

LAKE MANITOBA AND LAKE ST. MARTIN OUTLET CHANNELS PROJECT
RESPONSE TO IAAC TECHNICAL INFORMATION REQUESTS

Question IAAC-17

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ABBREVIATIONS AND ACRONYMS II

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Abbreviations and Acronyms

EIS	environmental impact statement
EMP	Environmental Management Program
EOC	emergency outlet channel
LMOC	Lake Manitoba outlet channel
LSMOC	Lake St. Martin outlet channel
MFRTF	Manitoba 2011 Flood Review Task Force
WCS	water control structure

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EIS Guideline Reference: 7.2.2 Changes to groundwater, surface water, and fluvial morphology;
9 Follow-up and Monitoring Programs

EIS Reference: Section 6.4.7.5 Changes in Regional and/or Local Sediment and Debris Transport

Context and Rationale

Section 7.2.2 of the EIS guidelines requires the proponent to assess the changes to sediment quality as a result of the Project. Section 9 of the EIS guidelines sets out detailed requirements regarding follow-up programs.

EIS Section 6.4.7.5 states that there may be changes in regional and/or local sediment and debris transport as a result of the Project.

The EIS does not provide details for monitoring of suspended sediments and sediment quality. Without these details, it is not clear whether or how the Proponent would monitor for Project-related changes to suspended sediments and sediment quality, and assess the effectiveness of mitigation measures.

Changes to suspended sediment loads and sediment quality may affect fish and fish habitat by altering habitat, such as through silting of spawning beds. Mitigation and monitoring of sediment quality are therefore important considerations to assessing the impacts on fish and fish habitat.

Information Requests

- a) Provide details of proposed monitoring plans for construction and operations that will be used to monitor for: suspended sediment levels during in-water excavation and slope contouring required to construct the LMOC and LSMOC inlet and outlet areas; release and transport of sediment from work sites to area waterways; increase in suspended sediments at inlet and outlet areas when the water control structure (WCS) gates are opened; and sediment quality changes as a result of storing water in, and releasing water from one lake to another and from the channels. Describe:
 - i. methods and approach to monitor suspended sediment levels and sediment quality in the Project area during construction, operation and maintenance activities, including comparison of collected samples to baseline/ reference levels and to recommended guidelines;
 - ii. methods that will be used to assess the effectiveness of mitigation measures, including erosion and sediment control measures during in-stream construction and during operations and to verify EIS conclusions.
 - iii. action levels to trigger specific management actions to protect surface water quality during construction, operation and maintenance activities; and

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- iv. monitoring parameters, locations, frequency, action levels, and response actions quality assurance/quality control methods.
- b) If any of the details requested above cannot be provided at the time of response, present a discussion of the gap in information, related uncertainty with regards to potential effects and mitigation, and any additional mitigation measures and/or monitoring and follow up that will be implemented on a precautionary basis.

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Response for a) and b)

Surface Water Assessment Overview

The Project is being built to alleviate an ongoing problem that, for decades, has caused adverse effects on people, the economy and the environment in Manitoba. The Project will allow for floodwaters to be moved more quickly through Lake Manitoba and Lake St. Martin by dividing the flows that would be forced to move only through the relatively narrow inlets and channels of the Fairford River and the Dauphin River. Dividing and redirecting floodwaters through the Lake Manitoba Outlet Channel (LMOC) and Lake St. Martin Outlet Channel (LSMOC) will result in less flooding and reduced lake levels on Lake St. Martin, which is a desired positive outcome and positive effect of the Project. The Project will not function like the emergency outlet channel (EOC) as there will be no floodwaters directed through the Buffalo Creek watershed. As such, the Project does not alter flow volumes, the direction of existing flow pathways, or the overall quality of the water flowing, and therefore, would not result in adverse effects on surface water or surface water quality, as outlined in IAAC-12 and IAAC-14.

Surface Water During Flood Conditions

Flood events occur in Manitoba due to a combination of factors such as soil moisture conditions, groundwater levels, precipitation amounts, wind and wave effects, and the physical characteristics of the waterway, e.g., gradient, elevation, geology and morphology (size, shape, capacity). During a flood event, flows in streams and rivers are high and fast, lake levels rise, backwatering occurs, and land areas that are typically dry are inundated and saturated with overland flooding. The high volumes of floodwater in 2011 that flowed through Lake Manitoba, Lake St. Martin and the Dauphin River caused catastrophic consequences to people, infrastructure and the environment. Natural watercourses were overwhelmed by high flows and entire communities, including Lake St. Martin First Nation, Little Saskatchewan First Nation, Dauphin River First Nation and Dauphin River, were displaced by flooding and suffered significant losses to homes, schools, infrastructure, livelihoods and lifestyles. Over 7,100 people were displaced and economic effects of the 2011 flood event exceeded \$1.2 billion for the province of Manitoba, including infrastructure repair and disaster payments as well as flood response costs (MFRTF 2013).

Volume 2, Figure 6G-2 in Appendix 6G of the environmental impact statement (EIS) shows the difference between the area of inundation that occurred around Lake St. Martin during the 2011 flood when the lake level reached 245.48 m (805.38 ft) and the predicted area of inundation around Lake St. Martin that would have occurred during the 2011 flood with the LMOC and LSMOC in operation. It is estimated that the operation of the outlet channels would have decreased the lake level to approximately 244.72 m (802.87

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ft), which represents a decrease of 27.5 km² in the amount of area that would have been inundated by flood waters. Volume 2, Figure 6G-3 in Appendix 6G of the EIS shows the difference between the area of inundation around Lake St. Martin for a low flood event under the current operating regime, which would result in a lake level of 244.43 m (801.93 ft); and the predicted area of inundation around Lake St. Martin for a low flood event with the LMOC and LSMOC in operation. It is estimated that the operation of the outlet channels would have decreased the lake level to about 243.91 m (800.22 ft), which represents a decrease of 21.4 km² in the amount of area that would have been inundated by flood waters around Lake St. Martin. These reductions in lake levels and decreased areas of inundation are the desired positive outcomes of the Project.

During a flood event, the high, fast flows entrain, resuspend and redistribute river or lake substrates, and floodwaters often contain high loads of sediment. Runoff from land areas may also contribute sediment to waterways during flood events. As such, water chemistry and sediment conditions during a flood event are turbulent and dynamic, and controlled by natural conditions that are beyond the control or influence of the Project.

As noted in IAAC-12, the Project planning and design includes studies on the potential changes to sediment due to construction, operation and maintenance of the Project, and measures to reduce the release and transport of sediment are incorporated in the Project design and mitigation measures. The studies have shown that the release and transport of sediment, and subsequent effects on water quality, are not altered by the Project, as these effects and conditions are part of a flood event and are not controlled by the Project. Information on the sediment studies is provided in IAAC-12. In addition, MI has developed a series of monitoring plans that includes monitoring of water quality and sediment in the Project area. Please see IAAC-15 for a detailed description of the Project Environmental Management Program (EMP) and associated monitoring plans.

No Storage or Retention of Water

The Project is not being designed to store or retain water. During periods of operation, floodwaters will flow from Lake Manitoba through the Fairford River and the LMOC to Lake St. Martin, then on to Sturgeon Bay via the Dauphin River and the LSMOC. When the water control structure (WCS) gates are closed, the water level in the channel on the upstream side will be the same as the water level on Lake Manitoba, and the water level in the channel on the downstream side will be the same as the water level on Lake St. Martin. These water levels will occur as the invert of the channel needs to be lower than water levels in the lakes, and are not due to any storage or retention of water. In the LSMOC, when the WCS gates are closed, there will be an approximately 1 m to 2.5 m depth of water in the channel, with average velocities typically less than 0.1 m/s depending on base flow. A limited discharge from Lake St. Martin may be conveyed through the WCS to maintain adequate water quality (e.g., dissolved oxygen levels) to sustain fish habitat in the LSMOC when the WCS gates are closed. These water levels and flows will be managed to sustain fish habitat, and there is no storage or retention of water in the LSMOC.

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Project Environmental Management Program

Please see IAAC-15 for a description of the EMP and associated monitoring plans. Components of the EMP such as environmental compliance monitoring and regular site inspection will verify whether mitigation measures are functioning as intended, and identify whether adaptive management is required, and how unanticipated effects will be identified or addressed. Monitoring and site inspections will help to identify unanticipated adverse environmental effects resulting from Project activities, and will enable timely pro-active or reactive response in order to avoid, minimize or mitigate these potential effects at a site-specific scale.

References

Manitoba 2011 Flood Review Task Force (MFRTF). 2013. Manitoba 2011 Flood Review Task Force Report.