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Oct 3, 2016

Rob Hajdú  
Project Manager  
Canadian Environmental Assessment Agency  
410 – 701 West Georgia Street  
Vancouver, BC V7Y 1C6

CEAR: 54754  
ECPT: 09-1202

Dear Rob Hajdú,

**Re: BURNCO Aggregate Mine Project- Environment and Climate Change Canada Comments on Environmental Impact Statement – Part I**

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Environment and Climate Change Canada (ECCC) has reviewed the following document provided by the Canadian Environmental Assessment Agency (Agency) for the proposed BURNCO Aggregate Mine Project (the Project):

- Application for an Environmental Assessment Certificate / Environmental Impact Statement (EIS) from BURNCO Rock Product Ltd (the Proponent), dated July 2016.

The attached comments are founded on the departmental mandate with a focus on matters related to air quality, greenhouse gases, emergencies, migratory birds, species at risk, and wetlands:

- Attachment 1- Annex 1: Advice to the Agency;
- Attachment 2- Annex 2: Information Requests directed to the Proponent;
- Attachment 3- Annex 3: Advice to the Proponent; and,
- Attachment 4- Standard Guidance for Environmental Assessments for Marbled Murrelet (Part A), Western Toad (Part B), and Black Swift (Part C).

Part II comments on water quality will be provided in a subsequent submission.

Thank you for this opportunity to comment. Please do not hesitate to contact me at 604- 666-7829 if you have any questions or concerns.

Yours Sincerely,

{ORIGINAL SIGNED BY}

June Yoo Rifkin  
Head, Environmental Assessment  
Attach. (4)

## Environment and Climate Change Canada (ECCC)

### *ANNEX 1: Advice to the Agency*

**Table 1: Advice for the Agency’s consideration in its recommendation to the Minister of Environment and Climate Change**

Questions	Responses/Comments
<ul style="list-style-type: none"> <li>Has the proponent described all project components and activities in sufficient detail to understand all relevant project-environment interactions? If not, identify what additional information is needed.</li> </ul>	<ul style="list-style-type: none"> <li>No additional comments</li> </ul>
<ul style="list-style-type: none"> <li>Were the study areas sufficient to predict potential effects from all relevant project-environment interactions, and to consider the effects within a local and regional context?</li> <li>Is the baseline information sufficient to characterize the existing environment, predict potential effects and obtain monitoring objectives? If not, identify what additional information is needed.</li> </ul>	<ul style="list-style-type: none"> <li>ECCC’s recommendations and notes on study areas, baseline information, and monitoring objectives is provided in the IRs (Annex 2).</li> </ul>
<b>Alternatives Assessment</b>	
<ul style="list-style-type: none"> <li>Has the proponent adequately described the criteria it used to determine the technically and economically feasible alternative means?</li> <li>Has the proponent listed the potential effects to valued components (VCs) within your mandate that could be affected by the technically and economically feasible alternative means?</li> <li>Has the proponent adequately described why it chose each preferred alternative means?</li> <li>Are there other alternative means that could have been presented? If so, please describe.</li> </ul>	<ul style="list-style-type: none"> <li>The proponent has not listed potential effects to VCs that could be affected by the technically and economically feasible alternative means.</li> </ul>
<b>Environmental Effects Assessment</b>	
<ul style="list-style-type: none"> <li>Has the proponent clearly described all relevant pathways of effects to be taken into account under section 16 of the former Act?</li> <li>Has the proponent identified all potential effects to VCs, including relevant species at risk, within your mandate?</li> <li>Were all potential receptors considered?</li> </ul>	<ul style="list-style-type: none"> <li>See Annex 2 for ECCC’s comments on VC selection and potential effects.</li> </ul>
<ul style="list-style-type: none"> <li>Were the methodologies used by the proponent appropriate to collect baseline data and predict effects, why or why not?</li> <li>Describe your level of certainty in the predictions based on the methods used. If there is uncertainty, what are the options for increasing certainty in the predictions presented by the proponent in the EIS?</li> </ul>	<ul style="list-style-type: none"> <li>ECCC recommendations on the proponent’s baseline methodologies are provided in Annex 2.</li> <li>As stated in Annex 2 ECCC recommends more baseline data from seasonal surveys repeated over multiple</li> </ul>

Questions	Responses/Comments
	<p>years to account for inter-annual variation.</p> <ul style="list-style-type: none"> <li>ECCC is not confident in the predictions based upon the baseline surveys conducted and the methods used, as indicated in the IRs.</li> </ul>
<ul style="list-style-type: none"> <li>Are the predicted effects described in objective and reasonable terms (e.g., beneficial or adverse, temporary or permanent, reversible or irreversible)?</li> </ul>	<ul style="list-style-type: none"> <li>Temporary and permanent are used to describe potential effects, but the proponent has not described whether effects are beneficial or adverse, reversible or irreversible.</li> </ul>
<ul style="list-style-type: none"> <li>Has the proponent adequately assessed the potential cumulative environmental effects, including using an appropriate study area and proposing mitigation and follow-up program requirements? Provide rationale.</li> </ul>	<ul style="list-style-type: none"> <li>ECCC has noted concerns regarding the adequacy of the description of potential cumulative effects in the IRs.</li> <li>There was no monitoring program proposed for Marbled Murrelet (see Annex 2, IR 16).</li> </ul>
<ul style="list-style-type: none"> <li>Has the proponent adequately described the potential for environmental effects caused by accidents and malfunctions, including the types of accidents and malfunctions, their likelihood and severity and the associated potential environmental effects? If not, identify what additional information is needed.</li> </ul>	<ul style="list-style-type: none"> <li>No potential effects were described in the case of a spill of deleterious substances. Additional information is needed on a mitigation plan for wildlife in this scenario.</li> </ul>
<ul style="list-style-type: none"> <li>Are you satisfied with the proponent's assessment of effects of the environment on the Project?</li> <li>Has the proponent characterized the likelihood and severity appropriately? Provide rationale.</li> </ul>	<ul style="list-style-type: none"> <li>No additional comments.</li> </ul>
<ul style="list-style-type: none"> <li>Has the proponent sufficiently described and characterized the project activities and components as they relate to federal decisions within your mandate? If not, identify what additional information is needed.</li> <li>Are changes to the environment, as they relate to federal decisions within your mandate, sufficiently described? If not, identify what additional information is needed.</li> </ul>	<ul style="list-style-type: none"> <li>The proponent has not sufficiently described changes to the environment as they relate to wildlife. Concerns about amphibian movement corridors and grizzly bear are noted in Annex 2.</li> </ul>
<b>Mitigation</b>	
<ul style="list-style-type: none"> <li>Are the proposed mitigation measures described in sufficient detail to have certainty in their effectiveness? If not, identify what information is needed.</li> </ul>	<ul style="list-style-type: none"> <li>ECCC recommends more baseline data (per IRs in Annex 2) to make an</li> </ul>

Questions	Responses/Comments
<ul style="list-style-type: none"> <li>Is it clear how each proposed mitigation measure links to each potential pathway of effect?</li> </ul>	<p>informed decision on mitigation effectiveness.</p> <ul style="list-style-type: none"> <li>It is not clear how each mitigation measure links to each potential effect.</li> </ul>
<ul style="list-style-type: none"> <li>Would you propose different or additional mitigation measures? If so, provide a description of the mitigation measure(s), with rationale.</li> </ul>	<ul style="list-style-type: none"> <li>Marbled murrelet mitigation measures should follow recommendations in the Marbled Murrelet Standard Guidance provided in Annex 4.</li> <li>Mitigation measures are not included for species-specific amphibian and bird species at risk that were observed in the Local Study Area (LSA) during baseline surveys.</li> </ul>
<ul style="list-style-type: none"> <li>Which of the proposed mitigation measures and/or project design elements do you consider to be necessary to reduce the likelihood of significant adverse environmental effects? Provide rationale.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<b>Residual Adverse Environmental Effects</b>	
<ul style="list-style-type: none"> <li>Are the identification and documentation of residual environmental effects described by the proponent adequate? If not, what are the aspects for which there is uncertainty and, where possible, indicate how these residual effects can be best described. If there is uncertainty, what are the options for increasing certainty?</li> </ul>	<ul style="list-style-type: none"> <li>As indicated in the IRs regarding baseline data collection (Annex 2), there remains a large uncertainty on residual effects for each VC and species at risk in the LSA.</li> </ul>
<ul style="list-style-type: none"> <li>Did the proponent provide a sufficiently precise, ideally quantitative, description of the residual environmental effects related to your mandate? Identify any areas that are insufficient.</li> </ul>	<ul style="list-style-type: none"> <li>No discussion was provided on the potential for residual effects on wildlife after mitigation had been applied. (It was provided for vegetation VCs).</li> </ul>
<b>Determination of Significance</b>	
<ul style="list-style-type: none"> <li>Are the conclusions on significance in the EIS supported by the analysis that is provided?</li> <li>Are the proponent's proposed criteria (magnitude, geographic extent, duration, frequency, reversibility, and social/ecological context) for assessing significance appropriate? This includes how they were characterized, ranked, and weighted. Provide rationale.</li> </ul>	<ul style="list-style-type: none"> <li>The proposed criteria did not include a social/ecological context.</li> <li>ECCC was unable to locate a description of proposed criteria for assessing significance.</li> </ul>
<ul style="list-style-type: none"> <li>Were appropriate methodologies used in developing the conclusions on significance?</li> </ul>	<ul style="list-style-type: none"> <li>See Annex 2.</li> </ul>

Questions	Responses/Comments
<ul style="list-style-type: none"> <li>Do you agree with the proponent’s analysis and conclusions on significance? Provide rationale.</li> </ul>	<ul style="list-style-type: none"> <li>No. Grizzly bear effects pathways were not considered in the effects assessment and significance discussion.</li> </ul>

Monitoring and Follow-up	
<ul style="list-style-type: none"> <li>Does the proposed monitoring and follow-up program verify the predictions of the environmental assessment? Please explain additional monitoring or follow-up needed to address uncertainty in the effects assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Species-specific monitoring and follow up programs should be implemented to assess abundance of species at risk with the potential to appear in the LSA. See Annex 2 IRs regarding baseline data collection.</li> </ul>
<ul style="list-style-type: none"> <li>Does the proposed monitoring and follow-up program verify the effectiveness of proposed mitigations? Please explain additional monitoring or follow-up needed to address uncertainty in the proposed mitigation.</li> </ul>	<ul style="list-style-type: none"> <li>The proponent will “Develop and implement wildlife monitoring program with the objective of measuring the effectiveness of mitigation and restoration on wildlife VCs within the LSA.” (EIS section 5.3 PDF pg 76). It is unclear whether this program will be implemented during construction, operations, or decommissioning phases. As described in Annex 2 IRs, some of the VC selection has resulted in uncertainty with proposed mitigation measures.</li> </ul>
<ul style="list-style-type: none"> <li>Is the objective of the follow-up program clear and measurable?</li> <li>Does the follow-up program include sufficient detail, and technical merit, for the Agency to achieve the stated objective (e.g., sufficient baseline dataset, monitoring plans, acceptable thresholds of change, contingency procedures)?</li> </ul>	<ul style="list-style-type: none"> <li>The objective is only to monitor the effectiveness of proposed mitigation measures. It is unclear whether the wildlife monitoring will take place during construction and operation, or</li> </ul>

	decommissioning. In addition, specific details of the monitoring (geographic extent, protocol to be used) is not provided.
<ul style="list-style-type: none"> <li>• Are you aware of any federal or provincial authorizations or regulations that will achieve the same follow-up program objective(s)? If so, how do these achieve the objective(s)?</li> </ul>	<ul style="list-style-type: none"> <li>• See Annex 4 for guidance on Marbled Murrelet and Western Toad.</li> </ul>
<b>Additional comments, views, advice</b>	
<ul style="list-style-type: none"> <li>• Provide any other comments.</li> </ul>	<ul style="list-style-type: none"> <li>• Comments in Annex 2 advise that the proponent has not chosen appropriate indicator species, and should reassess the selection of VCs.</li> <li>• Several of ECCC's IRs (Annex 2) highlight concerns with baseline data collection.</li> <li>• ECCC notes that there is potential for indirect effects on Marbled Murrelet due to the close proximity of critical habitat with the proposed Project area.</li> </ul>

**Environment and Climate Change Canada (ECCC)**

**ANNEX 2: Information requests directed to the proponent for the Burnco Aggregate Mine Project (the Project)**

IR Number	Valued Component	Reference to EIS guidelines	Reference to EIS	Context and Rationale	Specific Question / Request Information
ECCC- Air Quality (AQ) 1	<ul style="list-style-type: none"> <li>• Air quality indicators</li> <li>• Human health</li> </ul>	Part B; 5.7 Air Quality (page 78 AIR/EIS Guidelines)	Volume 2; 4.3 Establish Assessment Boundaries; Table 4-4 (page 4-24)	SO <sub>2</sub> , NO <sub>2</sub> , CO, and PM are associated with combustion source emissions and must be included in the emissions assessment.	In addition to PM, SO <sub>2</sub> and NO <sub>2</sub> , ECCC requests that the proponent provide quantitative estimates of CO emissions related to the mobile equipment (on-road and off-road engines).

ECCC-AQ2	<ul style="list-style-type: none"> <li>Air quality indicators</li> <li>Greenhouse gas (GHG) emissions</li> </ul>	<i>Part B; 5.7 Air Quality (page 78 AIR/EIS Guidelines)</i>	Volume 2; 2.5 Proposed Phases of Development; Table 2-7 (page 2-22)	ECCC requires further technical information in order to confirm the air emission estimates provided by the proponent in the EIS.	ECCC recommends that the Proponent provide technical information such as the emissions factor per type of engine standards, transient adjustment and deterioration factors, load factor, etc to allow for the assessment of air emissions.
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ECCC-AQ3	<ul style="list-style-type: none"> <li>Air quality indicators</li> <li>Greenhouse gas (GHG) emissions</li> </ul>	<i>Part B; 5.7 Air Quality (page 78 AIR/EIS Guidelines)</i>	Appendix 5.7-A; 2.11 Tugboat Emission; Tables 11 and 12 (page 15)	ECCC requires estimates for emissions related to water taxis in order to confirm how much the Project would increase emissions from this sector activity.	ECCC recommends that the Proponent include a quantitative assessment of water taxis as a source of emissions resulting from the Project, and provide any related information such as the number of additional trips/day, and taxi engine size.
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ECCC-AQ4	<ul style="list-style-type: none"> <li>Air quality indicators</li> <li>Greenhouse gas (GHG) emissions</li> </ul>	<i>Part B; 5.7 Air Quality (page 78 AIR/EIS Guidelines)</i>	<p>Volume 2; 5.7 Air Quality; 5.7.3.2.1 Spatial Boundaries (page 5.7-4)</p> <p>Volume 2; 5.7 Air Quality; Table 5.7-7 (page 5.7-17)</p>	<p>The Proponent states in Table 5.7-7 that the barge transport and the additional water taxis to transport crew and material are expected to be minimal to the current level of marine traffic in the region.</p> <p>The Regional Study Area (RSA) assessed by the proponent is limited to the marine region of Howe Sound. However, the Project will involve barge traffic on the Fraser river (outside this RSA) and this has not been assessed as part of the Project.</p> <p>Considering this, the barge emissions may be underestimated.</p> <p>ECCC cannot confirm marine emissions due to the Project along the Fraser River because emissions from barge transport beyond the Project site have not been assessed.</p>	<p><b>ECCC recommends the Proponent include an assessment of emissions on the barge traffic route on the Fraser River, with and without the Project, and include information on emission factors, activity, and estimation methodology.</b></p>
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ECCC-AQ5	<ul style="list-style-type: none"> <li>Air quality indicators</li> <li>Human health</li> </ul>	<i>Part B; 5.7 Air Quality (page 78 AIR/EIS Guidelines)</i>	Appendix 5.7-A; 2.12 Summary of Emission Rates; Table 13 (page 16)	Because the RSA doesn't include barge transport along the Fraser River, further information is required to confirm that fugitive dust from barges on the Fraser River will be controlled.	ECCC requests that the Proponent provides information regarding the mitigation measures that will be applied to control fugitive dust from barge transport, including along the Fraser River.
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<p>ECCC-AQ6</p>	<ul style="list-style-type: none"> <li>• Air quality indicators</li> <li>• Greenhouse gas (GHG) emissions</li> </ul>	<p><i>Part B; 5.7 Air Quality (page 78 AIR/EIS Guidelines)</i></p> <p><i>Part B; 5.8 Climate Change (page 82 AIR/EIS Guidelines)</i></p>	<p>Appendix 5.8-B; 6.1 Parameters Used to Calculate Greenhouse Gas Emission Estimates; Table 4 (page 10)</p>	<p>ECCC notes that the Proponent is using data from the BC Chamber of Shipping Inventory from 2007, which has been updated in ECCC’s National Marine Emissions Inventory. Using up-to-date emissions factors is necessary to confirm the marine emissions estimations, and ensure that this review is consistent with other project reviews.</p> <p>The National Marine Emissions Inventory (MEI), produced by ECCC, is a database of marine emissions from all commercial vessels operating in Canadian waters, based on current activity data, and is updated on an on-going basis. Where applicable, proponents are encouraged to refer to the MEI for the most current and best available information for estimating marine emissions, (load factors, emission factors etc.).</p>	<p>ECCC requests that the Proponent update load and emission factors for GHGs from tugs using data from <a href="#">ECCC’s National Marine Emissions Inventory</a>. ECCC is able to provide the proponent with updated emission factors upon request.</p>
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<p>ECCC – Environmental Emergencies EE1</p>	<ul style="list-style-type: none"> <li>• Marine Resources</li> <li>• Terrestrial Wildlife and Vegetation, including migratory birds</li> <li>• Surface Water Resources</li> <li>• Marine Transportation</li> </ul>	<p><i>Part D – Federal Information Requirements 15.0 Requirements for Federal Environmental Assessments ; Accidents and Malfunctions (page 126 AIR/EIS Guidelines)</i></p>	<p>Volume 2; 7.2 Marine Transportation; 7.2.1 Introduction (pages 7.2-1, 7.2-6)</p>	<p>Section 15.0 Requirements for Federal Environmental Assessments; Accidents and Malfunctions states:</p> <p><i>“Accidents and Malfunctions – The EAC Application/EIS will:</i></p> <ul style="list-style-type: none"> <li>• <i>Identify potential accidents, malfunctions, and unplanned events that could occur in any phase of the Proposed Project, the likelihood and circumstances under which these events could occur and the environmental effects that may result from such events, including impacts to marine benthic communities, assuming contingency plans are not fully effective;</i></li> <li>• <i>Describe how each potential accident, malfunction or unplanned event would be managed or mitigated; and</i></li> <li>• <i>Accidents or malfunctions that will be discussed in the EAC Application/EIS include: fire, contamination of soils and / or water due to fuel or hydrocarbon spills, power outages, flooding, erosion and / or loss or containment of aggregate pit, sediment transport into watercourses, accidental discharge of sediment laden wash water, motor vehicle and boating accidents and barge</i></li> </ul>	<p>In Section 7.2 Marine Transportation, 7.2.1 Introduction of the EIS, the Proponent states that: <i>“Volume 3, Part D – Section 14.0: (Accidents and Malfunctions) – addresses the potential environmental effects as a result of accidents and malfunctions related to marine transportation.”</i></p> <p>ECCC requests that the missing information from Volume 3 Part D – Section 14.0: (Accidents and Malfunctions) be provided, in addition to clarifying the following:</p> <ol style="list-style-type: none"> <li>1) Is the Accident and Malfunction information provided in Section 15.1.4 the same information that was intended for inclusion in Section 14.0? If yes, does the information provided in tables 15-4 and 15-5 provide the same level of detail that was to have been provided in Section 14.0?</li> <li>2) ECCC requests that the Proponent provides all information respecting the Mitigation Measures for Accidents and Malfunctions specifically related to Marine Transportation, including: <i>the extent to which their effectiveness can be measured and verified, including linkages to the Environmental Monitoring and Follow-up Program presented in Section 17.0 where appropriate.</i></li> </ol>
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				<p><i>shipping accidents.</i></p> <ul style="list-style-type: none"> <li>• <i>Factors of safety for the side slopes will be provided where sloughing or slope failure could cause retrogression of the pit crest to a degree that could impact on the safety of mine personnel.</i></li> </ul> <p><i>Mitigation Measures – The EAC Application/EIS will identify mitigation measures that are technically and economically feasible that would avoid and limit the environmental effects described in Sections 5.0 - 9.0. Descriptions of proposed mitigation will include:</i></p> <ul style="list-style-type: none"> <li>• <i>their suitability for project- and site-specific application;</i></li> <li>• <i>their technical and economic feasibility; and</i></li> <li>• <i>the extent to which their effectiveness can be measured and verified, including linkages to the</i></li> <li>• <i>Environmental Monitoring and Follow-up Program presented in Section 17.0 where appropriate.</i></li> </ul> <p><i>The level of detail provided will be commensurate with the risk associated with the potential effect being mitigated, and the degree to which the proposed mitigation has been proven effective in the same or similar applications elsewhere. Any uncertainty associated with the effectiveness of proposed mitigation measures will be described.”</i></p>	
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				<p>Although “Volume 3, Part D - Section 14.0 (Accidents and Malfunctions)” was referenced in Section “7.2 Marine Transportation”, it was not located in the EIS. A similar section was located in Section 15.1.4, but while tables 15-4 and 15-5 found within Section 15.1.4 (i) lay out the types of accidents and malfunctions that could be possible to occur, (ii) detail the likelihood of such occurrences, and (iii) list the potential environmental effects, the tables do not provide the required details as to :</p> <ul style="list-style-type: none"><li>• <i>“their suitability for project- and site-specific application;</i></li><li>• <i>their technical and economic feasibility; and</i></li><li>• <i>the extent to which their effectiveness can be measured and verified, including linkages to the Environmental Monitoring and Follow-up Program presented in Section 17.0 where appropriate.”</i></li></ul>	
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<p>ECCC – EED2</p>	<ul style="list-style-type: none"> <li>• Marine Resources</li> <li>• Terrestrial Wildlife and Vegetation, including migratory birds</li> <li>• Surface Water Resources</li> <li>• Marine Transportation</li> </ul>	<p><i>Part D – Federal Information Requirements 15.0 Requirements for Federal Environmental Assessments ; Accidents and Malfunctions (page 126 AIR/EIS Guidelines)</i></p>	<p>Volume 3; 15.1.4 Accidents and Malfunctions; Table 15-4 (page 15-17)</p>	<p>EIS Table 15-4 : “Likelihood of occurrence” values are provided for each of the Accident and Malfunction types.</p> <p>EIS Table 15-5: “Significance Analysis of Residual Effect” values are provided for each Accident and Malfunction type.</p> <p>There is no discussion of the characterization of either “likelihood” or “severity” that is applicable to Section 15.4.1 wherein all Accident and Malfunction types have been assigned one or a mix of “Negligible” or “Not-Significant”.</p>	<p>ECCC requests that the Proponent provides the Risk Rating Matrix that was used to inform the “Significance Analysis of Residual Effects”, and that was ultimately used to determine the Proponent’s selected mitigation measures, including:</p> <ul style="list-style-type: none"> <li>• <i>“their suitability for project- and site-specific application; and</i></li> <li>• <i>their technical and economic feasibility”.</i></li> </ul>
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ECCC – EED3	<ul style="list-style-type: none"> <li>• Marine Resources</li> <li>• Marine Transportation</li> </ul>	<i>Part D – Federal Information Requirements 15.0 Requirement for Federal Environmental Assessments ; Accidents and Malfunctions (page 126 AIR/EIS Guidelines)</i>	Volume 2; 5.2.5.4.2 Accidents and Malfunctions; 5.2.5.4.2.1 Toxic and Hazardous Material Spills (page 5.2-126)	<p>The Proponent states <i>“In the unlikely event of a collision of a Proposed Project vessel with another vessel, shore feature or man-made structure, effects may include the rupturing of the vessel’s fuel tank. In the worst-case scenario, the maximum amount of fuel that can be released into the marine environment is 81 m3 of diesel fuel (total tank volume of Seaspans Commander).”</i></p> <p>Given that a worst-case accident scenario could reasonably involve the sinking of the Proposed Project vessel, then all petroleum product types and volumes contained onboard the vessel should be included in a worst-case accident scenario.</p>	ECCC recommends that the Proponent’s characterization of a worst-case scenario involving the rupturing of the vessel’s fuel tank is revised to include the potential spilling of all other types and quantities of oils and gear lubes that are normally required to operate the vessel. The associated environmental effects and effectiveness of mitigation measures should also be revised accordingly.
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ECCC-Wildlife01	Terrestrial Wildlife and Vegetation	<i>Part B; 5.3 Terrestrial Wildlife and Vegetation (page 59 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Table 5.3-4 (page 5.3-7), Table 5.3-29 (page 5.3-103)	EIS guidelines state that “The LSA will also apply a buffer to this [spatial] boundary [for wildlife and vegetation VCs] based on local topography.” However, the buffer size is not stated in the EIS. ECCC provided similar comments in Annex 1.	ECCC requests that the Proponent provide the size of the buffer that will be applied within the Local Study Area (LSA) and the rationale for this size.  If no buffer has been applied, the spatial boundary for terrestrial wildlife and vegetation assessment on Valued Components (VCs) will need to be reassessed with the buffer in place.
ECCC-Wildlife02	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 4.2 Select Valued Components (page 31 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.3.1 (page 5.3-2), Table 5.3-3 (page 5.3-4), Section 5.3.4.1 (page 5.3-184)	All VCs (except roosevelt elk) are SARA-listed or COSEWIC-assessed and are used as indicators/surrogates for certain ecosystems and species (e.g. amphibian species at risk as aquatic indicator species). In addition, groups of species, which include species at risk, are listed as a single VC (e.g. amphibian species at risk).  When selecting surrogate/indicator species, ECCC does not recommend using SARA-listed or COSEWIC-assessed species	ECCC recommends revising the selection of VCs such that each species listed under SARA or assessed by COSEWIC is included as its own VC. ECCC recommends that an effects assessment be conducted and mitigation measures be provided to address effects for each VC.  ECCC recommends that species listed under SARA or assessed by COSEWIC are not included as surrogate/indicators of larger species groups.

			<p>as surrogate/indicator species (e.g., Northern Goshawk and Western Screech-owl were selected as surrogate species for excluded Bald Eagle and Osprey, while Common Nighthawk was selected for Purple Martin). Listed species often have very specific habitat needs that do not reflect those of the larger species group. Despite this, ECCC advises that each SARA-listed species that is likely to occur within the Local and Regional Study Areas be included as separate VCs (not representing a larger grouping).</p> <p>In general, ECCC recommends choosing migratory breeding bird indicator species that consider all bird guilds present (waterbirds, waterfowl, shorebirds, and landbirds) and all habitat types that the Project will likely impact (e.g. old growth forest, riparian areas, wetlands, freshwater/stream, alpine) as VCs when undertaking baseline work.</p> <p>ECCC recommends using the list of Priority Species provided by Bird Conservation Region Strategies as a selection guideline for potential Indicator Species:  <a href="http://nabci.net/Canada/English/bird_conservation_regions.html">http://nabci.net/Canada/English/bird_conservation_regions.html</a></p> <p>The following can also aid in selection of indicator species:  Caro T (2010) Conservation by proxy: indicator, umbrella, keystone, flagship, and other surrogate species. Island Press, Washington, DC, USA</p> <p>Kershner J, Samhouri JF, James CA, and Levin PS (2011) Selecting indicator</p>	
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				portfolios for marine species and food webs: a Puget Sound case study. PloS ONE 6:e25248	
ECCC-Wildlife03	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 4.2 Select Valued Components (page 31 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.3.1, Table 5.3-3 (page 5.3-4); Section 5.3.4.1, Table 5.3-7 (page 5.3-15)  Appendix 5.3-A; Table 12 (page 38), Figure 10 (page 42)	<p>The rationale for exclusion of olive-sided flycatcher as a VC states that “the proposed project area...is not considered highly suitable olive-sided flycatcher habitat...”, and that band-tailed pigeon was chosen as a surrogate.</p> <p>However, olive-sided flycatcher was observed in the proposed Project area and at other observation stations, as stated in the baseline report. ECCC notes that “no high suitability habitat” does not justify exclusion of olive-sided flycatcher, as it has been documented near the proposed Project Area within the LSA.</p>	<p>ECCC recommends including the olive-sided flycatcher species as its own VC as it was observed in the LSA following the recommendation above.</p> <p>ECCC also recommends updating Table 5.3-7 and the effects assessment to include olive-sided flycatcher as identified wildlife in the LSA.</p> <p>Following this recommendation, ECCC also recommends updating Table 5.3-7 to include other species at risk confirmed in the LSA during surveys.</p>

ECCC- Wildlife04	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3 Terrestrial Wildlife and Vegetation (page 61 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.4 Table 5.3-7 (page 5.3-15) Appendix 5.3-A; Section 3.3.1 (page 27)	Table 5.3-7 states that Northern Red-legged Frog was not identified in the LSA. This information contradicts the baseline report, which indicates that Northern Red-Legged Frog was one of two amphibian species recorded during amphibian species surveys in the LSA.	ECCC recommends that Table 5.3-7 is updated in the EIS to include Northern Red-legged Frog as identified wildlife in the LSA.
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ECCC- Wildlife05	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 4.2 Select Valued Components (page 31 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.3.1, Table 5.3-2 (page 5.3-3) Appendix 5.3-A	ECCC notes that no baseline surveys were conducted for invertebrate species at risk, nor were any included or addressed in the VC selection .	ECCC requests an explanation as to why invertebrate species at risk were not considered in the VC selection .
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ECCC-Wildlife06	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.5 Determine Potential Effects (page 63 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.5.3.3 (page 5.3-43)	<p>The Proponent indicates that “critical nesting habitat has been identified within the LSA but not within the Proposed Project Area, and therefore no direct loss of critical Marbled Murrelet nesting habitat is expected.”</p> <p>ECCC advises that Marbled Murrelet terrestrial critical habitat is identified in the final recovery strategy, and that shapefiles are available for its critical habitat. An identification of marine critical habitat is not included in the Recovery Strategy at this time.</p> <p>ECCC notes that the proposed recovery strategy for Marbled Murrelet referenced in the baseline may not have included the most recent shapefiles for critical habitat. ECCC advises that Marbled Murrelet critical habitat, as defined in the recovery strategy, will be refined over time; this refinement may include the addition of new critical habitat, if further research supports this inclusion.</p> <p>The environmental assessment should identify and describe any potential direct or indirect impacts to Marbled Murrelet and its critical habitat arising from Project activities.</p> <p>Baseline studies should include, but not be limited to:</p> <ul style="list-style-type: none"> <li>- a determination of whether suitable nesting habitat (SNH) for Marbled Murrelet is present within or near the Project area and,</li> <li>- if SNH is present within or near</li> </ul>	<p>ECCC requests clarification as to whether the critical habitat referenced in the baseline and EIS was based upon the geospatial files available as open data through the Open Data Portal at: <a href="http://donnees.ec.gc.ca/data/species/developplans/critical-habitat-for-species-at-risk-british-columbia/critical-habitat-for-species-at-risk-british-columbia-marbled-murrelet-brachyramphus-marmoratus/?lang=en">http://donnees.ec.gc.ca/data/species/developplans/critical-habitat-for-species-at-risk-british-columbia/critical-habitat-for-species-at-risk-british-columbia-marbled-murrelet-brachyramphus-marmoratus/?lang=en</a></p> <p>If not, ECCC requests a reassessment of Marbled Murrelet critical habitat using these geospatial files.</p> <p>ECCC recommends that the Proponent ), provide appropriate baseline studies based on the advice in the Marbled Murrelet Standard Guidance Memo (<i>Attachment 4</i>) and identify and describing all potential direct and indirect effects to Marbled Murrelet critical habitat as well as mitigation measures that will avoid or lessen the effects..</p>
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				<p>the Project area, or if a nest has been identified: Marbled Murrelet surveys during the breeding season to determine whether Marbled Murrelets are likely nesting in the Project area.</p> <p>Refer to Attachment 4: Standard Guidance for Environmental Assessments for Marbled Murrelet for detailed recommendations, as well as ECCC's responsibilities, related to Marbled Murrelet.</p>	
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ECCC-Wildlife07	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.5 Determine Potential Effects (page 63 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.5.5.1.1 (page 5.3-78), Section 5.3.1.5.6.1.1 (page 5.3-92)	<p>The EIS indicates that “a total of 0.125 ha of amphibian breeding habitat will be established during the construction phase of the project...” and that the predicted change in amphibian mortality is considered fully reversible.</p> <p>Human-made habitats, such as pit lakes, are sometimes used by Western Toad for breeding (COSEWIC 2012). However, human-made habitats can be a reproductive sink where these habitats produce no metamorphs (because the habitats attract the species, but do not meet the requirements of the species) and result in a waste of reproductive effort (Stevens and Paszkowski 2006).</p> <p>References:  COSEWIC. 2012. COSEWIC assessment and status report on the Western Toad <i>Anaxyrus boreas</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiv + 71 pp.</p> <p>Stevens, C.E., and C.A. Paszkowski. 2006. Occurrence of the western toad and its use of 'borrow pits' in west-central Alberta. <i>Northwestern Naturalist</i> 87:107-117</p>	ECCC recommends that the Proponent provide an re-evaluation of the expectation of full reversibility of the predicted change in mortality taking into consideration that human-made habitat may not be as effective as natural breeding habitat for Western Toad.
ECCC-Wildlife08	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.6 Mitigation (page 63 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.5.4.4, Table 5.3-15 (page 5.3-75)	Mitigation for habitat loss of VCs includes “Maintain[ing] vegetation buffers...” but provides no other detail.	ECCC requests clarification on what is defined as a vegetation buffer, how much of a buffer will remain, and the rationale for the amount that will be maintained and excluded.

ECCC-Wildlife 09	Terrestrial Wildlife and Vegetation, including migratory birds	<p><i>Part B; 5.3.5 Determine Potential Effects (page 63 AIR/EIS Guidelines)</i></p> <p><i>Part B; 5.3.6 Mitigation (page 63 AIR/EIS Guidelines)</i></p>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.5.5.1.1.1 (page 5.3-77)	The EIS states that “an accidental release of deleterious substances or sediment could occur when machinery is operated near aquatic breeding habitat.” The potential for accidents is not discussed in the proposed mitigation measures.	ECCC recommends that the Proponent provide: mitigation measures to prevent and mitigate an accidental release of deleterious substances; an explanation as to why the mitigation measures were selected; and a mitigation and follow-up strategy for potentially affected species at risk and migratory birds if an accidental release does occur.
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ECCC- Wildlife10	Terrestrial Wildlife and Vegetation, including migratory birds	<p><i>Part B; 5.3.5 Determine Potential Effects (page 63 AIR/EIS Guidelines)</i></p> <p><i>Part B; 5.3.6 Mitigation (page 63 AIR/EIS Guidelines)</i></p>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.5.5.1.8 (page 5.3-84)	The EIS states that “The habitat removed may be replaced at the end of the proposed project”; however, the EIS also states that habitat loss is predicted to be “fully reversible”.	ECCC requests clarification as to why the habitat <u>may</u> be replaced, as opposed to <u>will</u> be replaced, given the statement that habitat loss is predicted to be fully reversible.
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ECCC- Wildlife11	Terrestrial Wildlife and Vegetation, including migratory birds	<p><i>Part B; 5.3.5 Determine Potential Effects (page 63 AIR/EIS Guidelines)</i></p> <p><i>Part B; 5.3.6 Mitigation (page 63 AIR/EIS Guidelines)</i></p>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.5.6.1.1 (page 5.3-92)	<p>The EIS indicates that salvaging of amphibians within natal and upland habitat affected by the proposed Project will reduce project-related mortality.</p> <p>ECCC does not recommend amphibian salvaging be considered as a measure to mitigate mortality due to construction activities because the survival of translocated individuals is highly uncertain (Malt 2012). Refer to Attachment 4: Standard Guidance for Environmental Assessments for Western Toad for more information on salvage.</p> <p>References: Malt, J. 2012. Assessing the Effectiveness of Amphibian Mitigation on the Sea-to-Sky Highway: Population-level Effects and Best Management Practices for Minimizing Highway Impacts. Final Report. Ministry of Forest, Lands, and Natural Resource Operations.</p>	ECCC recommends revising the mitigation measures proposed for Western Toad by using guidance on translocation for Western Toad provided in the standard guidance memo in Attachment 4.
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ECCC- Wildlife12	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.5 Determine Potential Effects (page 63 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.2.5.2.2.1 (page 5.3-127)	The clearing and constructing of the processing area is anticipated to result in a temporary loss of riparian forest.	ECCC requests clarification on what ecosystem functions will be temporarily lost, what specific mitigation measures will be used to restore these functions, and how they restore them. ECCC further requests information on whether a monitoring plan for the mitigated riparian ecosystem will be implemented
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ECCC- Wildlife13	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.5 Determine Potential Effects (page 63 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.3.1 (page 5.3-2)	ECCC previously commented that the EIS was “missing discussion regarding key life stage requirements of wildlife VC’s, and landscape alteration as a function of biodiversity and ecosystem function.” (From Table of Concordance at previous stage). The EIS requires that a discussion on key-life stage requirements for each VC be added, in addition to a discussion on landscape alteration as a function of biodiversity and ecosystem function.	ECCC requests the provide key life-stage requirements in the effects assessment and mitigation measures (for example, migration corridors and other life stage habitats).
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ECCC-Wildlife14	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.7 Residual and Cumulative Effects Assessment (page 63 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.3.7 (page 5.3-175)	As indicated in the IRs elsewhere in this document, the VC selection, analysis of key life stage requirements, and baseline work (See IRs re: bird surveys including ECCC-Wildlife20 and ECCC-Wildlife 21) on certain species are inadequate for the scope of the Project. Residual cumulative effects were not assessed for any bird VCs.	ECCC recommends that with the additional survey data as requested in ECCC-Wildlife20 and ECCC-Wildlife21, residual cumulative effects and their significance be re-assessed .
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ECCC- Wildlife15	Terrestrial Wildlife and Vegetation, including migratory birds	<p><i>Part B; 5.3.5 Determine Potential Effects (page 63 AIR/EIS Guidelines)</i></p> <p><i>Part B; 5.3.7 Residual and Cumulative Effects Assessment (page 63 AIR/EIS Guidelines)</i></p>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.5.3.8 (page 5.3-63), Section 5.3.1.5.6.1.8, Table 5.3-26 (page 5.3-98), Section 5.3.3.2, Table 5.3-45 (page 5.3-154), Section 5.3.3.6, Table 5.3-52 (page 5.3-172)	<p>The EIS identifies significant cumulative effects to grizzly bears. However, potentially important effects pathways, such as habitat fragmentation and barriers to movement, were not considered in the effects assessment.</p> <p>The Proposed Project Area is not expected to cause any further fragmentation, but the justification for this statement is insufficient and requires further detail. In addition, existing projects in the area are characterized as creating a baseline barrier to grizzly bear movement without an appropriate explanation.</p>	<p>Given that significant cumulative effects to grizzly bears are predicted in the EIS, ECCC recommends carrying forward of all effects pathways be included in the effects assessment.</p> <p>ECCC requests clarification as to how existing projects provide a baseline barrier to movement for grizzly bears.</p>
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ECCC-Wildlife16	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.6 Mitigation (page 63 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.5.4 (page 5.3-67), Table 5.3-15 (page 5.3-75)	No Marbled Murrelet monitoring plan is provided, even though it was observed during baseline studies.	ECCC recommends that mitigation measures addressing potential effects on Marbled Murrelet be included in the EIS due to ECCC's concerns regarding the quality of baseline information (see IR ECCC-Wildlife06 regarding Marbled Murrelet baseline surveys). In addition, ECCC recommends that project monitoring be conducted in accordance with standardized methods (e.g. RISC 2001) for Marbled Murrelet and its habitat RISC (Resources Information Standards Committee). 2001. Inventory methods for Marbled Murrelets in marine and terrestrial habitats, Version 2.0. Standards for components of British Columbia's biodiversity, No. 10. Ministry of Environment, Lands and Parks, Resources Inventory Branch, Victoria, BC. <a href="http://www.ilmb.gov.bc.ca/risc/pubs/tebiodiv/murrelet2k1/mamu%20ml20.pdf">URL: http://www.ilmb.gov.bc.ca/risc/pubs/tebiodiv/murrelet2k1/mamu%20ml20.pdf</a>
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ECCC- Wildlife17	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.4 Baseline Conditions (page 61 AIR/EIS Guidelines)</i>	Appendix 5.3-A, Section 2.2.1 (page 5)  Appendix 5.3-A, Section 3.3.1 (page 27)	The baseline notes that Northern Red-legged Frog, Coastal Tailed Frog, and Western Toad all have the potential to occur in the LSA. However, no species-specific surveys were conducted.	<p>ECCC recommends that species-specific surveys be conducted and included for all amphibian species at risk with the potential to occur in the LSA, given differences in habitat, life stage requirements, and breeding behaviour. ECCC recommends that any species observed during surveys be included in the effects assessment and mitigation measures be provided to address effects.</p> <p>ECCC recommends that the Proponent refer to Attachment 4: Standard Guidance for Environmental Assessments for Western Toad for details on ECCC's suggested survey methodologies for Western Toad.</p>
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ECCC- Wildlife18	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.4 Baseline Conditions (page 61 AIR/EIS Guidelines)</i>	Appendix 5.3-A, Section 2.2.1 (page 5)  Appendix 5.3-A, Section 3.3.1 (page 27)	<p>Amphibian surveys were done on two dates in 2012 (March 26 and June 26), and one date in 2014 (March 25), and only in select areas of the LSA. No road surveys were performed.</p> <p>ECCC advises that the amphibian surveys conducted are not adequate for establishing an accurate baseline that will reflect natural inter-annual variation, which is important for assessing potential project impacts, focusing mitigation and monitoring, and addressing potential cumulative impacts.</p> <p>In addition, it appears that terrestrial habitats (for summering and wintering) for amphibians were not included in the effects assessment. ECCC emphasizes the importance of protecting amphibian terrestrial habitats. Terrestrial habitats are important habitats for feeding and overwintering and the biological interdependence between terrestrial and aquatic habitats is essential for the persistence of populations.</p>	<p>ECCC recommends including additional amphibian surveys, conducted as per appropriate standards:</p> <ol style="list-style-type: none"> <li>1. within the entire LSA; and</li> <li>2. for more than one year per survey location.</li> </ol> <p>ECCC recommends that any species observed during surveys be included in the effects assessment and mitigation measures be provided to address effects.</p> <p>ECCC requests the inclusion of terrestrial habitat in the effects assessment. and mitigation measures be provided to address effects</p>
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ECCC-Wildlife19	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.4 Baseline Conditions (page 61 AIR/EIS Guidelines)</i>	Appendix 5.3-A, Section 3.3.1 (page 27)	The Appendix states that no amphibian breeding was recorded in Pond 4 in 2014. However, ECCC notes that Red-Legged Frog tadpoles were recorded in Pond 4 in 2014. These two statements appear to contradict each other. The presence of tadpoles indicates that amphibian breeding occurs in the pond.	ECCC requests that the Proponent update the statement in the Appendix to reflect and/or clarify the 2014 survey information on Red-legged Frogs.
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ECCC-Wildlife 20	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.4 Baseline Conditions (page 61 AIR/EIS Guidelines)</i>	Appendix 5.3-A, Section 2.2, Table 1 (page 4), Section 3.5 (page 38)	<p>Breeding bird surveys were only conducted two days in one year.</p> <p>The existing baseline sampling for migratory birds does not meet requirements necessary to establish an accurate or current baseline that allows for assessment of potential impacts of the Project, including those on COSEWIC-assessed and SARA-listed avian species detected in the LSA and RSA. ECCC notes that Common Nighthawks (SARA: Threatened), Barn Swallows (COSEWIC: threatened), and Short-eared Owls (SARA: Special Concern) are not well represented by standard avian point counts and other standard survey techniques because of their unique behaviours.</p> <p>Establishing an accurate baseline that reflects natural inter-annual variation is important for assessing potential project impacts, focusing mitigation and monitoring, and addressing potential cumulative impacts. It is also important to note that a key purpose of collecting baseline data is to determine the presence of any biodiversity or distribution hotspots.</p> <p>The sampling methods chosen do not meet requirements necessary to establish an accurate or current baseline that allows for assessment of potential impacts of the Project on migratory birds</p>	<p>For the scientific assessment of potential impacts on migratory birds, ECCC recommends that the EIS should follow the guiding principles as presented in: Hanson et al. 2009, <i>A framework for the scientific assessment of potential project impacts on birds - CWS Technical Report series No. 508</i> (available online at: <a href="http://publications.gc.ca/site/archivee-archived.html?url=http://publications.gc.ca/collections/collection_2010/ec/CW69-5-508-eng.pdf">http://publications.gc.ca/site/archivee-archived.html?url=http://publications.gc.ca/collections/collection_2010/ec/CW69-5-508-eng.pdf</a>).</p> <p>ECCC recommends including additional baseline surveys using species-specific protocols throughout the LSA for Common Nighthawk, Barn Swallow, and Short-eared Owl.</p> <p>For all bird surveys, ECCC recommends the inclusion of surveys conducted over multiple years, incorporating multiple visits per year at the same points to account for natural and contemporary inter-annual variation and maximize detectability within the LSA.</p> <p>ECCC recommends that based on the survey information collected, reassess the effects on each VC and mitigation measures should be provided to address effects.</p>
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ECCC-Wildlife21	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.4 Baseline Conditions (page 61 AIR/EIS Guidelines)</i>	Appendix 5.3-A, Section 3.5.6, Table 16 (page 46), Section 3.5.6.1 (page 48)	Black Swift is COSWEIC assessed as Endangered and was observed at a station during breeding bird surveys. However, the EIS indicates that no species specific surveys were done due to “no suitable breeding habitat...in the LSA”	<p>ECCC requests the inclusion of black swift surveys following ECCC’s standard advice on Black Swifts (Refer to Attachment 4: Black Swift – baseline survey protocol and effects assessment for Environmental Assessment).</p> <p>ECCC requests the inclusion of further baseline surveys for Black Swift in the Project area following RISC protocols (“<i>Inventory Methods for Swallows and Swifts (Version 2.0)</i>” and attached Memo on Black Swift Protocol (Attachment 4)).</p> <p>These surveys may be guided by habitat suitability modeling in the project area.</p> <p>ECCC recommends that if Black Swift is observed during surveys then it should be included in the effects assessment and mitigation measures be provided to address effects.</p>
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ECCC- Wildlife22	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.4 Baseline Conditions (page 61 AIR/EIS Guidelines)</i>	Appendix 5,3-A, section 2.2.3 (page 10), Section 3.5.6.4 (page 52)	<p>Marbled Murrelet surveys were only conducted twice in a one year period (May and June 2012) and only repeated twice at two out of four observation stations. The observation stations from Figure 4 (“Marbled Murrelet Survey Locations, 2012”) do not fully encompass the LSA; specifically, marine areas that Marbled Murrelet may use to forage, or the forested areas used for movement are not included.</p> <p>ECCC notes that many sections of the LSA have not been surveyed, including the existing infrastructure in the southwest portion, proposed marine portion of the Project, and proposed Project area in the central portion though construction and operation activities are proposed in these areas.</p> <p>This sampling does not meet requirements necessary to establish an accurate or current baseline that allows for assessment of potential impacts of the Project on Marbled Murrelet.</p> <p>ECCC notes that the federal recovery strategy for Marbled Murrelet can be accessed here:  <a href="http://sararegistry.gc.ca/document/default_e.cfm?documentID=1290">http://sararegistry.gc.ca/document/default_e.cfm?documentID=1290</a>.</p>	<p>ECCC recommends that the Proponent provide information collected from conducting surveys over 5-10 years, incorporating 2 surveys per month (during the breeding season) each year at the same survey locations to account for natural and contemporary inter-annual variation and maximize detectability within the LSA.</p> <p>If Marbled Murrelet is observed during surveys, then it should be included in the effects assessment and mitigation measures be provided to address effects.</p>
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ECCC-Wildlife23	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.4 Baseline Conditions (page 61 AIR/EIS Guidelines)</i>	Appendix 5.3-A, section 3.6.6 (page 75)	Three species of bat were stated to have the potential to occur in the LSA. Two of the species are considered species at risk under SARA (Keen's Long-eared Myotis is identified as 'Data Deficient' in the baseline but is included in Schedule 3 of SARA as Special Concern, and Little Brown Myotis is listed as endangered on Schedule 1 of SARA). However, no bat surveys were conducted specific to these two bat species.	<p>ECCC recommends that Keen's Long-eared Myotis SARA status be updated to Special Concern (Schedule 3) in Table 27.</p> <p>ECCC recommends that baseline studies be conducted for bat species at risk that include both desktop surveys (see, for example, Bat Acoustic Monitoring Portal <a href="http://databasin.org/groups/59d81a3951fd4915909efacbe2317efb">http://databasin.org/groups/59d81a3951fd4915909efacbe2317efb</a>) and field surveys. ECCC recommends that field surveys employing methodologies such as radio telemetry, visual surveys, and acoustic monitoring should be evaluated for use in acquiring baseline information, including locations of hibernacula and maternity roosting sites. ECCC suggests referring to provincial inventory standards, published methodologies, and provincial best management practices for guidance on surveying methodologies. ECCC advises that acoustic bat surveys alone are insufficient in determining the presence and location of hibernacula and roosting sites for bats.</p> <p>ECCC recommends that bat surveys be conducted for more than one year to account for inter-annual variation, as well as survey and potential weather limitations. (See Loeb et al. 2015, Holroyd and Craig 2016).</p> <p>ECCC recommends that any species observed during surveys be included in the effects assessment and mitigation measures be provided to address effects.</p> <p>References:  Loeb, S.C., Rodhouse, T.J., Ellison, L.E., Lausen, C.L., Reichard, J.D., Irvine, K.M., Ingersoll, T.E., Coleman, J.T., Thogmartin, W.E., Sauer, J.R. and Francis, C.M., 2015. A plan for the North American bat monitoring program (NABat).  Holroyd, S.L., and V.J. Craig. 2016. Best Management Practices for Bats in British Columbia, Chapter 2: Mine Developments and Inactive Mine Habitats. B.C. Ministry of Environment, Victoria, BC. 60pp.</p>
ECCC-Wildlife24	Terrestrial Wildlife and Vegetation, including migratory birds	<i>Part B; 5.3.4 Baseline Conditions (page 61 AIR/EIS Guidelines)</i>	Volume 2; 5.3 Terrestrial Wildlife and Vegetation; Section 5.3.1.5.4.4, Table 5.3-15 (page 5.3-75)	In the EIS, all mitigation measures are anticipated to be effective, but ECCC notes that the issues with baseline data raised in the IRs above indicate that this prediction may need to be reassessed.	ECCC recommends reassessing the identified mitigation measures after more accurate baseline data has been collected for VCs and species at risk.



Environment and Climate Change Canada (ECCC)

*ANNEX 3: Advice to the proponent*

Departmental number (e.g. HC-01)	Reference to EIS	Context and Rationale	Advice to the Proponent
ECCC-EE01	All Accidents and Malfunctions sections in Volumes 2 and 3.	<p>ECCC's focus when reviewing Emergency Response Plans and Spill Contingency Plans and generating comments and recommendations to proponents is from the perspective of ensuring, to the extent possible, that all matters and issues pertaining to the Department's mandate under the <i>Canadian Environmental Protection Act, 1999</i>, (CEPA), the <i>Migratory Birds Convention Act, 1994</i>, and the pollution prevention provisions of the <i>Fisheries Act</i> are considered and addressed via preventative and mitigative measures. The feedback that ECCC provides to proponents is also based on any hazard assessment analyses (physical, environmental, and human health and life) if available, and whenever relevant to the subject project.</p> <p>Based on the above, ECCC requests further information regarding potential</p>	<p><b>Assessment of Risk and Environmental Effects</b></p> <p>ECCC encourages proponents to demonstrate, in their Environmental Impact Statement, how they have evaluated the risk of environmental effects arising from the project and what actions they would undertake to remediate spill-affected lands and waters. This is a longer term specialist task that could be partially accomplished during the environmental assessment phase through close coordination with environmental agencies and the expert community of environmental consultants and academia.</p> <p>While conducting the hazard identification and risk assessment, ECCC would ask that the proponent also consider contributing and/or complicating factors. These factors may pose unintentional or unplanned risk to a facility or process and may include external hazards such as severe meteorological events or other physical hazards which may have the potential to affect the integrity of project infrastructure or activities.</p>

		<p>environmental effects as a result of accidents and malfunctions related to marine transportation (see Annex 2, IR ECCC-EED1).</p> <p>ECCC requests further information regarding the Risk Rating Matrix used to inform the "Significance Analysis of Residual Effects (see Annex 2, IR ECCC-EED2).</p>	<p><b><i>Development of Environmental Management and Safety Management Systems</i></b></p> <p>ECCC recommends that proponents assume that worst-case accident and malfunction scenarios are not only possible, but rather are likely to occur during the lifespan of the project, and that contingency plans and response capabilities be developed accordingly. ECCC recommends that proponents commit to developing and adhering to Environmental Management and Safety Management Systems that include Emergency Response Plans (based on <i>CSA Standard CAN/CSA Z731-03 (R2009) Emergency Preparedness and Response</i>) detailing all relevant roles and responsibilities of their response personnel. ECCC encourages proponents to prepare Emergency Response Plans and Spill Contingency Plans that reflect a consideration of potential accidents and malfunctions and that take into account site-specific conditions and sensitivities. The Canadian Standards Association publication, <i>Emergency Preparedness and Response, CAN/CSA-Z731-03</i>, is a useful reference for this.</p> <p>ECCC encourages proponents to demonstrate, in their environmental assessment submission, which actions they would undertake and what equipment they would deploy to respond to spills. This would include showing a commitment to develop partnerships within industry sectors for mutual aid, and to practice and train with local emergency responders such as fire and public safety officials.</p> <p>A Spill Contingency Plan should be in place for all fuel storage or transfer locations, outlining a clear path of response in the event of a spill and address the key areas of prevention, preparedness, response and recovery. The Spill Contingency Plan should include a list of standard emergency equipment in the spill kits as well as their individual locations on the project site.</p>
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			<p><b>Operations</b></p> <p>ECCC recommends that proponents document worst-case accident and malfunction scenarios in a manner that is consistent with one or both of the OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response, and the CRAIM 2007 Risk Management Guide for Major Industrial Accidents.</p> <p>Biodegradable alternatives to petroleum-based hydraulic fluid for heavy machinery are commonly available from major manufacturers. As a best practice standard, such biodegradable fluids should be considered for use in place of standard petroleum products whenever possible and/or practicable.</p>
ECCC-AQ01	Volume 2 Part B 5.7 Air Quality	Greenhouse Gases - potential effects of pollutants of concern identified under <i>Canadian Environmental Protection Act, 1999</i> , (CEPA) - Schedule 1	<p>Site-specific plans should be developed and implemented to minimize releases of greenhouse gases. Plans should describe:</p> <ul style="list-style-type: none"> <li>• potential sources of releases of greenhouse gases;</li> <li>• factors that may influence releases of greenhouse gases;</li> <li>• measures to minimize releases of greenhouse gases;</li> <li>• monitoring and reporting programs for releases of greenhouse gases;</li> <li>• mechanisms to incorporate the results of monitoring programs into further improvements to measures to minimize releases; and</li> <li>• mechanisms to periodically update the plans.</li> </ul>
ECCC-AQ02	Volume 2 Part B 5.7 Air Quality	<p>Air Pollutants -potential adverse effects of pollutants of concern identified under the <i>Canadian Environmental Protection Act, 1999</i>, Schedule 1 (CEPA).</p> <p>CEPA provides the Government of Canada with tools to protect the environment and human health and establishes strict deadlines for controlling certain toxic substances.</p>	<p>Site-specific plans should be developed and implemented to minimize releases of particulate matter. These plans should describe:</p> <ul style="list-style-type: none"> <li>• potential sources of releases of airborne particulate matter, including specific activities and specific components of mine infrastructure;</li> <li>• factors that may influence releases of airborne particulate matter, including climate and wind;</li> <li>• potential risks to the environment and human health</li> </ul>

		<p>A key aspect of CEPA is the prevention and management of risks posed by toxic and other harmful substances. Substances that are declared “toxic” under CEPA are added to the List of Toxic Substances in Schedule 1 of the Act. CEPA regulates many of the substances that have a deleterious effect on the environment.</p> <p>Transboundary Air Quality: potential adverse effects of transboundary air pollution under Article V of the 1991 Canada/US Air Quality Agreement.</p>	<p>from releases of airborne particulate matter;</p> <ul style="list-style-type: none"> <li>• measures to minimize releases of airborne particulate matter from the sources identified;</li> <li>• monitoring programs for local weather, for consideration in the ongoing management of releases of airborne particulate matter;</li> <li>• monitoring and reporting programs for releases of airborne particulate matter and for environmental impacts of releases;</li> <li>• mechanisms to incorporate the results of monitoring programs into further improvements to measures to minimize releases; and</li> <li>• mechanisms to periodically update the plans.</li> </ul>
ECCC-CWS01	<p>Volume 2 Part B 5.3 Terrestrial Wildlife and Vegetation</p> <p>Appendix 5.3-A Wildlife Baseline Report</p>	<p><i>Migratory Birds, and Migratory Birds Convention Act, 1994 (MBCA)</i></p>	<p>The purpose of the MBCA is to implement the Migratory Birds Convention between Canada and the United States by protecting and conserving migratory birds, as populations and individuals. It is the responsibility of the Federal Government of Canada to protect and conserve the roughly 500 species of migratory birds regularly occurring in Canada. ECCC Canadian Wildlife Service provides the list of bird species protected under the MBCA, which derives from Article I of the Convention. This list includes all seabirds (except cormorants and pelicans), all waterfowl, all shorebirds and most landbirds (birds with principally terrestrial life cycles).</p> <p>Section 5.1 of the MBCA prohibits the deposit of a substance that is harmful to migratory birds in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area. The Act prohibits the possession of a migratory bird, nest or egg without lawful excuse. The <i>Migratory Birds Regulations (MBR)</i> provide for the conservation of migratory birds and for the protection of individuals, their nests and eggs. A prohibition against hunting is set out in section 5 of the MBR. The term “hunt” is given a specific definition in section 2 of the Regulations and includes attempting in any manner to kill, injure or harass</p>

		<p>migratory birds. A prohibition against the disturbance, destruction, or taking of a nest, egg or nest shelter of a migratory bird is set out in subsection 6(a) of the MBR.</p> <p>Avoiding of Detrimental Effects to Migratory Birds (Incidental Take):</p> <p>Migratory birds, the nests of migratory birds and/or their eggs can be inadvertently harmed or disturbed as a result of many activities—including but not limited to clearing trees and other vegetation, draining or flooding land, or using fishing gear. This inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs is known as incidental take and is prohibited under the MBCA. Incidental take, in addition to harming individual birds, nests or eggs, can have long-term consequences for migratory bird populations in Canada, especially through the cumulative effects of many different incidents. For further details, please refer to the Avoidance of Detrimental Effects to Migratory Birds (Incidental Take) website at: <a href="http://ec.gc.ca/paom-itmb/default.asp?lang=En&amp;n=C51C415F-1">http://ec.gc.ca/paom-itmb/default.asp?lang=En&amp;n=C51C415F-1</a></p> <p>Endangered and threatened migratory bird Species at Risk (species, subspecies, and distinct populations) also have federal legislative protection under the <i>Species at Risk Act</i> (SARA).</p> <p>ECCC advises that proponents should be aware that construction during the nesting period for migratory birds carries with it high risks of incidental take. Many bird nests are difficult to locate, even with highly trained observers. Proponents should be aware of the risks and take appropriate action to ensure they are in compliance with the MBCA.</p> <p>ECCC recommends that the following online tool be used to determine sensitive periods for all migratory birds: <a href="https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&amp;n=4F39A78F-1">https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&amp;n=4F39A78F-1</a></p>
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ECCC-CWS02	<p>Volume 2 Part B 5.3 Terrestrial Wildlife and Vegetation</p> <p>Appendix 5.3-A Wildlife Baseline Report</p>	Species at Risk and <i>Species at Risk Act</i> (SARA)	<p>The purposes of the SARA are to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity, and to manage species of Special Concern to prevent them from becoming endangered or threatened. SARA supports the federal commitments under the 1996 Accord for the Protection of Species at Risk, which outlines commitments by federal, provincial and territorial ministers to designate Species at Risk, protect their habitats and develop recovery plans as well as complementary legislation, regulations, policies and programs, including stewardship.</p> <p>ECCC has responsibilities for overall administration of SARA (subsection. 8(1)). As well, SARA defines “competent ministers” as the Minister responsible for the Parks Canada Agency (PCA) (with respect to individuals* of a wildlife species in or on federal lands administered by that Agency); the Minister of Fisheries and Oceans (with respect to aquatic species other than individuals on lands administered by the PCA); and, the Minister of the Environment and Climate Change (with respect to all other individuals of a wildlife species). Competent ministers have responsibilities regarding recovery planning, protection, permitting, and other activities identified within the legislation.</p> <p>SARA sets out a process for an independent assessment of species potentially at risk and for their consideration by Governor in Council for listing on Schedule 1 of SARA as extirpated, endangered, threatened, or of special concern. SARA requires that recovery strategies and action plans be developed by the competent minister for species listed as extirpated, endangered or threatened. Management plans must be developed for species of special concern.</p> <p>SARA also provides measures for the protection of listed threatened, endangered or extirpated species and their</p>
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			<p>residences. Under section 32 and 33 of SARA, individuals and residences of aquatic species and birds protected by the MBCA are automatically protected anywhere they are found in Canada. These general prohibitions apply to all other extirpated, endangered or threatened species listed on Schedule 1 of SARA when they are on federal lands in the provinces and on land under the authority of the Minister of the Environment and Climate Change or the Parks Canada Agency in the territories. These prohibitions can also apply on non-federal (provincial, territorial and private) lands if the Governor in Council makes an order to that effect, based on a recommendation from the federal Minister of the Environment (SARA s. 34 and s. 35).</p> <p>Based on the best available information, SARA requires an identification of critical habitat for Threatened, endangered, and extirpated species to the extent possible in a recovery strategy or action plan. SARA defines the critical habitat of a species as “the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or an action plan for the species.” Once critical habitat is identified in a final recovery strategy or action plan, SARA sets out a process to evaluate existing protection mechanisms, and if necessary, to put in place additional protection under SARA. The timelines and instruments which can be used to achieve critical habitat protection vary depending on land ownership and the species involved. SARA is designed to turn first to existing laws and initiatives before contemplating using SARA prohibitions directly, looking to federal laws when critical habitat occurs on federal land and to laws of the province or territory or Acts of Parliament including SARA when critical habitat occurs on non- federal lands.</p> <p>In an environmental assessment context, it is important that the decision maker is aware of critical habitat information, which is available on the SARA Registry, in</p>
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			<p>the area in which a project is located.</p> <p>Impacts to critical habitat:  Critical habitat is defined in SARA as habitat that is necessary for the survival or recovery of a listed wildlife species that is identified as the species' critical habitat in a recovery strategy or action plan for the species. Where a project is planned in habitat that would possess the attributes of a listed species' critical habitat, and loss of those critical habitat attributes is predicted, ECCC advises that this loss would have an adverse effect on the species if not fully mitigated. When impacts to critical habitat are considered in combination with other information on the status, threats, and life history of the species, ECCC considers that this adverse effect could potentially be significant because it would be likely to jeopardize the survival and recovery of the species. When project impacts affecting critical habitat are not avoided, successfully mitigated, or counterbalanced by offsets, this may create an adverse impact on the recovery or survival of the species with the result that ECCC may advise that the effect be considered as significant in the context of an environmental assessment. ECCC also advises that any loss of a listed species' critical habitat that is not fully mitigated has the potential to inform an opinion formed under SARA that critical habitat is not effectively protected.</p> <p>Availability of critical habitat information to inform the environmental assessment:</p> <p>Some geospatial files for posted critical habitat (posted on the Species at Risk Registry as proposed or final) are available as open data in British Columbia through the Open Data Portal at <a href="http://donnees.ec.gc.ca/data/species/developplans/critical-habitat-for-species-at-risk-british-columbia/?lang=en">http://donnees.ec.gc.ca/data/species/developplans/critical-habitat-for-species-at-risk-british-columbia/?lang=en</a> . Other, non-posted critical habitat information may be shared with the Proponent through a Restricted Data Sharing Agreement, but this rests within the discretion of</p>
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			<p>ECCC.</p> <p>While critical habitat maps are a useful tool to identify potential areas of critical habitat, they do not always constitute the complete identification of critical habitat. As well, critical habitat maps may not be available for critical habitat within draft recovery strategies that could be finalized within a timeframe that overlaps with project activities. Where maps are available, critical habitat is identified both by a geographic boundary and its biophysical attributes. In order to determine if there is critical habitat in the area of a project, a proponent needs to determine if the project is within the geographical boundary of critical habitat and if the biophysical attributes are present.</p> <p>*As defined in SARA, “individual” means an individual of a wildlife species, whether living or dead, at any developmental stage and includes larvae, embryos, eggs, sperm, seeds, pollen, spores and asexual propagules.</p>
ECCC-CWS04	<p>Volume 2 Part B 5.3 Terrestrial Wildlife and Vegetation</p> <p>Appendix 5.3-A, section 2.0, section 3.5</p>	Breeding bird surveys	<p>For all migratory bird species (including federally-assessed and –listed Species at Risk) that the Project may impact, ECCC recommends that:</p> <ul style="list-style-type: none"> <li>- Project effects be identified and assessed, and mitigation and monitoring plans be provided;</li> <li>- If a species is not identified, surveyed, and assessed as part of the Application, that a clear justification be provided;</li> <li>- Migratory bird survey data be evaluated in relation to habitat use, specifically: species abundance, distribution, and density in each habitat of the Project area, including the marine areas; and</li> <li>- Surveys be conducted in all seasons, including the winter months, in order to collect accurate baseline data</li> </ul> <p>Please see Annex II for specific IRs related to the above.</p>
ECCC-MP01	2.5.1 Project Components, Table 2-8	Disposal at sea information if/as applicable to the Project	CEPA prohibits the disposal of wastes and other matter at sea within Canadian jurisdiction and by Canadian

	Project Component Revisions		<p>ships in international waters and waters under foreign jurisdiction, unless the disposal is done under a permit issued by the Minister.</p> <p>ECCC regulates disposal at sea (DAS) under CEPA with the objective of protecting the marine environment. Regulated aspects of disposal at sea include the loading of material for disposal, the transport of that material to a disposal site and the disposal itself. The permit system allows Canada to meet its international obligations under the <i>London Convention, 1972</i> and the <i>1996 Protocol to the Convention</i>.</p> <p>Only material listed in Schedule 5 of CEPA may be considered for DAS under permit. A proposal to dispose of waste material at sea will only be considered for approval under CEPA if it is the environmentally and technically preferable means of managing that material. Meeting this requirement generally necessitates the conduct of a waste prevention audit and an alternatives assessment of waste management options (e.g. re-use, on-land disposal) including alternative DAS sites.</p> <p>Guidance related to the preparation and review of permit applications is accessible at <a href="http://www.ec.gc.ca/iem-das/Default.asp?lang=En&amp;n=0047B595-1">http://www.ec.gc.ca/iem-das/Default.asp?lang=En&amp;n=0047B595-1</a>. This guidance highlights the need to ensure potential environmental impacts on values such as fish and fish habitat, and other users of the sea, are taken into account and addressed.</p> <p>There are three regulations that further govern requirements for DAS permitting:</p> <ul style="list-style-type: none"> <li>• The <i>Regulations Respecting Applications for Permits for Disposal at Sea</i>, under CEPA, set out the application form and information requirements for submitting a permit application;</li> <li>• The <i>Ocean Dumping Permit Fee Regulations</i> (site monitoring), under the <i>Financial Administration Act</i>,</li> </ul>
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			<p>set out the permit fee for dredged and excavated materials;</p> <ul style="list-style-type: none"> <li>• The <i>Disposal at Sea Regulations</i> (<a href="http://laws-lois.justice.gc.ca/eng/regulations/SOR-2001-275/FullText.html">http://laws-lois.justice.gc.ca/eng/regulations/SOR-2001-275/FullText.html</a>), under CEPA, set out the reporting requirements for emergency dumping incidents and the action list for screening of dredged and excavated material.</li> </ul> <p>ECCC will issue a permit if the waste material fits Schedule 5, the assessment indicates that DAS is the best management option, and impacts to the marine environment can be prevented or mitigated. ECCC may inspect disposal activities and/or monitor disposal sites to inform future decision-making.</p> <p>Any sediment movement activities considered exempt from DAS permitting would still be required to meet other relevant provincial and federal legislation, such as subsection 36(3) of the <i>Fisheries Act</i>, the <i>Migratory Birds Convention Act, 1994</i> (MBCA), and the <i>Species at Risk Act</i> (SARA).</p>
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## Attachment 4: Standard Guidance

### Part A:

# Environment and Climate Change Canada Standard Guidance for Environmental Assessments

## Marbled Murrelet (*Brachyramphus marmoratus*)

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### **Purpose**

This document has been developed to assist proponents of proposed developments, as well as those responsible for reviewing proposed developments, in addressing concerns related to Marbled Murrelet (*Brachyramphus marmoratus*) that may arise in environmental assessment processes in British Columbia. The document provides the context within which the species is considered: the *Migratory Birds Convention Act* (MBCA), the *Species at Risk Act* (SARA), and the recovery strategy for Marbled Murrelet developed under SARA and published on the SARA Public Registry (<https://www.registrelp-sararegistry.gc.ca/default.asp?lang=En&n=24F7211B-1>). This document also provides recommendations regarding how to address Marbled Murrelet within the stages of the environmental assessment process.

### **Marbled Murrelet Protection, MBCA, and SARA**

#### **Marbled Murrelet under the MBCA**

Marbled Murrelet is protected under the *Migratory Birds Convention Act* (MBCA), which implements the Migratory Birds Convention between Canada and the United States and, together with the *Migratory Bird Regulations*, protects migratory birds, as populations and as individual birds.

Migratory birds, the nests of migratory birds and/or their eggs can be inadvertently harmed or disturbed as a result of many activities—including but not limited to clearing trees and other vegetation, draining or flooding land, or using fishing gear. This inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs is known as incidental take and is prohibited under the MBCA. Incidental take, in addition to harming individual birds, nests or eggs, can have long-term consequences for migratory bird populations in Canada, especially through the cumulative effects of many different incidents. For further details, please refer to the guidance on how to avoid incidental take at the website: <http://ec.gc.ca/paom-itmb/default.asp?lang=En&n=C51C415F-1>

Environment and Climate Change Canada (ECCC) further advises that proponents should be aware that construction during the nesting period for migratory birds carries with it high risks of incidental take. Many bird nests are difficult to locate, even with highly trained observers. Proponents should be aware of the risks and take appropriate action to ensure they are in compliance.

## Marbled Murrelet Recovery Strategy and Critical Habitat under SARA

The Marbled Murrelet is a small seabird that spends most of its time at sea within 0.5 km of shore. Marbled Murrelets are secretive and nest as solitary pairs at low densities, typically in old-growth forests within 30 km of the sea. In Canada, Marbled Murrelets are found only on Canada's Pacific coast. The Marbled Murrelet was assessed as Threatened in 2012 by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and is currently listed on Schedule 1 of SARA as Threatened.

The main threat to Marbled Murrelet is the direct loss of old-growth nesting habitat through forest harvesting, or clearing of land. These activities can also cause indirect impacts to Marbled Murrelet – clearing can create hard forest stand edges adjacent to remaining suitable habitat that increase opportunities for nest predator access (e.g., from crows and jays) into suitable nesting sites. It can also alter the microclimate (e.g., light, wind, moisture) necessary to support microhabitat attributes such as mossy platforms for nesting. Most of the microclimate effects occur within the first 50-100 m of forest adjacent to the hard edge.

Other main threats are related to the development of energy infrastructure, including collision risks and increases in predator concentrations. Marine threats include chronic and catastrophic oil spills; entanglement in fishing gear (mainly gill-nets); and current and future boat traffic and shipping which disrupt foraging and marine distributions.

Individuals and residences of migratory bird species listed on Schedule 1 of SARA as Threatened, Endangered or Extirpated have additional federal legislative protection under SARA wherever they are found. SARA requires the development of a recovery strategy document for such species. A recovery strategy provides strategic direction for recovering the species and, to the extent possible, identifies its critical habitat. The final federal recovery strategy for the Marbled Murrelet ([http://www.sararegistry.gc.ca/document/default\\_e.cfm?documentID=1290](http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=1290)) was posted June 3, 2014.

### Terrestrial Critical Habitat

The Marbled Murrelet Recovery Strategy includes population and distribution objectives for recovery; a partial identification of terrestrial (nesting) critical habitat; the geographical location and biophysical (ecological) attributes of that habitat; and activities likely to destroy critical habitat. Broad strategies for recovery and a schedule of studies for completing the identification of critical habitat are also included. The broad strategies captured in the Recovery Planning Table provide general approaches to achieve the population and distribution objectives (recovery) for the listed species. These measures will assist in the development of subsequent action plans to address refinement of the nesting critical habitat identification and habitat management, to better understand and mitigate marine threats, and to refine methods for tracking trends in Marbled Murrelet populations and habitat. The schedule of studies concentrates on the identification of marine critical habitat.

Critical habitat for the Marbled Murrelet is identified as that portion of the suitable habitat required for the survival and recovery of the species as specified by the population and distribution objectives in the Recovery Strategy. While Marbled Murrelets require terrestrial habitat (i.e., coniferous old-growth forest within 50 km of the ocean to support nesting) and marine habitat (0.5 to 2 km off the shore for foraging and moulting), information to identify and map suitable marine habitat was not yet available at the time of posting the Recovery Strategy in June 2014. Both habitat types, however, need to be considered in recovering and managing the species. It is important to note that marine critical habitat may be identified within a timeframe that overlaps with that of construction and operation of proposed development; ECCC recommends the Responsible Authority (RA)

ensure that the Proponent seek and consider the most up-to-date information on species at risk recovery planning in the development and implementation of project activities.

The Recovery Strategy further specifies that terrestrial critical habitat is identified as a state where greater than 70% of the 2002 suitable nesting habitat (SNH) coast-wide remains. This objective should not be interpreted as an intent to manage nesting habitat down to 70% of 2002 levels; rather, the quantification of SNH and losses over the period between the baseline year of 2002 and the present is an agreed upon starting point against which to measure progress to recovery. Based on this, and the degree of historic habitat loss, minimum retention levels for each of six conservation regions have been determined as follows:

Marbled Murrelet Conservation Region	Minimum Nesting Critical Habitat Retention Level (as a percentage of 2002 suitable nesting habitat) as described in the Marbled Murrelet Recovery Strategy
Northern Mainland Coast	68%
Haida Gwaii	68%
Central Mainland Coast	68%
West and North Vancouver Island	68%
East Vancouver Island	90%
Southern Mainland Coast	85%

Although determining Marbled Murrelet occupancy of a given area is important to avoid and lessen project impacts to the species (consistent with ss.79(2) of SARA), occupancy is not a component of the identification of Marbled Murrelet terrestrial critical habitat. Terrestrial critical habitat is identified based on habitat features within identified critical habitat polygons using the methodology described above.

Marine Critical Habitat

In the marine environment, Marbled Murrelets can be impacted by chronic and catastrophic oil spills and are also easily disturbed by the passage of boats. Proposed increases in natural resource exports via B.C. ports and increases in shipping traffic have the potential to increase risks to the species in the core of the Marbled Murrelet’s range and is likely to cause Marbled Murrelets to avoid otherwise suitable foraging habitat. While marine critical habitat has not yet been identified for Marbled Murrelet, it may be identified in an amended recovery strategy or action plan within a timeframe that overlaps with that of construction and operation of development projects. It is recommended, at all project stages, that project proponents be aware of any updates regarding species at risk, including those on the Species at Risk registry:

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

**Environmental Assessment Considerations of Marbled Murrelet Critical Habitat Destruction**

Critical habitat is defined in SARA as habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as critical habitat in a recovery document for the species.

If critical habitat is destroyed, this may affect the survival and recovery of the species in the following ways:

- reduced habitat availability and function for nesting, especially given the long time it takes for forests to develop the biophysical attributes necessary to support nesting (coniferous old-growth forests take decades to regenerate), which results in multi-generation impacts to the species;
- increased risk of predation on Marbled Murrelet and their eggs and chicks resulting from increased predator access and/or increased predator concentrations; and
- reduced reversibility of effects due to the compounding effects of long-term habitat loss, increased predation, and the biologically limiting factors of late onset of first reproduction (Marbled Murrelets do not begin to breed until they are 2-3 years of age) and low reproductive output typical of Marbled Murrelet.

In an environmental assessment context, project activities that would adversely impact the survival or recovery of Marbled Murrelet would be considered on a case by case basis. It is possible that the adverse effect would be significant if not fully mitigated because it may jeopardize the survival or recovery of the species.

## **Environment and Climate Change Canada Recommendations for Marbled Murrelet**

In order to assist project decision makers and project proponents, ECCC provides the following recommendations to help address potential impacts to Marbled Murrelet within the environmental assessment process.

### **Scoping**

#### Recommendation 1

ECCC recommends that the Proponent determine if the project has the potential to impact Marbled Murrelet, either directly or indirectly. If the project has potential to impact Marbled Murrelet, this species should be included as a Valued Ecosystem Component (terrestrial and/or marine) and included as a requirement in the environmental assessment guidelines.

#### Recommendation 2

If the project has the potential to impact Marbled Murrelet, the local and regional study areas for baseline studies should include Marbled Murrelet habitat (terrestrial and marine, as appropriate) as part of their scope, and this should be reflected in the environmental assessment guidelines.

### **Baseline**

#### Recommendation 3

ECCC recommends that the Proponent conduct baseline studies for Marbled Murrelet to determine the potential impacts of the project on Marbled Murrelet as part of the environmental assessment. Baseline studies should include, but not be limited to:

- a) an indication of which conservation region the project overlaps (refer to the Marbled Murrelet Recovery Strategy) and if there is overlap between the project and identified critical habitat polygons;
- b) a determination of whether suitable nesting habitat (SNH) for Marbled Murrelet is present within or near the project area. For guidance on this, please contact ECCC for the most up to date information. Note that identification of SNH is not dependent on Marbled Murrelet being present in the area. Identification is based on : the biophysical attributes of SNH and where potential nesting platforms occur, or where

there is an indication of likely Marbled Murrelet nesting or the presence of a nest, where a nest site is confirmed; and

- c) if suitable nesting habitat is present within or near the project area, or if a nest has been identified, Marbled Murrelet surveys during the breeding season to determine whether Marbled Murrelets are likely nesting in the project area. For guidance on the type and effort of surveys that should be conducted, please contact ECCC for the most up to date information.

## Effects Assessment and Mitigation

### Recommendation 4

ECCC recommends that the Proponent identify and describe any potential direct or indirect impacts to Marbled Murrelet and its critical habitat arising from project activities. This should include, but not be limited to:

- a) A determination of whether the project has the potential to impact SNH. This should include a description of how the biophysical attributes of SNH may be directly or indirectly impacted.
- b) Where the species has been detected, or where there is evidence of breeding, the environmental assessment should identify and describe any potential direct or indirect impacts to Marbled Murrelet, its eggs, or nests.

Where no impacts are anticipated, this should be documented as part of the environmental assessment and a rationale provided.

### Recommendation 5

ECCC recommends that the Proponent determine whether impacts to SNH would compromise the minimum nesting critical habitat retention level (including any conservation areas identified by the province, such as Wildlife Habitat Areas (WHAs)) for the conservation region where the project occurs. In particular, the proponent should consult with, and seek evidence from the province of BC in making this determination. This determination should be documented as part of the environmental assessment and include a consultation report, as well as an explanation of how the evidence was interpreted based on the following steps (A, B and C). The following only applies to terrestrial critical habitat. ECCC will provide advice on Marbled Murrelet marine critical habitat as this information becomes available through an updated recovery strategy.

#### A. CRITICAL HABITAT POLYGONS

1. Does the project have the potential to impact SNH within polygons identified as containing critical habitat for MAMU?

- If the response to A.1 is YES, proceed to step B.
- If the response to A.1 is NO, the project is unlikely to compromise the minimum nesting critical habitat retention level and no further steps are required under Recommendation 5.

#### B. MINIMUM RETENTION LEVELS

**To determine if there is evidence that confirms the minimum nesting critical habitat retention level *is compromised*:**

1. Does the project impact SNH within an area which has been designated as habitat for Marbled Murrelet (such as a Wildlife Habitat Area)?



2. Is there evidence from implicated provincial or federal authorities that indicates the potential impacts from the project would compromise the minimum nesting critical habitat retention level for the Conservation Region within which the project is located?

- **If the response to either B.1 or B.2 is YES, the advice from ECCC would be that destruction of critical habitat is likely. ECCC recommends the Proponent take a precautionary approach and avoid activities likely to destroy critical habitat, consistent with the Recovery Strategy.**

In general, where project activities may impact critical habitat for species at risk, measures to offset those impacts may be considered. However, in the case of Marbled Murrelet, offsetting all impacts is likely not possible (see further discussion of offsets below, Recommendation 6). As such, avoidance of Marbled Murrelet critical habitat remains ECCC's recommendation.

Despite the limitations of offsets in addressing impacts to critical habitat for Marbled Murrelet, in the case where avoidance is not fully incorporated into the project, a commitment by the proponent to avoid or lessen any impacts to the species and its critical habitat, consistent with the Marbled Murrelet Recovery Strategy, is still appropriate to assist the RA in meeting its obligations under ss. 79(2) of SARA.

In the context of potential impacts to critical habitat, this commitment should include measures that aim to avoid any increase in the risk to the survival and recovery of the species.

**To determine if there is evidence that confirms the minimum nesting critical habitat retention level *is not compromised*.**

3. Is there evidence from the from implicated provincial or federal authorities that indicates the potentially impacted SNH would not be used to make up the minimum nesting critical habitat retention level for the Conservation Region within which the project is located? Evidence from the province should provide a clear rationale why the SNH would not be part of the minimum retention level. The rationale should be science-based and may incorporate information from modeling and land-use planning that demonstrates how the province has come to this decision.

- **If the response to B.3 is YES, the advice from ECCC would be that destruction of CH is not likely. ECCC would, however, recommend the Proponent to take measures to avoid or lessen adverse effects to Marbled Murrelet and its habitat, and monitor those effects, consistent with the Marbled Murrelet Recovery Strategy.**

Early consultation with ECCC is recommended if any destruction of Marbled Murrelet critical habitat is anticipated as a result of project activities.

As indicated above, identification of critical habitat is not dependent on Marbled Murrelet being present; identification is based solely on the biophysical attributes of SNH in identified critical habitat polygons and the minimum retention levels.

#### Recommendation 6

ECCC recommends that the Proponent identify and describe measures to avoid, minimize, or offset for each potential impact identified. With respect to this mitigation hierarchy, the environmental assessment should describe how the hierarchy was applied and provide a rationale for moving from avoidance to minimization to offset. Given the long time it takes for forests to develop the biophysical attributes necessary to support nesting (coniferous old-growth forests with appropriate microclimate conditions take decades to regenerate), it may not be possible to fully compensate for impacts to habitat of Marbled Murrelet that would compromise the minimum retention level of critical habitat. This is because of the time lag between when impacts would occur and the time when compensated habitat would become suitable for nesting.

#### Recommendation 7

ECCC recommends that the Proponent identify and describe measures to protect and avoid harming, killing or disturbing Marbled Murrelets or destroying or taking their nests or eggs that are consistent with the MBCA and its *Regulations* as well as with the general prohibitions of SARA. Proponents should refer to ECCC's guidance to avoid Incidental Take of Migratory Birds in Canada, and in particular the section dealing with the General Nesting Periods of Migratory Birds in Canada. These advisories can be found at: <http://www.ec.gc.ca/paom-itmb>.

#### Recommendation 8

With respect to mitigating the impacts to SNH, ECCC recommends that the Proponent maintain a buffer around SNH in a manner that reduces the edge/SNH area ratio to minimize effects from hard edges such as increased predation risk and microclimate effects. Where clearing of vegetation adjacent to SNH cannot be avoided, any removal or alteration of vegetation should proceed in stages to minimize hard edge effects at any given time around the SNH area as well as at the landscape level. Note that while the measures above may help to reduce impacts to SNH from hard edges, in the case where the impacted SNH is identified as critical habitat, the mitigation measures above may still lead to destruction of critical habitat. As above, ECCC recommends avoidance of activities likely to destroy critical habitat.

#### Recommendation 9

ECCC recommends that the Proponent implement measures to avoid any increase in predators in the project area, including but not limited to waste management.

#### Recommendation 10

ECCC recommends that the Proponent identify cumulative effects of the project and other existing and future foreseeable activities in the regional assessment area on Marbled Murrelet and its critical habitat. Where no cumulative effects are anticipated, this should be documented as part of the environmental assessment and a rationale provided.

### **Monitoring and Follow-up**

#### Recommendation 11

Project monitoring should include monitoring of Marbled Murrelet and its habitat and be conducted in accordance with standardized methods, including but not limited to RISC 2001.

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Part B:

## Environment and Climate Change Canada Standard Guidance for Environmental Assessments

### Western Toad (*Anaxyrus boreas*)

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#### **Purpose**

This document has been developed to assist proponents of proposed developments, as well as those responsible for reviewing proposed developments, in addressing concerns related to Western Toad (*Anaxyrus boreas*) that may arise in environmental assessment processes in British Columbia. The document provides the context for this species under the *Species at Risk Act* (SARA). It also provides recommendations regarding how to address Western Toad within the stages of the environmental assessment process.

#### **Western Toad and SARA**

Western Toad is listed as Special Concern on Schedule 1 of SARA and is declining over much of its range (COSEWIC 2012). One of the reasons that Western Toad was assessed as Special Concern is habitat fragmentation due to resource extraction and road networks; these factors can affect the Western Toad population over a much greater area than the actual project footprint (COSEWIC 2012).

Environment and Climate Change Canada (ECCC) notes that, while this species is SARA-listed, the Province is the lead management jurisdiction for the species. Therefore, it is recommended to consult with the province of British Columbia regarding baseline studies and effects assessment for Western Toad.

Western Toad should also be considered in the context of the application of the Federal Policy on Wetland Conservation's goal of no net loss of wetland functions. Where the goal of no net loss may be relevant to a project, wetland functions that serve the Western Toad should be included as part of the wetland functions assessment.

#### **Western Toad Habitat**

##### ***Breeding Habitat***

Western Toads use aquatic habitat (ponds, stream edges, shallow margins of lakes) for breeding. They show strong breeding site fidelity, and will return to the same breeding site in successive years (Smith and Green 2005; Bull and Carey 2008). This species also uses communal breeding sites and can aggregate in large numbers at these breeding sites (COSEWIC 2012). Site fidelity and communal breeding may cause the Western Toad to only use one

or a few potential breeding sites within a relatively large area (Slough 2004), emphasizing the importance of locating and protecting these breeding sites.

During the breeding season, which occurs from late April to late May depending on latitude and elevation, adult Western Toads spend only about a week at the water and this week can vary yearly within a 1 month period, depending on the weather. The egg masses are strings that can be easily overlooked. Tadpoles school together in big black masses that can be easily seen; however, these schools sink to deeper water at a certain stage of development. These schools can also be hidden in smaller, shallower sections of the wetland.

### ***Summer Foraging and Winter Hibernation Habitat***

Western Toads use a variety of terrestrial and aquatic habitats during their life cycle. Western Toads can aggregate at all life stages, including during summer foraging and during hibernation and can therefore be vulnerable to mass mortalities (COSEWIC 2012).

After breeding, Western Toads use corridors to migrate to terrestrial habitats where they use a variety of habitat types, including marshes and riparian areas surrounding breeding sites, as well as forests, meadows, shrub lands, subalpine or alpine meadows, open forest patches, and older clear cuts (10-15 years) (Bartelt et al. 2004, COSEWIC 2012). These migration corridors are important to ensure safe movement of adults between breeding and terrestrial habitats. These corridors also provide a link between habitats; Western Toads are unlikely to move over open cleared areas to reach their breeding or terrestrial habitat. Western Toads need overhead cover, like shrubs, coarse woody debris, dense herb layers, boulders or mammal burrows, presumably to protect them from predation and desiccation (Davis 2000, Bartelt et al. 2004). Western Toads hibernate underground, below the frost line, and hibernacula include cavities under peat hummocks and spruce trees, mammal burrows and tunnels, natural crevices, under boulders, decayed root channels, Red Squirrel middens, abandoned Beaver lodges, logs, root wads, and stream or lakeshore bank cavities (Jones et al. 1998, Bull 2006, Browne and Paszkowski 2010). Most hibernation sites (68%) are communal (COSEWIC 2012).

Western Toad metamorphosis is usually complete by late July or early August. After metamorphosis, the toadlets form large post-metamorphic aggregations at the edge of the breeding sites. They also form large aggregations during their migration from the breeding sites to the terrestrial habitat (Black and Black 1969, Livo 1998, COSEWIC 2012). Identifying and protecting migration corridors are important in order to provide links between habitats and ensure safe movement of toadlets between breeding and terrestrial habitats.

Terrestrial habitats are important habitats for feeding and overwintering and the biological interdependence between terrestrial and aquatic habitats is essential for the persistence of populations (Semlitsch and Bodie 2003). Terrestrial habitats that surround wetlands are core habitats for semiaquatic species and it is important to determine and protect these areas to ensure the maintenance of amphibians (Semlitsch and Bodie 2003). Using criteria that are focused only on protecting water resources without considering habitats that are important to wildlife species, where many species spend extended periods of their time, creates a serious gap in the protection of biodiversity (Semlitsch and Bodie 2003).

## **Environment and Climate Change Canada Recommendations for Western Toad**

Subsection 79(2) of the SARA states that a person conducting an environmental assessment: “must identify the adverse effects of the project on the listed wildlife species and its critical habitat and, if the project is carried out, must ensure that measures are taken to avoid or lessen those effects and to monitor them. The measures must be taken in a way that is consistent with any applicable recovery strategy and action plans.”

In order to assist the Responsible Authority in fulfilling its obligations under SARA ss. 79(2), ECCC provides the following recommendations to help address potential impacts to Western Toad within the environmental assessment process.

## Scoping

### Recommendation 1 – Project effects :

ECCC recommends that the Proponent determine whether the project has the potential to impact Western Toad, either directly or indirectly, in their breeding and terrestrial habitats. This information can be acquired from various sources, including but not limited to: distribution maps, Conservation Data Centre data, conversations with local experts, various databases, habitat suitability mapping, and baseline studies. If the project has the potential to impact Western Toad, this species should be included as a Valued Ecosystem Component in the environmental assessment. ECCC suggests this recommendation be included as a requirement in the environmental assessment guidelines.

### Recommendation 2 – scoping

If the project has the potential to impact Western Toad, ECCC recommends that the local and regional study areas for baseline studies include Western Toad habitat (breeding, summer foraging, and winter hibernation) as part of their scope, and this should be reflected in the environmental assessment guidelines.

## Baseline Studies

The Provincial Management Plan for Western Toad in British Columbia recommends “*maintaining as much forest habitat as possible adjacent to breeding sites to allow for hibernation, foraging, and other essential life functions*” and identifies terrestrial habitat use as a knowledge gap that needs to be addressed to determine population viability and to improve best management practices (Provincial Western Toad Working Group, 2014).

### Recommendation 3 - Baseline Studies for Breeding and Terrestrial Habitat:

#### A. Breeding Habitat

ECCC recommends that baseline studies be conducted for Western Toad breeding habitat that follow Resources Inventory Committee Standards for pond dwelling amphibians (RIC 1998) (including timing and methods) during this EA, and include, but not be limited to, the following:

- a) presence/Not detected and distribution of Western Toad in the breeding habitat;
- b) identification of breeding sites;
- c) a minimum of three surveys per potential breeding site per year during the breeding season to accommodate variation in breeding timing due to weather and therefore to enhance the probability of detecting adults, egg masses and/or tadpoles;
- d) conduct surveys over multiple years to accommodate inter annual variation;
- e) identification of migration corridors used annually by adults and toadlets to move between breeding and terrestrial habitat (movement is often identified by a large number of individuals moving simultaneously between these habitats); and
- f) identification of migratory timing windows; recognizing the inter-annual variability in Western Toad migratory movements

#### B. Terrestrial Habitat

ECCC recommends that baseline studies be conducted for Western Toad terrestrial habitat during this EA. These studies could use methods such as habitat suitability mapping and/or telemetry and should include, but not be limited to, the following:

- a) determination of Presence/Not detected<sup>1</sup> and distribution of Western Toad in the terrestrial habitat;
- b) identification of summer foraging habitats; and
- c) identification of winter hibernation sites.

Semlitsch and Bodie (2003) proposed stratification around breeding habitat. Stratification should include three terrestrial protection zones next to the core aquatic and wetland habitats, namely 1) an aquatic buffer 2) the core habitat and 3) a terrestrial buffer of 50 m surrounding the core habitat to protect the core habitat from edge effect (Murcia 1995). In order to address all life stages of Western Toad and avoid impacts to the species, ECCC recommends avoidance of those activities that could destroy, alter or fragment terrestrial protection zones. As such, buffers around core wetlands and aquatic resources should therefore be at least 150-290 m to ensure the protection of a large percentage of Western Toad movement (Semlitsch and Bodie 2003, Bartelt et al. 2004). These terrestrial protection zones will assist in protecting Western Toad terrestrial summer and winter habitat.

ECCC also recommends that baseline studies for terrestrial habitat for Western Toads be conducted within a buffer of 150–290 m plus a 50 m buffer to protect the core habitat from edge effects, surrounding all potential breeding ponds within the LSA. To ensure the most effective baseline studies for Western Toads, ECCC recommends that the maximum range (i.e. 290 m + 50 m) be used and that the minimum range (i.e. 150 m + 50 m buffer) only be used if the habitat encompassed by the maximum range includes those habitats where there is certainty that it will not support Western Toads during summer or hibernation or where other factors do not allow for a wider buffer.

ECCC notes that Western Toads can travel distances beyond the proposed terrestrial protection zones and can use terrestrial habitat several kilometers from their breeding sites (Bartelt et al. 2004, Bull 2006, COSEWIC 2012). ECCC therefore recommends that, if Western Toad terrestrial habitat exists outside of the terrestrial protection zones, travel corridors be maintained to connect these zones with other terrestrial habitat.

## **Effects Assessment and Mitigation**

### Recommendation 4 – Effects Assessment:

ECCC recommends that the effects assessment for terrestrial habitat for Western Toads be conducted within the LSA within a buffer of 150–290 m (depending on buffer identified during baseline) plus a 50 m buffer surrounding all breeding ponds identified during baseline studies. The effects assessment should include a description of all potential direct or indirect impacts to Western Toad arising from project activities. This description should include, but not be limited to:

- a) the types of impact (includes the components of the project from which these impacts arise; effects on amphibians in the event of an accident or malfunction within amphibian habitat should also be included);
- b) the predicted effects of these impacts on Western Toads;
- c) the measures proposed to mitigate these effects; and
- d) the residual effects on Western Toad.

Where no impacts are anticipated, this should be documented as part of the environmental assessment and a rationale provided.

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<sup>1</sup> ECCC recommends that the precautionary principle be followed where, even if Western Toads are not observed within the terrestrial protection zones (i.e. 150-290 m + 50 m or terrestrial habitat), but are observed in the riparian/breeding habitat, the assumption is made that Western Toads occur in the terrestrial protection zones and that an effects assessment should be conducted.

### Recommendation 5 – Use of Mitigation Hierarchy

ECCC recommends that the Proponent identify and describe measures to avoid, minimize, or offset for each potential impact identified. With respect to this mitigation hierarchy, ECCC recommends that the Proponent describe how the hierarchy was applied and provide a full rationale for moving from avoidance to minimization to offset. Ultimately, mitigation measures shall eliminate the jeopardy of a species of special concern to become endangered or threatened.

### Recommendation 6 – Mitigation Measures:

With respect to developing mitigation measures, ECCC recommends that:

- appropriate mitigation measures be put in place to protect breeding and terrestrial habitat as well as migration corridors. Mitigation measures may include, but should not be limited to: setting speed limits on the road, avoidance of the area during the migration period, installation of signs to identify migration corridors, installation of wildlife crossings, fencing and access control measures;
- mitigation measures be identified to maintain water quality, as a change in water quality can have an adverse effect on amphibian populations;
- protocols be followed to ensure that diseases are not spread from one pond to another. Please see: <http://www.env.gov.bc.ca/wld/frogwatch/ecology/diseases.htm>;
- mitigation measures/protocols be developed in case of an accident or malfunction in the construction or operation phases of the proposed Project within amphibian habitat; and
- avoid formation of ephemeral ponds and ditches in the project area as they are potential population sinks. Human-created roadside ponds as mitigation measures have been shown to potentially put populations of western toad at risk of decline (Stevens and Poszkowski 2006).

ECCC further recommends the following considerations in the development of the mitigation measures:

- potential loss of habitat due to habitat fragmentation, barriers and/or disturbances or degradation of habitat be considered in developing mitigation measures.
- avoid stocking western toad breeding habitats with fish as it can introduce predation where it did not exist before

### Recommendation 7 – Salvage

Amphibian salvage and translocation should not be considered measures to mitigate the effects of habitat loss and mortality due to construction activities because the survival of translocated individuals is highly uncertain (Malt 2012). This can be explained, in part, by the fact that Western Toads have strong breeding site fidelity and will return to the same breeding ponds in successive years (Smith and Green 2005; Bull and Carey 2008). Western Toad also exhibits communal breeding behaviour. Communal breeding and site fidelity may cause Western Toad to select only one or a few of the potential breeding sites within a relatively large area (Slough 2004), emphasizing the importance of protecting known breeding sites. Despite the uncertain effectiveness of salvage, this technique may be appropriate in order to reduce direct impacts to the species and in situations where options for habitat mitigation are limited.

#### *A. Selection of Relocation Sites*

ECCC recommends that avoidance and minimization of impacts to Western Toad habitat be the first considerations. If salvage is carried out, ECCC recommends that suitable sites for potential relocations of Western Toad be identified prior to salvage activities. Identification of suitable sites should include surveys to determine whether potential relocation site(s) have the appropriate biophysical attributes for the Western Toad. ECCC recommends that the environmental assessment describe how relocation sites were selected and include, but not be limited to, the following:

- a) a rationale for the distance of relocation site from salvage site (travelling long distances should be avoided to the extent possible)
- b) a description of how presence of predators, such as but not limited to fish, was considered;
- c) a description of how the presence of existing amphibian populations and their respective densities (carrying capacity) were considered;
- d) a description of how protection from potential impacts (i.e., outside the area of impact) was considered; and
- e) a description of how the quality of habitat (equal or better habitat than salvage site) was considered.

#### *B. Salvage Operations*

Where salvage has been identified as an appropriate option and where relocation sites have been successfully identified, ECCC recommends that a salvage plan be developed as part of the environmental assessment and that this plan include, but not be limited to, the following:

- a) a description of the qualifications of the biologists who will be undertaking the salvage operations, which should include experience developing an amphibian salvage program;
- b) a description of how non-target species will be managed, which should include information on the need for an euthanization program to be put in place before the salvage operation starts in the event that a non-native species is captured;
- c) a description of the measures that will be implemented to prevent the spread of disease between wetlands;
- d) a description of the potential effects of genetic mixing between salvaged and local individuals; and
- e) a description of the monitoring measures that will be implemented post salvage to assess relocation success, which should include, but not be limited to monitoring methods and success criteria (e.g. mark-recapture at the relocation site and in the migration corridors).

#### Recommendation 8 – Cumulative Effects Assessment:

The environmental assessment should identify cumulative effects of the project and other existing and future foreseeable activities in the regional assessment area on Western Toad and its habitat. Where no cumulative effects are predicted, this should be documented as part of the environmental assessment and a rationale provided. ECCC recommends that identifying cumulative effects be included as a requirement in the environmental assessment guidelines.

### **Monitoring**

#### Recommendation 9 – Monitoring

ECCC recommends that Western Toad be included in a Wildlife Management and Monitoring Program as part of the EIS/application to assess the recovery of Western Toads and their habitats post-construction and the effectiveness of any mitigation measures, and to implement adaptive management where necessary. Some examples include: using remote cameras and time-lapse photography to assess amphibian use of passageways and the effectiveness of the installed fencing (Malt 2012), counting carcasses during roadkill surveys (Malt 2012), using of mark-recapture methods to assess the local and introduced (salvaged) populations (Malt 2012), and monitoring water quality.

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## Part C

# Black Swift - baseline survey protocol and effects assessment for Environmental Assessment

## Background

In May 2015 the BLSW was assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Endangered. The reason for this assessment is that *“Canada is home to about 80% of the North American population of this bird species. It nests in cliff-side habitats (often associated with waterfalls) in British Columbia and western Alberta. Like many other birds that specialize on a diet of flying insects, this species has experienced a large population decline over recent decades. The causes of the decline are not well understood, but are believed to be related to changes in food supply that may be occurring at one or more points in its life cycle. The magnitude and geographic extent of the decline are causes for conservation concern.”* (COSEWIC 2015). The BLSW is also a priority species in Bird Conservation Region (BCR) 10 (Environment Canada 2013). In an Environmental Assessment (EA) context, Environment Canada-Canadian Wildlife Service (EC-CWS) recommends that proponents include COSEWIC assessed species during their baseline studies and effects assessment. These species can be listed under the *Species at Risk Act (SARA)* Schedule 1 and recovery strategies and critical habitat identification can be completed in a timeframe that may overlap with Project construction. The BLSW is also protected under the Migratory Bird Convention Act (*MBCA*). Section 5.1 of the *MBCA* prohibits the deposit of a substance that is harmful to migratory birds in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area. The Act prohibits the possession of a migratory bird, nest or egg without lawful excuse. The Migratory Bird Regulations (MBR) provide for the conservation of migratory birds and for the protection of individuals, their nests and eggs. A prohibition against hunting is set out in section 5 of the MBR. The term “hunt” is given a specific definition in section 2 of the Regulations and includes attempting in any manner to kill, injure or harass migratory birds. A prohibition against the disturbance, destruction, or taking of a nest, egg or nest shelter of a migratory bird is set out in subsection 6(a) of the MBR.

## Introduction

BLSW nests on ledges or in shallow caves in steep rock faces or canyons, usually behind or near waterfalls (Lowther and Collins 2002). There is also a record of a BLSW nest in a sea cave (Legg 1956). BLSW ranges widely and forages over forest and open areas in mountainous habitats (Lowther and Collins 2002), up to 40 km and potentially up to 120 km from the nest site (Boyd 2015). In British Columbia (BC) during the Breeding Bird Atlas the BLSW was detected in mountainous areas north to the Stikine and Peace rivers, but was absent from the Haida Gwaii archipelago and the far north (Boyd 2015). In BC, the BLSW occurs at elevations from 0 – 2 600 m (Campbell et al. 1990).

There are limited nesting sites available for BLSW and the location and protection of the limited number of suitable nesting sites is essential to ensure the conservation of BLSW (Altman 2003, Levad et al. 2008). BLSW has high site fidelity (Collins and Foerster 1995, Lowther and Collins 2002, Hirshman et al. 2007, Levad et al. 2008) and some nest colonies have been active for decades (Kondla 1973, Foerster and Collins 1990, Hirshman et al. 2007), further emphasizing the importance of locating and protecting nesting sites and habitat.

## Survey protocol

Black swifts have a unique breeding ecology and standard count-based techniques (for example point counts) are not effective (Altman 2003). Even at nesting habitat, monitoring can be challenging because 1) the nest sites can be inaccessible 2) BLSW can be difficult to detect because they fly quickly and erratically and have minimal or no vocalization 3) BLSW travels large distances to forage opportunistically on flying insects and arthropods, and only appears at nesting habitat infrequently, usually leaving at first light and returning at dusk and 4) BLSW occurs in relatively low densities (Lowther and Collins 2002, Altman 2003, Hirshman et al. 2007).

Knorr (1961) described five characteristics for BLSW nesting sites and other studies have, in general, agreed with his analysis of BLSW nesting site characteristics (Hunter and Baldwin 1962, Kondla 1973, Foerster and Collins 1990). These five characteristics are (Knorr 1961):

1. Water. Water is always present, even in dry years, and can range from a rushing torrent to a trickle although the former seems to be preferred.
2. High relief. The nest sites have a commanding position over the surrounding terrain. This allows for BLSW flying out from the nest on a horizontal course to be automatically at feeding altitude above the adjacent valley.
3. Inaccessibility. The nests are inaccessible to terrestrial marauders. Nests can only be accessed by winged animals or humans with climbing gear.
4. Darkness. The nests are in such a position that the sun will not shine on an occupied nest.
5. Unobstructed flyway. The air immediately in front of nests is always free of obstructions. BLSW will fly through a narrow, twisting gorge but they will not fly through a maze of tree branches in front of their nest.

Most studies have focused BLSW surveys around nesting habitat (for example Knorr 1961, Hunter and Baldwin 1962, Kondla 1973, Altman 2003, Levad 2008) and Environment Canada (2013) also recommends that inventories be conducted at BLSW nest sites. Considering the importance of nesting sites, EC-CWS therefore recommends BLSW baseline studies and effects assessment be focused around potential nesting habitat. In identifying potential nesting habitat, it is important to conduct a literature review for information on waterfalls where BLSW have been reported and to consult ornithologists, professional and amateur, for information on BLSW occurrences and potential nest sites (Altman 2003). It is also important to review print sources and the internet to identify waterfalls in the area (Altman 2003). EC-CWS also recommends conducting habitat suitability modelling to identify potential nesting habitat. Knorr (1961) and Levad et al. (2008) can be used as guides in developing the habitat suitability model.

Once potential nesting habitat is identified, EC-CWS recommends conducting surveys at potential nesting sites following the protocol developed by Altman (2003):

*“Surveys were generally conducted during a 2-hour period prior to dusk as Black Swifts tend to concentrate nest visits at this time, and it is the best time for observing breeding adults near the nests (Foerster and Collins 1990). Most surveys were conducted by at least two individuals to enhance visual detectability and for safety reasons. Volunteers were asked to survey each waterfall once in July and once in August and record the highest number of adult individuals observed at any one time during each survey. Data sheets and instructions for data collection were provided on the web page. In addition to counting individual birds, volunteers were encouraged to look for nests and document any nesting activity. (Altman 2003 pg. 3).*

### **Observation Location**

*There are a number of factors that determine the best location for observing Black Swifts at waterfalls. In general, observations immediately at the waterfalls, and in particular at the base of the waterfalls, provides a distinct advantage for documenting Black Swift use of the falls for nesting/roosting because of the enhanced visibility for detecting birds by looking upward with the lighter sky as the background.*

*Observations at the top of the falls or out some distance away from the falls may be suitable for seeing birds from the sky down to the falls, but once the birds get down below the skyline or down to the falls, it becomes difficult to see them with the darker background. This is even more pronounced as it starts to get dark, which is when the birds are most often first appearing near the falls.*

*For some waterfalls, it is problematic and potentially dangerous to try to get to the base of the waterfalls for an observation location. This is especially true of a volunteer effort with people of various physical abilities and comfort levels in trying to get close to the falls. There is the added concern of having to walk out of the site after dark. Thus, participants were encouraged to place their safety as the highest priority and to access an*

observation point that they felt comfortable with. However, even observation points at some distance from the falls provided valuable data about Black Swift use of the area above and in the vicinity of the falls. This information can be used to then target certain falls for a closer observation point if possible, to determine if the falls are being used. (Altman 2003 pg. 5-6)

### **Evening Observation Times: Stay As Late as Possible**

One salient observation from the described experiences of volunteers and a review of the data is that at most waterfalls the birds were first detected relatively late in the evening, usually as darkness is affecting visibility. At several waterfalls, it was very dark when they first appeared and observers were only able to detect the birds because they were immediately below the falls looking into what minimal light was provided by the sky or they had night vision goggles to assist them. This has significant implications on confirming the presence of Black Swifts at waterfalls, since substantial effort in location (at the base of the falls) and timing (staying till well after sunset) may be required.

In July and through the first week of August, the earliest observation of Black Swifts at a waterfall was 8:50 PM (n=9), and in early July they first appeared as late as 9:30 PM. Birds could have been missed coming to the falls earlier, but the consistency of all the records near 9:00 PM and later suggests that this is probably typical. From early through mid-August, the first appearance at the waterfalls was between 8:10 PM and 8:50 PM (n=6) with one exception, 7:20 PM at Salt Creek Falls, OR. By late August (early September), the first appearance at a waterfall was just before 8:00 PM (n=3). Although the times of the later dates are earlier, it is getting darker earlier and the relationship of these times to sunset is about the same. These times also reflect close to 1,000 miles difference in latitude which affects the time of sunset.

It is important to note that the above times often do not reflect the first detection of Black Swifts during the observation period. Frequently (but not always), birds were seen in the sky well before appearing at the falls, and many times birds seen in the sky did not result in birds seen at the falls later. Thus, being at the observation point for the entire 2-hours is important to maximize all detections of Black Swifts.

The practical and safety issues of staying till after dark, especially for volunteers, is problematic. There were many waterfalls where the surveyors departure at 9:00 PM or earlier during July and early August may have caused them to miss the birds' arrival at the falls.

### **Seasonal Observation Timing**

Our recommended time frame for seasonal surveys of July and August seems appropriate, since birds were detected throughout that period. The earliest survey was conducted on June 30 and the latest September 8. The earliest date for a Black Swift detection was July 7, and the latest September 3. Most of the effort (approximately 70%), was between July 15 and August 21. It may be worthwhile to emphasize more effort during the early part of July, and perhaps even late June at more southern latitudes." (Altman 2003 pg. 6)

Altman (2003) also recommends the use of night vision goggles, if available, because it can enhance the ability to see BLSW.

### **An alternative method for inaccessible areas**

"An alternative to monitoring Black Swift populations where there are many waterfalls and/or they are relatively inaccessible may be to focus on **Strategic Location Counting** of Black Swift flybys rather than counting nesting birds at waterfalls. Strategic location counting of birds was tested at a few sites in Alaska and North Cascades National Park and appears to be an effective alternative to collecting data on populations where waterfalls are not accessible. These surveys should be done annually if possible using the same protocol for waterfalls (i.e., 2 hours before dark, once in July and once in August). The locations selected for these surveys should be

*strategically placed along rivers where there are waterfalls nearby or are known passage areas for Black Swifts (e.g., mouths of rivers that lead to waterfalls upstream), have good visibility in the sky overhead and up and down stream, and have safe access with minimal traffic.*

*An example of the potential data that can be collected using this technique of strategic location counting is from one of the locations in North Cascades National Park along the Skagit River where we recorded 151 Black Swifts flying mostly downstream during a 2-hour period. Knowledge of these numbers of birds in the area would not have been realized with just visits to waterfalls. Additionally, the nearly absolute directional movement of the birds (downstream in this instance) provided a significant clue in our geographic focusing of efforts on nesting waterfalls.*

*Use of strategic location counting of Black Swifts could also be used in concert with counts at waterfalls to gain a better understanding of the population in an area. If conducted annually, these surveys could provide trend information over the long-term, and be used to compare with the results of waterfall population counts, and trend information from the Breeding Bird Survey.” (Altman 2003 pg. 7)*

The protocol was developed for BLSW surveys in the Northern Pacific Rainforest Bird Conservation Region (NPRBCR; i.e., northwestern California; western Washington, Oregon, and British Columbia; and southeastern and southcoastal Alaska). The time of day to conduct surveys might need to be adjusted according to the location where surveys are conducted. It is important that, if safe, surveyors continue surveys until there is almost no light.

EC-CWS mentions that if the Strategic Location Counting is used instead of the waterfalls counts, it must be done in combination with the habitat modelling. Therefore, the “strategic location” must be chosen based on the results of the habitat modelling and if habitat modeling indicates a number of potential breeding habitats more than one “strategic location” should be chosen.

#### Effects assessment

Potential threats to BLSW include changes in stream flow and hydrology, recreation activities, forestry practices, climate change, insecticide and pesticide use and water diversion (Levad 2007, American Bird Conservancy 2013, Environment Canada 2013). During the effects assessment it is important that the proponent identify and assess the direct and indirect threats to potential nesting sites and habitat. Direct threats can include, but are not limited to, direct loss of nesting habitat or loss of nests, eggs or nestlings due to increased human access to the area and indirect threats can include, but are not limited to, clearing of forest adjacent to or elsewhere in the watershed (Altman 2003), any other activity that may impact stream flow (Altman 2003), alter hydrology (Environment Canada 2013) or activities that might result in a change to any of the five characteristics of BLSW nesting habitat.

EC-CWS fully recognizes the importance of ensuring the safety of field staff conducting the surveys. Surveys should not be conducted if there are any concerns about the safety of field staff, including those associated with accessing potential nesting habitat or hiking out of sites in darkness.

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Oct 11, 2016

Rob Hajdú  
Project Manager  
Canadian Environmental Assessment Agency  
410 – 701 West Georgia Street  
Vancouver, BC V7Y 1C6

CEAR: 54754  
ECPT: 09-1202

Dear Rob Hajdú,

**Re: BURNCO Aggregate Mine Project- Environment and Climate Change Canada Comments on Environmental Impact Statement – Part II**

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Environment and Climate Change Canada (ECCC) has reviewed the following document provided by the Canadian Environmental Assessment Agency (Agency) for the proposed BURNCO Aggregate Mine Project (the Project):

- Application for an Environmental Assessment Certificate / Environmental Impact Statement (EIS) from BURNCO Rock Product Ltd (the Proponent), dated July 2016.

The attached comments are founded on the departmental mandate with a focus on matters related to water quality:

- Attachment 1- Annex 2: Information Requests directed to the Proponent;

Thank you for this opportunity to comment. Please do not hesitate to contact me at 604- 666-7829 if you have any questions or concerns.

Yours Sincerely,

{ORIGINAL SIGNED BY}

June Yoo Rifkin  
Head, Environmental Assessment  
Attach. (1)



**ANNEX 2: Information requests directed to the proponent**

**Table 2: Comments and suggestions for information requests to be directed to the proponent**

IR Number (e.g. HC-IR-01)	Valued Component	Reference to EIS guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
<i>Environment and Climate Change Canada (ECCC)- Water Quality (WQ) 1</i>	<ul style="list-style-type: none"> <li>Surface Water Resources</li> </ul>	<i>Part B; 4.2 Select Valued Components (page 31 AIR/EIS Guidelines)</i>	Volume 4; Appendix 5.5-D Water Quality Modelling	<p>The proponent used the Maximum Authorized Monthly Mean TSS Concentration from Schedule 4 of MMER, 15 mg/L, in water quality modeling (Appendix 5.5-D, pg 12/22), rather than TSS data collected at the site of the proposed project</p> <p>In order to accurately assess the effects of the project, site-specific TSS baseline measurements should be used in water quality modelling.</p>	ECCC recommends that the proponent update water quality modelling with site-specific TSS concentrations, and provide rationale for the revised TSS concentrations selected.
<i>ECCC – WQ2</i>	<ul style="list-style-type: none"> <li>Marine Resources</li> </ul>	<i>Part B; 5.2.4 Marine Resources - Baseline condition ( page 55 AIR/EIS Guidelines)</i>	Volume 4; Appendix 5.2-A- Marine Resources Baseline Report, Figure 36 (pg. 88), Table 14 (pg. 87)	Marine habitat should be mapped using direct observations of the habitat type, rather than mapping substrate types and making assumptions about the resulting habitat.	ECCC recommends the proponent update marine habitat maps to be based on direct observation of habitat types (found in Appendix 5.2, Tables 11-13), and benthic invertebrate infauna groups (found in Appendix

					5.2, Table 20).
<i>ECCC – WQ3</i>	<ul style="list-style-type: none"> <li>Surface Water Resources</li> </ul>	Part B 5.5.3.3 Surface Water Resources - Assessment Methods (page 69 AIR/EIS Guidelines)	Volume 4; Appendix 5.5-A Surface Water Hydrological Baseline	<p>Chapman Creek records are used to establish the McNab Creek streamflow baseline. The proponent rationalizes that flows in Chapman Creek can be considered representative of flows in McNab Creek, because the McNab Creek flow monitoring station and the Chapman Creek hydrometric station have similar trends.</p> <p>Data from the McNab Creek monitoring station was collected during the period of Nov. 2011-Nov. 2012.</p> <p>Regional streamflow data from the Chapman Creek monitoring station was available for the period of 1970-1988.</p>	Given the temporal variation between the two data sets, ECCC requests a rationale for why the comparison of these data sets is appropriate, and how the proponent can be confident that Chapman Creek streamflow baseline is representative of McNab Creek streamflow baseline. Without a viable explanation, streamflow baseline trends are required from McNab Creek itself.
<i>ECCC – WQ4 260</i>	<ul style="list-style-type: none"> <li>Surface Water Resources</li> </ul>	Part B 5.5.3.3 Surface Water Resources - Assessment Methods (page 69 AIR/EIS Guidelines)	Volume 2; 5.5 Surface Water Resources; 5.5.4 Baseline Conditions (page 5.5-18)	<p>On pages 5.5-18 and 5.5-19 (Section 5.5), the proponent states that Port Mellon Station records are used to derive site-specific climate baseline parameter characterizations.</p> <p>Site-specific characterizations are provided in Appendix 5.5 for average, mean maximum</p>	ECCC recommends that the proponent provide site-specific estimates for all parameters listed on pages 5.5-18 and 5.5-19.

				and mean minimum monthly temperatures. However characterizations are missing for annual, seasonal (wet dry) and monthly precipitation; 200-year return period extreme high precipitation for various durations; and average monthly and annual evapotranspiration and evaporation.	
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