LAKE MANITOBA
LAKE ST. MARTIN

OUTLET CHANNELS PROJECT

MANITOBA INFRASTRUCTURE

Operation Environmental Management Program

November 10, 2020

Manitoba

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DISCLAIMER

This document was developed to support the Lake Manitoba and Lake St. Martin Outlet Channel Environmental Management and Monitoring Program. This document has been prepared by Manitoba Infrastructure as a way to share information and have discussion with Indigenous Communities and Groups and the public. This document has been prepared using existing environmental and preliminary engineering information, professional judgement as well as information from previous and ongoing public and Indigenous engagement and consultation. The contents of this document are based on conditions and information existing at the time the document was prepared and do not take into account any subsequent changes. The information, data, recommendations, and conclusions in this report are subject to change as the information has been presented as draft and will not be considered complete until further engagement and consultation is complete. The plans may be further revised based on information and direction received from provincial and federal environmental regulators. This draft report be read as a whole, and sections or parts should not be read out of context.

PREFACE

The Lake Manitoba and Lake St. Martin Permanent Outlet Channels Project (the "Project") is proposed as a permanent flood control mitigation for Lake Manitoba and Lake St. Martin to alleviate flooding in the Lake St. Martin region of Manitoba. It will involve the construction and operation of two new diversion channels: the Lake Manitoba Outlet Channel (LMOC) will connect Lake Manitoba to Lake St. Martin and the Lake St. Martin Outlet Channel (LSMOC) will connect Lake St. Martin to Lake Winnipeg. Associated with these outlet channels are the development of bridges, control structures with power connections, a new realignment of PR 239, and other ancillary infrastructure.

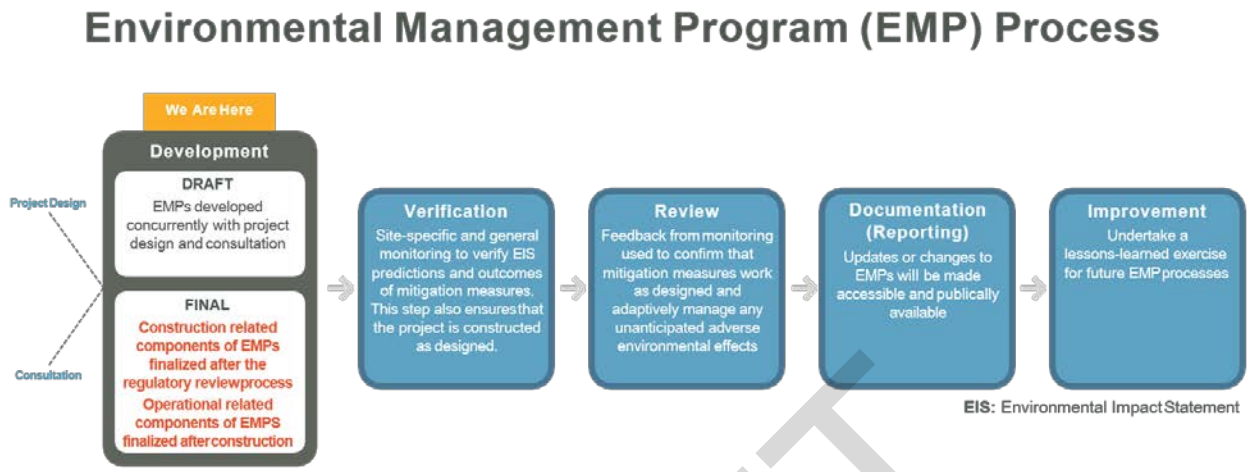
Manitoba Infrastructure (MI) is the proponent for the proposed Project. After receipt of the required regulatory approvals, MI will develop, manage and operate the Project. This Operation Environmental Management Program (OEMP) is one component of the overall Environmental Management Program (EMP) framework which describes the environmental management processes that will be followed during the construction and operation phases of the Project. The goal of the EMP is to ensure that the environmental protection measures committed to in the Environmental Impact Statement (EIS) and the conditions of the Environment Act Licence and Federal Decision Statement Conditions are undertaken in a timely and effective manner. This includes the verification that environmental commitments are executed, monitored and evaluated for effectiveness, and that information is reported back in a timely manner to the Project management team for adjustment if required.

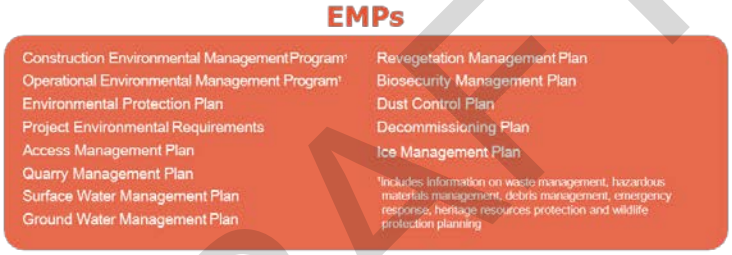
Manitoba Infrastructure remains committed to ongoing engagement and consultation with Indigenous groups and other stakeholders that are potentially impacted by the Project. Detailed EMP review discussions have been incorporated into community-specific consultation work plans and additional engagement opportunities will be provided prior to EMP finalization. Engagement opportunities include virtual open house events and EMP-specific questionnaires. EMP-specific questionnaires will be provided to Indigenous groups and stakeholders to obtain feedback and views on the draft plans, in addition to exploring opportunities for Indigenous participation in follow-up monitoring. Feedback and recommendations will be used to inform the completion of the plans.

The EMP provides the overarching framework for the Construction Environmental Management Program (CEMP) and the OEMP, which will be finalized as separate documents prior to Project construction and ideally operation, respectively. Their finalization will consider applicable conditions of the Environment Act Licence and associated approvals, any other pertinent findings through the design and regulatory review processes and key relevant outcomes of the ongoing Indigenous and public engagement and Consultation processes.

The purpose of the CEMP and OEMP is to guide how environmental issues will be addressed during construction and operation, respectively and how adverse effects of activities will be mitigated. The CEMP is supported by several specific or targeted management plans (e.g. surface water, groundwater, sediment, etc.), as shown in the Figure below, that will guide MI's development of the Project's contract documents and subsequently, the Contractor(s) activities, in constructing the Project in an environmentally responsible manner. The OEMP will likely include the same targeted plans developed to manage issues during construction, but prior to construction completion they would be revised and adapted to suit the specific needs during the operation phase.

Environmental Management Program Process and Associated Environmental Management Plans





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OUTLET CHANNELS PROJECT

GLOSSARY OF TERMS AND ACRONYMS

Acronyms

%	Percent
AEMP	Aquatic Effects Monitoring Program
ATV	All-Terrain Vehicle
BMP	Best Management Practices
CEAA	*Canadian Environmental Assessment Act*
CEMP	Construction Environmental Management Program
DFO	Department of Fisheries and Oceans Canada
EAO	Environmental Assessment Officer
EIS	Environmental Impact Statement
EMP	Environmental Management Program
GWMP	Groundwater Management Plan
HRPP	Heritage Resources Protection Plan
LMOC	Lake Manitoba Outlet Channel
LSMOC	Lake St. Martin Outlet Channel
m	Metre
MI	Manitoba Infrastructure
O&M	Operation and Maintenance Manual
OEMP	Operation Environmental Management Program
PDA	Project Development Area
PER	Project Environmental Requirements
PR	Provincial Road
Project	The Lake Manitoba and Lake St. Martin Permanent Outlet Channels Project
ROW	Right of Way
RVMP	Revegetation Management Plan
SMP	Sediment Management Plan
SOCC	Species of Conservation Concern

SWMP	Surface Water Management Plan
WCS	Water Control Structure
WHMIS	Workplace Hazardous Materials Information System

Glossary of Terms

Aquatic biota: Organisms temporarily or permanently living or found in water.

Aquatic habitat: The living and non-living components of a lake, river, wetland or other waters upon which aquatic life depends.

Aquatic ecosystem: All living organisms in an area of a lake, river, wetland or other waters and the non-living components of the environment upon which they depend, as well as all their interactions, both among living and non-living components.

Aquifer: A body of rock or sediment that is sufficiently porous and permeable to store, transmit, and yield significant or economic quantities of groundwater to wells and springs.

Aquitard: A confining bed and/or formation composed of rock or sediment that retards but does not prevent the flow of water to or from an adjacent aquifer. It does not readily yield water to wells or springs, but stores groundwater.

Artesian aquifer: A body of rock or sediment containing groundwater that is under greater than hydrostatic pressure: that is a confined aquifer. When an artesian aquifer is penetrated by a well, the water level will rise above the top of the aquifer; a flowing artesian well is when the water level will rise above ground surface.

Baseflow: The portion of the streamflow that is sustained between precipitation events, fed to streams by delayed pathways.

Bedrock: The solid rock that lies beneath the soil and other loose material on the Earth's surface.

Biodegradable: A substance or object capable of being decomposed by bacteria or other living organisms.

Carbonates: A rock made up primarily of carbonate minerals (minerals containing the CO3 anionic structure). Examples include: limestone, dolostone, and marble (metamorphosed limestone or dolomite) are the most commonly encountered carbonate rocks.

Carbonate aquifer: See Aquifer; see Carbonates. Refers to an aquifer comprised of a carbonate bedrock.

Cofferdam: An enclosure, usually only partially obstructing a river, from which water is pumped to expose the bottom to permit construction.

Confined aquifer: An aquifer that is bounded above and below by formations of distinctly lower permeability than that of the aquifer itself. An aquifer containing confined ground water. See artesian.

Critical habitat: The resources and environmental conditions required for persistence of local populations of listed wildlife species throughout their current distribution in Canada.

Deleterious substance: A substance which, if administered, would likely cause bodily injury. In terms of the *Fisheries Act*: "Any substance that, if added to any water, would degrade or alter or form part of a process of

degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or (b) any water that contains a substance in such quantity or concentration, or that has been so treated processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water".

Depressurization: Action of decreasing hydrostatic pressure. Active depressurization involves the use of pumps. Passive depressurization does not involve the use of pump, but rather uses a relation between hydrostatic pressure elevation and topographic elevation.

Dewatering: Removal or draining groundwater or surface water from a riverbed, construction site, caisson, or mine shaft, by pumping or evaporation.

Discharge: Rate of outflow; volume of water flowing down a river, from a lake outlet, or man-made structure.

Dolomite: A sedimentary rock composed mostly of dolomite (CaMg (CO3)2) which often forms from limestone as the calcium is partly replaced by magnesium, usually as water solutions move through the limestone.

Domestic well: A water well used to supply water for the domestic needs of an individual residence or systems of four or fewer service connections.

Entrainment: Fish (larval or adult) that are carried on a current and cannot escape; at weirs or hydroelectric dams often refers to entrainment over or through the man-made structure (e.g., powerhouse flow).

Flowing well: A well that has a static water level above the gradient ground surface (where water pressure in an aquifer causes water level to rise above the ground surface).

Glaciolacustrine: Pertaining to, derived from, or deposited in glacial lakes; especially said of the deposits and landforms composed of suspended material brought by meltwater streams flowing into lakes bordering the glacier, such as deltas, kame deltas, and varved sediments.

Groundwater: Water that occurs beneath the land surface and fills the pore spaces of soil or rock below saturated zone.

Groundwater quality: Refers to the chemical composition of groundwater and its suitability for various uses and also varies widely depending upon the local geologic setting, hydrogeological conditions, and past/current land use practices that may contribute anthropogenic effects.

Groundwater recharge: The natural or intentional infiltration of surface water into the zone of saturation. Groundwater recharge occurs either naturally as the net gain from precipitation, or artificially as the result of human influence.

Hydraulic conditions: 1) of or relating to liquid in motion; and, 2) of or relating to the pressure created by forcing a liquid through a relatively small orifice, pipe, or other small channel.

Hydraulic profile: The graphical representation of the water level through the channel based on the water level of the receiving water, control points, and the head loss.

Invasive species: Aquatic or plant species that are growing outside the country or region of origin and outcompeting or replacing native species.

Piezometric head/pressure: A measurement at a discrete location expressing the potentiometric surface which is an imaginary surface representing the pressure of groundwater in an aquifer that is defined by the level to which water will rise in a well.

Quarry: An open excavation or pit from which stone, gravel or sand is obtained by digging, cutting or blasting.

Quarry Permit: A permit issued for the production of a specified quantity of Crown quarry mineral (Quarry Minerals Regulation 1992).

Recharge: Water added to an aquifer or the process of adding water to an aquifer.

Riparian vegetation: Vegetation growing along the banks of rivers and streams, at the interface between water and land.

Riprap: A lightweight stone covering used to protect soil or surface bedrock from erosion by water or the elements.

Runoff: The flow of flood waters out of a drainage basin.

Species of conservation concern: Species that are either federally or provincially tracked by SARA, COSEWIC, or the MBCDC and are considered rare or at risk of extinction.

Suspended sediment: Particulate matter that is held in the water column due to movement of the water.

Till: An unstratified, unconsolidated mass of boulders, pebbles, sand and mud deposited by the movement or melting of a glacier.

Turbidity: A measure of the relative clarity of water.

Water table: The upper surface of the zone of saturation in an unconfined aquifer.

Wetted width: The width of a stream fully covered by water.

Wetland: Land that is saturated with water long enough to promote wetland or aquatic processes as indicated by the formation of water altered soils, growth of water tolerant vegetation, and various kinds of biological activity that are adapted to wet environments (National Wetlands Working Group 1988).

1.0 INTRODUCTION

This preliminary Operation Environmental Management Program (OEMP) has been prepared as part of the design, tendering and contract administration of the Lake Manitoba and Lake St. Martin Permanent Outlet Channels Project (the "Project") for Manitoba Infrastructure (MI). This OEMP has been prepared based on industry standard practices and the description provided in Section 3.7 of the Environmental Impact Statement (EIS) for the Project. Contractors required to support activities related to Lake Manitoba Outlet Channel (LMOC) or the Lake St. Martin Outlet Channel (LSMOC) substantial repairs of supporting infrastructure, will be required to abide by the procedures and measures identified within this OEMP.

During the operation and maintenance phase (post-construction), the LMOC and LSMOC will be in a stand-by status (gates closed) during periods of non-flood conditions. Maintenance activities on channel and Water Control Structure (WCS) infrastructure, in accordance with the Operation and Maintenance Manual (O&M Manual), will be completed during these stand-by periods. These maintenance activities, as well as general operation activities, have potential to result in adverse effects on the environment.

The purpose of the OEMP is to outline the environmental management processes and measures that will be implemented to minimize environmental effects during operation (gates open or gates closed) of the LMOC and LSMOC and from required maintenance. The OEMP will demonstrate MI's commitment to protection of the environment and compliance with the various federal and provincial environmental regulatory requirements and promotes Best Management Practices (BMPs) for environmental protection. The OEMP is a tool to check that the environmental management measures are executed, monitored, evaluated for effectiveness and that any required information is reported to MI for adjustments. The OEMP outlines the responsibilities of the various parties involved, provides a summary of potential activities related to the Operation phase of the LMOC and LSMOC and the subsequent potential environmental effects, and discusses the applicable environmental management measures, monitoring and reporting procedures.

Environmental management measures described herein, and in the specific or targeted management plans, are derived from MI's corporate, environmental and safety policies, MI's Project Environmental Requirements (PERs) and incorporate other BMPs such as those outlined in the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat, the Forest Management Guidelines for Riparian Management Areas, or the Boreal Wetlands Conservation Codes of Practice. Many of the topic specific management plans are interrelated and rely on each other for management and monitoring aspects. These topic specific management plans will also include references to other documents that will be developed to support the topic further.

This OEMP is preliminary based on the current stage of design and will be expanded and updated during the detailed design, tender, and construction phases of the project. The updates and finalization of the OEMP will reflect the construction and as-built information, requirements of the environmental approvals, permits and licenses, input from the O&M Manual, and other applicable documentation. The OEMP is a living document that will be reviewed and updated by MI on a regular basis as the Project is operated.

1.1 Licencing and Authorization

The proposed Project is a designated project under the *Canadian Environmental Assessment Act*, 2012 (CEAA, 2012), and therefore requires an Environmental Assessment. Pursuant to Section 15(d) of the CEAA, 2012, the Impact Assessment Agency of Canada is the authority responsible for federal review of the proposed Project and they issued Guidelines for the Preparation of an EIS for the Project. Other key federal legislation, under which approvals may be required, includes the *Fisheries Act*, *Canadian Navigable Waters Act*, *Migratory Birds Convention Act* and *Species at Risk Act*.

The proposed Project is considered a 'Class 3' development under the *Classes of Development Regulation* (164/88) of *The Environment Act* (Manitoba) and therefore requires an Environment Act Licence. Manitoba Conservation and Climate's Environmental Approvals Branch is the authority responsible for provincial review of the proposed Project and they provided Environmental Impact Statement Guidelines for the Project. In addition to addressing the EIS Guidelines, provincial permits related to operation of the Project will be required under several acts to address various Project activities, such as *The Mines and Minerals Act* (maintaining quarries for maintenance activities, as required), and *The Dangerous Goods Handling and Transportation Act* (petroleum storage tanks). Federal and provincial legislation relevant to the proposed Project is summarized in Appendix 1.

1.2 Applicable / Related Documentation

The OEMP is supported by several specific or targeted management plans that have been submitted as separate documents, with the exception of Waste Management, Hazardous Materials Management, Emergency Response, and Debris Management which are described in greater detail within this document. As listed in Section 3.7.2 of the Project EIS these targeted management plans include:

- Project Environmental Requirements;
- Access Management Plans;
- Quarry Management Plan;
- Debris Management Plan;
- Sediment Management Plan (SMP);
- Surface Water Management Plan (SWMP);
- Groundwater Management Plan (GWMP);
- Revegetation Management Plan (RVMP);
- Biosecurity Management Plan;
- Dust Control Plan;
- Waste Management Plan;
- Hazardous Materials Management Plan;
- Emergency Response Plan;
- Ice Management Plan;
- Heritage Resources Protection Plan (HRPP); and
- Decommissioning Plan.

In addition to the specific management plans, O&M Manuals for the LMOC and LSMOC will be developed that will detail the technical aspects of the required activities, as well as Project-specific restrictions respecting how such work is to be completed. The Operating Guidelines for the Project, the OEMP, and associated management plans will help guide the manner to which the outlet channels are operated and maintained.

2.0 PRIMARY RESPONSIBILITIES

All parties involved in this project need to be aware of their responsibilities so that the OEMP is implemented and; therefore, maximize environmental protection at the project site. The primary responsibilities of the various parties are listed in the following sections, however, these roles and responsibilities will be verified and modified as required when construction is nearing completion. Operation of the Project is governed in part by Environment Act Licence when received, which defines Manitoba Infrastructure as the licensee responsible for the construction, maintenance and operation of the Project and other environmental approvals when received.

2.1 Manitoba Infrastructure

MI will be the overall project manager, responsible for implementing, monitoring and amending the environmental aspects of the Project. As the proponent and owner of the Project, MI will be responsible for ensuring that the appropriate environmental protection measures, including BMPs, are adhered to during activities related to operation of the Project. MI will be responsible for providing relevant plans, such as the PERs and management plans, to MI's operation and maintenance personnel and any prospective Consultants and Contractors that will be working on site once the LMOC and LSMOC projects are established and operational.

The MI Project Manager, or a designated alternate, will coordinate with on-site personnel (MI personnel or Consultant/Contractor). The designated alternate may include the MI Construction Inspector or MI Senior Environmental Assessment Officer. The MI Project Manager / Designated Alternate will be supported by advice from a MI Technical Support Team comprised of environmental, health and safety, and design personnel. The Project Manager will coordinate information sharing between on-site activities and off-site support teams. The Project Manager with the support of the Technical Support Team will also have the following responsibilities under the OEMP:

- Liaise with the Federal Responsible Authorities and Manitoba Regulators concerning authorization requirements, monitoring and follow-up.
- Maintain a *Water Rights Act* authorization from Manitoba Water Stewardship for the purpose of removing water from groundwater monitoring wells and for water use at the WCS.
- Maintain a *Water Rights Act* authorization from Manitoba Water Stewardship for operation of the LMOC and LSMOC WCS and Channel.
- Attain a Live Fish Handling Permit in the event that fish salvage activities are required during operation.
- Provide approval, based on discussions with MI Environment, in cases where a Consultant / Contractor suggests methods to achieve a particular goal or objective that differ from those stated in applicable documentation.

MI may elect to assign an onsite Environmental Assessment Officer (EAO) to visit the site periodically to assess conditions. The EAO will report regularly to the MI Project Manager. Any information that is to be

distributed to the Technical Support Team and other essential MI representatives will be forwarded from the MI Project Manager for distribution. The EAO will carry out the following functions:

- Inspect for compliance with the requirements outlined in permits and/or authorization associated with the Project.
- Inform the Technical Support Team and Consultant / Contractor of appropriate environmental requirements and provide them a copy of relevant permits / authorizations.
- Review and evaluate this OEMP.
- Inspections and maintenance of ancillary structures, including vegetation management.
- Check that site specific plans outlined by a maintenance Contractor are appropriate and environmentally responsible.
- Monitor maintenance work sites and equipment and document to confirm that the PERs, environmental specifications and environmental management measures (e.g. containment, spill response) are implemented and that the site is maintained in accordance with the Contract Documents.
- Meet with maintenance Contractors accessing the site and request that regular updates be provided regarding progress on the environmental components of the maintenance work.
- Initiate and hold meetings as required to advise the maintenance Contractor of deficiencies in the environmental management measures, to address the deficiencies, and direct the Contractor to take appropriate and timely corrective action.
- Liaise with the Consultant / Contractor and Technical Support Team regarding deficiencies in the environmental management measures implemented, contract documents or in other environmental matters that involve the Contractor.
- In cases of recognized non-compliance with the legal requirements, or where a Consultant / Contractor fails to take appropriate timely measures to protect the environment, or fails to correct recurring deficiencies, direct the responsible party to suspend work until the appropriate measures have been met, and immediately contact the Project Manager.

MI, is responsible for operation of the WCS and ancillary structures (e.g. bridges, booms and buoys) associated with the LMOC and LSMOC. This responsibility includes:

- Pre-flood inspection of each WCS and preparation of each WCS for onset of spring flood flows and for overwintering.
- Operation of WCS systems and components including raising and lowering the gates of the WCS.
- Notifying the public and implementing safety measures during WCS operation.

2.2 Contract Administrator

Upon completion of the LMOC and LSMOC construction contracts, Contract Administrator responsibilities may fall under future contracts between MI and Engineering Service Providers, if MI chooses to contract out the work for maintenance and repair works.

The Contract Administrator will perform the following functions to manage environmental protection during the administration of the contract:

- Be familiar with the appropriate environmental requirements applicable to construction of the project.
- Where applicable, review the Contractor's construction submittals to determine if they are appropriate for the anticipated site conditions.
- Liaise with MI to address concerns with the proposed construction submittals.
- When requested, assist the EAO with monitoring the work site to confirm the Contractor implements environmental management measures and maintains the site in accordance with the Contract Documents.
- Forward required reports received from the Contractor to the Project Manager.
- While on site, notify the EAO of recognized non-compliance with the legal requirements or where the Contractor fails to take appropriate timely measures to protect the environment or fails to correct recurring deficiencies, so that the EAO and the MI Project Manager can determine the need and/or extent of cessation of work associated with the particular incident. The Contract Administrator will issue an immediate cease work order in the event of a non-compliance that will have an immediate and severe effect on the environment.
- Immediately notify the MI Technical Support Team of orders to suspend work or of environmental incidents, complaints or enquiries.

2.3 Contractor

MI will likely tender substantial maintenance and repair works to Contractors. Project Contractors will be responsible for implementing environmental management measures required to conduct maintenance activities for the continued operation of the Project. To manage environmental protection during operation and maintenance activities, Contractors will perform the following functions:

- Obtain relevant permits to conduct their work (e.g., Crown Lands work permits, quarry permits, etc.). Environmental permits or approvals obtained by the Contractor and any amendments will be identified and submitted to the Contract Administrator for compliance and record keeping purposes.
- Provide training for staff and confirm Subcontractors are trained and empowered to identify, address and report potential environmental problems. Training and orientation sessions will be documented, and copies provided to the Contract Administrator to document compliance with the EIS
- Confirm that Subcontractors are familiar and comply with the related Contract Documents.
- Confirm adherence to environmental permits.
- Implement the environmental management measures, maintain environmental control and protection devices and monitor the site for the effectiveness of the environmental management measures in accordance with the related Contract Documents and documentation requirements.
- Maintain a record file at the site in which relevant information relating to materials handling, spills, leaks, releases, and the implementation and adjustment of the environmental management measures is documented. Relevant information and/or significant events are to be documented and provided to the Contract Administrator in a timely fashion.
- Immediately report environmental incidents (e.g. spills, species at risk, nuisance wildlife, aquatic invasive species, wildfires) to the EAO so that the proper authorities can be notified and provide a copy

of the incident report to the EAO. The Contractor will also be responsible for meeting reporting requirements for permits they hold.

- Take action when it is identified that a violation of environmental regulation or a considerable impact to the environment will occur, such as work shut down, in consultation with the EAO and/or the Contract Administrator.
- Attend meetings initiated by the EAO and/or the Project Manager to address concerns or deficiencies in the environmental management measures and follow-up on direction provided to take appropriate and timely corrective action.

Requests for a change in environmental management measures initiated by the Contractor will be forwarded to the Contract Administrator for submission to MI. MI Environment will need to approve these changes based on discussions with the Federal Responsible Authorities and Manitoba Regulators, as required.

3.0 KEY ACTIVITIES AND POTENTIAL ENVIRONMENTAL EFFECTS

Activities associated with operation and maintenance of the LMOC and LSMOC and related infrastructure (access roads, drainage control structures, etc.) will be described in the O&M manuals for each channel that will be developed upon completion of the construction phase of the Project. The activities listed below have potential to cause adverse environmental effects or are required to maintain established environmental measures for the Project. Corresponding mitigation measures for potential adverse environmental effects are described in Section 4.0 Environmental Management and Protection.

- Regular and ongoing maintenance:
    - Cleaning / general upkeep;
    - Mechanical equipment maintenance;
    - Road maintenance and snow clearing;
    - Removal of debris in channel;
    - Removal of wastewater from the LSMOC WCS septic system; and
    - Installation and removal of navigational booms / buoys.
- Earthwork repairs (erosion and sedimentation).
- Vegetation maintenance:
    - Maintaining success of re-vegetation;
    - Controlling nuisance vegetation and noxious weeds in channel and outside drains; and
- Operating the LMOC and LSMOC to convey flood waters.

3.1 Regular and Ongoing Maintenance

3.1.1 Cleaning / General Upkeep

To maintain the aesthetic conditions of the Project, some general cleaning and upkeep will be required. This may include:

- Upkeep of signage
    - Signage may fall or be removed by recreational users of the project study area.
- Removal of illegal dumping
    - If materials are deposited on site by recreational users of the project study area, these materials should be removed from site.
- General maintenance
    - Materials brought on site should be stored neatly.
    - Waste generated should be removed from site as this could attract wildlife.

- Removal of graffiti
    - If graffiti occurs on structures related to the Project it should be removed or covered.

3.1.2 Mechanical Equipment Maintenance

Mechanical components such as the WCS gates, hoists, ancillary buildings, and electrical systems, as well as the LSMOC drainage structure gated culverts / flap gates, will require maintenance at periodic intervals. Potential adverse environmental effects associated with mechanical equipment maintenance are generally focused on soil compaction, contamination of soil and surface water from leaks and spills associated with vehicles used during maintenance activities, spills associated with onsite maintenance / repair of vehicles/construction equipment.

3.1.3 Road Maintenance and Snow Clearing

Access for the Project will use the existing Provincial and Municipal road network which will be maintained by the respective responsible parties. However, maintenance and snow clearing may be required for access to specific areas along the channels.

Potential adverse environmental effects associated with maintaining access include impacts to groundcover vegetation during snow clearing, increased dust generation during road repair, soil compaction, contamination of soil and surface water from leaks and spills associated with vehicles used during maintenance activities, spills associated with onsite maintenance / repair of vehicles / construction equipment.

3.1.4 Removal of Debris in Channel

Large debris (natural woody debris, manufactured materials) may be carried with flood waters into the LMOC and/or LSMOC during periods where the WCS is opened / conveying flood water through the channel. Conveyance of flood water could also result in buildup of sediment within sections of the channel, particularly on the upstream side of drop structures within the LSMOC. During stand-by periods where the gates are closed, there is a potential for beavers to build dams and / lodges. Debris in the channel could impact conveyance of flows and may have to be removed. Clearing debris may result in:

- Disruption and destruction of fish from direct disturbance of material being removed and surrounding sediment.
- Sedimentation into the channels from working along the side slopes.
- Contamination to soil and surface water from leaks and spills associated with vehicles use.

Mitigation measures to address these potential effects are described throughout Section 4.

3.1.5 Removal of Wastewater from Septic System

The LSMOC WCS will have a septic holding tank to collect wastewater, which will need to be emptied periodically during the operation and maintenance phase. The wastewater will be pumped from the holding tank in the ground into holding tanks on the back of transport vehicles and removed offsite by way of the

access road. The routine maintenance activity of wastewater removal from the LSMOC septic tank could potentially result in:

- Contamination of soil and surface water from leaks and releases of septic / wastewater during pumping of holding tanks, or accidental release during transport offsite.
- Contamination to soil and surface water from leaks and spills associated with vehicles use.

Mitigation measures to address these potential effects are described in Sections 4.2 and 4.4.

3.1.6 Installation and Removal of Navigational Boom / Buoys

The inlet and outlet designs include navigation safety measures such as warning signage and safety booms and buoys to delineate the regions of increased water velocities and to notify water users. It is anticipated that a boat will be used for the maintenance activity of inspecting and installation and removal, if required, of navigation safety booms and buoys.

Operation of a boat has the potential to adversely affect surface water quality associated with an accidental spill or leak of fuel and may facilitate conveyance of invasive or undesirable aquatic species, (zebra mussel, spiny water flea and toxic algae). Mitigation measures to address these potential effects are described in Sections 4.4 and 4.6, respectively. Additionally, operation of a boat is a worker health and safety concern. Conditions at the inlet or outlet prior to operation may present challenges for buoy or boom installation (e.g. ice conditions), which will be considered further at Detailed Design. A public safety assessment in accordance with the CDA Guidelines for Public Safety Around Dams will be undertaken at the Detailed Design stage to confirm and finalize all safety requirements that may be required for the Project.

3.2 Earthwork Repairs

Extended operation of the channels during flood events and intense storm events has the potential to erode the side slopes of the channels and impact the rock structures (e.g. jetties, drop structures, riprap placement). This erosion could lead to sedimentation within the channels and downstream into Lake St. Martin and Lake Winnipeg. Additionally, muskrat and beaver may burrow into the channel side slopes, although they are hard packed and mostly unusable in the initial years of operation. If during visual inspections of the inlet, channel and outlet damage is discovered to earthworks or rock structures, these areas would be repaired by MI or a Contractor. The potential adverse effects related to earthwork and drop structure repair include:

- Disruption of fish at the inlet, within the channel and at the outlet from direct disturbance of material being removed and surrounding sediment.
- Sedimentation into inlet, channel and outlet from working along the side slopes.
- Contamination to soil and surface water from leaks and spills associated with vehicle and equipment use.

Mitigation measures to address these potential effects are described throughout Section 4.

3.3 Vegetation Maintenance

3.3.1 Maintaining Success of Re-Vegetation

Groundcover vegetation along / within the channels, including along the spoil piles, outside drains, and dikes, is a design criterion included to provide protection against erosion and sedimentation . Maintaining an established vegetation cover will ultimately limit deposition of sediment into the receiving waters in Lake St. Martin and Lake Winnipeg. Vegetation management will include inspection of the re-vegetation success in the first few years after completion of the construction phase, with maintenance activities in areas where erosion might be present, as described in the RVMP. Even when the channels are in standby (gates closed) precipitation has the potential to scour the channel banks leading to rills and valleys removing the vegetation. Operating the channels to convey flood waters has the potential to affect survival of vegetative groundcover, and scour / remove isolated areas along the channel. The potential adverse effects related to inspection and repairs of vegetation cover include:

- Sedimentation into channel from working along the side slopes.
- Contamination to soil and surface water from leaks and spills associated with vehicle and equipment use.

Mitigation measures to address these potential effects are described throughout Section 4.

3.3.2 Control of Nuisance Vegetation and Noxious Weeds in Channel and Outside Drains

Vegetation management will be required to control nuisance vegetation that can impact conveyance of flows through the channel and outside drains, and to control noxious weeds throughout the LMOC and LSMOC right-of-way. Vegetation management throughout operation of the channels will include monitoring and maintenance activities as described in the RVMP, to manage the presence and extent of noxious weeds as defined under *The Noxious Weeds Act*. Management of nuisance vegetation and control of noxious weeds through either herbicide or mechanical control (mowing / tilling) may be required on an as-needed / where-needed basis. Either the herbicide or mechanical control methods will require equipment on site that has the potential to result in increased compaction of soils and potential for leaks and spills that could impact soil quality and subsequent surface water quality in local creeks and downstream receiving waters. If herbicides / pesticides are used, there is a potential for adverse environmental effects to humans during application, storage and handling as these products may contain hazardous materials. As well, if herbicide / pesticides are not used appropriately there is potential for these products to have an adverse effect on surface water quality and subsequently on aquatic biota within the channels, outside drains, proximal creeks, Lake St. Martin and Lake Winnipeg. Mitigation measures to address these potential effects are described throughout Section 4.

3.4 Operating WCSs to Convey Flood Waters

The Project EIS identified several potential adverse environmental effects related to operating the LMOC and LSMOC to convey flood waters through the channels. Some of the more notable of these potential adverse biophysical and socioeconomic environmental effects include:

- Stranding of fish and fish mortality in the LSMOC.
- Movement of suspended sediment laden water into downstream receiving waters.
- Movement of bedload at the outlets and into Birch Bay and Sturgeon Bay.
- Groundwater-surface water interaction.
- Risk to human health and safety from increase in flows through channel.
- Risk to wildlife from increase in flows through channel.

3.5 Additional Potential Environmental Effects

This OEMP is a living document that will be updated as project phases progress and will incorporate additional environmental effects and mitigation measures identified when additional public and Indigenous input is obtained and licencing and approval conditions are received. Additional potential adverse environmental effects related to operation and maintenance activities based on information that was included in the Project EIS are summarized as follows:

- Fugitive dust will be emitted from surface disturbance activities and the construction equipment usage is a source of greenhouse gas and particulate emissions that will adversely affect the local air quality. Maintenance activities will also result in temporary and localized increased noise from heavy machinery and ambient light levels from portable lighting.
- There is a risk of deleterious substances during maintenance affecting the soil quality, seeping into the groundwater, or entering the surrounding waterbodies and negatively influencing terrestrial and aquatic species and habitat. Possible sources include fuel spills or releases from equipment operation, during refueling or improper storage and handling of fuel. Additionally, hazardous material spills may occur as the result of improper handling, use, or storage of these materials on-site and while being transported to site.
- The channels will result in changes to the existing groundwater conditions within the perched peat (around LSMOC), overburden clay/till, and confined bedrock aquifer piezometric pressure conditions along the channels. Potential effects may include changes in groundwater flows, levels and quality through interaction with surface water. These conditions will persist during operation and maintenance and conveyance of flows through the channels during operation, which will increase the potential for groundwater surface water interaction.
- Clearing, excavation and other operation and maintenance activities could result in the release and transport of sediment and/or debris to waterways. Erosion due to precipitation and runoff can introduce sediment to the downstream receiving waterbodies, in particular at Birch Bay and Sturgeon Bay (outlet structures) which can negatively affect fish and fish habitat. Further, maintenance of the inlet and outlet and dredging of the lake beds (if required) has the potential to disturb and re-suspend

sediment in Lake Manitoba (LMOC inlet), Lake St. Martin (LMOC outlet and LSMOC inlet) and Lake Winnipeg (LSMOC outlet).

- Operation of the channels will result in potential change in flow patterns of the Fairford River, Dauphin River and at the inlets and outlets resulting in potential impacts to fish passage.
- Fish health and mortality could potentially be affected during maintenance activities within or near water through the potential release of deleterious substances to streams and lakes adjacent to or downstream of the channels.
- The maintenance activities may facilitate conveyance of invasive or undesirable aquatic species, (zebra mussel, spiny water flea and toxic algae). For equipment used during in-water work, aquatic invasive species could be transported into the project when equipment is initially brought to site, or from downstream to upstream locations once on site. The introduction and spread of invasive species can reduce the diversity and populations of native species and can modify habitat.
- During operation and maintenance activities, there is potential for increased wildlife mortality risk. Ground-nesting birds and species with decreased mobility (i.e., amphibians, small mammals) are most susceptible to direct mortality during maintenance activities such as removal of vegetative groundcover, reshaping and repairing of earthworks, excavating / dredging of channel.
- Increased traffic during maintenance activities has the potential to result in increased mortality risk to wildlife, including migratory birds, due to potential vehicle collisions.
- Maintenance activities have the potential to affect a change in wildlife movement by creating physical and sensory (noise, vibration and light) barriers. During maintenance activities, noise and activity associated with heavy equipment and personnel is anticipated to deter wildlife for the short-term.
- Operation of the LSMOC will potentially impact traditional use areas for hunting, trapping, fishing and gathering.
- Ground-disturbing maintenance activities, such as vegetation clearing and excavation in areas not disturbed during construction, have the potential to interact with heritage resources by subsurface disturbance and alteration of the horizontal and vertical locations of intact archaeological features or objects contained therein. This in turn has the potential to affect cultural and spiritual sites and sacred areas.
- Due to the potential storage of combustible materials or wastes, operation of internal combustion engines (e.g., vehicles, heavy equipment) and the presence of workers during maintenance activities, brush and wildfires could be ignited. In particular, the accumulation of slash during vegetation maintenance can contribute material for wildfires and hot combustion engines on vehicles driving over dry grass or fields can cause wildfires. An accidental fire could adversely affect air quality, vegetation, wildlife, land and resource use, infrastructure and services, economy and human health.

The mitigation measures to address these potential effects are outlined in Section 4 of this OEMP with additional details provided in the various topic specific management plans.

4.0 ENVIRONMENTAL MANAGEMENT AND PROTECTION

The environmental management and protection measures described in the following sections are proposed to mitigate potential temporary and/or permanent impacts resulting from the operation and maintenance phase of this Project. Additional detail on mitigation measures that will be followed are provided in the various environmental management plans associated with the potential effect, e.g., surface water and ice management plans. The manner to which these management and protection measures will be employed will be facilitated through the outcomes of inspections and monitoring outlined in Section 6. These management and protection measures are consistent with and augment the MI Lake Manitoba and Lake St. Martin Outlet Channels – Project Environmental Requirements.

4.1 Atmospheric Environment

As noted in the EIS, the effects on air quality during the Project operation and maintenance activities are expected to be lower in magnitude, duration, and extent than during the construction phase due to the reduced use of vehicles and equipment and the limited extent and infrequent nature of the activities.

Dust can be generated during operation and maintenance activities through driving on roads, road maintenance, earthwork and rock structure repair, and removal of materials from quarries, as required. Increased dust is not a concern during winter construction activities. Any activities that could generate dust that occur during non-frozen conditions will be conducted by methods that minimize the raising of dust. MI or the Contractor completing the maintenance work will implement dust control practices during activities such as excavation, and transporting of materials, to contain and collect dust and other particulate matter. Vehicles used to haul materials to or from the work site will have the load covered with a tarpaulin cover during transport to minimize dust and prevent material from falling out. Material stockpiles or spoil piles prone to wind erosion will be maintained as to minimize release of particulate matter or dust. This may include, but is not limited to, covering or stabilization of material stockpiled at the work site as required. If required, the application of dust suppressants, such as water, will be limited to the roadways, driveways or designated areas used for substantial maintenance and repair works. The amount of dust suppressant applied should not exceed the minimum amount required to effectively suppress dust and will be monitored to confirm excess does not pool or run-off and impact adjacent waterbodies.

To mitigate impacts to ambient air quality and reduce increased greenhouse gases associated with maintenance vehicle emissions, engines and exhaust systems will be properly maintained, vehicle idling times and cold starts will be reduced to the extent possible.

Due to the remote location of the LSMOC, there are no nearby residents that will be affected by the increased noise associated with heavy machinery and equipment during maintenance activities. The LMOC, however, is located in a developed area such that nearby residents may be affected by the increased noise associated with heavy machinery and equipment during maintenance activities. Accordingly, machinery and factory supplied noise-abatement equipment (e.g., mufflers) will be maintained in good working order and

machinery idling will be minimized. Additionally, MI will implement a management process based on response to noise complaints. Measures for mitigating the potential effects of noise and other sensory disturbance on wildlife are described in Section 4.8.

4.2 Soil

Soil quality in the Project Development Area (PDA) may be adversely affected during operation and maintenance from leaks and accidental spills or release of fuels or other hazardous substances. Mitigation to avert impacts to soil quality includes preventing leaks, spills and releases by providing secondary containment for fuel and hazardous material storage, requiring drip trays for equipment, refuel and conduct maintenance only in designated areas, provide spill clean-up equipment and materials, and provide an emergency (spill) response plan. As well, speed limits will be abided by when hauling material to and from the project site to avoid spills related to vehicular accidents. If a spill should occur, MI or the Contractor conducting the work would be responsible to provide notification within 24 hours and contaminated soil will be appropriately disposed of at a licensed facility or stored in a designated storage area to prevent secondary contamination. Quantities of hazardous materials removed will be recorded (e.g. weigh bills) and provided to MI. More details on measures to protect against and clean-up the potential accidental discharge of contaminants such as fuel, hazardous materials, hazardous waste and non-hazardous waste are discussed in Section 4.11 and 4.12 of this OEMP.

Most maintenance activities will occur on previously constructed / disturbed ground with the possible exception of the development of new quarry areas, if required. Quarrying activity will result in the loss of soil and use of heavy equipment can result in soil compaction. Efforts will be made to avoid causing ruts and disturbing soil. Mitigation to avert impact include avoid working in area when ground is wet, if possible.

4.3 Groundwater

4.3.1 Regional Groundwater Description

LMOC

A confined carbonate bedrock aquifer (commonly referred to in Manitoba as the “Carbonate Aquifer System”) is present in the area of the LMOC, which is overlain by 5 m to 18 m of till. Artesian pressures are present in the vicinity of the LMOC, with piezometric heads that can typically be up to 5 m above the ground surface. The bedrock aquifer is recharged via rainfall and snowmelt regionally. Groundwater recharge areas local to the LMOC are from upland areas as well as from local recharge zones to the east and west of the LMOC. Groundwater flow in the carbonate aquifer is interpreted to be from the LMOC area towards Lake Manitoba and Lake St. Martin.

LSMOC

Two distinct groundwater systems are known to be present within the region of the LSMOC, within the upper saturated peat and the lower confined carbonate bedrock aquifer. The upper, saturated peat unit is perched above the clays (where present) and underlying till units. The peat is recharged directly from surface rainfall

and snowmelt and the flows within the peat will be locally controlled. The water table within the peat is at or near ground surface, with an overall hydraulic gradient, including surficial flow, to the east. Glaciolacustrine clays/clay tills, and silt tills form a low permeability aquitard between the perched peat groundwater flow system, and the underlying confined carbonate bedrock aquifer system. Aside from regional surface water drainage patterns, the low permeability nature of the aquitard is a key element in maintaining perched water levels in the surficial peat and confined head in the bedrock aquifer and overlying silt till. The lower, confined bedrock aquifer is comprised of a Paleozoic rock sequence commonly referred to in Manitoba as the "Carbonate Aquifer System". This aquifer system is isolated from the peat unit by the upper clay zone and underling tills.

The confined bedrock aquifer is recharged via rainfall and snowmelt regionally. Groundwater recharge areas local to the LSMOC are located on topographically high ground areas with thin sediment cover south of Lake St. Martin, and also to the southwest at the Lake St. Martin Narrows where there are bedrock outcrops at ground surface. There are several artesian groundwater spring sites in the vicinity of the LSMOC. These are important because they provide a natural pressure relief of the bedrock aquifer system in the region of the LSMOC. The groundwater flow system is interpreted to be bound by discharge to naturally occurring spring sites, to Lake St. Martin, and to Lake Winnipeg. Groundwater is also likely to discharge into the Dauphin River to the northwest and to the Mantagao River to the east.

4.3.2 Potential Effects on Groundwater During Operation

Operation of the channels will result in potential changes to the existing groundwater conditions within the perched peat (LSMOC only), overburden clay/till, and confined bedrock aquifer piezometric pressure conditions along the channels. These may include water level (pressure) changes in aquifers, water quality changes, and changes in the relationship of the groundwater aquifer discharge to the surface water system. In areas where the bedrock aquifer pressures are elevated relative to the thickness of the confining till aquitard units and weight of water above, there is a risk of basal heave/hydraulic fracturing of the till. This may induce a connection of the bedrock aquifer to discharge at the base of the excavation, possibly producing some uncontrolled groundwater discharge into the channel.

For the LSMOC, infiltration of surface water during operation of the channel may cause local and short-lived water quality or possibly bacteriological degradation of the regional bedrock aquifer resource near the channel. However, there are no nearby domestic well users that would be affected and the overall hydraulic gradient is to the east northeast, with discharge to existing artesian spring sites, and ultimately into Lake Winnipeg. For the LMOC, the high piezometric pressure in the aquifer would protect against aquifer contamination during all phases of operation.

4.3.3 Management Measures

Groundwater management measures that will be implemented to mitigate or protect against impacts to groundwater or from groundwater during operation and maintenance of the channels are detailed in the GWMP.

Aquifer depressurization is required to reduce the risk of post-construction basal heave and slope instability within the LMOC. A long-term passive depressurization system is planned along the LMOC that will release groundwater from the confined aquifer into the channel, thereby reducing the groundwater pressure head in the LMOC area. This system would remain under artesian pressure and therefore flow upward year-round and will act as a discharge zone for the aquifer. The positive pressure in the aquifer depressurization system would protect against aquifer contamination.

The zone of influence of the LMOC depressurization system will expand over a limited distance and domestic water supply well pressure, as well as flowing well (artesian-dependent) operation, will be affected in this area. While most domestic water supply wells are drilled to an elevation deep enough into the bedrock that the water will remain in the well, pumping will be required to mitigate the loss of artesian pressure for flowing well operations.

Passive sub drains are planned to lower piezometric pressures beneath the base of the LSMOC WCS to protect against uplift. Additionally, to mitigate the potential for surface water infiltration to the bedrock aquifer the LSMOC is designed to minimize the difference between the operating (staged) channel water level, and the piezometric surface in the underlying bedrock aquifer.

Groundwater quality in the project area may also be adversely affected during operation and maintenance from leaks and accidental spills or release of fuels or other hazardous substances. Mitigation to prevent leaks, spills and releases include providing secondary containment for fuel and hazardous material storage, requiring drip trays for equipment, refuel and conduct maintenance only in designated areas, provide spill clean-up equipment and materials, and provide an emergency (spill) response plan. If a spill should occur, MI or the Contractor doing the work would be responsible to provide notification within 24 hours, and to document the event with an incident report. Specific measures to address the potential contamination of groundwater from hazardous materials and waste are discussed in Section 4.11 and 4.12 of this OEMP.

A long-term groundwater monitoring plan, beyond the 2-year post-construction monitoring period, will be developed, which will be based on the project monitoring data and an assessment of project effects. The plan will include monitoring the effect of the channel on groundwater quality and water levels during channel operation with gates open and gates closed. On-site and regional monitoring of the effects of any long-term passive aquifer depressurization system (such as proposed at the WCS) will also be included in the plan. MI will take appropriate action with respect to adaptive management procedures identified through the monitoring process and as outlined in the GWMP.

4.4 Surface Water

Operation of the channels will have potential changes to localized and regional drainage patterns. While the channels will alter the route and timing for the passage of high flows from Lake Manitoba to Lake St. Martin and to Sturgeon Bay (Lake Winnipeg), it does not change the overall composition or volume of water entering or leaving the system as these flows would ultimately reach Lake Winnipeg through the Fairford River and Dauphin River without the operation of the channels. As well, operation of the channels is expected to have a negligible effect on Lake Winnipeg water levels (refer to Project EIS Chapter 6). Surface water management measures that will be implemented to manage local drainage are detailed in the SWMP.

Operation of the channels will potentially result in changes to localized sediment and debris transport impacting water quality and also potential changes in regional water levels in Lake Manitoba, Lake St. Martin and Lake Winnipeg. Surface water management measures that will be implemented to mitigate the potential transport and deposition of sediments beyond areas disturbed during construction of the channels are detailed in the SWMP. Erosion and sediment control measures will be implemented to prevent the introduction of sediment, as summarized in Section 4.5 and detailed in the SMP. Measures that will be implemented to mitigate potential impacts to the environment or public and worker safety related to material entering, within or exiting the channels, including floating or submerged (e.g., driftwood, plants), are detailed in Sections 3.1.4, and 4.6 of this plan. Surface water quality along the channels will be monitored for two years post-construction by MI or their designated representative, as described in Section 6.1. While these surface water sampling events are occurring during the operation phase of the program, they are designed to monitor potential effects post-construction and not the effects related to operating the channels. Additional surface water quality monitoring during operation will be completed as part of the Aquatic Effects Monitoring Program (AEMP) to assess effects of water quality changes on fish and fish habitat.

Surface water quality in the project area may be adversely affected during maintenance and operation activities from leaks and accidental spills or release of fuels or other hazardous substances. Mitigation to avert impacts to surface water quality includes preventing leaks, spills and releases by providing secondary containment for fuel and hazardous material storage, requiring drip trays for equipment, refuel and conduct maintenance only in designated areas (located an appropriate distance from any surface water), provide spill clean-up equipment and materials, and provide an emergency (spill) response plan. If a spill should occur, MI or the Contractor doing the work would be responsible to provide notification within 24 hours, and to document the event with an incident report. Measures to protect against and clean-up the potential accidental discharge of contaminants such as fuel, hazardous materials, hazardous waste and non-hazardous waste are discussed in Sections 4.10 and 4.11 of this OEMP.

4.5 Erosion and Sediment Control

Operation and maintenance activities that may require temporary erosion and sediment control include, but are not limited to, earthworks repairs, rock structure repairs, revegetation, road repairs, and excavation of sediment / debris management. Erosion and sediment control measures for the mitigation and management of potential erosion during channel maintenance activities, and to minimize adverse, sediment related, effects to the receiving waters are detailed in the SMP. Measures may include, but are not limited to, rock riprap, erosion control blankets, check dams, straw waddles, silt fences, floating silt barriers (turbidity curtain) and sediment ponds. If erosion control blankets are used the product shall be 100% biodegradable, composed of natural fibers including netting, filling and thread. These temporary management practices are in addition to the permanent design mitigation that was built into the inlet, channel, and outlet. Establishing the vegetation cover within the channel and outside drains at the end of the construction phase and any subsequent maintenance activities will provide permanent mitigation against potential erosion and sedimentation from flooding and heavy precipitation.

Sedimentation from the erosion of exposed soils can negatively influence fish and fish habitat. To mitigate this effect, MI or the Contractor shall install effective erosion and sediment control measures in accordance

with the SMP, Contract Documents and MI's PER prior to commencing work and manage water runoff during maintenance activities to prevent undesirable soil movement or soil releases and discharges to a waterbody. Contractor requirements for environmental protection are based on best practices in the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat, the PERs developed by MI and MI's Manual of Erosion and Sedimentation Control During Highway Construction. Erosion and sediment control measures shall be maintained in disturbed sites until soils have stabilized and revegetation of disturbed areas is achieved. Necessary repairs and adjustments to erosion and sediment control measures shall be made immediately to ensure that measures are effective in controlling erosion and sedimentation.

If de-watering is required to conduct a maintenance activity, as part of the water management plans, sediment ponds will be constructed. Discharge from maintenance activities will be diverted into a sediment pond to allow suspended material to settle out before the water re-enters a natural waterbody. Pump discharge points will be lined with clean rock or other acceptable flow dissipating applications to prevent erosion and the release of suspended sediments. MI or the Contractor will take the necessary precautions to prevent contaminants (including sediments) from entering Lake St. Martin, Lake Winnipeg or the creeks adjacent the LSMOC.

If in-water work is required, turbidity curtains may be required to isolate / control sediment movement from the work area. The turbidity curtain will be of geotextile and manufactured to suit site conditions, including a continuous floating top, and a continuous heavy weight sewn into the bottom. The turbidity curtain will be installed beyond the extents of the maintenance activities. The use and installation of a turbidity curtain should be directed by the On-site Environmental Inspector in accordance with acceptable BMPs.

Providing for the success of the long-term management practices, such as maintaining the vegetation cover, is fundamental toward minimizing the erosion potential over the long-term operation and maintenance of the Project. Operation of the LMOC and LSMOC, as discussed in Section 4.7, may result in impacts to the cover vegetation along the channel side slopes, which could leave them vulnerable to erosion. Monitoring will be completed as described in the RVMP to assess the level of disturbance to vegetation and evidence of erosion following channel operation and to identify the need for corrective actions. Thresholds for remedial activities will depend on both the extent of vegetation dieback as well as the risks associated with erosion. Remedial approaches and methods in relation to thresholds are described in the RVMP. Corrective actions would generally include repairing areas of erosion, weed management and infill seeding, as required, following changes in water levels in the channel from operation.

Specific maintenance activities and field conditions may have unique requirements to control erosion and sediment concerns. As such, it is important to maintain an adaptive management approach to erosion and sediment control. Adaptive management procedures in regards to the SMP will focus on the key objectives of reducing the potential for wind and runoff induced erosion, and eliminating or controlling the amount of sediment that can enter channel, outside drains, proximal creeks, Lake Manitoba, Lake St. Martin, and Lake Winnipeg in order to maintain water quality goals. A water quality monitoring program will be developed, as part of the SWMP and AEMP, to assess any changes in water quality that may result from operation and maintenance activities and the effectiveness of proposed mitigation. Periodic inspections or progress updates may change or alter the need for erosion and sediment control measures during each maintenance activity.

Adaptive management may consider, but is not limited to, the following:

- The location and configuration of erosion and sediment control measures for proposed maintenance activities.
- Any additional activities on site that may impact erosion and sediment control measures or their effectiveness.

4.6 Fisheries and Aquatic Ecosystem

Operation of the channels has potential to alter fish habitat through movement and deposition of sediment into Birch Bay (Lake St. Martin) and Sturgeon Bay (Lake Winnipeg) and through changes in the flow patterns of the Fairford River, Dauphin River and the inlet and outlet of the channels. As well, when the channels are initially operated or wetted, fish will be able to access the channels. The LSMOC is being designed such that hydraulic conditions in the Dauphin River are suitable for upstream fish passage and spawning and egg incubation of target species (walleye and lake whitefish). The inlet and outlet have been designed to limit scour of sediment and entrainment of fish, eggs, and sediment in the outflow.

While not a concern with the LMOC, operation of the LSMOC has potential to strand fish and fish eggs within the channel when the WCS gates are closed. To manage this the channel was designed to allow downstream movement of fish throughout the open-water season and provide baseflow depths sufficient to prevent freezing to bottom, such that the LSMOC will sustain fish even when the channel is not in operation. While some stranding of individual fish and eggs may be unavoidable, the effects of stranding to the populations of local fish species are expected to be low. Operational procedures will be followed for closing the WCS gates to allow for gradual reduction in flows within the LSMOC to avoid the extent of potential fish stranding. As part of the AEMP, potential egg deposition below the most downstream drop structure will be monitored during operation, if eggs are found then an appropriate water management plan for the duration of egg incubation will be developed in consultation with the Department of Fisheries and Oceans Canada (DFO).

In addition to operation effects, maintenance activities such as cleaning debris and/or excess vegetation from the channels and the outside drains may potentially impact fish and fish habitat. This maintenance activity will be required to maintain conveyance of flows and may result in alteration of the substrate and flows. The navigation safety boom surrounding the inlet will help to manage and collect debris before it enters the channels. Debris captured by the boom will need to be removed periodically as it accumulates, likely using a boat. To reduce the potential for debris accumulation within the LSMOC outlet area from littoral drift during non-operation of the channel, rock jetties will be constructed at the outlet. Debris that does accumulate within either channel would be manually removed from the channel slopes after the flood waters have receded in accordance with the Debris Management Plan.

A detailed description of the project and potential effects will be provided in a submission to DFO to obtain the required *Fisheries Act* Authorization for the Project prior to construction. Therefore, no specific Authorization conditions have been received to date, however, once received they will be incorporated into the final OEMP. Standard advice typically issued with a project Authorization would still be applicable for reducing potential effects during operation and maintenance of the channels. Environmental measures likely to be expressed by DFO, some of which are contained within the PERs, may include the following:

- Work will be conducted in adherence to DFO Authorization(s).
- Follow DFO's Manitoba Restricted Activity Timing Windows for the protection of Fish and Fish Habitat for instream work, as practical, particularly for instream work required "in-the-wet".
- Comply with the Manitoba Aquatic Invasive Species to reduce the risk of increasing dispersal of invasive aquatic species. Heavy machinery will be required to be cleaned and disinfected prior to arriving on site and before moving between work areas at different lakes and drainages (if working upstream from Lake Winnipeg to Lake St. Martin or from Lake St. Martin to Lake Manitoba).
- Activities related to the project will be undertaken in accordance with the "Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat" and in consideration of the Fish Swimming Performance User Guide, 2016 and provincial fisheries objectives.
- Appropriate precautions will be taken so that potential deleterious substances (such as fuel, hydraulic fluids, oil, or sediment) do not enter a waterbody. Equipment operating near a waterbody is to be free of external fluid leaks, grease, oil and mud and the cleaning, fueling and servicing of equipment will be conducted in a manner to prevent the entry of deleterious substances into the surface water.
- Removal of riparian vegetation will be kept to a minimum to help maintain the stability of waterbody banks. The area over which vegetation in riparian vegetation areas is removed will affect no more than one third (1/3) of the total woody vegetation in the right-of-way within 30 m of the ordinary high-water mark of a waterbody. Clearing within 30 m of a waterbody will be done by hand and vegetative root masses found within the waterbody banks will remain undisturbed unless specified in the Contract Documents.
- Implementation of erosion and sediment control measures as appropriate in compliance with contract documents in order to prevent the entry of sediment in waterbodies. Suitable temporary and long-term erosion control measures will be installed where required so that disturbed areas are not subject to erosion prior to the establishment of vegetation. These measures are to be inspected regularly to confirm that they are functioning properly until vegetation is re-established and necessary repairs or adjustments will be made if damage is discovered or if these measures are not effective in controlling erosion and sedimentation.
- If maintenance of rock structures is required in the inlet and outlet of the LSMOC, these areas will be isolated from the adjoining waterbody using appropriate methods (turbidity curtain, temporary cofferdam, etc.).
- If required, de-watering of a cofferdam area will be pumped to a settling basin or filtering system protected with flow dissipating applications and then discharged onto the riprap shoreline prior to re-entering the waterbody. Alternatively, the dewatering could be pumped through dense terrestrial vegetation a sufficient distance from the waterbody to allow sediment deposition prior to discharge water reaching a waterbody.
- Live fish or mussels salvaged within a de-watering area will be transferred to the natural waterbody which it was from.
- Implement measures for materials handling, waste handling and disposal, and fuel handling and storage in designated areas located a minimum of 100 m from a waterbody and with secondary containment.
- Implementation of an Emergency Response Plan for spills including educating the workforce and maintaining accessible spill control and clean-up equipment.

4.7 Vegetation

It is not expected that additional clearing activities will be required during the operation and maintenance phase of the project. In the event that earthworks repair is required, there may be some disturbance to the revegetated areas along the LMOC and LSMOC alignment and supporting earthwork (outside drains, dikes, etc.) that was reclaimed immediately following the construction phase. Mitigation to reduce the adverse effects from maintenance repairs to earthworks and clearing of vegetation includes restricting clearing and grubbing to the isolated areas that require repair. The Contractor will not remove vegetation or excavate outside the limits of construction and staging areas without written authorization from MI or the Contract Administrator.

Clearing and grubbing activities will, whenever possible, occur during either dry or frozen conditions to limit impact to surrounding soil and vegetation. A 30 m setback will be applied to known occurrences of provincially listed Species of Conservation Concern (SOCC), where avoidance of SOCC is not possible however, construction in sensitive areas will be restricted to the winter months (outside of the growing season). Topsoil (i.e., the organic layer) will be salvaged and temporarily stockpiled to be replaced in support of re-vegetation as described in the RVMP. As a component of the SMP areas disturbed during maintenance activities will be re-vegetated. Where seeding is not required, temporary site locations will be left in a manner that promotes natural re-vegetation of the site.

Control of nuisance vegetation within the channels and outside drains may be required as a standard maintenance activity to retain appropriate conveyance of flows. Non-native invasive plant species, regulated in Manitoba by *The Noxious Weeds Act*, will also have to be controlled within the PDA. The need for vegetation management will be determined based on the results of monitoring completed in accordance with the RVMP. Management of nuisance vegetation and control of noxious weeds would involve either herbicide or mechanical control (mowing / tilling) or a combination of both methods.

Maintenance activities such as excavation, transportation of materials and blasting may result in increased fugitive dust, which can settle on vegetation in the study area resulting in impaired growth and development. It is anticipated that potential increased dust during operation and maintenance would be much less that what would be observed during construction activities. Mitigation measures to control dust are outlined in Section 4.1.

Operation of the channels may result in impacts to the cover vegetation along the channel side slopes. Many factors will influence the effect of operation on cover vegetation, including timing, magnitude, and duration of flooding, as well as effects due to ice scour, erosion, and sediment deposition. Loss of vegetation would be greater in the early years post construction when vegetation is establishing or if the channel is operated for a prolonged period. Monitoring will be completed as described in the RVMP to assess the level of disturbance to vegetation and to identify the need for corrective actions. Thresholds for remedial revegetation activities will depend on both the extent of vegetation dieback as well as the risks associated with erosion. Remedial approaches and methods in relation to thresholds are described in the RVMP. Corrective actions would generally include repairing areas or erosion, weed management and infill seeding, as required, following changes in water levels in the channel from operation.

4.8 Wildlife

4.8.1 Loss of Habitat or Disturbance to Wildlife During Operation

Operation of the channels may result in temporary disturbance of wildlife and wildlife habitat, as the water levels increase along the channel banks. While local populations of some common wildlife may be disturbed during an operation event, particularly burrowing animals and ground nesting species, there is sufficient habitat surrounding the channels to support these species. The potential to restore wildlife habitat in appropriate areas along the LMOC may include measures such as red-headed woodpecker snag installation and replacing coarse woody debris and planting shrubs to enhance eastern-whip-poor-will habitat.

Once the construction phase is complete and the channels enter operation phase, the water level maintained in the channels could limit some movement by wildlife species; however, most wildlife species are capable of crossing static or slow-moving water. During flood conditions, when the channels are conveying flow (gates opened), the increased depth, wetted width, and flow within the channels has the potential to increase this effect on wildlife movement. Mitigation for this effect will include monitoring and reporting of any wildlife interaction encountered when on site, as outlined in the Wildlife Monitoring Plan.

4.8.2 Disturbance During Maintenance Activities

It is not expected that additional clearing activities will be required during the operation and maintenance phase of the project. In the event that earthworks repair is required however, there may be some disturbance to the revegetated areas along the LMOC and LSMOC alignment and supporting earthwork (outside drains, dikes, etc.) that was reclaimed immediately following the construction phase. Mitigation to reduce the disturbance to wildlife habitat from maintenance repairs to earthworks and clearing of vegetation includes restricting clearing and grubbing to the isolated areas that require repair. Tree and brush clearing, if required, will not be conducted between April 1 and August 30 of any year unless absolutely required for an emergency and otherwise approved by MI. While rarely used, if clearing needs to be conducted for an emergency during this breeding period or other critical nesting periods, a qualified biologist shall conduct a nest survey to identify if active nests are present. Likewise, in the event that quarry or borrow sites need to be reinstated for maintenance materials during the breeding bird window, the surveys to determine presence or absence of nests will need to be conducted by a qualified biologist. If nests are discovered, work will be suspended and the EAO will be contacted.

There is potential for sensory disturbance to wildlife species (noise, presence of people and equipment) in the event of earthwork repairs and during clearing of debris and excess vegetation within the channels and outside drains. While sensory barriers to wildlife movement will be temporary during maintenance, the adversity will be mitigated by ensuring that equipment supplied for use on the Project is effectively “sound-reduced” by means of proper silencers, mufflers, acoustic linings, acoustic shields or acoustic sheds. Night lighting, if required, will be directed downward to reduce light disturbance to wildlife.

4.8.3 Wildlife Interaction with Vehicles

To reduce wildlife mortality associated with vehicle-wildlife collisions, vehicle speed will not exceed posted speed limits and wildlife warning signs will be installed where appropriate. Project-related vehicle-wildlife collisions will be tracked as part of the Wildlife Monitoring Plan. MI or Contractors for maintenance work will be required to keep worksites clean with food, garbage or waste that may attract wildlife stored and disposed of in an appropriate manner so that problem wildlife attractants are not created. Nuisance wildlife will be immediately reported to the Natural Resources Officer and the Contract Administrator.

4.8.4 Increase of Hunting Pressure

During operation and maintenance, the channels, outside drains and access roads have the potential to increase predator and hunter/trapper efficiency by providing access along a continuous linear corridor. Prey species encountering these linear corridors may be at greater risk to predation. Mitigation measures will be implemented to limit public access to the ROWs for the channels through use of gates or other barriers and signage will be posted to indicate limited access. As well, employees, workers and other staff associated with the operation and maintenance activities will not hunt, trap, or harass wildlife.

4.9 Land and Resource Use

Details related to access to the channels for land and resource use is described in the Access Management Plan. There is limited land along the LMOC and LSMOC alignments that has historically been used for recreational purposes with the exception of the inlet and outlet locations, which extend into Lake Manitoba, Lake St. Martin and Lake Winnipeg. Access to the shoreline / beaches in these areas will be limited and some recreational and commercial fishing may be restricted based on proximity to the LMOC and LSMOC infrastructure. To mitigate potential Project effects on resource use, MI will engage with Indigenous commercial fish harvesters and anglers to address potential conflict, disturbance, or access restrictions to fishing/harvesting areas and availability of fish resources.

The existing forestry road (Idylwild Road) and the existing quarry located at the end of this road are areas know to be used for hunting. It is anticipated that these areas will likely continue to be used by local hunters. Upon completion of the LSMOC, with the access road extended to the channel there will be potential for increased recreational use (ATV/Snowmobile/Camping), and hunting in the area, as well as providing potential access from the Dauphin River First Nation (south side of the Dauphin River) to Gypsumville. Mitigation measures will be implemented to limit public access to the LSMOC ROW through use of gates or other barriers and signage will be posted to indicate only permitted access as described in the Access Management Plan.

4.10 Heritage Resources

As an outcome of the Heritage Resource Impact Assessment conducted, a HRPP has been prepared specifically to deal with potential effects to heritage resources. It outlines measures to mitigate effects to cultural and heritage resources. It is unlikely that maintenance and operations activities will encounter heritage resources that were not encountered previously during construction of the Project. However, in the

event that heritage resources, or objects thought to be heritage resources, are discovered during operation and maintenance, the Historic Resources Branch (of the Manitoba Sport, Culture and Heritage Department) will be informed immediately. If a heritage resource is encountered, the activities in the immediate vicinity will cease, protective barriers will be placed around the potential heritage resource site, and the discovered heritage resources will remain in place until an archaeologist is contacted and prescribes instruction.

The current Project design and routing of the channels was influenced by the Indigenous engagement process to limit effects and concerns that were expressed in relation to changes to cultural and spiritual sites and sacred areas. Detailed recording and mapping of spiritual or cultural sites will be developed by MI in partnership with Indigenous groups, leading to a decision made about the relative importance of the site and potential mitigations strategies.

4.11 Materials and Waste Management

Operation and maintenance activities will require construction materials to be delivered to and stored at various locations along the channels and/or access roads, as required. Leaks and accidental spills or release of fuels or other hazardous substances related to operation and maintenance activities has been anticipated. The MI Spill Response and Prevention Plan covers the transportation, use, storage and transfer of hydraulic fluid, other mechanical lubricants, petroleum fuels, antifreeze and herbicides. To prevent potential environmental accidents and contain potential spills, hazardous materials will be transported, stored, and handled as recommended by the suppliers and/or manufacturers, and in compliance with applicable federal, provincial, or municipal regulations. Dangerous goods/hazardous wastes are identified by and will be handled according to *The Dangerous Goods Handling and Transportation Act* and Regulations. MI or the maintenance Contractor will have on-site staff that are trained and certified in the handling of the dangerous/hazardous goods being utilized on site.

When required on site during operation and maintenance, fuel storage will be in compliance with the *Manitoba Storage and Handling of Petroleum Products and Allied Products Regulation* 188/2001. Fuel stored in drums or containers of 230 L or less will comply with the requirements of the Manitoba Fire Code. Designated area(s) will be established for fuel storage, hazardous materials handling and storage, equipment cleaning, refueling and servicing. Designated areas will be located at least 100 m from a waterbody or wetland and will be kept clear of snow and/or miscellaneous materials to allow for clear access and routine inspection and leak detection. Dedicated petroleum storage areas will provide additional spill containment (impervious liner and berms). Only above ground storage tanks will be used for the storage of bulk petroleum products. The tanks will be equipped with overfill protection and spill containment consisting of perimeter dikes or secondary containment in the tank design.

Equipment maintenance and inspections are a key component to preventing small leaks from contaminating the waters and riparian areas associated with a project. This is particularly important for equipment working temporarily over the wetted area or within close proximity to Lake Manitoba, Lake St. Martin, Lake Winnipeg or other waterbodies. Maintenance equipment will arrive on site in a clean condition and will be kept in good working order free of external fluid leaks, grease and oil. Equipment working at a maintenance activity will be inspected daily for small leaks. Machinery that is found to be leaking fuel, oil or other fluids will be moved off

the work site immediately for repair. When equipment is stationary for extended periods of time within the work area drip trays will be installed to contain potential leaks. For mobile equipment on site, drip trays should be readily available, and used as needed.

MI or the maintenance Contractor will conduct day-to-day operations in such a manner as to avoid creating conditions that will be detrimental to the surrounding area. Different waste streams will not be mixed and waste materials and refuse will be removed and disposed of promptly in a manner that will not contaminate the surrounding area. Effort will be made to prevent debris from falling into, or accumulating on, ground surfaces or into the waterway at and in the immediate vicinity of the project. Areas requiring maintenance will be kept clean and orderly during and at completion of the activity. At no time during operation and maintenance activities will domestic solid, demolition or construction waste be permitted to accumulate for more than one day at a location on the work site, other than at a dedicated temporary waste storage site. These waste materials will be recycled to a degree that is economically and practically feasible or disposed of at a Waste Disposal Ground operating under the authority of a permit issued pursuant to *Manitoba Waste Disposal Grounds Regulation* 150/91. Sewage and seepage from on-site sanitary facilities, will be disposed of at a local licensed facility and in accordance with the *Manitoba Onsite Wastewater Management Systems Regulation* 83/2003.

Dangerous goods/hazardous waste storage areas will be located at least 100 m away from the high-water line of the nearest water body and be contained within a diked area or another form of secondary containment. Liquid wastes or fuels will not be permitted to be deposited upon the ground. When equipment servicing requires the drainage or pumping of lubricating oils, or other fluids from the equipment, a groundsheet of suitable material and size will be spread on the ground to catch fluids in the event of a leak or spill. Bulk waste oil will be stored in aboveground oil tanks, which will have secondary containment and a weatherproof cover. Waste oil will be recycled by a reputable recycling agency. Used oil filters will be drained, placed into suitable storage containers, and disposed of at approved facilities. Empty containers from equipment refueling and servicing will be removed to a licenced disposal site. Disposal of dangerous/ hazardous wastes will be at approved hazardous waste facilities.

4.12 Emergency Spill Response and Reporting Procedures

Emergency Response Procedures refer to spills, accidents, or malfunctions involving the release of fuels, dangerous goods or hazardous materials/waste. Due care and caution will be taken to prevent spills during operation and maintenance activities. In the event of a release the maintenance Contractor doing the work will follow their own spill response plans, which will have been reviewed and approved by MI as part of their contracts. MI has developed PERs, which Contractors will have to adhere to, that describe measures to address accidents and spills, including reporting, cleanup, compliance training, inspection, and enforcement. An updated list of key contacts and telephone numbers for reporting spills, accidents or malfunctions will be kept on site. A Workplace Hazardous Materials Information System (WHMIS) file will be maintained on site for the hazardous materials at the work area. Prior to commencement of the work, Safety Data Sheets will be submitted to the Contract Administrator for hazardous materials to be used on site. The Contractor will provide training for staff and confirm Subcontractors are trained and empowered to identify, address, and report potential environmental problems.

Spills will be contained and cleaned up immediately by on-site personnel in accordance with the approved on-site emergency response and containment plan. In the event that petroleum products (e.g. fuel or oil) spill or leak at the work site, the source of the spill should be stopped by shutting down equipment, closing valves and pumps, or plugging hoses. If possible, the spilling or dripping materials should be contained by a spill pan and diking around the spill to prevent it from entering the drainage system. These mitigation procedures should be conducted by the operator(s) that identified/were involved in the spill or leak. Any pooled liquids should be recovered by placing in appropriate drums for temporary storage and disposal by approved agencies. The residual liquids will be cleaned up using absorbent pads and contaminated soil and/or materials must be removed immediately and transported to an approved location for disposal. In the event that a petroleum product enters a natural waterbody (e.g. equipment leak while conducting in-stream works in, or while working along the periphery of Lake Manitoba, Lake St. Martin and Lake Winnipeg), the appropriate spill kit resources must be implemented immediately.

The maintenance Contractor will immediately report any reportable spills to Manitoba Conservation and Climate's Accident Reporting Line at (204) 944-4888 pursuant to *Manitoba Environmental Accident Reporting Regulation* 439/87. The Contractor will report spills and how they were managed to MI within 24 hours, whether it was necessary to report the spill to Manitoba Conservation and Climate or not. A follow-up report will be provided to the Director, at their request, for any reportable environmental accident outlining the causes(s) and proposed corrective action to prevent reoccurrence. This follow-up report will also be provided to other regulators, as required, such as DFO for example to adhere to the *Fisheries Act* Section 38(5) Duty to Notify – Deleterious Substance.

An adequate supply of suitable absorbent material and other supplies and equipment necessary to immediately cleanup inadvertent spills will be available on site during any maintenance activity, including an emergency spill kit for in-water use. Each machine working on site will also have a spill kit. Spill kits should contain as a minimum absorbent material, high density HDPE groundsheets and absorbent oil booms when working near water. Storage and disposal of residual material from spill cleanup must be done in an environmentally safe manner and in accordance with applicable regulations. The EAO will inspect storage areas to confirm requirements are being met.

4.13 Fire Prevention and Response Procedure

Wildfires can be a threat to people, property and activities. Advance planning, preparation and the implementation of safety measures is required to effectively respond to wildfires when they do occur. The Manitoba Emergency Plan provides information on prevention and mitigation, preparedness, response and recovery in relation to fires. MI has developed PERs, which maintenance Contractors will have to adhere to, that describe measures to address burning and brush disposal. On-site operation and maintenance personnel will be trained in fire prevention, including proper disposal of hot or burning material and designated smoking areas. An evacuation and emergency preparedness plan addressing wildfires will be implemented and submitted by the Contractor prior to commencing maintenance activity.

Fire prevention, at its most basic, is based upon the principle of keeping fuel sources, oxygen sources and ignition sources separate. Fire prevention starts with good housekeeping, such that materials are stored in

the right place and do not accidentally spill and cause fire. A primary zone will be established around longer-term temporary structures associated with maintenance activities. Flammable materials such as leaves, brush, dead limbs, and fallen trees will be cleared from the area regularly. Exhaust and engine systems of equipment and vehicles will be in good working condition and free of dried grass and other combustibles. Fire extinguishers will be available in heavy and light equipment and in equipment storage facilities and offices for fighting fires.

Reasonable steps will be taken to prevent a fire from burning out of control or spreading from the channels and associated infrastructure areas. It is unlikely that open fires will be required within the PDA during operation and maintenance activities. Regardless, no fires will be started without first taking sufficient precautions to keep the fire under control. Burning or smoldering matter will not be placed where it may cause a fire to spread. Fires will be completely extinguished after burning and will be monitored so that no hot spots remain. Open fires are prohibited from April 1st to November 15th annually. In the event that burning is required during that period, an application for a burning permit will be submitted for approval to Manitoba Conservation and Climate and the conditions imposed by the burning permit will be adhered to.

In the event that a wildfire occurs, it will be immediately reported to MI and to Manitoba Conservation and Climate at 1-800-782-0076. All related maintenance activities in the vicinity of a wildfire will cease until advised by the site supervisor that it is safe to resume operations. Additionally, reasonable attempts will be made to extinguish the wildfire with available equipment, services and labor made available at the disposal of an officer for the purposes of wildfire protection operations.

5.0 TRAINING AND AWARENESS

MI and the Contractor will be expected to provide mandatory training and awareness sessions for their workforce and Subcontractors prior to the start of any operation or maintenance activity, and to new personnel before they begin work. Employees involved in the storage, handling and use of dangerous goods and fuels will have WHMIS and spill prevention and response training. Additionally, if herbicides are used, they will be applied by trained personnel who meet provincial licensing requirements. The training and orientation sessions will be documented and issued to MI for their records and submission to regulators, where required.

The purposes of the training and orientation sessions are to confirm that on-site personnel are aware of and understand the environmental provisions of the contract documents including relevant drawings, specifications and Contractor submittals and updates. Orientation should include contents of this OEMP to confirm that environmental protection measures are followed. Topics of importance to be discussed with workers/Subcontractors include:

- What is a spill or discharge?
- What to do if there is a spill in water or on land?
- What spills are reportable and within what time frame?
- Fire prevention and response.
- What is a heritage resource and how to manage resources encountered?

The Contractor will submit the planned frequency and records of these meetings. This information, however, will likely be presented during the weekly project/construction meetings and the daily safety meetings that are held before each shift. The Contractor will maintain access to environmental provisions of the contract documents including relevant drawings, specifications and Contractor submittals and updates, in a location and manner accessible to employees, Subcontractors and agents.

6.0 MONITORING

Monitoring and reporting will be completed to verify that the environmental management measures outlined in this OEMP and the supporting topic specific management plans are being implemented, maintained and are effective in mitigating the adverse environmental effects of the Project. Additionally, it allows these measures to be adapted where necessary, and to anticipate any potential unforeseen adverse environmental effects. MI (Project Manager/EAO/Technical Support Team), Contract Administrators, and the Contractor(s) all have responsibilities for monitoring and reporting, as previously outlined in Section 2.0. More details characterizing the monitoring and follow-up are described in the Environmental Management Program Framework.

Upon completion of the contract, Contract Administrator responsibilities will fall under future contracts between MI and Engineering Service Providers for upkeep, maintenance and other activities related to the operational phase of the project.

6.1 Monitoring

Monitoring includes surveillance to document progress in operation and maintenance activities, identification of problems, issues and concerns, and environmental effects not predicted in the EIS. Throughout operation and maintenance of the channels, MI will monitor on-site activities to confirm adherence to, and the effectiveness of, environmental management measures outlined in this OEMP and the supporting topic specific management plans. There will also be monitoring of surface water quality, groundwater levels and quality, fish and fish habitat, vegetation, wildlife, land and resource use and heritage resources throughout operation of the Project where required to fulfill conditions of environmental approvals.

MI, or their designated representative, will be conducting groundwater and surface water monitoring for two years beginning at the end of the construction phase to monitor any post-construction effects from the Project. The program, as described in the SWMP and GWMP, is established to monitor only the post-construction effects related to construction of the Project.

If additional sampling events are required to support licencing / permits / Authorizations for the Project, the frequency of events and the parameters being monitored can be modified to suit the program. Further, monitoring and sampling related to operation of the Project would require increased frequency of events, particularly for monitoring of Total Suspended Solids / Turbidity in surface water during the first month that the WCS is conveying flood water through the channels. Additional, albeit, limited sampling may be required in the months that follow through to closure of the gates.

6.2 Reporting

Record keeping includes maintaining files and documentation related to environmental management measures and associated monitoring and reporting. During operation MI will record water levels, gate settings and estimated flows. It is anticipated that these records would be provided by MI in an annual report

along with other potential reporting requirements specified in the permits, approvals and Authorizations for the Project.

For operation and maintenance activities copies of permits, approvals, or other authorizations required for the work to proceed will be retained on site while work is underway. MI will also be responsible for maintaining these records at an offsite location as there will be limited access to the onsite facilities.

A Contractor assigned work on the Project for ancillary construction, operation and maintenance activities will maintain a record of file while onsite. The record file at the site will include relevant information relating to materials handling, spills, leaks, releases, and the implementation and adjustment of the environmental protection measures. The Contractor will be required to maintain a copy of these records for a minimum of 5 years after contract closeout. Relevant information and/or significant events are to be documented and provided to MI in a timely fashion. Records may include, but are not limited to:

- Accidents, spills, leaks, and releases and the reporting and clean-up procedures used.
- Reviews, improvements and adjustments to the environmental protection measures.
- Details of environmental training sessions, including the schedule of these sessions and the names of participants.
- A full inventory of dangerous goods brought onto the site.
- A full inventory of hazardous wastes encountered on the site.
- Records of waste hauled from the site for disposal, including the location, name and description of the disposal facility and waybills/manifests.
- Records of material hauled from the site for recycling, including the location, name and description of the person or facility the material was delivered to.
- Records of fuel transported and stored at the site.
- Records of equipment inspections and maintenance.
- Records of public complaints.
- Records of actions taken to remove deleterious substances and debris from waterbodies.
- Records of annual use of pesticides.
- Wildlife encounters and/or management measures employed.

If a compliance / enforcement order is issued from a regulatory authority directly to the Contractor, the Contractor will notify MI in writing and provide copies of the correspondence between the regulator and the Contractors as there may be implications to Environmental Assessment reporting requirements. The Contractor will provide MI with the identity of knowledgeable individual(s) who will act as the on-site emergency response coordinator(s) with the authority to redirect personnel to respond to a spill or environmental emergency. Additionally, the Contractor will provide the identity of an environmental coordinator capable of redirecting work to address non-compliance issues. As a general requirement, all work will be photo-documented and notification of the work will be provided to MI on a monthly basis for record keeping purposes.

MI, or a designated representative, will inspect the site on a weekly basis during operation and maintenance activities to confirm mitigation methods outlined in this OEMP are, when applicable, adhered to. Any request for a change in environmental management measures or contract restrictions initiated by the Contractor will

be submitted to MI. The EAO will complete a Weekly Environmental Inspection Form (Appendix 2) during their site visits. The form will summarize information including, but not limited to:

- Description and status of construction activities.
- Description and status of environmental protection measures (in particular erosion and sediment control).
- Deficiencies, issues or complaints and the corrective action to be taken.
- Environmental incident(s) reported.
- Summaries of onsite correspondence.
- Site photos documenting observations.

If an environmental incident/accident occurs, a separate Environmental Incident/Accident Report Form (Appendix 2) will be filled out by the Contractor with assistance from the EAO, which describes the incident, lists the individuals involved, and details the cause of the incident and corrective actions taken to prevent the incident from occurring in the future. The EAO will maintain an Environmental Incidents Running Record Form (Appendix 2) that identifies each incident and identifies "when" the actions were taken to clean up and or prevent the incident from occurring in the future.

In the event of a reportable spill, the EAO will immediately report to the proper authorities, and provide a copy of the incident report to the Project Manager. As noted in Section 4.12, a follow-up report will be provided to the Director of Manitoba Conservation and Climate, at their request, for any reportable spill outlining the cause(s) and proposed corrective action to prevent reoccurrence. There are also regulatory reporting obligations when hazardous substances are transported to or from the site and/or stored on site.

7.0 COMMUNICATION

7.1 Public Advisement of Operation

Prior to operating the LMOC and LSMOC to convey flood waters, public notifications will be issued to advise of the potential risk to public safety. An initial communication should be issued that indicates the proposed date to begin opening the gates within the LMOC and LSMOC and to provide website information as to where further information will be made available. Any federal or provincial regulators that require notification as a commitment of project related licencing / authorizations / permits will be included in the initial communication. Any news releases and or public communications will be the responsibility of, and to be conducted solely by, MI. Specific details on the responsibility and methods for communication with public / government authorities will be described in the O&M Manual.

7.2 Communication During Onsite Inspections and Maintenance

MI personnel will attend a 'pre-job' briefing prior to the first day that workers/Subcontractors commence work on site. The meeting is intended to review the activities that will be conducted and to express any potential health, safety, and environmental issues related to the proposed work.

Personnel working on the site will maintain daily communication to confirm safety and environmental protocols are adhered to during onsite operation and maintenance activities. Daily and weekly documentation will be maintained by on site personnel and forwarded to MI at an appropriate frequency (daily / weekly), as is applicable.

7.3 Environmental Concerns

Environmental concerns will be reported by the Contractor conducting maintenance activities at the end of each week to the MI EAO and MI Project Manager. If the Contractor is working under a Contract Administrator, then Communication and follow-up information will be directed through the Contract Administrator. If an environmental incident/accident occurs, the Contractor will report it immediately.

If an environmental incident results in a "reportable" spill, the Contractor / Contract Administrator (as applicable) will contact Manitoba Conservation and Climate's Accident Reporting Line at (204) 944-4888.

APPENDIX 1

Applicable Federal and Provincial Legislation

Applicable Federal and Provincial Legislation

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
Federal Legislation		
Canadian Environmental Assessment Act, 2012, SC 2012, c 19, s 52	• Physical Activities, Regulations Designating, SOR/2012-147. • Prescribed Information for the Description of a Designated Project Regulations, SOR/2012-148.	• Identifies requirements and provides guidance for environmental assessments of designated projects. • Project requires environmental assessment and approval.
Canada Water Act, RSC 1985, c C-11	• Management of water resources including conservation and utilization of water resources, and provides guidelines for Canadian drinking water quality.	• Protection of water resources, including water quality.
Canadian Environmental Protection Act, 1999 (S.C. 1999, c. 33, s 64, shed 1)	• Provides a series of regulations for toxic substances.	• The potential risks of environmental pollutants and toxic substances are evaluated under this Act that addresses pollution prevention and the protection of the environment (Environment Canada) and human health (Health Canada) to contribute to sustainable development.
Explosives Act, RSC 1985, c E-17	• Explosives Regulations 2013, SOR/2013-211.	• Legislates and regulates the manufacturing, testing, acquisition, possession, sale, storage, transportation, importation and exportation of explosives. • Blasting activities, explosives storage and transport will need to be licenced.
Federal Sustainable Development Act, S.C. 2008, c. 33	• The Governor in Council may make regulations for the purpose of achieving any of the goals of this Act.	• An Act to require the development and implementation of a Federal Sustainable Development Strategy and the development of goals and targets with respect to sustainable development in Canada, and to make consequential amendments to another Act.
Fisheries Act, RSC 1985, c F-14	• Applications for Authorization under Paragraph 35(2)(b) of the Fisheries Act Regulations, SOR/2013-191.	• Protects fish (as defined by the Act) from serious harm. Identifies general prohibitions, fisheries protections and pollution prevention, as well as requirements for authorization of works

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
	• Paragraph 36(3) Prohibits deposition of a deleterious substance of any type in water frequented by fish or in any place where the deleterious substance may enter the water, except those authorized by regulation. • Aquatic Invasive Species Reg. SOR/2015-121.	which may cause serious harm to fish prior to construction. • Protects against introductions of pollutants or high levels of sediment that could be deleterious to fish. • Lists invasive species that are prohibited and controlled. Identifies activities and regulatory tools to prevent the introduction of aquatic invasive species into Canadian waters and to control and manage their establishment and spread, once introduced.
Migratory Birds Convention Act, 1994, SC 1994, c 22	• Migratory Birds Regulations, CRC, c 1035.	• To protect and conserve designated migratory birds and their nests.
Navigation Protection Act, RSC 1985, c N-22	• Navigable Waters Bridges Regs. CRC, c 1231. • Navigable Waters Works Regs. CRC, c 1232.	• Protection of the right to navigation on navigable and scheduled waterways. Identifies prohibitions for the construction, placement, alteration, repair, reconstruction, removal or decommissioning or works in, on, over, under, through or across scheduled navigable water. Identifies requirements for authorization of works, and the potential for opting in for works at non-scheduled waters prior to construction. • MI will opt-in and obtain Transport Canada Authorization.
Species at Risk Act, SC 2002, c 29	• N/A	• Prohibits killing, harming or harassing endangered or threatened species at risk, provides for plans and strategies to enable the recovery and management of endangered, threatened or extirpated species, prohibits destruction of critical habitat, and allows for the management of species of special concern to prevent them from becoming endangered or threatened.
Transportation of Dangerous Goods Act, 1992, SC 1992, c 34	• Transportation of Dangerous Goods Regulations, SOR/2008-34.	• Defines methods for handling, containment and transportation of substances that could cause damage to personal safety or the environment.

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
Provincial Legislation		
The Environment Act, C.C.S.M. c. E125	• Classes of Development Reg. 164/88. • Environment Act Fees Reg.168/96. • Licensing Procedures Reg. 163/88. • Notice and Reporting Reg. 126/2010. • Onsite Wastewater Management Systems Reg. 83/2003.	• Classifies developments and identifies requirements for provincial licencing and environmental assessment. • Defines the application fees. • Defines information required to apply for licensing under The Environment Act. • Defines requirements regarding the notice of a licensing decision and reporting of releases to the environment. • Defines proper construction and disposal for onsite water management systems.
The Crown Lands Act, C.C.S.M. c. C340	• Crown Lands Fees Regulation 130/91. • Vehicle Use on Crown Lands Resource Roads Regulation 145/91.	• Identifies requirement for and issuance of leases, permits, easements and rights-of-way for specified works on provincial Crown lands. Work permits will be required.
The Dangerous Goods Handling and Transportation Act, C.C.S.M. c. D12	• Dangerous Goods Handling and Transportation Fees Reg. 164/2001. • Dangerous Goods Handling and Transportation Reg. 55/2003. • Environmental Accident Reporting Reg. 439/87. • Hazardous Waste Reg. 195/2015. • Storage and Handling of Petroleum Products and Allied Products Reg.188/2001.	• Identifies requirements for handling, containment and transportation of substances that could cause damage to personal safety or the environment. • Outlines reporting requirements in the case of an accidental spill. • Defines categories of hazardous wastes and registration of generators of hazardous waste. • Outlines requirements of storage systems for petroleum products.
The Endangered Species and Ecosystems Act, C.C.S.M. c. E111	• Threatened, Endangered and Extirpated Species Reg. 25/98.	• Regulates the protection of Manitoba's threatened and endangered species. Conserves and protects threatened and endangered ecosystems in Manitoba and promotes their recovery.
The Fires Prevention and Emergency Response Act C.C.S.M. c. F80	• N/A	• Any activities associated with combustible materials. • Provides for control of activities regarding the prevention, detection and extinguishment of fires. Work camp occupancy permit required.

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
The Groundwater and Water Well Act C.C.S.M. c. G110	• Groundwater and Water Well (General Matters) Regulation 214/2015. • Well Standards Regulation 215/2015.	• The purpose of this Act is: o to provide for the protection and stewardship of Manitoba's aquifers and groundwater; o to ensure that the construction, maintenance and sealing of wells and test holes meet standards that protect; o the environmental quality of Manitoba's aquifers and groundwater, and human health and safety; o to provide for the collection and sharing of well, aquifer and groundwater information to better understand, manage, conserve, protect, develop and use Manitoba's aquifers and groundwater.
The Heritage Resources Act, C.C.S.M. c. H39.1	• Heritage Resources Forms Regulation 99/86. • Heritage Objects Designation Regulation 160/89. • Heritage Sites Designation Regulation 122/88R.	• Designates heritage sites and identifies protections for heritage resources and heritage resource sites, including the requirement to conduct a Heritage Resource Impact Assessment (HRIA). A permit is required for the HRIA.
The Highway Traffic Act, SM 1985-86, c. 3	• Designated Construction Zones Regulation 145/2014.	• Provides guidelines and requirements for vehicles and driving on Manitoba highways.
The Mines and Minerals Act, C.C.S.M. c. M162	• Quarry Minerals Regulation, 1992, Reg.65/92. • Drilling Regulation, 1992, Reg. 63/92.	• Identifies and outlines requirements for sustainable development of mineral product exploration and production, including quarrying, in Manitoba. Quarry permits will be required.
The Noxious Weeds Act, C.C.S.M. c. N110	• Noxious Weeds Reg. 35/96.	• Identifies noxious weeds that may adversely impact Manitoba's environment or economy, outlines responsibilities to control or destroy such weeds and prohibits their spread during construction works.

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
The Public Health Act, P210	• N/A	• Relates to the preservation of health including conditions that may contaminate or pollute air, food or water. • Food handling permit is required for construction camps if they have kitchen facilities.
The Climate and Green Plan Implementation Act	• N/A	• Provides a framework through which the government develops a plan to reduce greenhouse gas emissions, address the effects of climate change, promote sustainable development and protect Manitoba's water resources and natural areas.
The Water Protection Act, C.C.S.M. c. W65	• Aquatic Invasive Species Regulation 173/2015. • Nutrient Management Regulation 62/2008.	• Provides protection and stewardship of Manitoba's water resources and aquatic ecosystems.
The Water Resources Administration Act, C.C.S.M. c. W70	• N/A	• Outlines a framework for the use and administration of water control works, including requirements and processes for approval of operating guidelines.
The Water Resources Conservation Act C.C.S.M. c. W72	• Water Resources Conservation Regulation 179/2010.	• Provides for the conservation and protection of Manitoba's water resources, and of the ecosystems associated with and reliant upon those water resources.
The Water Rights Act, C.C.S.M. c. W80	• Water Rights Regulation 126/87.	• Identifies rights and use of water in Manitoba and prohibitions against diversion of water or operation of water works and sets requirements for permitting and protections of aquatic ecosystems. Permits may be required for drainage works.
The Wildfires Act, C.C.S.M. c. W128	• Burning Permit Areas Regulation 242/97.	• Outlines wildfire controls, duties and prohibitions. A permit is required to burn clearing debris.

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
The Wildlife Act, C.C.S.M. c. W130	• General Hunting Regulation, Reg. 351/87. • Hunting Areas and Zones Regulation, Reg. 220/86. • Trapping Area and Zones Regulation, Reg. 149/2001. • Wildlife Protection Regulation, Reg. 85/2003.	• Designates provincial wildlife lands, regulates licenced harvest of wildlife, and identifies other protections for wildlife in Manitoba.
The Workplace Safety and Health Act, C.C.S.M. c. W210	• Workplace Safety and Health Regulation 217/2006. • Operation of Mines Regulation 212/2011.	• Outlines safety related duties in the workplace and identifies measures to ensure that safe work practices are being followed to protect health and safety of workers.

APPENDIX 2

Environmental Inspection Forms

(These will be included once developed during Detailed Design)