marine development activities.

Review of the Valued Environmental Component Impact Summary – **Table 2**, indicates the majority of predicted effects are either "neutral" or of "local" scale and are not predicted to permeate beyond the project site and its immediately adjacent lands and waters. However, some effects could occur beyond this "local" scale. These VECs will therefore be assessed in relation with other similar past, present, and future undertakings/ activities that could produce incremental cumulative project effects. These are discussed below.

10.0.3.1 Greenhouse Gas (GHG)

Fuel consumption is the major producer of GHGs. Pit and quarry development in Nova Scotia contributes less than 0.3% of the greenhouse gas in the province. Traditionally, there has been and are presently many small pit and quarry operations in the region. Two basalt rock quarries are presently in operation and are likely to continue in operation in the near future. No new basalt rock quarries other than the proposed quarry are known to be in the planning or permitting stages within the region. Planned mitigation for the proposed Whites Point quarry proposes no open burning, on-site forest management and conservation, incremental clearing, and incremental reclamation to offset GHG production. An insignificant negative cumulative effect is predicted for the region after proposed mitigation.

10.0.3.2 Flora Species at Risk

The regional ecosystem possesses flora species at risk of Federal and Provincial designations. Any land development (construction, forestry, agriculture, pit and quarries, tourism/recreation etc.) have the potential to affect regional species at risk. As a precautionary measure the Whites Point quarry underwent site specific botanical surveys. These surveys revealed flora species at risk exist on the quarry site. Planned mitigation measures for these species include an environmental preservation zone with expanded buffer areas for protection. Preservation of these species at risk will contribute positively to Provincial flora conservation efforts and maintenance of biodiversity in this regional ecosystem and sensitive coastal habitats. A significant positive cumulative effect is predicted for the region after proposed mitigation measures.

10.0.3.3 Marine Mammals – Blasting

The North Atlantic right whale and other marine mammals frequent this designated ecosystem region of the Bay of Fundy. Marine mammals are sensitive to noise transmitted into the marine environment. Blasting is not routinely conducted in this area of the Bay of Fundy. Future production blasting at the Whites Point quarry is proposed once every two weeks. Each blast will last less than one second. Mitigation measures include setbacks from the marine environment in accordance with the Department of Fisheries and Oceans

"Guidelines for the Use of Explosives in or Near Canadian Fishery Waters", reduced weights of explosives when blasting near the coastline, and observations to determine that no marine mammals are present in the prescribed "safety zone" before blasting. Considering the proposed mitigation measures and the present infrequency of blasting in the region, cumulative effects would rarely occur. An insignificant negative cumulative effect is predicted for marine mammals/species at risk after proposed mitigation.

10.0.3.4 Marine Mammals – Ship Interactions

The North Atlantic right whale and other marine mammals frequent this designated ecosystem region of the Bay of Fundy. Interactions between ships and marine mammals can be a cause of fatal and non-fatal injuries. Designated shipping lanes exist in the Bay of Fundy for vessels such as those proposed to transport quarry products from the Whites Point quarry. Approximately 50 ships per year are planned to traverse waters between the shipping lanes and the marine terminal during shipping activities. A significant mitigation measure was the location of the marine terminal within the marine region in an area of low marine mammal density, especially the North Atlantic right whale. Shipping activity to and from the Whites Point marine terminal is not required to go past or through the designated North Atlantic right whale Conservation Area. Large vessel traffic may increase in the future in the Bay of Fundy, however, cumulative effects of increased shipping between the shipping lanes and the marine terminal is not expected to increase in the future since only production from this quarry is planned to be shipped. There is no known planned marine development for this region of the Bay which would generate incremental vessel traffic. The only regional cumulative effect would be the additional 50 large vessels per year. An insignificant negative cumulative effect is predicted for marine mammals/species at risk after proposed mitigation.

10.0.3.5 Bay of Fundy Aesthetics

The Whites Point quarry and Marine Terminal will be visible from the coastline and waters of the Bay of Fundy. The coastline along this area of the Bay is relatively inaccessible and has no improved recreational facilities. Another basalt rock quarry visible from the water and land with an associated small craft harbour was recently constructed at Tiverton, Long Island in Petit Passage. Other fishing harbours have traditionally existed along the Bay of Fundy coastline with associated land development. With the exception of an approximate three month whale and seabird cruise season, the majority of nearshore use of the Bay of Fundy is for industrial purposes – e.g. fishing and fish processing. Whale and seabird cruises generally do not frequent this particular region of the coast since greater opportunity for whale and seabird sightings exist in other waters of the Bay. There are no known or planned future marine developments in this area of the Bay of Fundy. The proposed marine terminal and quarry would contribute to the present sparsely developed industrial coastline. An insignificant negative cumulativeeffect is predicted from an aesthetic value when the development is viewed from the coastline or nearshore waters.

10.0.3.6 Employment/Quarry Operation

The majority of employment in the region is generated by the fishing and fish processing industries. Stable employment opportunities and diversification have expanded recently within the broader region of Digby County mainly as a result of the service and commercial sectors. Some of these businesses have offered full-time employment opportunities in contrast to the traditional seasonal employment offered by the fishing or tourism industries. The Whites Point quarry will offer 34 full-time employment opportunities. These opportunities may benefit those men and women in the working age group that are presently under employed. These quarry jobs will pay industry standard wages, which are generally one of the higher industrial wage rates. Since there has been, and trends indicate a continued high rate of unemployment in this region, additional employment opportunities will add positively to the incremental cumulative effect. A significant positive cumulative effect is predicted on regional employment opportunities as a result of the quarry operations.

10.0.3.7 Municipal Tax Revenue/Quarry Operation

The Whites Point quarry and Marine Terminal will pay municipal taxes to the Municipality of Digby. These taxes will be incremental to existing revenues and contribute to the costs of municipal services for the residents of the County. A significant positive cumulative effect on the broader regional (County) tax base is predicted from operation of the quarry.

10.0.3.8 Tourism

The Digby Neck and Islands tourism industry is seasonal with whale and seabird cruises and outdoor activities the main attraction to the region. A “Discovery Centre” is in the planning stages in the vicinity of Freeport on Long Island. The Discovery Centre would supplement other physical attractions such as the Tiverton Museum and the Balancing Rock Trail. Many natural resource based developments such as pits and quarries, forest clear-cutting, or agriculture can affect scenic qualities of a regions landscape. Although the quarry will not be visible from the primary tourist route – Highway 217, it will be visible from the Bay of Fundy and its coastline. Although most whale and seabird cruises frequent other areas of the Bay, some tourists may be exposed to the quarry site. This industrial site could be considered cumulative with other industrial activities (fishing industry), resource extraction (pits and quarries) and forestry practices such as clear-cutting. Mitigation measures such as an environmental preservation zone around the perimeter of the quarry property, managed forest lands, incremental forest clearing, and incremental reclamation are proposed. An insignificant negative cumulative effect within the region is predicted if tourism participants view the quarry from the Bay of Fundy coastline or waters.

10.0.3.9 Quality of Life

Even though residents of a community may have different perceptions regarding their quality of life, a healthy and safe environment, access to health care, presence of family and good income and financial security ranked high among the community residents. The industrial development proposed at the Whites Point quarry could provide all of the above quality of life opportunities for some individuals in the community. Since all environmental regulations and standards will be adhered to, no environmental degradation is expected while the other factors will be available, thereby providing incremental opportunities to those already in place by existing industry. Little industrial diversification has occurred in the recent past and trends indicate limited growth in the future. Considering the potential quality of life opportunities presented by incremental cumulative industrial development, an insignificant positive cumulative effect is predicted resulting from the quarry operation.

10.0.3.10 Social Capital

Residents of rural areas generally exhibit a stronger community cohesion – a sense of belonging to one's community – than urban residents. A strong sense of belonging may also be characteristic of communities based on a primary resource industry. Although the community as a whole may not be in total support of the proposed quarry project, the Whites Point quarry has committed to employing and training a workforce of local people with an emphasis on women. In the long-term, this hiring practice from "within" the community will tend to strengthen community social cohesion such as networks, volunteerism, and social support systems. This strengthing of community cohesion will contribute to a predicted insignificant positive cumulative effect, in the long term, as a result of the quarry project.

The following **Table CEM - 2** presents a Valued Environmental Component Cumulative Effect Summary for the Whites Point quarry and Marine Terminal project. **Table CEM - 1** presents the monitoring program for the valued environmental component cumulative effect.

Whites Point Quarry and Marine Terminal

TABLE CEM - 2 CUMULATIVE IMPACT SUMMARY TABLE

VALUED ENVIRONMENTAL COMPONENT (VEC)

POTENTIAL CUMULATIVE ENVIRONMENTAL COMPONENT	SCALE	CUMULATIVE EFFECT Significance / Type	PROBABILITY
Greenhouse Gas	Regional	Insignificant / Negative	Possible
Flora Species at Risk	Provincial	Significant / Positive	Likely
Marine Mammals - Blasting	National	Insignificant / Negative	Unlikely
Marine Mammals - Ship Interaction	National	Insignificant / Negative	Unlikely
Bay of Fundy Aesthetics	Regional	Insignificant / Negative	Possible
Employment	Regional	Significant / Positive	Likely
Municipal Tax Revenue	Regional	Significant / Positive	Likely
Tourism	Regional	Insignificant / Negative	Possible
Quality of Life	Regional	Insignificant / Positive	Possible
Social Capital	Regional	Insignificant / Positive	Likely

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Whites Point Quarry and Marine Terminal
Table CEM - 1 Summary Table
Cumulative Environmental Component Monitoring

Environmental Component	Project Phase		Frequency	Description/EIS Paragraph	Regulatory Requirement
	Construction	Operation			
Greenhouse Gas	Yes	Yes	Annually	•Measurement of energy consumption by type of fuel **(para. 10.0)**	No
Flora Species at Risk	Yes	Yes	Varies by Species	•Maintain liaison with federal and provincial agencies regarding additions or deletions of regional species at risk **(para. 10.0)**	No
Marine Mammals - Blasting	Yes	Yes	Varies by Species	•Maintain liaison with federal and provincial agencies regarding additions or deletions of regional species at risk and adaptive management procedures **(para. 10.0)**	No
Marine Mammals - Ship Interactions	Yes	Yes	Varies by Species	•Work with the shipping company and DFO to develop detection systems for marine mammals in the designed ship route to and from the shipping lanes and the Whites Point Marine Terminal **(para. 10.0)**	No
Bay of Fundy Aesthetics	Yes	Yes	5 years	•Photographic documentation of view planes from the Bay of Fundy to the coastline to appraise effectiveness of reclamation **(para. 10.0)**	No
Employment / Quarry Operation	No	Yes	Annually	•Maintain a list of direct employment by occupation of quarry workers **(para 10.0)**	No
Municipal Tax Revenue / Quarry Operation	No	Yes	Annually	•Maintain amount of direct taxes paid to Municipality **(para. 10.0)**	No
Tourism	No	Yes	Annually	•Maintain rural landscape at entrance to quarry at Highway 217 **(para. 10.0)**	No
Quality of Life	No	Yes	after 5 years	•Assess quality of life of residents on Digby Neck by survey **(para. 10.0)**	No
Social Capital	No	Yes	after 5 years	•Assess success of training and local hiring of workforce at quarry **(para. 10.0)**	No

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10.0.4 Development by the Proponent or Others That May Appear Feasible Because of the Proximity of the Project's Infrastructure

The development of the Whites Point project by Bilcon is designed to supply Bilcon's parent company, Clayton Concrete Block and Sand, with washed aggregates to be used in the current concrete and block operations in New Jersey.

Clayton's requirement is for 2M tonnes per year and the capacity of the Whites Point Quarry operation has been designed to supply this quantity. Bilcon has no other land holdings capable of producing aggregate other than those in the Little River/Whites Point area.

The capacity of the shiploader is estimated to be 5,000 tonnes per hour and, theoretically, significantly more product could be loaded than the 2 M tonnes per year anticipated; however, while the shiploader has surplus capability, there is no additional space for stockpiling.

Bilcon has no intention of making the shiploader available to other producers in the area, since this would have serious effects on the efficiency of the anticipated operation and would create additional environmental impacts from trucking activities.