

Reference IR#	Expert Dept. or Group	EIS Guideline Reference	EIS Reference	Context and Rationale	Comments and Information requests
1	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 1.1. The proponent	1.2.2 - Corporate and Management Structures	From EIS Guideline: <i>"In the EIS, the proponent will:</i> ... <i>- describe corporate and management structures;</i> <i>- specify the mechanism used to ensure that corporate policies will be implemented and respected for the project;</i> <i>...."</i>	<ul style="list-style-type: none"> Section 1.2.2 of EIA "Corporate and Management Structures" does not appear to provide very much information regarding the organizational structure. It only focuses on Vision, mission, values and priorities. Please provide additional information on the corporate/management structures. There is also limited information on the "mechanism used to ensure that corporate policies will be implemented". Please add additional information.
2	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 1.3. Project Location	1.4 - Project Location	From EIS Guideline: ... <i>- the environmental significance and value of the geographical setting in which the project will take place and the surrounding area;</i> ...	<ul style="list-style-type: none"> While the surrounding geography, land use, and proximity to federal lands, environmentally sensitive areas, and communities is adequately described, there does not seem to be any indication of the significance or value, even if it is just in a general qualitative sense. Please add some discussion in this section (or cross-reference to another appropriate section) regarding environmental significance and value of the project setting.
3	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment subsection 7.1.4	2.2.1 - Lake Manitoba Outlet Channel (LMOC) 2.2.2 - Lake St. Martin Outlet Channel (LSMOC)	The EIS Guideline requires an adequate assessment of: "groundwater flow patterns and rates" . The excavation for both the LMOC and LSMOC will intercept groundwater-bearing intervals in both the till and underlying bedrock deposits. This groundwater will naturally flow into the channel alignments to provide some degree of sustained baseflow contribution. Insufficient information and data has been provided to determine the amount (and rate) of groundwater baseflow contribution to the LMOC and LSMOC channel flows.	<ul style="list-style-type: none"> Provide additional detail regarding the volume and rate of groundwater discharge anticipated to each channel alignment when control gates are both open and closed.
4	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment subsection 7.1.4	2.2.1.1 - Lake Manitoba Outlet Channel	The EIS Guidelines require an assessment of: "temporal changes in groundwater flow (e.g. seasonal and long term changes in water levels)" . The amount of water that will remain in the channels will influence how much baseflow contribution of groundwater occurs. Higher water levels will facilitate less contribution, and low water levels will facilitate more. Some information regarding how much water will remain in the LSMOC at all times (i.e. 1-2.5m) has been provided in the EIS (Section 2.2.2.1). However no information has been provided for the LMOC identifying what the water level that remains in the channel will be during times of open and closed gates, including the % of time the gates will be closed.	<ul style="list-style-type: none"> Provide more detailed information with respect to the levels of water above the invert depth that will be maintained in each channel alignment, including the length of time (or percentage of time)
5	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 3.2.3 Decommissioning and abandonment 3.5.4 Decommissioning and abandonment	3.3.3 - Decommissioning and Abandonment	From EIS Guideline: <i>"the preliminary outline of a decommissioning and reclamation plan for any components associated with the project;</i> <i>- the ownership, transfer and control of the different project components;</i> <i>- the responsibility for monitoring and maintaining the integrity of the remaining structures and hydrological function of the surrounding environment;</i> <i>- for permanent facilities, a conceptual discussion on how decommissioning and abandonment could occur."</i>	<ul style="list-style-type: none"> It is understood that the flood control systems of the Project are intended to be permanent. However, some additional discussion on responsibilities for monitoring/maintenance of structures, as well as conceptual discussion on decom/abandonment that could occur in the unforeseen event of its requirement at some point in the future, would be beneficial (or cross-reference to where this discussion takes place).
6	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 3.4.2 Lake Manitoba 3.4.2.1 Outlet Channel	3.4.2.1 - Outlet Channel	From EIS: "Average velocities in the LMOC are expected to range between approximately 0.9 m/s and 1.3 m/s, with locally higher velocities occurring in the vicinity of the bridges and the WCS when the gates are open (13% to 30% of the time depending on the month)."	<ul style="list-style-type: none"> Provide a cross-reference to the supporting calculations or modeling to support these depth and flow predictions.
7	PFN/SFN/SBO FN	Part 2 - Section 7, Effects Assessment, Subsection 7.1.4	3.4.2.10 - Drainage Realignment, 3.4.2.9 - Drainage Realignment	The EIS Guidelines require an adequate assessment of: "changes to surface water quality, including seasonal changes in runoff entering watercourses" . Insufficient information is provided to identify where the outside drainage-ways will be located in relation to surface water bodies and how they may influence those landscape features.	<ul style="list-style-type: none"> Provide a more detailed map showing where the outer drainage-ways will be located in relation to surface water bodies including an explanation as to whether these drainage-ways will result in impact to any of the surface water bodies.
8	PFN/SFN/SBO FN	7.3.1	3.4.2.10 - Drainage Realignment	Fish and Fish Habitat	<ul style="list-style-type: none"> Sec. 3.4.2.10 of the EIS, speaks to Drainage Re-alignment and drainage path interruption. Drainage waters from the till on the westside of the LMOC along with any wetland drainage along its path will be intercepted and drainage water pumped into the canal. This will cause the wetlands on the westside along with Birch Creek wetlands to draw down and potentially dry out.
9	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 3.4.3 Lake St. Martin Outlet Channel 3.4.3.1 Outlet Channel and Table 3A-1	3.4.3.1 - Outlet Channel	From EIS: "The range of depths and flows in the LSMOC channel, on a monthly basis, when the gates are open is presented in Appendix 3A, Table 3A-1. These values are based on the period of record, operating guidelines (Appendix 3D) and the current status of the design."	<ul style="list-style-type: none"> Provide a cross-reference to the supporting calculations or modeling to support these depth and flow predictions.
10	PFN/SFN/SBO FN	7.1.4	3.5.2.11 - Water Management	The EIS requires that a appropriate hydrogeological model be used and developed to assist in defining the hydrological systems present, flow regimes, analyses sensitivity to climatic variations and hydrological parameters, and a discussion on the models assumptions.	<ul style="list-style-type: none"> In 3.5.2.11 of the submitted EIS, it was stated "Groundwater Conditions are complex and critical to the functioning of the regional ecosystem in the Interlake Area. A detailed Groundwater Management Plan will be developed following the detail design phase [of the project]. Provide some indication of what this will involve and what the preliminary plan is. It is not possible to accurately assess the PDA/LAA/RAA impacts on hydrogeology without this.
11	PFN/SFN/SBO FN	7.2.2	3.5.2.11 - Water Management	The EIS states that the proponent will carry out modelling as required to substantiate anticipated changes to groundwater and surface water quality and quantity in all project phases and in all operational scenarios	<ul style="list-style-type: none"> In 3.5.2.11 of the submitted EIS, it was stated "Groundwater Conditions are complex and critical to the functioning of the regional ecosystem in the Interlake Area. A detailed Groundwater Management Plan will be developed following the detailed design phase of the project, similar statements were made with respect to surface water quality and quantity including sediment transport. However, no models were completed. Please provide details on the required models and when they will be completed.
12	PFN/SFN/SBO FN	7.2.2; 7.3.1	3.7.3 - Operation Environmental Management Program	Changes to groundwater, surface water and fluvial morphology. 7.2.2 of the EIS Guidelines require that the proponent will carry out modelling as required to substantiate anticipated changes to groundwater, surface water quality and quantity in all project phases and in all operational scenarios. 7.3.1 of the EIS Guidelines requires the proponent to provide the identification of any potential effects to fish and fish habitat as defined in Subsection 2 (1) of the <i>Fisheries Act</i> , including consideration of 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.	<ul style="list-style-type: none"> Section 3.7.3 of the EIS states that a Sediment Management Plan and Water Management Plan will be developed in the design phase of the project. No modelling has been done at this point. Based on the lack of modelling it is difficult to understand or to agree or disagree with many of the assumptions made throughout the EIS, with respect to water quality, sediment transport and groundwater dynamics.
13	PFN/SFN/SBO FN	7.1.1	6.2.2.2 - Existing Conditions for Atmospheric Environment	The EIS is required to provide: historical records of relevant meteorological information	<ul style="list-style-type: none"> With respect to wind speed and direction, 6.2.2.2 states that the wind directions from predominantly from the west and provides wind speeds as averages of average data. The CALMET data contradicts this in terms of both direction and speed. This could have implications to seiche set up particularly at the LSMOC on Lake Winnipeg, which given the fetch involved could be significant. Please clarify.

14	PFN/SFN/SBO FN	7.2.2	6.3 - Geology and Soils	Geology and Geochemistry: the EIS is required to provide baseline data	<ul style="list-style-type: none"> The EIS refers to both the diversion of intercepted till groundwaters along the westside of the LMOC and returning it to the canal for discharge to LSM. The EIS also refers to the collection of pressurized groundwater from relief wells and returning these waters to the wetlands. The two types of water are chemically dissimilar, and the effect of discharging the depressurized waters which has a very different ionic composition to that of the till groundwater, could cause an adverse effect on fauna and flora of the wetlands. Please discuss, provide chemical data to support the rationale of this water management solution.
15	PFN/SFN/SBO FN	Part 2 - Section . Effects Assessment, Subsection 7.1.4	6.3.2 - Existing Conditions for Geology and Soils	The EIS Guidelines require adequate information regarding: "physical properties of the hydrogeological units (e.g. hydraulic conductivity, transmissivity, saturated thickness, storativity, porosity, specific yield)" . This includes lithology and mineralogy. Lowering of the water table in the till deposits is expected when the LMOC and LSMOC channels are excavated. Lower water levels in the channels during operations will continue to promote the effect into the future. Lowering of the water table will expose otherwise saturated till to enhanced oxidation and wetting and drying effects. This will be exacerbated by periodic flooding events leading to bank storage and subsequent drainage. The potential impact of these effects on the quality of water draining from the till into the channels has not been assessed.	<ul style="list-style-type: none"> Provide details of how the seasonal wetting and drying of the till deposits along the channel alignment may influence the water quality discharging from those deposits.
16	PFN/SFN/SBO FN	7.1.2	6.3.2 - Existing Conditions for Geology and Soils	Geology and Geochemistry: the EIS is required to provide baseline concentrations of contaminants of concern within the Local, Regional and downstream receiving environments	<ul style="list-style-type: none"> Given that the construction of the LMOC channel will intercept and divert groundwater into surface waters, there appears to be no heavy metals data, or an assessment of the compatibility of the discharged groundwater with local receiving waters. It is not possible to assess the impact that these discharges would have on the receiving environment without this data. In particular, given the flood frequency of the wetlands between the LMOC and LSMOC has testing on the mobility of heavy metals and in particular methylated mercury from wetland soils into the groundwaters.
17	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment subsection 7.1.4	6.3.2.2 - Geology Overview	The EIS Guidelines require provision of: "physical properties of the hydrogeological units (e.g. hydraulic conductivity, transmissivity, saturated thickness, storativity, porosity, specific yield)" . Some information regarding the composition of the till deposits along the LMOC and LSMOC corridors is provided, but no detailed discussion of the lithological and mineralogical composition is provided. These factors can have an impact on the water quality in the till either under natural conditions or post-disturbance.	<ul style="list-style-type: none"> Provide borehole logs indicating the type of sediments within the till overburden deposits and the mineral content of the till deposits, including trace minerals present (e.g. types of sulphide minerals, as well as % content). <i>Note: IAAC mentions providing locations of boreholes and geological/stratigraphic cross-sections in Comment IAAC-10, but these are slightly different than our comment.</i>
18	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment subsection 7.1.4	6.3.2.2 - Geology Overview	The EIS Guidelines require an adequate: "hydrogeological context (e.g., hydrostratigraphy with aquifers and aquitards, major faults, etc.), including the delineation of key stratigraphic and hydrogeologic boundaries" . Till deposits on the plains of Canada are known to be heavily fractured in the upper weathered portion, which can extend several meters below ground level. This fracturing leads to enhanced hydraulic conductivity and water-bearing ability of otherwise low permeability deposits. The presence of fracturing in the till deposits flanking the LMOC and LSMOC corridors has not been confirmed, as well as the effect and role of water discharge from the till to the channels.	<ul style="list-style-type: none"> Provide information regarding the presence of fractures in till deposits along the LMOC and LSMOC channel corridors and the effect on groundwater transmission ability and drainage of water into the channels.
19	PFN/SFN/SBO FN	Part 1 - Key Considerations, 3.2.3.Spatial and temporal boundaries	6.4.1.4 - Boundaries	From EIS Guideline: <i>"The EIS will describe the spatial boundaries, including local and regional study areas, of each VC to be used in assessing the potential adverse environmental effects of the project and provide a rationale for each boundary. Spatial boundaries will be defined taking into account the appropriate scale and spatial extent of potential environmental effects, community knowledge and Indigenous knowledge, current or traditional land and resource use by Indigenous groups, ecological, technical, social and cultural considerations."</i>	<ul style="list-style-type: none"> In Section 6.4.1.4, there is description of the Spatial Boundaries for groundwater and surface water, split into PDA, LAA, and RAA. These are justified for the most part. However, there does not seem to be any discussion on the potential for the establishment of plumes (either of sediment or of accidental spills), and how this might affect the spatial boundaries of the assessment(s). It is recommended to add discussion on potential sediment plumes (mentioned later in this document), and tie that into the spatial boundaries of the assessments. <i>Note: IAAC also made some comments on spatial boundaries (IAAC-11, IAAC-19, IAAC-22); however their comments were related more to justification of the establishment of LAA and RAA, and therefore this comment is seen as separate and/or unique.</i>
20	PFN/SFN/SBO FN	Part 1 - Key Considerations, 3.2.3.Spatial and temporal boundaries	6.4.1.4 - Boundaries	Temporal boundary is essentially set as "indefinite" due to an unknown end-of-life for the Project. While this is appreciated that the Project will operate for the foreseen future, it becomes exceedingly difficult to conduct an assessment on something within an "indefinite temporal boundary", particularly when assessing cumulative impacts (see this link: https://iaac-aec.gc.ca/default.asp?lang=En&n=B82352FF-1&offset=6&toc=hide).	<ul style="list-style-type: none"> It is recommended to consider VC-based temporal boundaries and/or some combination of temporal boundaries that may vary based on VC, but should be more defined than "indefinite" to allow a realistically achievable assessment of potential impacts. <i>Note: IAAC also made some comments on temporal boundaries (IAAC-45); however their comments were related more to the specific temporal boundaries set for residual effects on wildlife; this is therefore a separate comment.</i>
21	PFN/SFN/SBO FN	Part 1 - Key Considerations, 4.3. Study strategy and methodology	6.4.1.6 - Significance Determination	Excerpt from EIS Guideline: <i>"The assessment will include the following general steps: ... - determining the potential significance of any residual environmental effect following the implementation of mitigation measures."</i> According to Sections 6.4.1.6 (Significance Determination), "Significance is not determined for groundwater and surface water. The changes to groundwater and surface water are used to determine changes and effects on the aquatic environment (Chapter 7), terrestrial environment (Chapter 8), human environment (Chapter 9), and Indigenous peoples' VCs (Chapter 10)"	<ul style="list-style-type: none"> While the secondary impacts on biological receptors is indeed important (and emphasized in the EIS Guideline), it is also important to determine the significance of the primary impacts on all VCs, including Surface Water and Groundwater. Without characterizing the significance of the impacts to these VCs, it becomes difficult to measure the effectiveness of implementing mitigation measures for these VCs, since the ultimate significance is only determined further down the pathway for the biological receptors. Furthermore, it is important to know the significance of any impacts to Surface Water and Groundwater regardless of the predicted secondary impacts to biological receptors, as otherwise it becomes more complicated to draw conclusions about the overall predicted health of surface water and groundwater, and the impact they may have on biological receptors in the future or due to cumulative impacts from other developments. <i>Note: IAAC suggested to revisit the methodology to assess residual effects to groundwater, surface water and fluvial morphology. This comment fits within that context but is itself a separate consideration.</i>
22	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.2 - Existing Conditions for Groundwater 6.4.5 - Existing Conditions for Surface Water	The EIS Guideline requires adequate information on: "all groundwater monitoring wells that may provide data relevant to the project, including their locations" . Lack of information has been provided regarding where baseline groundwater, as well as surface water samples, have been collected along the LMOC and LSMOC channel alignments.	<ul style="list-style-type: none"> Indicate where baseline surface water and groundwater samples have been collected, including date of collection and methodology.
23	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.2.1 - Groundwater Methods	The EIS Guidelines require identification of: "any local and regional groundwater resource use, including potable water and agricultural water uses, and a description of their current use and potential for future use" . The EIS indicates that there are a significant number of water wells that fall within the area projected to be impacted by dewatering effects. However, no information has been provided to determine how local water wells are completed, including their age, distance from the channel alignments, depth, lithology, use, yield capability, and chemical quality conditions.	<ul style="list-style-type: none"> Provide additional details of water wells along the channel alignments that may be adversely impacted by construction and long-term operations

24	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.2.2 - Groundwater Overview	The EIS Guidelines require adequate description of: " groundwater flow patterns and rates ". Some information is provided regarding the piezometric levels and flow conditions in the underlying carbonate bedrock aquifer beneath the LMOC alignment, but no information has been obtained for conditions beneath the LSMOC. The assumption is made that similar conditions exist. Additionally, no information is provided regarding piezometric levels or flow conditions in the overlying till deposits along either channel alignment. This information is important to understand the interaction between surface water and groundwater, the balance of hydraulic gradients and pressure between the till and the bedrock, as well as how groundwater may drain from the till deposits into the channel alignments.	<ul style="list-style-type: none"> Provide measurements of water levels in the till deposits (as metres below ground level) and how changes in potentiometric surface from channel construction and dewatering will affect vertical flow gradients. <p><i>Note: IAAC comments on groundwater elevations within till (Comment IAAC-20), but we are recommending additional data related to changes to vertical flow gradients from channel construction and dewatering</i></p>
25	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment subsection 7.1.4	6.4.2.2 - Groundwater Overview	The EIS Guidelines require an adequate description of: " groundwater quality, including lab analytical results for metals, major ions, and physical parameters, including temperature, with the interpretation of results for any anomalous values and for contaminants of concern ". Some information is provided in the EIS regarding the groundwater quality along the LMOC PDA. It is assumed that the samples were collected from the bedrock aquifer. Unfortunately no information is provided regarding groundwater quality along the LSMOC alignment. Additionally, no information is provided regarding the water quality in the till deposits flanking either the LMOC and LSMOC channel alignments. Once the channels are excavated groundwater will naturally drain from the till deposits into the channels. Therefore it is important to know what that water will contain in the way of dissolved constituents that may adversely affect water quality in the channels.	<ul style="list-style-type: none"> Provide detailed chemical information on water quality in the till deposits along both the LMOC and LSMOC channel alignments including major ions, metals and trace elements, nutrients etc.
26	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.2.2 - Groundwater Overview	The EIS Guideline require an adequate assessment of: " groundwater flow patterns and rates ". It is stated in the EIS that the piezometric levels in the bedrock aquifer can be up to 5 m above ground. It is also stated that removal of the surficial overburden will increase the risk of bedrock water flowing into the channel excavations. Insufficient information has been provided to determine the appropriate thickness of till cover required to avoid "blowouts" of this bedrock water from the underlying pressurized confined bedrock aquifer.	<ul style="list-style-type: none"> Provide details of how the thickness of protective till cover to avoid potential breakouts from the underlying bedrock has been determined
27	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.2.2 - Groundwater Overview	The EIS Guidelines require provision of: " physical properties of the hydrogeological units (e.g. hydraulic conductivity, transmissivity, saturated thickness, storativity, porosity, specific yield) ". Statements and values are provided in the EIS providing some idea of the hydraulic conductivity values in the till and bedrock along the LMOC (i.e., 2.9E-10 to 1.9E-5 and 1.7E-5 to 5.2E-5 m/s, respectively). No information is provided for the LSMOC alignment. It is unclear how the hydraulic conductivity (JK) measurements were performed and evaluated, including submission of K-test plots for evaluation).	<ul style="list-style-type: none"> Provide additional details of how hydraulic conductivity measurements were performed, and include the evaluation method and accompanying graphs to substantiate the values obtained.
28	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.2.2 - Groundwater Overview	The EIS Guidelines require: " a delineation and characterization of groundwater-surface water interactions including temperature and locations of groundwater discharge to surface water and surface water recharge to groundwater ". Statements are made in the EIS that there are springs along the channel alignments that may be impacted. Insufficient information has been provided regarding the presence and locations of springs along the LMOC and LSMOC alignments, including their importance to sustaining local water features and the impacts that dewatering may have on their future sustainability.	<ul style="list-style-type: none"> Provide a map showing the locations of known or suspected springs along the LMOC and LSMOC alignments in relations to the area of dewatering effects during construction and long-term operations. <p><i>Note: IAAC requested spring locations, but our comment provides some additional context.</i></p>
29	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.4.2 - Changes to Local Groundwater Flows, Levels and Quality	The EIS Guidelines require a: " a discussion of the hydrogeologic, hydrologic, geomorphic, climatic and anthropogenic controls on groundwater flow ". The EIS indicates that passive dewatering wells will be used to reduce the upward flow of groundwater from the confined bedrock aquifer beneath certain sections of the channel alignments. Although some information is provided regarding the extent of drawdown it is unclear what timeframe is used to determine these impacts. These passive dewatering wells will continue to drain water from the confined aquifer well into the future. It is unclear what the ultimate extent of impact this sustained dewatering will have on surface water bodies and springs reliant on the interaction with groundwater. Limited information has been provided to determine the long-term effects and spatial extent of impact on potentiometric surfaces until some sort of new equilibrium is reached.	<ul style="list-style-type: none"> Provide additional details from modelled projection of how long-term passive dewatering from pressure relief wells will affect the long-term (25, 50, etc. years) potentiometric surface in the bedrock aquifer including the extent of the drawdown effect outward until steady state conditions are achieved. Include an assessment of how (and where) groundwater dependent ecosystems will be adversely affected, and how impacts will be managed or compensated for.
30	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.4.2 - Changes to Local Groundwater Flows, Levels and Quality	The EIS Guidelines requires: " delineation and characterization of groundwater - surface water interactions including temperature and the locations of groundwater discharge to surface water and surface water recharge to groundwater ". Insufficient data and information has been provided to confirm the level of groundwater-surface water interaction between the till deposits and water features (i.e. creeks, streams, lakes, wetlands, etc.) along the LMOC and LSMOC channel alignments.	<ul style="list-style-type: none"> Provide more detailed information on the anticipated degree of GW-SW interaction with water bodies along the channel alignments and the anticipated zone of impact outward from the excavations (modelled projections). <p><i>Note: IAAC requests additional discussion on groundwater-surface water interactions on specific water bodies. Our comment is broader; we would like to see all potential interactions considered and where appropriate discussed.</i></p>
31	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.4.2 - Changes to Local Groundwater Flows, Levels and Quality	The EIS Guidelines require adequate information regarding: " physical properties of the hydrogeological units (e.g. hydraulic conductivity, transmissivity, saturated thickness, storativity, porosity, specific yield) ". This would include the lithology and mineralogy. Lack of information has been provided to determine the lithology and mineralogy of the till and how the groundwater quality may be impacted by drawdown effects of dewatering, including the potential introduction of oxygen and resulting weathering reactions.	<ul style="list-style-type: none"> Provide additional detail of how lowering of the water table in the till deposits and the potential introduction of more dissolved oxygen than is currently present may impact the weathering and leaching of minerals and adversely affect water quality.
32	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.4.2 - Changes to Local Groundwater Flows, Levels and Quality	The EIS Guidelines require a description of: " any monitoring protocols in place for collection of existing groundwater data ". It is stated in the EIS that Groundwater and Surface Water Management Plans are being developed to address negative impacts from channel construction and operations. No information is provided regarding protocols as to how samples will be taken, and how these plans will successfully detect and respond to negative impacts (i.e. mitigation). As such, there is a concern regarding how negatively impacted wetlands and other surface water bodies flanking the LMOC and LSMOC channel alignments will be rehabilitated and sustained, if at all.	<ul style="list-style-type: none"> Provide some details as to how the Groundwater and Surface Water Management Plans will be developed, including how impacts to surface water bodies along the LMOC and LSMOC channel alignments will be detected and how negatively impacted wetlands will be rehabilitated or compensated for.

33	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.4.2 - Changes to Local Groundwater Flows, Levels and Quality	The EIS Guidelines require provision of: "an appropriate hydrogeologic model for the project areas that discusses hydrogeological systems, flow regimes, analyses sensitivity to climatic variations (e.g. seasonal recharge) and hydrogeologic parameters (e.g. hydraulic conductivity) and a discussion of model assumptions" . It is stated in the EIS that dewatering of the confined bedrock aquifer along the LMOC will result in drawdown of about 14 m at the channel, reducing to 1.5 to 3.3 m at 3 km along segments being depressurized. Meanwhile, changes in the surficial overburden (till) will be limited to 1 m and only transfer 10 to 200 m at most. Unfortunately no information on the hydrogeologic model used to establish these drawdown effects is provided; therefore, the efficacy of these values cannot be substantiated. It is also unclear to what degree drying effects of the active and passive dewatering operations in the till and bedrock (including sustained drawdown effects) will have on the areas adjacent to the channel alignments.	<ul style="list-style-type: none"> Explain in further detail how the drying effects along the channel alignments have been assessed, including how these drying effects will influence vegetation health and viability of surface water features reliant on groundwater discharge.
34	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.4.2 - Changes to Local Groundwater Flows, Levels and Quality	The EIS Guidelines requires an assessment of: "changes to surface water quality, including seasonal changes in runoff entering watercourses" . Insufficient information has been provided in the EIS to determine the impact to water quality in the LMOC and LSMOC channels in the event of a "blowout" or series of "blowouts" of bedrock water if not properly managed.	<ul style="list-style-type: none"> Provide details of the potential impacts related to a breakout from the bedrock deposits on the water quality in the channel alignments
35	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7.2. Predicted changes to the physical environment 7.2.2.Changes to groundwater, surface water, and fluvial morphology	6.4.4.3 - Changes in Local Groundwater/Surface Water interactions Project Pathways LMOC	<p>"...</p> <p>Concern of GUDI (Drinking Water Quality)The GUDI at the proposed LMOC is very low due to high artesian pressure maintaining flow in the direction from groundwater to surface water</p> <p>..."</p>	<ul style="list-style-type: none"> Is there data that confirms very low GUDI at LMOC? If so please provide either a description or cross-reference to it in this section.
36	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7.2. Predicted changes to the physical environment 7.2.2.Changes to groundwater, surface water, and fluvial morphology	6.4.4.3 - Changes in Local Groundwater/Surface Water interactions Project Pathways LMOC	<p>Impacts on Wetlands adjacent to LMOC</p> <p>"Although water will likely not drain back through the till towards the limestone a source of water may be lost for this wetland when the construction dewatering occurs in the region. Water that is being discharged from the dewatering wells can easily be directed to the wetland to mitigate this potential although unlikely effect. Water quality monitoring would be required before a discharge occurs to ensure no harm is done to the vegetation or aquatic life (see Section 6.4.7.7)"</p> <p>Insufficient details on mitigation, and monitoring.</p>	<ul style="list-style-type: none"> This is a potentially serious impact to the wetlands. Provide additional details on how these wetlands will be protected and what monitoring and/or treatment measures will be implemented to protect the wetlands should water from dewatering wells be directed to wetlands. Provide the protocols for water quality monitoring during construction. <p>Note: IAAC also raised the issue of limited assessment of impacts to wetlands (Comment IAAC-23, among others). Our comment is related more to the mitigation and monitoring to abate such impacts.</p>
37	PFN/SFN/SBO FN	7.4. Mitigation measures	6.4.4.3 - Changes in Local Groundwater/Surface Water interactions	Mitigation measures provided are general and do not go into enough detail, especially with regards to potential effects to wetlands.	<ul style="list-style-type: none"> While it is noted that some of the mitigation measures are being prepared in the various EMPs as part of the engineering design, it would be beneficial to see additional details provided in the EIS so that their effectiveness can be weighed against the potential impacts. Many mitigation measures can be recommended based on best practice and are not dependent on final project design; current measures in the EIS should be expanded. <p>Note: While this is already mentioned by IAAC, as part of comment IAAC-15, its importance is high and we would like to re-emphasize that some elaboration is required here, whether it be including the draft Plans, or discussing best practice mitigation measures and a list of gaps that cannot be addressed until the detailed design stage.</p>
38	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7. EFFECTS ASSESSMENT 7.1. Project setting and baseline conditions	6.4.5 - Existing Conditions for Surface Water Appendix 6D EXISTING CONDITIONS FOR SURFACE WATER	<p>From EIS Guideline:</p> <p>"Where applicable and available, present baseline data pre- and post-2011 floods in Interlake Region."</p>	<ul style="list-style-type: none"> There does not seem to be clear discussion and comparison on pre-2011 and post-2011 baseline data. If this data exists, it needs to be organized more clearly to draw a comparison and illustrate the temporal variations. If it does not exist, pre-2011 data should be obtained and presented in the EIS. <p>Note: IAAC raised this in Comment IAAC-11. However, we would like to emphasize the importance of comparing the data to identify temporal variations, which is an extension of the IAAC comment.</p>
39	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7. EFFECTS ASSESSMENT 7.1.4.Groundwater and Surface Water	6.4.5.1 - Surface Water Methods 6.4.7.1 - Analytical Assessment Techniques for Surface Water Appendix 6I Appendix 6K	<p>Potentially insufficient hydrologic and hydraulic modeling.</p> <p>From EIS:</p> <p>"The hydrologic modelling included the following:</p> <ul style="list-style-type: none"> modelling of flow scenarios by Manitoba Infrastructure with and without operation of the Project (Manitoba Infrastructure 2019b) modelling of flood routing, sediment transport, and ice processes (KGS Group Ltd. 2014, 2016a, 2016b, 2017a, 2017b, 2018) modelling of channel flows for design and operation of the LMOC and LSMOC (see Chapter 3.0 Project Description)" 	<ul style="list-style-type: none"> There are no details of modelling except for water balance analyses. Provide details on hydraulic models used to simulate new channels and existing rivers along with any other modelling that may be already completed (water quality, sediment transport, ice processes). Modelling not completed yet should be described including future methods and criteria. <p>Note: DFO mentioned the requirement for hydraulic modeling in Comment IAAC-43 and IAAC-44. Our comment emphasizes also the importance of ice processes, distinguishing between the modeling and water balance analysis, as well as clearly describing future methods and criteria for modeling that is required in the future.</p>
40	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.5.2 - Surface Water overview	The EIS Guideline requires and adequate assessment of: "changes to surface water quality, including seasonal changes in runoff entering watercourses" . The EIS provides some limited information on the physical and chemical quality of surface water in some of the surface water bodies along the LMOC and LSMOC channel alignments. However, there is no information on some of the major wetlands that flank the LMOC and LSMOC channel alignments, as well as any springs that exist in the PDA, LAA, and RAA. The information provided lacks the detail necessary to assess how groundwater may be interacting with the surface water bodies to influence their chemistry.	<ul style="list-style-type: none"> Provide detailed water quality information (including major ions, metals and trace elements, nutrients, etc.) for the waters bodies and wetlands along the channel alignments that are anticipated to be adversely affected by channel construction and operation
41	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.5.2 - Surface Water Overview	The EIS Guidelines require: "a delineation and characterization of groundwater-surface water interactions including temperature and locations of groundwater discharge to surface water and surface water recharge to groundwater" . Detailed information on the groundwater and surface water quality has not been provided to assist with understanding the degree of interaction between these two entities. Equally, the locations of these interaction (groundwater to surface water, or surface water to groundwater) have not been sufficiently identified. More refined information on the locations of interactions and surface water chemistry is needed to assess these the exchange dynamics.	<ul style="list-style-type: none"> Provide detailed water chemistry information including individual measurements of pH, EC, redox, DO, temperature, alkalinity, hardness, major ions (Ca, Mg, Na, K, HCO₃, CO₃, SO₄, Cl), heavy metals and trace elements including As, B, Ba, Cd, Cr, Hg, Li, Sr, U, etc. plus dissolved organic carbon, nitrogen and phosphorous speciation, and types of hydrocarbons measured. <p>Note: IAAC also requested measurement of additional parameters, however these are our independent recommendations of parameters to include.</p>
42	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	6.4.7 - Assessment of Residual Environmental Effects on Surface Water	The EIS Guidelines require: "a discussion of the hydrogeologic, hydrologic, geomorphic, climatic and anthropogenic controls on groundwater flow" . Insufficient information has been provided to determine the long-term implications of LMOC and LSMOC channel excavations on the water balance of the adjacent areas (including impacts of climate change).	<ul style="list-style-type: none"> Provide an assessment of how the long-term presence of the channel alignments will affect the water balance in adjacent wetlands including the degree to which wetlands and water bodies will be negatively impacted (e.g. % less contribution from groundwater).
43	PFN/SFN/SBO FN	7.2.2	6.4.7 - Assessment of Residual Environmental Effects on Surface Water	The EIS Guidance requires that changes to suspended solids (TSS) that are anticipated as a result of the project will be addressed.	<ul style="list-style-type: none"> Suspended solids resuspension in the three receptor lakes are addressed in a qualitative manner, please provide a detailed sediment transport assessment based on the flow regimes expected and the contributions from LM, LSM. It is inferred that sediment transport will be high initially but will taper off as the new channel erodes; however, it is stated that the channels will really only operate every 3 to 5 years. In the intervening time sediment will collect in the channels under the reduced flow rates and will subsequently be flushed with the next flood flows. Additional transportable material may also accumulate in Lake Manitoba over the intervening years.

44	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7.2. Predicted changes to the physical environment 7.2.2.Changes to groundwater, surface water, and fluvial morphology	6.4.7.1 - Analytical Assessment Techniques for Surface Water	From EIS: "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."	<ul style="list-style-type: none"> It is understood that not all detailed information is available at this stage, however there should be an attempt to find a balance between conducting enough modeling to predict impacts, without conducting modeling that is not based on finalized data and would have to be redone. It is suggested to provide additional modeling (as noted elsewhere in this document), or to provide further details on the specific project information that is not yet finalized but required to conduct the modeling. In addition, there should be a clear description of future studies that will be required, as well as a description of how these studies will be carried out. This extends not only to modeling in this instance, but for all future baseline data collection, assessments, and modeling requirements. <p><i>Note: DFO and IAAC refer to various sections where future studies or models should be better described or provided in draft form, but our comment is more representative of all study gaps.</i></p>
45	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7.2. Predicted changes to the physical environment 7.2.2.Changes to groundwater, surface water, and fluvial morphology	6.4.7.3 - Changes in Regional and/or Local Fluvial Geomorphology and Shoreline Geomorphology	<ul style="list-style-type: none"> Studies are promised for the design of inlets/outlets including jetties, but no details on if they will be sediment transport studies. Goals for studies are presented including minimizing or preventing sediment moving. But there is no description of methods/models to be used. Reduction in the magnitude of extreme flows for Fairford and Dauphin Rivers may cause development of gravel or sand bars. 	<ul style="list-style-type: none"> Provide discussion about potential development of gravel or sand bars due to reduction in magnitude of extreme flows for Fairford and Dauphin Rivers. Provide discussion on whether that would be an issue. Provide details on studies for design of inlets/outlets including jetties. Provide description of methods and models to be used.
46	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7.2. Predicted changes to the physical environment 7.2.2.Changes to groundwater, surface water, and fluvial morphology	6.4.7.4 - Changes in Local Drainage Areas and Local Drainage Patterns	<ul style="list-style-type: none"> A reduction of 27% in catchment area for Birch Creek is expected to produce a low to moderate reduction in flows. More description required to backup the conclusion. Protocols for future monitoring should be established to confirm effects on Birch Creek system as well as on Buffalo Creek System. Actions in the mitigation plan should be considered in case the effect is higher than anticipated. 	<ul style="list-style-type: none"> Provide additional description to back up conclusion that 27% reduction in Birch Creek catchment area will produce low to moderate reduction in flows. Provide protocols and methods for future monitoring to confirm effects on Birch Creek system and Buffalo Creek System. Provide actions in mitigation plan to address above issues in case the effect is more pronounced than expected.
47	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7.2. Predicted changes to the physical environment 7.2.2.Changes to groundwater, surface water, and fluvial morphology	6.4.7.5 - Changes in Regional and/or Local Sediment and Debris Transport	No protocols for monitoring sediment have been provided.	<ul style="list-style-type: none"> Protocols for future monitoring on sediment should be provided. They should include methods to identify potential development of gravels/sand bars as well as changes in the sediment suspended solids.
48	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7.2. Predicted changes to the physical environment 7.2.2.Changes to groundwater, surface water, and fluvial morphology	6.4.8 - Summary of Project Residual Effects	Changes in regional and/or local surface water quality determined to have "Neutral" direction.	<ul style="list-style-type: none"> It seems unlikely that the changes would be anything other than adverse. The potential for erosion and sedimentation when constructing infrastructure projects adjacent to, and within, existing water bodies is substantial, and it is doubtful that any amount of mitigation measures will completely abate this negative effect on surface water quality. Please revisit the assessment conclusions.
49	PFN/SFN/SBO FN		6.4.8 - Summary of Project Residual Effects	The EIS Guidelines require an adequate assessment of: "groundwater quality, including lab analytical results for metals, major ions and physical parameters, including temperature, with the interpretation of results for any anomalous values and for contaminants of concern" . It is stated in the EIS that groundwater dewatered during the construction and operational phases of the outlet channels will be discharged to surface. Insufficient information has been provided to assess the impact of discharged groundwater from dewatering operations on local water bodies and associated aquatic habitat.	<ul style="list-style-type: none"> Provide detailed information regarding the water quality in the till that may drain to the channel alignments and the potential impact this water may have on aquatic habitat and life.
50	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7. EFFECTS ASSESSMENT 7.1.4.Groundwater and Surface Water	6.5.4.2 - Surface Water Overview	<ul style="list-style-type: none"> Presentation and sufficiency of baseline data on surface water and sediment quality is lacking. Monitoring and mitigation for Buffalo System are insufficient. 	<ul style="list-style-type: none"> 6.4.5.2 Surface Water Overview - Table 6.4-9. 6D.4 REGIONAL AND LOCAL SURFACE WATER QUALITY contains information from various sources on the baseline water quality in several water bodies. Please include a comparison against relevant regional or national water quality guidelines, with indicators (i.e. bold text) for parameters that exceed the guideline values to make it easier for the reader to quickly assess and compare baseline water quality. In addition, it isn't particularly useful to present the data as a single range for each water body. Further analysis on temporal and spatial variation within each water body should be conducted for parameters of concern. 6.4.5.2 Surface Water Overview - Sediment Quality. Limited data is presented on baseline sediment quality. This does not allow adequate future comparisons of effect to sediment quality from the project. Additional sediment quality data should be collected for the affected water bodies. For the Buffalo System, protocols for future monitoring should be provided so to be able to identify changes due to the project. A mitigation plan should be in place in case water need to be added to the system in the future. <p><i>Note: IAAC also mentions the lack of sediment baseline data (Comment IAAC-12), as well as the inadequate format/presentation of the current data for other baseline sections (i.e. groundwater in IAAC-26). Our comment provides additional context and specific details that should be taken into account.</i></p>
51	PFN/SFN/SBO FN	7.3. Predicted effects on valued components 7.3.1.Fish and fish habitat	7.0 ASSESSMENT OF POTENTIAL EFFECTS ON AQUATIC ENVIRONMENT 7.2 FISH AND FISH HABITAT	General comments on Section 7.2 Fish and Fish Habitat	<ul style="list-style-type: none"> Temporal Boundaries - see previous comments on temporal boundaries. Whilst this section is thorough, it is noted that it is highly dependent on the outcomes of the section on predicted changes to Surface Water (Section 6.4). Therefore, any changes that occur to the EIS in Section 6.4 should be examined to see if there are any implications on Section 7.2, and the section should be updated accordingly.
52	PFN/SFN/SBO FN	7.2.2.2	7.2 FISH AND FISH HABITAT	Fish and Fish Habitat	<ul style="list-style-type: none"> The EIS provides some information regarding the baseline conditions of Lake Winnipeg. However, the majority of information provided refers to the southern basin of the lake, when it is the northern basin that could potentially be most affected by the LSMOC. It also states that the northern basin of the lake has less sediment than the southern basin but provides very little data to support this statement. Since the LSMOC will carry higher sediment loads into Lake Winnipeg in the future this could affect the water quality, substate quality and secondary production in the lake. Provide data on sediment distribution in the lake and in particular within Sturgeon Bay.

53	PFN/SFN/SBO FN	7.2.2.2	7.2 FISH AND FISH HABITAT	Fish and Fish Habitat	<ul style="list-style-type: none"> The EIS states that Lake Manitoba has an average depth of 5 M and maximum depth of 7 M. Since the LAA only covers part of the north basin i.e., Watchorn Bay this is not pertinent since the north basin of the lake is generally only 1.5M in depth and is all within the euphotic zone making it highly productive. Most of the other information provided regarding Lake Manitoba is about the south basin and is very dated. The data regarding primary production and trophic status likely does not reflect current conditions in the lake since the opening of the Portage Diversion. This diversion is adding considerable volumes of highly nitrified waters to the lake annually. Could you provide more recent data from the north basin of the lake in order to assess its current productive status and/or provide future monitoring plans to provide same.
54	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.3.1	7.2 FISH AND FISH HABITAT	Fish and fish habitat. The permanent loss of fish habitat in Lakes Manitoba, St. Martin and Winnipeg by the excavation of the intake, and outlet channels has not been defined quantitatively.	<ul style="list-style-type: none"> These excavations represent a permanent HADD as defined in the Fisheries Act. No compensatory mitigation for this loss has been offered. Nor has the expected loss of habitat been clearly defined in terms of area of loss, or current use by fish and other aquatic species.
55	PFN/SFN/SBO FN	7.3.1	7.2 FISH AND FISH HABITAT	Fish and Fish Habitat. The EIS is required to locate and quantify spawning habitat by location and area	<ul style="list-style-type: none"> Spawning habitat usage was identified in in the EIS to occur in Birch Bay and Birch Creek by several studies but the amount of area used by fish for these purposes has not been quantified or located. Please provide further detail.
56	PFN/SFN/SBO FN	7.3.1	7.2 FISH AND FISH HABITAT	Fish and fish habitat.	<ul style="list-style-type: none"> Watchorn Bay is used as a migratory staging area for Watchorn Creek and Mercer Creek which both also support a commercial fishery. With the development of a flared intake bay bounded by rock jetties these movements may be restricted somewhat and by changing the currents in the area could diminish fish passage into these creeks in the future. Please comment and provide mitigation measures to reduce these potential impacts
57	PFN/SFN/SBO FN	7.3.1	7.2 FISH AND FISH HABITAT	Fish and fish habitat. The EIS is required to provide maps, at a suitable scale, indicating the surface area of potential or confirmed fish habitat used for spawning, rearing, nursery, feeding, overwintering, migration routes, etc. Where appropriate, this information should be linked to water depths (bathymetry) to identify the extent of a water bodies littoral zone.	<ul style="list-style-type: none"> The EIS refers to various habitat uses for all of these fish life stages but does not provide specific information on the extent in terms of surface areas except in a very general way for all water bodies assessed. The EIS also refers to the EOC as additional habitat and states that the EOC canals will not be decommissioned. In the event of an extreme flood stage, will these EOC canals take additional waters sufficient to reopen the connection to Lake St. Martin? Have the implications of this occurring been considered?
58	PFN/SFN/SBO FN	7.1.5;7.3.1	7.2 FISH AND FISH HABITAT	Fish and Fish Habitat. The EIS is required to provide a characterization of fish populations on the basis of species and life stages...The identification of any potential adverse effects on fish and fish habitats as defined in subsection 2(1) of the Fisheries Act ...	<ul style="list-style-type: none"> The EIS states that Whitefish and other fish larvae will be moved down the LMOOC from Lake Manitoba and in particular from Watchorn Bay into Lake St. Martin. Has the implications of this loss to the overall health of the fish populations in Lake Manitoba been considered?
59	PFN/SFN/SBO FN	7.3.1	7.2 FISH AND FISH HABITAT	Fish and Fish Habitat. The EIS is required to document the potential effects on riparian areas that could affect aquatic biological resources and productivity taking into account any anticipated modifications to fish habitat.	<ul style="list-style-type: none"> Riparian areas particularly along the shoreline of Birch Bay in Lake St. Martin would be at risk of flooding during any future flood stage where the canals are fully functioning. This would occur during the spring freshet period when several fish species are likely to be spawning in this area. Since the assessment was based on flood levels without consideration of wind effects or climate effects, both of which could be predicted to raise water levels at the Lake Manitoba Outlet, has the risk of these types of occurrences been addressed. Please provide an assessment of these types of scenarios in the form of a risk assessment .
60	PFN/SFN/SBO FN	7.3.1	7.2 FISH AND FISH HABITAT	Fish and Fish Habitat. The EIS is required to address the potential for fish mortality due to stranding in the channels during or after operation.	<ul style="list-style-type: none"> The EIS does address the issue of stranding, but no firm rescue plan for fish stranded in the canals has been put forward. Please rectify and as a suggestion involve the local first nations in the fish rescue plans.
61	PFN/SFN/SBO FN	7.3.1	7.2 FISH AND FISH HABITAT	Fish and Fish Habitat. The EIS is required to address the effects of any modifications on migration or local movements (upstream, downstream migration and lateral movements) following the construction and operation of works (physical and hydraulic barriers);	<ul style="list-style-type: none"> The construction and operation of the LMOOC intake will alter the lateral movement of fish and fish larvae in Watchorn Bay, Watchorn and Mercer Creeks. Similarly the outlet into Birch Bay may affect use and lateral movement within the Bay for fish and fish larvae during both the construction and operational phases of the project. The probability of these effects have not been discussed in detail and no mitigation plans have been suggested. The situation at the LSMOC in both Lake St. Martin and Lake Winnipeg have similarly not been addressed.
62	PFN/SFN/SBO FN	7.1.4 ; 7.3	7.1.4 Groundwater and Surface Water; 7.1.5 Fish and Fish Habitat; 7.3 Predicted effects on valued components	The EIS is required to describe the sediment and sediment quality, uses and locations of habitat by fish species; 7.3 Predicted effects on valued components, 7.3.1 Fish and Fish Habitat. The EIS is required to provide the identification of any adverse effects to fish and fish habitat as defined in subsection 2(1) of the Fisheries Act, including the calculations of any potential habitat loss (temporary or permanent) in terms of surface area (e.g. spawning grounds, fry-rearing areas, feeding) and in relation to watershed availability and significance. including the consideration of the geomorphological changes (e.g. modifications of the hydrological and hydrometric conditions of fish habitats (modifications of substrates, dynamic imbalance, silting of spawning beds)	<ul style="list-style-type: none"> The EIS states that sediment transport will be high immediately after the LMOOC canal and the LSMOC canals begin operating. But that sedimentation will decrease after the first flush and over the next 3 to 5 year period. There is no substantiating proof that this will be the case, please provide the rationale for this assessment. If the canals are predicted to only being used only every 3 - 5 years sediment will build up and be transported on and with the next flood event. This has the potential to infill any rocky or coarse gravel substrates in the near vicinity to both outlets. Such substrates are used for spawning by Whitefish and other species. These diverse substrates also typically support a high diversity of macrobenthic fauna which would be reduced in both diversity and productivity if sediment was being deposited where they occur.
63	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2. Fish and Fish Habitat, LAA; Lake Winnipeg, the EIS is required to provide a description of primary and secondary productivity in affected waters with a characterization of seasonal variability.	<ul style="list-style-type: none"> Secondary production data from 1928/29 has been compared to data from 1969 to establish a baseline for benthic macroinvertebrates. Were the collection techniques comparable between the two reporting periods? A summary table of the benthic data would be useful. A tripling of in benthic density was noted over the last several decades (1969 to 2002). No data is provided to illustrate this trend. It was speculated that the benthic density increase were due to the addition of nutrient rich waters resulting from urban growth and agricultural runoff from the watershed that contributes to the lake. Please provide summary data to support the trend in density and the changes to water quality.
64	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Fish Habitat in the RAA	<ul style="list-style-type: none"> The EIS states that little is known of the use of specific habitats used by fish in the lake but most species are wide spread. If little is known why was there no effort to quantify usage for this EIS?
65	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Fish Communities in the LAA	<ul style="list-style-type: none"> Tributaries are important for spring spawning and summer rearing, nearshore wetlands are important spawning areas for Northern Pike, Carp, Walleye and Yellow Perch. Were these areas defined, located, and measured as required as part of establishing the baseline conditions?
66	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Fish Communities in the LAA Watchorn Bay	<ul style="list-style-type: none"> The EIS states that the shallow depths and wave action in Watchorn Bay create conditions that mobilize sediments which likely makes the habitat suboptimal for spawning of most large bodies fish species in Lake Manitoba. However, these species do migrate through the bay to access the tributaries draining into it for spring spawning and summer rearing (Walleye, Northern Pike, Suckers). So while the bay may not be optimal habitat it does provide an important fish migratory route. Please provide more detail.
67	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Watchorn Bay, Fish Habitat in the LAA	<ul style="list-style-type: none"> The benthic invertebrate collected from Watchorn Bay are not typical of the types of invertebrate assemblages found on fine sediments they are more typical of coarse and rocky substrates. According to the description of the bay in the EIS the substrates are frequently mixed and suspended in the bay. If this is correct are the benthic samples representative of the area, how many samples were collected and where is the data?
68	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Fish Habitat in the LAA, Watchorn Bay	<ul style="list-style-type: none"> In the EIS the densities of benthic invertebrate collections from 2015 and 2018 in Lake St. Martin and Lake Winnipeg were compared to collections from Watchorn Bay, without a description of the collection techniques used, or a description of the substrates sampled and how many samples were collected this statement is not supportable or relevant.
69	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Fish Communities of the RAA; Lake Winnipeg	<ul style="list-style-type: none"> The EIS states that Walleye abundance in Lake Winnipeg has increased in concert with rainbow smelts abundance. However, the CAMP data referred to in the EIS apparently suggests that rainbow smelt abundance has decreased over the last few years substantially. So have the Walleye populations followed a similar trend? It would be useful for these comparative data to be summarized in the EIS.

70	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Commercial, Recreational and Aboriginal Fisheries	<ul style="list-style-type: none"> The EIS contains no data or data summaries if they exist for Aboriginal uses of the fishery. For example, although limited aboriginal traditional and subsistence fisheries information was provided, as the EIS states, no data of any sort was provided in the reviewed document. Given that the notes from the engagement process clearly show that Aboriginals (First Nations and Metis) do use the fishery for traditional, subsistence and commercial purposes. Please provide clarification on this lack of detail and a plan for rectifying this lack of information.
71	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Lake Winnipeg	<ul style="list-style-type: none"> The EIS provides some information regarding the baseline conditions of the Lake Winnipeg aquatic ecosystem. However, the majority of information provided refers to the southern basin of the lake, when it is the northern basin that could potentially be most affected by the LSMOC. For example, information relative to the increase in sedimentation of the approaches to the Dauphin River and its delta were provided as part of the EOC assessment. No comment was made regarding what if any effect this has had on fish migration or spawning use. Please provide comments.
72	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Fairford River - Fish Community in the LAA	<ul style="list-style-type: none"> The EIS states the studies of the Denil Fishway on the Fairford River undertaken in the Spring of 1987 and Fall of 2004 indicated that the fishway successfully allows upstream passage of large bodied fish from Lake St. Martin to Lake Manitoba. First Nations during the engagement process stated several times that the fishway is ineffective. Have the results from the two noted fishway studies been compared to pre-fishway catch data to determine if there has or has not been a reduction in the rivers use as a migratory corridor? If so please provide these data.
73	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	Pineimota Lake - Fish Community in the LAA	<ul style="list-style-type: none"> No baseline aquatic faunae information or fish data has been provided for this lake and only 15% of the lake was surveyed. Since the lake is probably used for spawning and as a resting area during staging and possibly a rearing area this deficiency should be rectified.
74	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Lake St. Martin, Fish Habitat in the LAA	<ul style="list-style-type: none"> The substrate information provided in the EIS is of little value and does not provide sufficient information to constitute a baseline. Since the EIS states that lake appears to be wind mixed and does not stratify additional sedimentation as is predicted with the completion of the LSMOC could have negative effects on the diversity of substrates available for both secondary productivity and fisheries use. Please supply additional detail.
75	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Dauphin River - Fish Community in the LAA	<ul style="list-style-type: none"> The Dauphin River drains Lake St. Martin to Lake Winnipeg. It is likely that the river will lose some portion of flow when the LSMOC is completed. More detail on the effects of the EOC on this river would be appropriate here to allow one to anticipate the kinds of impacts from this previous canals operations on the river were.
76	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	7.2.2.2 Birch Bay - Fish and Fish Habitat in the LAA	<ul style="list-style-type: none"> Sedimentation data is limited and of little value. The bay supports dense aquatic vegetation on west and east shores. Since these are likely spawning and rearing areas for fish like Northern Pike changes to the diversity of substrate in the bay as a result of increases in sediment load into the bay as a result of LMOCC construction and operation could affect these uses. Therefore it is critical to gather accurate information on the distribution of substrates and a measure of their diversity prior to the LMOCC being built. Please provide additional information on the distribution and size classes of substrates within the bay.
77	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	Sturgeon Bay - Fish and Fish Habitat in the LAA	<ul style="list-style-type: none"> The EIS states that during the operation of the EOC between 2011 and 2015, large volumes of sediment was deposited in Sturgeon Bay. Sampling conducted between 2011 and 2015 showed that the silt component of the bottom substrates increased as a direct result of the operation of the EOC. Where is this data? It should be provided so that the degree of past sedimentation as a result of the EOC operations is known. The LMSMOC will have a similar effect on sediment transport and possibly more than the EOC did. Increases in silt load into Sturgeon Bay as a result of the operation of the EOC covered the coarse substrates at the mouth of the Dauphin River with silt and clay. This would be a negative impact on fish use of the area, would decrease secondary productivity and diversity and would likely have some effects on migratory movement of fish into the Dauphin River. Given the implications of this effect it is surprising that only one reference was cited to provide an indication of sedimentation on benthic diversity and production was cited. This study was conducted in 2018 and showed that benthic densities decreased. Please provide detail and discussion relative to these past effects on the fish and fish habitat in Sturgeon Bay.
78	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	LAA - Lake St. Martin Fish and Fish Habitat	<ul style="list-style-type: none"> The EIS states that it is reported to have an abundance of Groundwater upwellings, which may be a key attribute to whitefish spawning habitat in the lake. Where are the most likely areas of groundwater upwelling and has the water chemistry been tested to confirm their presence? Please provide further detail.
79	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	LAA - Fish and Fish Habitat	<ul style="list-style-type: none"> In general, the EIS makes several suggestions of where fish spawning might occur. These statements are backed up somewhat by the capture of larval fish species in several fish sampling tows. However, in no instance were definitive locations and extent of spawning areas provided.
80	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	Commercial, Recreational and Aboriginal Fisheries	<ul style="list-style-type: none"> The EIS indicates that Lake Winnipeg, Lake St. Martin, Dauphin River and Lake Manitoba have supported subsistence fisheries since time immemorial. The EIS provides a listing of the principal fish species harvested by Aboriginal fishers. But no catch statistics were provided. Sturgeon Bay is also mentioned as an important commercial fishery primarily by fishers from the community of Dauphin River which is also primarily an aboriginal community. There is no indication of the catch statistics. If no data was made available state this to be the case. Fish are also used in ceremonial and other cultural events not just for sustenance.
81	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	Commercial, Recreational and Aboriginal Fisheries	<ul style="list-style-type: none"> In an earlier section of the EIS, it was reported that Mercer Creek and Watchorn Creek both support commercial fisheries, these locations are both within the LAA, close to First Nations, and will be affected by the construction of the LMOCC. If these are commercial fisheries, statistics on annual catches must be available and should be presented here. Annual fish harvest returns should also be monitored during the operational phases of the project in order to quantify any impacts that the project would have on the fishery in the future.
82	PFN/SFN/SBO FN	7.1.5	7.2 FISH AND FISH HABITAT	Commercial, Recreational and Aboriginal Fisheries	<ul style="list-style-type: none"> The effects of the EOC operation on the viability of the Sturgeon Bay Fishery was noted in numerous comments collected during the First Nations and Aboriginal engagement process, but only a passing mention is given here. Given the magnitude of the loss fisheries and local fishers and the likelihood that similar effects will result from the operation of the LSMOC, this section should be revisited and expanded to discuss the situation in 2011 through 2015 within this bay.
83	PFN/SFN/SBO FN	7.1.5	7.2.2.2 - Overview of Fish and Fish Habitat	Overview of Fish and Fish Habitat, LAA; Lake Winnipeg	<ul style="list-style-type: none"> Description of Lake Winnipeg and the baseline provided are insufficient. The lake should be discussed as two separated basins with the north basin likely to be the most impacted basin as a result of the discharge from the LSMOC. Statements such as, the north basin displays complete spatial and temporal variation in dissolved oxygen concentrations throughout the lake in recent years is not backed up with data. There is a suggestion that the north basin thermally stratifies but no data showing the depth of the thermocline. Other statements that say the lake is thoroughly mixed and wind swept suggest that the water column is mixed which is contradictory to stratification. Given that water from the LSMOC will likely be fairly turbid and warm in comparison to waters in the north basin of Lake Winnipeg, this section requires more detail to allow the future sections impact assessment. Please provide additional baseline data to help clarify.

84	PFN/SFN/SBO FN	7.1	7.2.1.5 - Boundaries	Project setting. Based on the scope of the project described, the EIS will present baseline information in sufficient detail to enable the identification of how the project would affect the VC's and an analysis of those effects. 7.1.5 Fish and Fish Habitat requires that the baseline to describe the potentially affected surface waters.	• 7.2.1.5 Refers to field surveys and literature that used field surveys designed to evaluate the EOC between 2001 and 2015, the data provided in the literature cited in support of the biological description of the LAA were not summarized. The descriptions of methods employed to gather these data, the study scopes and/or the study designs were not provided. So it is not possible to discern whether statements made have been interpreted correctly or if the methods used were compatible. Please provide the documents for review or provide summaries of the work included in them, including scope and methods used.
85	PFN/SFN/SBO FN	7.1.5	7.2.2 Existing Conditions for Fish; 7.2.2.1 Methods	Existing Conditions and Methods - Fish	• Field surveys are not documented or summarized in the EIS, the reader is referred to several technical reports that are referenced (KGS, NSCAA) to find these details. How are we able to assess whether the methods were comparable so that the data collected can be compared? Please provide information in summary form or make the references available for review.
86	PFN/SFN/SBO FN	7.3 Predicted effects on valued components	7.2.3 - Project Interactions with Fish and Fish Habitat	Project Interactions with Fish and Fish Habitat	• Table 7.2.5 is unclear in its present format. Suggest changing the dash to NA (No Effects) and open space to E (Effects), to clarify table and so that a reader can easily discern its meaning.
87	PFN/SFN/SBO FN	7.3 Predicted effects on valued components	7.2.3 - Project Interactions with Fish and Fish Habitat	Project Interactions with Fish and Fish Habitat	• The EIS suggests that the construction of the intakes and outlets on Lake Manitoba, Lake St. Martin and Lake Winnipeg have the potential to create a HADD. We disagree, there will be HADDs. We also disagree that the newly created channels will provide additional new fish habitat of equal value. No rationale for this assessment is provided except that the area of the channel exceeds the area of the excavated inlet channel. No alternate compensation are offered to make up for the loss of fish habitat.
88	PFN/SFN/SBO FN	7.3. Predicted effects on valued components 7.3.1. Fish and fish habitat	7.2.3 - Project Interactions with Fish and Fish Habitat	Project Interactions with Fish and Fish Habitat	• The EIS refers to the potential for the project to cause impacts to occur with respect to; fish health and mortality, fish passage and to create a permanent alteration or destruction of fish habitat. We disagree with this assessment based on the information provided in previous sections of the EIS. The construction of the LMOC and LSMOC intake and LMOC outlet channels will definitely create a permanent loss of fish habitat, this is not a potential loss. It is offered that the newly created channels will compensate for this loss of natural habitat. This assertion is based on there being more wetted area available for fish to use which is equated to more habitat. While there may be more habitat created by the channels, it is not clear from the previous sections that this new habitat will be equivalent to that which will be lost as a result of the construction. The supporting data regarding the effects and quality of groundwater from dewatering and the water quality overall that would result is not available for review in the EIS. This lack of data makes it difficult to accept this assessment. Further, the low flows in the channels following the passing of a flood would likely make water temperatures in the channels increase in comparison to that in the lake. The effects of temperature in the channels on fish use did not appear to have been addressed.
89	PFN/SFN/SBO FN	7.3 Predicted effects on valued components	7.2.3 - Project Interactions with Fish and Fish Habitat	Project Interactions with Fish and Fish Habitat	• The EIS in general suggests that for the identified changes that may occur that are related to fish and fish habitat and use; that there is only a potential for impacts to occur. To be clear, there will be impacts, most of which are negative, what is not clear from the data provided is the level of severity and the duration of said impacts. Overall the fisheries sections of the EIS is quite thorough but lacking in sufficient detail to make this assertion. Detail is lacking with respect to groundwater effects on water quality, what water quality constitutes the baseline, and how these factors interact with and affect fish and fish habitat use. Data on primary and secondary production in the three lakes is also minimal.
90	PFN/SFN/SBO FN	7.3 Predicted effects on valued components	7.2.3 - Project Interactions with Fish and Fish Habitat	Project Interactions with Fish and Fish Habitat	• The Lake Manitoba EOC channels are not to be decommissioned following the completion of the LMOC. This raises two points that require answering: one, have there been aquatic ecosystem studies completed on these channels that could be used to support the claim that these types of channels produce productive fish habitat. It was noted that the construction technique being planned for the LMOC is the same as the one that was used to construct the LMOC. So the habitat created would be similar over time which would make such a comparison extremely useful. And two, if the construction of the LMOC channels and infrastructure is going to take 5 or so years to complete, while the EOC serve as the emergency relief system over those years? Additionally, from a First Nations Traditional Use perspective if the EOC is to remain functional if required over the construction period of this means that the land between the EOC and the LMOC will be severely impacted in terms of use for any traditional or cultural practices that occur within those boundaries. The groundwater flows beneath the lands between the two channels will also be impacted in a cumulative manner that may cause the natural uses of these wetlands by plants and animals. Has this impact been evaluated.
91	PFN/SFN/SBO FN	7.3 Predicted effects on valued components	7.2.3 - Project Interactions with Fish and Fish Habitat	Project Interactions with Fish and Fish Habitat	• LSMOC, Reach 1 of the Lake St. Martin EOC will not be decommissioned following completion of the LSMOC. What was the rationale for this decision when the furthest downstream reach is being reused as part of the LSMOC? In the unlikely event that the lake receives flood waters at a higher level than the design capacity of the LSMOC and the LSMOC becomes functional, has the risk of waters flowing through been considered given that the downstream connection will not be available to accept this excess water. Additionally, have there been any studies of the LSMOC with respect to its use and productivity as fish habitat so that the value of the new channels as habitat can be more fully appreciated.
92	PFN/SFN/SBO FN	7.3 Predicted effects on valued components	7.3 Predicted effects on valued components	Analytical Assessment Techniques	• The EIS states that the potential effects of the project on fish and fish habitat were assessed quantitatively and qualitatively. Qualitative assessments were conducted using a weight of evidence approach. Which entailed using professional judgement based on an understanding of the potential effects, the habitat use and life history of focal fish species, and the likely effectiveness of mitigation measures supported by scientific literature, secondary literature, etc. While we fully agree with the use of professional judgement backed up by referenced sources, it would be appreciated if cited data in these sources if used frequently were summarized within the EIS. In many instances they were not and were not available for our review. Additionally, data that cites average values of ranges over long periods of time is not helpful in allowing one to assess the factors that go into this section of the EIS.
93	PFN/SFN/SBO FN	7.3 Predicted effects on valued components	7.2.4.1 - Analytical Assessment Techniques	Assessment of Residual Environmental Effects on Fish and Fish Habitat	• The EIS states that potential effects of the project on fish and fish habitat were assessed qualitatively and quantitatively, where possible. Qualitative assessments were conducted using the weight of evidence approach. While we accept the use of professional judgement it should be supported with summary information gathered from previous studies if new studies were not conducted. Throughout this section of the EIS, studies were referred to, to which we had no access to and for which little in the way of summaries were provided. Without this information it is not possible to either accept or reject these qualitative assessments.
94	PFN/SFN/SBO FN	7.3 Predicted effects on valued components; 7.5 Significance of Residual Effects	7.3 Predicted effects on valued components	Permanent Alteration or Destruction of Fish Habitat	• The EIS states that fish habitat may be altered or destroyed during the construction and operations of the LMOC and LSMOC. We would submit that fish habitat will be altered or destroyed. Its just a matter of how much, how severely and for how long. Many of the changes to the aquatic ecosystem that appear to be probable based on the EIS appear long term; for example the dewatering of several fens, minor lakes, and tributaries as a result of direct impacts on the local groundwater regime are likely to be negative, long term and depending on your point of view negative. For example, if dewatering dries out the fens and minor lakes adjacent to the ROW, it will directly impact the aquatic and terrestrial ecosystems that they support. This includes Traditional Lands and Cultural Land Uses of the Regional First Nations and Metis. We find the language used in this section of the EIS tends to minimize impacts with little in the way of data to support these conclusions.

95	PFN/SFN/SBO FN	7.5 Significance of Residual Effects	7.2.4.5 Summary of Project Residual Effects	Summary of Project Residual Effects	<ul style="list-style-type: none"> In the EIS summary Table 7.2-9 all residual effects of the project were given a magnitude rating of NL (negligible or low). Since the complexity of for example; the groundwater regime, was cited within the EIS and clearly not well understood at this time, the effects on fish habitat affected by dewatering cannot be measured or a magnitude assigned to the impact which will be long term and negative. Similar lack of knowledge exists for primary productivity, secondary aquatic productivity, the distribution of sediments and surface water quality. For each of these segments of the aquatic ecosystem the EIS suggests there will be future monitoring. It is understandable that fully detailed monitoring plans are not available at this time but a general plan could have been developed that outlines what, where and how such a program could be developed and initiated could and should be included within this EIS.
96	PFN/SFN/SBO FN	7.6.3.Cumulative effects assessment	Table 11.1-1 Other Projects and Physical Activities for Consideration of Cumulative Environmental Effects	<ul style="list-style-type: none"> The sources of information for determining future anticipated projects is not clear. Again the temporal boundary of "indefinite" does not make sense and makes a cumulative assessment essentially impossible within this time boundary. 	<ul style="list-style-type: none"> Please indicate the sources of information for determining the future anticipated projects. Revisit the definition of the temporal boundary. Consider multiple temporary boundaries if appropriate, especially for cumulative effects.
97	PFN/SFN/SBO FN	9. FOLLOW-UP AND MONITORING PROGRAMS	6.4.11 - Follow-up and Monitoring 7.2.8 - Follow-Up and Monitoring 12. Follow-up and Monitoring Programs	Insufficient discussion on monitoring programs for surface water (both quality and hydrology)	<ul style="list-style-type: none"> Monitoring programs for surface water are vague and mostly deferred to future management plans that will be prepared as part of the detailed design. Additional details on future monitoring requirements should be available now based on best practice, regional/national guidelines and legislation, and the results of the assessments in this EIS. While it is understood that the monitoring programs will be refined during the detailed design stage, some content should be presented on the potential number of monitoring sites, approximate or conceptual locations, monitoring frequency, parameters that will be monitored, duration, and responsible party for monitoring. <p><i>Note: IAAC requests additional monitoring details in various contexts throughout their review. We retain our comment as it provides some further detail on the types of data that should be presented at a minimum (in this case for surface water).</i></p>
98	PFN/SFN/SBO FN	7.6.1.Effects of potential accidents or malfunctions	14.2 - OUTLET CHANNEL BREACH/CONTROL STRUCTURE FAILURE	Modeling of flooding scenarios may not be sufficient.	<ul style="list-style-type: none"> Modeling related to failure of control structure should be conducted. If it has already been conducted (or is equivalent to the modeling for certain flooding scenarios), this should be more clearly stated and referenced within this section, along with reference to the results and their implications.
99	PFN/SFN/SBO FN	7.6.1.Effects of potential accidents or malfunctions	14.2.2 - Incident Prevention 3) Temporary Constriction of the Channels	EIS states that during operation, the channels will be monitored for ice and debris jams, and equipment will be available to remove the blockages as they occur.	<ul style="list-style-type: none"> Provide further description of the equipment used to remove the blockages.
100	PFN/SFN/SBO FN	7.6.2.Effects of the environment on the project	15.5 - EFFECT OF LONG-TERM CLIMATE CHANGE ON THE PROJECT	Minimal discussion on potential increase in flooding severity and frequency due to climate change, as well as mitigation measures for such eventual potential outcomes.	<ul style="list-style-type: none"> Conclusions on climate change effects should be backed-up with water balance modelling for climate change scenarios. The water balance modelling for climate change appears not to have been completed <p><i>Note: IAAC requests additional information on rationale for climate change discussion in the EIS in IAAC-57, and additional assessment in IAAC-58 and IAAC-59. Our comment has been retained due to its particular emphasis on the water balance modeling.</i></p>
101	PFN/SFN/SBO FN	Part 2 - Section 7. Effects Assessment, Subsection 7.1.4	15.5 - EFFECT OF LONG-TERM CLIMATE CHANGE ON THE PROJECT	The EIS Guidelines require: " a discussion of the hydrogeologic, hydrologic, climatic and anthropogenic controls on groundwater flow ". Climatic conditions in Canada are changing in relation to a warming world. As stated in the EIS, possible changes temperature and precipitation could be as much as 4°C and 6%, respectively, by 2080. It is also indicated that climate change is anticipated to increase the frequency, duration, and magnitude of extreme weather events including drought. Insufficient information has been provided to assess how groundwater levels and discharge characteristics will be affected by climate change, how surface water features sustained by groundwater discharge will be affected, and what the impacts caused by passive drainage by the LMOC and LSMOC channel alignments and/or dewatering activities will be during times of extended drought.	<ul style="list-style-type: none"> Provide additional information on the influence of extended drought conditions on the cumulative impacts to wetlands sustained by groundwater discharge that will be adversely impacted by channel construction and operational dewatering.
102	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7.2. Predicted changes to the physical environment 7.2.2.Changes to groundwater, surface water, and fluvial morphology	Appendix 6D.2 HYDRAULIC AND SEDIMENT TRANSPORT STUDIES	<ul style="list-style-type: none"> Sediment transport section only briefly references other studies for other projects. Reference is made to sediment sampling but clarification should be provided on that type of analysis. The assumption that sediment will not move between lakes during extreme events through the LMOC and LSMOC should be confirmed with sediment transport modeling. 	<ul style="list-style-type: none"> Sediment modeling (including plume modeling to determine an approximate Zone of influence) should be carried out specifically for this project to determine potential impacts to the various surface water bodies. Sediment analysis procedures and type of analysis should be clarified. It is assumed that sediment will not be moved from the lakes during extreme events into the LMOC and LSMOC but that should be demonstrated with sediment transport modelling including both bed load and suspended solids. <p><i>Note: IAAC requests sediment transport models in Comment IAAC-44. There are some specifics within our comment which differentiate it as an extension of the IAAC comment.</i></p>
103	PFN/SFN/SBO FN		Appendix 6D.4.10 Buffalo Creek Watershed, 6D.4.9 Birch Creek	The EIS Guideline requires and adequate assessment of: " a delineation and characterization of groundwater - surface water interactions including temperature and the locations of groundwater " No protocols have been provided for evaluation of future suitability of operating rules.	<ul style="list-style-type: none"> Provide detailed water chemistry for the wetlands and creeks sampled along the LSMOC channel alignment
104	PFN/SFN/SBO FN	Part 2 – Content of the Environmental Impact Statement, 7.2. Predicted changes to the physical environment 7.2.2.Changes to groundwater, surface water, and fluvial morphology	Appendix 6J Development Of Operating Rules For Lake Manitoba And Lake St. Martin Outlet Channels With Recommended Revisions (Manitoba Infrastructure 2019a)	No protocols have been provided for evaluation of future suitability of operating rules.	<ul style="list-style-type: none"> Protocols for future evaluation of suitability of operating rules should be provided.