

*9.2.1 Terrestrial Ecology*

EIS Reference: EIS Volume VI, Chapter 9, Section 9.2

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#### WP 1452 - Panel

*9.2.0.1 Species at Risk – The Panel requested that species identified as at risk on the COSEWIC and SARA lists be treated as VECs. However, the Panel did not intend to suggest that only species on those lists could be treated individually as VECs.*

*The Panel considers it more appropriate to treat species at risk individually as VECs.*

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#### RESPONSE

The approach followed in the identification of Species at Risk has been presented in Section 9.2.0.1. of the EIS (Vol. VI). In the subsequent Section 9.2.1 Terrestrial Ecology (EIS, Vol. VI) , Species at Risk in the terrestrial environment are discussed and include plants, arthropods (particularly Odonates and Lepidoptera) reptiles, amphibians, mammals and birds,. Aquatic Species at Risk, including fish, waterbirds, marine reptiles, and marine mammals, are addressed separately in a number of subsections to Section 9.2 of the EIS (Vol. VI) (i.e., 9.2.4.1.11 Waterbird Species at Risk; 9.2.5 Fish- Endangered; 9.2.6 Fish-Threatened and Special Concern; 9.2.7 Waterfowl –Special Concern).

In response to WP 1452 – Panel IR on “EIS Format” and “Valued Ecosystem Components (VECs)”, Bilcon clarified the VECs considered by the EIS. Two VECs are considered to capture the effects assessment on Species at Risk:

- Terrestrial Species at Risk; and
- Marine Species at Risk.

Given the number of individual Species at Risk that need to be addressed in the context of the EIS, it was deemed more practical to group Species at Risk into the above two VECs. For many Species at Risk the effects assessment and the mitigation and follow-up measures are based on similar considerations. Treating each individual Species at Risk as an individual VEC would have resulted in a highly repetitious and voluminous document.

For purposes of clarity, the effects assessment on Species at Risks has been consolidated below in text and table format and also includes a rating of significance of the residual adverse effects for each Species at Risk that may be affected by the project. It is assumed that this consolidated overview of the results of the effects assessment sufficiently addresses the concerns that may have triggered the Panel’s request for a treatment of each of the Species at Risks as individual VECs.

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#### *Approach*

The approach to the assessment of Project-related effects on terrestrial and marine Species at Risk involved the following principle steps:

- Identification of Species at Risk with a potential to occur in the region of the Project site (“initial inventory list”) based on priority lists and species status designations;
- Determination of a “long-list” of Species at Risk; i.e. Species at Risk for which the regional occurrence was determined to be possible, likely, or common based on the general distribution of these species;
- Determination of a “short-list” of Species at Risk; i.e., all those Species at Risk from the long list that, taken the specific habitat conditions on and near the site into consideration, were deemed to possibly or likely occur at or near the Project site. This also included all those Species at Risk that have been observed on or near the Project site during the study team’s surveys;
- Development of mitigation measures to avoid or minimise adverse effects for all short-listed species; and
- Assessment of residual adverse effects on the short-listed Species at Risk and it’s significance.

The “initial inventory list” of Species at Risk that was generated as part of the first step is presented in **Appendix 39** (updated and contained in this comment and response submittal). This list incorporated information from four priority lists and species status designations:

- Species listed under the federal Species at Risk Act (SARA 2003) as Endangered, Threatened or of Special Concern;
- Species listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Endangered, Threatened or of Species Concern;
- Species listed under the Nova Scotia Endangered Species Act (NS ESA 1999) as Endangered, Threatened or Vulnerable; and
- Species designated under the Nova Scotia General Status Ranks of Wild Species (NS GSR) as status red or yellow.

Information on the potential occurrence of the species listed on the “**initial inventory list**” (**Appendix 39**) was derived from scientific literature, databases maintained by the Atlantic Canada Conservation Data Centre (ACCDC), the Nova Scotia Museum of Natural History and the NS DNR (Significant Species and Habitat database) and consultation with scientists and naturalists.

All Species at Risk on the initial inventory list, for which the regional occurrence was rated possible, likely or common were used to establish the “**long list**” (**Table 1**). Subsequently, the regional occurrence of the long listed species was re-evaluated based on specific information on the Project site, the study team’s species and habitat surveys. This site-

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specific knowledge was used to generate the “short list” (Table 2). It includes all Species at Risk that, taken the specific site conditions into account, are possibly or likely occurring on or near the site and have been recently reported or have been observed during the study team’s species surveys.

Subsequently all species on the short list were reviewed as to whether or not there is a potential for interactions between the Project works and activities and the Species at Risk. Wherever a potential for interaction was identified, mitigation measures were determined that are suitable to avoid and/or minimize adverse effects on the species. These are included in Table 2. In a last step, the residual effects were discussed and their significance determined. The determination of significance took into consideration the criteria applied in the significance rating of the adverse effects on other VECs, i.e., magnitude, geographic extent duration/frequency, reversibility, social/ecological context.

For a rationale on the inclusion or exclusion of specific species in the long and or short list of Species at Risk please refer to the responses provided in this document to subsequent questions of the Panel, EC, and Nova Scotia Department of Tourism Culture and Heritage.

#### *Effects Assessment*

##### *Marine Species at Risk VEC*

A number of Marine Species at Risk were identified as actually or possibly occurring in the marine environment at or near the project site (Table 2). These species could be adversely affected by one or more of the following factors:

- the vessels destined for or departing from the Whites Point terminal (potential ship strikes);
- sound/pressure waves associated with the on-shore blasting activities; and
- changes in water quality.

Mitigation measures have been identified to avoid and or minimize the potential adverse effects involving such measures as:

- During ship movement an observer will relay any sightings of marine mammals to the vessel captain for possible speed reduction and/or change of course;
- Blasting in accordance with DFO “Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters”; and
- Blasting will not be conducted if cetaceans are within 500m (2500m for endangered marine mammals) of the blast site or if pinnipeds or waterbirds are present within 170m.

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For a more detailed listing of all mitigation and monitoring measures, please refer to Section 11 of this Document.

Taking the mitigation measures into account, none of the potential adverse effects of the Project on Marine Species at Risk were considered to be significant.

The effects of the Project on Marine Species at Risk have been discussed in detail in a number of Sections of the EIS (Vol. VI, Sections 9.2.4.1; 9.2.5; 9.2.6; 9.2.7; 9.2.8; 9.2.11; and 9.2.13). It includes an assessment of potential effects, mitigation measures and a final impact statement. As mentioned above, the findings of the EIS are summarized in this response in order to provide an overview of the work undertaken and the final conclusions. For details on the species-specific analyses please refer to the appropriate section in the EIS or this comment and response submittal.

#### *Terrestrial Species at Risk VEC*

A number of vascular plant, lichen, and land bird Species at Risk were identified as actually or possibly occurring on or near the Project site (Table 2). The key factors that could adversely affect these species involve:

- Habitat removal and/or alteration (e.g., change in hydrological habitat characteristics);
- Exclusion of animals from favoured habitats as a result of disturbance generated by Project operations;
- Increased lighting (potentially affecting migratory birds).

The main mitigation measures to be implemented in order to avoid and or minimize the potential adverse effects involve:

- Establishment and maintenance of a Environmental Protection Zones;
- Monitoring of rare plant species, invasive plant species, and breeding birds;
- Adjustment of mitigation measures / implementation of new mitigation measures e.g., local expansion of Environmental Preservation Zone; active management of invasive plant species);
- Incremental site reclamation over the life of the Project (forest cover); and
- Forest/ habitat management on adjacent Bilcon properties.

As for the aquatic Species at Risk a more detailed listing of all mitigation and monitoring measures is presented in Section 11 of this Document.

Taking the mitigation measures into account, none of the potential adverse effects of the Project on Terrestrial Species at Risk were considered to be significant.

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The effects of the Project on terrestrial Species at Risk have been discussed in detail in Section 9.2.1 of the EIS (Vol. VI). The section includes an assessment of potential effects, mitigation measures and a final impact statement. For details on the species-specific analyses please refer to the appropriate section in the EIS.

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**Table 1:  
Whites Point Quarry  
Effects Assessment – Summary, Species at Risk  
“Long List”)**

	Species at Risk	Conser- vation Status	Occurrence at/near site	
			1 = initial assessment (general sources) of presence within region	
			1	2
A	<b>MARINE SPECIS AT RISK</b>			
A1	<b>MARINE MAMMALS, FISH, MOLLUSCS, REPTILES</b>			
	North Atlantic Right Whale ( <i>Eubalaena glacialis</i> )	1E	Possible	Not found; but possibly near site
	Atlantic Salmon (iBoF) ( <i>Salmo salar</i> )	1E	Possible	Unlikely
	Harbour Porpoise ( <i>Phocoena phocoena</i> )	1SC	Likely	Found near site
	Fin Whale ( <i>Balaenoptera physalus</i> )	1SC	Likely	Not found; but possibly near site
	Atlantic Cod ( <i>Gadus morhua</i> )	1SC	Possible	Likely
	Squaw Foot ( <i>Strophitus undulates</i> )	3R	Possible	Unlikely
	Striped Bass ( <i>Morone saxatilis</i> )	1T, 3R	Possible	Unlikely
	Atlantic Sturgeon ( <i>Acipenser oxyrinchus</i> )	3R	Possible	Unlikely
	Pearl Dace ( <i>Margariscus margarita</i> )	3Y	Possible	Unlikely
	Brook Trout ( <i>Salveninus fontinalis</i> )	3Y	Possible adjacent	Unlikely
	Gaspereau ( <i>Alosa pseudoharengus</i> )	3Y	Possible	Unlikely
	Leatherback ( <i>Dermochelys coriacea</i> )	1E	Highly unlikely	Unlikely
	Porbeagle Shark ( <i>Lamna nasus</i> ) **	1E	Not assessed	Likely
	White Shark ( <i>Carcharodon carcharias</i> ) **	1E	Not assessed	Possible
	Shortfin Mako ( <i>Isurus oxyrinchus</i> ) **	1T	Not assessed	Possible
	Winter Skate ( <i>Leucoraja acellata</i> ) **	1SC	Not assessed	Likely
	Atlantic Wolffish ( <i>Anarhichas lupus</i> ) **	1SC	Not assessed	Likely
	Blue Shark ( <i>Prionace glauca</i> ) **	1SC	Not assessed	Possible
	American Eel ( <i>Anguilla rostrata</i> ) **	1SC	Not assessed	Likely
A2	<b>WATERBIRDS</b>			
	Harlequin Duck ( <i>Histrionicus histrionicus</i> )	1SC, 2E, 3Y	Winters in Trout Cove & Bear Cove areas	Not found at site; nearest sighting (1 pr.) within 1 km.
	Barrow's Goldeneye ( <i>Bucephala islandica</i> )	1SC, 3Y	Rare wintering	Not found at/near site
	Atlantic Brant ( <i>Branta bernicula</i> )	3Y	Common staging & uncommon wintering @ Brier Is.	May migrate past site

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	Species at Risk	Conser- vation Status	Occurrence at/near site 1 = initial assessment (general sources) of presence within region 2 = site-specific assessment/survey	
			1	2
	Common Loon ( <i>Gavia immer</i> )	3Y	Common wintering; breeds @ Harris Lake	Found at/near site
	Arctic Tern ( <i>Sterna paradisaea</i> )	3Y	Breeds @ Peter's Is.	May migrate past site
	Razorbill ( <i>Alca torda</i> )	3Y	Winters around Brier Is.	Wintering birds not found at/near site. Migrants unlikely to occur near site (offshore)
	Atlantic Puffin ( <i>Fratercula arctica</i> )	3Y	Possible migrant/wintering (offshore)	Rare winter occurrence recorded (1 bird) at/near site
	Common Tern ( <i>Sterna hirundo</i> )	3Y	Breeds @ Peter's Is.	Migrant, possible
	Red-necked Phalarope ( <i>Phalaropus lobatus</i> )	3Y	Common migrant (offshore); stages @ Brier Is.	Migrants unlikely to occur near site (offshore)
	Red Phalarope ( <i>Phalaropus fulicaria</i> )	3Y	Common migrant (offshore); stages @ Brier Is.	Migrants unlikely to occur near site (offshore)
	Red-necked grebe ( <i>Podiceps grisegena</i> )	ACCDC Priority list	Not initially assessed	Found wintering at/near site
	Black guillemot ( <i>Cephus grylle</i> )	ACCDC Priority list	Not initially assessed	Found wintering at/near site
<b>B</b>	<b>TERRESTRIAL SPECIES AT RISK</b>			
<b>B1</b>	<b>TERRESTRIAL MAMMALS, AMPHIBIANS, REPTILES</b>			
	Little Brown Bat ( <i>Myotis lucifugus</i> )	3Y	Possible	Likely
	Northern Long-eared Bat ( <i>Myotis septentrionalis</i> )	3Y	Possible	Likely
<b>B2</b>	<b>TERRESTRIAL VASCULAR PLANTS, MOSSES, LICHENS</b>			
	Eastern Mountain Avens ( <i>Geum peckii</i> )	1E, 2E, 3R	Possible	unlikely
	Boreal Felt Lichen ( <i>Erioderma pedicellatum</i> )	1E	Possible	Occurrence "remotely possible": on-site
	Golden Crest ( <i>Lophiola aurea</i> )	1T, 2T, 3R	Possible	unlikely
	Creeping Sedge ( <i>Carex chordorrhiza</i> )	3R	Possible	unlikely
	Little Green Sedge ( <i>Carex viridula brachyrrhyncha</i> )	3R	Possible	highly unlikely
	Stout Wood Reed-Grass ( <i>Cinna arundinacea</i> )	3R	Possible	highly unlikely
	Downy Rattlesnake-Plantain ( <i>Goodyera pubescens</i> )	3R	Possible	Not found; but possibly



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	Species at Risk	Conservation Status	Occurrence at/near site	
			1 = initial assessment (general sources) of presence within region	
			1	2
	Chestnut-Coloured Sedge ( <i>Carex castanea</i> )	3R	Possible	on-site unlikely
	Northern Blueberry ( <i>Vaccinium boreale</i> )	3R	Possible	unlikely
	Northern White Cedar ( <i>Thuja occidentalis</i> )	3R	Possible	Not found; but possibly on-site
	White Adder's Mouth ( <i>Malaxis monophyllos</i> )	3R	Possible	unlikely
	Southern Twayblade ( <i>Listera australis</i> )	3R	Possible	unlikely
	Slender Blue Flag ( <i>Iris prismatica</i> )	3R/un-determined	Possible	Not found; but possibly on-site
	Foxtail Sedge ( <i>Carex alopecoidea</i> )	3R	Possible	unlikely
	Round-Leaved Liverleaf ( <i>Hepatica americana</i> )	3R	Likely	Not found; but possibly on-site
	Low Spike-Moss ( <i>Selaginella selagioides</i> )	3R	Possible	highly unlikely
	Purple False Oats ( <i>Grappheporum melicoides</i> )	3Y	Possible	unlikely
	Purple-Leaf Willow-Herb ( <i>Epilobium coloratum</i> )	3Y	Possible	Not found; but possibly on-site
	Swedish Dwarf Dogwood ( <i>Cornus suecica</i> )	3Y	Possible	unlikely
	Large Round-Leaved Orchid ( <i>Platanthera orbiculata</i> )	3Y	Possible	unlikely
	Pale Jewel-Weed ( <i>Impatiens pallida</i> )	3Y	Possible	unlikely
	Adder's Tongue ( <i>Ophioglossum pusillum</i> )	3Y	Possible	unlikely
	Fountain Miner's Lettuce ( <i>Monita fontana</i> )	3Y	Likely	Not found; but possibly on-site
	A Bramble ( <i>Rubus recurvicaulis</i> )	3Y	Possible	unlikely
	Small-Flower Bitter-Cress ( <i>Cardamine parviflora</i> )	3Y	Likely	Not found; but possibly on-site
	Arrow-Leaved Violet ( <i>Viola sagittata</i> *)	Downgraded to G	Possible	Not found during field survey
	Pennsylvania Blackberry ( <i>Rubus pensilvanicus</i> *)	Downgraded to G	Possible	Not found during field survey
	Grassleaf Rush ( <i>Juncus marginatus</i> )	3Y	possible	Not found; but possibly on-site
	Alpine Blueberry ( <i>Vaccinium uliginosum</i> )	3Y	Possible	unlikely
	Slender Cotton-Grass ( <i>Eriophorum gracile</i> )	3Y	Possible	unlikely
	Capitate Spikerush ( <i>Eleocharis flavescens</i> )	3Y	Possible	unlikely
	Slender Wedge Grass ( <i>Sphenophosis obtusata</i> )	3Y	Possible	unlikely
	Humped Bladderwort ( <i>Utricularia gibba</i> )	3Y	Possible	unlikely
	Dwarf Huckleberry ( <i>Vaccinium cespitosum</i> )	3Y	Possible	unlikely
	Silky Willow ( <i>Salix sericea</i> )	3Y	Possible	unlikely
	Bog Willow ( <i>Salix pedicellaris</i> )	3Y	Possible	unlikely
	Northern Bog Violet ( <i>Viola nephrophylla</i> )	3Y	Possible	unlikely
	White Mountain Saxifrage ( <i>Saxifraga aizoon</i> )	3Y	Possible	unlikely
	Northern Comandra ( <i>Geocaulon lividum</i> )	3Y	Possible	unlikely
	White Bluegrass ( <i>Poa glauca</i> )	3Y	Possible	unlikely
	Field Milkwort ( <i>Polygala sanguinea</i> )	3Y	Possible	unlikely
	Purple Crowberry ( <i>Empetrum rubrum</i> )	3Y	Possible	unlikely
	Least Grape-Fern ( <i>Botrychium simplex</i> )	3Y	Possible	unlikely
	Yellow Nodding Ladies'-Tresses ( <i>Spiranthes ochroleuca</i> )	3Y	Possible	unlikely

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	Species at Risk	Conservation Status	Occurrence at/near site 1 = initial assessment (general sources) of presence within region 2 = site-specific assessment/survey	
			1	2
	Hemlock Parsley ( <i>Conioselinum chinense</i> )	3Y	No initial evaluation	Found on-site
	Mountain Sandwort ( <i>Arenaria groenlandica</i> )	3Y	No initial evaluation	Found on-site
	Glaucous Rattlesnake Root ( <i>Prenanthes racemosa</i> )	NS GSR: Blue	Believed extirpated	Found on-site
	Rock Spike-moss ( <i>Selaginella rupestris</i> )	Currently NS GSR Red	No initial evaluation; believed extirpated until rediscovered near Centreville in 2002	Not found during a search of the site for this species.
	Bird's-eye Primrose ( <i>Primula laurentiana</i> )***	ACCDC Priority List	No initial evaluation	Found on-site
	Skunk Cabbage ( <i>Symplocarpus foetidus</i> )***	ACCDC Priority List	No initial evaluation	Found on-site
B3	<b>LAND BIRDS</b>			
	Peregrine Falcon ( <i>Falco peregrinus anatum</i> )	1T, 2T, 3R	Common migrant; highly unlikely breeding	Regular autumn migrant along Digby Neck. Likely that some individuals pass through the site, particularly during their autumn migration movements.
	Rusty Blackbird ( <i>Euphagus carolinus</i> )	1SC (designated by COSEWIC in 2006)	Breeding and regular autumn migrant (diurnal)	Small area of potential nesting habitat on site. Not found during two years of breeding bird surveys.
	Northern Goshawk ( <i>Accipiter gentilis</i> )	3Y	Uncommon migrant; possibly breeding	No preferred nesting habitat on site and not found during two years of breeding bird surveys. Possible migrant through site.
	Nelson's Sharp-tailed Sparrow ( <i>Ammodramus nelsoni</i> )	3Y	Exceptional migrant; Possible breeding	Marginal and limited breeding habitat on site. Not found during two years of breeding bird surveys.
	Bobolink ( <i>Dolichonyx oryzivorus</i> )	3Y	Common migrant; highly	No habitat for breeding or migrating birds at site. Individuals may fly

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	Species at Risk	Conservation Status	Occurrence at/near site	
			1 = initial assessment (general sources) of presence within region	2 = site-specific assessment/survey
			1	2
			unlikely breeding	over site during migration.
	Boreal Chickadee ( <i>Pocile hudsonica</i> )***	ACCDC	No initial evaluation	Recorded on site during two years of breeding bird surveys
B4	<b>BUTTERFLIES, DAMSELFLIES, DRAGONFLIES</b>			
	Hoary Comma ( <i>Polygonia gracilis</i> )	3Y	Possible	Presence could not be confirmed (2006 surveys)
	Black Meadowfly ( <i>Sympetrum danae</i> )	3Y	Likely	Presence could not be confirmed (2006 surveys)
	Zorro Clubtail ( <i>Lauthus parvulus</i> )	3Y	Possible	Presence could not be confirmed (2006 surveys)
	Greenstriped Darner ( <i>Aeshua verticalis</i> )	3Y	Likely	Presence could not be confirmed (2006 surveys)
	Zigzag Darner ( <i>Aeshua sitchensis</i> )	3Y	Likely	Presence could not be confirmed (2006 surveys)
	Harlequin Darner ( <i>Gomphaeschua farcilata</i> )	3Y	Likely	Presence could not be confirmed (2006 surveys)

Notes:

\*Species have been downgraded by NSDNR from status Yellow to Green (Mark Elderkin *pers. comm.*) and therefore were not forwarded to the Short list/ further addressed in the EA.

\*\* Not included in App 39 listing; added in response to WP 5141 Fisheries and Oceans Canada

Shade: Species selected for Short List (Table 2)

\*\*\* Species identified during field survey, included in ACCDC priority list (note: species from this list were NOT included in the establishment of the initial list or regional occurring species)

Conservation Status

(1) COSEWIC - Committee on the Status of Endangered Wildlife in Canada

E= Endangered T= Threatened SC= Special Concern

(2) NS ESA - Nova Scotia Endangered Species Act

E= Endangered T= Threatened V= Vulnerable

(3) NS GSR - Nova Scotia General Species Ranks

R= Red Y= Yellow

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**Table 2:**  
**Whites Point Quarry**  
**Effects Assessment – Species at Risk Identified on or Near the Site**  
**or Possibly or Likely Occurring (“Short List”)**

	Species at Risk	Conser- vation Status	Occurrence at/near site 1 = initial assessment of presence within region; 2 = site-specific assessment/survey		Potential for Interaction with Project	Mitigation Measure	Residual Effect & Significance	EA Report page #
			1	2				
<b>A</b>	<b>MARINE SPECIES AT RISK</b>							
<b>1</b>	<b>Marine (Mammals, Fish, Molluscs, Reptiles)</b>							
	North Atlantic Right Whale <i>Eubalaena glacialis</i>	1E	Possible	Not found; but possibly near site	Potential for ship strikes; behavioural changes/ harm due to blasting and increased noise levels	<ul style="list-style-type: none"> <li>• During ship movement an observer will relay any sightings of marine mammals to the vessel captain.</li> <li>• Blasting in accordance with DFO “Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters”.</li> <li>• Blasting will not be conducted if cetaceans are within 500m or 2500m for endangered marine mammals.</li> </ul>	Not significant	EIS Vol. VI Section 9.2.11.1.1; 9.2.11.2 to 5; and 9.2.13
	Harbour Porpoise <i>Phocoena phocoena</i>	ISC	Likely	Found near site	Potential for ship strikes; harm due to blasting, displacement from home range	<ul style="list-style-type: none"> <li>• During ship movement an observer will relay any sightings of marine mammals to the vessel captain.</li> <li>• Blasting in accordance with DFO “Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters”.</li> <li>• Blasting will not be conducted if pinnipeds are present within 170m</li> </ul>	Not significant	EIS Vol. VI Section 9.2.11.1.4 and 9.2.11.2 to 5
	Fin Whale <i>Balaenoptera physalus</i>	ISC	Likely	Not found; but possibly near site	Potential for ship strikes; behavioural changes/ harm due to blasting and	<ul style="list-style-type: none"> <li>• During ship movement an observer will relay any sightings of marine mammals to the vessel captain.</li> <li>• Blasting in accordance with DFO</li> </ul>	Not significant	EIS Vol. VI Section 9.2.11.1.2 and 9.2.11.2 to 5

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Species at Risk	Conservation Status	Occurrence at/near site 1 = initial assessment of presence within region; 2 = site-specific assessment/survey		Potential for Interaction with Project	Mitigation Measure	Residual Effect & Significance	EA Report page #
		1	2				
				increased noise levels	“Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters”. <ul style="list-style-type: none"> <li>Blasting will not be conducted if cetaceans are within 500m or 2500m for endangered marine mammals.</li> </ul>		
Atlantic Cod <i>Gadus morhua</i>	1SC	Possible	likely	Project does not contribute to threat factors	NA	NA	
Porbeagle Shark ( <i>Lamna nasca</i> ) **	1E	not assessed	Likely	Project does not contribute to threat factors	NA	NA	See additional information provided in Bilcon response to Aquatic Ecology 9.2.3
White Shark <i>Carcharodon carcharias</i> **	1E	not assessed	Possible	Project does not contribute to threat factors	NA	NA	See above
Shortfin Mako <i>Isurus oxyrinchus</i> **	1T	not assessed	Possible	Project does not contribute to threat factors	NA	NA	See above
Winter Skate <i>Leucoraja acellata</i> **	1SC	not assessed	Likely	Project does not contribute to threat factors	NA	NA	See above
Atlantic Wolffish <i>Anarhichas lupus</i> **	1SC	not assessed	Likely	Project does not contribute to threat factors	NA	NA	See above
Blue Shark <i>Prionace glauca</i> **	1SC	not assessed	Possible	Project does not contribute to threat factors	NA	NA	See above
American Eel	1SC	not assessed	Likely	Project does not contribute to threat	NA	NA	See above

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	Species at Risk	Conservation Status	Occurrence at/near site		Potential for Interaction with Project	Mitigation Measure	Residual Effect & Significance	EA Report page #
			1 = initial assessment of presence within region;	2 = site-specific assessment/survey				
			1	2				
	<i>Anguilla rostrata</i> **				factors			
2	<b>Waterbirds</b>							
	Harlequin Duck <i>Histrionicus histrionicus</i>	1SC, 2E, 3Y	Winters in Trout Cove & Bear Cove areas	Not found at site	None currently but situation could change if population continues to increase.	<ul style="list-style-type: none"> <li>Review any changes in distribution and behaviour of wintering birds recorded during CWS annual monitoring program.</li> <li>Be prepared to work cooperatively with CWS should the potential for interaction increase.</li> </ul>	NA	EIS, Vol. VI, Sec 9.2.7, Page 105 and Reference Documents Vol. 1, Rep # 2
	Brant <i>Branta bernicla</i>	1Y	Common staging & uncommon on wintering @ Brier Is.	Possibly migrates past site. Staging habitat not present.	No known threat factors	NA	NA	EIS, Vol VI Sec 9.2.4, Page 87
	Common Loon <i>Gavia immer</i>	3Y	Common migrant & wintering; uncommon on breeding	Wintering birds common, summering (non-breeding) birds uncommon at site	Potential for disruption (due to blasting, ship traffic and land-based activities) of population considered minimal	Onshore observer to identify presence of waterbirds within 170m of the blast site – if waterbirds are sighted, delay of blasting event until birds move out of safety radius;	Not significant	EIS, Vol. VI, Sec 9.2.4.1.8 to 12
	Arctic Tern <i>Sterna paradisaea</i>	3Y	Possible migrant	Not observed at site; possible to fly along	Potential for disruption (due to blasting, ship traffic and land-based activities) on	None required; blasting is too infrequent to cause any significant adverse effects.	Not significant	EIS, Vol. VI, Sec 9.2.4.1.8 to 12

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	Species at Risk	Conservation Status	Occurrence at/near site		Potential for Interaction with Project	Mitigation Measure	Residual Effect & Significance	EA Report page #
			1 = initial assessment of presence within region;	2 = site-specific assessment/survey				
			1	2				
				coast	population considered minimal			
	Common Tern <i>Sterna hirundo</i>	3Y	Possible migrant	Not observed at site; possible to fly along coast	Potential for disruption due to blasting	See above	Not significant	EIS, Vol. VI, Sec 9.2.4.1.8 to 12
	Red-necked grebes <i>Podiceps grisegena</i>	ACCDC	Not initially assessed	Found wintering at site	Potential for disruption due to blasting	Onshore observer to identify presence of waterbirds within 170m of the blast site – if waterbirds are sighted, delay of blasting event until birds move out of safety radius;	Not significant	EIS, Vol. VI, Sec. 9.2.4.1.12
	Black guillemots <i>Cephus grylle</i>	ACCDC	Not initially assessed	Found wintering at site	Potential for disruption due to blasting	See above	Not significant	EIS, Vol. VI, Sec. 9.2.4.1.12
<b>B</b>	<b>TERRESTRIAL SPECIES AT RISK</b>							
<b>1</b>	<b>Terrestrial Mammals, Amphibians, Reptiles</b>							
	Little Brown Bat <i>Myotis lucifugus</i>	3Y	Known summering	Likely summering a site	Loss of forest foraging habitat. Possible gain in favoured aquatic foraging habitat (settling ponds) and preferred maternity colony sites (buildings)	<ul style="list-style-type: none"> <li>• Preservation and management of forest habitat on adjacent (Bilcon) property</li> <li>• Rehabilitation of forested areas will be ongoing throughout the life project as quarrying activity in specific areas is completed.</li> </ul>	Not significant	EIS Vol VI, Sec. 9.2.1.1.3, Page 23. Also see this document for response to questions on bats.
	Northern Long-eared Bat <i>Myotis septentrionalis</i>	3Y	Known (summering)	Likely (summering at site)	Loss of forest foraging habitat. Possible gain in	<ul style="list-style-type: none"> <li>• See above</li> </ul>	Not significant	EIS Vol VI, Sec. 9.2.1.1.3 Also see this

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	Species at Risk	Conservation Status	Occurrence at/near site 1 = initial assessment of presence within region; 2 = site-specific assessment/survey		Potential for Interaction with Project	Mitigation Measure	Residual Effect & Significance	EA Report page #
			1	2				
					potential maternity colony sites (buildings).			document for response to question on bats.
2	<b>Vascular Plants, Mosses, Lichens</b>							
	Boreal Felt Lichen <i>Erioderma pedicellatum</i>	1E	possible	Not found; occurrence "remotely" possibly on-site	Potential for physical damage/ habitat loss	<ul style="list-style-type: none"> <li>Species-focused survey prior to site development</li> <li>If found, development of mitigation plan in consultation with regulators</li> <li>Maintenance of Environmental Preservation Zone (if required adjustment to delineation)</li> <li>Incremental site reclamation</li> <li>Off-site forest management (Bilcon properties)</li> <li>Invasive species monitoring and management</li> </ul>	Unknown at this point; likely not significant	See information provided in subsequent response to Panel question on Species at Risk
	Downy Rattlesnake-Plantain <i>Goodyera pubescens</i>	3R	possible	Not found; but possibly on-site	Potential for physical damage/ habitat loss	See above	Unknown at this point; likely not significant	See above
	Northern White Cedar <i>Thuja occidentalis</i>	3R	possible	Not found; but possibly on-site	Potential for physical damage/ habitat loss	See above	Unknown at this point; likely not significant	See above
	Slender Blue Flag <i>Iris prismatica</i>	3R/undetermined	possible	Not found; but possibly on-site	Potential for physical damage/ habitat loss	See above	Unknown at this point; likely not significant	See above
	Round-Leaved Liverleaf	3R	likely	Not found;	Potential for physical	See above	Unknown at	See above



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Species at Risk	Conservation Status	Occurrence at/near site 1 = initial assessment of presence within region; 2 = site-specific assessment/survey		Potential for Interaction with Project	Mitigation Measure	Residual Effect & Significance	EA Report page #
		1	2				
<i>Hepatica americana</i>			but possibly on-site	damage/ habitat loss		this point; likely not significant	
Purple-Leaf Willow-Herb <i>Epilobium coloratum</i>	3Y	possible	Not found; but possibly on-site	Potential for physical damage/ habitat loss	See above	Unknown at this point; likely not significant	See above
Fountain Miner's Lettuce <i>Monita fontana</i>	3Y	likely	Not found; but possibly on-site	Potential for physical damage/ habitat loss	See above	Unknown at this point; likely not significant	See above
Small-Flower Bitter-Cress <i>Cardamine parviflora</i>	3Y	likely	Not found; but possibly on-site	Potential for physical damage/ habitat loss	See above	Unknown at this point; likely not significant	See above
Grassleaf Rush <i>Juncus marginatus</i>	3Y	possible	Not found; but possibly on-site	Potential for physical damage/ habitat loss	See above	Unknown at this point; likely not significant	See above
Hemlock Parsley <i>Conioselinum chinense</i>	3Y	No initial evaluation	Found on-site	Potential for physical damage/ habitat loss	Population is located within Environmental Protection Zone; adequacy of zone width to be determined based on monitoring and hydrological studies; adjustments to the design of the preservation zone or the quarry to be developed in consultation with NSDNR prior to quarry activities in vicinity of species	Not significant	EIS, Vol.VI, 9.2.1, p.20/21
Mountain Sandwort <i>Arenaria groenlandica</i>	3Y	No initial evaluation	Found on-site	Potential for physical damage/ habitat loss	<ul style="list-style-type: none"> <li>Annual survey of species;</li> <li>Depending on survey results development of mitigation plan in consultation with NSDNR</li> <li>Maintenance of Environmental</li> </ul>	Not significant	EIS, Vol.VI, 9.2.1, p.20/21

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	Species at Risk	Conservation Status	Occurrence at/near site		Potential for Interaction with Project	Mitigation Measure	Residual Effect & Significance	EA Report page #
			1 = initial assessment of presence within region; 2 = site-specific assessment/survey					
			1	2				
						Preservation Zone <ul style="list-style-type: none"> <li>Incremental site reclamation</li> <li>Off-site forest management</li> </ul>		
	Glaucous Rattlesnake Root <i>Prenanthes racemosa</i>	NS GSR: Blue (to be re-classified)	Believed extirpated	Found on-site	Potential for physical damage; disruption of hydrological regime/habitat loss	Population is located within Environmental Protection Zone; adequacy of zone width to be determined based on annual monitoring and hydrological studies; adjustments to the design of the preservation zone or the quarry to be developed in consultation with NSDNR prior to quarry activities in vicinity of species	Not significant	EIS, Vol.VI, 9.2.1, p.20/21
	Bird's-eye Primrose <i>Primula laurentiana</i>	ACCDC Priority List	No initial evaluation	Found on-site	Potential for physical damage/ habitat loss	Population is located within Environmental Protection Zone; adequacy of zone width to be determined based on annual monitoring and hydrological studies; adjustments to the design of the preservation zone or the quarry to be developed in consultation with NSDNR prior to quarry activities in vicinity of species	Not significant	EIS, Vol.VI, 9.2.1, p.21
	Skunk Cabbage <i>Symplocarpus foetidus</i>	ACCDC Priority List	No initial evaluation	Found on-site	Potential for physical damage/ habitat loss	Population not within Environmental Protection Zone; forest habitat on adjacent Bilcon properties provides similar habitat; lands to be included in targeted survey; if found, lands to be managed accordingly.	Not significant	EIS, Vol.VI, 9.2.1, p.21
3	<b>Land Birds</b>							
	Peregrine Falcon <i>Falco peregrinus anatum</i>	1T, 2T, 3R	Regular autumn migrant (diurnal)	No potential nesting habitat on site; possible to fly over	Potential foraging habitat loss.	<ul style="list-style-type: none"> <li>Maintenance of Environmental Protection Zone;</li> <li>Incremental reclamation;</li> <li>Off-site forest management.</li> </ul>	Not significant	EIS, Vol. VI, Sec. 9.2.1, p.23

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Species at Risk	Conservation Status	Occurrence at/near site 1 = initial assessment of presence within region; 2 = site-specific assessment/survey		Potential for Interaction with Project	Mitigation Measure	Residual Effect & Significance	EA Report page #
		1	2				
Rusty Blackbird <i>Euphagus carolinus</i>	ISC (listed in 2006)	Breeding and regular autumn migrant (diurnal)	Limited potential breeding habitat. Not recorded during two years of breeding bird surveys	Possibility of potential breeding/migration habitat loss	<ul style="list-style-type: none"> <li>Current potential breeding/migration habitat is located within Environmental Protection Zone. Additional potential habitat could be created with the addition of settling ponds and constructed wetlands and the restoration of forest adjacent to these wetlands.</li> </ul>	Not significant	See response in this document to question regarding the changed status of the rusty blackbird
Northern Goshawk <i>Accipiter gentilis</i>	3Y	Possible breeding; uncommon migrant (diurnal)	Preferred nesting habitat not present. Not recorded during two years of breeding bird surveys.	Possible loss of foraging habitat	<ul style="list-style-type: none"> <li>Maintenance of Environmental Protection Zone;</li> <li>Incremental reclamation;</li> <li>Off-site forest management.</li> </ul>	Not significant	EIS Vol VI Sec 9.2.1.1.3, Page 23
Bobolink <i>Dolichouyx oryzivorus</i>	3Y	Breeds and regular autumn migrant	No habitat for breeding or migrating birds; fly over during migration	Nocturnal migrant having potential for being attracted by on-site lights and collision with equipment	<ul style="list-style-type: none"> <li>Minimizing artificial light</li> <li>Reduction of light trespass</li> <li>Use of luminary (lighting fixtures) that reduce glare</li> </ul>	Not significant	EIS, Vol. VI, Sec. 9.2.1, p.23
Boreal Chickadee <i>Pocile hudsonica</i>	ACCDC,	No initial evaluation	Recorded on site during two years of	Possibility of potential breeding habitat loss	<ul style="list-style-type: none"> <li>Maintenance of Environmental Protection Zone;</li> <li>Incremental reclamation;</li> <li>Off-site forest management;</li> </ul>	Not significant	Not discussed

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	Species at Risk	Conservation Status	Occurrence at/near site		Potential for Interaction with Project	Mitigation Measure	Residual Effect & Significance	EA Report page #
			1 = initial assessment of presence within region; 2 = site-specific assessment/survey					
			1	2		• Breeding bird survey.		
				breeding bird surveys				

Note: \*Species have been downgraded by NSDNR from status Yellow to Green (Mark Elderkin *pers. comm.*) and therefore were not further addressed in the EA.

NA – not applicable since no potential for interaction with Project works and activities were identified

**Conservation Status**

- (1) COSEWIC - Committee on the Status of Endangered Wildlife in Canada
- (2) NS ESA - Nova Scotia Endangered Species Act
- (3) NS GSR - Nova Scotia General Species Ranks

- E= Endangered    T= Threatened    SC= Special Concern
- E= Endangered    T= Threatened    V= Vulnerable
- R= Red            Y= Yellow

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Appendix 39 identifies a range of species at risk that are “possible” or “likely” to be present at or near the site. Explain why these species are not described more fully in the EIS.

**RESPONSE**

In Appendix 39, species were listed according to their likelihood of occurring within the general region of the proposed quarry site. However, on-site investigations revealed that for some species that might occur within the region, there was no appropriate habitat available on the proposed quarry site and for other species, while possible habitat existed on the property, the species was not found to use this habitat.

**Plants**

After a botanical survey of the site and its habitats (Newell, 2002), the likelihood of many of these species occurring at the Whites Point site was determined to be different from that of their occurrence within the region, based on a lack of appropriate habitat at the site. The following is a list of those species whose occurrence in the region was considered “possible” but are considered “unlikely” or “highly unlikely” to occur at the Whites Point site:

*Species at Risk Table TE-1 – Vascular Plants, Mosses Lichens*  
(located in EIS Appendix Volume IV, Tab, 39)

Page	Species	Likelihood
5	<i>Geum peckii</i>	unlikely
	<i>Lophiola aurea</i>	unlikely
6	<i>Carex chordorrhiza</i>	unlikely
7	<i>Carex viridula brachyrrhyncha</i>	highly unlikely
	<i>Cinna arundinacea</i>	highly unlikely
	<i>Carex castanea</i>	unlikely
8	<i>Vaccinium boreale</i>	unlikely
	<i>Malaxis monophyllos</i>	unlikely
	<i>Listera australis</i>	unlikely
	<i>Carex alopecoidea</i>	unlikely
10	<i>Selaginella selagioides</i>	highly unlikely
12	<i>Grappheporum melicoides</i>	unlikely
13	<i>Cornus suecica</i>	unlikely
14	<i>Platanthera orbiculata</i>	unlikely
	<i>Impatiens pallida</i>	unlikely
	<i>Ophioglossum pusillum</i>	unlikely
15	<i>Rubus recurvicaulis</i>	unlikely
16	<i>Vaccinium uliginosum</i>	unlikely

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	<i>Eriophorum gracile</i>	unlikely
	<i>Eleocharis flavescens</i>	unlikely
17	<i>Sphenopholis obtusata</i>	unlikely
	<i>Utricularia gibba</i>	unlikely
	<i>Vaccinium cespitosum</i>	unlikely
	<i>Salix sericea</i>	unlikely
	<i>Salix pedicellaris</i>	unlikely
18	<i>Viola nephrophylla</i>	unlikely
	<i>Saxifraga aizoon</i>	unlikely
	<i>Geocaulon lividum</i>	unlikely
	<i>Poa glauca</i>	unlikely
19	<i>Polygala sanguinea</i>	unlikely
	<i>Empetrum rubrum</i>	unlikely
	<i>Botrychium simplex</i>	unlikely
	<i>Spiranthes ochroleuca</i>	unlikely

In addition to the above, three species considered “likely” to occur within the region (Table TE-1) were not found during botanical surveys of the site. However, the likelihood of these species being present at the site cannot be ruled out based on the survey or habitat considerations. The status of the following three species is now considered “possible” at the Whites Point site:

*Species at Risk Table TE-1 – Vascular Plants, Mosses Lichens*  
(Located in EIS Appendix Volume IV, Tab, 39)

Page	Species	Where Found
10	<i>Hepatica americana</i>	Woodland species found in other locations on the North Mountain
14	<i>Montia fontana</i>	suitable habitat present; reported from Brier Island; not observed during survey
15	<i>Cardamine parviflora</i>	occurs in dry woods; has been documented from several locations along the Bay of Fundy

Subsequent to the preparation of the EIS, two species, *Rubus pensilvanicus* and *Viola sagittata*, that were identified as possibly occurring in the region have been downgraded by NSDNR from status YELLOW to GREEN (Mark Elderkin *pers. comm.*) These species were not identified during the site survey, and considering the change of status, are not given further consideration in this response.

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Nine species (including the three species mentioned above) that were not identified during the botanical surveys but are still considered as possibly occurring at the site are discussed individually on Page 6 in the response to the Review Panel's comments regarding section 9.2.1.1.3.

#### *Arthropods*

On-site preliminary studies of butterflies, damselflies and dragonflies conducted in 2005 (Brunelle, 2005; Neil, 2005) suggested, based on habitat, that six species at risk were either "possible" or "likely" to occur at the site. These species were listed in Species at Risk Table TE-4 as follows:

Page	Species	Likelihood
22	Hoary comma <i>Polygona gracilis</i>	possible
22	Black meadowfly <i>Sympetrum danae</i>	likely
23	Zorro clubtail <i>Lauthus parvulus</i>	possible resident
23	Greenstripe darner <i>Aeshua verticalis</i>	likely
23	Zigzag darner <i>Aesua sitchensis</i>	likely
23	Harlequin darner <i>Gomphaeschua farcilata</i>	likely

In 2006, additional studies were conducted to verify the status of butterflies, damselflies and dragonflies, including the above species, at the proposed quarry site (Brunelle, 2006; Neil 2006). During four days of surveys for damselflies and dragonflies (Brunelle, 2006) and an additional three days of surveys for butterflies (Neil, 2006), none of the above species were found to be present at the site.

Neil (2006) did document the presence of five adult monarch butterflies (COSEWIC – Special Concern; NS GSR – Yellow) on his 30 July, 2006 visit to the Whites Point site. The presence of the adults did not suggest breeding at the site since the larval host plants (milkweed spp.) are not known to be present there (Newell, 2002). Unlike the larvae which are extremely host specific, the mobile adult monarch butterflies feed on the flowers of many plant species. Monarch butterflies were particularly abundant in southwestern Nova Scotia, and indeed all of eastern Canada, in the summer of 2006.

Two species whose status is considered "undetermined" provincially were identified by the investigators as being of possible conservation concern. One of these, the sweetflag spreadwing (*Lestes forcipatus*) was collected in 2005 (Brunelle, 2005) and was confirmed as breeding in 2006 (Brunelle, 2006). The small, man-influenced pond in which this species was observed during both 2005 and 2006, will be part of the environmental preservation zone.

In 2005, based on the presence of seemingly appropriate habitat, Neil (2005) suggested that the mustard white (*Pieris oleracea*), another species whose status is considered

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“undetermined”, might breed on the property. The 2006 surveys failed to confirm the presence of the mustard white (Neil, 2006). The habitat that was investigated for this species will also be part of the environmental preservation zone.

#### *Vertebrates*

All terrestrial vertebrates listed in Appendix 39 as “likely” or “possibly” occurring within the region of the Whites Point property have been discussed in the EIS.

#### **Literature Cited**

Brunelle, P. M. 2006. Odonata survey: (damselflies and dragonflies) Whites Point property, Digby County, Nova Scotia. 2006 addendum. 8 pp.

Brunelle, P. M. 2005. Odonata survey 2005: (damselflies and dragonflies) Whites Point property, Digby County, Nova Scotia. 11 pp. + table.

Neil, K. A. 2006. 2006 addendum to butterfly habitat and host plant survey of White’s Cove, Digby Co., N.S. 3 pp.

Neil, K. A. 2005. Adult butterfly habitat and larval host plant survey of Whites Point, Digby Co., N.S. 6 pp.

Newell, R. E. 2002. Plant survey at White’s Cove property, Digby Neck, Digby County, Nova Scotia. 22 pp.

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*9.2.1.1.3 Flora and Fauna – The Panel believes that a species previously listed as extirpated in Nova Scotia but subsequently discovered to be on the site could merit inclusion as a VEC.*

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#### **RESPONSE**

##### **Glaucous rattlesnake-root *Prenanthes racemosa***

##### *Research*

Glaucous rattlesnake-root is a perennial herbaceous plant that flowers in late summer. In the Whites Cove area it occurs on the lower section of a single headland, growing up through a ground cover of creeping juniper (*Juniperus horizontalis*). It also occurs very rarely on rock or cliff ledges below the headland. A census done in August of 2006 found 25-30 flowering individuals and 200-250 non-flowering plants. Seedlings were observed in one spot growing on bare peaty substrate on a narrow rock shelf.

Glaucous rattlesnake-root is listed as a blue species under the NS GSR. Blue or historic species are those that are believed to be extirpated within Nova Scotia because they have not been observed or reported within the province for a period of 50 years or greater. There are



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two historic records for glaucous rattlesnake-root from localities near White's Point. It was documented from Sandy Cove in 1948 and from Whale Cove in 1955 (see herbarium records of *Prenanthes racemosa* on the E.C. Smith Herbarium website: <http://herbarium.acadiau.ca/>). It was reported in the late nineteenth/early twentieth century from Sydney Mines by John Macoun but has not been reported from this location since. The ACCDC has ranked this species as an S1 (i.e., critically imperilled) for Nova Scotia. It is considered globally secure (G5) (NatureServe, 2006; <http://www.natureserve.org>). This species has not been reviewed, nor is it currently a candidate for review by COSEWIC.

The discovery of this population will probably change the status of the glaucous rattlesnake-root under the NS GSR from Blue to Red (A. P. (Tony) Duke, August 11, 2006, Whites Point Quarry and Marine Terminal Project, Comments on Environmental Impact Statement, NSDNR).

Glaucous rattlesnake-root ranges from Nova Scotia to British Columbia and south to Colorado, Montana, South Dakota, Ohio, Illinois and northern Maine with disjunct populations in southeastern New York and northern New Jersey. It occurs in a variety of habitats including calcareous river banks, shores, meadows, and damp prairies.

Conservation concerns documented for populations in Maine (St. Hilaire, 2004) where it is considered to be an S3 or vulnerable species (NatureServe, 2006) include disruption of disturbance regimes along river shore communities due to damming, river bank disturbance that may result in hydrological disruption to seep areas, clearing for camps and invasion by non-native species. The Whites Point population appears to be most vulnerable to disruption of hydrological regimes and invasive species that may come in with disturbance on site.

#### *Mitigation and Monitoring*

The headland area that contains the population of glaucous rattlesnake-root is part of the environmental protection zone and no activities associated with the quarry operation will be permitted within this zone. An annual monitoring program, which includes this species, began in 2006 (see Newell (2006) for the first monitoring report and EIS section 9.2.1.4 for an outline of monitoring procedures).

Concern has been expressed by NSDNR about the adequacy of the buffer zone and the possible effects of quarry activity on hydrology, drainage and microhabitats within the environmental protection zone (see response to NSDNR's comments regarding buffer zones). Bilcon considers this to be a legitimate concern and proposes that Bilcon and its botanical and hydrological consultants work with NSDNR to arrive at a science-based answer to the buffer zone question. Since no project activity is planned in the vicinity of the glaucous rattlesnake-root colony for at least 20 years, the results of monitoring studies and

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hydrological work should provide the required information to assure that quarry activities can, if necessary, be adjusted so as not to pose a threat to this population.

#### Literature Cited

Newell, R. E. 2006. In preparation.

St. Hilaire, L. 2004 *Nabalus racemosus* (Michx.)Hook. (Glaucous white lettuce) Conservation and Research Plan for New England. New England Wild Flower Society, Framingham, Massachusetts, U.S.A.

*The Proponent should review and consider other floral species at risk from Nova Scotia lists, or explain why they have been excluded from the VEC list.*

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#### RESPONSE

In response to the Review Panel's question concerning Appendix 39 (see above) Bilcon has listed the plant species at risk whose occurrence within the region was considered "possible" or "likely" but, because of lack of habitat, were considered "unlikely" or "highly unlikely" to occur at the Whites Point property. There remain nine species that, while not identified during the botanical survey, could possibly be present on the property. Only one of these species (boreal felt lichen) is considered at risk by SARA/COSEWIC. Eight of these species have Red or Yellow designations under NS GSR. The provincial status of one species (slender blue flag) has recently been changed from Red to Undetermined, however, it is still classified as "may-be at risk" in Nova Scotia in the national general status rank. These species are:

#### *Erioderma pedicellatum* (boreal felt lichen)

The boreal felt lichen has been designated as endangered under both provincial (Nova Scotia Endangered Species Act) and federal legislation (Atlantic population; COSEWIC/SARA). Globally, it has been listed as critically imperilled by IUCN. Over the last twenty years, there has been an alarming rate of decline (greater than 90%) in occurrences and individuals within the province of Nova Scotia. Currently there are two known locations for the province (Cameron, 2004).

This rare lichen occurs primarily on balsam fir (*Abies balsamea*) in humid, oceanic coniferous forests often in association with bogs, fens or swales. Threats include acid rain and habitat destruction (primarily forestry practices) (Cameron & Richardson, 2006).

Robert Cameron, a lichenologist with the provincial Department of Environment and Labour, considers that it is "remotely possible" that boreal felt lichen occurs on the Whites Point property (pers. comm., 2006). There are currently no known records for the North Mountain.

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#### *Goodyera pubescens* (downy rattlesnake plantain)

The orchid, downy rattlesnake plantain, is listed by the province of Nova Scotia as a RED species. It is considered to be at risk in Nova Scotia but not nationally at risk by COSEWIC/SARA. It occurs in dry woodlands (deciduous or mixed) in various counties in southwestern Nova Scotia. It has not previously been reported from Digby County but does occur in the adjacent county of Annapolis. Populations of this rare orchid are always very small and extremely localized. New populations are still being discovered within the province. It is not inconceivable that it could occur on the Whites Point property in the woodland area.

#### *Thuja occidentalis* (eastern white cedar)

Eastern white cedar is listed by the province of Nova Scotia as a RED species and has recently (2005) been designated as vulnerable under the provincial Endangered Species Act. It is considered to be at risk in Nova Scotia but not nationally at risk by COSEWIC/SARA. Eastern white cedar occurs at several inland locations in Digby County as well as on the North Mountain in the vicinity of Delaps Cove, Annapolis County. Although not documented for the North Mountain southwest of Digby, due to its preference for calcareous and neutral soils, it should be considered as a potential species for the Whites Point property and adjacent areas which are underlain by basalt.

#### *Iris prismatica* (slender blue flag)

Slender Blue Flag is listed by the province of Nova Scotia as an UNDETERMINED species. This indicates that insufficient data exists to allow a status assessment for this species. However, the national general status rank assigned to Slender Blue Flag for Nova Scotia is 2 (may-be at risk) (<http://www.wildspecies.ca/wildspecies2005>). This status indicates a species that may be at risk of extirpation or extinction and is therefore a candidate for a detailed risk assessment by COSEWIC, or the provincial or territorial equivalent.

In Canada, Slender Blue Flag occurs in Nova Scotia and Ontario. It is considered to be an introduced species in Ontario but native to Nova Scotia. Outside of Canada, this plant occurs from Maine southwards to Georgia and Tennessee. It occurs in a variety of wet, coastal habitats including meadows, marshes, pond margins etc.

In Nova Scotia, there are four records for this plant – one in each of four counties (Annapolis, Guysborough, Inverness and Cape Breton) (Roland, 1998). The Annapolis County record is from Paradise. Because a variety of wet coastal habitats occur on the Whites Point property, it was though prudent to consider this plant as a possible species for the property and adjacent lands.

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***Epilobium coloratum*** (purple leaf willow-herb)

Purple leaf willow-herb is listed as a YELLOW species by the province of Nova Scotia. In the province it occurs in poorly drained areas such as ditches, marshes, swales and springy slopes in scattered locations on the mainland (Roland, 1998). There is a record for this species from a marsh east of Roxville, Digby County (Roland & Smith, 1969) that is a distance of approximately 40 km northeast of Whites Point. It would seem reasonable to consider this species as a potential species for the Whites Point property in poorly drained areas.

***Juncus marginatus*** (grass-leaf rush, shore rush)

Grass-leaf rush is listed by the province of Nova Scotia as a YELLOW species. In Nova Scotia it is a plant of disturbed wet soils such as brook sides, ditches, roadsides and damp fields. It is currently known from a limited number of sites in Annapolis, Digby, Yarmouth and Shelburne Counties. It has been recently observed on the North Mountain in the vicinity of Delaps Cove, Annapolis County on a roadside. Although not found during the original surveys, it should still be considered as a possible species for Whites Point and adjacent areas.

***Hepatica nobilis var. obtusa*** (= *Hepatica americana*; round-leaved hepatica)

Round-leaved hepatica is listed by the province of Nova Scotia as a RED species. It is considered to be at risk in Nova Scotia but not nationally at risk by COSEWIC/SARA. There are approximately ten known extant locations for this species in the province, three of which occur on the North Mountain in Annapolis County. The westernmost of these occurs at Victoria Beach. This species tends to occur in rich, dry woods and openings. Populations of round-leaved hepatica are small and extremely isolated from one another. It appears that there has been a significant decline in populations of this species over the last one hundred years in Nova Scotia. Anecdotal information indicates that this species was once common enough to be a popular spring bouquet flower. It was also one of the flowers used in an early Plant Watch Program initiated by school superintendent Alexander MacKay and run from 1892-1923. School children in Nova Scotia were encouraged to record phenological data (flowering times) of specific plant species. Round-leaved hepatica was chosen to be one of the species monitored suggesting that it was a much more common plant than it is today. Because of the occurrence of several populations of round-leaved hepatica further east along the North Mountain (Annapolis County), it is considered to be a potential species for Whites Point and surrounding areas.

***Montia fontana*** (fountain miner's-lettuce, blinks)

Fountain miner's-lettuce is listed by the province of Nova Scotia as a RED species. It is considered to be at risk in Nova Scotia but not nationally at risk by COSEWIC/SARA. Roland (1998) describes its habitat in Nova Scotia as springy or seepy slopes, wet shores and brackish spots. There are extremely few known locations for this miniscule plant in Nova

### *9.2.1 Terrestrial Ecology*

Scotia and most sites have likely not been revisited since their original discovery in the 19<sup>th</sup> and 20<sup>th</sup> centuries to determine their current status. It has been reported from wet crevices of a sea-cliff on Brier Island (Roland & Smith, 1969). Whites Point has coastal habitat very similar to coastal habitat found on Brier Island so it would be reasonable to consider fountain miner's-lettuce as a possible species on the Whites Point property. Although no plants of this species were observed during the original surveys it would be quite possible to overlook a species that can be as small as one centimetre in height.

#### ***Cardamine parviflora*** (small flower bitter-cress)

Small flower bitter-cress is listed by the province of Nova Scotia as a YELLOW species. In Nova Scotia, this plant has been documented from a small number of locations along the Bay of Fundy from Brier Island to Cape Blomidon and Cape D'Or (Roland, 1998). It also occurs at one location in Halifax County and at several locations in Cape Breton. It tends to occur in dry, rocky habitats in the province. Primarily because of its documented occurrence on Brier Island on rocks back of a beach (Roland & Smith, 1969), it is reasonable to consider small flower bitter-cress as a potential species in coastal shoreline habitat at Whites Point.

#### ***Research and Mitigation***

Bilcon will contract qualified botanists to conduct on-site, species-focused searches of preferred habitats for the nine above-mentioned plant species. For vascular plants, surveys will be conducted during the flowering/fruitletting times of each species.

Prior to initiation of further on site development, botanical surveys for the above vascular plants will be conducted in at least all areas scheduled for development within the next ten years. Areas scheduled for later development will be surveyed for these species at least five years prior to development.

Priority will be given to a survey of all appropriate habitats on the entire site for the boreal felt lichen.

Reports will be prepared for each survey and NSDNR will receive copies of these reports.

Should any of these species at risk be found on the property, Bilcon will consult with NSDNR concerning appropriate mitigative measures.

#### **Literature Cited**

Cameron, R. 2004. A second location for the rare boreal felt lichen in Nova Scotia. *Evansia*, 21(1): 40-42.

Cameron, R. P. and D. H. S. Richardson. 2006. Occurrence and abundance of epiphytic cyanolichens in Protected Areas of Nova Scotia, Canada. *Opuscula Philolichenum*, 3: 5-14.

### 9.2.1 Terrestrial Ecology

Roland, A. E. and E. C. Smith. 1969. the flora of Nova Scotia. Nova Scotia Museum, Halifax, N.S. 743 pp.

Roland, A.E. 1998. Roland's flora of Nova Scotia. 3<sup>rd</sup> edition. Nimbus Publishing and the Nova Scotia Museum, Halifax, N.S. 1297 pp.

*9.2.1.2 Analysis – The Panel requires a more detailed reclamation and monitoring plan as part of the Project description to assess the effects of the quarry on the biological diversity of the site.*

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#### RESPONSE

Please refer to Section 7.0 Revised Project Description, Section 7.10 – Reclamation and Decommissioning in this submission and Bilcon's response to Environment Canada's information request #19 in this document.

*9.2.1.3 Migratory Land Birds Species at Risk – The Panel requires sufficient and appropriate quantitative information to judge the potential for adverse environmental effects of Project-related lighting on migrating birds. Similarly, a detailed description is required of potential mitigative measures, coupled with a means for assessing their effectiveness.*

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#### RESPONSE

Migratory birds are discussed in Section 9.2.1 (pages 25 – 28) and (page 38) of the EIS. Proposed lighting for the Whites Point Quarry and Marine Terminal is discussed in Section 9.1.12 (pages 76 – 77) of the EIS and Section 7.8 (page 100) of the Revised Project Description.

Twenty-three land bird species at risk have been documented as migrants or vagrants on Brier Island. Ten of these species are considered “common” or “uncommon” migrants, the remaining thirteen are considered “exceptional, rare, or irruptive” (ref. Table AA “Migratory Status and Timing of Land Bird Species at Risk at Brier Island, Digby County, Nova Scotia” in the EIS). Migration periods on Digby Neck in the spring are generally during April and May and in the fall during August to the end of October.

Migrating birds at night are attracted to artificial light sources, particularly during periods of inclement weather (Verheijen, F.J. 1958, 1985). This is compounded if foggy or rainy weather and glass and light occur in combination. Birds can become confused by the artificial lights, be blinded by the weather and are unable to see glass. Approaching the lights of lighthouses, floodlit obstacles, communication towers or lighted tall buildings make them especially vulnerable to collision with the structures themselves. Before mitigation measures were taken at Chicago's Hancock Centre, it was estimated approximately 1,500 birds died

### *9.2.1 Terrestrial Ecology*

each night when they crashed into the lighted tower during migration season. Songbirds appear to be the most at risk since they fly at lower altitudes. Lighted coastal structures such as lighthouses are also sources of mortality for nocturnally migrating songbirds. Mean annual kills at the Long Point Lighthouse on Lake Erie, Ontario from 1960 – 1989 were 200 birds in the spring and 393 in autumn with kills of up to 2,000 birds in a single night. After this light was automated with a new, narrower and less powerful beam, mortality dropped to a mean annual kill of 18.5 birds in the spring and 9.6 in the autumn from 1990 – 2002 (Jones and Francis 2003).

Bilcon's literature research revealed no sources of information regarding the effects of quarry type lighting on migratory birds. As indicated above, most of the research focuses on communication towers, urban high rise buildings, wind turbines and lighthouses. None of these types of artificially lighted structures are proposed at the Whites Point Quarry and Marine Terminal. The tallest structure proposed is the ship loader at approximately 30m above ordinary high water. Using a worst case scenario of loading all ships at night, the ship loader would be lighted approximately 21 nights during the annual 150 nights during spring and fall migrations. If a ship is not being loaded, the ship loader will only be lighted as required by regulation. Bilcon prefers to load ships during daylight hours and whenever possible will schedule ship arrivals for daytime loading.

In Bilcon's opinion, based on the proposed design and operational mitigation measures regarding artificial light, there will be little or no effect on migratory birds. In addition to the mitigation measures already stated in the EIS and Revised Project Description, the following mitigation measures are presented.

- The most significant mitigation measure is that the quarry operation is scheduled from 0600 – 2200 hours and not at night. Therefore, night lighting will not be required, except as indicated above in the infrequent occurrence of ship loading. Even so, migrating land birds are generally at much higher altitudes and in the case of Digby Neck are following the land mass unless blown off course. Additionally, birds tend to begin their descent from their peak altitudes after midnight when the quarry is not in operation. Bilcon therefore intends to follow the most effective and simplest mitigation measure by turning off the lights between 2200 and 0600 hours.
- Security lighting will be part of the overall security plan for the quarry and utilize sensor activated lighting. This will eliminate the need for continuous night-time illumination from security lighting.
- Research indicates there may be a greater attraction of birds to red lights as compared to white light sources (Beason, undated). Bilcon intends to use white light unless required otherwise by regulation.

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Bilcon proposes visual monitoring of potential bird mortality during migration periods on Digby Neck. Visual monitoring would be conducted around structures such as the compound, processing plant and ship loader areas. The frequency of monitoring would be monthly during the migration period for one year during quarry operation. This monitoring would be conducted early in the morning after a night of inclement weather. Any bird mortality would be recorded and identified by species and number. If the proposed mitigation measures prove ineffective, based on the monitoring results, appropriate adaptive management procedures will be implemented.

#### References

Beason, R. Ph.D., "The Bird Brain: Magnetic Cues, Visual Cues, and Radio Frequency (RF) Effects". Biology Department, State University of New York, Genesco, NY. undated.

Jones, J. and C.M. Francis. "The Effects of Light Characteristics on Avian Mortality at Lighthouses". *Journal of Avian Biology* 34(4), 328-333. 2003.

Verheijen, F.J. "Bird Kills at Lighted Man-Made Structures: Not on Nights Close to Full Moon". *American Birds*, 35: 251-254, 1981.

Weir, R.D., "Annotated Bibliography of Bird Kills at Man-Made Obstacles: A Review of the State of the Art and Solutions". Department of Fisheries and the Environment, Canadian Wildlife Service, Ontario Region. 1976.

*9.2.1.4 Monitoring – The Proponent states that early detection of invasive species is important, yet monitoring is proposed to occur every five years. Resolve this discrepancy within the context of the precautionary principle.*

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## RESPONSE

### Terrestrial Environment – Invasive Plants

#### *Background*

As a responsible corporate citizen Bilcon considers that, with respect to invasive terrestrial plant species, it should attempt to ensure that:

- 1) No new, invasive plant species that could affect biodiversity and ecological processes are introduced into the quarry site as a result of project operations;
- 2) Plant species at risk on the property are not impacted by any exotic plant species;
- 3) Biodiversity and ecological processes in rare or uncommon habitats (e.g. headlands, wetlands) on the property are not threatened by invasive species;



### 9.2.1 Terrestrial Ecology

- 4) During the reclamation phase that there be an active management plan for any invasive plant species that could negatively impact the reestablishment of native plant communities;
- 5) At any stage in Bilcon's ownership, the property not be allowed to become a source of invasive plant species that could infect native plant communities on adjacent properties and affect their biodiversity and ecological processes.

Bilcon believes that the above objectives can be achieved and be consistent with the precautionary principle by conducting intensive surveys focused on an inventory of the entire property for invasive plant species conducted at approximately five year intervals, combined with the annual monitoring (in the early phases of the project) of plant species at risk program, and the prompt implementation of appropriate control measures for species that are identified as posing a significant level of risk. The following paragraphs describe how this program is proposed to be conducted.

The initial botanical survey of the Whites Point Quarry site was conducted in July and August, 2002. The objectives of this survey were to describe the terrestrial plant communities on the site with a focus on identifying any plant species at risk. This survey did not focus on exotic or invasive species although several were identified.

Prior to the beginning of construction (probably in 2007), Bilcon intends to conduct a baseline survey of the quarry property that focuses on documentation and mapping of exotic, potentially invasive, plant species. During this survey special attention will be paid to the environmental preservation zone.

Bilcon is unaware of any "official" list of invasive plant species and the degree of threat they pose to native ecosystems, that is maintained by either the Province of Nova Scotia or the federal government. The Weed Control Act of Nova Scotia ([www.canlii.org/ns/laws/sta/r1989c.501/20060718/whole.html](http://www.canlii.org/ns/laws/sta/r1989c.501/20060718/whole.html)) applies to "noxious weeds" as defined under Weed Control Regulations, Appendix A ([www.canlii.org/ns/laws/regu/1968r.57/20060718/whole.html](http://www.canlii.org/ns/laws/regu/1968r.57/20060718/whole.html)). This legislation deals with plants that are "capable of spreading from the source to cultivated or pasture lands" (Class Number One) or "those capable of inflicting economic loss or ill health on people within the Province" (Class Number Two). Currently, the noxious weed list does not address species that might be harmful in native ecosystems.

Lacking specific guidelines, Bilcon proposes to use species identified as "Principal Invasive Aliens" as described in the 1993 publication by Canadian Wildlife Service entitled "Invasive Plants of Natural Habitats in Canada" ([www.cws-scf.ec.gc.ca/publications/inv/cont\\_e.cfm](http://www.cws-scf.ec.gc.ca/publications/inv/cont_e.cfm)) and/or species with Invasive Species Impact Rank (or I-Rank) of "High" as defined by

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NatureServe ([www.natureserve.org/explorer/](http://www.natureserve.org/explorer/)) as guidelines for the identification of those species that may require control measures.

If invasive species that are deemed to require control are identified during the baseline survey, control methods based on those described by The Nature Conservancy (The Global Invasive Species Initiative; <http://tncweeds.ucdavis.edu/esadocs.html>) will be used. A guiding principal in the selection of practical control methods will be the minimization of potential environmental impacts.

In the early phases of the project it is the environmental protection zone and the uncommon habitats and species at risk it contains that will require the greatest attention. To some extent this process has already begun. As indicated in Section 9.2.1.4 (Monitoring) of the EIS, annual monitoring of two of the plant species at risk found at the site (glaucous rattlesnake-root and mountain sandwort) was recommended during the first five years of the project. A monitoring study of these two species was conducted in 2006. As part of the monitoring study, an assessment of potentially invasive species in the vicinity of these plants was made. A recommendation was made that some rugosa rose plants growing in the vicinity of the glaucous rattlesnake-root, be removed.

The application of invasive species control measures in parts of the site that are to be excavated will be tempered by the projected time until the overburden removal is scheduled for that particular area and the degree of invasiveness attributed to the particular invasive species.

It is intended that, subsequent to the baseline survey of the entire property for potentially invasive exotic species, when the annual monitoring surveys of species at risk are conducted that they be extended to include surveys for invasive species within uncommon habitats in the environmental protection zone (i.e. headlands and wetlands) and in areas that have recently been disturbed by project activities. It is in these recently disturbed areas that invasive species are likely to first become established. These areas would include, the areas along roadways, around construction sites (particularly where fill has been imported), areas where overburden and composting organic matter is being stored and in areas where quarrying activity has been completed but where reclamation has not begun. (It is particularly important to control invasive species in the areas where overburden and composted organic matter is being stored so that invasive species seed banks do not accumulate in this material that will be subsequently used in the reclamation process.)

It is intended that these annual surveys be conducted for a period of five years and then evaluated after a second survey of the entire property for invasive species has been completed.

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As the project progresses and the area under reclamation becomes greater, the focus on invasive species will shift increasingly to these areas. This is discussed in our response to the Panel's question concerning section 9.2.1.2.

*Appendix 29 – A letter from the Nova Scotia Museum alerted the Proponent to possible rare or important species on the basalt cliff ( including, for instance, a “rare bristletail insect” and an unusual terrestrial mollusc). Explain why these species were not considered in the EIS.*

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#### RESPONSE

As indicated in section 9.2.0.1 of the EIS, four priority lists maintained by the responsible federal and provincial agencies were used to identify potential species at risk. Neither of the two above mentioned species is included in any of these lists nor are they on the COSEWIC list of candidate species as of August, 2006. NatureServe (not one of the four priority lists used) lists the Canadian status of the Appalachian pillar (*Cochlicopa morseana*) as N4 (widespread and fairly common) with its status in Nova Scotia as SNR (not yet ranked). The bristletail insect (*Petrobius brevistylis*) does not appear in the NatureServe species list.

Bilcon instructed its entomological consultant, Dr. Ken Neil, to determine the status of the bristletail insect at the Whites Point quarry site. Dr. Neil conducted his site investigation on 27 August and 15 September, 2006 and found no *Petrobius brevistylis* in the appropriate habitats (cracks in rocks or under rocks in an area between 1.5 and 6.5 m above high tide) at the proposed terminal site and an area extending about 300 m south of the terminal site. (Outside the terminal site, all habitat for this species lies within the environmental protection zone.)

Dr. Neil also advises that “*P. brevistylis* is not native to North America, but is endemic to Europe, the Adriatic and Black Seas, and Iceland (Swan 1956, Bousfeld 1958,1962). It was probably introduced into North America through the agency of man, more specifically, on the ballast of ships (Wygodzinsky and Schmidt,1980).” (Neil, 2006).

Bilcon requests that Nova Scotia Tourism, Culture and Heritage explain the reasoning involved in its request for Bilcon to determine the status, for the purpose of protection, of an introduced, exotic species.

With regard to the Appalachian pillar, Bilcon's attempts to contact the authority recommended by the Nova Scotia Museum of Natural History have, to date, been unsuccessful. From the description of the habitat where this species was found, as related by Museum personnel (deciduous leaf litter on a south facing slope), it would seem unlikely that appropriate habitat for this species would be found at the quarry site. However, Bilcon is continuing its attempts to contact a qualified malacologist to address this request.

### 9.2.1 Terrestrial Ecology

#### Literature Cited

Bousfeld, E. F. 1958. Littoral marine arthropods and molluscs collected in western Nova Scotia, 1956. Proc. Nova Scotia Inst. Sci., vol. 24, pp. 303-325.

Bousfeld, E. F. 1962. Studies on littoral marine arthropods from the Bay of Fundy Region. Nat. Mus. Canada, Bull. 183, Contr. Zool., pp. 42-62.

Neil, K. A. 2006. Attempts to locate *Petrobius brevistylis* Carpenter at Whites Cove, Digby County, Nova Scotia. 3 pp.

Swan, E. F. 1956. Isopods of the genus *Ligia* on the New England coast, Ecology, vol. 37 pp. 204-206.

Wygodzinsky, P. and K. Schmidt. 1980. Survey of the Microcoryphia (Insecta) of the Northeastern United States and Adjacent Provinces of Canada. Am. Mus. Nat. Hist. Nov. 2701, pp.1-17.

#### WP 1619 – Nova Scotia Department of Natural Resources

*Staff of the Wildlife Division, Nova Scotia Department of Natural Resource (NSDNR). have reviewed this Environmental Impact Statement or issues that relate to wildlife and their habitats. The authors and proponent are to be commended for the rigor applied to examination of these issues, in particular their consideration of rare species and species potentially at risk. The calibre of individual field investigators is very high and accordingly we have high confidence in the quality of their results and recommendations.*

*Although the Statement does not explicitly follow the methods documented in the Guide to Addressing Wildlife Species and Habitat in an EA Registration Document, we are satisfied that Appendix 39 and the methods adopted in field inventories, adequately covers the methods required.*

*The author's use of the term "critical habitat" for example in Section 9.2.0.1, is misapplied in the document. The authors should be aware that the term is a legal one encrypted in SARA, and it has not been defined for most species where the term is used. We suggest use of alternative terminology such as "significant habitat", "important habitat", "preferred habitat", "occupied habitat", "potential habitat", to name a few.*

9.2.1 Terrestrial Ecology

**RESPONSE**

**Errata: Section 9.0**

Page	Paragraph	Line	Change
8	4	1	“Critical to important”
23	2	6	“Critical to important”
23	2	15	“Critical to important”
31	last	4	“Critical to important”
31	last	8	“Critical to important”
41	last	2	Delete “Critical”

*It is noteworthy that, prior to this discovery, glaucous rattlesnake root had not been recorded for more than 50 years and thought extirpated from the province. The discovery of this new population within the development area is compelling physical evidence that the species status under the Nova Scotia General Status of Wild Species should now be changed from Undetermined to Red. Accordingly, conservation and protection for the plant to ensure impacts of the undertaking are eliminated or reduced will be required.*

**RESPONSE**

Please refer to Bilcon’s response to the Panel in section 9.2.1.1.3 of this submission.

*We believe the proposed coastal environmental preservation zone, that extends from the high water mark inland to the edge of tree cover with expansions at the headlands and boggy marsh, is the minimum area required for protection of the three rare plant species. We are concerned that quarry activity will alter hydrology, drainage and microhabitats within the zone to the detriment of these plants. We suggest the Joint Panel consider requiring a wider buffer, e.g. 100m, and reduce the width after a period of operation if the annual rare plant monitoring indicates no detrimental effect. This monitoring and reporting program should be designed in consultation with the NSDNR Wildlife Division.*

**RESPONSE**

It should be noted that two of the three plant species at risk (glaucous rattlesnake-root and hemlock parsley) are in portions of the environmental preservation zone where quarrying activity adjacent to these species is not anticipated for at least another 20 years. However, in the near future Bilcon will be conducting further hydrological studies and suggests that it might be useful to have an on site meeting of Bilcon representatives, including the botanist and hydrologist contracted by Bilcon, and representatives of NSDNR and other interested agencies, to consider what information could be collected during the hydrological studies that might contribute to reaching a science-based conclusion concerning buffer zones.

### 9.2.1 Terrestrial Ecology

Bilcon will be forwarding NSDNR its 2006 monitoring report for these plant species at risk and would be pleased to confer with the Department concerning the design and reporting of future annual monitoring efforts.

*In the CEM-2 table, the report claims that the project's potential cumulative effect is "Significant/Positive" for flora species at risk. We suggest this is open to misinterpretation and more accurately should be characterized as "unknown".*

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#### RESPONSE

Agreed. Please refer to Section 8.1 – Methods, Table 3.9 and Section 10 – Cumulative Effects in this document.

*In Table AA, Section 9.2.1 many species listed with SARA status are accidental or vagrants in this province. Cerulean Warbler, Prothonotary Warbler, etc. should be listed as accidental or vagrant not "exceptional".*

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#### RESPONSE

The term "exceptional" was that used by Lance Laviolette in his compilation of migratory bird observations on Brier Island. Bilcon concurs that other terms are probably more appropriate and suggest the following errata in Table AA:

Species	Migratory Status
Least Bittern	Very rare
Acadian Flycatcher	Accidental
Loggerhead Shrike	Accidental
Bicknell's Thrush	Very rare
Cerulean Warbler	Accidental
Prothonotary Warbler	Accidental
Louisiana Waterthrush	Accidental
Hooded Warbler	Accidental
Nelson's Sharp-tailed Sparrow	Very rare

#### Section 9.2.1.4

*We don't believe ongoing monitoring for Lepidoptera or Odonates is required for this project since there are no unique habitats or species in the development area. However we do encourage establishment of natural plant communities on the site during reclamation. Forest communities should match those identified for the area in the NSDNR's Ecological Land Classification mapping. Many butterflies in Nova Scotia utilize exotic flora or invasive plants for food and or breeding sites and these plants should be avoided in the reclamation process.*

### *9.2.1 Terrestrial Ecology*

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#### **RESPONSE**

Surveys conducted in 2006 for Odonates (Brunelle, 2006) and Lepidoptera (Neil, 2006) did not confirm breeding on the site of any species at risk that the 2005 preliminary surveys (Brunelle, 2005; Neil, 2005), based on habitat, suggested might be present.

During 2006, a year when monarch butterflies were numerous in Nova Scotia and throughout eastern Canada, adult monarch butterflies were observed on the site although there was no evidence of their breeding there (Neil, 2006). Adult monarch butterflies, unlike their larvae, use (nectar from) a wide variety of flowering plants as food. A variety of native flowering plants should be available on site throughout the project since reclamation work will begin as early as year 2 and continue at about 5 year intervals throughout the project, assuring the presence of early successional habitats that support these plants.

As indicated in the answer to questions regarding section 9.2.1.2, Bilcon intends to, wherever possible, use native plant species in its reclamation work that are characteristic of coastal ecosystems of this area.

Given the results of Bilcon's 2006 investigations of arthropods at the quarry site, Bilcon concurs with NSDNR that the resources for monitoring arthropods might be put to better use in other monitoring protocols (e.g. plant species at risk, invasive plant species).

#### **Literature Cited**

Brunelle, P. M. 2006. Odonata survey: (damselflies and dragonflies) Whites Point property, Digby County, Nova Scotia. 2006 addendum. 8 pp.

Brunelle, P. M. 2005. Odonata survey 2005: (damselflies and dragonflies) Whites Point property, Digby County, Nova Scotia. 11 pp. + table.

Neil, K. A. 2006. 2006 addendum to butterfly habitat and host plant survey of White's Cove, Digby Co., N.S. 3 pp.

Neil, K. A. 2005. Adult butterfly habitat and larval host plant survey of Whites Point, Digby Co., N.S. 6 pp.

### 9.2.1 Terrestrial Ecology

WP 1630 - Environment Canada

#### D. ASSESSING AND MANAGING POTENTIAL IMPACTS ON WILDLIFE VALUES

##### Item # 14 Environmental Preservation Zone

##### Information Request

*Identify and describe the rationale for the dimensions of the proposed "environmental preservation zone" including how it would accommodate the habitat quality requirements of species at the site and how it would provide protection of species and habitat from adjacent Project activities. Reference to supporting information and research should be presented.*

*Identify the rationale for the proposed wetland buffer zone. Identify the distance between the proposed EPZ from the edges of the coastal bog.*

*Identify the type of vegetation proposed for the coastal buffer area and explain how it will minimize runoff to marine waters.*

*Describe the monitoring plan that will be used to verify whether the proposed EPZ is serving its intended purpose including controlling runoff to marine waters and protecting existing wetlands, wildlife species and their habitats.*

*Identify responsibility for follow-up action and ensuring the EPZ is able to endure harsh climate events.*

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#### RESPONSE

The minimum environmental preservation zone width is based on the requirements in the NSDNR's "Wildlife Habitat and Watercourses Protection Regulations" (Jan. 2002) and the NSDEL's "Pit and Quarry Guidelines" (Dec 2002). The former relates to forestry activities and is applicable during site clearing. The latter relates to the quarry operations.

The NSDNR's "Wildlife Habitat and Watercourses Protection Regulations" require:

1. Buffer strips must be left along watercourses 50 cm or more in width. This "Special Management Zone" (SMZ), a strip of natural vegetation, of at least 20m wide must be left along each edge of the watercourse.
2. At least 10 living or partially living trees (representative of the stand) must be left for each hectare cut. There must be a minimum of 30 trees per clump.
3. Dead trees must be left standing and woody debris is to be left in the harvested area to help ensure habitat for wildlife and a source of nutrients for the next forest.

Bilcon's intent is to comply with these regulations by providing a minimum 30m wide environmental preservation zone along watercourses 50 cm wide or greater, by leaving a minimum 10 trees within the environmental preservation zone representative of the stand for



### *9.2.1 Terrestrial Ecology*

each hectare cut/cleared, and by using organic debris as part of the reclamation process. Further, incremental reclamation is proposed.

Also, a minimum 30m environmental preservation zone is intended to meet the requirements of the NSDEL's "Pit and Quarry Guidelines" (Dec. 2002). Appendix D, Section IV "Separation Distances for Quarry Operations" of these Guidelines indicate:

- (1) No person responsible for the operation of a quarry shall locate the associated works within:
  - (a) 30m of the boundary of a public or common highway unless the person has written consent from the Department of Transportation and Public Works to operate closer;
  - (b) 30m of the bank of any watercourse or the ordinary high water mark;
  - (c) 30m of the boundary of the property on which the quarry is located.

It should be noted that this proposed environmental preservation zone is a minimum 30m width, and is expanded under certain circumstances such as steep terrain (>20%) and in areas of sensitive terrestrial and aquatic habitats. The 30m width complies with the provincial regulatory requirements and guidelines. In many cases, the environmental preservation zone has been expanded to greater than 30m wide. For example, it is proposed that this zone be expanded to provide greater separation between the active area of the quarry and the location of the Mountain sandwort (NSDNR ranked yellow) and the Glaucous rattlesnake-root (NSDNR ranked blue). The expansion of the environmental preservation zone will be determined in consultation with NSDNR and NSDEL and based on scientific data collected for these particular plants and their environments.

The environmental protection zone around the inland edge of the coastal bog is a minimum 30m wide. This buffer will consist of the edge of the existing forest inland from the bog and the natural foreshore of the Bay to the north and south – see Plan IR – 7 attached to this Comment and Response Submittal.

The coastal buffer (environmental preservation zone) will consist of the existing natural vegetation presently occurring along the coastline. Since there is only one proposed out fall from the sediment retention ponds/constructed wetland into the Bay, the environmental preservation zone will continue to function, in concert with the ponds and constructed wetland, to minimize runoff and any potential total suspended solids from entering the Bay of Fundy.

Monitoring plans for maintaining water quality from the constructed wetland into the Bay of Fundy are presented in paragraph 9.1.6.4 and 9.2.2.4 of the EIS. Monitoring of aquatic wetland habitats are presented in paragraph 9.2.1.4 of the EIS. Wildlife monitoring for species such as breeding birds are presented in the response to Item #20 – Breeding Bird Monitoring of this Comment and Response Submittal.

### 9.2.1 Terrestrial Ecology

Bilcon will be responsible for monitoring the effectiveness of the environmental protection zone. The management objectives for the zone are to maintain it in its existing natural condition. The coastal forest has and will be subject to harsh coastal conditions and presently exhibit these environmental forces in growth patterns and species composition. If unusual situations develop as a result of the proposed quarry activities, an adaptive management approach will be taken for the environmental preservation zone management area.

#### References

Wildlife Habitat and Watercourses Protection Regulations, Section 40 of the *Forests Act* R.S.N.S. 1989, c. 179 O.I.C. 2001 – 528 N.S. Reg. 138/2001.

Nova Scotia Department of Environment and Labour. “Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia”. Dec. 2002.

Review Panel’s Comment and Bilcon’s Response to paragraph 9.2.2.1 of the EIS.

Environment Canada’s Comment and Bilcon’s Response to Item # 15, 16, 17, 18, 19, and 20.

NSDEL’s Comments from the Environmental and Natural Areas Management Division.

#### **Item #15 Habitat Value of the Constructed Wetlands and Sediment Retention Ponds**

##### *Information Request*

*Describe the timing and extent of activities involved in cleaning the sediment retention ponds, and those steps that will be taken to avoid adverse impacts on wildlife and wildlife habitat values.*

*Provide a clear definition of “low periods of biological activity” including identification of indicator species that would support the definition.*

*Provide a more detailed description of the proposed constructed wetlands including the following:*

- *The proposed locations;*
- *The type of wetlands proposed;*
- *The purpose for creating the wetlands;*
- *Location and timing of construction;*
- *Relationship of the constructed wetlands to habitat types that will be maintained and lost; and,*
- *The plan that will be used to monitor whether the wetlands are serving their intended purposes.*

### 9.2.1 Terrestrial Ecology

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#### RESPONSE

The six proposed sediment retention ponds have a surface area of 10.6 hectares. A typical section of a sediment pond is shown on **Figure SP – 2** of the Revised Project Description. A 1m deep sediment storage area is shown on **Figure SP-2** for ease of calculation of the water storage capacity of the ponds. At the predicted average rate of sediment accumulation and allowing for required water storage, the ponds would require clean out every nine years. However, a “sediment forebay” will be designed for pond 5. Pond 5 will be the first pond to receive runoff from the quarry site and the forebay is intended to trap the larger particles and to facilitate maintenance. The installation of such a forebay would concentrate clean-out operations in a portion of pond 5. Although the forebay would require more frequent clean-out, the habitat created in the remainder of the ponds would remain undisturbed for longer than the proposed nine years. Depending upon the size of the forebay, either an excavator or dragline would be used, from the berm, for clean-out. Excavated material would then be trucked to the sediment disposal area. Clean-out would be done during the winter months to reduce effects on wildlife and wildlife habitat values.

“Periods of low biological activity” is a general phrase used in the EIS to indicate times of the year in which construction activities could take place and have less effect on certain species as compared to other times of the year. For example, construction activities and land clearing for quarry expansion would be scheduled in late fall through winter. This would avoid birds breeding, nesting, and raising their young. The same time period would be used to avoid periods of plants flowering and seed production. Migratory species that are absent from local habitats during certain times of the year would be another example. Realizing that different species have different sensitive periods during their life cycle, Bilcon intends to consider these periods during construction activities.

Constructed wetlands are proposed as shown on **Plan IR – 7 and Figure CW – 1** of the Revised Project Description.

A tree/shrub bog wetland, similar to the other wetlands adjacent to the quarry property is the intent.

The purpose for creating the wetlands is to provide an additional precautionary measure to increase sediment retention time from the out fall from pond 1 before discharge into the Bay of Fundy. Also, since this wetland will not be subject to maintenance activities, it will be allowed to mature over time and increase biodiversity.

### *9.2.1 Terrestrial Ecology*

The location of the wetland is shown on Plan IR – 7. Construction of the wetland will begin at the same time the sediment pond berms are constructed. Reclamation of the berms and the constructed wetland is a first priority for reclamation and as soon as possible after construction.

The constructed wetland is located landward from the coastal environmental preservation zone. A portion of the land proposed for construction which will be lost is part of an abandoned gravel pit. The wetland itself will function to connect the overflow from sediment pond 1 to the water quality monitoring station required before discharge into the Bay.

As indicated in the EIS, the constructed wetland, along with other wetlands, such as the coastal bog, will be monitored. To document the potential effects of preserving wetlands and increasing wetland habitat with constructed wetlands and ponds, Bilcon will conduct general wetland surveys. Professionals contracted by Bilcon will conduct wetland surveys every five years. The objective of these surveys will be to document any changes in species composition and diversity from baseline conditions. Also, total suspended solids, an indicator of the overall effectiveness of the sediment control system (ponds and constructed wetlands) will be monitored at the out fall into the Bay of Fundy.

#### *Biodiversity – Ponds and Constructed Wetlands*

In 2002 and 2004, investigations of terrestrial habitats, including breeding bird surveys, established baseline species using the Whites Point site. As a result of the ponds and additional wetland habitat, certain species are likely to become inhabitants that had not been previously recorded from the site. These species are discussed below and have been marked as follows:

- \* a species that has not previously been recorded on the site
- \*\* a species that has not previously been recorded on the site and is considered at risk

During the 50-year life of the project, it is anticipated that succession in the ponds and constructed wetlands would move toward a bog ecosystem. This would be similar to the coastal wetland currently existing on the Whites Point property. It should be noted that the existing coastal bog also supports some plant species more associated with marshes than bogs. Bogs are the least productive of wetlands. It is not likely that these water bodies will support any significant fish populations or the birds or mammals that fish populations might support such as mink, otter, mergansers, kingfisher, herons or snapping turtles.

Soon after establishment of the ponds and constructed wetlands, aquatic flora and fauna should become established. The production of insects will begin providing a food source for

### *9.2.1 Terrestrial Ecology*

amphibians (several species of frogs), as well as forage for bats and swallows. Species likely to occur during the early stages of succession include:

- \*\* little brown bat
- \* tree swallow
- \* barn swallow
- \* cliff swallow (possible)

Also, spotted sandpipers might be expected to nest in open areas with little vegetation in the vicinity of the ponds.

During all stages of succession, the ponds will probably be used by migrating waterfowl including black ducks and mallards. Species likely to occur during these stages include:

- \* green-winged teal
- \* ring-necked ducks
- \* wood ducks
- \* Canada geese

It is likely that some of the ponds will be drawn down in late summer and it is possible that migrant shorebirds might forage in the ponds including:

- \* greater yellowlegs
- \* lesser yellowlegs
- \* solitary sandpipers
- \* pectoral sandpipers
- \* least sandpipers

Migrating swallows are also quite likely to forage at these ponds (swallows are diurnal migrants).

As vascular plants become established in and around the ponds, other amphibians, reptiles and mammals will likely become established including the following:

- \* muskrats
- \* painted turtle
- \* northern red-bellied snake
- \* northern ring-necked snake

### 9.2.1 Terrestrial Ecology

The eastern smooth green snake, a candidate species for designation by COSEWIC has been observed on the property and the other snakes mentioned are known to show preferences for open habitats near the edges of water bodies.

As shrubs and herbaceous vegetation become well established around the ponds, breeding habitat for dabbling ducks including black ducks and mallards would be most likely. Diving ducks such as the ring-necked duck may also breed, however, a well developed submergent and emergent vegetation is required along with a relatively stable water level. Canada geese may also be attracted to breed once vegetation becomes established and more mature. Water in the ponds may be too deep for cattail growth, however, the constructed wetland will be more suitable and attract other birds. In combination, these water bodies should attract the following breeding birds:

- \* black ducks
- \* ring-necked ducks
- \* Canada geese
- \* red-winged blackbirds

During later stages of succession, alders, red maples, and other deciduous and coniferous trees will become established. At this time, beavers may establish themselves and as conifers grow, the rusty blackbird could nest in these “wetland forest openings”. Late in the successional process when mats have formed around the edges of the ponds and sedges and grasses have established on these mats, Wilson’s snipe and palm warblers are likely to breed in these wetlands.

- \* beaver
- \*\* rusty blackbird
- \* Wilson’s snipe
- \* palm warblers

#### **Item #16 Protecting Wetlands Information Request**

*The following information should be provided for each wetland to facilitate an understanding of potential impacts and appropriate mitigation and follow-up monitoring:*

- *A map clearly delineating wetland habitat in relation to Project infrastructure; and*
- *The minimum distance from the edge of each wetland to Project-related activities and/or infrastructure.*

*Clarify whether the existing water flow into the bog will be maintained. If it is proposed that the bog receive water from other sources, all environmental impacts should be identified.*

### 9.2.1 Terrestrial Ecology

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#### RESPONSE

Map 18B of the EIS identifies wetland habitats in the vicinity of the Whites Point quarry. Identification of these bog wetlands was provided by the Nova Scotia Department of Natural Resources (NSDNR) – Wetland Database 2005. In addition to these wetlands, Bilcon’s on-site investigations identified other small wetlands and a coastal bog. The coastal bog had not been identified by any of the existing wetland databases reviewed for the Digby Neck area. The coastal bog is closest to the project’s infrastructure (processing plant) and is shown on **Plan IR – 7**.

The distance from the edge of the coastal bog to the quarry processing plant is approximately 300m as shown on **Plan IR – 7**. After site preparation for sediment ponds 4 and 5, disturbance to the area surrounding the coastal bog should be minimal. Other bog wetlands identified by NSDNR are located in different watersheds from the quarry property.

Since preparation of the EIS, more detailed field investigations of the coastal bog were conducted and more detailed plans and sections prepared - see **Plan CB – 1 and Figure CB – 1**. On-site investigations by Brylinsky and Kern in 2005 observed no stream entering the coastal bog as shown on the provincial 1:10,000 topography mapping. Two intermittent watercourses and unconfined surface runoff were found within the coastal bog watershed. Further, during preparation of a Forest Management Plan (Berry 2006) for Bilcon’s property east of the quarry property, the stream shown entering the coastal bog actually flowed northeast on the adjacent property.

Approximately 17 hectares of the bog watershed will be disturbed during construction. This will be caused during construction of the temporary rock storage area and subsequently sediment pond 5. A portion of the runoff from the total bog watershed is proposed to be directed to the coastal bog – see **Plan IR – 7**. Off-site runoff will be directed along the east side of the quarry road and piped through the temporary rock storage area and sediment pond 5. This is intended to compensate for watershed disturbance adjacent to the coastal bog on the quarry property. The disturbed areas are a priority for reclamation, which will proceed incrementally and be complete in Year 14.

#### *Preamble to Items #17 through 20*

A number of questions posed by Environment Canada relate to “mature and interior forests”, their use by birds and the potential impacts on birds by the removal of such forests. Before addressing specific questions it might be useful if we begin this response with a general review of forests within the region and at the site.

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#### *Coastal Forests*

The coastal environment is a very dynamic one where winds and salt spray are the primary forces affecting the species composition and the form of the forest (Davis and Browne, 1997). The forests of the Digby Neck and Islands are similar to forests along much of the 5,200 km of Nova Scotia's coastline, but particularly the Atlantic Coast Region extending from Digby to the northeastern coast of Cape Breton Island. The climax forest in this region is the "White Spruce, Fir-Maple, Birch" mixed wood association (Davis and Browne, 1997). These forests exhibit zonation tendencies with white spruce, because of its salt tolerance, providing a protective buffer along the coastline for the less salt tolerant balsam fir and hardwoods. Trees exhibit the "Krummholz" effect being stunted and wind sculpted.

In the Digby Neck and Islands the main hardwood species are red maple and white birch and these are generally scattered and not found in pure stands. The dominant species in these forests are the softwoods: primarily white spruce and balsam fir. Compared to inland forests the plant community in these forests is lacking in species diversity, vertical zonation is minimal (ground cover is mostly mosses and ferns) and there is essentially no shrub layer. These coastal forests, with their low species diversity and dominance of boreal species, display characteristics similar to the true boreal forest. One such characteristic is their susceptibility to extreme, periodic, stand-replacing natural disturbances (e.g. fire, insect infestation).

Within the past 10 years an epidemic outbreak of spruce beetle has occurred in parts of western Nova Scotia, and is particularly evident in the coastal forests of Digby Neck and Islands. This has resulted in the death of many conifers with a very high percentage of softwood trees in some stands having died. This natural disturbance has resulted in a sudden and extreme change in the structure of the forests in this area. In response to this there has been much salvage clear cutting.

#### *Mature Forests*

The dynamic nature of the coastal environment and the highly attenuated successional process in these forests, combined with these areas having been harvested for hundreds of years, makes the definition of "mature" a bit more difficult. The species composition and structure of what is considered a "climax coastal forest" would be considered to be early successional if found in an inland location where wind and salt spray were not the primary factors influencing the form and species composition of the forest.

#### *Interior Forests*

What constitutes an interior forest varies by and within species groups being considered but, in the case of birds, is generally considered to begin from 100 to 300 m from the forest edge. The amount of interior forest is influenced not only by the total area of the forest but also by



### *9.2.1 Terrestrial Ecology*

its shape, with long, thin forests having the lowest ratio of interior forest to total area and circular shaped forests having the highest ratio.

The Digby Neck is a 36 km long peninsula that for most of its length is between 2 and 3 km wide. Long Island and Brier Island are 19 and 7.5 km, respectively, extensions of the Digby Neck. For much of the length of Digby Neck and the Islands, a highway follows along a central depression and bisects these areas. Much human habitation and activity is focused along the highway thereby widening the area impacted by the transportation corridor. So both geography and development patterns have conspired to make the Digby Neck and Islands areas where the ratio of potential interior forest to total forest area is low.

Needless to say, other human activities such as clear cutting, have further fragmented the forests. However, a natural process, the recent spruce beetle infestation, has inflicted high levels of mortality on the dominant conifer species. This damage, while moderate in some stands, in others is much more widespread leading to a high level of tree mortality, blow downs over larger areas, and further habitat fragmentation.

#### *Whites Point Site*

The Whites Point property for which the EIS has been prepared consists of 154 ha of forested coastal land, about 28 ha of which was clear-cut in 2002 (see Map 18B, page 19, Volume VI, Section 9.2.1 in EIS). In addition to this property, Bilcon owns two parcels of land totalling about 110 ha that bound the quarry property: one that is approximately 250 m wide and extends along most of the east boundary and another that is approximately 300 m wide and extends from the Bay of Fundy shoreline along the north boundary of the quarry property and east to Highway 217. These two properties serve as buffers and are being managed for forestry although currently they contain little timber of any value (Berry, 2005). The property that abuts the eastern boundary of Bilcon's buffer property on the east side of the Whites Point property has recently been clear-cut. Another recent clear-cut parallels the north boundary of the northern buffer property about 400 m from its northern boundary. There has been no extensive clear cutting adjacent to the southern property boundary although there is one small clear-cut area, three unforested wetlands (see Map 18B, page 19, Volume VI, Section 9.2.1 of EIS) and a large patch where spruce beetle damage has been severe.

Table TE-1 (Volume VI, Section 9.2.1, page 16) of the EIS provides estimates of the age and species composition of forest stands on the proposed quarry site as derived from aerial photo analysis conducted in 1993 by NSDNR. This would suggest that, in 2006, the average age of the forests that remain after the 2002 clear cutting would be 49 years with a range of from 20 to 62 years.

In 2005, Bilcon contracted the preparation of a forest management plan for the two properties it owns adjacent to the proposed quarry site. A descriptive field cruise was conducted and it

### 9.2.1 Terrestrial Ecology

was concluded that trees were “predominantly in the 35 to 45 year class with scattered trees in the 55 to 65 year class.” It was also noted that “The softwood component has seen significant bark beetle damage in the last 10 years and some stands have mortality in excess of 50%.” (Berry, 2005). As the latter statement suggests, while all stands show evidence of the disease, some are much more affected than others. There has been much blow down of dead trees and natural regeneration has begun in these openings. The forest is thus a very cluttered patchwork of stands that have varying degrees of damage to the dominant conifer species. The older trees remaining in these stands would be at about their “mid-life” stage of development. While gaps where a tree or trees have died or been wind thrown, and where regeneration is taking place, are normal within a mature forest, the number and extent of the patches where most conifers have died as a result of the spruce beetle are well beyond what might be considered “normal”.

Studies were not conducted of coastal forests throughout the region; however, the general condition of the forests, as well as the extent of recent clear cutting in the Digby Neck area, is evident to even the most casual observer (e.g. photograph, page 1, Volume V, Chapter 7 of EIS).

#### *Theoretical Considerations*

The questions posed by Environment Canada are framed within the context of current understanding of the effects of habitat change on bird population dynamics which is derived primarily from studies conducted in temperate and tropical forests. In these forests the effects of habitat fragmentation and edge effects and their influence on bird species composition, abundance and reproductive success have been quite well documented. However, it is not clear to what degree these effects apply to boreal (and coastal) forest species, where some studies have indicated a far weaker response by birds to forest fragment size and connectivity than affects bird distribution and abundance in temperate and tropical regions (e.g. Schmiegelow and Mönkkönen, 2002). There is a hypothesis that, since boreal bird species have evolved in an environment that is subject to extreme, periodic, natural disturbances, they may be more resilient to such disturbances than their counterparts that inhabit the more stable temperate and tropical forests. (Avian Conservation and Ecology will be producing a special section in the autumn of 2006 entitled “Bird conservation in the boreal forest: Is there a case for resilience?”)

#### **Item #17 Birds and Bird Habitat – Description Information Request**

*Identify the area (hectares) of mature forest and interior forest present at the site, in the local surrounding area, and regionally. Identify what bird species use areas of mature forest and interior forest on the site as habitat and discuss the population characteristics outlined in the Guidelines, including the habitat requirements of those species.*

### 9.2.1 Terrestrial Ecology

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#### RESPONSE

Firstly, it should be noted that the bird surveys conducted for the EIS were designed to compile a list of breeding birds and their relative abundance for the property with the primary goal of identifying any species considered to be at risk by federal and provincial authorities (see EIS Volume VI Section 9.2.0.1). To that end, surveys were conducted to maximize coverage of available habitats during times when environmental conditions and bird song activity were optimal for conducting a song based census. Logistics was a major consideration in conducting surveys at this site. Where “roads” were used these were essentially logging trails or OHV tracks. The fragmentation of habitat by seldom used logging roads and OHV trails on this site pales in comparison to that caused by the recent spruce beetle infestation. What are considered interior forest species do not necessarily confine their breeding activity to forest interiors even though it is in these areas where breeding is thought to be most productive.

Table A presents the relative abundance of breeding bird species at the Whites Point property, as determined from surveys conducted in 2002 and 2004, that are known from the literature, to use mature forests as either primary or secondary nesting habitat. Included in the list are species that use forest openings as primary or secondary nesting habitat. Excluded are bird species that are mainly associated with aquatic habitats, grasslands, open fields and shrub edges.

While a qualitative indication of relative abundance of species based on their relative frequency of detection (mainly by song) is given in Table A, this must be treated with some caution because different species are not equally detectable since both frequency of singing and amplitude of song can vary among species. However, when differences in detection among species approach an order of magnitude and exhibit a high degree of consistency between the two years of study (see Alliston 2004), it seems likely that they demonstrate real underlying biological phenomena.

Of the 27 species that were believed to have nested in forest habitats on the Whites Point property, 12 (barred owl, gray jay, brown creeper, red-breasted nuthatch, winter wren, golden-crowned kinglet, northern parula, yellow-rumped warbler, black-and-white warbler, ovenbird, redstart, white crossbill) show a marked preference for mature forests. Of those 12 species, only one, the yellow-rumped warbler, was found in numbers sufficient to be considered common on the property. This species is perhaps the most common and ecologically generalized warbler in North America. Yellow-rumped warblers are also known to maintain normal or near-normal nesting densities in areas where some mature trees are left standing after selection harvesting or fire (Hunt and Flaspohler, 1998).

Of the 7 species that were common in the woodlands of the property (Table A), 4 (American robin, magnolia warbler, white-throated sparrow, dark-eyed junco) are associated with

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openings, edges and/or early regeneration in forest gaps. Given the current state of the forest, the abundance of these species is not surprising.

Two of the more common species found on the property were Swainson's thrush and black-throated green warbler. While both these species use mature forests they are also found in comparable or greater densities in forests at earlier stages of development (Erskine, 1984; Hansen *et al.* 1995; Morse, 1976).

Species	Abundance @ Quarry Site <sup>1</sup>	Use of Mature Forest Habitat <sup>2</sup>			Notes
		Coniferous	Mixed wood	Openings	
American woodcock	R	S	S	P	Ideal habitat - young forest & abandoned farmland mixed with forest
Barred owl	R	P	P		Will use highly fragmented habitat if cavity nest sites available *
Hairy woodpecker	U	S	S		In Maritimes, open woodlands used more than continuous forest
Eastern wood-pewee	R	S	S	P	Prefers forest stand of intermediate age
Yellow-bellied flycatcher	R	P	S		Also uses successional stands
Least flycatcher	R	S	P	P	Also uses second growth forest
Blue-headed vireo	U	S	S	P	Also uses mid-age forests
Gray jay	U/V	P	P		
Black-capped chickadee	U		S	P	Also uses open habitats
Boreal chickadee	R	P			Also uses young boreal forests
Brown creeper	R	P	P		
Red-breasted nuthatch	R	P	P		
Winter wren	U	P			
Golden-crowned kinglet	U/V	P	S		
Swainson's thrush	C	P			Also high densities in early successional habitat
Hermit thrush	U	P	P	P	Forest interior bird that favours internal edges
American robin	C	S	S	P	Prefers open areas and edge habitat
Northern parula	R	P	S		Prefers tall mature coniferous forests
Magnolia warbler	C	S	S		Prefers dense growth of young conifers
Yellow-rumped warbler	C	P	P		Much less common in early successional stages
Black-and-white warbler	U		P		Strongly prefers mature forest over early successional
Black-throated green warbler	C	P	P		Also uses mid-aged forests
Ovenbird	U/V		S		Prefers deciduous or mixed wood with dominant deciduous species
Redstart	U		S		In eastern N.A. favours large intact tracts of interior woodland
White-throated sparrow	C	S	S	P	Prefers forest with numerous openings, second growth
Dark-eyed junco	C	S	S	P	Uses woodland openings and edges
Purple finch	U	P	S		Prefers open coniferous forest
White-winged crossbill	U/V	P			
<sup>1</sup> Based on surveys in 2002 and 2004		<sup>2</sup> Literature-derived			
R = rare		P = preferred habitat			
U = uncommon		S = secondary habitat			
C = common					
V = shows year to year variation					
* Bilcon will be establishing barred owl nest boxes on adjacent "buffer" properties.					

### 9.2.1 Terrestrial Ecology

#### **Item #18 Birds and Bird Habitat – Impact Analysis**

##### **Information Request**

*Identify how much mature forest and interior forest would be lost as a result of the Project. Include the loss of interior forest outside of the project boundary due to the Project.*

*Discuss the potential changes in bird distribution and abundance associated with the loss of mature forest and interior forest that would result from the Project.*

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##### **RESPONSE**

For the purpose of calculations related to this discussion it will be assumed that forests are continuous unless interrupted by some anthropogenic disturbance (clear-cut, residential, farmland, highway) or a natural boundary (e.g. coastline, wetland) and the effects of the spruce beetle epidemic will be ignored.

As indicated above, a “buffer” property owned by Bilcon, that is approximately 250 m wide, extends along most (~1940 m) of the eastern boundary (~2340 m) of the Whites Point property. The property to the east of this buffer was clear-cut sometime prior to 2001, except for its northern extremity where wetlands interrupt forest cover. In 2002 a 24 ha section in the southeastern corner of the Whites Point property was clear-cut as was a 4 ha section at Whites Cove (see Map 18B, page 19, Section 9.2.1, Volume VI of the EIS). The maximum width of the area south of the “road” to Whites Point, between the clear-cut area and the coast, is about 325 m. Ignoring the fact that a substantial portion of the interior of this section has been heavily damaged by spruce beetle, by any measurement the current potential interior forest in this area is small. In the area north of the “road”, the maximum width of forested area is about 550 m (this includes the “buffer” property) reducing to about 300 m near the northern boundary of the Whites Point property. If we consider interior forest to begin 300 m inward from an edge, there would currently be no interior forest on the Whites Point property and the adjacent buffer property to the east. Using a minimalist assumption that interior forest begins only 100 m inward from an edge, and not considering the “road” to Whites Cove as an edge, then the total area of interior forest currently on the Whites Point property would be approximately 14 ha. A measure of zonal thickness would likely reveal an even smaller area of interior forest; however a GIS based analysis has not been conducted.

Over the 50-year duration of the project a maximum of about 14 ha of interior forest will be removed from the Whites Point site. If we continue with the assumption that 100 m from an edge defines the beginning of an interior forest, then project activity along the eastern boundary of the quarry site will effectively remove about an additional 8 ha of interior forest from the adjacent “buffer” properties. Current forest openings together with the coastline of the adjacent property to the south would suggest that no additional impact to interior forests would accrue as a result of activities along this boundary. Using the 100 m definition, project

### *9.2.1 Terrestrial Ecology*

activities could thus eliminate as much as 22 ha of interior forest over the life of the project. Using a 300 m definition, there would be no loss of interior forest.

The loss of some of this interior forest is likely to be permanent in some areas since project activities will create a precipice along the property's east and south boundaries that will be a permanent topographical feature (edge) separating the quarry site from adjacent areas. However, if restoration efforts are successful and if this site (excluding the settling ponds, constructed wetlands and road) is ultimately returned to forest, then about twice the total area of the current interior forest (using the 100 m definition and accounting for the change in topography) that would be lost during operations could be restored, after decommissioning, within the Whites Point quarry site.

During the project, forest cover will be removed and birds that had used these forests will be displaced. Forest cover will be removed along most of the east boundary opening up additional edge habitat which will attract species that prefer such habitats. These species may compete for resources with interior forest species. Predation and nest parasitism (the latter currently not being a significant problem in Nova Scotia) are generally higher in these edge habitats thereby reducing the productivity of breeding birds using these areas, although this is not always the case (e.g. Flaspohler et al., 2001; Harris and Reed, 2002; Morton, 2005; Rogers, 1994).

However, the above will occur within the following context that describes the current status of the site and surrounding areas:

- 1) Only by resorting to what is generally considered the minimal designation for interior forests, can any interior forest areas currently be defined on the property,
- 2) The most common bird species currently breeding in the forests on the Whites Point property are those that utilize forest edges and openings and those that prefer, or are capable of using, earlier successional stages,
- 3) With only one exception (yellow-rumped warbler), bird species that are known to prefer mature forests were recorded in low numbers on the property,
- 4) No bird species considered at risk, by federal and provincial agencies responsible for assigning such designations, was found using the property during the breeding season,
- 5) The extent of interior forests in the Digby Neck area is limited by both geography and historic development with the current extent and condition of interior forests being perhaps at a cyclical low, due primarily to a recent insect infestation and human responses to that infestation.

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#### **Item #19 Birds and Bird Habitat – Biodiversity**

##### **Information Request**

*Describe how the loss of mature forest and interior species would affect biodiversity at the ecosystem, species, and genetic level, and any contribution of such effects to environmental impacts at a regional level and higher.*

*Describe the effects of the Project on biodiversity (including birds and bird habitat) at ecosystem and regional scales.*

*Identify how the principle of “no net loss” of biodiversity has been applied in determining appropriate mitigation measures for the loss of mature and interior forest and for effects on bird species using these habitats.*

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#### **RESPONSE**

To provide a context for this discussion it might be useful to reiterate the intent of the protection of different levels of biodiversity as outlined by the International Association for Impact Assessment (Special Publication Series No. 3, July 2005). The intent as stated in this document is “to protect biodiversity at different levels, in particular;

- *Ecosystems* containing rich biodiversity, large numbers of threatened or endemic species, that are important for migrating species; have economic, social, cultural or scientific significance, or support key processes.
- *Species* and communities of species that are threatened, related to domesticated or cultivated species, have medicinal, agricultural, or other economic, social, cultural or scientific significance, and indicator species.
- *Genotypes* with social, scientific or economic significance.”

Terrestrial ecosystems at and adjacent to the quarry site are more or less typical of the North Mountain Basalt Ridge Natural Landscape and, to some extent, the ecosystems that are characteristic of much of Nova Scotia’s 5,200 km of coast. Within the North Mountain Basalt Ridge Natural Landscape, wetlands and, to some extent, headlands support relatively uncommon ecosystems. Coastal woodlands, with their simplified structure, low species diversity and dominance of boreal species, form a narrow band around the entire periphery of the province.

Bilcon has proposed the following steps be taken in an attempt to achieve “no net loss” of biodiversity at the ecosystem, species and genetic level:

- Bilcon has proposed an environmental protection zone that will include all uncommon terrestrial ecosystems (headlands and wetlands) that occur on the property, and the entire coastline of the property. In addition a reclamation program will be initiated starting in the second year of quarry activity and continuing at about

### *9.2.1 Terrestrial Ecology*

five year intervals throughout the life of the project. The ultimate objective of the reclamation will be to re-establish a forest ecosystem on the property similar to the one removed. A program to control invasive exotic plant species that have the potential to interfere with normal ecological processes will be ongoing throughout the project.

- At the species level, the property has been searched for vascular plant, vertebrate and invertebrate species considered at risk by federal and provincial authorities. Three plant species at risk were identified on the property, one of which was previously believed to have been extirpated from the province. Provisions have been made to protect and monitor the coastal habitats in which these plants are found. These habitats, which are within the environmental protection zone, will be protected from impacts resulting from human activity and from competition with any exotic plant species.
- The three plant species at risk mentioned above represent small, isolated populations at the extremities of their range and could be genetically distinct from conspecifics in areas where these species are more common. Protection of these populations may contribute to the preservation of genetic biodiversity.

With regard to “mature and interior forests” and bird biodiversity; depending upon how interior forests are defined, the proposed quarry project, during its 50-year life, will eliminate between zero and about 22 ha (14 ha on the site and 8 ha on adjacent property) of existing interior forest bird habitat. Whether the existing forests are mature is debatable; however, it appears that they do not contain high densities of bird species that **require** mature forests (see Table A). Relatively high densities were found for 2 species (Swainson’s thrush and black-throated green warbler) that are more or less equally attracted to mature and successional forests and a third, very common, species (yellow-rumped warbler) that can also persist in high densities in mature forests that have been subject to considerable perturbation (fire, selection cutting). While it is true that a number of bird species that are adapted to breeding in mature forests are experiencing population declines, and these are likely due to habitat loss, for many of these species that are migratory, habitat loss on their wintering grounds is a primary concern. None of the bird species identified as possibly breeding on the Whites Point property is currently considered at risk or is a candidate for consideration by the responsible federal or provincial government agencies. Furthermore these bird species are quite common and widespread in appropriate habitats throughout the province and beyond. There is no indication that isolated, possibly genetically distinct populations of even the non-migratory bird species (e.g. barred owl, boreal chickadee, gray jay) exist on the Digby Neck and hence that these populations might provide some significant diversity to the species gene pool. Against a background in which a natural phenomenon (although its magnitude may have been influenced by anthropogenic factors such as acid rain and climate change) has



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recently led to a significant change in forest structure in the Digby Neck area, and that this has been further exacerbated by an escalation in (salvage) clear cutting in this area, and that activities that are subject to little or no regulation such as clear cutting and development are rampant in many coastal areas, it is difficult to see how the removal of a maximum of 22 ha of interior forest (and possibly none at all) over a period of 50 years would lead to a decrease in breeding bird biodiversity at any level other than the site itself.

As indicated above, a reclamation program will be carried out and, if successful, after the quarry is exhausted, even after accounting for new wetlands and topographical “edges” created by the project, will ultimately result in the restoration of an area of interior forest greater than what currently exists. This would admittedly require several decades and assume that natural succession processes would proceed, uninterrupted by invasive species, after Bilcon may have ceased to use the property.

Bilcon is maintaining about 110 ha of forested land adjacent to the east and north boundaries of the quarry site. These lands should ultimately provide mature forest habitats although not necessarily “interior” habitats. To what degree these buffer properties are capable of providing “interior” habitats is in part related to the actions of neighbouring landowners. The maintenance of these buffer properties will also assure that corridors for wildlife movement in both north-south and east-west directions are maintained throughout the life of the project.

When considering biodiversity it is inappropriate to focus only on one aspect of biodiversity: in this case as it applies to species that require “mature and interior” forests. The project will convert about 10.6 ha of forest adjacent to the coast, into a series of six freshwater ponds and 0.3 ha of constructed wetlands. These wetland habitats are uncommon within the North Mountain Basalt Ridge Natural Landscape and could provide habitat for species that are uncommon or rare in this landscape, possibly including species at risk. The establishment of these habitats would serve the principles of “no net loss” of biodiversity by compensating for the loss of a rather common habitat, coastal forest, by “providing substitutes of at least similar biodiversity value” (International Association for Impact Assessment). Most of these wetland habitats will be established and the initial reclamation work completed early in the project and will be subject to monitoring and adaptive management as necessary (see below).

#### *Biodiversity – Uplands*

Upon completion of quarrying a specific area, incremental reclamation will take place. Significant areas will be planted in herbaceous vegetation with selected areas being planted in native tree species characteristic of the coastal forest. Varying stages of succession will be evident as quarrying and reclamation continues over the 50-year life of the project. Open, early successional habitats could attract a number of species not currently present on the site.

### 9.2.1 Terrestrial Ecology

A thick herbaceous layer (with grasses and legumes) could lead to high populations of meadow voles, which are a primary food source for a number of raptorial bird species and mammals including:

- \* great horned owl
- \*\* long-eared owl
- \*\* short-eared owl
- \* red fox

Of the two species at risk, there is a remote possibility that long-eared owls might nest in the adjacent woodland and hunt in the “fields”. It would seem more likely that, if short-eared owls were to use the area, it would be during migration, or possibly in winter.

The establishment of a heavy grass cover would attract breeding birds possibly including:

- \*\* bobolink (possible)
- \*\* vesper sparrow (remotely possible)
- \* horned lark (remotely possible)
- \* killdeer (likely)
- \* nighthawk (remotely possible)
- \*\* bluebirds (remotely possible)
- \* yellow warblers (likely)

Flowering plants in the fields in the autumn, such as goldenrod and aster, will also provide a source of food for migrating monarch butterflies and breeding humming-birds, which have been observed on the site.

As planted trees attain a height of two or three meters, bird species that prefer open areas but nest in trees, could establish on the property including:

- \* grackle (likely)
- \* mourning dove (likely)
- \* eastern kingbird (likely)
- \* chestnut-sided warbler (likely)

As forests continue to mature in the upland areas after decommissioning, the fauna of the forests would converge toward the species composition recorded in the 2002 and 2004 field investigations. If ultimately a true “mature” forest is achieved, the proportional representation of various species may change but relatively few new species would likely be added.

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#### **Item #20 Breeding Bird Monitoring Information Request**

*Indicate the design of the proposed multi-year breeding bird surveys, including indicators and goals, proposed survey locations and survey timing. Describe how the proposed design was developed, drawing from regional experience and demonstrate how it draws from existing breeding bird survey examples.*

---

#### **RESPONSE**

##### ***Background***

Although basalt removal will ultimately result in the removal of vegetative cover from all of the property excepting the environmental protection zone and certain buffers, this will be done over the 50-year life of the project. Substantial clearing of the site (~60 ha), will occur during the first 2 years of the project; however, clearing of the remainder of the site will be spread over the ensuing 4 decades.

Restoration work will begin as early as year 2 of the project and continue, at about 5-year intervals, over the life of the quarry. By year 14 the entire area north and west of the processing plant will have had the initial restoration work completed (see EIS Chapter 7, page 23). This area includes the constructed wetlands and 5 of the 6 settling ponds that are proposed for the quarry operations. Thus, by the time the quarry is ready to be decommissioned, the woodland area surrounding these ponds and constructed wetlands could be of similar age to the forests currently found on and adjacent to the property.

##### ***Purpose***

The main purposes of the breeding bird monitoring study are to:

- 1) identify any major changes in the species and numbers of common breeding birds in areas adjacent to quarry activity,
- 2) document the effectiveness of reclamation efforts in re-establishing breeding bird populations and possibly increasing the diversity of breeding birds using the site.

##### ***Survey Design***

A complete survey design has not been formulated and approved at this time; however, the general design and methods of approach can be outlined.

Unlike the original surveys, a primary focus of which was to identify breeding bird species at risk using the property (none was found), this survey is to monitor the more common species using the areas on and adjacent to the quarry site. Since this study could continue at regular (5-year) intervals for as much as half a century, it is important that the original design can be

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adhered to over time, recognizing that significant changes in technology (automated censusing) and knowledge of bird communities will likely occur during this period.

The basis for the survey will be the 10-minute point count of singing (territorial) males or pairs detected. Since the objective will be to compare the use by breeding birds of the points being surveyed over time, and with one another, rather than deriving estimates of absolute densities, unlimited radius point counts that provide density indices, will be used (Blondel et al., 1981). (As appropriate technology becomes available, point-distance sampling may be substituted to derive absolute density estimates.) The indicator species will be the common passerine species identified during the original site surveys (see Table A above). Surveys will be conducted during the period from early June through early July when territorial songbirds are most detectable. Surveys will be conducted between ½ hour before sunrise and 5 hrs after sunrise, the period when territorial songbirds are generally most vocal. Surveys will not be conducted during rain, when winds are greater than 15 kph or when there is heavy surf. Two counts will be conducted at each point during the survey year and these counts will be made at intervals of  $\geq 10$  days. The maximum number of pairs or singing males detected on the 2 visits will be used as a measure of the annual abundance of each species at each point (Staicer and McLennan, 2004; Thompson et al., 1999).

Fixed survey points will be established on the buffer properties owned by Bilcon to monitor bird populations in areas adjacent to the quarry. Use of the buffer properties will assure some predictability and control of the use of these areas during the half century over which monitoring will be conducted. Survey points will be established at the 4 small wetland sites in the buffer properties (2 bogs, 1 closed bog and 1 treed bog) and at least 6 other sites within the woodlands.

At least 2 permanent points will be established on the quarry site within the environmental protection zone; one at the coastal boggy marsh and a second near the southeastern boundary of the property. Two temporary points will be established in the southwestern section of the property that is not scheduled for any work until after year 15 of the project. This is the only area on the quarry site where boreal chickadees were recorded.

Monitoring points will be added on the quarry site as the initial reclamation is completed. The first point to be added will be in the area of the 4 settling ponds that is scheduled for restoration in year 2 of the project. A second point will be added in the vicinity of settling pond 5 which will have the initial restoration completed between years 6 and 14 of the project. Thus at the northern extremity of the property, the efficacy of restoration work with regard to the reestablishment of breeding bird populations will be monitored for 35 or more years. Data collected in the reclaimed areas can be compared with similar data collected in the buffer areas. Additional monitoring points will be added as restoration of significant areas is completed.

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All survey points will be marked and recorded using a GPS. No 2 points will be closer than 250 m to assure that the same birds are not counted at adjacent survey points. Survey points that are to monitor woodlands will be located 50 m or more from an “edge”.

At each of the survey points habitat information will be collected during each survey. A protocol for the collection of these data has not yet been finalized; however, it will involve both qualitative and quantitative assessments of the immediate area surrounding the survey point as well as a qualitative assessment of the surrounding area and, in particular, any changes that may have occurred since the last survey.

As has been suggested previously, logistics in this area are particularly difficult as a result of the many dead and wind thrown trees and substantial patches of blow downs. The final design of the monitoring program will have to incorporate practical considerations concerning the surveyors’ ability to expeditiously access survey points.

Some of the points that are located in the buffer property along the north boundary of the quarry site might be located in what could be considered interior forest. However, this will be dependent upon activities in adjacent properties. Most points will not be in what might be considered interior forests. We believe, however, that this is simply a reflection of the situation as it exists in this area.

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### 9.2.1 Terrestrial Ecology

#### F. MANAGING A DECOMMISSIONED PROJECT SITE

##### Item #22 Identifying Responsibility for Post Operational Issues

*...It is noted that there is currently ATV activity at the Project site. The impacts of such activity on the integrity of wetlands and revegetated areas during and after operations need to be considered...*

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#### RESPONSE

Please refer to Bilcon's Revised Project Description in Section 7.0, page 155.

#### INFORMATION/EDITORIAL COMMENTS

##### Introduction of Invasive Alien Species

##### Reference: EIS Sec. 9.2

*In the discussion on invasive alien species (IAS) in Section 9.2.0.2, the proponent identifies Environment Canada as the lead agency in development of a strategy to deal with this issue. The document, *An Invasive Alien Species Strategy for Canada*, September 2004, is a collective effort of several government departments and provincial government (<http://www.cbin.ec.gc.ca/primers/ias-invasive.cfm?lang=e>). The strategy recognizes the Minister of Natural Resources, and Minister of the Environment as lead federal Ministers on invasive alien species. The strategy also calls for inter-jurisdictional coordination mechanisms and the establishment of multi-stakeholder advisory committee.*

*To date proposed action plans have been established or proposed for invasive alien terrestrial plants and plant pests (led by Canadian Food Inspection Agency), a proposal for a Canadian Action Plan to Address the Threat of Aquatic Invasive Species (Canadian Council of Fisheries and Aquaculture Minister Aquatic Invasive Species Task Group) and Canada's National Wildlife Disease Strategy (Canadian Wildlife Service)/ Consideration of this issue in the EIS should reflect the most current and complete regulatory and policy framework.*

---

#### RESPONSE

In addressing the issue of invasive alien species in this document, Bilcon has taken a practical approach and has considered existing legislation and guidelines. Bilcon concurs with the comment that the strategy to deal with invasive alien species should be periodically reviewed to reflect new guidelines or action plans which may evolve in the future.

### 9.2.1 Terrestrial Ecology

#### Species at Risk – Rusty Blackbird

##### Reference: EIS, Sec 9.2

*It should be noted that the Rusty Blackbird is now listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Special Concern.*

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#### RESPONSE

##### *Status*

In April, 2006, COSEWIC designated the rusty blackbird as a species of Special Concern. This species is currently assigned a green status (not at risk) under the NS GSR. The rusty blackbird is not protected under the Migratory Birds Convention Act (1994).

##### *Research*

The rusty blackbird is the least studied and most northerly breeding of North American blackbirds, breeding in wet boreal forests of Alaska, Canada and, in the northeastern United States, only in northern New York and New England. Its preferred nesting habitat is adjacent to bogs, muskeg swamps, beaver ponds, streams and in alder swales (Erskine, 1992; Avery, 1995). Its “Primary winter range [is] from s. Massachusetts, se. New York, se. Pennsylvania, s. West Virginia, n. Ohio, extreme s. Michigan, se. Wisconsin, central Iowa, and e. Nebraska south through eastern portions of Kansas, Oklahoma, and Texas to the Gulf Coast and n. Florida.” (Avery, 1995). In winter it maintains its preference for wet areas wintering in river bottomlands, swamps, wet woodlands and along pond edges.

Current evidence suggests that rusty blackbirds were once abundant but since the mid 1800’s there has been a chronic decline in numbers which, during the last three decades of the 20<sup>th</sup> century, has become acute. Several separate studies suggest that population declines are greater than 90% (Greenberg and Droege, 1999; COSEWIC, 2006). In recent years there are signs that the rate of decrease in populations has moderated somewhat (COSEWIC, 2006).

The reasons for this decline are not well understood. The conversion of approximately 80% of the lower Mississippi river bottomlands, a primary wintering area for rusty blackbirds, to agricultural use, and the blackbird control programs conducted in the U.S. since the 1960’s are possible factors. However, other factors such as acidification of water bodies in the east, where rusty blackbirds are believed to formerly have been most abundant, and population declines most severe (Erskine, 1977), and the resultant release of mercury into the environment, has not been studied.

In February, 2005, the International Rusty Blackbird Technical Working Group was formed for the purpose of developing a “cross-seasonal and comprehensive research program to develop the information to understand the causes and ecological significance of the rusty blackbird’s decline.” (Smithsonian National Zoological Park, Migratory Bird Centre web



### *9.2.1 Terrestrial Ecology*

site). The Working Group has initiated a research and monitoring program designed to obtain critically-needed information in three different areas:

- 1) Basic ecology and natural history
- 2) The effects of specific possible causes for declines
- 3) The most efficacious survey techniques and monitoring program

Nova Scotia is at the southern extremity of the rusty blackbird's breeding range. Erskine (1992) suggests that, in the Maritimes "the wetland habitats where rusty blackbirds breed, although remote and difficult to farm, have been reduced since the start of European settlement..... Clear cutting of forests around wooded swamps favours grackles which depend more on open areas for foraging, and may lead to replacement of the rusty blackbird by the larger blackbird. .... Forecasts of global warming may imply further declines in future for this as well as other species in our area that are near the southern limits of their range here."

Tufts (1986) indicates that, in Nova Scotia, during the breeding season rusty blackbirds are "usually found about still waters or sluggish streams, more often in the interior than along the coast and, as a rule, somewhat remote from human settlements." In forested areas, breeding rusty blackbirds are strictly riparian and rarely use the forest interior (Whitaker and Montevecchi, 1999). Nests are placed in thick, dense vegetation, often coniferous trees, near the edges of forest openings and almost always close to water (Avery, 1995).

Probable breeding by rusty blackbirds was reported in the vicinity of Little River during the collection of data for the Maritime Breeding Bird Atlas (Erskine, 1992).

#### *Analysis*

Important habitat for rusty blackbirds in Nova Scotia would be that associated with nesting. Potential nesting habitat for rusty blackbirds on the Whites Point property is confined to the small, coastal, boggy marsh north of Whites Point. This wetland was surveyed for breeding birds in 2002 and 2004 and no rusty blackbirds were observed (Alliston 2004a, 2004b).

#### *Mitigation*

Although no nesting rusty blackbirds have been found on the property, the only potential nesting habitat for this species on the property will be part of the proposed environmental preservation zone. This preservation zone includes both the wetland area where nesting rusty blackbirds could forage as well as an area of adjacent forest where they could place their nest.

### 9.2.1 Terrestrial Ecology

#### *Monitoring*

As indicated in the EIS, section 9.2.1.4, it is proposed that, with the initiation of the project, a breeding bird monitoring program will also be implemented. This program will include a survey of the boggy marsh area. These surveys are to be repeated at five year intervals, however, should species at risk such as the rusty blackbird (or Nelson's sharp-tailed sparrow) be encountered, the frequency and nature of the surveys in this area would be modified to address the situation.

#### *Impact Statement*

As indicated in the EIS section 9.2.1.5. - Vertebrate Species at Risk.

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### 9.2.1 Terrestrial Ecology

#### Web Sites

Smithsonian National Zoological Park, Migratory Bird Centre.  
[http://nationalzoo.si.edu/ConservationAndScience/MigratoryBirds/Research/Rusty\\_Blackbird/](http://nationalzoo.si.edu/ConservationAndScience/MigratoryBirds/Research/Rusty_Blackbird/)

#### Explanation of Abbreviation, Acronyms, Codes and Figures

Reference: Table TE-1

*The abbreviations TTS and PTS (sec 9.2.12.2) are not defined*

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#### RESPONSE

The number 999 in Table TE – 1 of the EIS indicates no data was available for the age of that particular forest stand.

The abbreviations TTS and PTS in Section 9.2.12.2 of the EIS are defined as follows.

TTS is defined as “temporary threshold shift”

PTS is defined as “permanent threshold shift”

#### Reference: EIS Section 6.0

*The term “wildlife plantings” is shown on Figure 1 (p. 17), but this is not explained in the text.*

*Reference: Volume 111 Appendices, Appendix 14*

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#### RESPONSE

The term “wildlife plantings” on Figure 1 of the EIS is used here to indicate plantings of food and cover value for wildlife rather than plantings intended for timber production.

*An explanation should be offered for the “Code” column for Weymouth Falls station data referenced in this section.*

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#### RESPONSE

The “code” column in the Weymouth Falls Weather Station data indicates the minimum number of years used to calculate the normal for each element. For example:

“A”: No more than 3 consecutive or 5 total missing years between 1971 and 2000.

“B”: At least 25 years of record between 1971 and 2000.

“C”: At least 20 years of record between 1971 and 2000.

“D”: At least 15 years of record between 1971 and 2000.

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#### WP 1641 – Nova Scotia Department of Tourism, Culture and Heritage

##### Zoology

*The document is extensive, wide-ranging, and offers insight into the majority of issues that we would consider of note for the site. There remain several areas that require clarification. Staffs recognize the complexity of acronyms in the document. Since this type of source document may be the basis for a legal process regarding environmental management, lack of rigour in terminology in one portion of the document reflects poorly on the confidence one may put in the content of the balance of the text.*

---

##### RESPONSE

Comment noted.

*Section 9.2.1 refers to the list of faunal species at risk (Appendix 39, Table TE2). The department notes that this appears to be limited to COSEWIC-listed species, and therefore does not reflect candidate species not yet listed.*

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##### RESPONSE

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

*There is no reference to the possible occurrence of the rare Canadian land snail *Cochlicopa morseana*, recorded from a site with somewhat similar habitat characteristics. Its presence should have been investigated for the purpose of this review*

*There is no reference in the documents to the marine bristletail *petrobilus brevistylis*, restricted to several sites in Nova Scotia, specifically along basaltic headlands. If the purpose of this document is to define the baseline habitat and species suites, Highlight possible species at risk, and offer information on mitigation of negative impacts, it is important that data on potential candidate species be noted or retrieved in the field investigation. This is one of the elements of precautionary principle in environmental documentation.*

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##### RESPONSE

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

*The department has some concerns over the information provided in 9.1.10 (noise and vibration – plant). The data presented and the references provided (Ref. Vol V tab 31) do not provide enough information to adequately conclude the degree of impact on species (egg bats) that use a wide audio-spectral range for activity. The definition of the word "noise" is not the standard operational one, but a subjective one which is not referenced. Noise is defined, in a scientific sense, as a broad spectrum sound covering frequencies from "audible tones to 50KHz and up and usually peaking at around 40 KHz" The use of the term "noise"*

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*as unwanted sound is inappropriate in the context of an Environmental Review. Several species of bats, including the relatively uncommon tree bats in the area (which are not noted in the field data) would be affected by the presence of higher volumes of sound, especially in the ultrasonic ranges. The study well-documented information for human ranges, but ignores these other frequencies. The department suggests that information on the sound regimes in the higher frequencies, especially from 20-60KHz, be included for proper evaluation of impact and/or mitigation. These are important data during periods of crepuscular foraging activities.*

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#### RESPONSE

Blasting, as well as other mechanical activities conducted during quarry operations do not emit sounds at ultrasonic frequencies and so are unlikely to impact bat hearing, orientation or foraging success. In addition, bat foraging activities typically occur at night time, when the quarry is not in operation.

*Section 9.2.1 notes the possible presence of two bat species in the area. It is likely that four or five provincial species (all yellow-listed) could be using these habitats. A proper field survey would have identified their presence/absence. Extrapolating site-specific use from a focussed migratory study at an insular site 100 km distant many not be the most appropriate way in which to address this specific issue. In addition, the presence of nursery habitats or hibernacula in the specific sites is not essential for the significant use of the site. The presence of more-optimal roosting sites away from the proposed development does not preclude its use for or importance in foraging. Several species of bats, including *Myotis lucifugus*, have been recorded as foraging at considerable distance from normal day roost/nursery colony areas. This question can be readily addressed with a simple field survey using either event-type bat detectors or ANABAT systems. In addition, even the small *M. lucifugus* has been recorded as seasonally migrating several hundred kms to hibernacula, along fairly tightly-defined corridors. The absence of such records from Bon Portage Island do not preclude migration in a westerly direction to New Brunswick-based hibernacula.*

*Section 9.2.1 "Migratory Mammals", states that, based on the interpretation of existing records and a migratory study, previous records of the presence of three species (tree bats) are extralimital. The data noted and records currently held do not support such a conclusion, so that should be removed from the report. There are some suggested seasonal patterns to the use of provincial habitats by these three species. However, there is insufficient data to conclusively marginalise these species at this time.*

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#### RESPONSE

Echolocation studies conducted by Broders et al. (2003) at Brier Island (BI) in 2001 were within 30 km of, in the same Natural Landscape as, and included similar habitats to, the proposed quarry site. The timing of data gathering covered spring (late May) and autumn

### 9.2.1 Terrestrial Ecology

(early September) migratory periods as well as the non-migratory period when the young are born and reared (mid-June and mid July). Twelve sites that were representative of four habitats were sampled twice during each of the four sampling periods providing 96 detector-nights of information. (Equal sampling intensity was also conducted at sampling sites in Kejimikujik National Park.) This study is the most comprehensive study of bats that has been conducted in the Digby Neck area and its proximity, climate and habitats make it very relevant to the proposed quarry site.

In the 96 detector nights of data collected on BI, Broders et al. (2003) found only two bat species, little brown bat and northern long-eared bat, to be common, with the little brown bat calls constituting most of the recorded sequences. Habitats where the highest levels of activity by little brown bats were recorded were associated with rivers and still waters where activity levels were about 27 times and 4 times higher, respectively, than those recorded in forests. There are no rivers on BI but a comparison between BI and Kejimikujik National Park (KNP) of little brown bat activity at still water and forest sites indicated low activity levels on BI; approximately one third the levels recorded at KNP. On BI, similar relatively low levels of activity were observed in both forest and meadow habitats and in bog habitats very low levels of activity were recorded. As indicated in the EIS and its supporting documentation, we believe that foraging little brown bats would be found on the Whites Point property, however, the habitats present (currently 80% forest, 16% clear cut, 1% bog, 3% cleared quarry site) are not those favoured for foraging by little brown bats. (In Pennsylvania, Hart et al. (1993) found that, of 9 habitats investigated, clear cut areas were the habitat least utilized by *Myotis* species.) Furthermore, the studies conducted by Broders et al. (2003) suggest that little brown bat activity in the coastal habitats of Digby Neck and Islands may be considerably less than in corresponding inland habitats.

Unlike the “generalist” little brown bat, the northern long-eared bat is a specialist, confining much of its activities to forest interiors. On BI northern long-eared bats were recorded in low numbers in forests and at coastal meadows (Broders et al., 2003). We would expect that northern long-eared bats would forage at the Whites Point site and, similar to BI, would be found in low numbers and densities in the coastal forest on the site.

#### *Myotis Species*

Unlike the two *Myotis* species that are believed to be province wide in their distributions (Rockwell (2005) recorded *Myotis* species at each of the 64 sites sampled on mainland Nova Scotia), the eastern pipistrelle is believed to be confined to southwestern Nova Scotia (Broders et al., 2003; Corning and Broders, 2005; Rockwell, 2005). This breeding population is believed to be disjunct from other North American populations and therefore is thought to be of high conservation value. Broders et al. (2003) recorded no eastern pipistrelles on BI in 2001 and subsequent work by Corning and Broders (2005) suggests that the cool climate restricts the summer distribution of this species to the warmest area in the province; the

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interior of southwestern Nova Scotia. Regardless of climatic factors, foraging habitat of eastern pipistrelles is associated with freshwater habitats; 90% rivers and 10% still waters (Broders et al. 2003). Neither of these habitats is found on or immediately adjacent to the Whites Point property.

#### *Migratory Tree Bat Species*

The three migratory tree bat species that have been recorded in Nova Scotia are believed to be very rare here and Broders et al. (2003) consider these occurrences to be extralimital. Only 0.02% of the 30,471 sequences recorded during this study might be attributed to tree bats. These species are generally solitary during June and July when young are born and reared and roost singly or as a family in trees during daylight hours although maternity colonies have been reported for silver-haired bats (Betts, 1998; Mattson et al., 1996 in Schmidt, 2003; Parsons et al. 1986).

#### *Hoary Bats*

The only tree bat species to be recorded on BI during the 2001 study (Broders et al., 2003) was the hoary bat for which two sequences were recorded in a coastal meadow on 11 September, 2001. Only four hoary bat sequences were recorded in this entire study which involved 192 full detector nights (BI and KNP) and 10 detector half nights (collected opportunistically at Bon Portage Island in early September, 2001). More recent echolocation research that gathered information from 64 sites (none in Digby County) scattered throughout mainland Nova Scotia suggests that hoary bats might be more widely distributed in mainland Nova Scotia than previously thought (34 sequences from 8 sites out of a total of 10,071 sequences identified; 0.3%) but are still believed to be rare (Rockwell, 2005). Habitats where hoary bats were recorded were in open areas; railway corridors, rivers, fields and at a street lamp in a parking lot, although the sampling sites were largely from such open areas. Hart et al. (1993), working in Pennsylvania, found that of 9 habitat types investigated, lakes, ponds and "mixed streams" (streams bordered by a mixture of forested and open habitat) were the most used habitats by foraging hoary bats although deciduous forest clear cuts were also quite heavily used. No usage was recorded in agricultural lands and "open streams" (streams bordered on both banks by non-forested habitats). Very low levels of activity were recorded in old fields, forests (i.e. mature or successional forests not adjacent to water) and wooded streams. It would appear that the most attractive foraging habitat for hoary bats at the Whites Point property might be the clear cut area. With the current level of salvage clear cutting on the Digby Neck as a result of the spruce beetle epidemic, much similar habitat is available in that area.

#### *Red Bats*

Evidence of the presence of red bats in Nova Scotia during the summer is very limited. The first and only published breeding record for Atlantic Canada was in 2001 at Sand Beach, Yarmouth Co. (Broders et al., 2003). In the summer of 2003, Rockwell (2005) recorded four

### *9.2.1 Terrestrial Ecology*

red bat echolocation sequences from three locations: southeastern Queens Co. – 2; Yarmouth Co. – 1; near Truro – 1. The few additional records were taken primarily during the fall migration period and have been from islands (Sable Island, Cape Sable Island and a *possible* 5 echolocation sequences from Bon Portage Island) and from boats off the coast of Nova Scotia (Norton, 1930; Brown, 1953; Peterson, 1970).

Rockwell (2005) recorded red bats in river, lake and field habitats. In Pennsylvania, Hart et al. (1993) found the highest usage by red bats in wooded stream, open stream, lake and pond habitats. Of the 9 habitats investigated, forest clear cuts, were amongst the least used. The forest interior received only moderate usage.

We have serious doubts that the tiny seasonal streams on the Whites Point property would provide the red bat's preferred "wooded stream" habitat as described by Hart et al. (1993). The density of the coastal forest would likely prove to be difficult foraging habitat for a species that has, during its evolution, sacrificed manoeuvrability for speed.

#### *Silver-haired Bat*

The silver-haired bat would appear to be the rarest bat species in Nova Scotia with only two confirmed records; one near Lake Kejimikujik (10 July, 1959; Bleakney, 1965) and another from Hants County (Fuller, 1998 *in* Rockwell, 2005) and breeding not having been confirmed. (Bleakney (1965) indicated that three seasons of collecting effort by Nova Scotia Museum staff directed at tree bat species resulted in the collection of only a single adult female silver-haired bat and two possible sightings of hoary bats.) Echolocation studies have recorded either silver-haired bat or big brown bat calls at Bon Portage Island (3 sequences; Broders et al. 2003) and Fancy Lake, Lunenburg Co. (one sequence; Rockwell, 2005).

Breeding silver-haired bats are often associated with old growth forests and tend to forage in the vicinity of ponds, streams and other aquatic habitats in coniferous and mixed deciduous forests (Schmidt, 2003). The lack of old growth forest in the vicinity of the Whites Point site, as well as the lack of appropriate foraging habitats on the Whites Point site make it most unlikely that this extremely rare species would be found here.

#### *Field Survey with Bat Detectors or ANABAT Systems*

It is suggested that the question posed concerning bat foraging activity could be answered by a simple field survey using bat detectors or ANABAT systems. While these systems have opened new avenues to bat research, simple is perhaps not the best term to describe them. The ANABAT system can sample an area extending only about 15 m from the receiving microphone. There is a very high degree of night to night variability in bat activity at a given site (Broders et al, 2003; Krusic et al, 1996). This requires that, to obtain meaningful information concerning the use of an area, multiple nights of recording must be made. Broders (2003) suggests that more than 20 nights of observations may be required in



### 9.2.1 Terrestrial Ecology

terrestrial sites to obtain a modest level of accuracy. A separate set of recordings would need to be made for each habitat at the site. Differentiation between some species (e.g. little brown bat and northern long-eared bat) requires the use of holographic neutral networks. This is not a trivial exercise.

#### *Bat Migration*

With regard to bat migration; the studies conducted in 2001 (Broders et al., 2003) provided no indication of migratory movements of bats through BI. Observations were made during the third week of May and the second week of September so it is unlikely that, if significant migration events were occurring, they would have been missed. This would be particularly so if it involved, as suggested, a significant “local” migration of the more numerous *Myotis* species to hibernation sites in New Brunswick. If this were occurring, in autumn, migrating bats would presumably proceed in a southwesterly direction along the Digby Neck and, as observed with birds, there would be a build up of migrants on BI awaiting favourable weather conditions for a flight across the Bay of Fundy. The numbers of echolocation sequences of *Myotis* species recorded in September, 2001 were less than half those recorded in June and July. The numbers of echolocation sequences recorded in May, 2001 were less than 15% of those recorded in June and July (Broders et al., 2001). During more than 15 years of mist netting autumn (August-September) migrant passerines at BI, Lance Laviolette (pers. comm.) recalls only once having captured a bat (believed to be a little brown bat), even though nets are always opened before sunrise and, in the past, were sometimes open at sunset and at night.

As indicated previously, activity levels by *Myotis* species on BI were only about one third the levels recorded at similar habitats in the mainland interior, so with relatively low populations of breeding bats on BI, an autumn influx of bats from the mainland would likely have been apparent. The lack of evidence of migrating bats at BI suggests that any local migrations of *Myotis* species along the Digby Neck would probably be northeasterly during the autumn and southwesterly during the spring and consist largely of those individuals that summer, apparently in rather low densities along the Digby Neck and Islands, on their way to and from hibernation sites possibly in central or eastern Nova Scotia or even New Brunswick.

For those bats (*Myotis* species) that might move along the Digby Neck on their way to and from their winter hibernaculae, there is little knowledge of habitat requirements during these movements. The property that forms the east boundary of the proposed quarry property is owned by Bilcon and will remain in forest cover for the duration of this project. This property, together with the 30 m buffer at the boundary of the proposed quarry property, will provide an approximately 280 m corridor that could be used by bats passing through the area of the quarry. Bats are known for their navigational abilities and collisions with structures associated with the quarry are not anticipated. For reasons that are not yet understood, significant bat mortality has been associated with wind farms (Johnson et al., 2003; Williams,

### 9.2.1 Terrestrial Ecology

2003). Since no wind generation facility will be associated with the quarry operations, this will not be an issue.

As noted in the EIS, the construction of buildings at the quarry site could provide roosting habitat for little brown bats and possibly northern long-eared bats. The construction of ponds could provide preferred foraging areas, particularly for little brown bats, currently not present at this site.

#### *Summary*

In summary, Bilcon recognizes that two species of bats, little brown bat and northern long-eared bat probably summer within the vicinity of the quarry site and possibly use the quarry site for foraging. These bats are found in appropriate habitats throughout Nova Scotia and their range extends continuously to the north and east through New Brunswick, Prince Edward Island, Newfoundland and southern Quebec therefore it is most unlikely that the Nova Scotia populations of these species, although not long distance migrants, are genetically distinct and, for that reason, of special conservation concern. Research from nearby BI suggests that these species would be found in low densities on the quarry property compared with similar forest habitats in the interior mainland.

The Nova Scotia population of the eastern pipistrelle is at the northern extremity of its range and appears to be disjunct from other populations suggesting that this population could be genetically distinct and thus of considerable conservation concern. Recent research indicates that the Nova Scotia breeding populations are confined by climate to central southwest Nova Scotia. There is no evidence that their short-distance movements to hibernation sites would take them through Digby Neck and the vicinity of the proposed quarry site.

The three species of tree bats that have been recorded in Nova Scotia are at or beyond the eastern limit of their normal breeding range and might be considered rare (hoary bat), very rare (red bat) or extremely rare (silver-haired bat), with evidence of breeding being confined to a single observation of one species (red bat). These species are migratory and since breeding takes place during fall migration and/or on their wintering grounds, should breeding populations occur in Nova Scotia it would be unlikely that they would be genetically distinct. Preferred habitat for any of these species does not exist on or immediately adjacent to the Whites Point property.

Bilcon believes that currently available information regarding bats, their life history, distribution and habitat requirements, while by no means complete, are sufficient to rule out the possibility of the quarry construction and operations potentially having a "serious or irreversible impact" on any of these species. Bilcon therefore has not undertaken echolocation studies which, to be properly done, would require considerable time and costs and, in the light of current knowledge, would likely produce little information that would be

### 9.2.1 Terrestrial Ecology

useful, either for impact mitigation or the furtherance of scientific knowledge. If new information or concerns are brought forward, Bilcon is prepared to review and evaluate the implications with the appropriate regulatory authorities and act accordingly.

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### 9.2.1 Terrestrial Ecology

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#### **Botany**

*Department staff do not understand Table 2, which suggests that there will be a significant Positive Effect on Terrestrial Floral Species at Risk, and only an insignificant Negative Effect on Terrestrial Ecology-Habitat Alteration. It seems more likely that quarry would have a Significant Negative Impact on both, especially when measured at the local level. From a provincial perspective the impact would be less, but never positive.*

*Departmental staff could not find a list or table which provides the basis for predictive modelling. If the Museum or some other authority was consulted to provide a list of potential species at risk, this information should be appended.*

### 9.2.1 Terrestrial Ecology

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#### RESPONSE

Please refer to Table 3.9 Environmental Effects Summary for Terrestrial Ecology Section 8.1 – Impact Assessment Methodology in this document.

*While the department understands that the presence of three plant Species at Risk is insufficient to alter such a large project, the proposed mitigation should only be considered under the following conditions:*

- 1. the Impact Statement explicitly defines the buffer and preservation zone in terms of permitted quarrying/reclamation activities within, in plain language;*
- 2. the populations of the Species at Risk are monitored by provincial authorities or their agents*

*The introductions of non-native species, both terrestrial and marine, is a concern.*

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#### RESPONSE

Please refer to Table 2 – Mitigation – Commitments Summary in Section 11.6 Follow-up Program in this document

Please refer to Bilcon's response to the Panel on terrestrial invasive species in this document.

*Volume 6 under mitigation of floral species also does not appear to indicate the types of activities allowed in the buffer or preservation area.*

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#### RESPONSE

1. The preservation zone will be an area in which no activities associated with quarrying will occur. Project activity within the preservation zone will be confined to the monitoring of plant species at risk and uncommon habitats (wetlands, headlands) and the identification and control of any invasive plant species that could threaten these species or habitats (see response to Review Panel's question concerning monitoring of invasive species – Section 9.2.1.4).

2. Bilcon considers that, during its ownership, it has the prime responsibility for monitoring any species at risk on its property and will contract qualified professionals to conduct monitoring programs. It is Bilcon's intent to have ongoing consultations with the appropriate provincial authorities regarding the monitoring programs. If provincial authorities or their agents also wish to conduct monitoring studies of these species they are welcome to do so.

### 9.2.1 Terrestrial Ecology

#### WP 1625 – Partnership for Sustainable Development

#### Deficiency Statement 12

#### EIS Guidelines

4.1 – *Use of Existing Information - 'The EIS must provide sufficient information to identify, describe and determine the significance of potential impacts on the environment that could arise from the Project.'*

8.1 – *Methods - 'Identify and justify any assumptions made. Indicate the degree of certainty in the impact predictions and determination of significance (identify measures used). Document all models and studies so that, to the extent possible, the analyses are transparent and reproducible, support analyses and conclusions with reference to appropriate literature and provide all relevant references.'*

9.2.1 – *Species at Risk - 'Identify all aquatic and terrestrial listed species...and their critical habitats...found within the regional study area.'*

10 – *Environmental Impact Analysis - 'The assessment must provide a clear, traceable path of information from the baseline conditions through the identification of potential impacts, monitoring, mitigation, residual impacts and determination of significance of effects.'*

10.2.1 – *Species at Risk - 'Consider any change the Project might cause to a listed species, its critical habitat or individual residences...'*

#### EIS

9.2 – *Biological Environment - The EIS indicates that nesting birds will be left alone where possible, but we are neither given the methods or amount of effort that will be used to find nesting birds, nor what constitutes "where possible". In the same place, the creation of a sediment pond is presented as a benefit, but this is certainly not the case for the organisms that will be removed or displaced from that site. It is similarly laughable that the Project will be a benefit to the local flora. We are also told that Bilcon will conduct faunal surveys every 5 years to document changes, but we aren't told what Bilcon will do if changes occur.*

9.2 – *Biological Environment – The EIS states that bats "might possibly forage on the Whites Point property." This is not very convincing evidence of a sound assessment of the property. Similarly, the upland bird surveys were conducted on an inadequate time scale, and do not cover migrants or winter residents. For the spring and summer data, no rarefaction curves are provided to enable one to assess the extent to which the bird community has been assayed. This is important because we are talking about a 50-year rather than a several-day perspective, and this EIA does not provide that view, especially in the context of rapid climate change. For example, some species of birds naturally irrupt and may be observed perhaps only every 10 years; this natural pattern may be subject to much more dramatic fluctuations with climate change. Surveys also miss vagrant birds that may be searching for future breeding sites in autumn, and the importance of the habitat for migrants is dismissed without supporting evidence (Chapter 9.2, p 28). In general, the variation inherent in survey data is not quantified or estimated, nor is its importance grasped by the authors of the report. Because there is so much variation among years, the duration of their surveys cannot capture properly the dimensions of the communities on the property.*

### 9.2.1 Terrestrial Ecology

*The EIS dismisses impacts on breeding birds without linking them to impacts on migrant birds (e.g., we are told in Chapter 9.2 p 24 that the quarry site is unlikely to support breeding bluebirds, but we are not told whether they would use the site during migration). The EIS's dismissal in several places of organisms that don't breed locally is also disturbing (e.g., we are told in Chapter 9.2 p 87 that the juvenile loons will probably breed north of the quarry site, implying that if some harm comes to them from activities associated with the quarry, this is not a concern). Another troubling statement Chapter 9.2 is "Most animals also acclimate to some level of disturbance". The troubling part is that the ones that don't acclimate also tend to be the ones that are listed.*

*Again vague language "relatively few waterbirds were recorded". Relative to what? Also, "It would seem quite unlikely ... but this is not known" and again on p. 94 that starts "It is not known ...". Similarly on p 94, "would not be great" What does this mean in quantitative terms?*

*The evidence that harlequin ducks do not move or switch flocks during the winter is based on a total of 9 ducks and is entirely circumstantial. Because we are dealing with a listed species, such evidence is inadequate. The Proponent should revise the EIS (Section 9.2) to reflect the requirements of the Guidelines.*

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#### RESPONSE

Please refer to responses to the Panel, Nova Scotia Department of Tourism, Culture and Heritage and Environment Canada in this document.

#### Deficiency Statement 57

##### EIS Guidelines

*9.2.1 - Species at Risk – 'Conduct appropriate surveys to identify the presence of floral and faunal species, including any species at risk that might occur at or near the Project site, as well as throughout other areas that may be affected by the Project. Conduct surveys during appropriate times of the year.'*

##### EIS

*9.2.1.1.3 - Flora and Fauna - The floral survey was too short to realistically expect an accurate assessment of the species at risk that may be present on the site. The survey took place during three days in July and would likely have resulted in missing spring or late summer species and three days seems far short of the time needed to do a comprehensive survey of mid-summer species, particularly since this survey appears to have been conducted by a single individual (Ruth Newell).*

*A similar criticism must be made of the faunal survey. Four days in June is simply not enough time to do a comprehensive survey. What about species that are present only at other times of year?*

### 9.2.1 Terrestrial Ecology

*The same can be said for the Odonate survey. Mr Brunelle is an excellent odonate taxonomist and naturalist but even he could only do so much with a 2 day survey. This was not adequate.*

*The above comments are relevant to any monitoring that would be done after operations begin. If monitoring is not more frequent and intense than was conducted for the EIA then they will not provide sufficient data to accurately determine whether any real change has taken place due to the operation of the quarry. Right now, the baseline is insufficient, so I don't see how there can be any realistic hope of detecting change following the beginning of operations. The baseline needs to be done more comprehensively and the follow up surveys will not be considerably more comprehensive as well. Given the current situation it is not surprising the conclusions from all of this are "long-term insignificant effects" but I don't think we really have enough information gathered to actually draw this conclusion.*

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#### RESPONSE

Please refer to responses to the Panel, Nova Scotia Department of Tourism, Culture and Heritage and Environment Canada in this document.

#### Deficiency Statement 68

##### EIS Guidelines

*10.2.1 - Species at Risk – 'Consider any change the Project might cause to a listed species, its critical habitat....'*

##### EIS

*9.2.1.3 – Mitigation – The EIS fails to address whether the proposed 30 metre environmental preservation zone is sufficient to protect the identified rare flora. Specific issues to be considered include: edge effects, habitat fragmentation, changes in microclimates, dust, disruption of pollinators etc.*

*Section 9.1.5.3 mentions a 30 metre buffer as a mitigation tool to minimize the influence of quarry operations on adjacent habitats. An operation of this size would no doubt require a much larger buffer than this to minimize impacts on adjacent habitats and biodiversity. There is a lot of scientific literature on the subject and the effects vary with habitat and organism type but the weight of evidence suggests at least 100 metre buffer should be required and it would not be hard to justify a 500 metre or even a 1000 metre buffer if there was real concern about not impacting biodiversity in adjacent habitats.*

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#### RESPONSE

Please refer to responses to the Panel, Nova Scotia Department of Tourism, Culture and Heritage and Environment Canada in this document.



### 9.2.1 Terrestrial Ecology

#### Deficiency Statement 71

##### EIS Guidelines

10.2.7 – Biodiversity - “Describe and assess the ways in which the Project might influence biodiversity, through changes in ecosystem and habitat loss; habitat fragmentation and barriers to movement; the recovery capacity of habitats or species; edge effect responses; species distributions; the occurrence of invasive or non native species; polluting emissions to water and air; species of concern; harvest levels; and important habitats.”

*This statement is based on the concept that biological diversity, in its various facets (genetic, species and ecosystem or community diversity), is an indicator of environmental health and, if analyzed with regard to possible Project effects, an integrated measure of relative environmental impact(s). The Guidelines primarily address the various aspects of species and ecosystem diversity. These are no doubt, key components that should be addressed by the proponents in assessing the environmental impact of the proposed Project.*

##### EIS

*Since this Project is located at the boundary of terrestrial and aquatic environments, both components and the intertidal zone need to be considered for biodiversity impacts. Surprisingly, the plain language summary makes no reference to this. Indirect reference is made only through “Species at risk” or “endangered”. While this is one aspect, the EIS certainly should not to be restricted to these biodiversity components.*

*In addition, while there is some reference on the marine component for the Inner Bay of Fundy Salmon and Mammals and water birds, there is a near-absence of summarycommentary with regard to invertebrates. The latter represent by far the largest biodiversity component and are the major vertebrate food source, yet only the commercially important lobster is mentioned. I fail to see why only species at risk, endangered, or of direct commercial importance should be investigated in terms of potential impacts. Quarry operations are likely to affect floral (seaweed) and invertebrate faunal components both intertidally and subtidally in the vicinity of operations through transport and deposition of quarried material. This is evident from other similar operations, such as in the St. Croix Estuary. In order to address this, a base line study of the invertebrate community structure in areas surrounding the proposed quarry should be a necessary component in establishing potential impacts (for example the relatively rare Canadian records of the mud shrimps, *Callinassa biformis* and *C. atlantica*, are along the Nova Scotian coast of the Bay of Fundy (Squires, 1990), but the limited work done (see below) does not constitute an invertebrate baseline study.*

*A search of the remaining overly voluminous and difficult to follow EI Statement document revealed four sections addressing biological diversity or biodiversity: Volume IV Chapter 3, Section 3.4, Ecosystem Approach; Volume VI Chapter 9.2, Section 9.2.0, Introduction; Volume VI Chapter 9.2, Section 9.2.1; Terrestrial Ecology; Volume VII Chapter 10.0, Cumulative Impacts.*

*Section 3.4 identifies and recognizes diversity as an ecosystem component and the necessity of its conservation but reveals little else.*

### 9.2.1 Terrestrial Ecology

*Section 9.2 focuses on invasive species and species at risk (why do the proponents not use the ACCDC rankings that “tend to identify more species as being at risk”?). I note that specific studies were conducted to assess the terrestrial fauna and flora but I note a less detailed approach for the intertidal and near-shore marine systems. For example, I see no evaluation of total diversity within these systems; why were tide pools not considered in the intertidal work (there is no mention of them as far as I can tell)? The near-shore assessment in particular seems inadequate, based on apparent interpretation of limited data. A one time sampling of seven successful grab samples does not constitute a characterization of the benthos of the area (while the information may be somewhere amongst the overly complex documentation, I could not find what screen mesh size was used in analyzing the benthos samples – screen size greatly affects what animals are retained and the results seem to indicate that only large components (cm rather than mm) were addressed). Given the predominantly hard or mixed substrate, quadrat studies and those based on suction sampling would likely have been more appropriate and revealing. I also see no attempt at quantification (e.g., how many species are there?). On the plankton side I note that while krill are a major source of whale food not found in the vicinity of the proposed quarry operation, the copepod *Calanus finmarchicus* is found nearby and is a major source of food of a number of organisms, including whales, sea birds, and several commercial fish species. The recent decline of that largest of copepod species in that part of the Bay of Fundy (Brown et al., 2004) is of concern and could potentially be further impacted by the quarry operations. This should be looked at further.*

*Finally, in Chapter 10 I note a single reference to biodiversity and only in context of the floral species at risk. I see no overall assessment of possible biodiversity impacts in a wider context.*

*Despite mitigating measures, quarry operations such as the one suggested invariably produce fines (whether from blasting, crushing or shore to ship transport) that eventually end up in the marine environment (e.g. from high winds). I see no attempt in evaluating this impact, or a review of such work elsewhere. I think this is crucial and simple statements that operations are conducted according to some guideline are in my opinion not sufficient. I also saw no reference to a much needed subtidal monitoring program in case the quarry operations should proceed.*

*I conclude that while an attempt has been made in the EIS to address issues of species at risk, and to a lesser degree habitat loss, there is insufficient conformity to the guidelines in the EI Statement in terms of addressing biodiversity issues in an overall context. Some specific and potentially significant issues (identified above) also are in need of being addressed.*

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#### **RESPONSE**

Please refer to Bilcon’s responses to the Panel and Environment Canada in this section.

*9.2.1 Terrestrial Ecology*

**Appendix 1**  
Forest Management Plan

# Forest Management Plan

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Prepared for: **Bilcon of Nova Scotia Corporation**  
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## Purpose of a Forest Management Plan

The purpose of this forest management plan is to help promote good forestry practices on Nova Scotia woodlands. Consideration has been made for sustainability, provincial wildlife guidelines, environmental concerns and best management practices in Nova Scotia.

Data for this management plan was obtained from a descriptive field cruise ( forest inventory ), a sampling procedure designed to provide for each forest stand, a description and diagnosis from which optimum forest management practices can be prescribed.

## Woodlot Owner's Objectives

Bilcon of Nova Scotia Corporation, the woodlot owner, has requested the following to be included in their forest management plan:

- a. A plan delineating the various forest stands ( cover type and age ) existing on the identified properties including a forest inventory.
- b. A report prescribing the sustainable treatment for each forest stand and a schedule for implementation.
- c. A plan of infrastructure required to implement the plan.
- d. Identification of any sensitive environments ( ie. streams, wetlands, etc. ) on the properties and any restrictions on forest harvesting activities around these sensitive lands.
- e. Encourage long term, sustainable, management of the forest to encourage Acadian Forest species.
- f. Control competition in planted areas without herbicide use if possible.

### Woodlot Description

**Bilcon of Nova Scotia Corporation's** woodlot, which is located near Little River in Digby County, contains 269.6 acres ( estimate only ) of which 16.7 acres are wetlands and are considered to be non productive forest land. The remaining 252.9 acres are considered to be productive forest land.

The softwood component of the woodlot is comprised of white spruce, red spruce, black spruce and balsam fir. The hardwood component is comprised of red maple and white birch with scattered yellow birch, white ash and beech. These scattered hardwood species are considered to be shade tolerant and could be left standing in harvest areas as a seed source for natural regeneration. These species are also representative of the Acadian forest.

Ages are predominantly in the 35 - 45 year age class with scattered trees in the 55 - 65 year age class. The softwood component has seen significant bark beetle damage in the last 10 years and some stands have mortality in excess of 50 %. Blowdown has also occurred in these areas. Harvesting of bark beetle infested trees usually must be carried out within 2 years of infestation before the wood is too old for best utilization. Some of these stands are too late for harvest and probably are best left undisturbed at this time. Natural regeneration is already occurring and these areas provide excellent wildlife habitat.

The woodlot supports the Rossway soil series - dark grayish brown sandy loam over dark yellowish brown sandy loam, stony. Topography is strongly rolling to hilly and is moderately to poorly drained, in some areas. The limiting factors of this soil series are extreme stoniness, topography and poor drainage, in some areas.

Boundary line conditions range from recently surveyed ( March 2003 ) to old lines that require renewal by brushing out and reblazing. ( see Woodlot Plan FM-2 )

Access to the woodlot is generally poor and some road work has been recommended to access treatment areas. ( See Woodlot Plan FM-2 )

### Woodlot Recommendations

This section is a brief description of each forest stand as numbered on the woodlot plan. The description gives information on each stand explaining recommended treatments. Incorporated in the recommendations are sound forest management practices for harvests, silviculture and construction with considerations made for environmental, wildlife and recreation concerns. All recommendations have been made with the intent of working towards a future "Acadian Forest" mix of species. ( ie. Red spruce, yellow birch, white ash and beech ).

The following Nova Scotia Wildlife Habitat and Watercourses Protection Regulations must be adhered to by law on all harvest operations in the province. A Forest Technician or Forester should be consulted for layout of these areas on the ground prior to harvest.

#### 1. Special Management Zones ( SMZ ) along watercourses .

When harvesting adjacent to a watercourse 50 centimeters ( 20 inches ) or more in width, leave at least a 20 metre ( 66 feet) wide strip along each side of the brook. In areas with slope this width must be increased.

#### 2. Leaving Legacy Trees / Wildlife Clumps

When harvesting any area larger than 3.0 hectares ( 7.5 acres)

- leave at least 10 living trees standing for each hectare harvested
- leave these trees in clumps, with a minimum of 30 trees per clump

#### 3. Leaving Coarse Woody Debris

Leave standing dead trees and as much large woody debris on the harvested area as possible.

#### **Stand # 1**

Stand Description: Overmature softwood stand with scattered hardwood trees. Severe blowdown in some areas.

Species: White spruce and balsam fir with scattered red maple and white ash.

Age: 52 years

Recommendation: Most of this stand is too late for harvest due to past bark beetle and resulting blowdown. A class "D" road is being recommended through this stand to stand #2 ( see woodlot plan ). Some group selection harvest could be carried out in scattered merchantable pockets of wood. It is recommended to leave white ash standing after harvest as a seed source for natural regeneration.

**Stand # 2**

Stand Description: Mature softwood stand showing minimal signs of bark beetle at this time.

Species: Balsam fir and white spruce with scattered red maple and white ash.

Age: 39 years

Recommendation: Clear cutting is recommended, in this stand, followed by site preparation and planting of red spruce seedlings 2 years after harvest. Leaving scattered white ash standing after harvest could provide a seed source for some natural regeneration to mix with planted trees. Additional fill planting of tolerant hardwoods could also be carried out, at the landowner's expense, to encourage Acadian Forest species. Competition control after planting could be carried out by manual weeding with brush saws, after the leaves have fallen, as an alternative to herbicide application. This could be carried out every 2 years after planting for a total of 3 times. Only 1 of these treatments would receive financial assistance under present management programs. The other 2 treatments would be at the landowners expense.

**Stand # 3**

Stand Description: Mature mixedwood stand on steep to inoperable slopes.

Species: Red maple, white and yellow birch, white spruce, balsam fir with scattered beech.

Age: 55 years

Recommendation: This stand could be left to mature naturally to minimize Erosion on steep slopes.

**Stand # 4**

Stand Description: Mature mixedwood stand with heavy mortality in balsam fir and white spruce due to bark beetle and blowdown.

Species: Balsam fir, white spruce, red maple and white birch.

Age: 51 years

Recommendation: This stand has very poor access and low merchantability due to past mortality and could be left to mature naturally at this time. Natural balsam fir regeneration is already well established in some areas.

**Stand # 5**

Stand Description: This is a wetland that is considered to be non productive forest land.

Species: Black spruce, balsam fir and red maple.

Recommendation: Although no harvest is being recommended adjacent to this stand, a special management zone has been designated for this area as per provincial regulations.

**Stand # 6**

Stand Description: Mature mixedwood stand on moderate to steep slopes.

Species: Red maple, white birch balsam fir and white spruce.

Age: 62 years

Recommendation: This stand has very poor access, steep slopes, softwood mortality from bark beetle and could be left to mature naturally at this time. Natural balsam fir regeneration is already well established in some areas and hardwood is generally healthy at this time.

**Stand # 7**

Stand Description: This is a wetland that is considered to be non productive forest land

Species: Black spruce, balsam fir and red maple

Recommendation: Although no harvest is being recommended adjacent to this stand, a special management zone has been designated for this area.

**Stand # 8**

Stand Description: Immature mixedwood stand.

Species: Red maple, white spruce and white birch.

Age: 38 years

Recommendation: This stand is generally healthy, immature, with poor access and could be left to mature naturally at this time.



**Stand # 9**

Stand Description: Immature to mature mixedwood stand on a poor salt water site bordering on the Bay of Fundy.

Species: Black, white and red spruce, balsam fir and red maple.

Age: 42 years

Recommendation: This stand has very low merchantable wood volumes, has low site capability and could be allowed to mature naturally at this time. A brook running out of stand # 10 has a very deep rocky gorge and a special management zone is recommended in this area. This SMZ could be widened to 40 meters on either side of the brook.

**Stand # 10**

Stand Description: Immature to mature mixedwood stand.

Species: Red maple, white birch and balsam fir.

Age: 40 years

Recommendation: A brook running out of stand # 12 has a very deep rocky gorge and a special management zone is recommended in this area. This stand could be allowed to mature naturally at this time. This SMZ could be widened to 40 meters on either side of the brook.

**Stand # 11**

Stand Description: Immature to mature mixedwood stand.

Species: Black and red spruce, balsam fir and red maple

Age: 42 - 65 years

Recommendation: This stand has moderate to heavy balsam fir mortality from bark beetle. Clear cutting could be carried out followed by site preparation and planting of red spruce seedlings 2 years after harvest. A special management zone is recommended adjacent to stand # 12. Hardwood areas should be utilized for Wildlife Clumps to minimize future blowdown. Additional fill planting of tolerant hardwoods could also be carried out, at the landowner's expense, to encourage Acadian forest species. Competition control after planting could be carried by manual weeding with brush saws after the leaves have fallen as an alternative to herbicide application. This could be carried out every 2 years after planting for a total of 3 times. Only 1 of these treatments would receive financial assistance under present management programs. The other 2 treatments would be at the landowners expense.

**Stand # 12**

Stand Description: This is a wetland that is considered to be non productive forest land  
Species: Black spruce, balsam fir and red maple  
Recommendation: A special management zone has been designated for this area.

**Stand # 13**

Stand Description: Immature to mature mixedwood stand.  
Species: White and red spruce, balsam fir and red maple.  
Age: 42 - 65 years  
Recommendation: Clear cutting could be carried out followed by site preparation and planting of red spruce seedlings 2 years after harvest. Hardwood areas should be utilized for Wildlife Clumps to minimize future blowdown. A class "D" road is being recommended through this stand. Additional fill planting of tolerant hardwoods could also be carried out, at the landowner's expense, to encourage Acadian Forest species. Competition control after planting could be carried out by manual weeding with brush saws after the leaves have fallen as an alternative to herbicide application. This could be carried out every 2 years after planting for a total of 3 times. Only 1 of these treatments would receive financial assistance under present management programs. The other 2 treatments would be at the landowners expense.

**Stand # 14**

Stand Description: Mature mixedwood stand with heavy mortality in balsam fir and white spruce due to bark beetle and blowdown.  
Species: Balsam fir, white spruce, red maple and white birch.  
Age: 45 years  
Recommendation: This stand has low merchantability due to past mortality and could be left to mature naturally at this time. Natural balsam fir regeneration is already well established in some areas.

**Stand # 15**

Stand Description: Mature mixedwood stand with heavy mortality in balsam fir and white spruce due to bark beetle and blowdown.

Species: White spruce and balsam fir with scattered red maple and white birch.

Age: 45 years

Recommendation: This stand has low merchantability due to past mortality and could be left to mature naturally at this time. Natural balsam fir regeneration is already well established in some areas.

**Stand # 16**

Stand Description: This is an alder wetland.

Species: Alder

Recommendation: Leave as a natural wildlife habitat.

## Annual Allowable Cut

The purpose of this Annual Allowable Cut ( A.A.C. ) calculation is to establish a sustainable harvest, in cords, for the woodlot.

Total Woodlot Pulpwood Volume	= 1021 cords
Total Woodlot Hardwood Volume	= 755 cords
<u>Total Woodlot Sawlog Volume</u>	<u>= 546 cords</u>
<b>Total Woodlot Volume</b>	<b>= 2,322 cords</b>

Von Mantel's formula for A.A.C.

$$Ya = \frac{2 * Ga}{R}$$

$$Ya = \text{A.A.C.}$$

Ga = growing stock or total inventory incords

R = rotation in # years

$$Ya = \frac{2 * 2322}{50}$$

$$Ya = 92 \text{ cords per year}$$

**Note :** An estimate of 570 cords is being recommended for harvest in this management plan. This is the equivalent of 6.2 years sustainable harvest and is the only harvest recommended in this 10 year period.

Table 1

**10 Year Forest Management Schedule with Estimated Stumpage Revenue**

Financial assistance is available through existing forest management programs for some treatments as shown below.

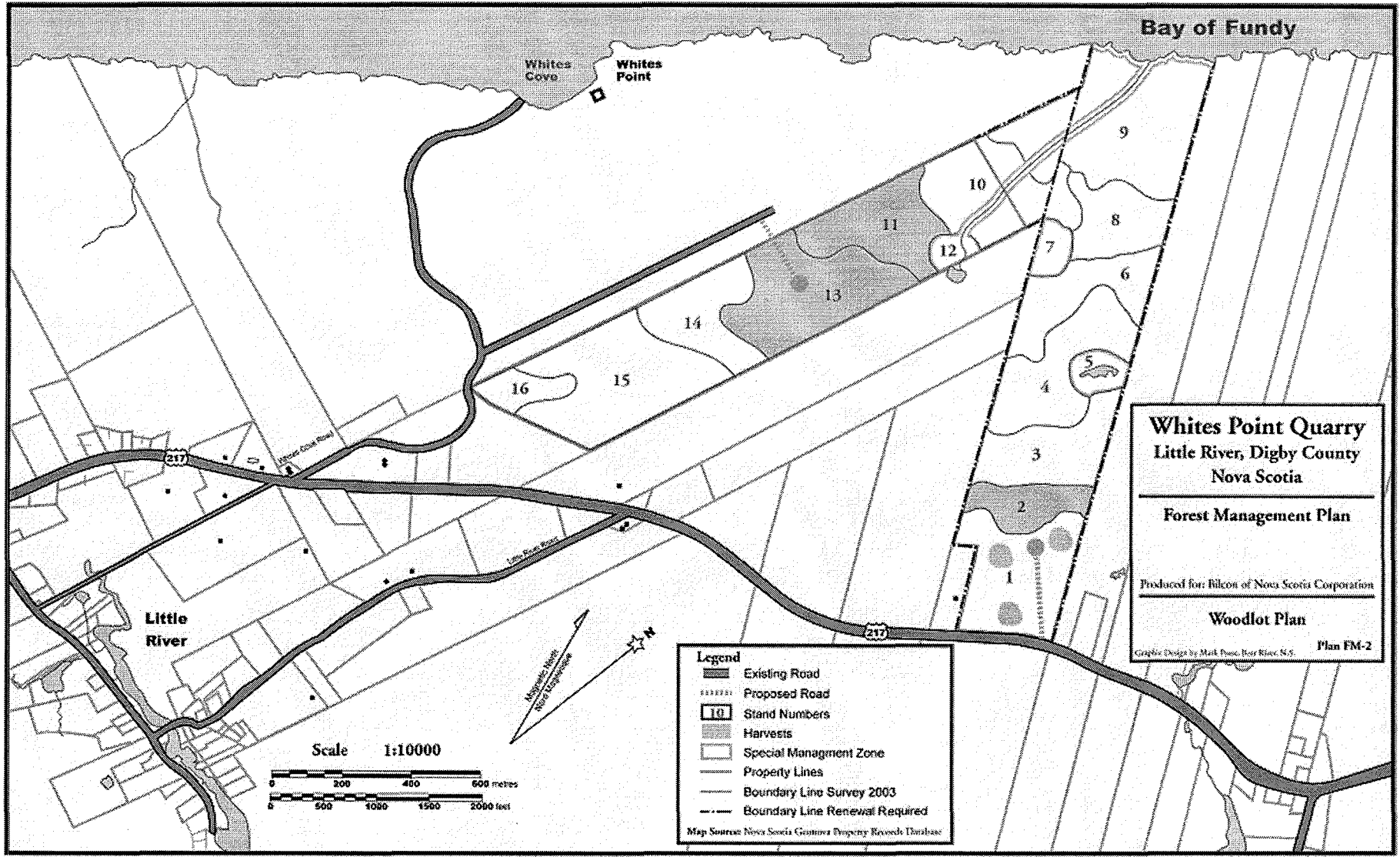
Year	Stand# / Acres	Treatment	Assistance Available	Estimate \$ Stumpage
2006	1 4.0	Group select	No	660.00
2006	2 9.4	Clear cut	No	6,400.00
2007	2 9.4	Site prep	Yes	
2008	2 9.4	Plant swd	Yes	
2008	2 9.4	Plant hwd	No	
2010	2 9.4	Man. Weeding	No	
2012	2 9.4	Man. Weeding	Yes	
2014	2 9.4	Man. weeding	No	
2006	11 17.0	Clear cut	No	2,900.00
2007	11 17.0	Site prep	Yes	
2008	11 17.0	Plant swd	Yes	
2008	11 17.0	Plant hwd	No	
2010	11 17.0	Man. Weeding	No	
2012	11 17.0	Man. Weeding	Yes	
2014	11 17.0	Man. weeding	No	
2006	13 29.6	Clear cut	No	10,325.00
2007	13 29.6	Site prep	Yes	
2008	13 29.6	Plant swd	Yes	
2008	13 29.6	Plant hwd	No	
2010	13 29.6	Man. Weeding	No	
2012	13 29.6	Man. Weeding	Yes	
2014	13 29.6	Man. weeding	No	
			<b>Total \$ Stumpage</b>	<b>\$20,285.00</b>

Table 2

## 10 Year Forest Management Constuction with Estimate of Costs

Project	Estimate of Costs	Year
Class "D" Road approximately 550 meters	\$ 6-10,000.00	2006
Boundary Line Renewal 3.6 km * \$1500/km	\$ 5,400.00	2006







*9.2.2 Aquatic Ecology – Freshwater*

EIS Reference: EIS Volume VI, Chapter 9, Section 9.2.2

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### 9.2.2 Aquatic Ecology – Freshwater

#### WP 1452 – Joint Review Panel

#### 9.2.2 Aquatic Ecology – On-site Freshwater

9.2.2.1 – *The Proponent proposes to use the bog/marsh to polish effluent from the settling ponds. At the same time, it will designate the bog as an environmental protection area. Effluent from the quarry site will pass through this wetland to be cleansed of harmful elements on its way to the ocean. The Panel requires additional information for its assessment including:*

- *the dimensions of the coastal bog/marsh, and documentation (including maps at sufficient resolution) of where and how it currently drains;*
- *an indication of the soil depth, type, and water storage capacity (based on a series of cores/samples collected on transects both parallel and perpendicular to the coast);*
- *an indication of the salinity of the water in different areas of the bog/marsh;*
- *estimates of the current and projected water flow through the bog/marsh (in average and extreme weather conditions, and during periods when water is being stored for operational purposes);*
- *estimates of potential sediment and solute loads into the bog/marsh as a result of the Project; and*
- *an assessment of the effects of the Project on the bog/marsh and its capacity to continue to function as projected.*

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#### RESPONSE

As mentioned previously in Section 7.0 of the Revised Project Description, Bilcon does not intend to use the coastal bog to “polish effluent”. This bog area will be managed as part of the proposed environmental preservation zone and maintained in its existing condition. An expanded buffer area is proposed around the bog – see **Plan IR - 7** included with the Revised Project Description. More detailed information regarding the coastal bog follows.

As shown on **Plan CB - 1**, the area of the bog is approximately 1.5 hectares. The bog slopes toward the Bay of Fundy and drains into the Bay as shown on **Plan IR - 7**. Typical sections of the bog are shown on **Figure CB - 1**.

This is a sloping bog dependent upon rainfall. On-site observations indicate the bog to have a few small areas with shallow standing water or no visible surface water depending upon the time of year. Since the surface of the bog slopes toward the Bay, any surface water storage capacity is continually fluctuating, depending on the amount of precipitation. Core samples in the bog will be taken, if requested by the Panel, during the industrial permit phase of the project.

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Water quality sampling at the out fall of the bog was conducted at sample station WWP – 6 in 2002 (Map 12 of the EIS). Laboratory analysis for bacteriology, general chemistry, and trace metals for sample station WWP – 6 are contained in Appendix 45 of the EIS. Since this is a sloping bog, draining toward the Bay at an approximate 4% gradient, only the lower margins of the bog adjacent to the Bay would be subject to salt water intrusion during extreme high tides. The greatest amount of water entering the bog would be freshwater from terrestrial runoff from rainfall and snow melt. Salinity measurements of the water in different areas of the bog will be taken, if required by the Panel, during the industrial permit phase of the project.

Water flow through the bog is dependent upon rainfall and surface water runoff from an approximate 55 hectare watershed. This watershed consists of many small watercourses cut into the exposed basalt rock. The difficulty in plotting streams in this type of topography is illustrated on **Plan OP1 – R1** which shows a stream flowing from a small pond/wetland within the coastal bog watershed. The location of this stream on the provincial 1:10 000 topography mapping appears to be in error. On-site field investigations during preparation of a Forest Management Plan (Berry 2006) for the property owned by Bilcon adjacent to and to the east of the quarry site identified the primary flow from this pond/wetland to be northwest through a deep gorge into the Bay of Fundy and not feeding the coastal bog. Also, on-site field investigations by Brylinsky and Kern 2005 observed no stream as shown on **Plan OP1 – R1**, rather two intermittent watercourses and unconfined surface runoff feeding the bog. An attempt to monitor water flow in one of the watercourses was not successful due to insufficient flow. This could also be confirmed by NSDEL's site investigation in 2002 and DFO's investigation of the area as fish habitat in 2002.

Runoff calculations for the quarry watershed are contained in Reference Document V – 30 – Hydrologic Budget and in supplemental information contained in responses to the Panel's comments in this Comment and Response Submittal. Monthly runoff data is contained in the referenced documents for average, extreme, and low precipitation events. A portion of the watershed runoff, from off site, is proposed to be directed to the coastal bog. This is intended to compensate for watershed disturbance adjacent to the coastal bog on the quarry property. Approximately 17 hectares of the bog watershed will be disturbed during construction of the temporary rock storage area and subsequently sediment pond 5. These disturbed areas are a priority for reclamation. Reclamation is scheduled to begin in Year 6 and this portion of the bog watershed would be fully reclaimed by Year 14, except for the surface water area of sediment pond 5. It should be noted that even if all the runoff from the off-site (38h) watershed was directed to the bog and not to the sediment ponds for quarry water use, the runoff from the comparable watershed south of Whites Cove Road, scheduled to function as a back-up water supply, would off-set this temporary loss of water for quarry use.

Environmental controls (drainage ways, pipes, and berms) will be installed during construction of the temporary rock storage area and sediment pond 5. Sediment from

### *9.2.2 Aquatic Ecology – Freshwater*

construction in this area will be directed to sediment pond 4. Water supply to the bog will be taken from the undisturbed area of the bog watershed mentioned above which should only contain naturally occurring total suspended solids. Further investigation, if requested by the Panel, will be conducted during the industrial permit phase of the project and before construction regarding existing water flow into the bog.

Bilcon's intent is to maintain the coastal bog in its existing condition by implementing appropriate environmental controls during construction and by maintaining off-site water supply as required during construction and operation.

*9.2.3.2 Bioaccumulation in Locally Harvested Species – Clarify who will conduct the monitoring of VECs throughout the course of the Project to ensure that the effects of Project-derived metals are not significant. Ensure that monitoring intervals reflect a precautionary approach.*

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#### **RESPONSE**

##### **EIS Coverage**

Section 9.2.3.2 of the EIS is labelled Analysis and does not address the issue of bioaccumulation in locally harvested species. However, it is addressed in Section 9.3.21 Human Health - Country Foods.

A response to the human health issues pertaining to copper in locally harvested species is provided later in this document.

Bilcon will be responsible for all monitoring of VEC's throughout the life of the project. Conceptual monitoring plans are presented in the EIS and in some instances further defined in this Comment and Response Submittal. Bilcon will adhere to acceptable scientific sampling procedures and use accredited laboratories for sample analysis. Monitoring intervals will reflect a precautionary approach. Results will be coordinated with the appropriate regulatory agency and made available to the public.

Since the Project area has a naturally high background copper concentration, it is not expected that metal concentrations in intertidal and offshore waters will exceed current background conditions due to the site operations. Precautionary measures will reduce the possibility of contaminants entering the marine environment and affecting marine organisms. It is proposed that all outflows from sediment retention ponds be sampled semi-annually and analyzed for copper (see section 5.0 Contaminants for additional information). Total Suspended Solids and pH sampling and analysis are already planned (weekly) and that will indicate any change in that aspect of water quality. Bioaccumulation of several metals is already occurring due to the background levels. Background levels of copper have been

### 9.2.2 Aquatic Ecology – Freshwater

analyzed in periwinkles (22.1 mg/kg; see Appendix 31 of EIS). A sampling program for periwinkle has been proposed (see section 7.0 9.3.21 Human Health – Country Foods). However, bioaccumulation (BCF) has been found not to be a useful indicator of hazard for metals to aquatic organisms (Adams et al. 2000; Chapman et al. 2003). Many invertebrate organisms that could potentially be monitored (e.g., molluscs, crustaceans) are able to regulate and/or store copper (Bryan 1968; Dallinger 1977) with large differences in residues found in muscle (low) versus regulatory organs (high) such as the hepatopancreas (Bagatto and Alikhan 1987).

It is highly unlikely that any potential release from the site could be detected in the local biota. The proposed sampling program reflects a precautionary approach. Therefore, sampling of additional VEC's is deemed unnecessary at this time.

#### **WP 1403 – Nova Scotia Department of Agriculture and Fisheries**

*Staff have reviewed this submission and have offered no comments at this time other than to note the presence of significant efforts to mitigate fishery habitat related issues*

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#### **RESPONSE**

Comment noted

#### **WP 1498 – Nova Scotia Department of Environment and Labour**

**Darrell Taylor-Water and Wastewater Branch–NOTES–questions 1, 2, 3, 4, 7, 9, 10, 11, 12, and 13 have been put under surface water**

*5) At least three watercourses have been identified on the project site; two of which are near the boundaries of the project to the north and south, and one which originates in a pond or wetland beyond the project boundaries to the east and draining to the coastal bog identified near the shoreline of the Bay of Fundy. All are identified as intermittent streams with low or no flow during the late summer period. The two watercourses at the north and south boundaries are proposed to be included in 30 meter “Environmental Protection Zones” or vegetated buffer areas to ensure their protection. It might be beneficial to extend the Environmental Protection Zones to include the area around the third watercourse which flows to the coastal bog as well. This would help ensure protection of the bog and allow the existing watercourse to be maintained as habitat for aquatic life.*

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#### **RESPONSE**

As indicated above, the “middle” stream flowing into the coastal bog as shown on the provincial 1:10 000 topographic mapping, could not be found as indicated. However, protection and mitigation proposals for the coastal bog are detailed in the response to the Panel's question under 9.2.2.1.

### 9.2.2 Aquatic Ecology – Freshwater

6) *The current approval from NSDEL to Nova Stone Exporters Inc. for the quarry (Volume IV, Appendix 33) requires the proponent to maintain separation distances of 30 meters from the active area of the quarry to any watercourse. It is unclear exactly what is proposed in the EIS related to development of the quarry and the watercourse that drains to the coastal bog.*

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#### RESPONSE

Although no stream was found, the active quarry area will disrupt a portion of the watershed of the coastal bog. A more detailed plan of the coastal bog area is shown on **Plan IR – 7** included with the Revised Project Description for the EIS. This plan indicates an extension of the 30m environmental protection zone landward of the coastal bog. It is also proposed to collect surface water runoff from the watershed above the quarry road and pipe this runoff to the coastal bog. Reclamation of the disturbed portion of the watershed around sediment pond 4 will begin in Year 2 and continue around sediment pond 5 in Years 6 – 10. Complete reclamation of the coastal bog watershed, except for sediment pond 5 is scheduled to be completed in Year 14.

7) *If avoidance of all watercourses are not possible, and planned diversions of watercourses (as mentioned in section 9.1.6.3) are necessary for a viable project then approvals for watercourse alterations or diversions would likely be required.*

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#### RESPONSE

Bilcon acknowledges the necessity for approvals for watercourse alterations or diversions should these become necessary.

A representative from NSDEL inspected a proposed watercourse diversion in the watershed of the coastal bog in 2002. More specific plans are now available in relationship to the proposed quarry site development. Appropriate approvals for any watercourse alterations or diversions will be requested from NSDEL by Bilcon for this particular watershed.

8) *A sound rationale should be provided for diverting the watercourse(s) feeding the coastal bog and creating a sedimentation pond in that location, in year 5 or 6 of the operation, if that is proposed. Maps Plan OP-1 and Plan OP-2 seem to indicate this. Otherwise avoidance and protection of the watercourse would be appropriate.*

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#### RESPONSE

The proposed quarry site development (temporary rock storage and the subsequent sediment pond 5) are critical aspects of the quarry development, especially sediment pond 5. Bilcon intends that the proposed plan for protection of the coastal bog will preserve this resource during the short-term disruption of the bog watershed. In addition to the buffer area around

### 9.2.2 Aquatic Ecology – Freshwater

the bog, berms will be constructed to control runoff during site preparation of the temporary rock storage area and subsequent construction of sediment pond 5.

*11) Proposed water quality and quantity monitoring programs relate to effluent discharge from the sedimentation ponds only. It would be beneficial additionally for all watercourses on site to be part of the effects monitoring program to confirm impact prediction and to assess whether mitigation is effective. The baseline water quality and quantity monitoring program at upstream and downstream location of areas of influence from the quarry would serve well as follow up effects monitoring post-development. This would be in the proponent's interest particularly where the southern watercourse originates outside the project area, and as recognized in the report, is "subject to the prevailing activities" in the watershed upstream of the proponent's property.*

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#### RESPONSE

Bilcon agrees that all watercourses on site should be part of the effects monitoring program to confirm impact prediction and to assess whether mitigation is effective.

Baseline water quality data was collected at the outfall into the Bay of Fundy (W.W.P. 2) and off-site (W.W.P. 8) above the influence of the permitted 3.9 hectare quarry on the Whites Point site. This data is presented in paragraph 9.1.6.2 of the EIS and indicates sediment control measures were effective in controlling total suspended solids (TSS) in accordance with the 3.9 hectare quarry permit.

Baseline water quality data was also gathered at water sample station W.W.P. 6 at the outflow of the coastal bog. In addition to the required water quality monitoring from the sediment ponds outfall shown on **Plan IR – 7**, Bilcon proposes the following:

Prior to construction in the area of the coastal bog, water flow at the outfall of the bog into the Bay will be measured. This will be conducted on a seasonal basis. Subsequently, after construction and through reclamation, this sampling station would be monitored seasonally for water quality and quantity. Moreover, off-site runoff to be fed to the coastal bog will be monitored at inflow and outflow points during temporary disruption of the bog watershed. The objective of this monitoring is to provide a comparison of flow quality and quantity in order to confirm the effect prediction and that mitigation measures are effective.

*12) Characterization of water quality in freshwater monitoring programs typically involves analysing nutrients such as phosphorus and nitrogen to the lowest detection limits available. This allows better characterization, comparisons over time and space, and avoids water quality reporting of non-detectable concentrations as seen in Volume IV, Appendix 45. Although nutrients are unlikely to be an issue with this project, it would be beneficial to*

### 9.2.2 Aquatic Ecology – Freshwater

*include low level nutrient analysis to any subsequent freshwater monitoring programs for receiving waters.*

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#### RESPONSE

It is agreed that it would be beneficial to include low level nutrient analysis to any subsequent freshwater monitoring programs for receiving waters.

*13) The Little River has been identified as a larger more significant watercourse outside of the project area. Proposed mitigation measures related to drainage from a small piece of its watershed lying in the project area should ensure protection of that resource.*

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#### RESPONSE

Comment noted.

#### WP 1541 – Fisheries and Oceans Canada Vol. I – Plain Language Summary

*Page 27 – The document states, new sediment ponds comprising 20 acres of surface water will create aquatic/wetland habitat.” What species would be expected to use this habitat? Would there be any treatment (chemical, biological or physical) of the settling pond that could have an impact on this created habitat or the species that would use it?*

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#### RESPONSE

The construction of sediment ponds and a constructed wetland is expected to create aquatic/wetland habitat not usual in this area. Species most likely to use these habitats may be different than those already found on the Whites Point site. Specific species to use these created habitats during progressive successional stages are identified in response to Environment Canada’s Item #15 Habitat Value of Constructed Wetlands and Sediment Retention Ponds contained in Section 9.2.1 - Terrestrial Ecology in this submission.

No chemical treatment of the sediment ponds, such as flocculents, are proposed. Biological treatments such as planting the sediment pond berms is proposed as well as planting the constructed wetland. Physical cleanout of accumulated sediments in the ponds will be required. To reduce the disturbance of clean-out activities, a “sediment forebay” in pond 5 is proposed to facilitate maintenance of sediments. The forebay would trap sediments in a portion of pond 5 where runoff enters pond 5. The forebay would require more frequent clean-out, however, the remainder of the ponds would remain relatively undisturbed and allowed to mature.



### *9.2.2 Aquatic Ecology - Freshwater*

#### **Volume III – Maps**

*Map 15 – Digby Neck – Important Freshwater Wetlands – there is no indication as the meaning of the score in the legend.*

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#### **RESPONSE**

The source of the information presented on this map is the Nova Scotia Department of Natural Resources – Wetland Atlas. The score was developed by NSDNR.

#### **9.2 Biological Environment and Impact Analysis**

##### ***9.2.2 Aquatic Ecology – On-site Freshwater***

*Page 48 – for surface water impacts, as mentioned previously, if there is no effect, what is the purpose of providing duration and scale for the effect?*

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#### **RESPONSE**

This was done to maintain consistency of application of environmental evaluation criteria. Please refer to Table 3.10 – Environmental Effect Summary for the Freshwater Aquatic Environment in Section 8.1 – Impact Assessment Methodology in this document.

*9.2.3 Aquatic Ecology – Marine*

EIS Reference: EIS Volume VI, Chapter 9, Section 9.2.3

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### 9.2.3 Aquatic Ecology – Marine

#### WP 1452 – Joint Review Panel

9.2.4.1.11 *Waterbird Species at Risk – What evidence was used to determine that the Common Loons sighted do not belong to the Nova Scotia breeding population? On what basis has the Proponent concluded that only a small number of Common Loons are expected to be exposed to Project activities (despite evidence that considerable numbers were observed congregating at the site)?*

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#### RESPONSE

The statement that common loons wintering along the coasts of Nova Scotia are likely to be mainly from populations that breed in more northerly areas was based upon general knowledge of this species and its behaviours; e.g. McIntyre and Barr (1997) describe the common loon as a “Medium distance complete migrant” and Tufts (1986) indicates that in Nova Scotia there are “definite migrations along the coast: north largely between mid-March and late April, and south between mid-September and late November.” While in recent years the tagging of common loons with satellite tracking gear has led to a greater understanding of the migration routes and wintering areas of some breeding populations in the interior of North America, similar work has not been conducted in Nova Scotia hence migration routes and wintering areas for Nova Scotia common loons remain the subject of speculation.

Lacking reliable information concerning wintering areas for loons breeding in Nova Scotia , application of the precautionary principle would require that we reject what we believe to be true based on general biological knowledge and make some very conservative assumptions. These assumptions would be:

- a) that the Nova Scotia breeding population of common loons and their young migrate from their inland breeding lakes to nearby coastal waters of Nova Scotia where they winter,
- b) the immature segment of the Nova Scotia population (common loons first attempt to breed at an average age of six years (Evers, 2004)) also winter in the coastal waters of Nova Scotia.

Although our very conservative assumptions are that all Nova Scotia loons winter along the Nova Scotia coast, it seems quite likely that wintering loon populations using the Nova Scotia coast also include numbers of loons from populations breeding further north (Kerekes, *pers. comm.*).

The best current estimate of the number of breeding pairs of common loons in Nova Scotia is 1200 (Erskine, 1992). Including immature birds and young of the year, using population parameters as described by Evers (2004), a rough estimate of the Nova Scotia wintering population would be about 3300 birds. The maximum number of common loons observed along the coastline of the Bilcon property was recorded during a land-based survey conducted between 0810 and 1223 h on 7 February, 2005. During this survey 14 common loons were observed scattered along approximately 2.5 km of the property coastline. If we

### *9.2.3 Aquatic Ecology – Marine*

were to make a further conservative assumption that all these loons were from the Nova Scotia population then this would suggest that approximately 0.4% of this population might inhabit the coastline adjacent to the Bilcon property. These crude calculations would certainly represent a worst case scenario.

Boat surveys conducted on 9 February, 2005 indicated higher densities of common loons in the ~3 km of the coastal waters adjacent to the property (3.2 loons/km) than in the surveyed waters of Digby Neck to the south (~8 km; 0.0 loons/km) and north (~16 km; 1.6 loons/km) of the property. However, neither the boat survey nor the land based survey indicated a “congregation” of loons; rather loons were scattered along the coast in a manner suggestive of a species exploiting a more evenly spaced food source (Evers, 2004). In Bilcon’s opinion, the maximum number of loons (14) observed using the coastal waters adjacent the property do not constitute “considerable numbers”, even in the light of the conservative assumptions made above.

Disturbance from quarry operations would constitute the major potential for impact on loons in the vicinity of the quarry and this could result in their exclusion from habitats adjacent to the source of disturbance. It would seem most likely that loons and other waterbirds would be most sensitive to activities occurring within the marine environment they inhabit. Project activities in the marine environment during the operations phase of the project are confined in space to the area around the marine terminal and in time to the weekly arrival, loading, and departure of a carrier vessel which would normally take place over a 24 hr period. Loons tended to be distributed mainly as scattered, lone individuals therefore not all birds using the coastal waters of the property would be exposed to the same level of disturbance from marine terminal activities; some could be as far as 2 km from the marine terminal. Furthermore, Bilcon has indicated that maintenance work will be conducted during January and February and during that time quarry production activities and shipping will be curtailed. Thus disturbance of adult loons during their sensitive winter moulting period (January to March) would be minimized.

The periodic disturbance generated by activities associated with the marine terminal would, of course, be in addition to disturbance in the marine environment caused by boat activities associated with lobster fishing which is ongoing in the coastal waters of the Digby Neck area from December through May. It would appear that common loons have acclimated to the disturbance caused by lobster fishing activities and might show a degree of acclimation to the periodic activities at the terminal.

Land based activities would likely have less potential to displace common loons from their coastal feeding habitats than marine based activities. Noise from extraction activities in close proximity to shoreline might cause loons to be excluded from the marine environment immediately adjacent to these operations for their duration. However, the proposed

### 9.2.3 Aquatic Ecology – Marine

environmental protection zone, as well as the relatively high noise levels that are naturally generated within coastal waters, should provide a buffering effect between land based activities and the marine environment. As stated above, Bilcon has indicated that extraction activities will be curtailed when maintenance work is being done during the months of January and February.

In summary, neither direct mortality of common loons through interaction with project activities, nor significant loss of habitat is anticipated. Periodic (one day per week maximum) disturbance associated with shipping activities would likely exclude loons from habitat adjacent to the terminal facility during those activities. Extraction activities close to shoreline might also exclude common loons from habitat in the immediate vicinity of these operations for their duration. Both of these activities are expected to be curtailed during January and February; perhaps the most critical times for wintering adult (moulting) loons. During our studies, a maximum of 14 wintering loons were observed scattered along 2.5 km of the property shoreline. If we make the very conservative assumption that all of these birds are from the Nova Scotia breeding population, these birds would constitute approximately 0.4% of the population. Not all of the loons using the coastline of the property would be similarly exposed to or potentially affected by the activities associated with the quarry.

#### References

Erskine, A.J. 1992. Atlas of Breeding Birds of the Maritime Provinces. Nova Scotia Museum, Halifax, Nova Scotia. 270 pp.

Evers, D.C. 2004. Status Assessment and Conservation Plan for the Common Loon (*Gavia immer*) in North America. U.S Fish and Wildlife Service, Division of Migratory Birds, Hadley Maryland. 87 pp.

McIntyre, J. W., and J. F. Barr. 1997. Common Loon (*Gavia immer*). In *The Birds of North America*, No. 313 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.

Tufts, R. W. 1986. Birds of Nova Scotia. Nova Scotia Museum, Halifax, Nova Scotia. 478 pp.

#### Personal Communications

Kerekes, Joseph. Research Scientist Emeritus, Environment Canada, Canadian Wildlife Service, Dartmouth, Nova Scotia.

## 9.2 Biological Environment And Impact Analysis

### Page 16 - 9.2.4.3. Waterbird and Mammal Mitigation

9.2.4.3 Waterbird and Mammal Mitigation – *If a Project employee observes marine mammals or water birds within predetermined distances from the quarry site, and if that information is transmitted to the captain of the ship, what mitigation measures will the*

### 9.2.3 Aquatic Ecology – Marine

*Proponent expect the ship to take in order to limit effects? Will those conditions be stipulated in the contract with the shipper? How accurate are those observations expected to be at the proposed distances under variable weather conditions?*

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#### RESPONSE

As noted elsewhere in this document, the ship will leave the shipping lanes at or less than a speed of 12 knots. This speed will diminish as the ship nears the terminal to a speed of 1 knot. Contact with the ship's captain will be maintained throughout this transit and if a project employee observes marine mammals or waterbirds in the designated lane from the shipping lane to the terminal, this information will be transmitted to the ship's captain. The ship's captain will have two alternate strategies. During the lobster season the captain will further reduce speed and outside of the lobster season, the captain may alter his course or reduce speed or both. These conditions will be stipulated in the contract with the shipper. Observations from the shoreline will clearly vary with the distance to the shipping lanes and with weather conditions. It should be noted again, that the primary mitigation measure is the slow speed of the ship in the area between the marine terminal and the shipping lanes.

*9.2.6.2 Fish, Threatened and Special Concern, Analysis – What are the possible effects of a major breach of the sediment ponds or the berms enclosing the sediment disposal area on species in the Bay of Fundy ecosystems, especially those that may be endangered:*

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#### RESPONSE

With respect to the sediment ponds, it is anticipated that the majority of sediment will be contained in ponds four and five. It is calculated that 10,300 cubic metres of sediment will be deposited each year in the sediment ponds. The ponds have been designated for a one in one-hundred year rain event and calculations show that under normal operating conditions, the ponds will contain that event. Should the one in one-hundred year rain event occur when water levels in the ponds are high, water will be discharged via concrete spill ways into the next pond and finally into the constructed wetland and into the Bay of Fundy. The berms surrounding the sediment ponds will not be over-topped due to the spill ways so a breach from the top will not occur.

The berms themselves will be constructed of rock material and will be designed to ensure that a slump does not occur. As above, the maximum amount of sediment contained in the sediment pond system will be 51,500 cubic metres after a five-year period. A major breach in either of the two upper ponds could lead to a significant volume of the sediment being discharged to the constructed wetland, and ultimately to the Bay of Fundy. This would have a serious effect on the constructed wetland, necessitating a major clean-up. The balance of material not retained in the constructed wetland would be discharged to the Bay of Fundy. Given the high dispersal rate, no permanent adverse effect would be anticipated.

### 9.2.3 Aquatic Ecology – Marine

However, the purpose of the sediment ponds is to prevent any sediment from reaching the waters of the Bay of Fundy and the design of the berms and spillway will be carried out to ensure that a breach cannot occur.

The sediment from the high rate thickener will be pumped to the sediment disposal area on the east side of the quarry site. It will be contained in two bermed cells and will be used at the end of each five-year period mixed with topsoil for reclamation purposes. Below the bermed cells, a safety berm will be constructed to contain the sediment, should a cell berm be breached. It should be noted that while sediment pumped into the cells is initially a thick viscous liquid, it very quickly hardens and typically within a few weeks, it is capable of being driven on by heavy vehicles.

The bermed cells themselves are on generally level ground and the possibility of slumping of the materials in the cells is remote. There is also a significant distance between the west cell berm and the west safety berm comprised of uneven ground with extensive vegetative cover.

As with the sediment ponds, the berms for the two cells and the safety berm will be constructed of rock material and the precautionary principle will be used in the design. The result of a major breach in either of these berms will be an on-site clean-up but no sediment will reach the Bay of Fundy.

Please refer to Section 7.0 Revised Project Description, Environment Canada, Item #7 and Section 11.0 – Accidents and Malfunctions in this document.

#### 9.2.9 Blasting

*The Panel requires better information on the potential effects of blasting on marine species at this site.*

**9.2.11.2 Harbour Porpoise (and Seals)** – *Harbour porpoises, commonly sighted off White Point, are a species of concern. Provide evidence to substantiate the claim that a distance of 170 m from a blast is acceptable for these animals without lasting physiological or behavioural effects.*

*DFO has suggested monitoring seal colonies near the site before, during and after blasts occur to gauge effects on behaviour. Describe how that suggestion has been incorporated into the monitoring plan.*

---

#### RESPONSE

The CONWEP model was used to determine possible effects from blasting on cetaceans (whales, porpoises, and dolphins) and pinnipeds (seals) – see Ref. Vol. V, Tab. 27 (Hannay and Thomson 2003) of the EIS.

### 9.2.3 Aquatic Ecology – Marine

Data on behavioural responses of marine mammals to explosions are limited for pinnipeds. Some response may be evident, however, pinnipeds seem quite tolerant of noise pulses from explosives. Also, the behaviour of harbour seals living near a major airport show that they have apparently become habituated to repeated aircraft over flights (Richardson et al 1995). Further, DFO indicates “seals are considered to be more behaviourally tolerant to loud sounds and to have less sensitive underwater hearing relative to many cetacean species (DFO 2006).

Modeling was conducted using the variables outlined for an initial (test) blast at the quarry site. The results of this modeling for the initial blast indicate a safety range for pinnipeds (seals) could be approximately 170m if inverse distance (1r) acoustic spreading transmission loss is assumed. The 170m is based using the variables indicated for the initial blast. Bilcon intends to curtail blasting if pinnipeds are observed within 170m of the detonation.

Modeling for cetaceans (whales, porpoise, and dolphins) using the variables outlined for an initial (test) blast at the quarry site indicates a 500m safety range appears appropriate for cetaceans. Further, Fisheries and Oceans Canada’s review of Bilcon’s Blasting Protocol indicates “it is considered unlikely that blasting would result in physical effects on marine mammals, endangered or otherwise, beyond 500m”. It was not intended to imply that the safety range of 170m for pinnipeds was to be applied for the harbour porpoise. Bilcon intends to curtail blasting if cetaceans are observed within 500m of the detonation.

Monitoring of the seal colony at Crowells Cove as proposed in Bilcon’s Blasting Protocol will be conducted in coordination with DFO. Visual monitoring of the behaviour of the seal colony is proposed prior to, during, and after the initial blast. The approach will be to monitor and document any behavioural reaction to the initial blast event. As recommended by DFO, observations will be conducted during the breeding season and by an experienced biologist. Video documentation is proposed and the details of monitoring will be coordinated with DFO prior to the initial blast.

*How does the Proponent intend to verify the results of the blasting model in the absence of a test blast?*

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#### **RESPONSE**

The initial blast at the quarry site will be conducted as a test blast using monitoring protocols agreed to in discussions with Fisheries and Oceans Canada. The monitoring results will be carefully examined against the predictions from the blasting model and adjustments will be made to the blasting protocol and design if required.



### 9.2.3 Aquatic Ecology – Marine

#### 9.2.13 North Atlantic Right Whale – Ship Interactions

*Based on existing records of vessel-whale interactions in the Bay of Fundy, provide a quantitative risk analysis of such a collision by a ship serving the Project over its anticipated 50-year lifespan.*

---

#### RESPONSE

In a personal communication with Moira W. Brown, Ph.D., Senior Scientist, Right Whale Research, New England Aquarium and Canadian Whale Institute, Bilcon was advised that a quantitative risk assessment of a North Atlantic right whale – ship interaction by a ship serving the project over its anticipated 50 year lifespan would be difficult if not impossible.

Bilcon notes the following from the section entitled “Marine Mammals under Comments on the Conclusions of the EIS, page 32, Fisheries and Oceans Canada comments on the Whites Point Quarry and Marine Terminal Project to the Joint Review Panel, August 2006. “The conclusions provided in the EIS regarding collision risk with right whales are generally correct. The increased ship traffic due to the proposed activity, and the proposed route for these vessels, will result in an increase in the probability of vessel-whale interaction along the proposed route, but the increase will not be substantial. The likelihood of collision will still be low in the immediate vicinity of the marine terminal relative to other regions in the Bay of Fundy (such as in the vicinity of the Conservation Zone).

*Since the EIS states that both 44 and 50 vessel-visits are expected annually, identify the correct number.*

---

#### RESPONSE

The precise number of vessels is not known due to the varying carrying capacities of the ships that may be used. It is Bilcon’s view that between 44 and 50 vessel visits can be expected annually.

*Identify the planned mitigation measures that will be employed to avoid a whale collision and indicate if those measures will be written into the contract with the shipper.*

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#### RESPONSE

Please refer to 9.2.13.3 Mitigation in EIS Volume VI and to the response to 9.2.4.3 Waterbird and Mammal Mitigation in Section 9.2.3 – Aquatic Ecology – Marine in this document.

### 9.2.3 Aquatic Ecology – Marine

**Reference Documents V.2 Tab 12** – *The consultant recommends that better baseline data be provided on Total Suspended Solids (TSS). Provide that information.*

---

#### RESPONSE

Monitoring of total suspended solids (TSS) flowing to the intertidal zone was conducted by Bilcon during 2002, 2003, and 2004. After his June 2003 sampling, Dr. Brylinsky made a recommendation that monitoring of TSS be continued on a weekly basis and more frequently during construction. TSS sampling at all identifiable outflows from the quarry site, to obtain seasonal variation, was also recommended.

The out fall from the cleared and grubbed 3.9 hectare quarry site (sample station W.W.P. 2) was sampled by Bilcon on a weekly basis for TSS. This was required by NSDEL as part of the industrial permit's terms and conditions for the 3.9 hectare quarry. This sampling took place from May 6, 2003 through January 7, 2004. Laboratory analysis of the water samples was prepared by PSC Analytical Services. This data is contained in Appendix 45 of the EIS. Upon approval of an industrial permit to operate the proposed quarry, and before construction, Bilcon will install a continuous monitoring system at the proposed out fall into the Bay.

Additionally, six tide pools were recommended for monitoring of organic and inorganic composition of any accumulated sediments. After Dr. Brylinsky's initial sediment analysis of the tide pools in June 2003, no further sampling was conducted in the tide pools since no evidence of excessive sediments were noted during out fall water sampling.

**Reference Documents V.2 Tab 13** - *The consultant recommends several commitments that might be added to the contract with the shipper to limit the risk of invasive species. Is the Proponent adopting these commitments?*

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#### RESPONSE

Ballast water control and management regulations under the *Canada Shipping Act* came into effect on June 8<sup>th</sup>, 2006. Bilcon's shipper is required to comply with these regulations

#### Contaminants

*Provide information on the potential effects of copper on marine life. What are the normal range of levels and acceptable levels for marine sediments and waters? What organisms could take up or accumulate copper and what organisms are particularly susceptible to the presence or effects of copper? What strategies may be applied to mitigate (a) the potential release of copper in the marine environment or (b) the effects of its release?*

### 9.2.3 Aquatic Ecology – Marine

#### RESPONSE

##### EIS Coverage

This information is not currently in the EIS. A summary of the fate and effects of copper in marine life is presented below in the response to panel questions.

Embryo-larval life-stages of bivalve mollusc represent the genera most sensitive to copper (USEPA 2003). By sensitivity rank, the genera are *Mytilus* (GMAV1 = 11.5 µg/L) and *Crassostrea* (GMAV = 12.6 µg/L). No chronic toxicity data exists for these genera. Chronic data were available for the sheepshead minnow, *Cyprinodon variegatus*. In that study, the chronic value, based on growth as the most sensitive endpoint, was 249 µg/L. The 96-hour LC50 was 368 µg/L. The U.S. EPA is currently using an Acute to Chronic Ratio (ACR) of 3.1 to determine the chronic criterion. Data of acceptable quality pertaining to bioaccumulation of copper in marine or estuarine organisms are given for polychaete worms (BAF = 1,006–2,950), mussels (BAF = 2,491–7,730), and Pacific oysters (BAF = 33,400–57,000).

According to the ATSDR (2004), the concentration of copper in lakes and rivers typically ranges from 0.5 to 1,000 µg/L with an average concentration of 10 µg/L. The average copper concentration in groundwater is 5 µg/L. The average concentration of copper in tap water ranges from 20 to 75 µg/L. The concentration of copper in the oceans has been reported to be in the range of 1-34 µg/L at sites from Woods Hole, MA to the Bahamas (Galtsoff 1943). Jenkins (1981) reported it as 3 µg/L. Copper in samples of marine water from sample station 5 off of the Whites Point Quarry site ranged from 0.4 to 0.8 µg/L.

The current Canadian water quality guidelines (CCME 2006) for copper in freshwater range from 2 – 4 µg/L, depending on a hardness (CaCO<sub>3</sub>) ranging from 0 to >180 mg/L. No guideline for copper in seawater is given. The guideline for copper in community water, based on an aesthetic objective, is ≤1000 µg/L. Water for agricultural use in irrigation is allowed to contain copper at 200 to 1000 µg/L and water for livestock, 500 to 5000 µg/L. The current U.S. EPA water quality criteria (USEPA 2006) for copper are as follows for freshwater (hardness dependent): Criterion Maximum Concentration (CMC) = 13 µg/L; Criterion Continuous Concentration (CCC) = 9.0 µg/L; For saltwater: CMC = 4.8; CCC = 3.1 µg/L. U. S. EPA notes that when the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate. U. S. EPA has drafted an update to the copper criteria<sup>2</sup> which is available at the URL <http://www.epa.gov/waterscience/criteria/copper/>.

<sup>1</sup> GMAV = Genus Mean Acute Value

<sup>2</sup> Freshwater

The procedures described in the Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses indicate that, except where a locally important species is very sensitive, freshwater aquatic organisms and their uses should not be affected unacceptably if the 4-day average concentration of dissolved copper does not exceed the BLM-derived site-water LC50 (i.e., Final Acute Value (FAV)) divided by the final acute-chronic ratio more than

### 9.2.3 Aquatic Ecology – Marine

Soil generally contains between 2 and 250 mg/kg copper, and in relatively clean sediment, the copper concentration is typically <50 mg/kg (ATSDR 2004). Canadian soil quality guidelines allow 63 mg/kg in agricultural and residential/parkland land uses. In commercial and industrial land use, 91 mg/kg is allowed. The Ontario Ministry of Agriculture and Food and Ontario Ministry of Environment (1992) allows up to 100 mg/kg in sludge amended soil. Canadian sediment quality guidelines for freshwater specify an ISQG of 35.7 mg/kg and Probable Effect Level (PEL) of 197 mg/kg. The ISQG for marine sediments is 18.7 mg/kg and the PEL is 108 mg/kg. The ISQG or SQG is defined as the level at which no biological effects occur. The PEL is defined as the level above which adverse biological effects are usually or always observed.

Loring (1979) sampled and analyzed for metals in the sediments of the Bay of Fundy and found copper concentrations in sediments averaged 19 mg/kg. Sediments were characterized by grain size and showed an increase in copper concentration with decreasing grain size, sand to mud, with a range of average copper concentration of 12 to 22 mg/kg. For the Whites Point Quarry EIS, analyses were performed for total copper in sediment samples collected from three sites in the waters offshore of Whites Cove. The total copper concentration ranged from 11 to 17 mg/kg.

According to the Province of Nova Scotia – Department of Mines and Energy, the Basalt Till Facies of the Beaver River Till Unit in the area of the quarry has naturally high levels of copper (NSDME 1982). Loring (1979) noted that copper concentrations in near shore sediments are relatively higher as compared to offshore sediments due to detrital bedrock material derived from the underlying and coastal basalts. The geochemical analysis of the Beaver River Till showed a mean copper concentration of 131 mg/kg (n=5) and ranged from 80 – 218 mg/kg. In the two samples closest to the site (Whale Cove and West Mink Cove), copper concentration ranged from 80 to 107 mg/kg. In borehole samples of the basalt, average copper concentration was 101 mg/kg, with a range of 27 to 230 mg/kg at depths ranging from 5 to 61 meters. Basalt samples with copper concentrations ranging from 39 to 270 mg/kg were subjected to leachate tests (Maxxam Analytics Inc., *Atlantic CGSB Leachate + Metals (Leachate) 2006/07/20*, and *Atlantic CGSB Leachate + Metals (Liquid)*, attached), using acetic acid at average final pH of 4.9. Average initial pH of the basalt samples was 9.8. The resultant leachates had copper concentrations ranging from non-detect (20 ug/L) to 480 ug/L, with an average percent leached of 0.078 % (range: 0.012 to 0.209%) of the basalt concentrations. Analysis of copper in ground water (pH = 7.4) was consistently below the

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once every 3 years on the average (i.e., the CCC); and if the 24-hour average dissolved copper concentration does not exceed the BLM-derived site-LC50 (or FAV) divided by two, more than once every 3 years on the average (i.e., the CMC).

#### *Salwater*

The procedures described in the Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses indicate that, except where a locally important species is very sensitive, saltwater aquatic organisms and their uses should not be affected unacceptably if the 4-day average concentration of dissolved copper does not exceed 1.9 µg/L more than once every 3 years on the average (i.e., the CCC); and if the 24-hour average dissolved copper concentration does not exceed 3.1 µg/L more than once every 3 years on the average (i.e., the CMC).

### 9.2.3 Aquatic Ecology – Marine

EQL of 2 ug/L. Surface water samples (pH = 5.7 to 7.2) ranged from non-detect (EQL = 1.0 ug/L) to 3.0 ug/L.

Copper in natural water is predominantly in the Cu(II) state. In this form, copper is complexed or tightly bound to organic matter; little is present in the free (hydrated) or readily exchangeable - bioavailable form. Copper adsorbs to organic matter, hydrous iron and manganese oxides, and clay (Davies-Colley et al. 1984). Harrison and Bishop (1984) determined that, in water, a significant fraction of the copper is adsorbed within the first hour of introduction, with equilibrium usually obtained within 24 hours. Copper complexation capacity of waters controls copper toxicity by keeping the aqueous concentration of Cu(II) at nontoxic levels (Rivera-Duarte 2005). The chemical conditions in most natural water are such that, even at relatively high copper concentrations, these processes will reduce the free Cu(II) concentration to extremely low values (ATSDR 2004).

In seawater, organic matter is generally the most important complexing agent (Coale and Bruland 1988). Copper has been shown to be subject to binding by dissolved organic carbon (Arnold, W.R. 2005). Iron oxides are also an important binding agent, particularly in estuarine sediments (Davies-Colley et al. 1984), and binding does not vary significantly with salinity reduced from 35 to 5‰.

Analysis of surface water at the site resulted in a mean total organic carbon content of 8.6 mg/L (N = 8), ranging from 2.7 to 16.6 mg/L. Iron was highly variable, ranging from 0.32 ug/L to 5.2 mg/L. Iron in marine water samples ranged from 25 to 120 ug/L. The total organic carbon in marine sediments offshore of the site ranged from 1.1 to 60 g/kg

Concern has been expressed about the potential effects that copper may have on marine life. As stated in section 4.3, for in many organisms, copper, an essential element, is regulated and/or stored. Bioaccumulation of copper in these organisms reflects this process and is not indicative of hazard. Based on (1) the mitigation proposed in the EIS, Sections 9.2.2.3, 9.1.2.3, 9.1.6.3 to minimize runoff into marine waters (i.e., drainage channels, sediment retention ponds, constructed wetlands, and an environmental preservation zone), (2) the potential binding capacity of the organic carbon and iron content in the surface and marine waters, and (3) the expected high pH of basalt slurry, it is highly unlikely that any marine organisms will have a significant exposure to copper from the site over and above background levels. The background concentration of copper in surface water at the site has been measured as high as 3 ug/L. Chronic effects from background concentrations are not apparent, probably due to environmental complexation and/or regulation by biota. As a precautionary approach Bilcon proposes that if dissolved copper concentrations in sediment retention pond effluents exceed 4.8 ug/L, samples of pond effluent will be submitted to a qualified contract laboratory for a toxicity screening test using a marine species known to be sensitive to copper. If significant mortality is observed, additional mitigation measures (e.g.,

### 9.2.3 Aquatic Ecology – Marine

treatment by coagulation, flocculation, filtration, adsorption or other appropriate methods) will be undertaken to reduce the copper to a non-toxic concentration prior to discharge.

#### **WP 1403 – Nova Scotia Department of Agriculture and Fisheries**

*Staff have reviewed this submission and have offered no comments at this time other than to note the presence of significant efforts to mitigate fishery habitat and related issues.*

---

#### **RESPONSE**

Comment noted.

#### **WP 1541 Fisheries and Oceans Canada**

##### **VOLUME I Plain language Summary**

*Page 28 – Section 7.5 Fishing –The list of potential effects in this section deals primarily with environmental effects on fish and habitat, rather than conflicts with or potential effects on fishing activities. For example, Section 9 goes into some detail on these issues (e.g. good communication with fishers and compensation gear damage) yet no mention of this made in the Summary.*

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#### **RESPONSE**

Comment noted. In hindsight it would have been useful to provide some background with respect to communication with lobster fishers and compensation for gear damage in the Plain Language Summary.

*Page 29 – Paragraph 1 – The proponent is not required under the Fisheries Act to provide habitat compensation, it is rather in accordance with DFO’s Policy for the Management of Fish Habitat to strive to achieve the guiding principle of no net loss of productive capacity of fish habitat through habitat replacement or compensation.*

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#### **RESPONSE**

Comment noted. Bilcon’s intent, in accordance with DFO’s Policy for the Management of Fish Habitat, is to achieve no net loss of productive capacity of fish habitat through habitat compensation.

*Page 29 – The document states “Bilcon has received approval in principle for the Fish Habitat Compensation Plan which involves installing fish shelters and creating habitat on the pipe piles themselves”. This statement appears in several section of the EIS and in a least one instance the document states DFO has approved the Fish Habitat Compensation Plan (Volume VII, Chapter 11, page 5). As stated in a letter from DFO to Bilcon of Nova Scotia dated November 24, 2005 (found in Appendix 21 of the EIS) “based on the preliminary information provided, the Department of Fisheries and Oceans is satisfied that the overall components of the proposed habitat compensation plan would meet the*

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### 9.2.3 Aquatic Ecology – Marine

*requirements and objectives of the Policy for Management of Fish Habitat under the Fisheries Act". This statement is not an approval in principle or otherwise.*

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#### RESPONSE

Comment noted. Bilcon accepts DFO's clarification of their intent regarding the Fish Habitat Compensation Plan "based on the preliminary information provided, the Department of Fisheries and Oceans is satisfied that the overall components of the proposed habitat compensation plan would meet the requirements and objectives of the Policy for the Management of Fish Habitat under the *Fisheries Act*".

*Page 33 - The proponent states that "North Atlantic right whale sightings in the Whites Cover area will be communicated to the ships captain before the ship exits the inbound shipping lane (see Map 4) or leaves the marine terminal for the outbound shipping lanes." Who will do the sightings and at what times? If a North Atlantic right whale is sighted, what would be the course of action, understanding that Bilcon of Nova Scotia is not the operator of the vessels? What will be the accuracy of a trained observer in poor weather conditions? Is there a contingency plan for this situation?*

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#### RESPONSE

As noted elsewhere in this document, the ship will leave the shipping lanes at or less than a speed of 12 knots. This speed will diminish as the ship nears the terminal to a speed of 1 knot. Contact with the ship's captain will be maintained throughout this transit and if a project employee observes marine mammals or waterbirds in the designated lane from the shipping lane to the terminal, this information will be transmitted to the ship's captain. The ship's captain will have two alternate strategies. During the lobster season the captain will further reduce speed and outside of the lobster season, the captain may alter his course or reduce speed or both. These conditions will be stipulated in the contract with the shipper. Observations from the shoreline will clearly vary with the distance to the shipping lanes and with weather conditions. It should be noted again, that the primary mitigation measure is the slow speed of the ship in the area between the marine terminal and the shipping lanes.

Further, recent updates on the reverse side of Navigation Chart 4011, Approaches to the Bay of Fundy, DFO, prescribes Guidelines (June – November) for vessel operators regarding right whales.

With respect to poor weather conditions which are still suitable for the ship to berth safely, should visibility hinder the accuracy of the trained on-shore observer, the contingency plan will be for the work boat to examine the designated shipping route ahead of the arriving or departing vessel.

### 9.2.3 Aquatic Ecology – Marine

A primary source of right whale sightings will be provided by Fundy Traffic directly to ships via their advisories. A secondary source of information will be requested by Bilcon from whale watch tour operators, on a voluntary basis, which would then be relayed by Bilcon to the ship's captain. The ultimate responsibility of avoidance of a potential right whale/vessel interaction lies with the captain of the ship. If right whales or other endangered marine species i.e. leatherback turtles, are reported to be in the area between the shipping lanes and the marine terminal and poor visibility conditions exist, Bilcon will dispatch their work boat with a trained observer to patrol the ship's route within the 2500m safety radius. Dispatch of Bilcon's work boat, if necessary, with a trained observer would be the contingency plan for poor visibility conditions.

#### **Volume III Maps**

*Map 21 – Marine Mammal and Seabird Observations – Other species of whale that are not listed on the map have been seen in this area. In particular, humpbacks, fin backs and sei whales have been seen. Additional data are available from sources such as the Brier Island Whale and Seabird Cruises which cover some of the area depicted and the International Fund for Animal Welfare (IFAW) 2006 right whale survey also covered some of this area.*

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#### **RESPONSE**

The intent of these observations contracted with Bay to Bay Adventures Ltd. was to gather more specific whale and seabird data in the vicinity of the proposed Whites Point project. Bilcon thought this data would be useful since this area may not be frequented by whale watching tours operating from Digby Neck and Islands. The observations are an indication of the species of whales and their location in this particular area at this point in time.. Additional historic whale observation data for North Atlantic right whales, finback whales, humpback whales, minke whales, and harbour porpoise from the Maritime Fisheries and Oceans Canada, St. Andrews Biological Station Sightings Database is shown on **Maps 38A through 38E** as in this document.

*Map 23 – Leatherback Turtles – The proponent should provide information on the timing of these records, including seasonal occurrences.*

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#### **RESPONSE**

The source of data for the records of leatherback turtles is the Nova Scotia Leatherback Turtle Working Group – 1998. Information on seasonal occurrences was not indicated in the reference nor was the date of the four reports from the mouth of the Bay of Fundy.



### 9.2.3 Aquatic Ecology – Marine

*Map 25 – Right Whale Density – This map appears to be accurate but there is newer data from the same source since 2000 which should be considered.*

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#### RESPONSE

It is Bilcon's understanding that the more recent data is "observational" since 2000. Sightings from the University of Rhode Island's database were reviewed for years 1980-2005. Sightings for years 2000 through 2005 are indicated on **Maps 42A through 42F**. The right whale density map - **Map 25** indicates sightings per unit effort and therefore a true density per unit area. Further, it is Bilcon's understanding that an ongoing research grant-Right Whale (*Eubalaena glacialis*) Research and Monitoring in the Bay of Fundy by Dr. Scott Kraus, New England Aquarium is due to end in December 2006 followed by review by NOAA (pers comm. Al Barker, New England Aquarium).

*Map 26 – Atlantic Salmon Rivers of the Inner Bay of Fundy – Context for this map has not been provided (i.e., what is the map meant to represent). A more descriptive caption or title would be helpful. For example, the rivers depicted here appear to be rivers for which an electrofishing survey or reported recreational catch were available to indicate the past presence of Atlantic salmon. This does not necessarily capture all rivers that may support inner Bay of Fundy populations of Atlantic salmon.*

*Atlantic salmon migration routes, as depicted on this map, are theoretical and incomplete and do not cover all life-history stages.*

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#### RESPONSE

The intent of this Map is to show the geographic relation of Atlantic Salmon Rivers of the inner Bay of Fundy to the Whites Point quarry site on Digby Neck. These are the rivers identified in the National Recovery Strategy for inner Bay of Fundy Atlantic salmon (*Salmo salar*) Populations 2002 and indicate on which rivers recreational catches have been recorded in one or more years since 1969. Also, this Map shows predicted migration routes by M. J. Dadswell based on tag return data. More recent information on the distribution of Atlantic salmon postmolts of different origins in the Bay of Fundy and Gulf of Maine is contained in Lacroix and Knox 2005. Postmolts surveyed by surface trawling in the Bay of Fundy and Gulf of Maine during 2001-2003 were aggregated in several areas in the Bay of Fundy. The distribution and abundance of Atlantic salmon postmolts captured in 2001 during a survey in the Bay of Fundy is shown on **Map 40**. It is agreed that the migration routes shown on Map 26 of the EIS are theoretical.

### 9.2.3 Aquatic Ecology – Marine

#### Volume IV – Chapter 1

*Table ECM – Summary Table – Page 6 – Does the proponent anticipate that dredging will be required at any point during the life of the project?*

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#### RESPONSE

Dredging in the marine environment is not proposed during the life of the project.

*Table ECM – 1 Summary Table – Page 7 – The document states, “If unexpected turbidity conditions develop during installation of the pipe piles for the marine terminal exceeding CCME Guidelines, controls such as silt curtains will be implemented.” How practical would the use of silt curtains be in the Bay of Fundy? Does the proponent know of examples of silt curtains used in this or similar environments?*

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#### RESPONSE

##### *Introduction*

The reviewers of the EIS for Environment Canada have asked questions on the use of silt curtains:

- How practical would the use of silt curtains be in the Bay of Fundy?
- Does the proponent know of examples of silt curtains used in this or similar environments?

Noting that construction methods are not fully defined at this time, only a general commentary on silt curtains can be provided.

##### *Requirement for Silt Curtains*

Silt is typically defined as having a particle size between 0.002 mm and 0.06 mm. Marine silts are generally associated with glacial or fluvial deposits, typically as subsea deposits or in deltaic formations. The seabed at the White’s Point Quarry is basalt bedrock with no significant sediment overburden. Silt size particles are not a significant part of the marine seabed at the site so the suspension of fine particles in the water resulting in turbidity will be relatively minor.

The proposed construction methodology includes drilling and socketing large diameter pipe into basalt bedrock and subsequently drilling tension anchor rods inside pipe. The removal of cuttings from within the piles will yield mostly broken rock and coarse particles but it is possible some finer particles capable of being suspended and causing turbidity could be created. Isolating cuttings from drilling activity may be achieved by a number of methods including silt curtains, however, typically cuttings will be removed from the inside of the pipe using an apparatus such as an air lift and deposited directly into a hopper or an open pile. In this instance, silt curtains are not required.

### 9.2.3 Aquatic Ecology – Marine

Silt curtains are usually used to contain turbidity generated by dredging or filling operations. Practical current speed and wave height limits for the deployment of silt curtains is about two knots current and, depending on ruggedness, half-metre wave height. Tide range is not an issue for silt curtain deployment. At the proposed site, foreseeably, removal and disposition of cuttings from pile drilling will utilize both a hopper and open piles. The hopper will be used for temporary storage of cuttings and open piles will be used for permanent disposition of cuttings after they are grouted and anchored only. Silt curtains could be a contingency for critical operations when circumstances permit, however, if care is taken using the methods described above, silt curtains should not be required.

#### *Summary*

The generation of turbidity from marine construction at the proposed site should not be significant as there are no native fine particles on the seabed of any significance to be suspended and the drilling activity itself will create particles that are mostly coarse. For the small fraction of particles from drill cuttings that are fine enough to create turbidity, they will be contained and isolated from the marine environment by disposing of them inside the piles on site. Drilling and socketing piles into the seabed rock and drilling of pile anchors should not generate turbidity.

The marine contractor's equipment will include apparatus to convey completely within closed conduits drill cuttings from inside piles to the specified area of disposition. It is noted that the scope of work will not include dredging or filling so this type of activity is not an issue for generation of turbidity. The use of silt curtains to contain turbidity, although technically feasible, should not be required in light of the above noted construction methodologies.

*Table ECM – 1 Summary Table – Page 13 – The document states, “During the infrequent, once per week, vessel arrival and departure, a trained observer will be stationed on the ship loader and if marine mammals or waterbirds are sighted, their location will be communicated to the ship’s captain.” What is the mitigation action if marine mammals or waterbirds are sighted?*

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#### **RESPONSE**

As noted elsewhere in this document, the ship will leave the shipping lanes at or less than a speed of 12 knots. This speed will diminish as the ship nears the terminal to a speed of 1 knot. Contact with the ship's captain will be maintained throughout this transit and if a project employee observes marine mammals or waterbirds in the designated lane from the shipping lane to the terminal, this information will be transmitted to the ship's captain. The ship's captain will have two alternate strategies. During the lobster season the captain will further reduce speed and outside of the lobster season, the captain may alter his course or reduce speed or both. These conditions will be stipulated in the contract with the shipper.

### 9.2.3 Aquatic Ecology – Marine

Observations from the shoreline will clearly vary with the distance to the shipping lanes and with weather conditions. It should be noted again, that the primary mitigation measure is the slow speed of the ship in the area between the marine terminal and the shipping lanes.

*Table ECM – 1 Summary Table – Page 13 – Under Species at Risk there is no mention of marine mammal species at risk such as the North Atlantic Right Whale, Blue Whale, Fin Whale or Harbour Porpoise. These should be recognized as species at risk under this section of the table.*

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#### RESPONSE

The species at risk such as the North Atlantic Right Whale, Blue Whale, Fin Whale or Harbour Porpoise were not included under the Species at Risk section of the Summary Table but are specifically noted under Blasting – Marine Mammals in the Summary Table.

*Table ECM – 1 Summary Table – Page 14 – The document states, “An additional mitigative measure will be adopted of three times the designated setback indicated in the “Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters” from the blast to fish habitat during times of the year when inner Bay of Fundy Atlantic salmon could be present in these coastal waters.” More details are required for this mitigation measure. What are the times of the year when inner Bay of Fundy Atlantic salmon could be present in these coastal waters? What are the separation distances during other times of the year?*

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#### RESPONSE

Regarding the proposed mitigation measure of inner Bay of Fundy Atlantic salmon and the times of year with iBoF Atlantic salmon may be present in these coastal waters, reference is made to Peter Amiro, Diadromous Biologist with Fisheries and Oceans Science indicated that there may be migrating iBoF Atlantic salmon in the Whites Point, Digby Neck area from May until October (Meeting Bilcon/DFO-HMD December 10, 2004). Thus during May until October, it is Bilcon’s understanding that the “three times” the designated setback indicated in the Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters would be applicable. During other times of the year (October through April) the separation distances based on the Guidelines would be applicable.

*Table ECM – 1 Summary Table – Page 15 – More information is required on the marine mammal observers (e.g. training, experience, equipment, limitations, etc.).*

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#### RESPONSE

Bilcon intends to hire its workforce from the local area to the extent practicable. Marine mammal observers would be required to meet the job description for that particular employment position. Appropriate education, experience and the ability to work with others

### 9.2.3 Aquatic Ecology – Marine

would be required. Bilcon is prepared to provide training for individuals if deemed necessary.

Specific equipment for the marine mammal observer is described in EIS Volume VI, Chapter 9.2.11.3. Observations within the 500m safety radius will be conducted from the elevated platform (shiploader) which extends approximately 200m into the Bay. This elevated observer position will provide a better view of any marine mammals in wave conditions. If endangered marine mammals are reported to be in the vicinity of the marine terminal, the safety radius will be expanded to 2500m. In this case, the marine observer will patrol this area by boat.

During periods of low visibility, blasting will not be conducted. However, shipping activity may take place during low visibility. If a ship is scheduled to arrive or depart during low visibility conditions, the marine observer will conduct observations by boat. Please refer to EIS Volume VI, Chapter 9.2.11 – Blasting – Marine Mammals.

*Table ECM – 1 – Page 20 – Coordination of shipping with local fishers – Will there be exclusion zones setup during inbound/outbound shipping, approaches and departure?*

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#### RESPONSE

The proposed ship approach and departure is shown on **Map SR – 1** included in Section 7.0 of the Revised project Description. While this is not an exclusion zone, fishers will know that there is some risk to setting nets or traps directly in this lane.

*Table ECM -2 - Page 3 – The proponent should explain why is it “No” to Fish Habitat Compensation during the construction phase. Could compensation not be monitored during the construction phase? Also why is it “No” to Initial Blast Monitoring regulatory requirement? Some of this monitoring is to ensure compliance with SARA.*

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#### RESPONSE

Monitoring within the area of the fish habitat compensation will be conducted prior to construction to establish baseline conditions. The fish habitat enhancement measures would be installed as part of the marine construction. After installation, monitoring would continue as stated in the Fish Habitat Compensation Plan Proposal, i.e. for five consecutive years after installation.

*Table C1 – Commitments Table – Page 7 – This table only includes the lobster fishery. Is there potential for damage to other gear types? Can the “lobster trap fund” be used to compensate for other gear losses? Commitment 11.3 makes the very specific commitment that carriers will enter and leave on the “same predetermined bearing.” Will this final route be determined with input from local fishers?*

### 9.2.3 Aquatic Ecology – Marine

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#### RESPONSE

Bilcon has been advised in discussions with local fishers that no other fishing gear is currently being used in the Whites Cove area. Bilcon was specifically advised that gill nets have not been set for eight to ten years.

The predetermined bearing for the ship to approach and depart the Whites Point Terminal will be set following discussions and input from local fishers.

*Table C1 – Commitments Table – Page 7 – The proponent has not received approval in principle for the compensation plan and the development of the plan is associated with DFO's Policy document not the Fisheries Act.*

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#### RESPONSE

Comment noted.

#### Volume IV – Chapter 3

*Page 6 – The document states, “Where there is uncertainty with respect to the effectiveness of measures that are used to prevent serious or irreversible environmental damage, Bilcon will take an adaptive management approach.” Given the uncertainty surrounding potential behavioural impacts on marine mammals from blasting and impacts on lobster from blasting, what potential adaptive management strategies could be applied if the project was shown to have an adverse effect, behavioural or otherwise, on an endangered marine mammal or lobster population?*

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#### RESPONSE

It is agreed that some uncertainty surrounds the potential behavioural impacts on marine mammals from blasting and impacts on lobster from blasting. Should adverse effects of the Project-activities be identified, a range of general adaptive management options could be employed to mitigate these effects such as:

- Early warning of the pending impact, but at a lower, non-intrusive level than the actual impact. An example could be the use of an acoustic deterrence device (ADD) sounded prior to a blast
- Adjustment of the intensity or level of impact to a more appropriate level, e.g., by
- Reducing the charges per delay;
- Increasing decking;
- Modifying the blast delay time
- Adjustment of the limits to the safety zone to accommodate the increased concern

### 9.2.3 Aquatic Ecology – Marine

- Temporary cessation of the impact to avoid the undesired effects, such as not blasting when the species of concern has been identified as being in the area of effect, when young are present, etc.
- Timing of the impact to consider the presence or absence of a species of concern, life stage issues, such as avoiding an impact during certain times of the year when young may be present, migratory seasons, etc.
- Cessation of the impact if it is concluded that serious negative effects are unavoidable such as, the permanent presence of a species of concern and the inability to mitigate the effect to an acceptable level.

Specific adaptive management measures would have to be developed for individual species of concern to address the appropriate variables. These would be developed by Bilcon in conjunction with the Responsible Authorities as the need for them becomes apparent.

#### Volume IV – Chapter 6

*Page 21 – “The intertidal zone – (see photo) is comprised mainly of bedrock outcrops with a cobble zone at Whites Cove.” The proponent should indicate which photo (i.e., page, section, etc.).*

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#### RESPONSE

Bedrock outcrops are shown in the photo captioned “Marine Intertidal Zone” on page 23 of Chapter 6. The photo of the cobble zone at Whites Cove was mistakenly omitted.

*Page 43 – Protection of Species at Risk – the proper wording here is: the Minister of Fisheries and Oceans is the “Competent Minister” with respect to aquatic species at risk.*

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#### RESPONSE

Comment noted.

*Page 43 – Species at Risk Act (SARA) – DFO is developing a recovery strategy for the North Atlantic right whale, which will contain information and recommendations that may guide the issues that need to be considered if the project proceeds. Related documents, such as Allowable Harm Assessments (Allowable Harm Assessment for north Atlantic right whale is scheduled to be completed in the fall of 2006), should be used as potential criteria for assessing adverse and significant effects as required in Section 79(2).*

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#### RESPONSE

In the EIS document Bilcon has addressed the various species at risk that are presently included under the Species at Risk Act (SARA). Bilcon understands that SARA assessment is an ongoing process and that recovery strategies are under development that will contain information and guidelines that may have implications for various phases of the project as it

### 9.2.3 Aquatic Ecology – Marine

proceeds. In addition, other documents such as Allowable Harm Assessments are being prepared and these will have to be considered for incorporation in the management process as they become available. Future listings may also be made under SARA that will require consideration.

Bilcon understands that this is a dynamic situation and that Bilcon must comply with the legislation both during the environmental assessment process and also throughout the life of the project.

*The proponents should also consider the potential for the future listing of species at risk as much as possible. The species that DFO considers for listing under SARA are initially assigned a status (extirpated, endangered, threatened, etc.) by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC). COSEWIC posts their candidate list for assessments at the following link:*

*[http://www.cosewic.gc.ca/eng/sct3/index\\_e.cfm](http://www.cosewic.gc.ca/eng/sct3/index_e.cfm). The SARA registry also provides information what species DFO is considering for listing under SARA:*

*[http://www.sararegistry.gc.ca/default\\_e.cfm](http://www.sararegistry.gc.ca/default_e.cfm).*

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#### RESPONSE

Comment noted

*If a species is added to the list of wildlife species at risk during the lifetime of any project, the project must be compliant with SARA with respect to these species regardless of the outcome of the completed Environmental Assessment. The proponent should demonstrate that they understand the prohibition and know that Critical Habitat could come into effect during the lifetime of the project if it is identified in a Recovery Strategy or Action Plan. To address this issue, a commitment should be made by the proponent to ensure compliance with SARA during the lifetime of the project if it proceeds. At regular times (e.g., yearly) between now the completion of the project, the proponent should evaluate whether any newly listed species is likely to be found within the project area, and if so, engage the regulatory agencies in determining what is required to ensure that the project remains in compliance with SARA.*

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#### RESPONSE

Bilcon recognizes that species will be added to the list of wildlife species at risk during the lifetime of this project and that the project must be compliant with SARA with respect to these species, regardless of the outcome of the completed environmental assessment. Bilcon commits to ensure compliance with SARA during the lifetime of the project and will on an annual basis, evaluate whether any newly listed species is likely to be found within the project area and to communicate with regulatory agencies to determine what is required to ensure that the project remains in compliance with SARA.



### 9.2.3 Aquatic Ecology – Marine

#### 9.2.3 Aquatic Ecology – Marine Intertidal Zone

*Page 49 – Section 9.2.3 – Marine Intertidal Zone – This section provides a reasonable summary of the marine intertidal zone and the proponent has collected data directly from the site. Since there is no infilling planned, it is agreed that habitat disturbance from construction of conveyor system supports is likely to be short lived and limited in extent. A concern is the reliability of the containment system for aggregates being transported to the ship. From the description provided, it is difficult to judge whether the containment system would be fully secure.*

---

#### RESPONSE

As noted elsewhere in this document and in particular under Section 11 – Accidents and Malfunctions, the conveyor system transporting aggregates to the ship will be equipped with spill-trays to prevent aggregate from being inadvertently discharged into the marine intertidal zone.

*Page 52 – One statement on lobsters is a bit broad, “Lobsters also rely on macroalgal habitat during various stages of their life cycle and ducks forage for amphipods and periwinkles living in the rockweed community.” This statement infers that rockweed is a habitat for lobsters. Intertidal seaweeds are not typically considered lobster habitat; however, subtidal kelps are considered to be lobster habitat.*

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#### RESPONSE

There is a growing wealth of recent literature that supports the use of intertidal habitats by postlarval and juvenile lobsters (see e.g., Cowan, D.F. 1999. Method for assessing relative abundance, size distribution, and growth of recently settled and early juvenile lobsters (*Homarus americanus*) in the lower intertidal zone. J. Crustacean Res. 19(4):738-751.)

Anecdotal evidence that adult lobsters within the Bay of Fundy use the intertidal zone includes the common successful practice by first nations people of setting lobster traps within the intertidal at low tide and then retrieving the traps on the following low tide (per. comm., Jonathan Lowe, Fisheries Representative, Nova Scotia Department of Fisheries and Aquaculture, Yarmouth, N.S.)

*Page 54 – For the monitoring of Total Suspended Solids (TSS) the proponent states that “the frequency of monitoring will be monthly, with a monthly report...” Monitoring should be more frequent (including monitoring after significant weather events) to predict potential impacts.*

---

#### RESPONSE

Monitoring of total suspended solids will be conducted in the intertidal zone and nearshore waters during marine construction. The following procedure as described more fully in EIS

### 9.2.3 Aquatic Ecology – Marine

Volume VI, Chapter 9.2.4.4 pages 95 and 96 is proposed. A summary of the monitoring procedure follows:

- Visual monitoring within 100m of marine construction (continuous)
- If distinct colour differences are observed at 100m, work is stopped
- Assess turbidity levels at 100m with turbidity meter
- Compare turbidity levels with marine aquatic life guidelines
- Maximum allowable increase in turbidity of 8 NTUs for short-term exposure (e.g. 24 hour period)
- Contact Fisheries and Oceans Canada representatives if guideline criteria are exceeded

### 9.2.4 Aquatic Ecology - Coastal Nearshore Marine

*Page 58 – Section 9.2.4.0.3 – Plankton community – This description of the plankton community is quite adequate. In paragraph 2, it seems unnecessary to zooplankton both “small” and “microscopic”; either one alone would suffice.*

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#### RESPONSE

Comment noted

*Page 66 – Is the proponent able to provide copies of the video transects?*

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#### RESPONSE

The video transects are available in VHS, however the quality is not good. Preconstruction video transects are planned in the vicinity of the marine terminal and Fish Habitat Compensation site.

*Page 66 – Under macroalgal production, the EIS contains the statement, “that the Digby area contains significant stands of macroalgae with biomass of up to 20kg/m<sup>2</sup> wet weight and estimated seaweed net production along the shorelines of the Outer Bay of Fundy to be about 845 gCm<sup>-2</sup>yr<sup>-1</sup>.” The proponent should provide the significance of this information in relation to the project.*

---

#### RESPONSE

This statement is intended to indicate that the intertidal shoreline along the proposed quarry site contains a very productive macroalgal community and likely contributes significant amounts of organic matter to the offshore food chain. Accordingly, it is important that its health be preserved and not endangered by quarry operations.

*Page 74 – The proponent uses the term “salmonid” habitat, when discussing the likelihood of suitable habitat for the three watercourses on site. DFO has an interest in conserving all*

### 9.2.3 Aquatic Ecology – Marine

*fish habitat. DFO has concluded that the watercourse in the active quarry area is not suitable for fish habitat, including habitat for species other than salmonids. The proponent should describe the likelihood of fish habitat in general for the other two watercourses in the area of the project.*

---

#### RESPONSE

The objective of this survey was to assess the possibility that the streams may be suitable for anadromous fish and salmonids. The possibility that anadromous fish would use these streams is very unlikely because of their small size (bankfull widths generally less than one metre) and the opportunity for access from the sea only at high tide.

*Page 75 – What was the total search effort (in hours) for marine mammals conducted by the proponent? What equipment was used and how many individuals were searching? What are the qualifications and/or experience in those individuals searching for or identifying marine mammals? What was the confidence level in identifying species sighted? What were the visibility and weather conditions during the sighting efforts?*

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#### RESPONSE

Total hours for nearshore boat observations for marine mammals and seabirds was 20 hours. These trips were made in a lobster boat outfitted for summer whale watching use. A captain and one crew member were the observers. The captain has been in the whale watching/tour business for over 10 years. Considering the number of marine mammals observed (3) during these trips, the confidence level of species identification could be considered high. Trips were generally scheduled during good visibility and weather conditions.

*Page 90 – Did the proponent conduct any analysis of the lobster catches in the immediate area of the project?*

---

#### RESPONSE

Bilcon has not to this date conducted any analysis of the lobster catches in the immediate area of the project.

*Page 95 – The document states, “If marine mammals or waterbirds are sighted, communications regarding their location will be transmitted to the captain of the vessel.” What action would be taken by the proponent if a marine mammal or waterbird is sighted? Would mitigation apply to all marine mammals or just those listed as endangered?*

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#### RESPONSE

Mitigation would apply to all marine mammals and not just to those listed as endangered. The action to be taken by Bilcon if marine mammals or waterbirds are sighted during the

### 9.2.3 Aquatic Ecology – Marine

ship's approach is to communicate the location (longitude/latitude) of the sighting to the ship's captain. The ship's captain may reduce his speed or alter course or both.

*Page 95 – The proponent should indicate what training or experience the marine mammal observer would need to have as a minimum?*

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#### RESPONSE

Bilcon has committed to training its employees, as required, to a level to perform the specific job description. A marine mammal observer would have a job description outlining the tasks to be performed as would any other Bilcon employee. Potential employees would be hired based on experience, education and their personal suitability.

*Page 95 – The proponent should explain how marine mammal monitoring will be conducted from the work boat during period of low visibility?*

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#### RESPONSE

Periods of low visibility will present challenges for the marine mammal observer working from the work boat. During low visibility conditions, observations from the work boat would concentrate in the area of the prescribed route of the vessel.

*Page 95 – Section 9.2.4.4 – This section contains the statement “If excessive change occurs in the turbidity levels 100 m (330 ft) from the construction site that differs from existing conditions (i.e. distinct colour differences) as a result of the drilling activities, the work will be stopped and turbidity levels will be assessed in relation to marine aquatic life guidelines.” The commitment on page 54 reads, “A water quality monitoring program within the intertidal zone in Whites Cove will be implemented by Bilcon of Nova Scotia Corporation during construction of the conveyor supports. This program will include monitoring of Total Suspended Solids (TSS) within the intertidal marine environment.” The proponent should indicate the relationship between intertidal and near-shore monitoring (i.e. will high TSS levels recorded in the intertidal result in monitoring of the near-shore environment as well).*

---

#### RESPONSE

The marine construction area (intertidal and nearshore) would be treated as one construction zone for monitoring purposes.

### 9.2.3 Aquatic Ecology – Marine

*Page 96 – It is not clear from Section 9.2.4.5 what period of low biological activity the document is referring to. The proponent should indicate the period by date and provide data to support that this is a period of low biological activity.*

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#### RESPONSE

Please refer to Bilcon's response to Environment Canada, Item #15 in Section 9.2.1 – Terrestrial Ecology in this submission.

“Periods of low biological activity” is a general phrase used in the EIS to indicate times of the year in which construction activities could take place and have less effect on certain species as compared to other times of the year. For example, construction activities and land clearing for quarry expansion would be scheduled in late fall through winter. This would avoid birds breeding, nesting, and raising their young. The same time period would be used to avoid periods of plants flowering and seed production. Migratory species that are absent from local habitats during certain times of the year would be another example. Realizing that different species have different sensitive periods during their life cycle, Bilcon intends to consider these periods during construction activities.

*Page 96 – The Proponent should provide a speed or a range of speeds in place of “slow speed” when referring to the speed of the vessels.*

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#### RESPONSE

Within the final approach of the marine terminal as shown on **Map SR-1** (included in Section 7.0 Revised Project Description), the bulk carrier's speed would probably be between 0-5 knots, depending upon prevailing sea conditions.

### 9.2.5 Fish – Endangered

*Page 97-Section 9.2.5 Fish-Endangered-The Recovery Strategy for inner Bay of Fundy salmon is currently being redrafted, which may include identification of critical habitat. (see comments on Reference Document 25).*

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#### RESPONSE

Comment noted. It is Bilcon's understanding that an updated Recovery Strategy for the inner Bay of Fundy Atlantic salmon is in final stages of review but not available to the public (pers comm. Phil Zamora – Fisheries and Oceans Canada – habitat Management Division, Dec. 2006).

*Section 9.2.5 As stated in the Notes from the Meeting Between DFO-HMD and Bilcon of Nova Scotia December 10, 2004 (see Appendix 9 of EIS), DFO remains of the opinion that historic fishing, scientific sampling and theoretic modelling indicates that there could be*

### 9.2.3 Aquatic Ecology – Marine

*migrating inner Bay of Fundy Atlantic salmon in the Whites Point, Digby Neck area from May until October.*

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#### RESPONSE

Upon review of recent studies (Amiro 2003) (Lacroix and Knox 2005), Bilcon concurs that there is a possibility that inner Bay of Fundy Atlantic salmon could be present in the Whites Point, Digby Neck area from May until October. **Map 40** indicates distribution and abundance of Atlantic salmon postsmolts in the Bay of Fundy (Lacroix and Knox 2005).

*Page 101 – The Proponent states that, “No elevated inorganic sediment accumulation in tide pools located within the influence of the operating four hectare quarry was evident.” The guidelines are for total suspended solids, not only inorganic solids. The separation of the organic and inorganic components may provide some indication of the source of sediments, but it is not clear evidence as to where the organic and inorganic material originated from.*

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#### RESPONSE

The statement in question refers to deposited, not suspended sediments, and is in reference to the results of a study (see Reference Document – “Results of Suspended Solids Survey at the Whites Point Quarry”, EIS Reference Volume II, Tab 12) to determine if sediments accumulated within tide pools located in close proximity to the 4 ha quarry site were as a result of quarry activities. The study did not attempt to determine if the tide pools had elevated suspended sediment levels. The following statement is extracted from the study:

“Sediment contained within the tide pools was also sampled, mainly to determine the degree to which they may have accumulated inorganic sediments, the assumption being that inorganic, as opposed to organic, sediment is the type most harmful to aquatic organisms and most likely to be the dominant type mobilized by the quarry activities.”

### 9.2.6 Fish – Threatened and Special Concern

*Page 103 – Section 9.2.6 Fish – Threatened and Special Concern – No information is provided on Atlantic whitefish which is listed as endangered on SARA schedule 1. St. Mary’s Bay/Digby Neck are within the historic extent of occurrence of Atlantic Whitefish and could be again should repatriation of the species to the Tusket Watershed proceed. While spawning habitat requirements of Atlantic cod are not fully understood, there may be other habitat requirements that could have been described here. For example:*

*“The habitat most likely to be critical and potentially limiting for Atlantic cod may well be the vertical, “three-dimensional” structures provided by plants, rocks, physical relief, and corals. In addition to providing protection from predators, such physical heterogeneity would almost certainly provide habitat for small fish and invertebrates, organisms upon which juvenile cod could feed.” (COSEWIC, 2003).*

### 9.2.3 Aquatic Ecology – Marine

Sections 9.2.5 and 9.2.6 discuss potential impacts of the project on COSEWIC and/or SARA listed species that occur in the vicinity of the project area. At least three COSEWIC-assessed species that are known to occur in the Bay of Fundy have been omitted from the table in Appendix 39). These are Winter Skate (Special Concern, assessed May 2005), Atlantic Wolffish (Special, assessed May 2004) and Porbeagle Shark (Endangered, assessed May 2004). The EIS should include a discussion of potential impacts on these species. In addition to the two species mentioned above, a number of species that occur in the Bay of Fundy were assessed by COSEWIC in April 2006. Since this meeting occurred after the publication of the EIS, it is understandable that these species are not discussed in the document. Recently-assessed species that may occur in or around the project area include: White shark (Endangered), Shortfin Mako (Threatened), Blue Shark (Special Concern), and American Eel (Special Concern). To the extent possible, impacts on these species should be considered. As discussed earlier, the proponent is responsible for ensuring the project complies with SARA requirements for newly listed species throughout the lifetime of the quarry.

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#### RESPONSE

The Atlantic whitefish, porbeagle shark and white shark should be added to the list of COSEWIC designated endangered species.

#### *Atlantic Whitefish*

Atlantic whitefish (*Coregonus huntsmani*) status under SARA Schedule 1 is endangered and the last COSEWIC designation (November 2000) was endangered. Also, the Atlantic whitefish is listed as endangered (2002) under the *Nova Scotia Endangered Species Act*. The Atlantic whitefish is a species endemic to Nova Scotia, meaning that it breeds nowhere else in the world. It is a freshwater anadrolous species found only in the Tusket and Petite Riviere watersheds in southern Nova Scotia. Estimates of population size and specific habitat requirements are largely unknown for the Atlantic whitefish. If repatriation is successful in St. Mary's Bay/Digby Neck, it is extremely unlikely that suitable habitat for this species exists on or is immediately adjacent to the Whites Point Quarry site.

#### Reference

[http://www.speciesatrisk.gc.ca/search/speciesDetails\\_e.cfm?SpeciesID=64](http://www.speciesatrisk.gc.ca/search/speciesDetails_e.cfm?SpeciesID=64)

#### *Porbeagle Shark*

Porbeagle shark (*Lamna nasus*) was assessed as endangered by COSEWIC (May 2004). The porbeagle shark is a large cold-temperate coastal and oceanic shark. Its distribution includes the Bay of Fundy. This species is a pelagic, epipelagic or littoral shark preferring waters between 5-10 degrees C with little variation throughout the year. The porbeagle is primarily an opportunistic piscivore feeding on a wide variety of pelagic, epipelagic and benthic

### 9.2.3 Aquatic Ecology – Marine

species (Joyce et al 2002). Over-exploitation is the primary factor responsible for its decline. The quota for 2002 – 2007 of 200 – 250t represents a substantial reduction from catches in the mid-1900s, however this corresponds to a high exploitation rate because of low population abundance. It is likely that the porbeagle shark inhabits the nearshore waters in the Bay of Fundy adjacent to the Whites Point quarry site.

#### Reference

COSEWIC 2004. COSEWIC assessment and status report on the porbeagle shark *Lamna nasus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Viii+43pp. ([www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm))

#### *White Shark*

White Shark (*Carcharodon carcharias*) was assessed as endangered by COSEWIC (April 2006). The (great) white shark is widely distributed in sub-polar to tropical seas of both hemispheres, but is not frequently observed and captured in inshore temperate water over the continental shelves of the western North Atlantic. Records from the Bay of Fundy and Passamaquoddy Bay exist. The habitat of the white shark is in both inshore and offshore waters, from the intertidal to the upper continental slope and mesopelagic zone. Known bathymetric range is from just below the surface to just above the bottom down to a depth of at least 1,280m. It occurs in the breakers off sandy beaches, off rocky shores, and readily enters enclosed bays, lagoons, harbours, and estuaries, but does not penetrate brackish or fresh waters to any extent. Humans present the most significant threat from sport fishing, commercial by-catch, and for international trade of body parts. It is possible that white sharks inhabit the waters adjacent to the Whites Point quarry site.

#### Reference

Martin, R. Aidan, Scott Wallace. COSEWIC status report on white shark *Carcharodon carcharias* prepared for Committee on the Status of Endangered Wildlife in Canada. Draft April 2005.

#### *Shortfin Mako*

Shortfin mako (*Isurus oxyrinchus*) was designated by COSEWIC as threatened (April 2006). The Shortfin mako is a large, pelagic shark inhabiting temperate and tropical waters. The Atlantic Canada population is considered to be a part of the larger North Atlantic population. Although there is no apparent decline in the portion of the species in Atlantic Canada, recent decline in the North Atlantic population as a whole (40% 1986 – 2001 and 50% 1971-2003) are evident. The main cause of the species decline is mortality due to by-catch in the longline and other fisheries. It is possible that the Shortfin mako could inhabit the Bay of Fundy waters adjacent to the Whites Point quarry site.



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#### Reference

COSEWIC 2006. COSEWIC assessment and status report on the Shortfin mako *Isurus oxyrinchus* (Atlantic population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Vi+24pp. [www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm).

#### *Winter Skate*

Winter skate (*Leucoraja ocellata*) Georges Bank – Western Scotia Shelf – Bay of Fundy population was designated by COSEWIC as special concern (May 2005). The winter skate is a bottom-dwelling species usually found on sand and gravel at depths less than 111m and in waters ranging between 5 and 9 degrees C. Their diet consists mainly of rock crab and squid, as well as worms, amphipods, shrimp, clams and small fish. Spawning has been reported to occur in late summer/early autumn. In Canadian waters, winter skate are subject to capture as by-catch in ground fish and scallop fisheries. Distribution data from 1970-2002 indicate concentrations of winter skate in the upper Bay of Fundy (COSEWIC Assessment and Status Report 2005). It is therefore likely that winter skate could inhabit the Bay of Fundy waters adjacent to the Whites Point quarry site.

#### Reference

COSEWIC 2005. COSEWIC assessment and status report on the winter skate *Leucoraja ocellata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Vii+41pp ([www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm)).

#### *Atlantic Wolffish*

Atlantic wolffish (*Anarhichas lupus*) was designated by COSEWIC as a species of special concern (2000). Atlantic wolffish is found in the western North Atlantic with its southerly range extending from the Scotia shelf to the Gulf of Maine. Basically a cold water fish, it inhabits the continental shelf on rock or hard clay bottoms feeding on benthic crustaceans and invertebrates. It is found from very shallow water to 500 m with preference of depths between 100 and 150m and tolerating a broad temperature range of -1 to 10 degrees C. Tow statistics in the Bay of Fundy from 1975 – 1994 indicate 1 to 100 catch per tow with a mean catch per tow of 3 to 7 fish. Population decline is attributed to by-catch with mortality positively correlated with commercial landings of cod and shrimp. The Atlantic wolffish is likely to inhabit the Bay of Fundy waters adjacent to the Whites Point quarry site.

#### Reference

COSEWIC 2005. COSEWIC assessment and status report on the Atlantic wolffish *Anarhichas lupus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Vii+21pp ([www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm)).

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#### *Blue Shark*

Blue shark (*Prionace glauca*) Atlantic population was assessed as special concern by COSEWIC (April 2006). The blue shark is pelagic and considered epipelagic and found worldwide. It is considered to have a highly migratory population in the North Atlantic being present in Canadian waters seasonally. Blue sharks are most commonly encountered offshore between the surface and 350m. Canadian waters provide habitat for primarily sub-adult (immature) individuals although adult (mature) specimens are occasionally encountered. Loss of habitat is not considered a threat for this species. Fishing mortality is the single largest threat to blue shark populations worldwide from pelagic fisheries as by-catch. Blue sharks are encountered in the Bay of Fundy and their occurrence is possible in waters off the Whites Point quarry site.

#### Reference

COSEWIC 2005. COSEWIC assessment and status report on the Blue Shark *Prionace glauca* (Atlantic and Pacific populations) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Vii+46pp  
[www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm)

#### *American Eel*

American eel (*Anguilla rostrata*) was designated special concern by COSEWIC (April 2006). Indicators of the status of the species are primarily from the Upper St. Lawrence River and Lake Ontario where populations have declined by approximately 99% since the 1970s. No long term indices are available for Scotia/Fundy, Newfoundland and Labrador. Because the eel is panmictic, i.e. all spawners from a single breeding unit, recruitment of eels to Canadian waters would be affected by the status of the species in the United States as well as in Canada. The American eel uses a broad diversity of habitats. During oceanic migrations, eels occupy salt water and during their continental phase occupy fresh and all salinity zones. In streams, eels generally do not show consistent preferences for habitat type, cover, substrate or water temperature. Possible causes of decline include habitat alteration, dams, fishing harvest, oscillations in ocean conditions, acid rain and contaminants which may continue to impede recovery. Eels inhabit freshwater ecological area FEA3 in the Maritimes, including sites in Nova Scotia. Ocean habitat used during migrations would include the Bay of Fundy. The occurrence of American eel in the streams immediately adjacent to the Whites Point quarry site is unlikely due to their small size and poor accessibility from the Bay of Fundy. However, it is likely eels inhabit the Bay of Fundy waters during migration.

#### Reference

COSEWIC 2006. COSEWIC assessment and status report on the American eel *Anguilla rostrata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. X+71pp. ([www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm)).

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#### *Atlantic Cod*

With respect to the Atlantic cod, a more detailed commentary on habitat requirements could have been included in the EIS - “the habitat most likely to be critical and potentially limiting for Atlantic cod may well be the vertical, “three dimensional” structures provided by plants, rocks, physical relief, and corals. In addition to providing protection from predators, such as physical heterogeneity would most certainly provide habitat for small fish and invertebrates, organisms upon which juvenile cod could feed” COSEWIC, 2003).

*Page 104 – The document states, “Implementation of the proposed Fish Habitat Compensation Plan will provide three times the bottom habitat lost by construction of the marine terminal. Enhanced pelagic fish habitat is also part of the compensation plan.” Compliance and effectiveness monitoring would need to be required as part of any fish habitat compensation to confirm the success of the compensation.*

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#### **RESPONSE**

A conceptual monitoring plan for the fish habitat compensation area was outlined in the Fish Habitat Compensation Plan Proposal submitted by Bilcon to Fisheries and Oceans Canada – Habitat Management Division. As indicated in DFO’s letter of November 24, 2005 regarding the proposed Habitat Compensation Plan Proposal, a detailed monitoring plan would be required as part of any potential Fisheries Act Subsection 35(2) authorization for the Whites Point Quarry and Marine Terminal project. Bilcon intends to use the “Benthic Protocol for Lobster Enhancement Projects” (Comeau 2003) as a basis for preparing a detailed monitoring plan. Also, Bilcon intends to consult with DFO – Habitat Management Division during preparation of a detailed monitoring plan.

*Page 104 – Section 9.2.63/4 – Mitigation/Monitoring – The focus should have been on Blasting Controls that will be implemented to protect these threatened species.*

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#### **RESPONSE**

The following blasting controls will be implemented by Bilcon regarding threatened and special concern fish species. All on land blasting will be done in accordance with the “Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters”. As noted elsewhere in this document the precautionary approach will take when IBOF salmon could be migrating. This precautionary approach will of course also apply to all fish, threatened or of special concern, during this time period.

#### **9.2.8 Marine Reptiles – Endangered (leatherback turtle)**

*Page 109 – Section 9.2.8 – Marine Reptiles – In general, this section was not well referenced and contains several inaccuracies. For example, in the first paragraph on page 109, *Lepidochelys kempi* should be referred to as Kemp’s Ridley instead of Ridleys. In addition, the COSEWIC assessment for loggerheads was deferred – it was not assessed at the May*

### 9.2.3 Aquatic Ecology – Marine

2006 meeting. There is no further mention of loggerhead turtles. There have been very few sightings of leatherback turtles in the Bay of Fundy. It should be noted that CITES does not list species (i.e., does not itself determine whether a species is endangered or not); the IUCN and COSEWIC list species. The first paragraph on page 110 provides no discussion of the extent of the survey coverage in either time or space. The second paragraph states that “leatherback turtles are fast and deep swimmers,” but provides no reference. This information does not reflect DFO’s current understanding.

*The leatherback turtle sightings information could be updated since data presented only shows 1990s.*

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#### RESPONSE

Bilcon recognizes that the preferred common name for *Lepidochelys kempii* could be Kemp’s Ridley instead of Ridleys and appreciates the information concerning the COSEWIC assessment for loggerhead turtles was deferred from the May 2006 meeting as indicated in the EIS. Bilcon also acknowledges and did not intend to infer that CITES makes a determination on whether a species is endangered or not. Review of James 1999 indicates no definitive time or space data was presented on the four records of leatherbacks in the Bay of Fundy by the Nova Scotia Leatherback Turtle Working Group. The statement that leatherback turtles are “fast and deep swimmers” is incorrect and should have been leatherback turtles are “fast swimmers and deep divers”.

*Page 110 – The proponent should still include mitigation such as no blasting if any endangered species is sighted in the monitoring zone, however unlikely. Noise has unknown effects on marine turtles and precautionary measures should be taken.*

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#### RESPONSE

Since blasting effects on marine turtles are unknown, Bilcon would not conduct blasts if endangered leatherback turtles were observed within the 2,500m safety radius proposed for endangered marine mammals.

#### 9.2.11 Blasting Marine Mammals

*Page 118 – Section 9.2.11 – Blasting Marine Mammals – See DFO advice (dated February 10, 2006) on the blasting Plan by Bilcon of Nova Scotia Corporation, May 2005 (in Appendix 9 of EIS).*

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#### RESPONSE

Bilcon intends to follow the advice provided by Fisheries and Oceans Canada dated February 10, 2006 on Bilcon’s Blasting Protocol. Continued coordination during preparation of monitoring parameters and details for a one year (4 season) verification period during quarry site preparation and construction will be held with Fisheries and Oceans Canada. A

### 9.2.3 Aquatic Ecology – Marine

summary of Bilcon’s research and monitoring commitment for the one year verification period for near and far field is presented below.

1) If the results from the initial blast monitoring validate the predicted results, Bilcon proposes calibrated blast sound measures in near and far field locations during the first year of construction.

- Measure the underwater blast sound levels at the edge of the tidal zone, and at 170m, 500m, 1000m, 2500m and at the margin of the right whale conservation area. This monitoring would be conducted during the first year of construction over 4 seasons.
- Schedule the first and second blasting shots prior to or after right whales are expected to be present; if measurements reveal low levels at distances that can be monitored effectively, then permit operations.
- Marine mammal monitoring by trained observers should occur prior to and during any blasting, as proposed, but the observer should use at least 7x50 binocular on a pedestal to ensure the ability to better detect marine mammals at greater distances.

2) Visual observation of seal behaviour before, during, and after construction blasting – especially of known seal aggregations, i.e. during seal pupping.

3) Testing of the effectiveness of visual observation methods at 2500m from the blast site is also recommended, including determination of the average site visibility conditions.

4) Opportunities to link up with other research initiatives e.g. university research, should also be considered.

*Page 122 – DFO has not formally “accepted” 180dB and 190 dB as acceptable thresholds for sound exposure of toothed whales and pinnipeds.*

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#### RESPONSE

Bilcon recognizes that DFO has not formally accepted 180 and 190dB as acceptable thresholds for sound exposure of toothed whales and pinnipeds.

*Page 122 – With respect to duration, it is suggested that seismic persists “for hours on end” whereas a blasting event will be over in less than a second. This is a valid comparison for duration, but it ignores intensity and waveform. In the case of seismic airguns, there is a very slow rise time that is thought to have less impact on swim bladders and other tissues/organs. With explosives, however, there is a very sharp rise time that introduces peak pressure quite suddenly. Therefore the comparison may not be entirely appropriate for short distances from the source.*

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### 9.2.3 Aquatic Ecology – Marine

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#### RESPONSE

Bilcon recognizes that the comparison between seismic airguns and blasting may not be entirely appropriate for short distances from the source.

*Noise monitoring at far-field (i.e.) greater than 500m) locations has not been proposed as was recommended in the DFO advice on blasting dated February 10, 2006. Monitoring of the seal colony in the Blasting Plan (Appendix 9 of the EIS) should have been also noted in this section. As well, the Blasting Protocol indicates that underwater blast sound levels will be monitored at the margin of the North Atlantic Right Whale Conservation Area during the initial blast. This should have been indicated in section 9.2.11.4 on page 124.*

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#### RESPONSE

DFO's advice regarding sound monitoring at distances stated below should have been included in Chapter 9.2.11 of the EIS:

- At the edge of the intertidal zone
- In the nearshore water at 170m from the detonation site
- In the nearshore water at 500m from the detonation site
- In the nearshore water at 1000m from the detonation site
- In offshore water 2500m from the detonation site
- In offshore water at the edge of the North Atlantic Right Whale Conservation Area

*Page 123 – The proponent should provide clarification on where location of the 500m setback radius is measured from (i.e., does this 500m from shore or from the blast location on land).*

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#### RESPONSE

Bilcon proposes that the 500m setback radius is measured from the blast location on land. See schematic diagram in the Map section in this document.

*Page 123 – What evidence does the proponent have that indicates an observer can accurately identify a marine mammal at 2500 metres? If there is no evidence, the proponent should confirm with marine mammal researchers on the ability to make identifications and in what conditions would this ability be limited*

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#### RESPONSE

The increased safety zone of 2500m for endangered marine mammals would be adhered to if endangered marine mammals have been sighted within the local area. If endangered marine mammals have been sighted, the 2500m safety radius as shown on **Map 41** would be patrolled by boat with an observer on board.

*Map 31 – It would be useful for the proponent to illustrate the 2500m buffer.*

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#### RESPONSE

The 2500m buffer is shown on **Map 41** in this submission

### 9.2.3 Aquatic Ecology – Marine

Section 9.2.11.5 – *The EIS concludes that blasting will result in an “insignificant negative impact” on at-risk marine mammals. For the purposes of SARA Section 79, the fact that these impacts are deemed to be insignificant does not change the requirement that measures be taken to avoid or lessen the effects and that the effects be monitored. SARA requires that all adverse effects on species at risk be avoided or lessened and monitored, regardless of their significance.*

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#### RESPONSE

Bilcon intends to comply with SARA Section 79, and take measures to avoid or lessen effects on at-risk marine mammals.

*The mitigation measures proposed for blasting impacts on species at risk, if applied rigorously, should help to lessen adverse effects on species at risk given the right conditions. One of the key mitigation measures proposed for blasting impacts on marine mammals is the establishment of “safety zones” around the blast site. Blasts will not be conducted if marine mammals are present in these safety zones. The EIS proposes that the presence of marine mammals will be determined by an onshore observer equipped with binoculars. The document notes that this approach is expected to reduce harmful impacts on marine mammals “under good visibility conditions”.*

*Visibility around Digby Neck is not always good. If the proponent intends to blast during periods of low-visibility (e.g. fog, rain, high waves, low light), the EIS should specify what mitigation measures will be taken. This is consistent with requirements for other activities that result in intense marine noise. For example, the Statement of Canadian Practice on the Mitigation of Seismic Noise in Marine Waters requires that operators use passive acoustic monitoring in addition to visual observations during reduced visibility in areas frequented by marine mammals that vocalize. It should be noted that the effectiveness of passive acoustic monitoring for determining the presence of right whales is still being studied, and that it cannot be used reliably to confirm their absence since right whales may only vocalize occasionally. Nonetheless, it may be more effective than visual surveys during low visibility. To be compliant with Section 79 of SARA, monitoring of the effect of blasting on marine mammal species at risk would need to be conducted if the project proceeds. The EIS proposes only to monitor the initial series of blasts to confirm sound propagation models and establish a baseline. While this may be a useful activity, monitoring the initial blasts is not sufficient. Monitoring of pressure/vibration/sound from blasting should be conducted at various times of the year at locations deemed appropriate by DFO and should continue for a sufficient length of time to draw reasonable conclusions. In addition to monitoring pressure and vibration, there is a need to monitor actual effects on species at risk to satisfy SARA requirements. According to the Canadian Wildlife Services Environmental Assessment Best Practice Guide for Wildlife at Risk in Canada, “actual effects on species should be monitored to verify the accuracy of predictions and warn of impending harm to individuals*

### 9.2.3 Aquatic Ecology – Marine

*or populations, community degradation or loss of ecosystem function.” This could involve, for example, monitoring marine mammal behaviour through visual or acoustic observations prior to and after blasting events to verify conclusions of no adverse behavioural effect.*

*Also, monitoring should be conducted to confirm the effectiveness of the mitigation measures. In this regard, the CWS best practice guide states that “as a priority, mitigation measures designed to protect wildlife at risk should be monitored to verify their effectiveness” For the Whites Point Quarry, this should include confirming the effectiveness of methods used to determine the presence/absence of marine mammals in the blasting safety zone. Details should be provided as to what course of action will be taken if monitoring determines that the sound propagation models used in the EIS are inaccurate, the mitigation measures prove ineffective, or the effects are greater than expected. For example, what if the underwater sound pressure levels are greater than predicted? It would be useful to see some details on the “future adaptive management practices” that are being considered pending the initial blast monitoring (e.g., will the safety radii be adjusted?)*

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#### RESPONSE

Monitoring methods to determine the presence or absence of marine mammals within the safety zone during high wave conditions include:

##### *Observation Criteria*

Use of knowledgeable marine mammal observers will enhance the probability of spotting a marine mammal. A knowledgeable observer can:

- Identify a marine mammal more quickly than a casual observer
- Understand how to best divide the field of observation into more easily scrutinized segments to increase the probability of spotting a marine mammal
- Select and utilize the proper optics for the conditions

##### *Technical Passive Observations*

If passive acoustic technology becomes proven, Bilcon will consider establishing an array of strategically placed acoustic monitoring devices and consider acoustic deterrent devices as early warning systems as appropriate.

##### *Third Party Observations*

Reports from Coast Guard Fundy Traffic on whale sightings will be monitored. Reports from Bilcon’s contracted bulk carries will also be used.

Communications will be maintained by the observer with local whale and seabird cruise operators known to tour the waters adjacent to the marine terminal. Their sightings of marine mammals will be considered and verified in decision making regarding “go/no go” for blasting.



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To enhance the likelihood of the observer's success in high wave conditions, Bilcon will ensure that:

- The observer is in place at least one hour before blasting is scheduled to begin
- Buoy markers are used to delineate the limits of the safety zone
- Intermediate buoys are used to allow for determination of the range of visibility
- A raised, stable, covered platform (i.e. shiploader) is used to help overcome some of the obscurity caused by a high sea state and
- The observer is supplied with all sources of observational information and is appropriately equipped for the task

To allow for the efficient communication of an observer's decision, Bilcon will develop an effective communication strategy that:

- Defines the observer's authority in relation to the blast coordinator with respect to calling off a scheduled blast
- Established firm "go/no go" protocols as discussed in EIS Volume VI, Chapter 9.2.11
- Requires that records of observations (location, time, date, visibility, weather, species etc.) are maintained that include decisions reached by the observer
- Establishes protocols for conveying the decision from the observer to the blast coordinator

The success of observation in high wave conditions is enhanced through the use of a combination of observation and supplementary devices and third party information. It is further enhanced with the continued use of effects monitoring to provide cyclical feedback on the effectiveness of these observational methods and to help fine tune procedures and equipment chosen and to help determine its most effective use.

Blasting activities at the Whites Point Quarry will not be conducted during periods of low atmospheric visibility (e.g. rain, snow, fog, low light etc.) or during thermal inversions. If clear weather prevails with high waves hampering visual observations from land within the 500m safety zone, the marine mammal observer will patrol the area by boat. Since blasting will not be conducted during low atmospheric visibility and the reliability of confirming the presence or absence of North Atlantic right whales using passive acoustic monitoring is still being developed, Bilcon believes the proposed visual approach should be reliable. If severe limitation become evident, an adaptive management procedure may be required and the use of passive acoustic monitoring and/or acoustic deterrent devices considered at that time.

Bilcon intends to monitor pressure/vibration/sound from blasting activities for one year on a seasonal basis in addition to monitoring the initial blast. This ongoing blast monitoring would be coordinated with DFO and would continue for a sufficient length of time to draw reasonable conclusions. Behavioural effects on selected marine mammal species e.g. seals,

### 9.2.3 Aquatic Ecology – Marine

will also be monitored prior, during and after blast events to verify conclusions regarding no adverse behavioural effects.

As mentioned above, mitigation measures will be monitored to confirm their effectiveness. Specifically, this would include:

- Confirming the effectiveness of methods used to determine the presence/absence of marine mammals in the blasting safety zones
- Confirming DFO's CONWEP models are accurate by initial blast monitoring
- Developing adaptive management procedures in consultation with DFO if models are inaccurate, mitigation is not effective or if scientific evidence changes

If data gained by monitoring the initial blast proves or disproves the models, adjustments to the proposed safety radius may be warranted. Adaptive management options that would be considered if on-going monitoring indicates that the measures are not as effective as expected are discussed in the response to DFO Comments on Volume IV, Chapter 3, page 6 in Section 3.6 – Adaptive Management.

*Page 124 – The EIS states that if local whale watching operators report right whale sightings in the near-shore area, “verification of right whale activity within the 2500m safety zone will be conducted prior to any blasting activity”. It is unclear how this “verification” would differ from the regular pattern of visual observation proposed prior to and after all blast events. Clarification of this term would be useful. This raises several questions of methodology which should be considered by the proponent. For example, if whale watching operators report Right Whale activity in nearshore waters, how exactly will the observer verify activity within the 2500m area?*

*It should also be noted that relying upon reports from researches and whale watching is questionable. These activities may not be conducted year round and they can take place well away from the project area. What will happen when an at-risk species enters the 2500 m radius but there are no reports of nearshore whale activity and thus no trigger for observation out to 2500 m? Under these circumstances will an at-risk species be detected before it enters the normal 500 m observation area? What are the risks of unobserved animals between 500-2500 m being exposed to a blast?*

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#### RESPONSE

Visual observation from the elevated shiploader is only considered to be effective within the 500m safety radius from the point of blast. If right whale sightings are reported in the vicinity “verification of right whale activity within the 2500m safety zone will be conducted prior to any blasting activity”. Observation within the 2500m zone as shown on Map 41 would be conducted by boat. To ensure a reduced risk factor, Bilcon proposes a routine observation trip during the morning that a blast is scheduled.

### 9.2.3 Aquatic Ecology – Marine

*Page 124 – The blast monitoring locations on Map 31 do not appear to correspond with the location indicated by the proponent. The proponent should provide a diagram of the proposed initial blast site with the location of the blast monitoring locations. Does the proponent plan to monitor blasts at the limits 500 and 2500 metre marine mammal observation area to determine if these limits are appropriate? The underwater sound level monitoring was proposed at these limits in the Blasting Protocol.*

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#### RESPONSE

The “proposed blast monitoring location – water” indicated on **Map 31** of the EIS is correct for monitoring noise and vibration in the marine environment for the initial blast for monitoring locations at the edge of the marine tidal zone, 170m and 500m from the point of detonation.

Further, in commenting on Bilcon’s Blasting Protocol Plan, DFO recommended “far-field” (i.e. greater than 500m) noise monitoring for marine mammals. Therefore, in addition to the monitoring shown on **Map 31** of the EIS at the edge of the marine intertidal zone, 170m and 500m from the point of detonation, Bilcon intends to monitor noise at 1000m, 2500m and at the edge of the Right Whale Conservation Area during the first year of site preparation and construction – see **Map 41**.

*Page 124 – The proponent needs to provide more information on the proposed blast monitoring program (e.g. what equipment will be used, what time of year, impact of water temperature on the results, any observations of seals during blasts and any proposed action if the blast noise levels exceed those predicted in the EIS)*

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#### RESPONSE

Details of the proposed marine blast monitoring program will be developed in coordination with DFO during the industrial permit phase of the project. The type of equipment to be used will depend on the final variables to be measured, water depth and the anticipated frequency.

The following is included here as an example of the type of equipment to be used during the initial blast to verify model results. Three monitoring stations in nearshore waters are proposed to measure peak pressure levels in the water column and ground vibration levels on or near the bottom. The proposed type of equipment would include a combination of microphones, hydrophones and geophones.

#### Station 1

At the ordinary high tide line, a 4 channel Instantel Mini Mate seismograph could be used to monitor peak pressure in the air through the use of a calibrated linear microphone and triaxial geophone. The final sensor position would be located using differential GPS.

### 9.2.3 Aquatic Ecology – Marine

#### Station 2

In nearshore waters approximately 118m from the detonation point, a 4 channel Instantel Mini Mate seismograph could be used to monitor peak pressures in the water column through the use of a calibrated hydrophone. A single 4 channel unit is proposed to be used with the hydrophone to ensure sampling rates of 65,000 samples/sec to capture the peak pressure signatures. A 4 channel seismography would be located on shore for recording.

Also, an underwater geophone will be installed at this location on or near the bottom. This geophone will be connected to an 8 channel Mini Mate seismograph which will record vibration data for both the 118m and 164m locations with recorder located on shore. Again, the sensor position would be located using differential GPS.

#### Station 3

In nearshore waters approximately 164m from the detonation point, using similar equipment as indicated for monitoring station 2.

The recording station would be set-up at monitoring station 1 on land for these nearshore stations. At this location, a total of 4 seismographs would record a total of 12 channels from the microphone, hydrophones and geophones located at the 3 monitoring stations. Data from the microphone and hydrophones would be expressed in time (msec) versus pressure (kpa) and geophone data for each of the transverse horizontal and vertical axes as peak particle velocity (mm/sec), peak acceleration ( $m/sec^2$ ) and peak displacement (mm).

The first step would be to conduct and monitor an initial blast as proposed for verification of the model results. After this data analysis, a more precise analysis may be possible regarding the proposed monitoring program involving near and far-field locations (170m, 500m, 1000m and 2500m from the detonation site and at the edge of the Right Whale Conservation Area) and to comply with the intent of SARA Section 79. If the results of far-field monitoring indicate no concerns, far-field monitoring would be terminated.

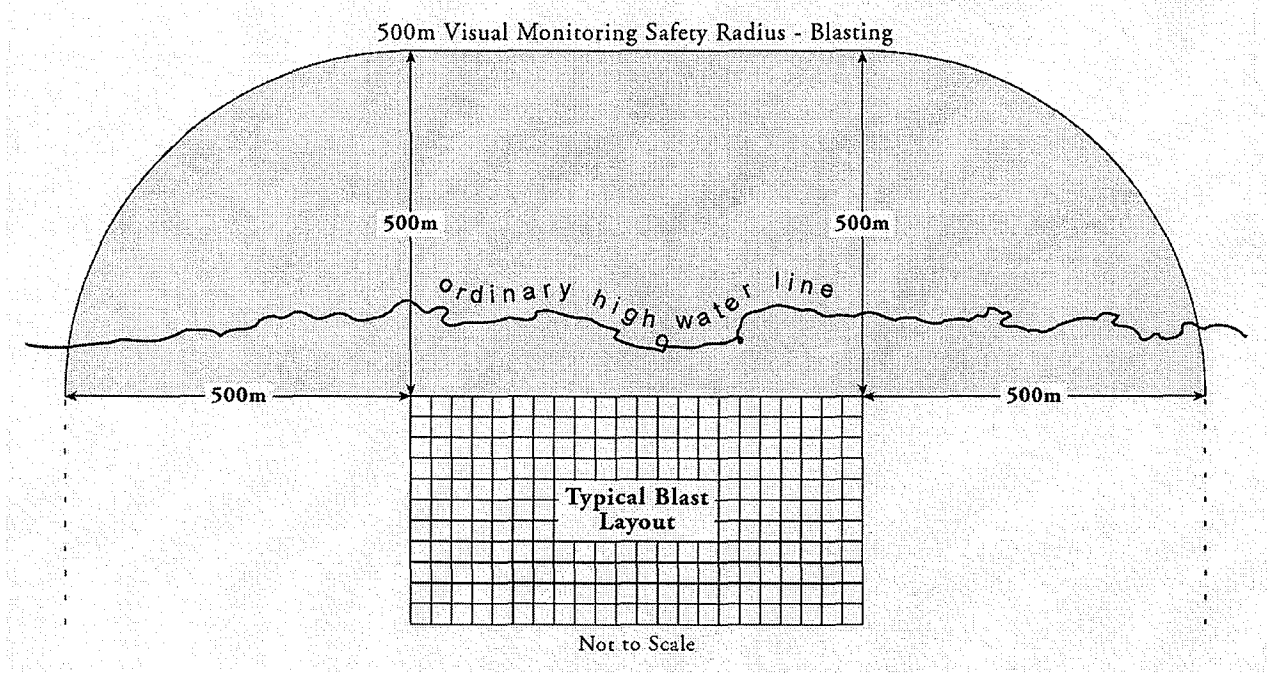
*Page 124 – If the monitoring zones are calculated from the blast location, the proponent should explain how the marine mammal monitoring zones are determined given that the blast will not be a single point but a series of blasts.*

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#### RESPONSE

The proposed visual monitoring zones are calculated from the on-land blast location. The following diagram is presented as an example to illustrate a typical calculation for determining a 500m monitoring zone.

9.2.3 Aquatic Ecology – Marine



9.2.11- The information contained in the SARA table has or will soon change. A decision on Fin Whale is expected by August 16<sup>th</sup>, 2006. The Minister of Environment recommended that this species be listed as Special Concern on June 10. Harbour Porpoise has been referred back to COSEWIC for further consideration and a listing decision is therefore not expected in the near future. The COSEWIC status of the Western North Atlantic Humpback Whale is “not at risk” rather than “not assigned”.

**RESPONSE**

Bilcon realizes that SARA designations are an ongoing process and it is their responsibility to comply with SARA over the life of the project. Regarding the SARA Table on Page 118, EIS Volume VI, Chapter 9.2.11.1, recent review of the fin whale, harbour porpoise and Western North Atlantic humpback whale on the SARA Public Registry indicates the following:

Species	Last COSEWIC Designation	SARA Status
Harbour Porpoise	Special Concern	No Status
Humpback Whale	Not at Risk	No Status
Fin Whale	Special Concern	Special Concern

### 9.2.3 Aquatic Ecology – Marine

Bilcon appreciates the SARA species update provided.

#### References

[http://www.sararegistry.gc.ca/species/speciesDetails\\_e.cfm?sid=874](http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=874)

[http://www.sararegistry.gc.ca/species/speciesDetails\\_e.cfm?sid=147](http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=147)

[http://www.sararegistry.gc.ca/species/speciesDetails\\_e.cfm?sid=160](http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=160)

#### 9.2.13 Ship Interactions – North Atlantic Right Whale – also in 9.3.4 - Transportation

*Page 128 – Section 9.2.13 – The EIS defines the possible area of effects for ship/whale interactions as the area between the shipping lanes and the quarry. This area is chosen because “Vessels arriving and departing the Whites Point marine terminal are ‘rule’ vessels (vessels >20m in length and >300 gross registered tonnes)”. However, the guidelines for the EIS acknowledge that the spatial boundaries of the assessment will vary depending on the VEC and will extend beyond the project site in many instances. One of the criteria proposed for determining appropriate boundaries is “the physical extent (terrestrial and marine) of the proposed Project, including any offsite facilities or activities (such as shipping).” Based on the data provided in the EIS, it would appear more likely that vessels en route to or from the quarry would interact with whales while in the shipping lanes rather than after turning in towards the marine terminal. Also, it is unclear why the size and weight of the vessels is the appropriate determinant of the area of effects for ship/whale interactions.*

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#### RESPONSE

**Map 25** contained in the EIS indicates the density of right whales sightings per unit effort (SPUE) in the Bay of Fundy. Also, **Maps 38A through 38D** indicate sightings of right whales, finback whales, humpback whales and minke whales in the Bay and **Maps 42A through 42F** indicate historic sightings (2000-2005) of right whales. The latter two series of maps are contained in this section. Based on these maps, there appears to be a greater number of SPUE and sightings of whales in general in other areas of the Bay than between the shipping lanes and the marine terminal at Whites Point. The low density and infrequent sighting were an important determining factor for the proposed shipping route selection between the inbound/outbound shipping lanes and the marine terminal.

The inbound/outbound shipping lanes were relocated in 2003 to reduce the possibility of ship/right whale interactions in the Bay of Fundy and to avoid to the extent practicable, the concentration of right whales and other species of whales frequenting the right whale conservation area. The size of vessels transporting quarry products entering and exiting the Bay of Fundy are required to use the inbound/outbound lanes with no alternatives. Bilcon would agree that there may be a possibility of whale/ship interactions in the shipping lanes as presently located. Since no alternatives exist to the inbound/outbound lanes, appropriate mitigation measures must be relied upon to avoid interactions such as ship speed reduction and avoidance.

### 9.2.3 Aquatic Ecology – Marine

*Page 128 – Section 9.2.13 – Ship Interactions, North Atlantic Right Whale – The EIS indicated that sighting of North Atlantic right whale in the area of proposed operation are relatively low compared to other areas of the Bay of Fundy. DFO and Right Whale Consortium hold sighting data additional to the SPUE data analyzed in the EIS. These data suggest that right whales are seen occasionally in the area.*

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#### RESPONSE

Sightings of North Atlantic right whales in the area of proposed quarry operations are relatively low compared to other areas in the Bay of Fundy. Right whale sightings from 1971 through 2005 from the database file housed at the University of Rhode Island were reviewed. A total of 13,509 sightings are recorded in this database for the 30 year period (1971-2005). Right whale sightings in addition to the SPUE data, from the University of Rhode Island database for the years 2000 through 2005 are shown on **Maps 42A through 42F**. Also, an aggregate of right whale sightings from the Maritime Fisheries and Oceans Canada, St. Andrews Biological Station Sightings Database is shown on **Map 38A**. These databases indicate that right whales were sighted very infrequently in the area of the proposed ship route between the inbound/outbound shipping lanes and the marine terminal at Whites Point. As indicated on Map 38A, 1 sighting of a right whale was recorded during an approximate 30 year period in this area of the ship route.

*Page 133 – The proponent should explain what the statement “this route will be designated” means.*

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#### RESPONSE

The proposed shipping route from the inbound/outbound shipping lanes and marine terminal is shown on Map 25 in the EIS and on Map SR-1 in Section 7.0 – Revised Project Description. The term “designated route” is intended to be the course which the master of the ship will adhere to unless safety considerations for ship and crew or marine mammal sightings indicate a variance is necessary.

*Page 133 – The section on mitigation measures for shipping impacts on Right Whale requires some clarification and further details. It is not entirely clear from the first paragraph, whether the proposed mitigation activities will be carried out or may be carried out. This section proposes that the presence of whales along the proposed ship route be monitored through communication with research and whale watching vessels operating around the project area. Specifics on how the quarry will maintain communication with research vessels and whale watchers, whether the latter have agreed to cooperate with the quarry operators, and whether they are likely to be present in the project area with any frequency is needed (see note below Fundy Traffic reports). Also, details should be provided on the mitigation measures that will be taken if whales are sighted. And as noted above, research and whale watching may not be conducted year round, unlike quarry operations.*

### 9.2.3 Aquatic Ecology – Marine

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#### RESPONSE

Mitigation measures proposed by Bilcon are specific to the ship route between the inbound/outbound shipping lanes and the Whites Point Marine Terminal. As mentioned previously, Fundy Traffic Services provide vessel captains with regular advisories on right whale locations in the Bay of Fundy.

As an additional precautionary measure, Bilcon intends to request any right whale sightings from whale watching tours operating in the area between the shipping lanes and marine terminal. Provision of right whale sightings to Bilcon by tour operators would be voluntary. It is quite likely, due to the historic infrequent sightings of right whales in this area, that whale watching tours may not frequent this area on a regular basis. Also, tour operators generally do not provide tours throughout the year when shipping of aggregate products are proposed. Therefore, a more reliable source of information may be from Fundy Traffic and their advisories which would provide a more comprehensive observation source.

Implementation of mitigation measures, if right whales are sighted, is the responsibility of the ship's captain. Further, recent updates on the reverse side of Navigation Chart 4011, Approaches to the Bay of Fundy, DFO, prescribes Guidelines (June – November) for vessel operators regarding right whales. In this regard, mitigation measures in certain waters in the United States are presently proposed (National Oceanic and Atmospheric Administration (NOAA) 2006). The intent of these proposed regulations is to reduce the risk of collision between ships and endangered northern right whales. These proposed rules were published in the Federal Register/Vol.69, No.105/Tuesday June 1, 2004/Proposed Rules. A key aspect of the proposed rule by NOAA Fisheries service is a uniform, mandatory vessel speed reduction of 10 knots or less in specific locations along the U.S. East Coast during times when whales are likely present.

*Page 133 – Commercial vessels operating in the shipping lanes and approaches are advised to contact Coast Guard Fundy Traffic if they sight right whales. Fundy Traffic then issues reports to all ships in the area. This would provide a more comprehensive observation source, supplemented by whale watchers and researchers. Also, the main period of concern is May-November for these animals.*

#### RESPONSE

Bilcon agrees with this approach that Coast Guard Fundy Traffic be the primary source of right whale sightings, supplemented by whale watch tour operators. Also, the main period of concern is May – November for the right whale.

*Page 133 – The EIS states only that shipping activity will be monitored (i.e., keeping records of arrivals and departures, fulfilling Transport Canada's monitoring requirements). SARA*



### 9.2.3 Aquatic Ecology – Marine

*requires monitoring of the effect on species at risk. Monitoring measures for shipping impacts on marine species at risk should be added. This should include monitoring the effectiveness of mitigation measures and confirming the effect predictions.*

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#### RESPONSE

In addition to monitoring shipping activities at the marine terminal, Bilcon will monitor any sightings and/or ship interactions by the shipping company with right whales between the shipping lanes and the marine terminal. The intent of this monitoring would be to determine the effectiveness of the mitigation measures being implemented but it should be noted that this sea area will be frequented by other boats so that only the mitigation by Bilcon will be able to be assessed rather than the overall effect on species at risk as listed by SARA by all shipping activities in the area.

#### Section 9.2.14 Ballast Water – Also in Section 9.3.4 Transportation

*Page 134 – The summary of invasive species in section 9.2.0 does not mention concerns about the potential for the introduction of disease organisms. Among those mentioned in the reference document (Reference Document 13) is the pathogen thought to be responsible for lobster disease in New Jersey:*

*“The greatest immediate concern for the Whites Point ecosystem and fishing community would be the potential introduction of the “pathogen” responsible for the mass lobster mortalities observed in the Long Island Sound area in 1999. Evaluating this risk is, however, very difficult given the current status of the research on this issue” (Carver and Mallet, 2003).*

*The potential for the transport of this pathogen could be addressed by experts in aquatic animal disease. This potential for introduction of pathogens and other invasive (such as the Asian crab) by this project may be no different than that from existing shipping but this does not appear to be addressed.*

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#### RESPONSE

Bilcon assumes that the new regulations introduced by Transport Canada in 2006 will negate the potential for the introduction of pathogens and other invasive species. However, Bilcon will conduct monitoring for invasive species as set out in the response to the question below.

*Page 136 – The proponent states that they will employ a “reputable bulk carrier” which is required to follow ballast water exchange guidelines. They agree to conduct monitoring at the receiving terminal, and submit a written report to Environment Canada upon completion of the investigations. However, they provide no details of what “upon completion of the investigations” means. The proponent should be more specific about this. They conclude*

### 9.2.3 Aquatic Ecology – Marine

*that no mitigation is required and the impact is neutral. While current practices for ballast water management do not eliminate all risks, there is no compelling reason to disagree with their position regarding ballast water control.*

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#### RESPONSE

Notwithstanding the fact that new regulations under Transport Canada are now in place, monitoring in marine waters adjacent to the Whites Point Marine Terminal is proposed on a voluntary basis in order to contribute and add to the knowledge base as to the effectiveness of the regulations, please refer to EIS Volume VI, Chapter 9.2.14.4. Monitoring would be conducted seasonally during the first year of shipping activities. Thereafter, monitoring would be conducted once a year for the next five years. After five years, an evaluation of the monitoring results would be conducted to determine if continued monitoring is warranted. Written reports will be prepared at the end of the first year (seasonal) and at the end of the five year period. Coordination will be maintained with Environment Canada and Fisheries and Oceans Canada.

*Section 9.2.14.1 – Ballast Water Research – This section should note that the Ballast Water Control and Management Regulations do not retain designation for “vulnerable area” as contained in the draft Annex V of the “Guidelines for the Control of Ballast Water Discharge from Ships in Waters under Canadian Jurisdiction” (200). As such, the Bay of Fundy is not formally considered a vulnerable area for the purpose of ballast water management and regulation.*

*A more detailed description of the Ballast Water Control and Management Regulations should be provided by the proponent, particularly the provision requiring the management of ballast water on vessels operating between points south of Cape Cod, Massachusetts and Canadian waters.*

*The proponent should also note that invasive species may be transferred via hulls of ships, although the primary vector and risk is expected to be via ballast water.*

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#### RESPONSE

It is noted that the Ballast Water Control and Management Regulation have changed from the 2001 Draft.

The provision for ballast water management on vessels operating between points south of Cape Cod, Massachusetts and Canadian waters is contained in the Ballast Water Control and Management Regulations (Canada Shipping Act, Ballast Water Control and Management Regulations SOR/2006-129). In the case of shipping at the Whites Point Marine Terminal, paragraphs 6 (Ballast Water Exchange – Transoceanic Navigation) and paragraph 7 (Ballast Water Exchange – Non-Transoceanic Navigation) of the Regulations should be referred to.

### 9.2.3 Aquatic Ecology – Marine

In addition to potential for invasive species carried via ballast water, it should also be noted that invasive species may be transferred via hulls of ships.

*Section 9.2.14.3 – Ballast Water Mitigation – The proponent should state that mitigation will occur through ballast water management on vessels using the marine terminal. The proponent should also discuss the potential for a ballast water management plan to be incorporated into any shipping agreement.*

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#### RESPONSE

Since regulations governing ballast water management on vessels are in effect, this would constitute a mitigation measure. A ballast water management plan is a requirement of these regulations and Bilcon does not intend to have any additional requirements incorporated into any shipping agreement.

*Page 136 – The requirement for monitoring is not based on community and stakeholder concerns about invasive species resulting from ballast water discharges. The requirement for monitoring is based on the risk of invasive species associated with marine traffic at the terminal. While the commitment to monitoring is recognized, the proponent will have to provide a detailed monitoring plan for review by DFO and other relevant agencies if the project proceeds.*

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#### RESPONSE

Bilcon's proposed monitoring in marine waters adjacent to the Whites Point Marine Terminal is a voluntary precautionary measure and not a requirement of the Ballast Water Control and Management Regulations. As previously mentioned, monitoring is proposed seasonally for the first year of shipping activity and once a year thereafter for five years. A detailed monitoring plan will be coordinated with Environment Canada and Fisheries and Oceans Canada

*Page 136 – The impact statement is likely valid provided that vessels operate in compliance with ballast water management and control measures. However, the ongoing risk of invasive species posed by vessel traffic in the area should be acknowledged. The determination of magnitude of effects is challenging in that one successful invasion/colonisation (i.e., from one vessel discharge) can lead to local and regional effects.*

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#### RESPONSE

Bilcon concurs with this paragraph and acknowledges that all vessel traffic in the Bay of Fundy poses a risk of invasive species introduction. In this regard as a precautionary measure, Bilcon intends to monitor marine waters in the vicinity of the Whites Point Terminal to determine the effectiveness of ship mitigation measures involving ballast water control and management during the first six years of project shipping activities.

### 9.2.3 Aquatic Ecology – Marine

*Page 137 – 9.2.15 concludes that noise from shipping will have a long term, insignificant negative effect on marine organisms. The EIS does not specify which organism will be affected but it can be assumed that this would include locally occurring species at risk, and especially at risk marine mammals, which are considered to be sensitive to noise. Ambient/ship induced noise is identified as a potential limiting factor for right whales in the COSEWIC Status Report*

*No mitigation for ambient noise is proposed but SARA Section 79 requires that measures be taken to reduce or avoid adverse effects on species at risk. The EIS does note that vessels will reduce their speed after they turn in from the shipping lane, and implies that this will result in noise reduction. This could be viewed as an effort to reduce the adverse effect of noise, as required by Section 79. If so, the proponent should provide more detail on the expected noise levels at the speed at which the vessels will be travelling.*

*The proposed monitoring of noise levels is supported, but DFO recommendations (in Appendix 9 of EIS) regarding noise monitoring need to be considered. Also, unless it can be clarified that the negative impact of noise will only affect marine organisms that are not SARA listed, monitoring of the effect of noise on species at risk will be required. This could involve for example, coupling passive acoustic monitoring and/or visual behavioural monitoring with the noise monitoring system to determine whether the movement of ships is affecting marine mammals*

*DFO supports the proposal for sound and vibration monitoring in the water column near the marine terminal but more detail should be provided by the proponent (e.g., target frequencies, duration, seasonality, reporting, continuance etc). There also seems to be a disconnect between this section and the earlier one on blast monitoring (9.2.11.4). If the proponent is going to install a semi-permanent acoustic monitoring system, it should be designed so that it can be used to monitor blasting noise as well as more general sound from the terminal operation.*

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#### **RESPONSE**

The effect of noise from shipping was primarily directed to marine mammals at risk, which may be sensitive to noise. It is recognized that ambient/ship-induced noise has been identified as a potential limiting factor for right whales (COSEWIC Assessment and Update Status Report 2003). Further clarification is offered for the previous statement.

“It has been suggested that the constant hum of shipping noise in the North Atlantic has habituated right whales to ship sounds, making them less likely to avoid oncoming vessels. It is also possible that the higher levels of ambient noise in the ocean have reduced the ability

### 9.2.3 Aquatic Ecology – Marine

of right whales to hear mating calls over large distances, perhaps reducing mating opportunities” (COSEWIC Assessment and Update Status Report 2003).

Sound levels and frequency characteristics are generally related to ship size and speed. The primary sources of sounds are propeller cavitation, propeller singing and propulsion equipment. Propeller cavitation is usually the dominant noise source (Ross 1976). Both propeller cavitation and singing originate outside the hull of the vessel while noise from propulsion machinery originates inside and reaches the water via the vessel hull. Large vessels create stronger and lower frequency sounds because of their greater power, large drafts and slower turning engines and propellers. Commercial vessels such as the bulk carriers that will carry aggregate products from the Whites Point quarry produce high sound levels mainly at low frequencies. Noise also increases with ship speed (Richardson et al 1995). Expected noise levels for a vessel traveling at 10 knots would be 152 dB re 1  $\mu$ Pa<sup>2</sup>/Hz at 100 Hz near the source (Urick 1975). It should be noted that this data is based on a freighter of that time period and at 1m from the vessel. More modern vessels may produce greater noise levels. Speed between the shipping lanes and the marine terminal, a distance of approximately 13k, would range from 10 to 0 knots. Reduction in speed generally results in a decrease of noise. Thus, continued speed reduction will result in continued noise reduction as the ship approaches the terminal. When the ship departs the terminal, loaded, there may be an increase in noise as compared to the unloaded ship approaching the terminal.

Large commercial ships could be quieted with the application of certain vessel quieting technologies, however, there is apparently no consensus as to whether the need for this is clear, based on current understanding of impacts. Also, the application of these technologies whether in new construction or retrofitting existing vessels is expensive. It therefore appears that any mitigation measures such as quieting technologies to reduce noise from vessels presently lies with the shipping industry in either new construction or retrofitting.

An ecosystem-based approach to conservation management regarding marine pollution, which could include noise, appears to be emerging under IMO as well as other conventions and agreements. However, there are currently no explicit and binding international guidelines or regulations regarding the impacts of anthropogenic noise sources, including vessels, on marine mammals (NOAA 2004. “Shipping Noise and Marine Mammals: A Forum for Science, Management and Technology”).

Vessel speeds in the shipping lanes are expected to be approximately 14 to 15 knots. Reduction from these speeds upon approach to the marine terminal at Whites Point would begin approximately 24km from the terminal. Expected speed upon exiting the inbound shipping lane would be less than 10 knots and 2 to 5 knots while beginning manoeuvring to the marine terminal, depending on sea conditions. There are presently no speed restrictions

### 9.2.3 Aquatic Ecology – Marine

for vessels operating in or outside the shipping lanes in the Bay of Fundy. Ship speed is at the discretion of the ship's master in accordance with ship and crew safety considerations.

As stated in the EIS, Bilcon has indicated monitoring noise levels from vessels arriving and departing the marine terminal will be conducted. Also, as stated in Bilcon's Blasting Protocol, background noise monitoring in the Bay at the edge of the Right Whale Conservation Area will be conducted at the time of monitoring the initial blast. Bilcon is not aware of any regulations requiring monitoring of noise from vessels in marine waters. This proposed monitoring would be done on a voluntary basis. Details of the proposed monitoring program will be coordinated with DFO and could involve visual behavioural monitoring of marine mammals in conjunction with the noise monitoring. Bilcon's intention would be to incorporate appropriate equipment for monitoring noise from vessels, at appropriate frequencies, at the monitoring stations proposed for monitoring blasting noise and vibration in the vicinity of the marine terminal and at the edge of the Right Whale Conservation Area.

#### 9.2.15 Noise and Vibration Marine – Also in 9.3.4 – Transportation

*Page 137 – Section 9.2.15 – Noise and Vibration, Marine – In Sub-section 9.2.15.2 it is stated that for a one day sonobuoy deployment within the North Atlantic right whale Conservation Area, sound levels were elevated at both 500 and 100 Hz, the measurement period coinciding with verified high levels of shipping in the area. Upon examination of the literature, the measured noise levels reported in Sub-section 9.2.15.1 at 100 Hz appear to be as much as 10 dB higher than normally expected in corresponding heavy shipping areas in the deep ocean and 20 – 25 dB higher than those anticipated in the same deep ocean areas both measured a sea state zero. The sonobuoy levels are somewhat comparable to older historical acoustic levels measured in shallow waters of New York harbour (Urlick 1975) however; one day of recording does not provide a representative sample of baseline noise.*

*It is reasonable to assume that two bulk carrier transits per week through or close to the Conservation Area would not add greatly to average incremental exposures in the Conservation Area itself. However it should be emphasized that for any individual vessel passage the locally observed noise level and any specific animal exposure will be very dependent on the distance to the vessel and also, at increasing ranges, water depth and other physical variables. As an example, for a freighter traveling at 10 knots Urlick (1975) quotes a 100 Hz spectral noise level of 152 dB re 1 VPa<sup>2</sup>/Hz at 1 yd, which is about equivalent (within 1 dB) to a reference viewing distance of 1m. Crudely assuming single vessel noise to fall-off at a 20 log R rate up to a distance comparable to the water depth, say 200m in the Grand Manan Basin, and at a 10 log R rate for distances beyond 200m, vessel acoustic levels comparable to the above reported 93 to 81 dB ambient would be approached at ranges of 4 to 60 km. What this implies is that at observation ranges up to at least a few kilometers the*

### 9.2.3 Aquatic Ecology – Marine

*noise levels from a large ship will almost certainly be above the measured (elevated) ambient background. The last sentence in Sub-section 9.2.15.2 stating “background noise levels are therefore expected to be less than noise levels recorded in the North Atlantic right whale Conservation Area study previously mentioned” is difficult to interpret. This is no doubt true providing acoustic levels are highly averaged over time and space. Levels from one or two close bulk carrier passages will no doubt average to something close to the otherwise ambient levels provided the averaging period is long enough (e.g., one week).*

*The last sentence in Sub-section 9.2.15.2 stating “background noise levels are therefore expected to be less than noise levels recorded in the North Atlantic right whale Conservation Area study previously mentioned” is difficult to interpret. This is no doubt true providing acoustic levels are highly averaged over time and space. Levels from one or two close bulk carrier passages will no doubt average to something close to the otherwise ambient levels provided the averaging period is long enough...*

*If this project were to proceed, it would be advisable to make baseline measurements of bulk carrier noise around the terminal and nearby areas of potential environmental sensitivity. It should be noted that it is not entirely certain that modern bulk carrier generated noise levels would closely approximate those of a “freighter at 10 knots” nor if the general ambient noise levels close to Whites Point would be similar to those measured in the Conservation Area during a period of high shipping density.*

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#### RESPONSE

In response to the first paragraph of the comment: Bilcon would agree that one day of recording noise levels in the North Atlantic Right Whale Conservation Area does not provide a representative sample of baseline noise. Regarding ambient noise levels in the Bay of Fundy, Bilcon was unable to access contemporary data. If Fisheries and Oceans Canada has reliable contemporary data, Bilcon would appreciate being provided references.

In response to the second paragraph of the comment: It should be noted that the proposed ship route from the inbound/outbound shipping lanes to the marine terminal at Whites Point does not pass through the right whale conservation area. Based on the infrequent shipping schedule of two transits per week, and the reduced ship speeds (below 10 knots entering or exiting the shipping lanes, the predicted effect of quarry induces shipping would constitute an insignificant negative effect (EIS Volume VI, Chapter 9.2.15.5). This predicted effect is for the marine waters between the inbound/outbound shipping lanes and the marine terminal. Bilcon agrees with DFO’s analysis that the ship would produce noise levels comparable to that recorded in the Right Whale Conservation Area based on the presented assumptions. However, other variables such as vessel speed (less than 10 knots), duration (travel time to and from the shipping lanes to the marine terminal), water depth, season, etc. should be considered.

### 9.2.3 Aquatic Ecology – Marine

In response to the third paragraph of the comment: Bilcon would agree that shipping activities at the Whites Point Quarry will add to the ambient noise levels in the Bay of Fundy. Also, there appears to be a lack of quantifiable data existing on ambient noise levels in various areas of the Bay. Since no regulations exist concerning noise level emissions from ships in marine waters, Bilcon has voluntarily proposed monitoring at the marine terminal (EIS Volume VI, Chapter 9.2.15.5). Also, as indicated in Bilcon's Blasting Protocol, monitoring at the edge of the Right Whale Conservation Area will be conducted for the initial blast. Background/ambient noise monitoring would be conducted prior to and after the initial blast. This response should be read in conjunction with the previous response.

It should be realized that sources other than large ships contribute to ambient noise in the area of the Bay. Natural environmental forces such as wind driven waves and surf and other anthropogenic sources such as smaller boats such as fishing and whale watching boats also contribute to ambient noise. The fishing and whale watching boats in coastal regions contribute significant sound, adding to aggregate noise. Since fishing boats comprise the largest number of vessels operating in the Bay, and have higher-speed engines and propellers than large ships (Richardson et al 1995), their contribution to ambient noise may far exceed the noise generated by two bulk carrier transits per week.

#### References

Richardson et al. "Marine Mammals and Noise". 1995

Gisiner, Robert C., Ph.D. Marine Mammal Science Program Office of Naval Research. "Proceedings – Workshop on the Effects of Anthropogenic Noise in the Marine Environment". 10-12 February 1998.

Final report of the National Oceanic and Atmospheric Administration (NOAA) International Symposium: "Shipping Noise and Marine Mammals: A Forum for Science, Management, and Technology". 18-19 May 2004. Arlington, Virginia, U.S.A.

In summary, at the present time, Bilcon is not aware of any regulation requiring noise/vibration monitoring in the marine environment. Bilcon intends to operate in accordance with the Fisheries Act and Species at Risk Act and other applicable acts. Bilcon also intends to follow the criteria/thresholds regarding blasting contained in the "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters". As a precautionary measure, Bilcon will voluntarily monitor an initial blast at the Whites Point site to verify the CONWEP model results and DFO's formulas upon which the "Guideline" criteria are based. Once this initial data has been gathered and analyzed, any effects of concern regarding marine animals would be identified. If the criteria/thresholds contained in the "Guidelines" are achievable based on the results of the initial findings, a reasonable time frame for "significance" monitoring would be established. Bilcon proposes a one year (4 season) time



### 9.2.3 Aquatic Ecology – Marine

frame to further verify original predictions of change either positive or negative. This monitoring would be conducted during the first year of quarry construction.

Regarding spatial boundaries for monitoring, Bilcon believes it reasonable that the suggested “far-field” monitoring would only be implemented if significant near-field monitoring results are deemed of concern, i.e. if the results of the initial blast conclusively exceed the model and DFO’s guideline criteria/thresholds. If DFO’s guideline criteria/thresholds in the near-field where the greatest effect is most likely, it would appear unreasonable to continue monitoring in the far-field after the one year verification period, provided there were no new scientific standards or regulatory requirements. If, during the 50 year life of the project new standards or regulations come into effect, Bilcon would take an adaptive management approach in coordination with the regulatory authority.

*Wharf Construction - the proponent should describe the impact of drilling rock sockets (as compared to pile driving)? Also the impact of the terminal operation, ship loading and the drilling of blast holes should be described.*

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#### RESPONSE

Please refer to Bilcon’s response to Fisheries and Oceans Canada in Section 9.1.7 – Noise and Vibration.

#### Volume VII – Chapter 9.3 Human Environment and Impact Analysis

*Page 127 – Section 9.3.18 to 9.3.20 – Contaminants – There is no proposal within this EIS for environmental effects monitoring of the commercially valuable species such as lobster, crab, and scallop that are sensitive to the toxic metal exposures, especially in the Bay of Fundy areas. The monitoring of water quality of outflow from the sediment retention ponds is insufficient to detect the possible problem of contamination associated with quarrying operation. In the study of the selection of bioindicators for monitoring marine environmental quality of the Bay of Fundy, Chou et al. (200) reported that lobsters from Digby had elevated digestive gland copper (70ug/g) in comparison to lobsters from Pubnico (10ug/g. Chou et al. also reported the ineffectiveness of mussels and sediments as reliable indicators of contaminants. Mussels and sediments failed to reveal the problem of high toxic metals in the Bay of Fundy area. The EIS quotes the Gulfwatch results and states that heavy metal concentrations in blue mussels are near natural levels (Table MC-1, page 128). The report should include recent bioindicator studies by Chou et al. with regard to the contaminant levels in lobsters and crabs from the Bay of Fundy areas. The selection of bioindicators is key to revealing the toxic metal exposure in marine organisms.*

### 9.2.3 Aquatic Ecology – Marine

#### Comments on Mitigation and Monitoring

##### Contaminants

*It is suggested that lobster, scallop and crab be assessed for contaminants in addition to other environmental samples within the environmental effects monitoring program.*

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#### RESPONSE

##### *EIS Coverage*

Section 9.3.18 Human Health - Drinking Water Quality; 9.3.19 Human Health - Marine Contaminants; 9.3.20 Human Health - Land Contaminants; 9.1.6 On-site Surface Water Drainage

In Section 9.1.6.4 Monitoring, it is stated that water quality monitoring of all outflows from sediment retention ponds will be conducted weekly for Total Suspended Solids (TSS) and pH and monthly for general chemistry. TSS will be maintained at less than 50 mg/L per grab sample or 25 mg/L monthly arithmetic mean while pH will be maintained within a range of 5 – 9 per grab sample or 6 – 9 monthly arithmetic mean at the sediment pond outlet. These TSS and pH limits correspond with those contained in the permit for the four hectare quarry on this site. The frequency of monitoring will be weekly for TSS and pH and a monthly summary of results will be prepared by Bilcon of Nova Scotia Corporation and be available to regulatory agencies.

In Section 9.3.19 Human Health – Marine Contaminants, 9.3.19.1 Research, it is stated that contaminants such as metals have been measured in scallop and lobster in the Bay of Fundy. Scallop from most of the Bay generally had metal levels comparable to those from uncontaminated areas (Bay of Fundy Ecosystem Partnership 2004, Ref. 99). Copper measurements in the tissues of lobster in the upper Bay of Fundy, **predominately in a non-industrialized area** (emphasis added), had levels as much as 30 – 100 times higher than industrialized areas.

##### *Response to Fisheries and Oceans Canada*

Given the concern over the potential for high copper levels, it is proposed that all outflows from sediment retention ponds be sampled semi-annually and the samples analyzed for copper. This program would then be sunsetted if the levels of copper can be shown to be of no concern.

The use of bioindicators is said to be “key to revealing the toxic metal exposure in marine organisms”. This is incorrect because it assumes there will be significant exposure to organisms in the marine environment, which is a false premise. As indicated in the response to the panel in the previous section on contaminants, copper exposure is expected to be extremely low due to the planned mitigation strategy and the physical/chemical processes acting upon the copper in the environment. Analysis of periwinkle has shown copper levels

### 9.2.3 Aquatic Ecology – Marine

of 22.1 mg/kg, a consequence of the naturally occurring background levels of copper. Research for this response did not identify current guidelines for copper content in marine organisms. Stewart and White (2001), in a review paper of contaminants on the Scotian Shelf, referred to a Health and Welfare Canada Guideline (circa 1996) of 100 µg/g in marine and freshwater animal products. Bilcon of Nova Scotia Corporation, in good faith, has proposed to continue the sampling and analysis of periwinkles for copper. It is anticipated that any biomonitoring will not discern exposure due to the site activities nor show copper levels over and above that which is due to background exposure.

The full range of elevated digestive gland copper in lobster as presented in Chou et al. (2003) include the following digestive gland (ug/g wet weight) copper concentrations from the Bay of Fundy:

Inner Bay of Fundy	Cobequid Bay	856 ug/g ± 40
	Minas Basin	405 ug/g ± 20
	Minas Channel	110 ug/g ± 25
New Brunswick Coast	Shepody Bay	637 ug/g ± 36
Nova Scotia Coast	Cumberland Basin	836 ug/g ± 17
Saint John Harbour	Dumpsite	317 ug/g ± 16
Annapolis Basis	Annapolis Basin	70.5 ug/g ± 2.8
Outer Bay of Fundy	Pubnico	10.4 ug/g ± 3.6

There are several issues against the use of lobster in a biomonitoring strategy. In Chou et al. (2003), there were high levels of copper in the digestive gland (hepatopancreas) of lobster, but edible tissues were not analyzed. It is expected that muscle tissue would likely have been much lower in copper concentration than the level determined in the hepatopancreas. This phenomenon has been observed in other decapod crustaceans that regulate metals (Bryan 1968; Bagatto and Alikhan 1987). Metals are sequestered in the hepatopancreas via metallothioneins, membrane metal transport proteins, and vacuolar sequestration mechanisms (Ahearn et al. 2004) and thus removed from circulation. The correlation of hepatopancreas copper and the copper concentration in the sediments in the Bay of Fundy was poor. The source of copper was unknown and could be from background sources. Lobsters appear to have a greater capacity for metal uptake and accumulation. Lobsters are also rather mobile, making it even more difficult to pinpoint a contributing source of contamination.

Metals have been measured in scallop and lobster in the Bay of Fundy. Scallop from most of the Bay generally had metal levels comparable to those from uncontaminated areas (Bay of Fundy Ecosystem Partnership 2004). Copper measurements in the tissues of lobster in the upper Bay of Fundy, predominately in a non-industrialized area, had levels as much as 30 – 100 times higher than industrialized areas.

### 9.2.3 Aquatic Ecology – Marine

These facts raise serious questions as to the suitability of lobster in a monitoring program. A periwinkle biomonitoring program has been proposed. Use of lobster in a biomonitoring program is not recommended.

#### References

Please see Section 12 – AMEC Earth and Environmental Inc. Response to the Panel on Copper.

#### Volume VII- Chapter 11

*Page 45 – The document states that the loss of fish habitat is an insignificant negative effect. Compensation is required under DFO's policy and under CEAA to mitigate the loss of fish habitat. Without this compensation the impact to fish habitat could be considered significant.*

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#### RESPONSE

Comment noted.

#### REFERENCE DOCUMENTS

##### Volume II – Reference Document 8

*This survey was not sufficient to draw the conclusion on the significance of the sublittoral benthic habitat. The grab samples and video described in this report are restricted to just two days (June 28 and 29m 2002) between 9.5 and 41.5m depth. Only two video transects were taken, 525m and 30m long. Only 12 grabs were attempted, yielding only five actual samples and the sieve size for sample analysis is not stated. According to the maps provided, the short video transect had only one grab sample associated with it and the long video transect had none. Apparently, the camera was drawn through the water too quickly or it was not in focus most of the time.*

*This information and the points stated below indicate an inadequate sampling design and field execution.*

- *Shallow areas (<9.5m) were not surveyed, even though that zone can be highly productive and diverse.*
- *By only sampling on two days in June, seasonal variability was not captured.*
- *Taking only two video transects and five grab samples is very limited field survey.*
- *Net and traps were not deployed, and no useful information on mobile organisms like crabs and fish was obtained.*
- *Typical analysis of benthic grab samples involves checking for organisms >0.5mm in size. No attempt was made to look for organisms on that scale.*

### 9.2.3 Aquatic Ecology – Marine

*Considering the problems noted, the conclusions section of this report (part 4.0) can not be taken as definitive. The statement on subtidal substrate (coarse sands, gravels and mollusc shell fragments) is likely accurate given the field of evidence, however, the statement that “there appears to be little or no infauna” cannot be supported.*

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#### RESPONSE

Although not indicated in the methodology section of the report, the laboratory analysis was carried out by examining each sample, un-sieved, under a binocular microscope

Bilcon would argue that a significant infauna community is unlikely since both this and the sediment contaminant survey, the latter of which collected a total of 30 samples along three transects, failed to show the existence of a benthic substrate likely to harbour infauna. The sea bottom consisted of either bedrock or very coarse unstable sediments, neither of which is suitable for infauna.

#### Volume II – Reference Document 10

*The brief survey and transects described in this report are restricted to just two days (June 13 and 14, 2002). Only three transects were made, one in Whites Cove and two outside. All from high tide to low tide mark. Tidal range on the days of sampling is not specified. The description of general shoreline morphology appears to be accurate given the photos provided. By only sampling on two days in June, seasonal variability was not captured. Observations along only three transects is a rather limited survey. The photographs indicate a typical Nova Scotia semi exposed rocky shoreline in healthy condition. Table 1 is a very short listing of marine shoreline plants and animals that could be found almost anywhere in Nova Scotia. The field survey was very cursory and rare/small/cryptic organisms were not sought out, therefore organisms unique or unusual in the area may have been missed.*

*The observations made on North Brook suggest that “It is unlikely that this stream serves as a significant habitat for salmonids.” This may be valid but it can not be confirmed without better sampling over a number of seasons.*

*Overall, the report provides some indication of the nature of the biological community in the area, but is certainly not definitive. For example, the Laminaria beds noted in the sublittoral may be important habitat to a number of crab or fish species which are not found in abundance in other areas of the coast but the Laminaria beds were not sampled.*

---

#### RESPONSE

The decision to limit the survey to three transects was based on an initial survey of the entire shoreline along the proposed quarry site which indicated that the intertidal community was very homogenous except for the area within the vicinity of Whites Cove which contained a cobble beach. As a result, it is believed that although only three transects were surveyed, the

### 9.2.3 Aquatic Ecology – Marine

transects chosen adequately entail the types of intertidal habitats and communities present and it is unlikely that additional transects would result in any additional significant findings. It was admittedly a cursory survey, but the area is very typical of the entire coastline of the outer Bay of Fundy and Bilcon feels the effort made is typical of what is expected for an EIA assessment.

Stream surveys for salmonid habitat are based primarily on physical and morphological characteristics that do not vary seasonally, so Bilcon fails to see the necessity for a seasonal component.

The Laminaria beds were not sampled in this survey because it focused on the intertidal and Laminaria beds are considered to be subtidal.

The tidal ranges on the days of the survey are listed in the Table below.

Tide times and heights on days in which the intertidal surveys were carried out (data based on Digby and obtained from Tides & Currents for Windows Version 3.0 Copyright© 1993-2001 by Nobeltech Corporation).				
	13 June 2002		14 June 2003	
	Time	Height (m)	Time	Height (m)
<b>High</b>	01:38	8.15	02:24	8.17
<b>Low</b>	07:58	0.92	08:44	0.91
<b>High</b>	14:06	7.68	14:53	7.72
<b>Low</b>	20:15	1.40	21:03	1.38

#### Volume II - Reference Document II

*Results of a survey of the plankton communities located offshore of a proposed quarry site at Whites Cove, Digby Neck, Nova Scotia*

*This report represents a reasonable and competent survey. The spatial and temporal coverage of the survey performed was not detailed, but adequate. The species encountered were as expected from previous studies and appear to be typical of the area. It provides a baseline with which future changes can be examined. There were, however one or two technical errors:*

*On page 5 – Section 4.1.3 “mesodinium rubrum” is misspelled and incorrectly characterized. The correct spelling is “mesodinium rubrum”, although the name has been changed to “Myrionecta rubra” (Jankowski, 1976). It is an obligatory phototrophic ciliate that contains endosymbiotic cryptophyte chloroplasts.*

### 9.2.3 Aquatic Ecology – Marine

*On page 5 – Section 4.2 “Pheocystis pouchetii” is not a foraminifera. It is a species of phytoplankton, a member of the Haptophyta. It is found either as solitary flagellated cells (about 3 microns across) or in a colonial form, with individual cells embedded in a gelatinous matrix.*

*On page 8 – 4<sup>th</sup> paragraph “Mesodinium rubren” is misspelled and wrongly classified as a dinoflagellate (see above).*

*On page 13 – “Pseudo/Paracalanus” at station S3, the value is written 112,2. I assume it should be 112.2.*

*On page 14 – “Microstella” should be “Microsetella”*

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#### RESPONSE

These errata are noted.

#### Volume II – Reference Document 12

*Results of a Suspended Solids Survey at the Whites Point Quarry*

*There are some critical points that should be addressed in this report. The report does not conclusively refute the statement of the DFO inspector that sediment was entering the bay from the Quarry site making it difficult for the proponent to use it as a reference for no impact. Deficiencies in the report need to be addressed. Such as:*

*The salinity values for the tide pools appear to be wrong. With the exception of stations 2 and 4 which are above the “ordinary high water mark” indicated on the map provided all others should have been inundated by seawater within 6 hours of sampling. For the tide pools to be fresh there must be an outside source of freshwater filling them. There are three possible sources: rainfall, groundwater or fresh water runoff from the quarry or other source on land none of which appear likely in this environment.*

---

#### RESPONSE

The locations of the tide pools were all very close to the ‘ordinary high water mark’ and may not be inundated by seawater during parts of the 14 day lunar tidal cycle. Examination of tide tables for Digby indicates that the study was carried out during a neap tide and it is likely that the tide pools were not recently inundated by seawater. In addition, Environment Canada weather records for Annapolis Royal indicate that significant amounts of precipitation occurred on 1 June 2003 (16,4 mm) and 5 June 2003 (9.4 mm). These two factors likely contributed to the low salinities observed.

### 9.2.3 Aquatic Ecology – Marine

The fact that all of the tide pools were observed to have growths of benthic algae also suggests that they have not been subjected to significant amounts of sediment deposition.

*It is not clear if there is a relationship between the Total Suspended Solids (TSS) in the tide pools and the amount of sediment on the bottom. One would assume that if the material on the bottom is fine-grained, then it settled from the overlying water. No data on the ambient sediment concentrations in the water overlying the pools at high water has been provided. This is a critical parameter for evaluating how much sediment is likely to be deposited in the pools naturally. The material in the tide pool would be expected to start settling as soon as the pool is exposed by the falling tide. The time between exposure and sampling is another critical factor for the interpretation of the data that should be provided. Assuming a standard floc settling velocity of ~1mm/s, the deepest pool could be expected to clear within several minutes.*

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#### RESPONSE

Bilcon agrees that sediments would settle quickly unless they were very small, clay sized particles. However, this study was initiated by verbal reports made to a department of Fisheries and Oceans inspector that tide pools near the active quarry site were becoming filled with sediments and the primary objective of the study was to determine if there was any evidence of this. The critical information gathered to address this question was the nature and extent of sediment deposited (as opposed to suspended) within the tide pools.

*From the photos provided, tide pools 1 and 5 closest to the outfall appear to have elevated sediment concentrations. In the images, they appear to be a cloudy brown which would seem to be unusual for this area. They also appear to be significantly different from the other images provided. Tide pool 5 appears to have sediment on the bottom whereas in tide pool 1 it appears to be suspended. If there is a build up of sediment on the bottom, then it could be reasonably assumed that it settled in the tidal pool between inundations. The depth of the newly deposited sediment in the pool could give some indication of the amount of material available in the overlying water. Again, it is critical that the time between sampling and initial exposure of the pool be provided.*

*Based on the images alone, it is difficult to see how pool 6 can have such a high level of TSS. It appears to be clearer than pool 5. It should be noted that the receiving environment is very energetic and that any sediment that enters from the quarry will likely be dispersed, it should also be noted that TSS values can appear to be high when observed optically which might be the case in trying to interpret the photos. This can be due to the presence of very fine grained sediment at low concentration. Depending on the type of treatment being carried out in the quarry's settling basin (no information provided), it is possible that a "stranded population of very small but optically very significant particles are remaining in suspension. It is unlikely that a significant build up of sediment will occur along the*



### 9.2.3 Aquatic Ecology – Marine

*shoreline near the outfall from the settling basin; however, at this time, the report should not be used as the sole basis for such a statement.*

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#### RESPONSE

It is difficult to comment on this interpretation of the photographs with respect to what they may indicate about suspended sediment levels. Reflections from the sky, time of day, the texture and nature of bottom sediments and other factors may explain the observed differences. Data on the actual suspended sediment concentrations, which were sampled at the same time the photos were taken, is contained in Table 4.1 of the report and is a more reliable indication of suspended sediment concentration.

#### Volume II – Reference Document 13

*A preliminary assessment of the risks of introducing non-indigenous phytoplankton, zooplankton species or pathogens/parasites from South Amboy, New Jersey (Raritan Bay) into Whites Point, Digby Neck, Nova Scotia*

*This appears to be a thorough review of the available material. The recommendations are reasonable, again based on the available material.*

---

#### RESPONSE

Comment noted.

#### Volume V – Reference Document 25

*This report contains several inaccuracies. For example, it is not clear that the statistics in Table 4 are correct, and many of the arguments are based on extrapolation from material that may be inappropriate. In addition, the conclusion that salmon do not migrate close to shore is questionable as the weir data apparently show that good numbers do in fact migrate close to shore.*

---

#### RESPONSE

The author states that the statistics in Table 4 are correct and that all the data used was from Fisheries and Oceans publications or data banks.

The author did not conclude that salmon do not migrate close to the shore. The author notes that the data and the DFO Weir Catch Records (Allen and Lindsey 1967) indicate that they do not migrate close to shore in the Digby Neck region.

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### 9.2.3 Aquatic Ecology – Marine

*Page 26 – What is the basis for the assumption that fish caught in the Digby Neck area would be from the Annapolis Basin?*

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#### RESPONSE

The author of Reference Document 25 notes that the publication, Huntsman 1934, clearly states that based on his work, salmon do not move inshore in the Digby Neck region until they are close to Digby Gut and it was Huntsman's opinion at the time that they were all from the Annapolis Basin.

#### Reference:

Huntsman, A.G. 1934. Factors influencing the return of salmon from the sea. Trans. Amer. Fish. Soc. 64:351-355.

#### Appendices

#### **Volume III – Appendix 9 – Blasting Plan by Bilcon of Nova Scotia Corporation May 2005**

*Page 3 – What does the proponent define as a trained observer for the marine mammal monitoring program?*

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#### RESPONSE

A minimum requirement for the “trained” marine mammal observer would be to identify marine mammals to the species level. Bilcon intends to give preference to hiring local people and providing any necessary training. Practical training could include training sessions on a local whale watching boat and/or formal training through consultation with a recognized professional in the field. At this time, Bilcon has not developed specific employment requirements for the marine mammal observer.

*Page 4 – Who would observe behaviour at the seal colony? What aspect of behaviour would the proponent be looking for specifically?*

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#### RESPONSE

Behaviour of seals at the colony at Crowells Cove will be observed and documented prior to, at, and post detonation of the initial blast at the Whites Point Quarry. Bilcon will be responsible for coordinating this aspect of the initial blast monitoring. A qualified person will be employed by Bilcon. At the present time, the proposed observer will be Dr. George Alliston. Video documentation of the seals prior to, at, and post detonation of the initial blast will be recorded. A specific aspect of the monitoring would be to record any visual behavioural reaction at the time of detonation.

### 9.2.3 Aquatic Ecology – Marine

#### **Fisheries and Oceans Comments on the Conclusions of the EIS**

##### **Intertidal Fish Habitat**

*The statement on subtidal substrate (coarse sands, gravels and mollusc shell fragments) is likely accurate given the field evidence. However, the statement that; “there appears to be little or no infauna,” cannot be supported. The field sampling and lab analysis were insufficient to make any claims regarding infauna.*

---

##### **RESPONSE**

Comment noted.

*Since there is no infilling planned, it is agreed that disturbance of intertidal fish habitat from construction of conveyor system supports is likely to be short lived and limited in extent.*

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##### **RESPONSE**

Comment noted.

##### **Suspended Sediments**

*The overall conclusion that sediment from the quarry will be dispersed is likely correct but the report provided does not support it. Supporting documentation does not conclusively refute the statement of the DFO inspector that sediment was entering the bay from the quarry site, which makes it difficult to use his as the basis for a conclusion of no impact.*

---

##### **RESPONSE**

Bilcon’s understanding is that this statement from the DFO inspector was based solely on a report that the tide pools were accumulating sediments from the quarry and this is what Bilcon addressed, i.e., he was not responding to a general statement that the quarry was exporting sediment.

##### **Marine Mammals**

*The conclusions provided in the EIS regarding collision risk with right whales are generally correct. The increased ship traffic due to the proposed activity, and the proposed route for these vessels, will result in an increase in the probability of vessel-whale interaction along the proposed route, but the increase will not be substantial. The likelihood of collision will still be low in the immediate vicinity of the marine terminal relative to other regions in the Bay of Fundy (such as in the vicinity of the Conservation Zone).*

*It is reasonable to assume that a couple of bulk carrier transits per week through or close to the Right Whale Conservation Area would not add greatly to average incremental exposures in the Conservation Area itself. However it should be emphasized that for any individual vessel passage the locally observed noise level and any specific animal exposure will be very*

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### 9.2.3 Aquatic Ecology – Marine

*dependent on the distance to the vessel and also, at increasing ranges, on the water depth and other physical variables.*

*If applied correctly and with rigour, subject to the recommendations provided above, the proposed mitigation should minimize the risk of direct noise effects to marine mammals.*

---

#### RESPONSE

Comment noted.

#### Sea Turtles

*It is agreed that this proposed activity is likely to have no effect on sea turtles; however, this conclusion can not be supported by the text provided.*

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#### RESPONSE

Please refer to Bilcon's response to Sea Turtles in this document.

#### Atlantic Salmon

*DFO remains of the opinion that historic fishing, scientific sampling and theoretic modeling indicates that there could be migrating inner Bay of Fundy Atlantic salmon in the Whites Point, Digby Neck area from May until October.*

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#### RESPONSE

Information on the Atlantic salmon has been updated based on recent studies by (Amiro 2003), (Lacroix and Knox 2005) and (Lacroix et al 2005). Also, **Map 40** indicates distribution and abundance of Atlantic salmon postsmolts in the Bay of Fundy after Lacroix and Knox which is included in this Comment and Response Submittal. Also, it is Bilcon's understanding that an updated Recovery Strategy for the inner Bay of Fundy Atlantic salmon is in preparation. Recent review of SARA species at risk indicates critical habitat for iBoF Atlantic salmon has not been designated to date.

#### Effects of Noise on Fish

*Based on physical modeling, there seems to be minimal cause for concern in terms of lethal effects on fish. It should be kept in mind that the 100KPa criteria pertains to lethal or obvious sub-lethal injury to fish and not to more subtle behavioural effects, which if they do exist, are likely to be transitory considering the frequency of quarry blasting.*

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#### RESPONSE

Comment noted.

### 9.2.3 Aquatic Ecology – Marine

#### **Effects of Noise on Lobster**

*Sound from blasting appears to be substantially less than that from seismic exploration, but enough uncertainty remains that there should be some monitoring and possible mitigation of potential negative effects to lobster.*

---

#### **RESPONSE**

Bilcon is prepared to work with DFO to determine the parameters of a monitoring program to determine the possibility of negative effects to lobster. There appears to be little science on this subject at the present time and while there may be some uncertainty as noted, there is no evidence at present of negative effects. Nonetheless, Bilcon is certainly prepared to try to remove the uncertainty.

#### **Invasives**

*The potential for introduction of pathogens and other invasives (such as the Asian Crab) by this project may be no different than that from existing shipping. While current practices for ballast water management will not eliminate all risk, there is no obvious reason to disagree with the position regarding ballast water control.*

---

#### **RESPONSE**

Comment noted

#### **Fisheries and Oceans Canada Comments on Mitigation and Monitoring**

##### **Marine Mammals**

*Bilcon of Nova Scotia Corporation makes the following commitments:*

- *North Atlantic right whale sightings in the Whites Cove area will be communicated to the ships captain before the ship exits the inbound shipping lane.*
- *Blasting will not be carried out if seals are present within 170 metres of the point of detonation or if whales or porpoises or dolphins are within 500 metres of detonations. If endangered marine mammal species such as right whales, blue whales or fin whales are sighted in the near-shore area of Whites Point the safety radius will be increased to 2500 metres.*

*These commitments will require monitoring of the area before and during blasting and also before and during ship transit. Details on how the proponent will undertake this monitoring, especially during periods of reduced visibility, should be provided.*

---

#### **RESPONSE**

Bilcon intends to follow the advice provided by Fisheries and Oceans Canada dated February 10, 2006 on Bilcon's Blasting Protocol. Continued coordination during preparation of monitoring parameters and details for a one year (4 season) verification period during quarry

### 9.2.3 Aquatic Ecology – Marine

site preparation and construction will be held with Fisheries and Oceans Canada. A summary of Bilcon's research and monitoring commitment for the one year verification period for near and far field is presented below.

1) If the results from the initial blast monitoring does not raise any concerns, Bilcon proposes calibrated blast sound measures in near and far field locations during the first year of construction.

- Measure the underwater blast sound levels at the edge of the tidal zone, and at 170m, 500m, 1000m, 2500m and at the margin of the right whale conservation area. This monitoring would be conducted during the first year of construction over 4 seasons.
- Schedule the first and second blasting shots prior to or after right whales are expected to be present; if measurements reveal low levels at distances that can be monitored effectively, then permit operations.
- Marine mammal monitoring by trained observers should occur prior to and during any blasting, as proposed, but the observer should use at least 7x50 binocular on a pedestal to ensure the ability to better detect marine mammals at greater distances.

2) Visual observation of marine mammal behaviour before, during, and after construction blasting – especially of known marine mammal aggregations, i.e. during seal pupping.

3) Testing of the effectiveness of visual observation methods at 2500m from the blast site is also recommended, including determination of the average site visibility conditions.

4) Opportunities to link up with other research initiatives e.g. university research, should also be considered.

*If this project were to proceed, it would be advisable to make baseline measurements of bulk carrier noise around the terminal and nearby areas of potential environmental sensitivity.*

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#### RESPONSE

Bilcon will make baseline measurements of bulk carrier noise around the terminal and nearby areas of potential environmental sensitivity.

### 9.2.3 Aquatic Ecology – Marine

*Monitoring for potential effects of blasting on lobster should be conducted when lobsters are near shore.*

---

#### **RESPONSE**

Bilcon is prepared to work with DFO to determine the parameters of a monitoring program to determine the possibility of negative effects to lobster. There appears to be little science on this subject at the present time and while there may be some uncertainty as noted, there is no evidence at present of negative effects. Nonetheless, Bilcon is certainly prepared to try to remove the uncertainty.

#### **Contaminants**

*It is suggested that lobster, scallop, and crab be assessed for contaminants in addition to other environmental samples with the environmental effects monitoring program.*

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#### **RESPONSE**

Please refer to Bilcon's responses to Fisheries and Oceans Canada earlier in this section.

#### **Fish Habitat**

*For more detailed information on the monitoring of any compensation project the report entitled "Benthic Protocol for Lobster Enhancement Projects: Protocol for the choice of a site and sampling of the habitat" is attached.*

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#### **RESPONSE**

Comment noted.

#### **WP 1525 - Environment Canada**

#### **Introduction of Invasive Alien Species**

#### **Reference: EIS Sec. 9.2**

*In the discussion on invasive alien species (IAS) in Section 9.2.0.2, the proponent identifies Environment Canada as the lead agency in development of a strategy to deal with this issue. The document *An Invasive Alien Species Strategy for Canada, September 2004*, is a collective effort of several government departments and provincial governments ([http://www.cbin.ec.gc.ca/primers/ias\\_invasives.cfm?lang=e](http://www.cbin.ec.gc.ca/primers/ias_invasives.cfm?lang=e)). The strategy recognizes the Ministers of Agriculture and Agri-Food, the Minister of Fisheries and Oceans, the Minister of Natural Resources, and the Minister of the Environment as lead federal Ministers on invasive alien species. The strategy also calls for inter-jurisdictional coordination mechanisms and the establishment of multi-stakeholder advisory committee.*

*To date proposed action plans have been established or proposed for invasive alien terrestrial plants and plant pests (led by Canadian Food Inspection Agency), a proposal for a Canadian Action Plan to Address the Threat of Aquatic Invasive Species (Canadian Council of Fisheries and Aquaculture Ministers Aquatic Invasive Species Task Group), and*

### 9.2.3 Aquatic Ecology – Marine

*Canada's National Wildlife Disease Strategy (Canadian Wildlife Service). Consideration of this issue in the EIS should reflect the most current and complete regulatory and policy framework.*

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#### **RESPONSE**

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

#### **WP 1641 – Nova Scotia Department of Tourism, Culture and Heritage**

*Section 9.2.11.1.3 "Marine Mammals", notes that blue whales are extremely rare in the Bay of Fundy. Records suggest that there may be regular, short duration visitation by a small number of individuals in the bay, usually in late May to mid June. It is suggested that the species in the report, although mitigation of possible impact could be limited to increased surveillance etc.*

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#### **RESPONSE**

Please refer to EIS Vol.VI, Chapter 9.2.11.1.3 – Marine Mammals – Blue Whale  
Please refer to EIS Vol.VI, Chapter 9.2.4.1.7 – Marine Mammals – Blue Whale

*There is no reference to the use of these waters by Atlantic Sturgeon *Acipenser oxyrinchus*, and migrating Striped Bass *Morone saxatilis*, both species of concern in Maritime waters. This absence from the report is an oversight.*

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#### **RESPONSE**

Please refer to EIS Vol. VI, Chapter 9.2.4.1.6 and Table AE-1 – Appendix 39 and also 9.2.6.1

#### **Botany**

*Volumes 11 and 13 recommend that ballast water be discharged en route in American waters, and the department does not support that approach. The introduction of *Codium fragile* is only starting to foul our coastal waters and the impact of its introduction is just now being studied.*

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#### **RESPONSE**

Ballast water control and management regulations under the *Canada Shipping Act* came into effect on June 8<sup>th</sup>, 2006. Bilcon's shipper is required to comply with these regulations



### 9.2.3 Aquatic Ecology – Marine

#### WP 1625 – Partnership for Sustainable Development

#### Deficiency Statement 48

##### EIS Guidelines

8.4.1 - *Spatial Boundaries* – ‘When determining appropriate spatial boundaries for the assessment of potential environmental effects, consider (but do not be limited to) the following criteria; - the physical extent (terrestrial and marine) of the proposed Project, including any offsite facilities or activities (such as shipping)...’

10.2.1 *Species at Risk* – ‘Consider any change the Project might cause to a listed species, its critical habitat....’

##### EIS

9.2.13.2 – *Analyses* – The EIS states, “Therefore, for the purpose of this EIS, the possible area of effects regarding ship/whale interactions is defined as the spatial area between the designated inbound/outbound shipping lanes and the Whites Point marine terminal.”

The assessment of likely damages associated with shipping traffic focuses only on the relatively small area between the shipping lane and the loading terminal. Clearly, dangers to organisms such as the Right and Blue whales and other species may result from the increase in ship traffic offshore away from the terminal. Right whales are highly endangered and shipping traffic is considered to be one of the primary problems in their recovery. So, I believe the risk to Right whales and possibly other marine mammals has been underestimated in this EIA and needs to be reassessed. My sense is that the limited amount of traffic (once a week) added by the quarry may not be a problem but I’d be a lot happier if this was actually assessed and put in the context of overall shipping traffic on the Bay. The Proponent should expand & justify the scale of the area being considered for ship-whale interactions.

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#### RESPONSE

Please refer to responses to the Panel and Agencies in this section, also Section 9.3.4 – Transportation.

#### Deficiency Statement 58

##### EIS Guidelines

9.2.1 *Species at Risk* – “...provide information on seasonality, frequency, habitat...” “Useful resources pertaining to these topics include: species specialists, the primary scientific literature...”

##### EIS

9.2.5.1 - *Research* – The EIS states, “Extensive literature research on the biology, movements and migrations of Atlantic salmon in the Bay of Fundy was conducted by M.J. Dadswell, PhD.” The EIS further states, “This research indicates that the seaward migration or departure of kelts (spawned-out adult salmon) from inner and outer Bay of Fundy rivers is along the New Brunswick shore.” Section 9.2.5.1 does not cover recently published research on Atlantic salmon post-smolt (seaward) migration. Lacroix and Knox, 2005 examined the

### 9.2.3 Aquatic Ecology – Marine

*distribution of Atlantic salmon postsmolts of different origins in the Bay of Fundy and Gulf of Maine. They reported that “captures in the outer Bay of Fundy were concentrated in two areas, in the main channel northeast of Grand Manan Island and just off the coast of Nova Scotia.” Therefore, a portion of Atlantic salmon exiting the Bay of Fundy travel along the Nova Scotia coast.*

*Further, an acoustic electronic tagging study (Lacroix et al 2005), where a fish carries a tag that reports to a moored set of receivers, indicated that some Atlantic salmon post-smolts released from the Big Salmon River, an iBoF river whose population is classified as “endangered” by COSEWIC and SARA, showed a resident behaviour in the Bay of Fundy and occupied waters on the Nova Scotia side of the bay in the months of July and August. Therefore, although conventional tagging data, and herring weir by-catch may not indicate the presence of Atlantic salmon “kelts” on the Nova Scotia side of the outer Bay of Fundy, the scientific trawl study and the electronic tagging study do indicate that the outer Bay of Fundy salmon populations and the endangered iBoF salmon populations occupy near shore habitat in this area.*

*The information provided in section 9.2.5.1 of the EIS fails to meet the requirements set out in section 9.2.1 of the EIS Guidelines because it does not include all of the pertinent scientific information available on the species.*

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#### **RESPONSE**

Please refer to responses to the Panel and Agencies in this section.

#### **Deficiency Statement 59**

*EIS Guidelines 9.2.2 – Fish, Invertebrates and Habitat – “Identify marine and fresh water fish and invertebrates occurring in any identified or receiving watercourses contiguous to the quarry site that might be impacted by the Project and its associated shipping activities,”*

#### **EIS**

*9.2.4 – Aquatic Ecology – Coastal/Nearshore Marine Habitat – The ecological description provided in this part of the EIS is general. To meet the requirements of the EIS Guidelines information specific area of concern should be provided.*

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#### **RESPONSE**

Please refer to responses to the Panel and Agencies in this section.

#### **Deficiency Statement 67**

#### **EIS Guidelines**

*10.2.1 – Species at Risk – Discuss potential Project impacts on species of concern in relation to applicable legislation, policy, management plans, recovery strategies, action plans or land use planning initiatives.”*

### 9.2.3 Aquatic Ecology – Marine

#### **EIS**

9.2.5.5 – *Impact Statements* – The EIS states that the activities of the quarry will have a long term, neutral (no) effect on the endangered inner Bay of Fundy (iBoF) Atlantic salmon. This impact statement was based on incomplete scientific data as described in Deficiency Statement # 58. Given the iBoF salmon will pass through the Project area this impact statement does not satisfy the requirements of section 10.2.1 of the EIS Guidelines.

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#### **RESPONSE**

Please refer to responses to the Panel and Agencies in this section, also Section 8.1 – Impact Assessment Methodology in this document.

Notwithstanding the research submitted as a reference document in the EIS conducted by Dr. Dadswell, Bilcon has recognized that there is a possibility that there could be migrating Inner Bay of Fundy Atlantic Salmon in the Whites Point area from May until October. Bilcon has therefore taken a precautionary approach with respect to blasting distances set out in the *Guidelines for the Use of Explosives in or near Canadian Fisheries Waters*. The distances calculated for individual blasting between May to October will use a safety factor of three, which has generally been accepted by Fisheries and Oceans Canada.

#### **Deficiency Statement 69**

##### **EIS Guidelines**

10.2.2 - *Fish, Invertebrates and Habitat* – ‘Describe and evaluate Project impacts on VECs related to fish, invertebrates and their habitats, including consideration of: introduction of non-native species’

12.1 - *Management Criteria* – ‘Detail should be adequate to allow an understanding of the purpose [environmental management] programs, how issues, subjects or indicators would be selected, how the programs would function, who would be responsible for their implementation and how reporting would take place.

12.5 - *Mitigation Measures* – ‘Describe proposed measures to mitigate any adverse effects and to enhance beneficial effects over the lifespan of the Project that have been identified....’

#### **EIS**

9.2.14.2 - *Analyses* - The EIS states that ‘Bilcon of Nova Scotia Corporation will have no control over what port ballast water is taken on or where exchanged en route to the Whites Point Terminal. Clearly, responsibility for ballast water management is with the shipping company, to either follow the current guidelines or comply with the pending regulations.’

The material in the EIS addressing ballast water considerations is, in my view, quite weak and superficial. The route is known, the problem is well documented, and the regulations are in place. There is no reason for the EIS not to set out quite specifically the procedures that it expects the ships to follow. In particular, whether it is proposed to exchange ballast water, and if so how? Or whether it is proposed to treat ballast water, and again, if so, how? The

### 9.2.3 Aquatic Ecology – Marine

*ship(s) will need to have a ballast water management plan setting out the measures and procedures it /they expect to be following. The main elements of such a management plan should appear in the EIS.*

*It should be taken as given that any contractors employed by Bilcon of Nova Scotia Corporation will follow all appropriate laws and guidelines. Given the Proponent's ability to incorporate ballast water management conditions into a shipping contract, the EIS needs to document what these conditions are and how their implementation will be verified and documented.*

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#### **RESPONSE**

The EIS referenced draft Annex V of the “Guidelines for the Control of Ballast Water Discharge from Ships in Waters under Canadian Jurisdiction”, 2001. In June, 2006, post-submission of the EIS, Ballast Water control and management regulations came into force. Compliance with these regulations lies with the owner of a ship and the master of a ship. Bilcon’s shipper will be required to comply with the regulations, as well as all shippers in Canadian Waters.

#### **Deficiency Statement 70**

##### **EIS Guidelines**

*10.2.2 - Fish, Invertebrates and Habitat - ‘Describe and evaluate potential Project impacts on VECs related to fish, invertebrates and their habitats...’*

*4.3 Expectations, ‘The EIS must support any analyses, interpretation of results and conclusions by providing all relevant references’*

##### **EIS**

*9.2.4.3 - Mitigation – loss of sub-tidal habitat. See also Appendix 17 – Fish Habitat Compensation Plan Proposal. No drawings or diagrams are provided of habitat enhancement structures. No evidence or references are provided to substantiate that the structures proposed will be suitable and effective. No information, quantification or analysis is provided of measures to increase surface area of selected pipe piles.*

*Regarding habitat compensation for "losses" caused by insertion of the pilings for the loading wharf, there are no diagrams or drawings of the habitats proposed, and the argument for their efficacy is weak. There does not appear to be any clear reference to their subsequent monitoring.*

*Section 9.2.4.3 states that, “...selected pipe piles will have increased surface area of vertical habitat in the water column to attract food sources for pelagic fish.” The EIS does not appear to contain any further reference this form of marine habitat enhancements and there are no diagrams of what is being proposed. I understand the argument that additional surface area will provide substrate for the settlement of seaweeds, etc., but can’t see that building the support pilings with some sort of fluting on them (my guess) will have any measurable incremental effect on productivity More explanation should be provided.*

*9.2.3 Aquatic Ecology – Marine*

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**RESPONSE**

Please refer to EIS Appendix Volume III, Tab 17, Fish Habitat Compensation Plan.

**Deficiency Statement 81**

**EIS Guidelines**

*12.4 – Monitoring – Describe the proposed approach for monitoring each of the VECs identified.*

**EIS**

*9.2.3 – Aquatic Ecology – Marine Intertidal Zone - The EIS provides predictions of insignificant effects, but no ongoing monitoring to ensure it happens. How will the Proponent know if conveyor construction impacts exist or if they are local or if they are insignificant? The EIS provides description of species such as lobster, but does not quantify densities, etc. Without this information the Proponent cannot monitor effectively or manage adaptively. The monitoring information must be included in the EIS.*

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**RESPONSE**

Please refer to EIS Volume VI, Chapter 9.2.3 – Aquatic Ecology and responses to the Panel and Agencies in this section.