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April 23, 2020

Christine Baljko
Director – Environment & Consultation
Manitoba Infrastructure
1520-215 Garry Street
Winnipeg, MB R3C 3P3

Dear Christine Baljko,

SUBJECT: Technical Review of the Environmental Impact Statement for the Lake Manitoba and Lake St. Martin Outlet Channel Project – Information Request Round 1 Package 1

The Impact Assessment Agency of Canada (the Agency) and federal authorities are conducting a technical review of the Environmental Impact Statement (EIS) for the Lake Manitoba and Lake St. Martin Outlet Channel Project (the Project) received from Manitoba Infrastructure on March 5, 2020.

Upon review of the EIS, the Agency and federal authorities identified gaps in the information provided. This information is necessary to determine whether the Project is likely to cause significant adverse environmental effects and to inform the Agency's preparation of the Environmental Assessment (EA) Report under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012).

The Agency prepared the attached Information Request Package 1 to allow Manitoba Infrastructure to continue gathering essential information in a timely manner. A second package of information requests, informed by Indigenous groups, the public, and federal authorities, will be submitted following the close of the public comment period.

On April 3, 2020, the deadline to submit comments on the potential environmental effects of the project and any proposed measures to prevent or mitigate those effects, as described in the EIS was extended to May 25, 2020, in light of circumstances surrounding the COVID-19 public health crisis.

When responding to information requests, the Agency requests that Manitoba Infrastructure:



- consider the context and rationale for the required information for every question;
- include updated information and assessments of effects that take into account any data gathered, mitigations measures considered, analysis undertaken, and engineering and design details planned since the submission of the EIS;
- describe specific, achievable, measureable, and verifiable mitigation measures in a manner consistent with direction provided in the EIS Guidelines;
- present thorough discussions of any areas of uncertainty, applying a precautionary approach, given that some studies and plans may not be complete at this time;
- where uncertainty remains, provide clearly defined, detailed follow-up program measures, including proposed further mitigation measures; and
- present complete or summarized information and discussion within the information request responses, rather than limiting responses to references to applicable reports.

In accordance with CEAA 2012, time taken by Manitoba Infrastructure to provide the required information is not included in the legislated timeline within which the Minister of the Environment and Climate Change must make an EA decision. Issuance of this Information Request Package pauses the timeline at day 131 of 365.

The Agency welcomes the opportunity to discuss the outcome of this review with you and provide further advice on how to best address the information required to move forward with the assessment process. To this end, the Agency proposes a technical workshop with federal experts and your team to facilitate a better understanding of the expectations of the Agency and federal authorities, and to ensure complete responses to information requests. In light of recent public health recommendations, we are proposing a virtual meeting or teleconference at this time. Please contact the Agency to confirm availability for a discussion during the next few weeks. If you have any questions, please contact me at Barbara.Pullishy@canada.ca or 587-341-4350.

Sincerely,

Barbara Pullishy
Regional Director

cc:

Ruth Eden, Assistant Deputy Minister, Manitoba infrastructure
Jaime Smith, Manitoba infrastructure

Scott Johnstone, Manitoba infrastructure

Bruce Webb, Manitoba Conservation and Climate

Anjala Puvananathan, A/Director General, Impact Assessment Agency of Canada

Chelsea Fedrau, Impact Assessment Agency of Canada

Matthew Dairon, Impact Assessment Agency of Canada

Anna Kessler, Impact Assessment Agency of Canada

Attachment (1): Information Request Package 1 – Technical Review – Lake Manitoba
and Lake St. Martin Outlet Channels Project



Lake Manitoba and Lake St. Martin Outlet Channels Project - Technical Review Information Requests Round 1 Package 1 – April 23, 2020

List of Acronyms

BOD	Biochemical Oxygen Demand
CAAQS	Canadian Ambient Air Quality Standards
CBOD	Carbonaceous Biochemical Oxygen Demand
CCME	Canadian Council Of Ministers Of The Environment
CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>
COPC	Contaminant Of Potential Concern
CRA	Commercial, Recreational, Or Aboriginal
DFO	Department Of Fisheries And Oceans
EA	Environmental Assessment
ECCC	Environment And Climate Change Canada
EIS	Environmental Impact Statement
EOC	Emergency Outlet Channel
FRWCS	Fairford River Water Control Station
GCDWQ	Guidelines For Canadian Drinking Water Quality
GHG	Green House Gas
ha	Hectare
HC	Health Canada
Hr	Hour
IAAC	Impact Assessment Agency Of Canada
LAA	Local Assessment Area
LMOC	Lake Manitoba Outlet Channel
LSMOC	Lake St. Martin Outlet Channel
MAAQC	Manitoba Ambient Air Quality Criteria
MSD	Manitoba Sustainable Development
MWQSOG	Manitoba Water Quality Standards, Objectives And Guidelines
NO2	Nitrogen Dioxide
NRCan	Natural Resources Canada
PAL	Protection Of Aquatic Life
PDA	Project Development Area
PM2.5	Particulate Matter With A Diameter < 2.5 Micrometers
QA/QC	Quality Assurance/ Quality Control
RAA	Regional Assessment Area
ROW	Right Of Way
SAR	Species At Risk
SARA	<i>Species At Risk Act</i>
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
VC	Valued Component
WCS	Water Control Structure

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Reference IR#	Expert Dept. or group	EIS Guideline Reference	EIS Reference	Context and Rationale	The Proponent is Required to – Comments and potential Information Requests
Atmospheric Environment					
IAAC-01	IAAC ECCC	7.4. Mitigation Measures	6.2.4.2 Change in Ambient Air Quality - Project Mitigation Measures; 6.2.4.4 Change in Acoustic Environment	<p>Section 7.4 of the EIS guidelines require that “mitigation measures will be written as specific commitments that clearly describe how the proponent intends to implement them and the environmental outcome the mitigation measure is designed to address” and that “the EIS will also present an assessment of the effectiveness of the proposed technically and economically feasible mitigation measures”.</p> <p>Many of the mitigation measures included in the EIS do not provide sufficient detail to enable full understanding of potential residual effects. For example:</p> <p>Section 6.2.4.2 (pg. 50) Change in Ambient Air Quality, Project Mitigation Measures states “Project off-road construction equipment will comply with emission standards in the Canadian Off-Road Compression-Ignition Engine Emission Regulations”.</p> <p>Section 6.2.4.2 (pg. 50) Change in Ambient Air Quality, Project Mitigation Measures states that “equipment will not be operated...that shows excessive emissions of exhaust gases”.</p> <p>Section 6.2.4.4 (pg. 69) Change in Acoustic Environment, Project Mitigation Measures states “if noise abatement barriers are ineffective, a temporary reduction in the intensity of construction activities...”</p> <p>Clarity is required, for all phases of the project, to conclude on the significance of environmental effects related to changes to the atmospheric environment.</p>	<p>a. For mitigation measures proposed to address impacts to the atmospheric environment, provide sufficient detail to enable full understanding of potential residual effects. Include:</p> <ul style="list-style-type: none"> i. Whether all construction equipment will meet Tier 4 emission standards or if a fleet with a mix of Tier 4 and less stringent emission criteria will be deployed; ii. What is meant by “excessive emissions of exhaust gases” and indicate how this will be determined, including any inspections and the related frequency; and iii. The design and locations of the noise abatement barriers and describe what information will be used to determine if they are working effectively.

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IAAC-02	IAAC ECCC HC	7.1.1. Atmospheric Environment; 7.5. Significance of Residual Effects	6.2.2.2 Overview of Atmospheric Environment - Table 6.2-1; 6.2.4.2 Change in Ambient Air Quality; 6.2.1.4 Boundaries Project Development Area; 12.2 Atmospheric Environment	<p>EIS guidelines require the EIS to assess significance of impacts against existing environmental standards, guidelines or objectives. The EIS identifies CAAQS and MAAQC standards (Table 6.2-1) but does not consistently apply these criteria/standards throughout the assessment, including to predicted ambient concentrations.</p> <p>Short-term exposure to NO₂ and PM_{2.5} has been associated with a range of adverse health effects. These pollutants are considered to be non-threshold. Acute (short-term) concentration estimates, including an analysis of the background, project-only, and project plus background levels, were not provided. This information is required to accurately characterize the risks these air pollutants pose on human health as a result of the project.</p> <p>No rationale was provided for why predicted ambient air quality was not compared to CAAQS, which are more stringent than the MAAQC. The background concentrations for NO₂ and PM 2.5 appear to be near or exceed the CAAQS and the degree to which predicted ambient air quality could further exceed standards is not described in the EIS. This information is required to understand project changes to air quality relative to applicable standards/criteria to be able to characterize impacts to human health and the environment throughout all phases of the project, and ultimately determine significance of residual effects.</p>	<p>a. Provide an updated air quality assessment to include comparison to the short-term (1 Hr and 24 Hr) and long-term (annual) CAAQS, in addition to the MAAQC:</p> <ul style="list-style-type: none"> i. Update the air quality assessment to compare the CAAQS to predicted ambient concentrations (including background, project only and project plus background) for all relevant parameters (SO₂, NO₂ and PM_{2.5}) in the LAA and RAA. Assess the locations and frequency of any exceedances of the CAAQS standards that may occur as a result of the Project. ii. If CAAQS are exceeded, describe what mitigation measures would be employed and how follow-up and monitoring plans would be updated to consider monitoring with comparison to the CAAQS. Describe the criteria which trigger the air quality follow-up and monitoring plan, and the timing for when mitigation measures to reduce COPC concentrations would be implemented.
IAAC-03	IAAC HC	9. Monitoring and Follow up Programs	6.2.7 Follow up and monitoring; 6.2.4 Assessment of Residual Environmental Effects on Atmospheric Environment	<p>Section 9 of the EIS Guidelines requires that a follow-up program be designed to verify the accuracy of the effects assessment and to determine the effectiveness of the measures implemented to mitigate the adverse effects of the project. Further, the EIS guidelines state that follow-up programs should be used to ensure concerned/affected populations receive information on the status project impacts and related mitigation. In addition, programs should be used to obtain feedback from affected populations, including Indigenous Groups to determine appropriate mitigation measures and whether they are performing as expected.</p> <p>Throughout section 6.2.4 the EIS states that air quality effects to receptors will be reassessed and further development/refining of mitigation measures may be conducted once final design details</p>	<p>a. Provide the details of a mitigation, monitoring and follow-up plan to validate models and predictions for all aspects assessed under atmospheric environment: ambient air quality, GHG emissions, noise and light. Provide a description of how and when adaptive management strategies will be implemented, for all phases and components of the Project.</p> <ul style="list-style-type: none"> i. For the acoustic environment, describe a plan to monitor noise levels during construction phase, to validate models and predictions at key locations where human health may be impacted, such as permanent or seasonal residences.

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				<p>are determined. The EIS states that impacts to any receptors that were not initially identified in the EIS will be assessed as well.</p> <p>The EIS does not specify how potential human receptors will be engaged in the preparing of the monitoring and follow-up program nor in the undertaking of this program.</p> <p>No follow-up or monitoring is proposed for air quality, except for monitoring of the acoustic environment in the event of residential complaints related to construction noise.</p>	<p>Describe adaptive management measures that could be taken to address impacts based on monitoring results, prior to complaints being brought forward. Include a formal plan to address noise complaints, describing corrective actions and determinants used to decide whether corrective action is required, and timelines for complaint resolution.</p> <p>ii. Provide details on how follow-up and monitoring plans and programs will be communicated to concerned/affected populations within the RAA, how these populations will participate and/or be included in the plans/programs, and how they will be involved in the development of additional mitigation measures or monitoring as required.</p>
IAAC-04	HC	<p>7.1.12. Human Environment;</p> <p>7.2.1. Changes to the atmospheric environment</p>	6.2.4.1 Analytical Assessment Techniques - Table 6.2-17	<p>Section 7.2.1 of the EIS guidelines require the proponent to describe predicted changes in ambient noise levels.</p> <p>Table 6.2-17 in the EIS presents the parameters used in the noise modelling and states that the ground factor (G = 0.7) chosen was representative of the ground condition within the LAA considering summertime conditions when land is covered in vegetation. Use of this ground factor may underestimate the presence of large water bodies, winter conditions such as hard packed snow, and the lack of foliage present during fall and spring, considering the construction schedule has not yet been finalized.</p>	<p>a. Provide a justification for use of the ground factor (G = 0.7) in noise modelling with consideration to the presence of large water bodies and the potential for construction to take place in seasons other than spring. Alternatively, provide updated modelling results using ground factors that are representative of the different conditions found in the LAA and the expected construction season(s). Updated modelling should:</p> <p>i. Identify if noise model predictions at receptor locations change based on the updated ground factor; and;</p> <p>b. Provide a visual representation of the affected receptors, including seasonal and temporary residences, illustrating seasonal variations.</p>
Geology and Soils					

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IAAC-05	IAAC	7.1.2 Geology and Geochemistry	6.3.2.2 Geology Overview; 6.3.3 Project Interactions with Geology and Soils	<p>The EIS Guidelines require the geochemical characterization of blast and excavated materials such as waste rock and/or soils, and potential construction materials (e.g. borrow materials) in order to predict and mitigate metal leaching and acid rock drainage. It also requires baseline assessment of contaminants of concern that include, but are not limited to, selenium, sulphate, cadmium, nitrate and calcite.</p> <p>Geochemical assessment in the EIS is limited to desktop studies regarding potential sulphide. There has not been an assessment (desktop or otherwise) on borrow/quarry materials that may be used for construction.</p> <p>The EIS states the Project will not have interactions with geology; however, quarry material will be used to construct the project. While the EIS indicates the limestone formations in which quarries will be located, no project-specific geochemical analysis has been completed.</p> <p>Information about the characteristics of excavated and construction materials is required because associated metals leaching can adversely affect areas of federal jurisdiction, including fish and fish habitat and wildlife including migratory birds, Species at Risk (SAR) such as amphibians (northern leopard frog), and species of cultural importance.</p>	<p>a. Provide a detailed assessment for acid rock drainage and metals leaching for each formation considered as source material for construction.</p> <ul style="list-style-type: none"> i. Provide a baseline assessment of contaminants of concern. ii. Provide a sampling program that will be used to assess the suitability of quarry material for use in constructing the project. The program should outline and provide rationale for the metals suite that is used, the thresholds that are acceptable, the sampling intensity, and how waste rock will managed and stored. iii. Complete an assessment on how source material for construction may interact with the environment, including potential pathway of effects to all VC's. Present mitigation measures, including a discussion criteria for source material selection that could mitigate effects, and assess significance of residual effects. Discuss associated monitoring and follow up.
IAAC-06	IAAC	3.1. Designated project Associated works and activities; 3.2. Project Activities	6.3.1.4 Boundaries; 6.3.2.2 Geology Overview	<p>The EIS guidelines identify rock quarries and borrow sites as associated works and activities and requires a description of rock quarries and borrow areas.</p> <p>The EIS acknowledges potential project effects from quarries and borrow pits. The EIS states that the location of these project components as well as the volume and sources of aggregate needed for the Project are not known at this time, and bases the LAA for geology on potential project effects to groundwater, which could affect geology.</p>	<p>a. Present an assessment of project effects associated with the location and size of quarries and borrow pits.</p> <ul style="list-style-type: none"> i. Identify and describe existing or potential quarry and borrow pit locations, including figures, and/or identify and discuss parameters that will be considered in identifying existing and potential borrow and quarry sites.

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				<p>Quarry and borrow pit location and the volume of aggregate extracted may result in environmental effects to federal jurisdiction from the footprint of the project components including hauling requirements and associated increased SAR habitat fragmentation, increased wildlife mortality, risks to human safety (vehicle collisions), increased access, and potential impacts to current use of lands and resources for traditional purposes and to sites of importance for Indigenous peoples.</p>	<p>ii. Identify all potential pathways of effects to valued components from the construction, operation, decommissioning, and abandonment of quarries and borrow pits. Discuss mitigation measures and assess the significance of residual effects. Discuss associated monitoring and follow-up.</p>
IAAC-07	IAAC	<p>7.2 Predicted changes to the environment;</p> <p>7.2.3 Changes to riparian, wetland and terrestrial environments;</p> <p>2, 7.3.2 Migratory birds;</p> <p>7.3.3 Indigenous Peoples;</p> <p>7.3.4 Other valued components;</p> <p>7.3.5 Species at risk</p>	<p>6.3.4.2 Change in Terrain Conditions;</p> <p>6.4.4.3 Changes in Local Groundwater/Surface water Interactions;</p> <p>8.2.4.5 Change in Wetland Functions;</p> <p>8.3.6.2 Change in Habitat;</p> <p>9.2.4.3 Change in Agricultural Land Use</p>	<p>The EIS Guidelines require that predicted changes to the environment be described in terms of magnitude and geographic extent, duration and frequency, and whether the environmental changes are reversible or irreversible. The EIS Guidelines require that environmental effects due to changes to the environment are assessed as well as the interconnection between multiple VCs.</p> <p>The EIS recognizes that the Project will result in changes to terrain conditions (soil moisture regimes) and surface water/shallow groundwater (hydrologic function) in Sections 6.3.4.2 and 6.4.4.3. This is characterized as the wetting of the up-gradient environment and the drying of the down-gradient environment and effects to wetlands, vegetation, wildlife and socioeconomic factors in Sections 8.2.4.5, 8.3.6.2, and 9.2.4.3. It is acknowledged that the experience of the Emergency Outlet Channel (EOC), where impacts have been observed 1600 m up-gradient and 600 m down-gradient, is not representative of potential impacts to either the LMOC.</p> <p>The EIS infers that mitigations will be sufficient to mitigate up-gradient effects for the LMOC and partially mitigate up-gradient of the LSMOC. The EIS also notes that both channels will result in down-gradient effects to multiple VCs. The extent of the down-gradient effects is estimated to be less than 500 m perpendicular to the channels. No data or assessment is provided to justify this</p>	<p>a. Present the details of the assessment used to conclude the 500 m geographic extent of changes to the environment perpendicular to the LMOC and to the LSMOC. Include associated modelling, summarized data, and source of the data. Discuss the degree of confidence in the conclusions and any limitations of the existing data or methods.</p> <p>b. Provide an interpretation with supporting data and resource material for the magnitude, duration and seasonality, and reversibility of changes to soil moisture regimes and hydrologic function relative to baseline conditions.</p> <p>c. Provide any additional data gathered since the compilation of the EIS and provide a plan to fill information gaps in the analysis of effects.</p> <p>d. Discuss the interconnected nature of the predicted changes to soil moisture regimes and hydrologic function and the affected VCs. Include a mitigation strategy that considers the interconnected nature of the changes and resulting effects. Include an evaluation of the effectiveness of mitigations.</p>

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				<p>conclusion. Interconnections between the changes to the environment and the effects to VCs are not discussed.</p> <p>Information on the magnitude and extent of interconnected changes to the environment are required because they can adversely affect areas of federal jurisdiction - wildlife including migratory birds, SAR, and species of cultural importance, etc.</p>	
IAAC-08	IAAC	<p>3.1. Designated Project;</p> <p>5. Engagement with Indigenous Groups and Concerns Raised</p>	<p>6.3.1.3 Potential effects, pathways and measurable for Geology and Soils</p>	<p>The EIS Guidelines require the proponent to assess the potential effects of the Project on geology and soils.</p> <p>The EIS states that “Environmental effects on soils could result in changes to soil quantity and quality, which can in turn affect soil capability for vegetation communities and agriculture.” The EIS describes the LMOC portion of the LAA as predominately under natural vegetation and wetlands and not areas rated for agricultural capability. The LSMOC portion was rated using reclamation suitability classes for northern forests regions using an Alberta system. This reclamation suitability system was designed for upland soils that are predominately of the Luvisolic Soils Great Group in Alberta and not for the Organic Soils Great Group in Manitoba.</p> <p>Reclamation suitability has implications for mitigating the potential effects of the Project on the environment, including effects to wildlife and land use.</p>	<p>a. Provide rationale for the selection of reclamation suitability and discuss the applicability of a reclamation suitability system that was developed for agricultural capability for northern Alberta forest region to the LSMOC portion of the LAA which is predominately natural vegetation and wetlands. Discuss how the selected reclamation suitability will affect mitigation of effects to other relevant VCs.</p>
IAAC-09	IAAC	<p>3.1.3 topography and soils;</p> <p>3.3 terrestrial environment;</p> <p>5.4 potential effects and mitigation;</p>	<p>Throughout;</p> <p>6.4.4.3 Changes in Local Groundwater/Surface water Interactions, Page 6.167</p>	<p>The EIS Guidelines require the proponent to present existing conditions of topography, soils, and vegetation, including any anthropogenic conditions, as this baseline data informs the assessment of potential effects of the Project to the environment, including to surface water.</p> <p>The EIS states that the LAA area of the LSMOC section was semi-remote with seasonal (winter) road access and not disturbed (EIS summary Section 2.1, Page 5) and also states that the LSMOC PDA</p>	<p>a. Clarify and describe the area (ha) and type of land disturbances existing in the LSMOC sections of the PDA and LAA. If the area (ha) and type of land disturbances differ from those described in the EIS, discuss implications for the assessment of effects to all relevant VCs, including surface water.</p>

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		5.5 residual effects		<p>area was previously disturbed by human activities and previous floods (Section 6.4.4.3, Page 6.167).</p> <p>Information on existing disturbance levels is necessary to understanding baseline conditions and potential effects of the Project.</p>	
IAAC-10	NRCan	7.1.2 Geology and Geochemistry	6.3.2. Existing Conditions for Geology and Soils	<p>Section 7.1.2 of the EIS Guidelines requires a description of the bedrock geology, geomorphology, topography, and geotechnical characteristics of all areas proposed for the construction of major project components, including a cross-section of appropriate scale.</p> <p>This information in the EIS is sufficient in detail for the LMOC, which includes a cross-section (Figure 6.3B-5) showing borehole locations. However, several of the boreholes shown in the cross-section are offset from the section. No plan view map has been provided to locate these boreholes.</p> <p>The information provided in the EIS for the LSMOC is not specific to the area of construction, and no information is available for the Manitoba Hydro distribution line (although it is inferred that nearby data should be applicable). A cross section showing geology, topography, and preliminary channel design is not provided for the LSMOC.</p> <p>Cross-sections and plan view maps will demonstrate the availability of geological data required to assess effects of the channels on groundwater quantity.</p>	<p>a. Provide plan view maps showing the locations of all major project components and the locations of boreholes/drillholes used to develop the description of the geology.</p> <p>b. Provide a geological/stratigraphic cross-section in the area of the LSMOC which includes the boreholes/drillholes and preliminary channel invert, similar to Figure 6.3B-5.</p>
Surface Water					
IAAC-11	IAAC	3.2.3 Spatial and temporal boundaries; 7.1 Project Setting and baseline conditions	6.4 Groundwater and surface water;	<p>The EIS Guidelines require the proponent to describe spatial and temporal boundaries and to present information on baseline conditions that supports the assessment of the potential effects of the Project on VCs. For surface water, the EIS Guidelines require the proponent to present information necessary to understand</p>	<p>a. Provide a specific reference list for published and unpublished sources of information relevant to the RAA. Provide any reference documents not yet submitted to the Agency and/or present a summary of relevant information.</p>

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			6.4.5.1, page 6.167	<p>baseline conditions prior to the 2011 floods in the Interlake Region.</p> <p>In Section 6.4.5.1 of the EIS, the proponent provides a list of sources of data that was used to determine the RAA for surface water. On page 6.167, the proponent refers to “other published and unpublished literature relevant to the RAA and Project Activities”.</p> <p>The EIS does not present baseline surface water data pre-2011 floods of the Interlake Region as required.</p> <p>Clarity on the information used to inform the selection of RAA and baseline information on conditions is required to support a confident understanding of potential changes to surface water quality and related effects to the environment.</p>	b. Describe pre-2011 flood baseline conditions, including a summary of baseline data and relevant references, for surface water quality, flow, and drainage.
IAAC-12	ECCC	7.1.4 Groundwater and Surface Water	EIS Section 6.4.5 – Existing Conditions for Surface Water	<p>Section 7.1.4 of the EIS guidelines requires that the proponent present baseline information on sediment quality and quantity of the Project’s local watersheds.</p> <p>Section 6.4.5 of the EIS provides limited sediment quality data for Sturgeon Bay (i.e. the range of total organic carbon in Sturgeon Bay sediment). No mention is made of sediment quality in other water bodies that may be impacted by the Project (such as Lake St. Martin or Lake Manitoba).</p> <p>Overall, the characterization of baseline sediment quality is insufficient, as it is not provided for all the waterbodies potentially impacted by the Project. Given the potential for sediment transport between water bodies as an effect of the Project that would have subsequent effects on fish and fish habitat as well as fishing, existing sediment quality and quantity should be adequately characterized in order to be able to predict, assess, and detect potential effects.</p>	<p>a. Provide a comprehensive summary of sediment quality for all relevant water bodies. If relying on several sources, the information should be provided as a summary of relevant information used to establish sediment baseline data. Data should include a summary of statistics and sampling information, as well as raw data. Any gaps in existing sediment quality data should be identified and information should be provided on how data gaps will be filled.</p> <p>b. Complete an assessment of how sediment quality may interact with the environment and potential pathways of effects to fish and fish habitat and current use by Indigenous peoples.</p>

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IAAC-13	ECCC	7.1.4 Groundwater and Surface Water	6.4.5 Existing Conditions for Surface Water ; Appendix 6D Existing Conditions for Surface Water	<p>Section 7.1.4 of the EIS guidelines requires the proponent to present baseline information on surface water quality of the Project’s local watersheds. This information informs the assessment of changes to water quality as well as the baseline for an assessment of effects to fish habitat.</p> <p>In Section 6.4.5 of the EIS and Appendix D, the Proponent provides brief summaries of water quality for the main waterbodies potentially impacted by the Project. However, ECCC has identified a number of gaps in the information provided that are required to properly describe baseline surface water quality conditions, in addition to describing current baseline conditions for fish habitat.</p> <p>An accurate understanding of the existing conditions must be provided in order to adequately assess any potential changes to water quality that may occur during the construction and operation of the Project. Overall, the baseline data as presented in the EIS is insufficient to be able to assess any changes that might occur as an effect of the Project. This information is required to support full understanding of the potential effects of the project on fish and fish habitat.</p>	<p>a. Provide a specific reference list for published and unpublished sources of information relevant to baseline surface water quality. Provide any referenced documents not yet submitted to the Agency and/or present a summary relevant information, including:</p> <ul style="list-style-type: none"> i. the data used from the National Hydro Network for the RAA as listed on page 6.167; ii. NSC 2013 report referenced on page 6.170; and iii. both NSC and KGS Group 2016 a, and b reports referenced in Appendix 6D. <p>b. Provide available water quality baseline data for all parameters listed in the EIS guidelines, including any seasonal data.</p> <ul style="list-style-type: none"> i. Provide raw datasets for data used in establishment of baseline water quality. ii. Provide a map depicting the locations of monitoring stations that have been included in the baseline water quality dataset. iii. Provide a table of summary statistics for all data used in establishment of baseline that includes all parameters required under the EIS guidelines. Summary statistics should include, at a minimum, mean, standard deviation, 95th percentiles, minimum, maximum, and number of samples. This table should also include comparisons to relevant water
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					<p>quality guidelines. Summary statistics should be broken down by season.</p> <p>c. Provide a discussion on potential gaps in water quality baseline data, and if appropriate, information on how data gaps will be addressed.</p> <p>i. Discuss methodology used to screen historical water quality data for inclusion in the baseline water quality dataset. Discuss the applicability and limitation of data used, given that some historical data may not have been sampled using proper QA/QC or detection limits.</p>
IAAC-14	ECCC	7.2.2 Changes to Groundwater, Surface Water, and Fluvial Morphology	6.4.7 Assessment of Residual Environmental Effects on Surface Water	<p>Section 7.2.2 of the EIS guidelines requires the proponent to assess the changes to groundwater, surface water and fluvial morphology as a result of the project. The EIS Guidelines direct the proponent to apply the <i>Agency’s Operational Policy Statement, Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under CEAA 2012</i> when assessing the significance of the potential effects of the Project (https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/determining-project-cause-significant-environmental-effects-ceaa2012.html).</p> <p>EIS Section 6.4.7.7 provides conclusions on potential residual environmental effects of the project on surface water quality. For example, it states that “it is not expected that the operation of the LMOC and LSMOC will alter the surface water quality in the LAA beyond the range of variability already observed in these waterways” and that “the diversion of water is not expected to substantially change the water temperature in the lakes and rivers in the region.” The methodology used to assess residual environmental effects on surface water quality is not provided in sufficient detail, and the EIS does not present information to justify the conclusions drawn.</p>	<p>a. Present an updated assessment of effects of the Project on surface water quality that applies the Agency’s guidance. To support this analysis:</p> <p>i. Present a detailed description of methodology used to assess residual effects of the Project on surface water quality. Include data analyses to support/demonstrate conclusions drawn regarding residual environmental effects on surface water quality.</p> <p>ii. Address all the surface water quality and associated sediment quality/quantity parameters including:</p> <ul style="list-style-type: none"> • temperature changes in surface water as a result of groundwater-surface water interactions; • changes to surface water quality, including seasonal changes in runoff entering watercourses;

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				<p>The EIS does not appear to address all water quality parameters of the EIS Guidelines; for example the EIS does not present a quantification of potential temperature changes in surface water as a result of groundwater-surface water interactions. This information is required to understand whether potential changes from the Project to surface water quality were adequately characterized and whether predicted residual effects are accurate.</p>	<ul style="list-style-type: none"> • changes to total suspended solids (TSS), total dissolved solids, turbidity, oxygen level, water temperature, pH, dissolved oxygen, water quality including metals, methyl mercury, nutrients, algae blooms, dissolved/total organic carbon, biochemical oxygen demand (BOD)/carbonaceous biochemical oxygen demand (CBOD), pesticides, aquatic indicators, sediment quality; • temperature changes in surface water as a result of water diversion and retention; • changes to water quality and quantity and sediment quality and quantity during all phases of the Project associated with Project-related: drainage areas, flow paths, and seepage of groundwater into surface water; erosion and sedimentation; excavation, blasting, and stock-piling of materials and waste rock; wastes, wastewater, fuels, chemicals, hazardous materials, contaminated soils, including run off from agricultural lands; spills and releases; mercury methylation; metal leaching and acid rock drainage; • water quality and sediment quality changes as a result of storing water in, and releasing water from one lake to another and from the channels <p>b. Drawing upon the updated assessment in a), present an assessment of how residual effects to water quality may interact with the environment and potential pathways of effects to all relevant VCs.</p>
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IAAC-15	ECCC	<p>7.4 Mitigation Measures;</p> <p>3.2.2 Operation</p>	<p>3.5.3.4 Water Management;</p> <p>3.7.2 Construction Environmental Management Program;</p> <p>6.4.7.7 Changes in Regional and/or Local Surface Water Quality</p>	<p>Section 7.4 of the EIS Guidelines details the requirements for the Proponent’s description of mitigation measures. Section 3.2.2 of the EIS Guidelines also requires water management through each Project component, including a detailed water management plan. The EIS indicates that mitigation measures for the protection of surface water will be included in various plans and programs. The EIS does not provide the required detailed water management plan, nor any other management plans. Instead, the EIS indicates that plans will be developed in the future to address key aspects of surface and groundwater management during construction and operations. As these plans have not been provided for review, ECCC is not able to evaluate surface water quality mitigation measures for this Project, including key items such as management of sediment, shoreline erosion, management and monitoring of total suspended solids (TSS). In addition, the EIS does not appear to consider how to prevent impacts to water quality related to the use, storage, transport, and handling of ammonia-based explosives. These topics should be discussed with respect to potential effects on water quality and planned mitigation measures.</p>	<p>a. Provide all proposed plans or details of draft plans that include mitigation measures for surface water quality, including the Surface Water Management Plan and the Sediment Management Plan. Specify how the following are or will be addressed in management/monitoring plans:</p> <ul style="list-style-type: none"> i. temperature changes in surface water as a result of groundwater-surface water interactions; ii. temperature changes in surface water as a result of water diversion and retention; iii. changes to surface water quality, including seasonal changes in runoff entering watercourses; iv. changes to total suspended solids (TSS), total dissolved solids, turbidity, oxygen level, water temperature, pH, dissolved oxygen, water quality including metals, methyl mercury, nutrients, algae blooms, dissolved/total organic carbon, biochemical oxygen demand (BOD)/carbonaceous biochemical oxygen demand (CBOD), pesticides, aquatic indicators, sediment quality; v. changes to water quality and sediment quality during all phases of the Project associated with Project-related to: <ul style="list-style-type: none"> • drainage areas, flow paths, and seepage of groundwater into surface water; • erosion and sedimentation;
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					<ul style="list-style-type: none"> • excavation, blasting, and stock-piling of materials and waste rock; • wastes, wastewater, fuels, chemicals, hazardous materials, contaminated soils, including run off from agricultural lands; • spills and releases; • mercury methylation. <p>b. If any of the details requested above can not be provided at the time of response, present a discussion of the gap in information, related uncertainty with regards to potential effects and mitigation, and any additional mitigation measures and/or monitoring and follow up that will be implemented on a precautionary basis.</p>
IAAC-16	HC	<p>5 Engagement with Indigenous Groups and Concerns Raised;</p> <p>7.1.4 Ground Water and Surface Water;</p> <p>9.0 Follow-up and Monitoring Programs;</p> <p>9.2 Monitoring</p>	<p>9.5.2.2 Existing Conditions for Human Health Overview;</p> <p>Chapter 10 page 382;</p> <p>12.4.2.3 Surface Water Quality;</p> <p>12.4.1.3 Surface Water Quality;</p> <p>16.3 Key Mitigation Measures and Commitments -</p>	<p>The EIS Guidelines require the proponent to assess the effects of project activities on human health in terms of drinking and recreational water, including effects related to changes in surface water or ground water quality.</p> <p>The EIS does not present underlying studies, data or relevant calculations to support or inform the assessment of residual changes to surface water quality and related effects to drinking waters and recreational water. The EIS does not provide sufficient information on the baseline characterization of groundwater quality, especially given the reported exceedance of GCDWQ criteria (i.e. total coliforms in all samples).</p> <p>Chapter 10 of the EIS (and Vol 5, Section 12.4.1.3) states: “The [surface water quality] monitoring program being developed for the Project area waterways will include the continued collection of surface water samples from regional and local waterways and analyses of a suite of parameters that will provide information on</p>	<p>a. Provide details of the proposed surface water quality monitoring program, including GCDWQ parameters, and measures to be taken if the findings refute EIS conclusions.</p> <p>b. Provide a clear rationale if any parameters or contaminants of potential concerns (COPCs) have been scoped out from the sampling program.</p> <p>c. Identify (in table and map format) the proposed surface water locations to be sampled, how often each water body will be sampled, and how traditional knowledge was incorporated into the development of the monitoring plans.</p> <p>d. Provide a description of available groundwater samples for LMOC & LSMOC in a table and map format, including depth (e.g. near-surface groundwater samples (Surficial Aquifer) vs. bedrock (Confided</p>

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			<p>Table 16.3-1 page 16.45</p>	<p>surface water quality in the Project area during Project construction, operation and maintenance activities.”</p> <p>As this plan has not been provided for review, Health Canada is not able to evaluate surface water quality mitigation or monitoring measures for this Project, including key items such as being protective of traditional or recreational land users near the project.</p> <p>In addition, in Section 12.4.2.3 of the EIS, the proponent proposes a water quality follow-up and monitoring plan that will include a number of parameters which will be compared to Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOGs) for the protection of aquatic life (PAL), Canadian Council of Ministers of the Environment (CCME) guidelines for the protection of freshwater aquatic life, or MWQSOGs or Health Canada guidelines for drinking water. The only criteria Health Canada recognizes as being developed to be protective of human health for drinking water are the Guidelines for Canadian Drinking Water Quality (GCDWQ).</p> <p>Health Canada notes the EIS does not consider all possible sources of contaminants contributing to the exceedances of thresholds noted in the EIS for TDS, total coliforms, and manganese in groundwater. In addition, Health Canada noted a lack of strong linkage between the assessment of effects to surface water and Contaminants of Potential Concern (COPCs) during sampling programs.</p> <p>Without monitoring program/plan details, it is not clear whether or how the Proponent would: monitor for Project-related changes to surface water and ground quality; assess the effectiveness of mitigation measures; link monitoring results to adaptive management; and verify EIS predictions and conclusions.</p>	<p>Carbonate Aquifer)), and information on reported observations and parameters that exceed the GCDWQ, with consideration of potential sources of well contamination (see the 2019 Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Manganese. https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-manganese.html)</p>
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IAAC-17	ECCC	7.2.2 Changes to groundwater , surface water, and fluvial morphology; 9 Follow-up and Monitoring Programs	Section 6.4.7.5 Changes in Regional and/or Local Sediment and Debris Transport	<p>Section 7.2.2 of the EIS guidelines requires the proponent to assess the changes to sediment quality as a result of the Project. Section 9 of the EIS guidelines sets out detailed requirements regarding follow-up programs.</p> <p>EIS Section 6.4.7.5 states that there may be changes in regional and/or local sediment and debris transport as a result of the Project.</p> <p>The EIS does not provide details for monitoring of suspended sediments and sediment quality. Without these details, it is not clear whether or how the Proponent would monitor for Project-related changes to suspended sediments and sediment quality, and assess the effectiveness of mitigation measures.</p> <p>Changes to suspended sediment loads and sediment quality may affect fish and fish habitat by altering habitat, such as through silting of spawning beds. Mitigation and monitoring of sediment quality are therefore important considerations to assessing the impacts on fish and fish habitat.</p>	<p>a. Provide details of proposed monitoring plans for construction and operations that will be used to monitor for: suspended sediment levels during in-water excavation and slope contouring required to construct the LMOC and LSMOC inlet and outlet areas; release and transport of sediment from work sites to area waterways; increase in suspended sediments at inlet and outlet areas when the water control structure (WCS) gates are opened; and sediment quality changes as a result of storing water in, and releasing water from one lake to another and from the channels. Describe:</p> <ul style="list-style-type: none"> i. methods and approach to monitor suspended sediment levels and sediment quality in the Project area during construction, operation and maintenance activities, including comparison of collected samples to baseline/reference levels and to recommended guidelines; ii. methods that will be used to assess the effectiveness of mitigation measures, including erosion and sediment control measures during in-stream construction and during operations and to verify EIS conclusions. iii. action levels to trigger specific management actions to protect surface water quality during construction, operation and maintenance activities; and iv. monitoring parameters, locations, frequency, action levels, and response actions quality assurance/quality control methods.
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					<p>b. If any of the details requested above can not be provided at the time of response, present a discussion of the gap in information, related uncertainty with regards to potential effects and mitigation, and any additional mitigation measures and/or monitoring and follow up that will be implemented on a precautionary basis.</p>
IAAC-18	ECCC	7.2.2. Changes to groundwater , surface water, and fluvial morphology	<p>6.4.4.3 Changes in Local Groundwater / Surface Water Interactions;</p> <p>6.4.7.7 Changes in Regional and/or Local Surface Water Quality;</p> <p>6.4.11 Follow-Up and Monitoring;</p> <p>12.4 Groundwater and Surface Water Follow-up and Monitoring Program</p>	<p>Section 7.2.2 of the EIS Guidelines requires the proponent to assess the changes to groundwater and surface water as a result of the project.</p> <p>ECCC notes that during construction there will be active aquifer depressurization, with groundwater to be discharged to surface waters or potentially to wetlands to mitigate loss of artesian recharge of the wetlands. For discharges that are to be directed to wetlands, water quality monitoring is needed to understand the effects on vegetation and aquatic life.</p> <p>Section 6.4.7.7 of the EIS indicates expectations that the groundwater would be within Manitoba Sustainable Development (MSD) and Canadian Council of Ministers of the Environment (CCME) recommended guidelines for the protection of aquatic life. The EIS does not provide details on the monitoring frequency or actions to be taken if guidelines are exceeded.</p> <p>The Follow-Up and Monitoring Program for surface water quality includes decision thresholds in the monitoring plan, but similar thresholds are not proposed for groundwater, which will be discharged to surface waters. Details of the proposed water management and monitoring plans are required to evaluate the proposed management, monitoring, and mitigation measures.</p>	<p>a. Provide details of groundwater monitoring plans that identify groundwater quality thresholds that will be applied in groundwater quality monitoring and indicate what adaptive management actions will be taken if the thresholds are exceeded (such as changes in monitoring frequency and other actions to protect surface water quality). Include description of a monitoring program for runoff and groundwater seepage which also includes water quality thresholds for adaptive management.</p> <p>b. If any of the details requested above cannot be provided at the time of response, present a discussion of the gap in information, related uncertainty with regards to potential effects (assessment predictions) and mitigation, and any monitoring and follow up that will be implemented on a precautionary basis to verify assessment predictions as well as additional mitigation measures required to adaptively manage.</p>
Groundwater					
IAAC-19	NRCan	7.1.4 Groundwater and Surface Water	6.4.1. Scope of Assessment	<p>The EIS guidelines require the proponent to explain its rationale for the location of the spatial boundaries used in the assessment.</p> <p>The LAA for Groundwater is described as including a 20 km buffer around the LMOC and a five km buffer around the LSMOC, but no rationale is provided for the difference between the two channels.</p>	<p>a. Provide a scientifically based rationale for why a 20 km buffer has been selected for the LMOC groundwater LAA and a five km buffer has been selected for the LSMOC groundwater LAA to describe how these areas were defined.</p>

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				Rationale to explain the extent of the groundwater LAA for the two channels is required to understand the information that contributed to defining these areas.	
IAAC-20	NRCan	7.1.4 Groundwater and Surface Water	6.4.2 Existing Conditions for Groundwater	<p>The EIS guidelines require baseline information on groundwater elevations and seasonal variability in groundwater elevation including magnitude and direction of the hydraulic gradients between the interfaces of bedrock, till and surface water features.</p> <p>In the EIS Section 6.4.2.2, the presence and thickness of the glacial till unit is the primary control on groundwater recharge and discharge and groundwater surface water interactions in the RAA. While a general description of the thickness of this unit is provided for the LMOC and LSMOC, these details are not sufficient to delineate recharge and discharge areas, or potential areas of groundwater surface water interaction. For example, Section 6.4.2.2 states that 5 m to 18 m of till is present in the area of the LMOC. While the upper end of that range likely indicates an intact aquitard, 5 m of till may not be sufficient to perform as an aquitard.</p> <p>Groundwater flow patterns, groundwater recharge and discharge areas, and groundwater surface water interactions are strongly related to the thickness of the till aquitard and the location of bedrock outcrops. The spatial variations in the thickness of this unit need to be mapped to adequately assess effects of the project on groundwater quantity.</p> <p>In the area of the LMOC, several meters of the till unit likely underlie all surface water features. No information on groundwater elevations or seasonal variations within this unit has been provided. Discussion is focused on a comparison between bedrock groundwater elevations and surface water elevations in the major lakes (e.g. Figure 6.4B-4). However, the thickness of the till separating the bedrock from the lakes is not discussed, nor are the groundwater elevations within the till. As this unit is the</p>	<p>a. Provide maps of overburden thickness and bedrock topography in the LAA. Show data points used to generate the maps. Include the groundwater elevations within the till unit at both LMOC and LSMOC and in proximity to surface water features where available. Where data is not available, infer the information and provide the rationale. Where available, the locations of surface water features and groundwater springs should also be shown on this map.</p> <p>b. Provide a cross-section showing bedrock topography, overburden stratigraphy, channel inverts, channel operation levels, and groundwater elevations required for construction and operation for both LMOC and LSMOC.</p> <p>c. Provide information on the seasonal variability in groundwater elevations within the till. Describe the hydraulic conductive and groundwater elevations with the bedrock aquifer. This assessment should include information on the magnitude and direction of the hydraulic gradients between the bedrock and the till and the till and surface water features where available.</p>

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				primary connection between surface water features and the bedrock aquifer, gradients through this unit and their seasonal variations need to be understood to assess the potential effects of the Project on groundwater surface water interactions.	
IAAC-21	NRCan	7.2.2. Changes to Groundwater, Surface Water and Fluvial Morphology	11.4.1 Groundwater; 12.4.1 Purpose and Objectives; 16.2 Summary of Environmental Effects	<p>The EIS Guidelines require the proponent to assess the effects of the Project on groundwater and surface water, including groundwater and surface water interactions, and to present evidence to support conclusions drawn about these effects.</p> <p>In Section 16.2 of the EIS, under potential effects to groundwater, it is stated that water levels will decrease in the area of the Dauphin River during the construction phase of the LSMOC. This river is a significant distance north of the LSMOC (greater than the 500 m distance where effects are stated to occur). No analytical assessment was presented to demonstrate the potential for decreases in groundwater levels at this distance from the LSMOC.</p> <p>This information is required to understand the extent of changes from the Project to groundwater and surface water and associated environmental effects.</p>	<p>a. Present an assessment of the reduction in groundwater elevations associated with the construction and operation of the LSMOC. The assessment should include a discussion of potential changes in the quantity of groundwater discharging to surface water. The assessment should include:</p> <ul style="list-style-type: none"> i. A cross-section showing bedrock topography, overburden stratigraphy, channel inverts, channel operation levels, and groundwater elevations required for construction and operation. ii. An assessment of the hydraulic conductivity of the bedrock aquifer. iii. An assessment of the groundwater elevations within the bedrock aquifer. iv. An assessment of changes in bedrock and overburden groundwater levels associated with the construction and operation of the LSMOC.
IAAC-22	IAAC	7.1.4 Groundwater and Surface Water	6.4.2. Project Interactions with Groundwater; 6.4.5 Existing Conditions for Surface Water	<p>The EIS Guidelines require the proponent to identify and explain the selection of spatial boundaries.</p> <p>The EIS identifies different areas for the RAA for the soils, groundwater/geology, and surface water VCs. It is not clear how the Buffalo Lake watershed overlaps with the selected RAAs. In the EIS, the proponent refers to Appendix 6B, Figure 6.4B-8 to describe</p>	<p>a. Discuss applicability of the RAA for surface water and given Buffalo Lake watershed boundaries. If warranted, presented revised figures to demonstrate consideration of the Buffalo Lake watershed boundaries in the selection of the RAA for surface water.</p>

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				<p>the Buffalo Lake watershed. However this figure does not define the Buffalo Lake watershed boundaries. The EIS notes that defining the watershed boundary of a wetland is difficult and generally describes the Buffalo Creek watershed as consisting of Big Buffalo Lake, Little Buffalo Lake, Buffalo Creek and several small unnamed lakes, ponds and creeks as having a very complex hydrology. Understanding the rationale for the selected RAA is necessary to support the assessment of changes from the Project to water and associated effects, including effects to fish and fish habitat.</p>	<ul style="list-style-type: none"> i. Provide baseline data of the Buffalo Lake watershed including but not limited to drainage areas, flow paths, and seepage of groundwater into surface water (and erosion and sedimentation) to inform understanding of the watershed boundaries and to support understanding of changes in flows. Present an updated figure to define the likely Buffalo Lake watershed boundaries. ii. Provide field assessment data of the surface and shallow subsurface drainage flow in the LSMOC LAA considering the Buffalo Lake watershed.
IAAC-23	IAAC	3.2. Project Activities; 7.1.4 Groundwater and Surface Water	<p>6.4.4 Assessment of Residual Environmental Effects on Groundwater;</p> <p>6.4.6 Project Interactions with Surface Water Environment;</p> <p>6.4.7. Assessment of Residual Environmental Effects on Surface Water</p>	<p>The EIS Guidelines require the proponent to present information to support its assessment of potential changes from the project to wetlands and water quality and quantity, and associated environmental effects.</p> <p>The EIS notes the LSMOC will pass through the Buffalo Lake wetland and states that effects to the wetland are difficult to determine. Information presented in the EIS appears to be contradictory, making it difficult to assess the effects of the LSMOC on the surrounding wetlands. For example, the EIS concludes that changes in water level caused by the LSMOC on the wetland in proximity to the channel are expected to be similar in distance from the channel as effects from the EOC (i.e., 1600 m); that the effects of the LSMOC would be different than the effects of the EOC due to complexity of hydrology in the wetland area; and that the effects of the LSMOC would be of lesser magnitude than the effects of the EOC because the LSMOC will be constructed and operated with considerations for drainage and wetlands connectivity.</p> <p>The EIS notes the uncertainty in the effects of the LSMOC on surface water runoff, given that surface water does not flow uniformly through wetlands. The EIS states that the construction and operation of the LSMOC does not physically alter the drainage</p>	<ul style="list-style-type: none"> a. Clarify the potential effects of the construction and operation of the LSMOC on groundwater and surface water interactions, groundwater and surface water quality and quantity, wetlands. Compare these to the effects to water quality and quantity as well as wetlands of the EOC, including details of anticipated similarities, differences, and mitigation. Present analysis and modelling data, where available, to support conclusions drawn and confirm if the changes in water level caused by the LSMOC on the wetland in proximity to the channel are expected to be similar to EOC. b. Provide details of the follow-up program to confirm the predictions in the EIS regarding changes to the surface water levels in the PDA and the affected wetlands in the LAA and RAA.

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				<p>areas but the location of the LSMOC intercepts drainage from the south and east of the channel to the Buffalo Creek system. The effects of this interception are uncertain. The EIS states that mitigation measures, such as the adjustment of flows, will be applied, but does not provide details on the likely mitigation measures or their anticipated effectiveness.</p> <p>Further information is required to support an understanding of the potential changes from the Project to wetlands and water, related to the interaction of the LSMOC and Buffalo Lake, and associated effects to the environment.</p>	
IAAC-24	IAAC NRCAN	<p>7.1.4 Groundwater and Surface Water;</p> <p>7.2.2 Changes to groundwater, surface water and fluvial morphology</p>	<p>6.4.2. Project Interactions with Groundwater;</p> <p>6.4.4. Assessment of Residual Environmental Effects on Groundwater</p>	<p>The EIS Guidelines require the proponent to include current baseline information in sufficient detail to identify how the project could affect VCs and provide an analysis of those effects. The EIS guidelines require the proponent to present information to support the assessment of effects related to changes in quantity of groundwater discharging to surface water.</p> <p>Section 6.4.2.2 of the EIS states that ground water flow radiates out from uplands in all direction towards major lakes and that the aquifer likely discharges into surface water bodies, including Lake Manitoba, Lake St. Martin and Lake Winnipeg. Regarding the LSMOC, there is potential for a change in groundwater discharge rates to the lakes and small wetlands in the Birch Creek drainage system due to proximity to the LMOC. This change would be related to a reduction in groundwater elevations in the underlying till due to either a lateral connection to the LMOC, or a lowering of the bedrock artesian pressure. Prediction of bedrock drawdown related to the construction of the LMOC does not include the prediction of pressure reduction within the till unit. Without this information it is not possible to assess potential changes in groundwater discharging to surface water. The Birch Creek drainage system is in close proximity to the LMOC, however the potential for groundwater surface water interactions within this drainage system is not discussed. Without</p>	<p>a. Regarding the LMOC, provide an assessment of changes in groundwater discharge to surface water that accounts for reductions in groundwater elevations within the till as a result of lowering of groundwater pressures within the bedrock.</p> <p>i. Discuss potential for groundwater surface water interactions for the small lakes along the Birch Creek drainage system and wetlands near the LSMOC. This discussion should include an approximation of lake depth, overburden thickness, and potential seasonal variability in surface water levels as they relate to the potential for groundwater discharge.</p> <p>b. Regarding the LSMOC, complete an assessment of the reduction in groundwater elevations associated with the construction and operation of the LSMOC. The assessment should include a discussion of potential changes in the quantity of groundwater discharging to surface water. The assessment should include:</p>

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				<p>characterization of these interactions on this drainage system it is not possible to evaluate potential changes resulting from the long term operation (and associated groundwater depressurization) for the LMOC.</p> <p>Regarding the LSMOC, any changes in the quantity of groundwater discharging to surface water should also be assessed. Drop structures at the outlet end of the LSMOC will expose bedrock under artesian pressure in an area with known spring discharge. Insufficient information has been provided to assess potential changes to spring discharge or groundwater levels in the bedrock aquifer related to construction and long term operation of the LSMOC.</p>	<ul style="list-style-type: none"> i. A cross-section showing bedrock topography, overburden stratigraphy, channel inverts, channel operation levels, and groundwater elevations required for construction and operation. ii. An assessment of the hydraulic conductivity of the bedrock aquifer iii. An assessment of the groundwater elevations within the bedrock aquifer iv. A map showing the locations of spring discharge and the associated extent of groundwater drawdown resulting from the construction and operation of the LSMOC.
IAAC-25	IAAC NRCan	<p>3.2 Project Activities; 7.1.2 Geology and Geochemistry; 7.1.4 Groundwater and Surface Water; 7.2.2 Changes to groundwater, surface water and fluvial morphology</p>	<p>Throughout; 6.3.2 Existing Conditions for Geology and Soils; 6.4.2 Existing Conditions with Groundwater; 6.4.3 Project Interactions with Groundwater; 6.4.5 Existing Conditions for Surface Water;</p>	<p>The EIS Guidelines require the proponent to describe pathways of effects and present mitigation measures to support the assessment of the potential effects of the Project on groundwater and surface water.</p> <p>The EIS describes surficial geology, sediment layers, and bedrock outcrops to varying degrees of specificity throughout the EIS. Bedrock outcrops are noted along the LMOC and LSMOC, though not all are quantified through field verification. Some characteristics, including the thickness of till overburden and depth to bedrock along the LSMOC and bedrock elevation along the LMOC are not yet defined, and the EIS notes additional detail will be gathered during detailed design. Conclusions are drawn from assumptions based on information available to date. The EIS states that glacial till acts as a confining unit for the potable bedrock aquifer in the area of both the LMOC and LSMOC. In Sections 6.4.4.2 and 6.4.4.3, the EIS states that the construction</p>	<ul style="list-style-type: none"> a. Provide any additional information being collected for the engineering design that will identify the areas of exposed bedrock and areas of thin till over the aquifer within the PDA that could cause blowouts during construction and operations and alter surface drainage patterns and flows. b. Include a map of overburden thickness and potential bedrock outcrops location for both the LMOC and LSMOC. c. If no additional information has been collected for the engineering design regarding locations of bedrock and/or thin till, provide the confidence level of understanding of presence of bedrock and thin till areas over the aquifer for successful engineering design.

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			<p>6.4.6 Project Interactions with Surface Water Environment;</p> <p>6.4.7 Assessment of Residual Environmental Effects on Surface Water;</p> <p>8.2.3 Project Interactions with Vegetation</p>	<p>of the LMOC and LSMOC will intersect with the carbonate aquifer that is under high artesian pressure in the region close to Lake Winnipeg. In the LMOC, the piezometric head can be up to 5 m above ground level. As the till is under pressure, there is a risk that the water pressure will break through the till – this is known as “blowout”. These locations in the vicinity of the water control structure are where the till could be breached during construction and can cause blowouts. Blowouts have the potential to contaminate wells under artesian pressure or wetlands with flooding surface water.</p> <p>Also, it was noted that the permanent water in the channel will act as a counterweight on till to prevent blowouts. In the north section of the LMOC, passive depressurization was stated to be required by developing pressure relief wells along the channel to remove water and pressure where till and remaining water is not enough to maintain safe ground pressure.</p> <p>Overall, the potential for blowouts (pressure break through till) during construction is not clearly described in the EIS. This can affect installed wells (domestic and livestock) which are only under natural artesian pressure. The EIS states that some wells may have piezometric head impacted to a large enough degree to require mitigation.</p> <p>Information on geological features along the outlet channels, including the remaining thickness of the till unit following construction of the channel, is important for the assessment of the potential for blow-out of the till. This information is necessary to understand potential changes of the project to water and wetlands, and associated environmental effects.</p>	<p>d. Describe how piezometric head data for the LSMOC LAA, including areas of thin till over carbonate bedrock aquifer and bedrock outcrop areas, was used to confirm the findings of the assessment.</p> <p>e. Describe potential design alterations or potential measures to mitigate the effects of groundwater/surface water interactions, if required. This can effect wetland habitat as well as water supply in wells.</p>
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IAAC-26	ECCC HC	7.1.4 Groundwater and Surface Water	6.4.2 Existing Conditions with Groundwater	<p>The EIS guidelines require baseline information on groundwater quality to support understanding of the potential changes from the Project to water quality and associated effects to the environment.</p> <p>The EIS provides information on groundwater quality from sampling programs completed between Fall 2016 and Spring 2018 in the Lake Manitoba Outlet Channel Project Development Area. The EIS does not provide the locations of groundwater monitoring wells used to establish baseline data. Therefore, it is unclear where the sampling sites are located in relation to the Project components and whether they provide an accurate representation of relevant baseline groundwater quality. No groundwater quality data was collected along the LSMOC section. This information is required to review project residual effects.</p> <p>In the EIS, Table 6.4-7 only provides the maximum and minimum results; no summary statistics or information on number of samples is provided. The range of values alone does not provide enough information to adequately determine the baseline groundwater quality conditions and additional summary statistics are required.</p> <p>This information is required to understand whether baseline groundwater quality is accurately characterized for the Project Area. Accurate baseline data is necessary to assess the potential effects of the Project on groundwater quality.</p>	<p>a. Provide groundwater quality baseline date for the LSMOC assessment areas or provide rationale or justification why the groundwater sampling program has not been conducted along the LSMOC.</p> <p>b. For both LMOC and LSMOC assessment areas:</p> <ul style="list-style-type: none"> i. Clearly indicate the methodology used to include historical groundwater quality data in the baseline groundwater quality dataset; ii. Provide raw baseline groundwater quality data, including sample depth; iii. Provide summary statistics for groundwater quality, which should include, at a minimum: mean, standard deviation, 95th percentiles, minimum, maximum, and number of samples; iv. Provide a map depicting the locations of monitoring stations that have been included in the baseline groundwater quality dataset; v. Identify the potential gaps in groundwater quality baseline data, and indicate how data gaps will be addressed. Discuss implications of data gaps for conclusions drawn, uncertainty, and additional follow up and monitoring that would be implemented to address uncertainty in a precautionary manner.
IAAC-27	NRCan	7.2.2 Predicted Changes to Groundwater	1.1 Introduction (EIS Summary); 6.4.4. Assessment of Residual Environmental	<p>The EIS guidelines require the proponent to present information about the potential effects of the Project on groundwater, including associated effects to nearby groundwater users. The EIS guidelines require modelling to support predicted changes to groundwater elevations.</p>	<p>a. Provide the rationale for the selection of a ten month period for the calculation of construction phase drawdown.</p>

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			Effects on Groundwater	<p>With respect to the construction phase of the project, the EIS states that groundwater drawdown associated with construction dewatering is predicted to last for a period of ten months. However, the project summary states that construction would occur over a three year period. Drawdown following ten months of construction is provided for three km and five km from the LMOC based on modelling results shown in KGS 2017a, Deliverable D6. The method and assumptions used for this modelling are not discussed in the EIS or in KGS 2017a. The results do not appear to account for the potential for interaction between the till and the bedrock aquifer.</p> <p>Details on the assumptions and methods used in the modelling are required to review the results presented. Representation of the potential for hydraulic head drawdown in the till are needed to evaluate the potential for changes to groundwater surface water interactions. The timing and duration of the dewatering of both the LMOC and LSMOC is needed to understand the potential impacts of groundwater drawdown on nearby groundwater users, during construction.</p>	<p>b. Provide a detailed description of the modeling used to evaluate the drawdown associated with the construction phase of the project.</p> <p>i. Describe the assumptions used in the model as they relate to the hydrogeological context of the project.</p> <p>c. Evaluate the potential lowering of groundwater within the till based on the dewatering of the bedrock aquifer.</p>
IAAC-28	NRCan HC	7.1.4 Groundwater and Surface Water; 7.2.2 Predicted Changes to Groundwater; 9.2 Monitoring	6.4.4 Assessment of Residual Environmental Effects on Groundwater; 12.4. Groundwater and Surface Water	<p>The EIS guidelines require the proponent to present information on the potential effects of the Project on groundwater, including associated effects to drinking water quantity.</p> <p>Section 6.4.4.2 of the EIS states that the maximum potential for drawdown at drinking water wells will be less than 3 m, which is within the seasonal variability of water levels in the area. It is then concluded, based on these results, that the Project would have no impact on domestic well operation during the construction phase of the project. This conclusion is based on the assumption that all drinking water supply wells have greater than 3 m of available drawdown during dry periods of the year. No supporting evidence has been provided to demonstrate that available drawdown is sufficient to handle drawdown during the</p>	<p>a. Discuss the likely available drawdown for domestic wells within the LAA for the LMOC. Provide updated figures that show the predicted drawdown contours based on the modeling.</p> <p>b. Provide an assessment of potential risks to the confined carbonate aquifer (a potential source for drinking water) and possible mitigation measures to minimize the potential for contamination to influence the water quality of the aquifer.</p> <p>c. Discuss the feasibility of drilling new (deeper) groundwater wells in terms of the potential depth required, and the potential quality and quantity of water at this greater depth.</p>

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			<p>construction phase. If available drawdown is not sufficient, drinking water wells may go dry during the construction phase.</p> <p>Additionally, as shown on Figure 6.4B-5, many domestic wells are within the three km buffer surrounding the LMOC. These wells may experience more than three m of drawdown based on the results provided on Plate D6-5, of Deliverable 6 (KGS, 2017a).</p> <p>Regarding groundwater quantity throughout all phases of the project, the EIS does not contain sufficient information on the alignment of the LSMOC to adequately assess potential impacts on groundwater. With respect to the LMOC, the EIS states that there is potential for perpetual passive dewatering north of the control structure. The EIS states that the associated drawdown would be lower than during the construction phase, and within the ROW for the LMOC. The required groundwater elevations during the operations phase are not provided on KGS 2017a Deliverable D5, Plate D5-10. Details on the assessment of drawdown extent associated with this passive dewatering are not provided in KGS 2017a. The information provided is not sufficient to confirm that the long-term passive dewatering will not affect drinking water wells.</p> <p>In Section 6.4.4.2, the EIS states that the surficial aquifer is not suitable for drinking water purposes because it is too shallow, but the overall quantity is enough to provide water to wetlands in the LSMOC area (page 6.151). The proponent has committed to conducting further aquifer investigation and modelling to determine the effect of construction dewatering on specific private wells in the potentially affected area of the LMOC. The proponent also stated that observation wells will be installed prior to construction dewatering to monitor the effects in the area during dewatering of each section during construction.</p> <p>An outline of the monitoring plan should be included in the EIS. This outline should include a description of monitoring locations</p>	<p>d. Include an analytical assessment of groundwater drawdown associated with the passive dewatering during the operations phase of the project. The assessment should be completed for steady-state conditions, and should consider the potential range in required drawdown based on the range in operating levels in the LMOC.</p> <p>e. Provide details of the additional investigations and modelling proposed for the Groundwater Management Plan. Include information on groundwater wells to be used in the follow-up program to monitor the effects on groundwater quality. Include a discussion of likely groundwater level monitoring locations, and depth interval. The discussion should also include the intended purpose of the monitoring location.</p>
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				<p>where foreseeable. This information is not provided in Section 12.4.1.4.</p> <p>This information is required to evaluate the potential for the Project to interact with groundwater that may be used as drinking water and to determine requirements for mitigation.</p>	
IAAC-28	NRCan	7.1.4 Groundwater and Surface Water	6.4.2. Existing Conditions for Groundwater	Incorrect labelling of the wells in EIS.	<p>a. Clarify the discrepancy between the text in the EIS describing Manitoba Water Resources Branch Wells WRB122050 and WRB116766 and the information in Figure 6.4B-3.</p>
Fish and fish habitat					
IAAC-29	DFO	3.1 Designated Project; 7.6.3 Cumulative effects assessment	3.4.3.1 Outlet Channel; 3.5.3.1 Operation Criteria; 3.5.4.1 Permanent Facilities; 6.4.7.2 Changes in Regional Flow and Water Levels; 6.4.7.4 Changes in Local Drainage Areas and Local	<p>Section 7.6.3 of the EIS guidelines requires the assessment of cumulative effects of the project in combination with other physical activities that have been or will be carried out.</p> <p>The EIS states the Lake St. Martin Emergency Outlet Channel (EOC) will neither be incorporated as part of the Project nor decommissioned as part of the Project. The EIS explains that decommissioning is not currently planned but lacks clarity on what will be done with the EOC. The EIS states both that the EOC will only be used in the future under exceptional emergency conditions and also that the EOC is not expected to operate for flood control after the construction of the LSMOC. The EIS also states that repurposing of the EOC may occur to allow additional flows to the Buffalo Lakes and Buffalo Creek from Lake St. Martin and would potentially replace any flows lost from interception of wetland flows to the creek.</p>	<p>a. Clarify if there are plans for the EOC, including conditions under which it would be operated, plans for repurposing, and considerations for potential future decommissioning.</p> <p>b. Describe how the cumulative effects assessment accounts for the plans described in response to a) as reasonably foreseeable future physical activities or provide an updated discussion of cumulative effects associated with the EOC and the Project.</p>

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			Drainage Patterns; 11.5.1 Project Residual Effects Likely to Act Cumulatively	Information about the intended operation, repurposing, and/or decommissioning of the EOC is required to confirm appropriate scope of the Project and potential cumulative effects.	
IAAC-30	DFO	7.1.3 Topography and Soil; 7.2.2 Changes to groundwater, surface water, and fluvial geomorphology; 7.3.1 Fish and Fish Habitat	3.5.2.13 Revegetation	<p>Section 7.1.3 of the EIS guidelines requires the proponent to identify potential for soil instability and erosion as a result of the Project. In addition, Section 7.2.2 requires the proponent to consider the predicted changes to surface water quality as a result of erosion and sedimentation, and Section 7.3.1 requires the identification of potential adverse effects to fish and fish habitat, including as a result of water quality and sediment quality changes from storing water in and releasing water from the channels.</p> <p>Section 3.5.2.13 of the EIS states that revegetation is required to mitigate the potential for surface water erosion, and that revegetation activities will include test plots using varying soil thickness and soil amendments that are being installed in the Project region and monitored over the summer of 2019 in order to optimize vegetation growth on the channel slopes. The EIS also indicates that Erosion and Sediment control plans for the channels will be developed and will include information on revegetation.</p> <p>Further information on potential erosion rates under maximum flow conditions is required to assess the effects of the Project on fish and fish habitat.</p>	<p>a. Provide information on potential erosion rates under maximum flow conditions, and the potential effects of erosion to fish and fish habitat.</p> <p>b. Describe associated mitigation measures, including a discussion of the effectiveness informed by the test plot studies, and assess significance of residual effects to fish and fish habitat.</p> <p>c. Discuss associated monitoring and follow up.</p>
IAAC-31	DFO	7.3.1 Fish and Fish Habitat	3.5.3.5 Ice Management; 6.4.7.4 Changes in Local Drainage Areas and Local Drainage Patterns	<p>Section 7.3.1 of the EIS Guidelines direct the proponent to assess potential changes to water quality and effects to fish and fish habitat resulting from the Project, including from storing water in the channels.</p> <p>Sections 3.5.3.5 and 3.4.3.1 of the EIS state the following, regarding water in the outlet channels:</p>	<p>a. Provide information regarding under-ice water quality and fish survival in the LMOC and LSMOC.</p> <p>i. Provide water quality information for the outlet channels under minimum flow and maximum ice-cover winter conditions.</p> <p>b. Complete an assessment of the potential effects of the Project on fish and fish habitat from changes in water</p>

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				<ul style="list-style-type: none"> • Solid cover of ice will form within both channels, lake type ice cover and could reduce the capacity of the LMOC. • A limited discharge from Lake St. Martin may be conveyed through the LSMOC water control structure to maintain adequate water flow and water quality in the channel when the WCS gates are essentially closed, and to sustain water quality within parameters required for fish and other aquatic life. • During non-flood operations, when the WCS gates are closed (70% to 87% of the time, depending on the month), there will be an approximately 1 m to 2.5 m depth of water in the channel, as a minimum, with average velocities typically less than 0.1 m/s depending on base flow. The deepest areas will be located immediately upstream of drop structures. <p>Survival of fish in the outlet channels during the winter when the channel is ice-covered and flow depth and velocity are limited is a concern.</p>	<p>quality in the LMOC and LSMOC. Describe associated mitigation measures and assess significance of residual effects. Discuss associated monitoring and follow up.</p>
IAAC-32	DFO	7.1.7 Riparian, Wetland and Terrestrial Environments	6.4.7.3 Changes in Regional and/or Local Fluvial Geomorphology and Shoreline Geomorphology	<p>Section 7.17 of the EIS guidelines requires the proponent to characterize the shoreline and banks that are likely to be affected by project activities.</p> <p>Section 6.4.7.3 of the EIS identifies the waterbodies of which shorelines and banks may be affected by the project and describes potentially affected shorelines and banks at a high level. The EIS states that additional studies are planned as part of ongoing detailed design and include the collection of additional shoreline data to aid in detailed design and reduce changes to shoreline geomorphology where possible.</p> <p>The results of the studies mentioned in the EIS and the mitigation associated with engineering design are important to predicting residual impacts of the project on fish and fish habitat.</p>	<ol style="list-style-type: none"> Present the results, or preliminary results of studies related to shoreline geomorphology. Present the results, or preliminary results, of the engineering designs intended to mitigate effects to shoreline geomorphology. Using study results, assess the potential effects of changes to hydraulic conditions and sediment transport on fish and fish habitat. Describe applicable mitigation measures and assess significance of residual effects. Discuss associated monitoring and follow up.

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IAAC-33	DFO and IAAC	7.1.5 Fish and Fish Habitat 7.3.1 Fish and Fish Habitat	7.2.1.4 Potential Effects, Pathways and Measurable Parameters 7.2.1.7 Significance Definition	<p>Section 7.3.1 of the EIS guidelines requires that the effects of changes to the aquatic environment on fish must be assessed, including the anticipated changes in the composition and characteristics of the populations of various fish species. In Section 7.2.1.4 of the EIS, the proponent has indicated that the focus of the fish and fish habitat assessment is on Project activities or components that may affect fish and fish habitat that are part of or that support commercial, recreational, or Aboriginal (CRA) fisheries. Four CRA fish species in particular have been identified for the assessment that “have unique life history (e.g., spring spawning) and habitat requirements that cover the range of life histories and habitat requirements for other CRA fish species in the LAA and RAA.”</p> <p>Section 7.2.1.7 of the EIS defines significant effects to fish passage as “an irreversible, measurable reduction of critical upstream or downstream movements (i.e. spawning runs) of CRA fish species”. Both the 2013 and 2019 Fisheries Act and their respective policy statements define migration areas more broadly as a component of fish habitat. Fishes certainly migrate to spawn but they also migrate at other times, such as to feed or for other reasons.</p> <p>Under the new Fisheries Act, protections are afforded to all fish species and not just CRA fish species. Further, the effects to fish and fish habitat under CEAA 2012 are not limited to CRA fisheries. Consideration of all potentially affected species is necessary for a full understanding of potential effects to fish and fish habitat.</p>	<p>a. Discuss the applicability of the effects assessment to fish and fish habitat to all fish species present in the LAA and RAA. Demonstrate that the CRA species used in the assessment are adequately representative of the unique life history and habitat requirements of all fish species in the LAA and RAA.</p> <p>i. If it is determined that the CRA fish species used in the assessment do not cover the unique life history and habitat requirements of all fish species in the LAA, complete an assessment of the potential for the Project to impact all fish species. Describe mitigation measures and assess the significance of residual effects. Discuss associated monitoring and follow up.</p> <p>b. Discuss the effects of the Project on fish passage applying a broader definition of migration (i.e. fish movements possible within the current system).</p>
IAAC-34	DFO	7.5 Significance of Residual Effects	7.2.1.7 Significance Definition, 7.2.5 Determination of Significance; 7.2.5.1 Significance of	<p>Section 7.5 of the EIS guidelines requires that “the EIS provide a detailed analysis of the significance of the residual environmental effects that are considered adverse following the implementation of mitigation measures, using guidance described in Section 4 of the Agency’s Operational Policy Statement, Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under CEAA 2012” (https://www.canada.ca/en/impact-assessment-</p>	<p>a. Discuss the potential for the Project to result in significant adverse effects to fish and fish habitat, and present a significance determination, applying the criteria and methodology described in the Agency’s guidance. Discuss the use of not fully avoided or mitigated death of fish or harmful alteration, disruption, or destruction of fish habitat as a threshold of significance.</p>

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			<p>Residual Environmental Effects from the Project</p> <p>Table 16.2-1 Summary of Environmental Effects; Fish and Fish Habitat; Permanent alteration or destruction of fish habitat</p>	<p>agency/services/policy-guidance/determining-project-cause-significant-environmental-effects-ceaa2012.html).</p> <p>It is unclear in the EIS how the significance of residual effects to fish and fish habitat is characterized. Table 16.2-1 provides only a single residual effects characterization and significance determination for all fish and fish habitat residual effects.</p> <p>It should be noted that under the Fisheries Act, a Fisheries Act authorization is required when the prohibitions against death of fish and/or the harmful alteration, disruption or destruction of fish habitat cannot be avoided or fully mitigated. This could be considered as a potential threshold of significance.</p> <p>Information on the proponent’s assessment of significance is required to understand the conclusions drawn regarding the effects of the Project on fish and fish habitat.</p>	
IAAC-35	IAAC	7.1.5 Characterization of fish populations	<p>7.2.2.1 Methods</p> <p>7.2.2.2 Fish and Fish Habitat</p>	<p>Section 7.1.5 of the EIS guidelines requires that the proponent provide a description of primary and secondary productivity in affected water bodies with a characterisation of season variability.</p> <p>Section 7.2.2.2 of the EIS provides some primary and secondary productivity data for some but not all affected waterbodies in the LAA and RAA, and characterisation of season variability is missing.</p> <p>The sources of baseline information for primary and secondary productivity referenced in the text (Section 7.2.2.2) are not described as they are in Section 7.2.2.1 for Fish Inventories, Habitat Use Surveys, and Fish Habitat Assessments.</p> <p>This information is required to understand the assessment of effects to fish and fish habitat.</p>	<p>a. Clearly describe the sources of baseline data for primary and secondary productivity, including the methodologies used for data collection.</p> <p>b. Provide a description of primary and secondary productivity with a characterization of season variability for LAA waterbodies.</p>
IAAC-36	DFO	7.1.5 Characterization of fish populations	<p>7.2.2.1 Methods</p> <p>7.2.10.1 Literature Cited</p>	<p>Section 7.1.5 of the EIS Guidelines requires the proponent to describe the fish surveys carried out and the source of data available (e.g. location of sampling stations, catch methods, date of catches, species, catch-per-unit effort) for characterization of fish populations.</p>	<p>a. Provide an analysis of baseline collection methods for the studies cited in the EIS. Similarities and differences should be provided. Provide a discussion on the validity of conclusions in the EIS if disparate methodologies were applied.</p>

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			7.2.7 Prediction Confidence	<p>Section 7.2.2.1 of the EIS includes a list of fish inventories, habitat use surveys, and fish habitat assessments that were used to develop the existing conditions for fish habitat in the RAA and LAA. The proponent has also indicated that “Descriptions of the methods used to conduct the fish habitat assessments, bathymetric and substrate surveys, benthic invertebrate surveys, and fish community inventories are provided in the technical</p> <p>Reports identified above and listed in the reference section of this assessment.”</p> <p>Section 7.2.7 of the EIS states that “additional data will be required, prior to construction, to address potential changes to the Project coming out of detailed design and to ensure that the baseline is adequate for an effective aquatic effects monitoring program.” With the information presented in the EIS, it is difficult to determine if baseline data collected used similar methods.</p> <p>Further information provided on the baseline collection methods, including an analysis of similarities and differences between methods, is required in order to understand how data collected using various methods was integrated for the analysis of effects to fish and fish habitat.</p>	<p>b. Describe proposed further baseline studies methodology and provide any available results or preliminary results. Consider and discuss the need for additional mitigation, including offsetting, to address uncertainties, given baseline data limitations.</p>
IAAC-37	DFO	7.4. Mitigation measures 7.3.1 Fish and fish habitat	7.2.1.2 Influence of Engagement on the Identification of Issues and the Assessment Process 7.2.4.2 Permanent Alteration or Destruction of Fish Habitat	<p>As stated in Section 7.4 of the EIS Guidelines, the EA must include mitigation measures to eliminate, reduce or control the adverse environmental effects of a designated project, as well as restitution for damage to the environment through replacement, restoration, compensation or other means.</p> <p>The EIS states that “The Project will mitigate any permanent alteration or destruction of fish habitat caused by building the channels through creating new fish habitat in the LMOC and LSMOC. When completed, the LMOC and LSMOC will provide at least 172 ha of new fish habitat; 72 ha in the LMOC and 100 ha in the LSMOC.”</p> <p>The EIS also states that the potential need for measures to offset residual Project effects will be addressed in the Fisheries Act</p>	<p>a. Provide details pertaining to mitigation of effects to fish and fish habitat, including offsetting.</p> <p>i. Discuss the proposed offsetting relative to the habitat types affected by the project and update the assessment of residual effects to fish and fish habitat;</p> <p>b. Discuss the degree to which the proposed offsetting would counterbalance the residual impacts to fish and fish habitat. While not required for the environmental assessment, the proponent may choose to present this in the form of offsetting measures for the Fisheries Act Authorization Offsetting Plan. Under the Fisheries Act,</p>

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				<p>Authorization for the Project, and that requirements for future Authorizations will be addressed separately from the environmental assessment process.</p> <p>DFO has indicated that the design of the outlet channels have been optimized for flood control and not as fish habitat. Creating a trapezoidal wetted channel will not meet the regulatory and policy required to be accepted as a habitat offset plan, and may not be effective mitigation for the potential effects of the Project on fish and fish habitat.</p> <p>Information regarding the proposed mitigation is required to understand the potential effects of the Project on fish and fish habitat, to understand how the proposed use of channels as offsetting will mitigate the effects of the Project to specific habitat type and fish species, and to understand how the proposed offsetting would counterbalance residual effects.</p>	<p>offsetting must be undertaken to restore, enhance, rehabilitate or create fish habitat.</p>
IAAC-38	DFO	<p>3.2 Project Activities</p> <p>7.3.1 Fish and fish habitat</p>	<p>7.2.4.2 Permanent Alteration or Destruction of Fish Habitat</p>	<p>Section 3.2 of the EIS guidelines requires the EIS to provide a list of project activities, with emphasis on activities with the greatest potential to have environmental effects. Sufficient information will be included to predict environmental effects and address concerns identified by the public and Indigenous groups.</p> <p>Section 7.3.1 of the EIS Guidelines requires the EIS to include a consideration of how the predicted changes to the environment as a result of the project being carried out will affect fish and fish habitat.</p> <p>The EIS indicates that final design decisions have not all been made, resulting in information gaps on how the proposed work, undertaking or activity may impact fish and fish habitat. For example, the EIS states:</p> <ul style="list-style-type: none"> Final decisions about what type of machinery are used and whether the excavations will be conducted in-the-wet or in-the-dry has not been made. 	<p>a. The Agency understands that detailed design has advanced since the EIS was submitted. Provide an updated project design, including an assessment of how these updates may change the assessment of effects to fish and fish habitat.</p> <p>b. Provide a discussion of how continued unknowns in project design affect uncertainty in conclusions regarding effects to fish and fish habitat.</p>

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				<ul style="list-style-type: none"> • Rock-filled jetties and cofferdams may be built around the excavation areas to protect the work areas from excessive sedimentation and to allow the excavations to be conducted in-the-dry. Alternatively, temporary groins may be built using rock-fill and/or spoil from the excavation to provide the machinery with access to the excavation area if work is to be conducted “in-the-wet”. • Construction of the culvert and gate system on Creek C and the two unnamed tributaries will isolate upstream habitat from fish in Buffalo Creek. • This is because fish will not be able to ascend the channel from Sturgeon Bay due to the hydraulic jump and high water velocities at the downstream-most drop structure when the water control structure gates are open and because of the height of the vertical drop at the downstream-most drop structure when the water control structure gates are closed. • Pool depths upstream of the drop structures will be sufficient to maintain a wetted channel upstream to the next drop structure. Together with the channel geometry and drop structures, baseflows in the LSMOC will limit variations in water levels in the LSMOC when not in use and allow a stationary, lake-type ice cover to form on the channel without freezing to the bottom. <p>The information provided is not sufficient to make a determination on the predicted changes to the environment, their residual effects and their significance. This information is important for assessing potential effects to fish habitat and death of fish.</p>	
IAAC-39	DFO	9.1 Follow-up programs 9.2 Monitoring	12.5 Follow-up and Monitoring Program: Fish and Fish Habitat	The EIS guidelines require that the EIS present preliminary follow-up and monitoring programs, which should also include intervention mechanisms used in the event that an unexpected deterioration of the environment is observed.	a. Provide detailed monitoring plans and fish rescue plans. If full plans are not yet available, present preliminary plan details that describe methods, principles, and objectives of the plans and discuss

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			Appendix A: Proposed Lake Manitoba and Lake St. Martin Operating Guidelines	Section 12.5 of the EIS, outlines the follow-up and monitoring program for fish and fish habitat. Contingency measures have not been identified in the case that Lake St. Martin water levels are low and base flow is required in the channels. In addition, fish rescue options should be in place should Dissolved Oxygen monitoring indicate the potential death of fish. A monitoring schedule after operation of the channels should be in place.	means of ensuring effectiveness of monitoring and contingency measures.
IAAC-40	DFO	3.2 Project Activities 7.3.1 Fish and fish habitat	Appendix 6J Development Of Operating Rules For Lake Manitoba And Lake St. Martin Outlet Channels With Recommended Revisions (Manitoba Infrastructure 2019a)	<p>Section 3.2 of the EIS guidelines requires a description of the activities during the operations phase of the project, with emphasis on activities that have the greatest potential to have environmental effects and Section 7.3.1 requires information to support the assessment of the potential effects of the Project on fish and fish habitat.</p> <p>Appendix 6J of the EIS has identified a number of Operating Rules for the LMOC and LMBOC operating channels. Rule 2 states that:</p> <p>“The Lake Manitoba Outlet Channel may be opened pro-actively (when the water level is below 812.5 ft.) if the water level on Lake Manitoba is forecasted to be above 813 ft. in the same season (REV 1). - Modelling of the 103 years with data indicated that Operating Guideline #2 has minimal impact on reducing the peak water level when compared to no pro-active operation (i.e., outlet only open when water level is above 812.5 ft.). However, it will likely be widely supported over a reactive approach based on perceived effectiveness.”</p> <p>The EIS identifies variants of standard guidelines for the conditions under which the Project would be operational, including times when the outlet channels would be opened pro-actively. The EIS does not address potential environmental effects associated with the full suite of operational scenarios.</p>	a. Provide an assessment of effects under all possible operating scenarios. Alternatively, provide a justification for why the conclusions in the EIS are valid for all operating scenarios.
IAAC-41	DFO	7.3.1 Fish and fish habitat	Appendix 6J Development Of Operating Rules For Lake Manitoba And	Section 7.31 of the EIS requires the proponent to assess the effects of the project on fish and fish habitat, including effects from modifications of hydrological and hydrometric conditions on fish	a. Provide information on proposed flow allocation plans for the outlet channels and the existing Fairford and Dauphin Rivers, and explain how flow allocation was determined.

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			Lake St. Martin Outlet Channels With Recommended Revisions (Manitoba Infrastructure 2019a)	<p>habitat and on the fish species’ life cycle activities (e.g. reproduction, fry-rearing, movements).</p> <p>Appendix 6J of the EIS describes how the operation of the outlet channels was based on lake levels. With the outlet channels there is an opportunity to reduce the flow in natural channels during higher flow events, which could alter the existing hydrograph for higher flow events in the natural channels. It is unclear how flows in the Fairford and Dauphin Rivers would be allocated and the potential loss of higher flows in the natural channels when the outlet channels are in operation and associated effects are not explained. Information is required to understand the potential effects to fish and fish habitat from changes to flows in the Fairford and Dauphin river.</p>	b. Identify potential changes to the hydrographs for the Fairford and Dauphin Rivers based on the flow allocation plan with a focus on the potential reduction in higher flow events in the natural rivers and the potential effects of these flow reductions. Describe the effects of these changes to fish and fish habitat, present mitigation measures and provide an updated significance determination.
IAAC-42	IAAC		Throughout	Errata that were identified in Chapter 7 of the EIS.	<p>Correct the following errata:</p> <ul style="list-style-type: none"> • The last paragraph at the bottom of page 7.5 is cut-off (there appears to be text missing) • There appears to be a typo in Section 12.5.1. Please confirm that the section being referenced in 7.2.1.4, and not 7.2.4.1. • A number of references to the appendices throughout the text are incorrect. • The first sentence of the last paragraph of page 7.53 is incomplete. • Provide the units for the data presented in Table 7.2A-16.
IAAC-43	DFO	7.2.2 Changes to groundwater, surface water, and fluvial morphology; 7.3.1 Fish and Fish Habitat	7.2.7 Prediction Confidence; 6.4.7.1 Analytical Assessment Techniques for Surface Water;	<p>Section 7.2.2 of the EIS guidelines requires that the proponent describe changes to water quality and quantity and sediment quality and quantity during all phases of the Project associated with project-related effects to drainage areas, flow paths, and seepage or groundwater into surface water. In addition, Section 7.3.1 requests a description of modifications of hydrological and hydrometric conditions on fish habitat and on the fish species’ life cycle activities.</p> <p>With regards to hydraulic modeling, the EIS states that “hydraulic modelling to predict the potential change in hydraulic conditions in</p>	<p>a. Provide appropriate models to assess flow hydraulics in the various impacted waterbodies. These models can be used to assess potential residual impacts to fish and fish habitat based on habitat suitability considerations (water depth and velocity, substrate).</p> <ul style="list-style-type: none"> i. Conduct hydraulic modelling of the LMOC and LSMOC under different conditions; ii. Conduct hydraulic modelling to predict the potential change in hydraulic conditions in

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			<p>6.D2 Hydraulic and Sediment Transport Studies;</p> <p>3.5.2.11 Water Management</p>	<p>Fairford River, the FRCWS Denil fishway, and the Dauphin River have not been conducted. Hydraulic conditions in the LMOC and LSMOC under different discharges also have not been modeled nor have hydraulic conditions at, and downstream of, the water control structures and drop structures. Therefore, assessment of the potential effects of changes to the hydraulic conditions in the rivers and in the channels on fish habitat, fish passage, and fish and fish egg stranding are qualitative, based on professional judgment using the information available.”</p> <p>The EIS also states that additional studies to further refine the assessment of the residual effects of the Project on surface water are planned as part of detailed design. These studies will include the collection of data to supplement existing hydrologic and hydraulic modelling and enable further examination and quantification of the residual effects on surface water. The information generated by these additional studies planned for the detailed design phase will be provided as it becomes available.</p> <p>The Agency notes that these studies and modelling are important in predicting residual impacts during the EIS process and validation through follow-up monitoring. Hydraulic models should be developed to evaluate project related effects on groundwater and surface water and to provide a quantitative summary of the potential residual impacts to fish and fish habitat.</p> <p>The information available in the EIS is insufficient to make a determination of significance of impacts to fish and fish habitat and assess habitat suitability under different flow scenarios.</p>	<p>Fairford River, the FRWCS Denil fishway, the Dauphin River, Lake St. Martin, and other potentially affected waterbodies.</p> <p>iii. Using the modelling results, complete an assessment of the potential effects of changes to hydraulic on fish and fish habitat. Apply mitigation measures where applicable and assess significance of residual effects. Discuss associated monitoring and follow up.</p> <p>iv. Update the Surface Water Management Plan with results from the hydraulic models.</p> <p>b. If the proponent is of the view that hydraulic modelling cannot be conducted or is not required, present a rationale, discuss the validity of conclusions drawn, the related uncertainty with regards to potential effects (assessment predictions) and mitigation, and any monitoring and follow up that will be implemented on a precautionary basis to verify assessment predictions as well as additional mitigation measures required to adaptively manage potential effects of channel hydraulics and sediment transport to fish and fish habitat.</p>
IAAC-44	DFO	<p>7.2.2 Changes to groundwater, surface water, and fluvial morphology;</p> <p>7.3.1 Fish and Fish Habitat</p>	<p>7.2.4.2 Permanent Alteration or Destruction of Fish Habitat</p>	<p>Section 7.2.2 of the EIS guidelines requests that the proponent describe changes to water quality and quantity and sediment quality and quantity during all phases of the Project.</p> <p>Section 7.2.4.2 of the EIS states that the amount of sediment mobilized from the channels and deposited in Birch Bay and Sturgeon Bay is expected to decrease over time as the amount of</p>	<p>a. Using sediment transportation models, identify the potential range of sediment deposits in Birch Bay and Sturgeon Bay through all phases of the Project, including under the operational flow conditions. If sediment transport modelling is not conducted, present estimates for the range of sediment deposits including a rationale and a discussion of areas of uncertainty.</p>

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				<p>fine, erodible substrates diminishes with each successive use of the channels.</p> <p>However, sediment erosion and deposition will never completely stop when the channels are in use and spikes in suspended and deposited sediment are expected whenever a high flood event occurs, and the channels are conveying water at maximum capacity. The EIS does not characterize sediment erosion and deposition throughout all phases of the Project.</p> <p>The information available in the EIS is insufficient to make a determination of significance of impacts to fish and fish habitat and assess habitat suitability under different flow scenarios.</p>	<p>b. Update the assessment effects to fish and fish habitat informed by the range of sediment deposits in Birch Bay and Sturgeon Bay identified in a). Identify mitigation measures and assess significance of residual effects. Discuss associated monitoring and follow up.</p>
Wildlife					
IAAC-45	IAAC	3.2.3 Spatial and temporal boundaries	<p>8.3.1.4 Boundaries;</p> <p>8.3.6.2 Changes in Habitat;</p> <p>6.3.6 Assessment of Residual Effects on Wildlife</p>	<p>The EIS Guidelines require the establishment of spatial and temporal boundaries to support the assessment of effects to wildlife, including migratory birds and SAR.</p> <p>The EIS defines the spatial boundaries for the LAA as a one km buffer beyond the PDA. The referenced wildlife survey reports (EEI 2017a, b) consider a five km buffer from the PDA centerline.</p> <p>The proponent defines temporal boundaries of the wildlife assessment as one to two years after construction. Some of the mitigations and evaluation of residual effects on wildlife (including SAR) are contingent on reclamation of disturbed sites, including corridors. The EIS states habitat loss would eventually soften through reclamation or natural revegetation. Within established temporal boundaries, reclaimed land is unlikely to be suitable habitat within established temporal boundaries and therefore residual effects will persist.</p> <p>Appropriate spatial and temporal boundaries are necessary to support understanding of potential effects to wildlife, including migratory birds and SAR and proposed measures to mitigate those effects.</p>	<p>a. Present the rationale for the discrepancy between wildlife LAA chosen for the EIS compared to that considered in the referenced wildlife reports. Describe the implications for the assessment of effects to wildlife of using one km buffer instead of the five km buffer.</p> <p>b. Discuss how the temporal boundaries considered the time required for reclamation to re-establish habitat as an effective mitigation for wildlife effects. Provide leading indicators for successful reclamation of suitable habitat for SAR, migratory birds, and species of cultural significance.</p>

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IAAC-46	IAAC ECCC	7.1 Project setting and baseline information; 7.1.9 Species at Risk	8.3.9 Prediction Confidence	<p>The EIS Guidelines require the proponent to include current baseline information in sufficient detail to support the assessment of effects of the Project on SAR.</p> <p>Subsection 79(2) of SARA establishes a requirement to identify and avoid or lessen all adverse effects of a Project on listed wildlife species and critical habitat, regardless of the significance of those effects. Mitigations measures are to be consistent with applicable recovery strategies and action plans.</p> <p>The EIS states that the significance confidence is moderate, “based on the quantity and quality of data available” and the “effectiveness of the mitigation measures in the Environmental Management Plan.” The EIS also states that the quality and quantity of baseline information for the residual effects assessment for SAR is limited and that the Environmental Management Plan has not been developed.</p> <p>Baseline surveys completed by the proponent did not include targeted survey methods intended to detect all potential or known SAR that may be affected by the project, including Northern Leopard Frog, Snapping Turtle, Yellow Rail, Least Bittern, and Piping Plover. The proponent has not justified the omission these SAR from the surveys. The surveys used by the proponent include several limitations related to effort, timing, and targeting.</p> <p>Understanding baseline conditions, including SAR occupancy in the Project area and potentially affected habitat in the LAA, mitigation measures, the limitations of the surveys completed to date is necessary for the assessment of potential effects to SAR.</p>	<p>a. Discuss how the limitations of the SAR baseline data collected to date are likely to affect the conclusions of the assessment of effects. Explain the omission of potential SAR from the surveys.</p> <p>b. Discuss how ongoing baseline information collection for SAR will occur to improve the confidence in the residual effects assessment and support the development of the Wildlife Mitigation Plan and compensation offsetting plans. For surveys, include the types, quantities, and methodologies. Describe the specific survey methods that will be used, to provide greater certainty the extent of occupancy of the following SAR in the RAA: Northern Leopard Frog, Snapping Turtle, Yellow Rail, Least Bittern, and Piping Plover.</p> <p>c. Provide details of the Environmental Management Plan, Wildlife Mitigation Plan, and compensation offsetting plans that outline measures to mitigate the residual effects of the Project on wildlife, including SAR.</p>
IAAC-47	IAAC ECCC	7.3.2 Migratory Birds	8.3.6.4 Change in Movement	<p>Section 7.3.2 of the EIS Guidelines requires an assessment of the potential effects of the Project on migratory bird migration patterns, flyways, local movement, and seasonal habitat use.</p> <p>Consideration of all potential pathways of effects is required to understand the adverse effects to migratory birds.</p>	<p>a. Describe the potential use of project components by migratory birds and SAR, and the potential effects of the Project on migratory birds at each stage of the Project (including operation) including:</p> <ul style="list-style-type: none"> i. Migration patterns ii. Flyways

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				<p>The proponent’s assessment of the effects of the Project on wildlife movement did not consider how changes to waterbodies and wetlands might affect staging waterfowl and the movements of migratory birds. The EIS does not consider the use of the channels and/or waterbodies created by quarries and borrow pits and does not provide justification to support conclusions that the predicted Project effects to waterbodies and wetlands used by staging waterfowl will be temporary (i.e. during construction only).</p> <p>The EIS does not describe mortality effects to migratory birds and SAR from collisions and electrocution from power lines in sufficient detail, nor were mitigation measures proposed for such effects. In the absence of mitigation, increased mortality, which may include migratory birds, including SAR, should be described and evaluated in order to understand the potential risk from power lines to migratory birds and SAR.</p>	<ul style="list-style-type: none"> iii. Local movement iv. Seasonal habitat use <p>b. Describe proposed measures to prevent and mitigate bird collision and electrocution from the Project’s power distribution line. Identify migratory bird species and SAR which may interact with the power distribution line, and evaluate the predicted effects of the Project on migratory bird species and SAR, including mortality.</p>
IAAC-48	ECCC	7.1.9 Species at Risk; 7.4 Mitigation measures	8.3.6.2 Change in Habitat	<p>The EIS Guidelines require that the proponent provide information to support the assessment of the potential effects of the Project on SAR and mitigations for these effects.</p> <p>Subsection 79 of the SARA establishes a requirement to avoid or lessen all adverse effects of a Project on listed wildlife species and critical habitat and to monitor them, regardless of the significance of those effects. The methods are to be consistent with any applicable recovery strategy or recovery plans. It is necessary that appropriate baseline information is collected and that mitigation plans are clearly understood.</p> <p>Hibernacula are critical habitat, and maternal roosts contribute to the survival and recovery of bat species, as per the Environment and Climate Change Canada Recovery Strategy (2018).</p> <p>Reports referenced in the EIS (EEI 2017a, b) state that two bat SAR, little brown myotis and northern myotis, were detected in the baseline Project surveys completed in 2016, which also identified habitat features in the Project LAA which could potentially be used for overwintering (hibernacula) by bats. Mortality caused by winter construction and potential alterations to hibernacula, or</p>	<p>a. Identify hibernacula and maternity roosts used by little brown myotis and northern myotis in the Project LAA and:</p> <ul style="list-style-type: none"> i. describe the elevation of hibernacula features, and ii. assess the potential for Project effects to these key wildlife sensitive areas as a result of abiotic environmental changes (humidity, temperature, moisture) that may occur as a result of Project-related landscape changes in the area (such as potential ground water/surface water fluctuations). <p>b. Describe mitigation measures to avoid and lessen Project effects to little brown myotis and northern myotis during the life of the Project, including mortality effects and disturbances to or loss of hibernacula and maternal roosting habitat.</p>

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				<p>potential measures to mitigate these effect were not described in sufficient detail.</p> <p>The EIS identifies potential project effects to maternal roosting habitat for myotis (sp.) and includes mitigation measures, including tree habitat retention and removal strategies. Even when unoccupied, removal of trees suitable for maternal roosting habitat limits the capacity of habitat available for subsequent seasons and may hamper species recovery. An evaluation of suitable alternative maternity roosting habitat is necessary to fully assess effects and effectiveness of the mitigation strategy.</p>	<p>c. Discuss the amount of possible maternity roosting habitat that is available for little brown myotis and northern myotis in the RAA and describe the potential indirect effects to critical habitat in the RAA. Discuss potential loss of possible maternity roosting within the Project area or LAA, relative to overall available maternity roosting habitat in the RAA.</p>
IAAC-49	ECCC	<p>7.3.2. Migratory Birds;</p> <p>7.3.5. Species at Risk;</p> <p>7.4. Mitigation Measures</p>	<p>8.3 Wildlife;</p> <p>11.6.5.3 Residual Cumulative Effects on Change in Wetland Functions</p>	<p>The EIS Guidelines require the proponent to describe mitigation measures in relation SAR that are consistent with any applicable recovery strategy and action plans.</p> <p>Subsection 79(2) of SARA establishes a requirement to avoid or lessen all adverse effects of a Project on listed wildlife species and critical habitat, regardless of the significance of those effects.</p> <p>Commitments to avoid direct Project effects to migratory birds and SAR by scheduling Project activities and using setback buffers are key mitigation measures noted throughout the Project EIS. Some commitments throughout the EIS appear to be contradictory or incomplete.</p> <p>Clarification of these key mitigation measures is needed in order to understand whether there will be residual environmental effects associated with the Project.</p>	<p>a. Describe the details of commitments associated with Project scheduling and setbacks:</p> <ul style="list-style-type: none"> i. Provide a definition of “known sensitive wildlife habitat.” ii. Describe critical lifecycle periods for each SAR and migratory bird species potentially affected by the Project. iii. Define the intended avoidance periods for Project activities that coincide with bird breeding and nesting seasons. iv. Define the intended avoidance periods for Project activities that coincide with reproduction of other wildlife, including SAR. v. Describe the provincial terrestrial setback distances proposed for the Project.
IAAC-50	ECCC	<p>7.3.2. Migratory birds;</p>	<p>8.2.4.5 Change in Wetland Functions;</p>	<p>The EIS Guidelines require the proponent to provide information to support the assessment of effects to migratory birds. Section 5.1 of the Migratory Birds Convention Act prohibits the deposit of</p>	<p>a. Describe mitigation measures to address adverse effects to migratory birds associated with release of harmful substances to waters frequented by migratory birds. Include measures to mitigate the effects of the Project on waters frequented by migratory birds</p>

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		<p>7.3.5. Species at Risk;</p> <p>7.4. Mitigation Measures</p>	<p>8.3 Wildlife</p>	<p>harmful substances to waters or areas frequented by migratory birds.</p> <p>The EIS recognizes that road salt and potentially petroleum products from the PR 239 route are likely to affect natural wetlands as water from ditches to control runoff are likely connected. Water quality will likely be effected throughout the year and continuously through operation.</p> <p>The proponent states, "...most effects should be offset with wetland compensation and are therefore considered low magnitude." Offsets cannot address adverse effects to migratory birds resulting from the release of harmful substances. A description of appropriate mitigation measures for this pathway of effects to migratory birds is required to assess the potential effects of the Project.</p>	<p>caused by road salt, oil and other contaminants from road construction and use.</p> <p>b. Discuss the potential effects of the Project on migratory birds, taking into account these proposed mitigation measures. Describe monitoring and follow up programs that will be used to confirm the predictions of the assessment</p>
IAAC-51	ECCC	7.4 Mitigation Measures	<p>Appendix 8B, Figure 8.3B-11</p> <p>8.3.6.2 Change in Habitat</p>	<p>Where mitigation measures are proposed for which there is little experience or questions as to their effectiveness, the EIS Guidelines require the proponent to clearly and concisely describe the potential risks and effects to the environment should those measures not be effective.</p> <p>In the EIS, the proponent approximates a 7.8 percent loss (165.75 ha) of critical habitat for Red Headed Woodpecker in the LMOC PDA. Mitigation measures for the effects of the Project on Red-headed Woodpecker include retaining and erecting large diameter snags, where feasible/practical, that have potential to support red-headed woodpecker nests and erecting large diameter snags that have been cleared from the PDA along the ROW edges.</p> <p>The EIS does not present a related discussion on the density and suitability of decadent trees within the LAA or the ability to undertake the practices described within the Project area such that there is alignment with the Red-Headed Woodpecker Recovery Strategy.</p> <p>The effectiveness of erecting large diameter snags that have been cleared from the PDA along the ROW edges as mitigation for the</p>	<p>a. Estimate the number of suitable decadent trees in the LAA and quantify those that may be removed by construction in the PDA within Red-headed woodpecker critical habitat.</p> <p>b. Describe planned steps to ensure the effectiveness of mitigation measures to protect Red-headed Woodpecker such as additional measures to retain standing snags and to reduce the likelihood of snags falling over.</p> <p>c. Given the potential uncertainty regarding the effectiveness of erected removed snags post-construction along new ROW edges as mitigation for loss of critical habitat for Red Headed Woodpecker:</p> <p>i. Assess and identify the likelihood of partial and complete failure of the proposed mitigation. Identify contingency measures to be taken if the mitigation is not functioning as planned.</p>

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				<p>loss of critical habitat for Red Headed Woodpecker in the LMOC PDA is not certain.</p> <p>Understanding the baseline amount of large decadent deciduous trees per hectare in the LAA and an evaluation of the feasibility of the strategy to erect cleared snags is required to assess the effectiveness of the proposed mitigation measures and to assess the effects of the Project if the measures are determined not to be effective.</p>	
IAAC-52	ECCC	7.4 Mitigation Measures	8.3.6.3 Change in Mortality Risk	<p>The EIS Guidelines require the proponent to present an assessment of the potential effects of the Project on SAR that includes mitigation. Subsection 79(2) of SARA establishes a requirement to avoid or lessen all adverse effects of a Project on listed wildlife species and critical habitat, regardless of the significance of those effects.</p> <p>The EIS states, “overwintering amphibians and mammals are also at greater risk as they may encounter heavy machinery during ground disturbance activities.” The EIS does not describe mitigation required to address this effect, particularly for SAR including Northern Leopard Frog.</p> <p>It is necessary to describe key mitigation measures in order to understand any residual effects and the nature of those effects.</p>	<p>a. Describe how occupied habitat and key areas of seasonal use, where Project activities such as construction may introduce risk of mortality through heavy machinery use and ground disturbance, has been or will be identified. Provide measures to mitigate this effect.</p> <p>i. Provide seasonal species-specific mitigation measures for overwintering amphibian and mammal SAR species within the Project affected area.</p>
IAAC-53	ECCC	<p>7.2.3 Changes to riparian, wetland and terrestrial environments;</p> <p>7.3.2 Migratory birds;</p> <p>7.3.4 Other valued components;</p> <p>7.3.5 Species at risk</p>	8.3.6.2 Change in Habitat	<p>The EIS Guidelines require the proponent to assess the effects of the project on the habitat of migratory birds in terms of quality, quantity, diversity, distribution and functions and changes to critical habitat for federally listed SAR.</p> <p>The EIS identifies wildlife use of project-area wetlands and species associations with wetlands are indicated in the appended Technical Reports (EEI 2017a, b). The EIS predicts project changes to water levels and inflow to waterbodies within the LAA and RAA and predicts residual effects to wetlands, such as alteration of vegetation cover types. Further, in its assessment of changes to habitat, the EIS states alterations of the sub watersheds in the intersection of the LMOC and PR 239 realignment may cause changes to wetland habitat quantity and quality resulting in impacts to Migratory birds and SAR. Migratory birds and SAR</p>	<p>a. Describe interactions of predicted project abiotic changes in project-area waterbodies, wetlands and riparian areas with habitat quality, quantity and wetland function for migratory birds and SAR.</p> <p>b. Evaluate functional changes to habitat quality in the assessment of changes to wetland function. Explain how residual effects of the Project on wetlands relate to loss of habitat functions for migratory birds and SAR.</p> <p>c. Identify mitigation measures for altered habitat functions resulting from the Project, and consider timing of Project changes with seasonality of habitat</p>

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				<p>identified for the project use various wetland types for a variety of nesting, breeding, and staging activities.</p> <p>Wetland compensation in the EIS includes both wetland creation and wetland enhancement, but information on wetland types to be included, habitat functions, restoration objectives, or post-construction revegetation monitoring is not included. The assessment of how the Project changes to wetland types by area will affect habitat functions of wetlands for SAR and migratory birds is incomplete as the description of pathway of effects is not extended to how these primary changes would alter habitat quality and function for migratory birds and SAR.</p> <p>Migratory birds and SAR observed in the Project RAA/LAA/PDA include species that use various wetland types (e.g. open water, marsh, swamp, fen, bog) for a variety of nesting, breeding, and staging activities. Understanding potential changes to wetland habitat quality, function, and quantity by the Project, is important for planning mitigating and understanding potential effects to migratory birds and SAR.</p>	<p>use. Include details regarding proposed wetland compensation offsetting and how habitat function will be considered in offset planning.</p> <p>d. Explain how habitat loss will be quantified for wetland dependent SAR and how this will be used to calculate wetland function compensation offsets.</p> <p>e. Describe monitoring and follow-up for habitat function of wetlands and effects of habitat changes or loss to migratory birds and SAR</p>
IAAC-54	ECCC	7.4 Mitigation Measures	8.3.6.2 Change in Habitat	<p>The EIS Guidelines require the proponent to describe mitigation measures in relation to species and/or critical habitat listed under SARA that are consistent with any applicable recovery strategy and action plans. Where mitigation measures for which there is little experience or for which there is some question as to their effectiveness are proposed, the potential risks and effects to the environment should those measures not be effective should be described.</p> <p>The EIS proposes compensation offsetting for habitat loss for several migratory bird SAR (Red-headed Woodpecker, and Eastern Whip-poor-will) as well as compensation offsetting for effects to wetland functions. The proponent has not described that Yellow Rail will be included in wetland compensation offsetting plans.</p> <p>Clarity on species-specific mitigation is required to understand the potential effects of the Project on bird SAR.</p>	<p>a. Outline mitigation measures for the avoidance of Project effects to key or important habitat features for SAR.</p> <p>b. Provide the proposed offset or compensation plans for Eastern Whip-poor-will and Red-headed Woodpecker.</p> <p>c. Discuss how Yellow Rail and Yellow Rail habitat requirements will be incorporated into the wetland function and compensation offsets.</p>

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IAAC-56	ECCC	<p>7.2.3 Changes to riparian, wetland and terrestrial environments;</p> <p>7.3.2 Migratory birds;</p> <p>7.3.4 Other valued components;</p> <p>7.3.5 Species at risk</p>	<p>8.2.1.2 Influence of Engagement on the Identification of Issues and the Assessment Process;</p> <p>8.2.4.5 Change in Wetland Function;</p> <p>8.3.3 Migratory Birds;</p> <p>8.3.6.2 Change in Habitat;</p> <p>6.4.2 Existing Conditions for Groundwater</p>	<p>The EIS Guidelines state that the proponent must assess changes to the habitat of migratory birds including changes to shorelines and riparian areas (e.g. due to erosion; vegetation changes).</p> <p>The EIS provides a limited description of how Project changes to shoreline habitats, including shorelines of the Lake St. Martin Important Bird Area and federal lands may affect migratory habitat type, or breeding, and chick-rearing activities. The EIS does not fully assess how the Project effects to shoreline habitat type will effect migratory birds.</p>	<p>a. Describe the potential effects of the Project on to shoreline habitats, including on federal lands within the LAA and RAA. Include a discussion of the seasonal timing of operational disturbance to these habitat types due to water level controls in relation to species breeding, nesting, and rearing of young activities.</p>
Effects of the Environment on the project					
IAAC-57	ECCC	7.6.2. Effects of the environment on the project	<p>6.0 Assessment of Potential Effects on Physical Environment;</p> <p>15.0 Effect of the Environment on the Project;</p> <p>15.5 Effects of Long-term Climate change on the Project</p>	<p>The EIS guidelines require that effects of the environment on the project be considered in different probability patterns (e.g. 5-year flood vs. 100-year flood), under a range of future climate states and that the potential impact of climate change on these probability patterns be considered over the lifetime of the project including a description of climate data and projections used.</p> <p>The EIS uses secondary sources of information to describe climate scenarios in relation to effects of long-term climate change on the project. The EIS does not provide enough information on the source, rationale, or details (e.g., data source, study methods and assumptions) of climate change information used in the development of the EIS. This information is required to validate that the full range of relevant potential climate change impacts on the Project are considered and used to assess the full range of</p>	<p>a. Describe the source, rationale, and details (e.g., data source, study methods and assumptions) of the climate change information used in the development of the EIS. Consider and discuss relevant climate projections for the region for the full lifetime of the Project (including any post-closure periods where Project components remain sensitive to climate) from a range of emission scenarios (low to high forcing) from multiple climate models to reflect uncertainty in future climate projection.</p>

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				potential impacts of the environment on the Project and of the Project on the environment.	
IAAC-58	IAAC ECCC	7.6.2 Effects of the environment on the project	15.3 Effect of Extreme Weather and Climate Conditions on the Project; 15.4 Effect of Extreme Hydrological Conditions on the Project; 15.5 Effect of Long-term Climate Change on the Project	<p>The EIS Guidelines state that effects of the environment on the project be considered in different probability patterns (e.g. 5-year flood vs. 100-year flood), under a range of future climate states; consideration of the potential impact of climate change on these probability patterns over the lifetime of the project and the discussion will include a description of climate data and projections used; and that details be provided of planning, design and construction strategies (or measures) intended to minimize the potential environmental effects of the environment on the project.</p> <p>The EIS states that: the outlet channels and other structures will be designed to resist both normal and extreme physical environmental conditions, based on historical records and future climate; the design flood is anticipated to be between the 1 in 10-year and the 1 in 300-year flood event; and climate change is likely to increase the frequency, duration, and magnitude of extreme weather events, including extreme precipitation and flooding.</p> <p>The EIS does not describe how flooding under future climate scenarios compares to the design flood of the project and does not provide details on how future climate scenarios were considered in the design of the project.</p> <p>If the frequency and magnitude of future flood events or likelihood of channel breaches or infrastructure failure are underestimated, direct and cumulative effects to valued components, including federal lands, from the loss of flood protection integrity may be greater than predicted.</p>	<p>a. Provide an assessment of how the project will perform over its lifetime in the context of climate change, climate uncertainty, and increasing frequency, duration, and magnitude of extreme weather events. Specifically:</p> <ul style="list-style-type: none"> i. Confirm the design flood of the project. ii. Provide estimates of the frequency and magnitude of floods, and methodologies used to develop estimates, under a range of future climate states. iii. Describe how these estimates compare to the design flood and were considered in the design of the outlet channels and other infrastructure. iv. Describe the frequency at which flood events under different climate scenarios are estimated to exceed the design capacity of the outlet channels and infrastructure. v. Provide details of the planning, design and construction strategies (or measures) intended to minimize the potential environmental effects of the environment on the project. vi. Update the effects analysis and conclusions as necessary.

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IAAC-58	IAAC	7.6.2 Effects of the environment on the project	Chapter 15 Effects of the Environment on the Project; 15.5 Effect of Long-term Climate Change on the Project	<p>The EIS Guidelines require that the EIS take into account how local conditions and natural hazards could adversely affect the project and how this in turn could result in effects to the environment; that effects of the environment on the project be considered in different probability patterns, under a range of future climate states; and that details be provided of planning, design and construction strategies intended to minimize the potential environmental effects of the environment on the project.</p> <p>The EIS does not describe how lake water dynamics may change under future climate scenarios. This information is required to understand potential effects of the environment on the Project and corresponding effects of the Project on valued components.</p>	<p>a. Under a range of future climate states:</p> <ul style="list-style-type: none"> i. Provide estimates of any potential changes to lake water dynamics due to climate change. ii. Describe how lake water dynamics could adversely affect the project and in turn the environment. iii. Provide details of the associated planning, design and construction strategies intended to minimize the potential environmental effects of the environment on the project.
IAAC-59	IAAC	7.6.1. Effects of potential accidents or malfunctions; 7.6.2 Effects of the environment on the project	14 Accidents and Malfunctions 14.2 Outlet Channel Breach/Control Structure Failure 15 Effect of the Environment on the Project 15.5 Effect of Long-Term Climate Change on the Project	<p>The EIS Guidelines require the proponent to analyze the risks of accidents and malfunctions, their effects, and preliminary emergency response measures, and state that the EIS must take into account how local conditions and natural hazards could adversely affect the project and how this in turn could result in effects to the environment.</p> <p>The EIS indicates that if a breach were to occur, effects to VC's would be similar to during a flood event in the absence of the project. It also indicates that if damage to Project infrastructure occurs at the same time as a flood event, the potential residual effects of a channel breach would extend beyond the PDA, depending on the location of the breach, and lessen the effectiveness of the Project acting as a flood mitigation measure. The EIS does not describe Project effects to the environment from such a scenario, other than to say the effects on the environment would likely be less than those expected without the Project.</p> <p>Given that the project involves large infrastructure and will channel and move water within the landscape, further information is needed to understand effects that might not otherwise occur</p>	<p>a. In the case of a channel breach or infrastructure failure, discuss any effects to the environment that could occur due to the interaction of the project, the event and environment, e.g., interaction of infrastructure and flooding, location of effects due to project routing of water.</p>

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				during a flood due to interactions between the project and flood waters.	
IAAC-60	IAAC	7.6.1. Effects of potential accidents or malfunctions; 7.6.2 Effects of the environment on the project	3 Project Description 14.4 Fire 15.7 Effects of Fire Hazards on the Project	<p>The EIS Guidelines require an analysis of the risks of accidents and malfunctions, their effects, and preliminary emergency response measures, and that details be provided of planning, design and construction strategies intended to minimize the potential environmental effects of the environment on the project.</p> <p>Chapter 3 of the EIS describes that the project will involve multiple fuel storage areas during construction and standby diesel generators for the operation of the water control structures. Chapters 14 and 15 describe fire, including the worst case scenario of wildfire interacting with the project which could result in damage to infrastructure and corresponding effects on VCs. The EIS does not identify mitigation measures specific to fire risk from flammable materials and associated environmental effects.</p> <p>The areas surrounding the project area that could be affected by fires, especially if project components increase or cause fire risk, include potential critical habitat and features that are mitigation measures for other project effects (e.g. revegetation that supports habitat and land use). Further information is needed to understand measures that will be taken to mitigate the risk of ignition of flammable materials associated with the project, including from wildfires.</p>	<p>a. Describe specific measures that will be taken to:</p> <ul style="list-style-type: none"> i. minimize risk of fire and explosions associated with temporary and permanent fuel storage areas, or other flammable materials, during construction and operations; and ii. minimize the likelihood of wildfires spreading to the project area and interacting with temporary and permanent fuel storage areas or other flammable materials.
IAAC-61	IAAC	7.6.2 Effects of the environment on the project	15.5 Effect of Long-Term Climate Change on the Project; Volume 1, Appendix 3D Operational guidelines	<p>The EIS guidelines require consideration of events under a range of future climate states and that the assessment of effects of the environment on the project take into account both natural events and human management of the existing environment.</p> <p>Appendix 3D outlines operational guidelines for the project and other flood management infrastructure, and uses historic data to develop water level simulations for the period of 1915-2017 under different operating regimes.</p>	<p>a. Under a range of future climate scenarios where there is an increase the frequency, duration, and magnitude of extreme weather events, including extreme precipitation and flooding:</p> <ul style="list-style-type: none"> i. Describe management, operation and capacity of the integrated system of flood management infrastructure (e.g., Fairford

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				<p>There is limited discussion in the EIS regarding operation and management of integrated flood infrastructure under future climate states.</p> <p>This information is required to understand potential climate change impacts on the Project and how the project will perform over it's lifetime in the context of climate change.</p>	<p>Water Control Structure), and how this may interact with the project.</p> <ul style="list-style-type: none"> ii. In the context of the integrated system of flood management infrastructure, describe how events under future climate scenarios may adversely affect the project and how this in turn could result in effects to the environment. iii. Describe details of planning, design, construction, and operation strategies intended to minimize any potential environmental effects of the environment on the project.
Accidents and Malfunctions					
IAAC-62	IAAC	<p>7.4 Mitigation measures;</p> <p>7.6.1 Effects of potential accidents or malfunctions</p>	<p>14.2.4 Incident Response and Mitigation;</p> <p>14.2.2 Incident Prevention;</p> <p>14.3.2 Incident Prevention</p> <p>14.6 Summary of Residual Effects,</p>	<p>Section 7.4 of the EIS guidelines require the proponent to present mitigation measures as specific commitments, with sufficient detail to support an understanding of the implementation and effectiveness of the proposed measures. Section 7.6.1 of the EIS guidelines requires the proponent to describe safeguards established to protect against accidents/malfunctions and the contingency and emergency response procedures that would be in place if such events do occur, taking seasonality into consideration.</p> <p>The EIS notes, throughout all phases of the project, many mitigation measures associated with accidents and malfunctions, such as routine inspections and maintenance, as well as actions to be taken if an accident/malfunction were to occur, but does not provide enough detail to enable the Agency to understand likely effectiveness of these measures or potential residual effects.</p> <p>The EIS discusses how some potential effects from accidents/malfunctions may change with seasonality. The EIS does not describe specific mitigation measures required based on seasonal variation. The EIS mentions the Emergency Response and</p>	<ul style="list-style-type: none"> a. For each mitigation measure proposed to address accidents and malfunctions, provide sufficient detail to enable the Agency to understand potential residual effects of an accident or malfunction. <ul style="list-style-type: none"> i. Discuss the anticipated effectiveness of currently proposed mitigation measures in various seasonal conditions and associated adaptations or alternate mitigation that could be required. Include details on surveillance, inspections and maintenance to help support the assessment of effectiveness. ii. Identify additional known mitigation measures that could be reasonably included in the referenced plans, including enough detail to understand implementation of the measure and the environmental outcome the mitigation measure is designed to address, in

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				Preparedness Plans (not yet developed), the Spill Response and Prevention Plan (referenced but not provided), and the Project environmental management program. As these plans are not provided, it is not clear if additional mitigation measures not explicitly mentioned in the EIS will be used.	addition to the assessment of the effectiveness.
IAAC-63	IAAC	7.6.1 Effects of potential accidents or malfunctions	14.3 Spills of Hazardous Materials, Table 14.6-1; 14.2 Outlet Channel Breach/ Control Structure Failure	<p>EIS Guidelines state that the proponent will “conduct an analysis of the risks of accidents and malfunctions, determine their effects, and present preliminary emergency response measures” and that EIS should include “safeguards that have been established to protect against such occurrences”.</p> <p>Section 14.3 Spills of Hazardous Materials does not discuss sediment as a hazardous material even though sediment can be considered a deleterious substance under the Fisheries Act and even though Table 14.6-1 lists fine aggregate as a contaminant under spills. The EIS contains some information on potential effects due to sediment entering surface waters through outlet channel breach or control structure failure but no specific mitigation measures are provided to address this.</p>	a. For all phases of the project, provide an assessment of risks for accident and malfunction scenarios involving sediment, including impacts to surface waters and aquatic species. Include mitigation measures that will be put in place to help prevent the scenario(s) from occurring and/or to address effects, including an assessment of the effectiveness of the measures.

