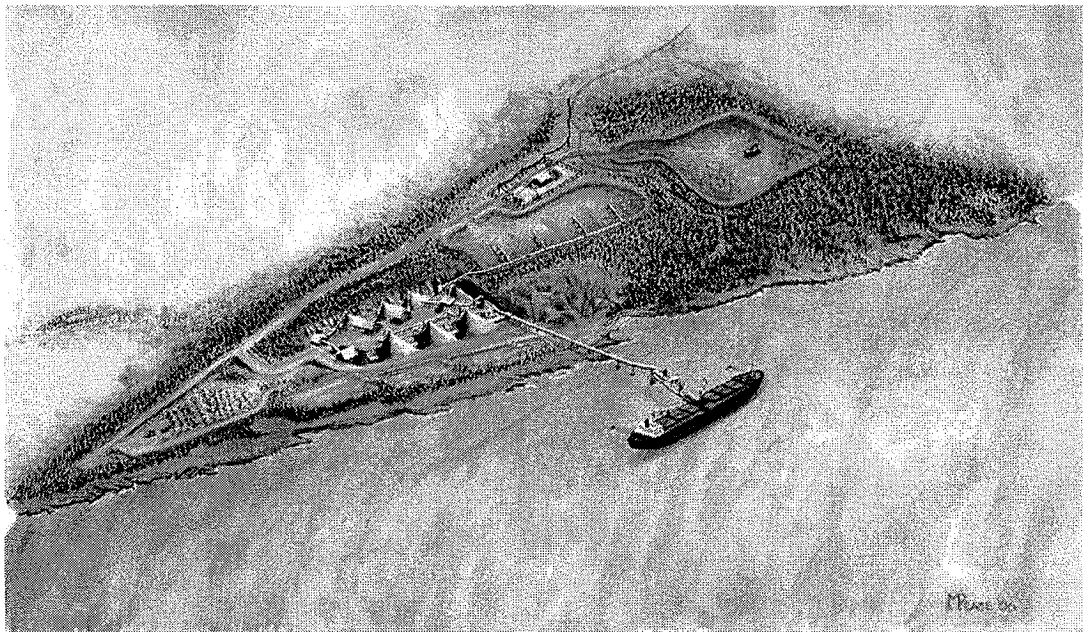


Whites Point Quarry and Marine Terminal

RESPONSES

VOLUME IV



- 10.0 Cumulative Effects
- 11.0 Environmental Management
- 12.0 Reference Documents

000091

10.0 Cumulative Effects

EIS Reference: EIS Volume VII, Chapter 10

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10.0 Cumulative Effects

WP 1452 – Joint Review Panel

10.0 Cumulative Effects Assessment

The cumulative effects analysis does not follow the methodology recommended in the Guidelines and the Panel does not accept the Proponent's justification for the approach that was taken in the EIS.

The Proponent is directed to submit a revised cumulative effects assessment that employs the accepted methodology outlined by the Panel and detailed in Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act (March 1999).

For further clarity, where a measurable effect on a VEC is predicted, the proponent is to define the spatial and temporal boundary of that VEC and predict the effects that would result from the proposed Project in combination with other past, present and reasonably foreseeable projects of all kinds. The revised assessment should include an inventory of these other projects. Consider using maps or diagrams to illustrate how the 'zones of influence' of other projects overlap with the boundaries of an affected VEC.

Of particular interest to the Panel are the predicted cumulative effects on marine mammals, aesthetics and tourism. Ensure that the cumulative effects on these and other relevant VECs are appropriately assessed. As directed in the Guidelines, emphasize sensitive VECs or VECs that may be at significant risk.

Follow the directions below in the revised assessment to allow the Panel to understand the Proponent's opinion on the significance of the potential cumulative effects:

- *Assess effects over the lifecycle of the Project;*
- *Provide quantitative, verifiable and referenced information and data – avoid vague qualifiers such as some, higher, and recently;*
- *Use the significance parameters of magnitude, duration, geographical extent, frequency, reversibility and ecological context, as appropriate, in the prediction of effects.*

In addition, ensure that a revised table of cumulative effects is submitted. Consider using a table that summarizes the predicted effects, the source of effects, mitigation/compensation, monitoring, follow up and significance determinations.

RESPONSE

Cumulative effects have been assessed in the EIS, Vol. VII, Chapter 10. In response to the Panel's request additional information has been generated. This includes:

10.0 Cumulative Effects

1. Bilcon's approach to cumulative effects assessment (CEA);
2. Identification and screening of other projects (present and future);
3. Assessment of potential adverse cumulative effects;
4. Development of mitigation measures; and
5. Assessment of the significance of residual adverse cumulative effects.

Given the Panel's particular concerns, the findings of the CEA are subsequently discussed with a focus on:

- Cumulative effects on marine mammals;
- Cumulative effects on aesthetics; and
- Cumulative effects on tourism.

Approach to Cumulative Effects

Subsection 16(1) (a) of the CEAA requires that every screening of a project include an assessment of the "cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out." This assessment considers the regional context for each VEC to identify potential cumulative effects with other projects and activities in accordance with the Cumulative Effects Assessment Practitioners Guide (Canadian Environmental Assessment Agency, 1999a,b).

In accordance with the EIS Guidelines (Canadian Environmental Assessment Agency, 2005), the CEA conducted for the Whites Point Quarry Project includes five components:

- scoping;
- analysis and effects prediction;
- mitigation / compensation;
- significance; and
- follow-up and monitoring measures to verify effect predictions and effectiveness of mitigation measures.

Similar to other projects such as the Joint Review Panel for the Sydney Tar Ponds Remediation in Cape Breton Island (CEAA Registry, 2006, Ref.# 05-05-8989), the CEA for the Project at hand requires for a project or activity to be considered cumulative that:

- there must be a measurable environmental effect of the project being proposed;
- any environmental effects must be demonstrated to interact cumulatively with the environmental effects from other projects or activities; and
- it must be known that the other projects or activities have been, or will be, carried out and are not hypothetical.

10.0 Cumulative Effects

For the purposes of the assessment, it is assumed that the existing status or condition of each VEC reflects the influence of other past and current projects and activities occurring within or outside of the Project area. It also assumes (unless there is evidence to the contrary, such as predictable down or upward trends in a population) that these existing activities will continue to be carried out in the future and will have similar effects as are currently observed. The assessment has, therefore, integrated the cumulative effects of these ongoing projects and activities. The CEA thus focuses on the effects of other future projects and activities, as considered and assessed for each VEC.

Scoping

The objective of the CEA scoping exercise was to focus this assessment on specific VECs and the potential for interaction with other projects and activities. The scoping entailed:

- identification of VECs and rationale for their selection;
- definition of the spatial and temporal boundaries for the CEA; and
- identification of past, present, and/or foreseeable other projects or activities that could impact VECs in combination with the Project.

Although at insignificant levels, potentials for residual effects have been identified for all VECs analysed in the direct effects assessment (please see EIS, Vol. IV, *Executive Summary* Table 2 Impact Summary; also refer to Bilcon's response to the Panel in Section 8.0 Impact Assessment Methodology, Tables 3.1 to 3.18.). Consequently, all VECs were considered in the CEA. The rationale for the VECs has been established as part of the direct effects assessment of the Project (please refer to Bilcon response to the Panel in Section 4.2 - EIS Format).

The predictions of the direct effects assessment are associated with VEC-specific spatial and temporal boundaries (for VEC-specific boundaries also refer to Bilcon's response to the Panel's IR-2, *Ecosystem Approach*, Table 3). The same boundaries have been applied in the CEA.

Other past, present, and/or foreseeable projects or activities that have a potential to act in combination with the Project have been identified through a screening exercise, which is discussed below.

10.0 Cumulative Effects

Identification of Other Projects and Activities

Identification Criteria

The identification of other projects and activities relevant to the CEA has been conducted based on the criteria described in Table 1 together with a rationale and a description of how the criteria have been applied.

**Table 1:
Criteria Applied in the Identification of Other Projects and Activities**

Criteria	Rationale/ Application of Criterion
<p>Status of other project or activity:</p> <ul style="list-style-type: none"> • Past and existing; or • Certain/planned; or • Reasonably foreseeable. 	<p>The CEA does not specifically consider past and present projects and activities. These projects and activities are captured by description of the baseline conditions. Their effects will have been evaluated in the assessment of effects of the Project.</p> <p>To clearly acknowledge their probable contribution to the baseline conditions and demonstrate the inclusion of past projects in the assessment, they have nevertheless been listed under a separate heading.</p> <p>Planned/certain projects are those that have a high probability of being implemented, i.e., those that have already been approved or are under review by appropriate agencies, or have been announced publicly as imminent developments.</p> <p>Reasonable foreseeable projects and activities are probable to be implemented and include typically those identified in approved development plans or those that are in other advanced stages of planning.</p> <p>Hypothetical and speculative projects and activities were not considered as part of the CEA.</p>
<p>Potential for overlap related to timing of the Project and /or activity:</p> <ul style="list-style-type: none"> • Other project or activity must be carried out or 	<p>The Whites Point Quarry Project involves the following time frames:</p> <p>Construction Phase Operating Phase</p>

10.0 Cumulative Effects

Criteria	Rationale/ Application of Criterion
implemented during the time frame that is relevant to the Project Phases.	Decommissioning Phase In accordance with this time line, the time frame for projects relevant to the CEA will extend from the start of the Project (2007), through the construction, operation, and decommissioning phase of the Whites Point Quarry Project.
<p>Potential for overlap related to the type of effect:</p> <ul style="list-style-type: none"> • Other projects and activities must exhibit potential to result in effects on VECs similar to Project-related residual effects. 	<p>projects and activities with a “reasonable potential” to exhibit types of effects similar to those anticipated for the Project were identified. The selection of projects and activities on the basis of this criterion had to be broad and expansive and based on professional judgment and a conceptual understanding of these other projects.</p>
<p>Potential for a spatial overlap of effect:</p> <ul style="list-style-type: none"> • Other project or activity must influence the Project as defined in the effects analysis for the various VECs. 	<p>For the CEA, all projects with an identified or expected zone of influence that may overlap with the effected geographic area likely affected by the Project are of interest. Since one of the objectives of the CEA is to determine the potential for environmental effects within the regional context of the Project, the CEA includes projects that are located within the regional context of the Project.</p>

Other Projects

Based on the approach discussed above, an initial list of other projects and activities (Table 2) was identified. These projects and activities may have the potential to act in combination with the Project with adverse or beneficial environmental effects.

10.0 Cumulative Effects

TABLE 2: Identified Other Projects and Activities and Potential for Cumulative Effects

#	Project/Activity	Location	Project Name/ Description	Status & Time Frame	Potential for Cumulative Effects (Screening)*	Rationale
1	Past and Present Projects					
1.1	Fish processing plants	Little River (about 2.5 km east off-site); Saint Mary's Bay	Fish processing; Plant at Little River is closest to the Project sites; others are located in Mink Cove, East Ferry, Tiverton (for locations, see EIS, Vol. III, Map 6B)	In operation	-	Effects of project captured by baseline description; addressed through direct effects assessment;
1.2	Small harbours Little River Sandy Cove	Bay of Fundy; Saint Mary's Bay	Base for inshore and off-shore fishing vessels Base for whale watching and adventure tour operators (for locations, see EIS, Vol. III, Map 6B)	In operation	-	see above
1.3	Tiverton New Harbour	Tiverton (about 10 to 15 km south of Project site)	See above	In operation	-	see above
1.4	Basalt rock quarry at Tiverton	Tiverton	Supply of local markets (for locations, see EIS, Vol. III, Map 6B)	In operation	-	see above
1.5	Basalt rock quarry at Rossway	Rossway	Supply of local markets	In operation	-	see above
1.6	Other small sand and gravel pits	Digby Neck area	Supply of local markets	In operation	-	see above

10.0 Cumulative Effects

#	Project/Activity	Location	Project Name/ Description	Status & Time Frame	Potential for Cumulative Effects (Screening)*	Rationale
1.7	Ecotourism attraction (Balancing Rock Trail)	Tiverton	Approximately 2.5 km interpretive walking/hiking trail to a unique rock formation and view of St. Mary's Bay; operation limited to summer season	In operation	-	see above
1.8	Ecotourism: Whale watching; adventure tour cruises	Existing wharves and harbours in Digby Neck area	Interpretive boat tours and cruises near and off-shore shore; variable duration; courses dependent on whale observations and weather conditions; Operations limited to summer season (for locations, see EIS, Vol. III, Map 6B)	In operation	-	see above
1.9	Aquaculture facilities	Closest locations: Mink Cove and Long Beach (St.Mary's Bay)	Land-based aqua-culture operation	In operation	-	see above
1.10	Subdivision and housing development	Digby Neck and Islands	25 housing units between 1996 and 2001	In operation	-	see above
1.11	High speed ferry	Yarmouth to Bar Harbour / Portland	High speed ferry service by Bay Ferries Limited (formerly operated by Marine Atlantic) between Yarmouth and Bar Harbour / Portland Not operational between November and April	In operation	-	see above
		Digby to Saint John	Ferry service by Bay Ferries Limited	In Operation	-	See above

10.0 Cumulative Effects

#	Project/Activity	Location	Project Name/ Description	Status & Time Frame	Potential for Cumulative Effects (Screening)*	Rationale
2	Planned and Certain Projects					
2.1	Ecotourism attraction - Discovery Centre	Freeport (Digby Neck, approximately 25km south of the Project site)	Proposed \$2-million interpretive centre in Freeport, devoted to the natural environment, cultural aspects and history of the Bay of Fundy. The present plan would see the Centre itself overlooking the Grand Passage between Long Island and Brier Island, with two wildlife viewing stations at the north and south extremities of Brier Island	Planning stage	-	Overlap unlikely: <ul style="list-style-type: none"> • Spatial overlap: No • Temporal overlap: not relevant • Overlap in the types of effects: not relevant Potential overlap of beneficial socio- economic type of effects on local/regional level not investigated – see text item 1.4.5.
2.2	Aquaculture Facility – Kelly Cove Salmon Ltd	Mink Cove (Digby Neck, Saint Mary’s Bay)	Expansion of land-based aquaculture facility with water-based site	Approval process under way	-	see above

10.0 Cumulative Effects

#	Project/Activity	Location	Project Name/ Description	Status & Time Frame	Potential for Cumulative Effects (Screening)*	Rationale
2.3	Irving Canaport	Saint John	<p>Port facility associated with Canada's largest refinery (production over 300,000 barrels per day; export to US approximately 175,000 barrels/d).</p> <p>New year-round ice-free crude receiving deepwater terminal is under construction and includes LNG receiving terminal:</p> <p>Capacity: 1 billion standard cubic feet per day (initial capacity) Storage: Three 160,000 cubic meters full containment liquefied natural gas storage tanks Pier: 350 meter jetty with mooring facilities for LNG carriers with up to 200,000 cubic meters capacity.</p>	Construction of expansion and LNG component underway In Service: 2008	x	<p>Overlap likely:</p> <ul style="list-style-type: none"> • Spatial overlap; LNG tankers will navigate through the same shipping channel as vessels under contract with Bilcon • Temporal overlap: quarry operation planned for 50 years; realization of LNG terminal certain during quarry operation; • Overlap in types of effects: yes; potential effects on climate, marine mammals, marine species at risk <p>Potential overlap of beneficial socio-economic type of effects on regional level not investigated – see text item 1.4.5.</p>
3.	Reasonably Foreseeable Projects					
3.1	Water bottling plant	Gullivers Cove (near Rossway); about 10 km northeast of Whites Point	Status unknown	Application for water withdrawal withdrawn	-	<p>Overlap unlikely :</p> <ul style="list-style-type: none"> • Spatial overlap: no • Temporal overlap: no • Overlap in types of effects: not relevant <p>Potential overlap of beneficial socio-economic type of effects on regional level not investigated - see text item 1.4.5.</p>

10.0 Cumulative Effects

#	Project/Activity	Location	Project Name/ Description	Status & Time Frame	Potential for Cumulative Effects (Screening)*	Rationale
3.2	LNG Terminal	Mill Cove, near Robbinston, Passamaquoddy Bay, Maine (USA)	Downeast LNG Project; the proposal includes: <ul style="list-style-type: none"> • An estimated 3,500' long pier with mooring dolphins for an LNG ship. • 160,000 m3 capacity containment LNG storage tank. • Water bath re-gasification units. • LNG shipments once every 8-10 days in summer and every 5-7 days in winter 	Proposals have been submitted	x	Overlap likely: <ul style="list-style-type: none"> • Spatial overlap; LNG tankers will navigate in outer Bay of Fundy and possibly through same shipping channel as vessels under contract with Bilcon • Temporal overlap: quarry operation planned for 50 years; realization of LNG terminal foreseeable during quarry operation; • Overlap in types of effects: yes; potential effects on climate, marine mammals, marine species at risk, tourism (whale watching tours)

10.0 Cumulative Effects

#	Project/Activity	Location	Project Name/ Description	Status & Time Frame	Potential for Cumulative Effects (Screening)*	Rationale
3.3	LNG Terminal	Pleasant Point, Passamaquoddy Bay, Maine USA	<p>Quoddy Bay LNG Project; the proposal includes:</p> <ul style="list-style-type: none"> • LNG Import and Regasification Facility (pier, two vessel berths, regasification process platform); Support Facility (control building, office and warehouse); • LNG transfer pipelines and vapour return line; • Onshore Storage and Regasification Facility (three storage tanks, electric generation equipment, and a regasification facility); • LNG shipments: during initial phase, 2-3 ships per week; later 1 ship every second day (approximately 180 ships per year) 	Formal acceptance from FERC received in September 2006; operation to commence in 2009	x	<p>Overlap likely:</p> <ul style="list-style-type: none"> • Spatial overlap; LNG tankers will navigate in outer Bay of Fundy and possibly through same shipping channel as vessels under contract by Bilcon • Temporal overlap: quarry operation planned for 50 years; realization of LNG terminal foreseeable during quarry operation; • Overlap in types of effects: yes; potential effects on climate, marine mammals, marine species at risk, tourism (whale watching tours)

10.0 Cumulative Effects

#	Project/Activity	Location	Project Name/ Description	Status & Time Frame	Potential for Cumulative Effects (Screening)*	Rationale
3.4	New Irving Oil Refinery	Saint John	Irving Oil is exploring building a second refinery in Saint John: <ul style="list-style-type: none"> • decision on whether to move forward with an application for a permit by early 2007 • Proposed capacity: up to 300,000 barrels per day of refined product • Estimated cost: approximately \$5-7 billion • Potential employment: approximately 5,000 jobs during construction phase; 1,000 permanent jobs. 	Exploring possibility	x	Overlap likely: <ul style="list-style-type: none"> • Spatial overlap; tankers will navigate in the Bay of Fundy and through same shipping channel as vessels under contract with Bilcon • Temporal overlap: quarry operation planned for 50 years; realization of LNG terminal foreseeable during quarry operation; • Overlap in types of effects: yes; potential effects on climate, marine mammals, marine species at risk, tourism (whale watching tours) Potential overlap of beneficial socio-economic type of effects on regional level not investigated.

* X= Potential for cumulative effects with Proposed Project identified; forwarded for Cumulative Effects Assessment

10.0 Cumulative Effects

The scoping was conducted in a step-wise fashion (Figure 1). Each of the identified projects and activities was reviewed as to whether or not there was a potential to cause effects on any of the VECs that may overlap with the effects of the subject Project (spatial overlap). If yes, these effects were discussed in a second step with emphasis on the temporal extent (temporal overlap). Where an overlap of the temporal boundaries was identified, the question was investigated as to whether or not the type of effects may be similar (i.e., overlap with respect to the type of effect).

As a result of this scoping or screening exercise, a total of four projects were identified for inclusion within the CEA (Table 2). These projects and activities are:

Planned/ Certain Projects:

- Canaport, Saint John

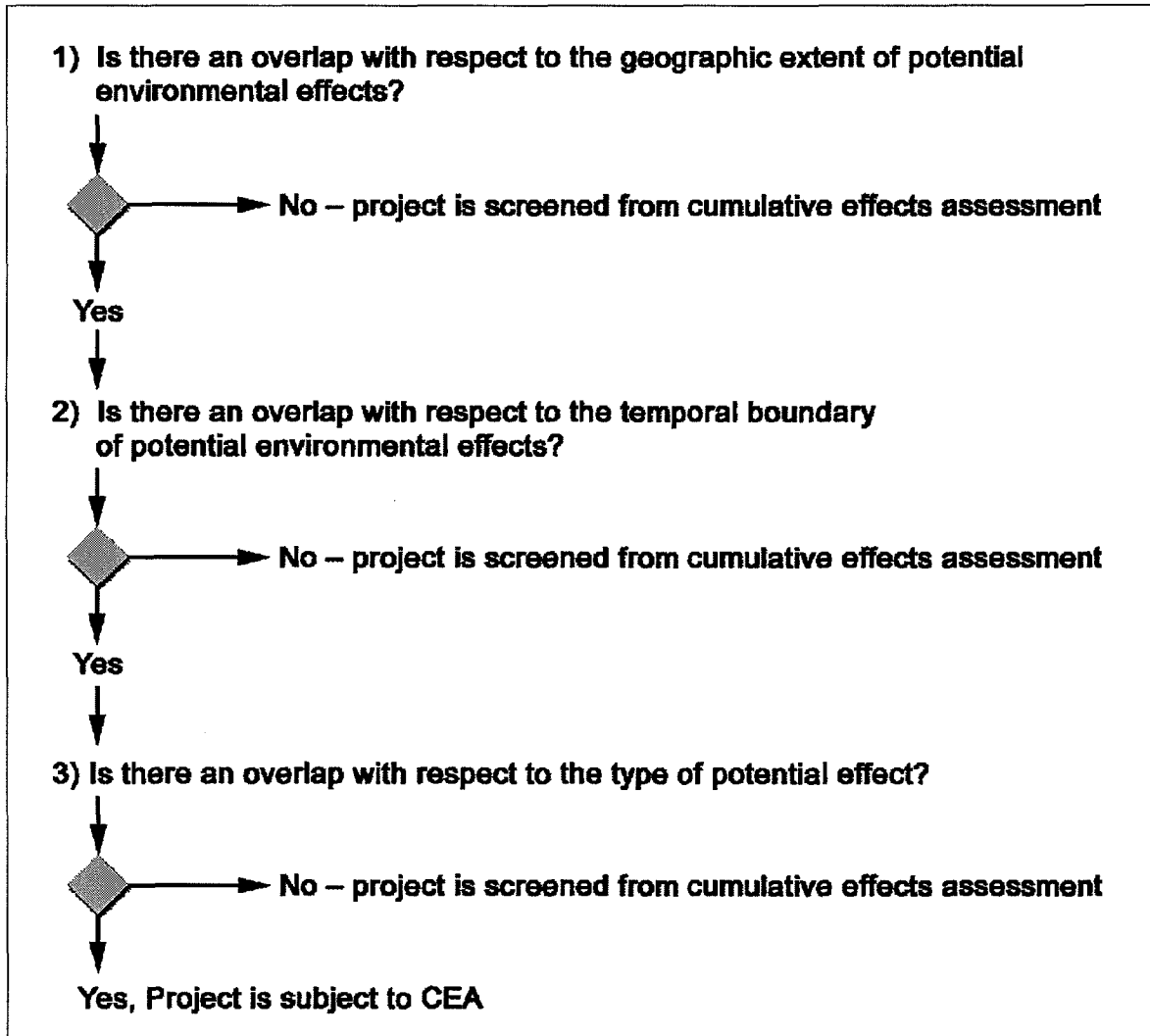
Reasonably Foreseeable Projects:

- Downeast LNG Terminal, Mill Cove, Passamaquoddy Bay (USA)
- Quoddy Bay LNG Terminal, Pleasant Point, Passamaquoddy Bay (USA)
- New Irving Oil Refinery, Saint John

The locations of these projects are depicted in Figure 2. Each of the projects is briefly described in the following section. No individual projects were identified for inclusion with the CEA based on the potential for overlap with socio-economic effects of the subject Project alone and were considered as a group (see discussion in Section 1.4.5).

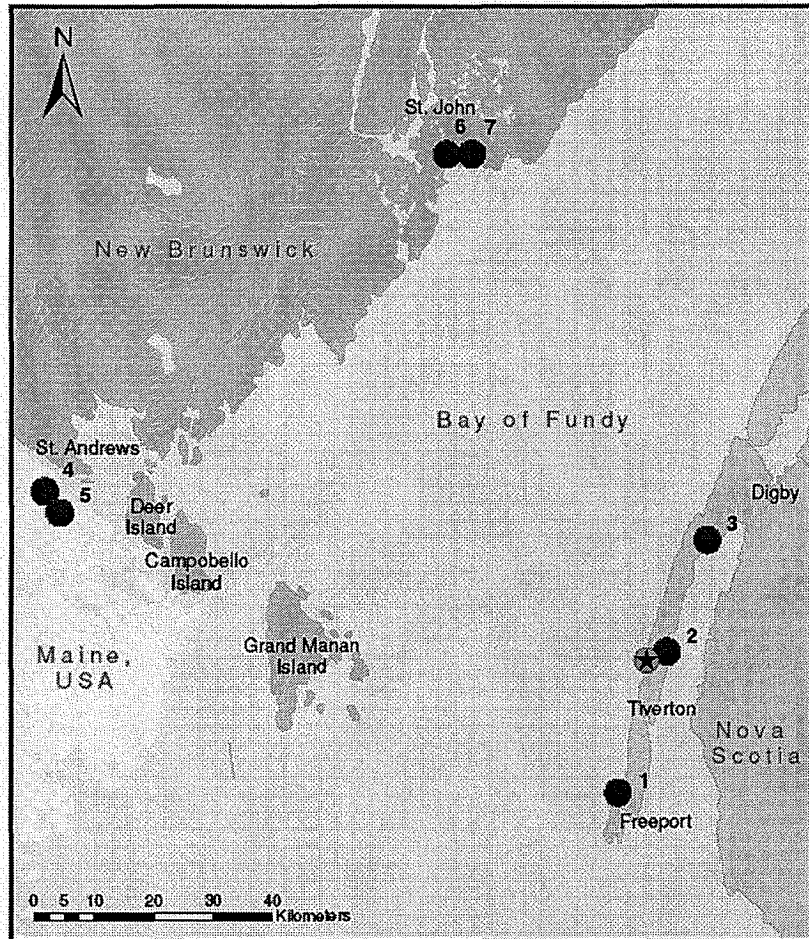
10.0 Cumulative Effects

FIGURE 1 VEC-Specific Screening of Projects and Activities



10.0 Cumulative Effects

FIGURE 2: Other Future Projects



- Future Projects
- 1 - Discovery Centre - Freeport
- 2 - Aquaculture (Kelly Cove Salmon Ltd.) - Mink Cove
- 3 - Bottling Plant - Gullivers Cove
- 4 - Quoddy Bay LNG - Passamaquoddy Bay, USA
- 5 - Downeast LNG - Passamaquoddy Bay, USA
- 6 - New Irving Refinery - St. John Harbour
- 7 - Canaport - St. John Harbour
- ⊗ Whites Point Quarry

Other Future Projects
December 2006
Figure 2

10.0 Cumulative Effects

Assessment of Cumulative Effects

As mentioned earlier, the CEA does not specifically consider past and present projects and activities. These projects and activities are captured by description of the baseline conditions and their effects will have been evaluated in the assessment of effects of the Project. The potential for cumulative environmental effects with future projects (planned and certain, and reasonably foreseeable projects) is discussed below.

All four projects, for which a potential for adverse cumulative effects with the proposed Whites Point Quarry Project has been identified, involve the introduction of additional large vessels to the Bay of Fundy. The four projects include: Canaport, Downeast LNG, Quoddy Bay LNG, and the New Irving Refinery. If approved and implemented, the effects of these projects are likely to occur during the design life of the Whites Point Quarry Project (temporal overlap) and are likely to cause effects in the same geographic region, i.e. the Bay of Fundy (spatial overlap). The types of effects for which a geographic and temporal overlap has been identified relate to effects on four VECs:

- Climate;
- Marine Mammals;
- Marine Species at Risk; and
- Economy - Tourism.

Each of the individual projects is likely to cause environmental effects on other VECs (e.g., terrestrial habitat, air quality) during the lifetime of the Whites Point Quarry Project. However, none of these effects is expected to cause measurable effects in the same geographic area as the effects of the Whites Point Quarry Project.

In addition, each of the future projects listed in Table 2 can be expected to cause beneficial cumulative effects with the Whites Point Project on local and/or regional level:

Potential for cumulative local economic/ socio-cultural benefits

- Aquaculture, Mink Cove
- Water bottling Plant, Gullivers Cove
- Discovery Centre, Freeport

Potential for cumulative regional economic/ socio-cultural benefits

- Canaport, Saint John
- Downeast LNG Terminal, Mill Cove, Passamaquoddy Bay (USA)
- Quoddy Bay LNG Terminal, Pleasant Point, Passamaquoddy Bay (USA)
- New Irving Oil Refinery, Saint John

10.0 Cumulative Effects

If approved and realized, the beneficial cumulative effects likely relate to the following VECs

Economy:

- Employment
- GDP
- Municipal taxes
- Tourism
- Land value

Socio-Cultural

- Commercial Patterns
- Community Infrastructure/ Institutional capacity
- Education, Training Skills

The beneficial cumulative effects of future projects on these VECs have not been evaluated in further detail. A general overall assessment is provided in Section 1.4.5.

1.1.1 Description of Future Projects

Canaport, Saint John

The Canaport facility will be associated with Canada's largest refinery (production over 300,000 barrels per day; export to US approximately 175,000 barrels/d). The new year-round ice-free crude receiving deepwater terminal is under construction and includes a LNG receiving terminal with storage for three 160,000 cubic meters full containment liquefied natural gas storage tanks, and a jetty with mooring facilities for LNG carriers with up to 200,000 cubic meters capacity.

The Canaport facility will be generating additional vessel traffic within the Bay of Fundy. The maximum number of Canaport LNG related vessels is expected to amount to 94 to 134 vessels per year (14 Orimulsion tankers, 80 to 120 LNG tankers) (Table 2). These vessels will be navigating in and out of the Bay of Fundy along the designated and marked shipping route and in accordance with the traffic lane separation scheme (TSS), adopted by the International Maritime Organization and effective since June 1st, 1983 and modified in 2003.

Downeast LNG and Quoddy Bay LNG

Two LNG projects are currently proposed for two different locations along the shores of Passamaquoddy Bay, in the State of Maine, USA. The projects are based on two independent proposals, one filed by Downeast LNG and the other by Quoddy Bay LNG. Applications have been submitted to US regulators by both proponents. If approved, the projects will be developed on the US side of Passamaquoddy Bay at Pleasant Point across from Deer Island,

10.0 Cumulative Effects

Canada (Downeast LNG) and Mill Cove near Robbinston across from St. Andrews, New Brunswick, Canada (Quoddy Bay LNG).

Both facilities involve the construction of a marine terminal and the year-round operation of large tankers delivering LNG to the terminals. Downeast LNG expects to receive about 52 ships annually and Quoddy Bay LNG about 180 vessels annually (Table 2). Tankers destined for either one of the Project sites are expected to come from markets in the Caribbean, Europe, the Mediterranean, or Africa. They will enter the Bay of Fundy along the same marked international shipping route as the tankers destined for Canaport and vessels destined for the Whites Point Quarry terminal. The LNG tankers will leave the channel at a point north of Grand Manan Island from where they will be travelling northwest towards Deer Island and from there through a narrow channel into Passamaquoddy Bay. An approach route west of Grand Manan Island may be suitable as alternate route.

Bilcon has no information as to whether or not the two projects could co-exist and remain economically viable. For cumulative effects assessment purposes, the worst case is assumed, i.e., that both projects receive approval and operate at the proposed level. This would result in a total volume of 230 vessels annually (about 29 % increase over current levels).

New Oil Refinery, Saint John

Irving Oil of New Brunswick is currently considering the development of a second refinery in Saint John. The decision on whether to move forward with an application for a permit is scheduled for early 2007. The new facility, if built, would produce an additional 300,000 barrels a day of transportation fuels: gasoline, jet fuel and ultra-low-sulphur diesel destined largely for the U.S. northeast. The project is estimated to offer approximately 5,000 jobs during construction and 1,000 permanent jobs (Associated Morris 2006). No predictions of the anticipated increase in vessel numbers or change in the size of vessels servicing the refinery have been identified.

1.1.2 Cumulative Effects Assessment

Effects on Climate

As part of the direct effects assessment for the Whites Point Quarry Project it has been estimated that the Project will contribute annually approximately 80,000 tonnes CO_{2eq} or 0.27% of the Provincial GHG emissions total for Nova Scotia or 0.01-0.03% of the total GHG emissions in the region of the Atlantic provinces (see Bilcon's response to the Panel's IR- 2, *Section 9.1 Physical Environment, Climate – Greenhouse Gas*). Predictions for the Canaport operation estimate approximately 386,000 tonnes CO_{2eq} per year (Jacques Whitford 2004, p.332) or about 4 times as much as the GHG emissions predicted for the Whites Point Quarry (EIS, Vol. VI, Section 9.2.13.1). Bilcon has been unable to obtain any information on the quantities of GHG emissions associated with the Quoddy Bay LNG and the Downeast

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LNG projects. Based on the predictions for the Canaport LNG project however, it can be assumed that the proposed LNG projects together will generate significantly higher GHG emissions than the Whites Point Project (key sources: vessel traffic; re-gasification facilities).

The GHG emissions of the three LNG projects could contribute to the adverse effects of regional and global climate change. The magnitude of such cumulative effect is uncertain but likely not significant. The projects will increase local GHG emissions, however on a regional and global scale, the overall effect will largely depend on the use of the delivered natural gas in the Atlantic region for the replacement of GHG emission intensive fuels (e.g., No. 6 fuel, No. 2 fuel, coal). The replacement of such fuels with natural gas can off-set or can at least contribute to off-setting the emissions associated with the LNG transport and processing.

Bilcon has been unable to obtain information on predictions for GHG emissions from the proposed New Irving Refinery. Given the nature and size of the proposed operation it can be assumed that it will represent a significant contributor to GHG emissions generated in the Atlantic region. Its emissions are expected to significantly exceed the GHG emissions of the other future projects for which a potential for cumulative effects on climate have been identified.

Effects on Marine Mammals / Marine Species at Risk

To focus the CEA, the North Atlantic right whale has been selected as indicator species for the effects assessment on Marine Mammals and Marine Species at Risk. Other marine mammals observed in the Bay of Fundy are listed in the EIS (Vol. VI, Section 9.2.4.1.7 *Marine Mammals*). The right whale was selected because this population is considered vulnerable to direct mortality due to increased vessel traffic, is listed as endangered under the *Species at Risk Act* (SARA, Part 2 *Endangered*), is subject to considerable public interest and concern, and a major attraction for visiting tourists.

Table 3 provides an overview of the estimates on the predicted increase in large vessels navigating into and out of the Bay of Fundy. Each of the individual projects has the potential to act together with the proposed Whites Point Project cumulatively. This relates to the combined increase in vessels using the same navigation channel and the associated potential increase in vessel-whale collisions (in particular collisions involving right whales).

Incoming vessels destined for the Whites Point quarry will use the same shipping lanes as the vessels associated with the Canaport, the Quoddy Bay LNG and the Downeast LNG projects to a point in the outer Bay of Fundy that is approximately 5 km south of the designated North Atlantic Right Whale Conservation Area (NARWCA). At this location, the vessels under Bilcon contract will leave the TSS and will navigate along the shortest route (about 10 to 15 nautical miles) to the Whites Point quarry terminal. Vessels departing from the Whites Point

10.0 Cumulative Effects

quarry terminal will travel along the same course and therefore will also avoid the NARWCA and enter the TSS about 5 km to the south of the conservation area.

The total number of vessels docking at the Whites Point Quarry is estimated to amount to about 48 vessels annually (=96 trips annually). This represents an incremental increase by about 6% over the current traffic volumes (about 800 vessels or 1600 trips annually not including fishing vessels, tour boats, pleasure crafts etc.). With the vessel traffic from Canaport, the two US LNG projects, and the vessels under Bilcon contract the total number of vessels is expected to amount to about 1214 (Table 2), an increase of about 52% over existing levels. About 4% of all future vessels would be under Bilcon contract. No data are available on the potential increase in vessel numbers as a result of the proposed New Irving Refinery.

The extent of the resulting cumulative effects on right whales is uncertain for several reasons:

- details on the navigation route of the LNG tankers entering/leaving Passamaquoddy Bay have not been established (i.e., they may be navigating west of Grand Manan Island);
- operational parameters of the proposed new LNG tanker traffic have not been determined (e.g., speed; whale monitoring);
- even if approved, not all three LNG proposals may become operational due to limited markets; and
- the effectiveness of the diversion of the shipping lanes away from the Bay of Fundy NARWCW in 2003 and the resulting decrease in vessel-whale collisions.

1.1.3 Mitigation

Mitigating Effects on Climate

Bilcon is committed to implement a series of measures designed to avoid and minimize GHG emissions from its Project. This includes such measures as avoiding any GHG emissions from its land clearing activity through chipping of woody vegetation rather than burning. The reforestation of the site and the management of adjacent lands as forest habitat will further mitigate against GHG emissions. For a complete listing of Bilcon's mitigation measures, please refer to Table 3.1 in the Bilcon response to the Panel's IR-2, *Section 8*.

Bilcon has been unable to obtain information on mitigation measures related to GHG emissions to be implemented by the Downeast LNG, the Quoddy Bay LNG, and the New Irving Refinery projects. GHG mitigation measures proposed for the Canaport facility rely on the use of best available technology for the re-gasification (i.e., technology with high fuel and thermal efficiency) as well as adaptive management (Jacques Whitford 2004, p.303).

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Mitigating Effects on Marine Mammals/ Marine Species at Risk

Bilcon has developed a number of mitigation measures in the context of the direct effects analysis for the Whites Point quarry (EIS, Vol. VI, Section 9.2.13; see also Bilcon response to the Panel's IR-2, 11.6 Follow-up Program). These equally apply for the mitigation of cumulative effects in that they will reduce adverse effects of the vessels under Bilcon contract. These Bilcon mitigation measures include:

- **Reduced speed:** Vessels destined for / departing the Whites Point quarry will be traveling at a reduced speed (12 knots and less) outside of the main shipping channel, i.e., ships will travel significantly below speeds at which most lethal collisions occur (studies have shown that collisions causing lethal or severe injuries occur at speeds greater than 14 knots (Laist 2001));
- **Monitoring of whales:** during the infrequent, once per week, vessel arrival and departure, a trained observer will be stationed on the ship loader and if marine mammals are sighted, their location will be communicated to the ship's captain;
- **Further speed reductions/course alterations:** Bilcon will be in contact with whale watching tour operators on the day of vessel arrival/departure in order to obtain up-to-date information on the presence of whales in the vicinity of the Whites Point terminal and the prescribed navigation route. If warranted, vessels under contract for Bilcon will reduce speeds and/or initiate course adjustments to the extent considered safe by the master of the vessel.

During operation, Bilcon will monitor the effectiveness of the mitigation measures and the validity of the effects predictions. For vessel arrivals and departures this will include the recording of such information as whale sightings, locations, vessel-whale collisions/ near-collisions, speed reductions/course alterations in response to whale sightings.

The results will be discussed with the Community Liaison Committee (CLC). If required, adjustments to mitigation and or vessel operation will be investigated and implemented. Further, Bilcon is committed to work with government agencies and environmental non-government organizations throughout the quarry operation toward an improved management and protection of the Bay of Fundy marine resources.

No information has become available to Bilcon on proposed mitigation measures for the Downeast LNG, the Quoddy Bay LNG, and the New Irving Refinery projects. The EIS for the Canaport LNG project identified no potential for significant cumulative effects from this project (Jacques Whitford 2004, p.436). Mitigation measures include monitoring, adaptive management approaches and commitments to participation in conservation initiatives.

It is beyond Bilcon's control and familiarity with the above projects to determine the need for and appropriateness of mitigation measures for the Canaport, Quoddy Bay LNG and

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Downeast LNG projects. This responsibility rests with the regulatory agencies reviewing and approving the individual development proposals.

1.1.4 Residual Effects and Significance

The results of the CEA are summarized in Table 4 and the residual effects and their significance discussed below. As stated in Table 4, beneficial cumulative effects have not been evaluated. These are briefly addressed in Section 1.4.5 below.

Residual Effects on Climate

The identified projects are likely to contribute to the annual emissions of GHG in the Atlantic region. The cumulative effects on climate (without the proposed New Irving Refinery) have been rated not significant. The emissions from the LNG projects may be compensated by the reduction in GHG emissions through the replacement of emission-intensive fossil fuels with the natural gas and the GHG emissions from the Whites Point are expected to represent only a small fraction of GHG emissions in the region. The GHG emissions from the New Irving Refinery have not been established at this point. The significance of the cumulative effects including this project therefore has not been rated.

Residual Effects on Marine Mammals/ Marine Species at Risk

Taking all of the identified major project proposals into account, there is a potential for a total increase in vessel traffic by 52%. The significance of the consequential effects of this cumulative increase on the right whale population in the Bay of Fundy is unknown.

Bilcon's contribution to the total increased traffic represents approximately 4% and is considered not significant. Vessels of the Whites Point Project will travel outside of the NARW whereas all other additional vessel traffic will navigate through the conservation area. Further, vessels under Bilcon contract will navigate away from the main shipping channel and into shallower waters. These areas are less frequented by right whales (i.e., waters less than 90m depth; right whales are mostly found in waters of 90 to 240m depth). Vessels associated with the other projects travel significantly longer distances through deep water with a higher probability for the occurrence of right whales. In addition, Bilcon has committed to a comprehensive set of mitigation measures. Overall this is expected to make collisions between vessels under Bilcon contract and right whales an extremely unlikely occurrence.

1.1.5 Cumulative Beneficial Effects

As mentioned under item 1.4, the cumulative beneficial effects of the future projects and the Whites Point quarry on socio-economic and socio-cultural conditions have not been evaluated in detail. This would require detailed data on such areas as predicted project-

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specific contributions to local and regional employment, local labour markets, current income levels, and municipal tax revenues and is considered to exceed the scope of this CEA. Based on professional judgement and the current local economic and socio-cultural conditions (Digby Neck) (EIS, Vol. VII, Section 9.3) it is nevertheless expected that the cumulative beneficial effects of the locally relevant projects (Aquaculture at Mink Cove, Water Bottling Plant at Gullivers Cove, and the Discovery Centre in Freeport) will be significant. Given its size and duration, the White's Point quarry project must be considered a major contributor among these projects. The implementation of Bilcon's employment and procurement policy, which favours local labour and supply markets, will ensure that these beneficial effects will be maximised.

The cumulative effects of the regionally relevant projects are expected to be experienced in the Digby Neck area only as indirect effects level through economic spin-offs. For example, the number of tourists may increase in the Digby Neck area as a result of increased employment opportunities in Saint John and associated increases in expendable incomes. These beneficial cumulative spin off effects have not been quantified but are expected to be not significant for the local economy and socio-cultural conditions.

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**Table 3:
Potential Incremental and Absolute Increase in the Number of Large Vessels**

	Estimated Vessel Volumes and Future Projects	Approximate Number of Vessels per Year	Incremental Increase Over Existing (800 Vessels)	Contribution to Potential Total Future Volume (1214 Vessels)
1	Existing	800	NA	66%
2	Bilcon (NS)	48	6%	4%
3	Canaport LNG (NB)	134	17%	11%
4	New Irving Refinery (NB)	no data	no data	no data
5	Downeast LNG (USA)	52	6%	4%
6	Quoddy Bay LNG (USA)	180	22%	15%
7	Subtotal (incremental)	366 (without Bilcon) 414 (incl. Bilcon)	46% (without Bilcon) 52% (incl. Bilcon)	30% (without Bilcon) 34% (incl. Bilcon)
	Grand Total	1214	NA	NA

Source:

- 1) EIS Vol. VI, Section 9.2.13.1
- 2) EIS, Vol. III, Section 7.8
- 3) Jacques Whitford 2004
- 4) Morris 2006
- 5) Downeast LNG 2005
- 6) Quoddy Bay LNG n.d

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Table 4: Summary Cumulative Effects Assessment

Other Project	VEC Related Potential Cumulative Effects (Whites Point Quarry Project and Other Future Projects)	Mitigation*	Significance Criteria					Residual Cumulative Effects & Significance
			Magnitude*	Geographic Extent	Duration/Frequency	Reversibility (R= reversible NR = Not reversible)	Ecological/Social-cultural and Economic Context	
Marine terminals and LNG Projects (see Table 2)	<p><u>Climate</u></p> <p>Contributions to regional and global climate change as a result of:</p> <ul style="list-style-type: none"> • GHG emissions from operation of combustion engines of equipment (all project phases) • GHG emissions from Re-gasification process • GHG emissions from various refinery operation • Loss of carbon storage with removal of trees for development 	<p><u>Bilcon:</u></p> <ul style="list-style-type: none"> • Incremental quarry development and rehabilitation (i.e., re-vegetation) • Re-vegetation of quarry site • No burning of vegetation <p><u>Other Projects:</u></p> <p>Use of best available technology (Canaport)</p> <p>Adaptive management (Canaport)</p> <p>No information on LNG projects proposed for Passamaquoddy Bay and new Irving Refinery</p> <p>The use of the natural gas as replacement fuel for GHG intensive fuel types will mitigate effects on a more regional/global level</p>	<p><u>Cumulative</u></p> <p>Unknown</p> <p><u>Bilcon</u></p> <p>emissions: Annually 0.03-0.05% of regional emissions</p>	Local to global	On-going	NR	Bilcon proposal supported by provincial policies on economic development	<p>Yes</p> <p>Not significant (without New Irving Refinery; level of significance with new refinery unknown)</p>

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Other Project	VEC Related Potential Cumulative Effects (Whites Point Quarry Project and Other Future Projects)	Mitigation*	Significance Criteria					Residual Cumulative Effects & Significance
			Magnitude*	Geographic Extent	Duration/Frequency	Reversibility (R= reversible, NR = Not reversible)	Ecological/ Social-cultural and Economic Context	
	(construction and operation phases)							
	<p><u>Marine Mammals (incl. NARW)</u></p> <ul style="list-style-type: none"> Whale strikes by vessels 	<p><u>Bilcon:</u></p> <ul style="list-style-type: none"> Blasting will not be conducted if endangered marine mammals are within 2500m of site; Blasting activity to adhere to “Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters” Water quality and sediment monitoring; Vessels will use designated inbound/outbound shipping lanes shown on the Canadian Hydrographic Chart. <p><u>Other Projects:</u> unknown</p>	<p><u>Cumulative:</u> Unknown</p> <p><u>Bilcon:</u> minimal</p>	<p><u>Cumulative</u> Bay of Fundy</p> <p><u>Bilcon:</u> South of NARWCA</p>	<p><u>Cumulative</u> Likely daily over lifetime of projects</p> <p><u>Bilcon:</u> 1 / week over entire operation phase</p>	NR	Involves endangered North Atlantic Right Whale (SARA, Schedule 1)	Yes Significance unknown

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Other Project	VEC Related Potential Cumulative Effects (Whites Point Quarry Project and Other Future Projects)	Mitigation*	Significance Criteria					Residual Cumulative Effects & Significance
			Magnitude*	Geographic Extent	Duration/Frequency	Reversibility (R= reversible NR = Not reversible)	Ecological/ Social-cultural and Economic Context	
	<u>Marine Species at Risk</u> <ul style="list-style-type: none"> North Atlantic Right Whale strikes by marine vessels 	See above	See above	See above	See above	See above	See above	See above
	<u>Economy – Tourism</u> <ul style="list-style-type: none"> Whale strikes by vessels resulting in reduced numbers of whales and less frequented tour operations 	<u>Bilcon:</u> All mitigation listed above Whites Point Quarry project is also expected to cause beneficial effects on local tourism; this is expected to further mitigate any adverse effects (see text discussion under 2.3 Cumulative Effects on Tourism) <u>Other Projects:</u> unknown	Unknown; dependent on cumulative effects on whale population	Bay of Fundy Tourism	Lifetime of projects	NR	Tourism is important component of local economy	Yes Significance unknown (dependent on cumulative effects on whale population)

* For a full listing of mitigation measures proposed by Bilcon refer to Table 3.1 in the Bilcon response to Panel IR-2, Section 8

10.0 Cumulative Effects

2.0 Specific Concerns

2.1 Cumulative Effects on Marine Mammals

The potential for cumulative effects on marine mammals has been discussed above in the context of the supplementary information on the CEA for the Whites Point quarry project. The assessment concluded that there are several large scale development proposals for marine terminals that are relevant for the CEA. If approved and implemented, these projects will result in a cumulative increase in large vessel traffic of up to 52 % over current levels. This increase in vessel traffic could cause adverse effects on marine mammals in the Bay of Fundy, in particular the right whale.

The significance of the cumulative effect is unknown due to the conceptual nature of some of the project proposals and an incomplete understanding of population declines in this species. The vessels under contract for Bilcon are expected to contribute little to the overall cumulative effect due to:

- the small number of vessels (about 4% of the overall expected large vessel volume); and
- a course that avoids the North Atlantic right whale conservation area.

In accordance with Bilcon's precautionary approach to its project implementation, additional mitigation measures related to its vessel operations have been established.

Overall, the Whites Point Project's contributions to the cumulative effects on marine mammals are considered insignificant.

2.2 Cumulative Effects on Aesthetics

No other planned and certain or reasonably foreseeable project was identified that can be expected to act together with the Whites Point Quarry Project and cause a cumulative adverse effects on Aesthetics at or near the Project site.

None of the future developments listed in Table 1 can be expected to adversely affect the visual quality of the landscape or coastal environment in the vicinity of the proposed Project. Projects with a potential to affect the visual landscape character such as the LNG project proposals or the discovery centre in Freeport are too far away to cause cumulative effects with the quarry Project.

In addition, the Whites Point Quarry Project itself is not expected to cause significant adverse effects on the landscape aesthetics (EIS, Vol. VII, Chapter 9.3.6). The site will not be visible from Highway #217. Whale watching tour boat operators typically navigate routes at distances where the quarry site, if visible, would not be considered visually intrusive.

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2.3 Cumulative Effects on Tourism

Only a few of the projects listed in Table 1 may have the potential for direct adverse effects on tourism. This includes the LNG project proposals and perhaps the proposed aquaculture expansion in Mink Cove. However, the aquaculture project is located on the St. Mary's Bay coast and is unlikely to affect tourism along the Bay of Fundy coastline. The LNG proposals (Downeast LNG, Quoddy Bay LNG, Canaport LNG) may affect tourism in the vicinity of the associated marine terminals but are unlikely to directly affect tourism along the Digby Neck coastline.

Indirect effects on tourism could be experienced if the cumulative increase in vessel traffic results in a decline of the whale populations in the Bay of Fundy (see discussion under item 2.2). This could affect local whale watching tour boat operations. The significance of the cumulative effects of increased vessel traffic on whale populations is unknown. The contribution of the Whites Point quarry operation to any such cumulative effects is considered minimal (see 2.2).

Aside from the potential for cumulative effects on whale populations, the Whites Point Project is not expected to cause any adverse effects on tourism (EIS, Vol. VII, Section 9.3.14). The projects contributions to an increased municipal tax base and increased income could benefit the local economy. This can indirectly contribute positively to tourism infrastructure and service levels.

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Section 10.0.3.3 and 10.0 .3.4 - Marine Mammals, Blasting and Ship Interactions

Cumulative impacts due to blasting and vessel traffic are difficult to evaluate. For ship interactions, see comments on Section 9.2.13. The methods proposed for mitigation of possible deleterious effects due to blasting appear appropriate, if undertaken with rigour and in accordance with the recommendations provided above. However, the ability to detect marine mammals in low visibility conditions should be further examined.

Page 5 – the relative increase in shipping for the Bay of Fundy should have been noted in this section as it also appears elsewhere in the document (Chapter 11, page 23)

RESPONSE

Please refer to Bilcon's response to the Panel in this section.