LAKE MANITOBA
LAKE ST. MARTIN

OUTLET CHANNELS PROJECT

MANITOBA INFRASTRUCTURE

Construction 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 Construction Environmental Management Program (CEMP) 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 CEMP and the Operation Environmental Management Program (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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GLOSSARY OF TERMS AND ACRONYMS

Acronyms

%	Percent
BMP	Best Management Practices
CEAA	*Canadian Environmental Assessment Act*
CEMP	Construction Environmental Management Program
cfs	Cubic feet per second
DFO	Department of Fisheries and Oceans Canada
EIS	Environmental Impact Statement
EPP	Environmental Protection Plan
ER	Environmental Representative
ERP	Emergency Response Procedures
FN	First Nation
GWMP	Groundwater Management Plan
HRPP	Heritage Resources Protection Plan
IDF	Inflow Design Flood
km	Kilometre
kV	Kilovolt
LAA	Local Assessment Area
LMOC	Lake Manitoba Outlet Channel
LSMOC	Lake St. Martin Outlet Channel
m	Metre
m^3/s	Cubic metres per second
MCC	Manitoba Conservation and Climate
MI	Manitoba Infrastructure
PDA	Project Development Area
PER	Project Environmental Requirements
PR	Provincial Road

PTH	Provincial Trunk Highway
ROW	Right of Way
SAR	Species at Risk
SARA	*Species At Risk Act*
SDS	Safety Data Sheets
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 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.

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.

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 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.

Invert (channel-): The stream bed or floor within a structure or channel.

Piezometric 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.

Pool: A deep, slow-moving area of a stream; an artificially confined body of water above a dam or weir.

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

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.

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 Construction Environmental Management Program (CEMP) 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 CEMP 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. The construction Contractors will be required to abide by the procedures and measures identified within the CEMP.

The purpose of the CEMP is to outline the environmental management processes and measures that will be implemented to minimize environmental effects during construction of the project. The CEMP is a tool to ensure that the environmental management measures are executed, monitored, evaluated for effectiveness and that information is reported to the Project management team for adjustments, as required. The CEMP will demonstrate MI's commitment to protection of the environment and compliance with the various federal and provincial environmental regulatory requirements.

The CEMP outlines the responsibilities of the various parties involved, provides a summary of construction activities and potential environmental effects and discusses the environmental management measures, monitoring and reporting procedures to be applied during the project construction. The CEMP and supporting management plans will guide the Contractor(s) construction of Project components in a manner that promotes Best Management Practices (BMPs) for environmental protection.

The CEMP 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 and Emergency Response Plans, which are described in greater detail within this document. Many of these 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. As listed in Section 3.7.2 of the EIS these targeted management plans include:

- Environmental Protection Plans (EPPs)
- Project Environmental Requirements (PERs)
- Access Management Plan
- Quarry Management Plan
- Sediment Management Plan (SMP)
- Surface Water Management Plan (SWMP)
- Groundwater Management Plan (GWMP)
- Revegetation Management Plan
- Biosecurity Management Plan
- Dust Control Plan
- Waste Management Plan (see Section 5.11)
- Hazardous Materials Management Plan (See Section 5.12)
- Emergency Response Plan (See Section 5.13)

- Heritage Resources Protection Plan (HRPP)
- Wetland Compensation Plan
- Decommissioning Plan

Environmental management measures described herein and in the supporting management plans are derived from MI's corporate, environmental and safety policies, MI's 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.

This CEMP is preliminary based on the current stage of design and will be expanded and updated during the detailed design stage. The updates and finalization of the CEMP will reflect detailed design, construction work scheduling, site conditions, input obtained from consultation and engagements, requirements of the environmental approvals, permits and licenses, and other applicable environmental plans and reports. The CEMP is a living document that will be reviewed and updated by MI on a regular basis, with continuous improvement being made so that the Project is constructed in an environmentally responsible manner.

1.1 Project Description

The Project will involve the construction and operation of the Lake Manitoba Outlet Channel (LMOC), the Lake St. Martin Outlet Channel (LSMOC) and associated components such as bridges, control structures with power connections, a new realignment of PR 239, and other ancillary infrastructure, as described in the following subsections.

1.1.1 Lake Manitoba Outlet Channel

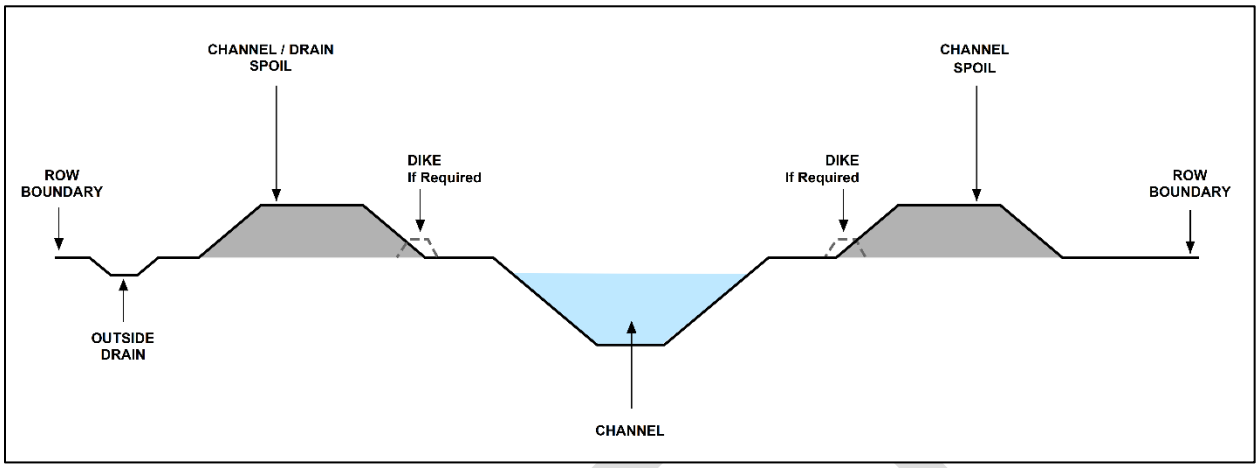
The LMOC addresses the Province's commitment to permanently enhancing the Lake Manitoba outlet capacity, working in conjunction with the LSMOC to better regulate water levels on these lakes and help reduce the effects of future flood events.

The LMOC Project consists of an approximately 24 km long outlet channel, with the inlet positioned at Watchorn Bay on Lake Manitoba and the outlet on the west side of Birch Bay on Lake St. Martin, as shown in Figure 1. The LMOC is designed to convey a flow of 212 m^3/s (7,500 cfs) at a Lake Manitoba water level of 248.11 m (812.5 ft) and a Lake St. Martin water level of 244.14 m (801 ft).

Figure 1: LMOC Project Area

The proposed channel will have an invert elevation of about 242.1 m at Watchorn Bay and about 239.3 m at Birch Bay. The channel will have a trapezoidal shape with a flat base varying in width from 12 m to 22 m and side slopes varying between 4H:1V to 5H:1V. Embankment dikes will be constructed on both sides of the channel in areas where existing ground levels are low. Spoil berms will be located behind the dikes on either side of the channel which will also be used to gain access to the channel for maintenance. An outside drain will be constructed and located on the west side of the channel to collect surface water runoff originating from the west and convey it into Lake Manitoba and Lake St. Martin. Drainage overflow structures may also be incorporated to allow flows in the outside drain during high local runoff periods to discharge into the LMOC. A typical cross section of the channel is provided in Figure 2.

Figure 2: Typical Cross-Section of the Lake Manitoba Outlet Channel



Inlet and outlet works will be required to allow for a smooth transition of flow from Watchorn Bay into the channel and from the channel into Birch Bay. The hydraulic profile of the channel will require the lake bottom to be excavated at the channel inlet and outlet to match the proposed channel invert elevations. The excavations will be tapered over a short distance out from the shoreline to meet natural lakebed elevations.

A water control structure (WCS) will be constructed at Iverson Road (approximately 21 km downstream of the inlet) to control flows through the LMOC while ensuring that Lake Manitoba water levels remain within their normal operating range when use of the channel is not required. A bridge will be integrated into the WCS to provide access across the channel. The preliminary design of the WCS consists of three 5.4 m wide sluice bays with vertical lift gates, upstream and downstream stoplogs, and a stilling basin with chute blocks, baffle blocks and an end sill. An ancillary building providing an enclosed space will also be constructed in proximity to the WCS to house the mechanical and electrical systems.

Permanent electrical service is required for power at the WCS to electrically raise and lower the gates, as well as to heat an appropriate number of gates to maintain winter operation capability. Manitoba Hydro will install an overhead distribution line to a pad-mount transformer that will be installed at the WCS location.

The LMOC will intersect provincial highways and municipal roads. Realignment of PR 239 is required in order to accommodate the LMOC while still allowing for safe, economically feasible, and hydraulically efficient structures across the channel. Various sections of municipal road will also be realigned or extended for the purposes of maintaining residential access and agricultural activities.

A total of four new bridges are planned to span the LMOC, of which one will be combined with the WCS as described above. The other three will be dedicated multispan bridges, constructed to maintain connectivity along the Township Line Road, realigned PR 239 (currently Carne Ridge Road) and PTH 6.

The LMOC will be accessed using the existing road network. Temporary access routes may be required along the channel length for access to laydown areas, construction camps and other areas required for the LMOC.

It is expected that a portion of the LMOC construction workforce may be housed within existing accommodations in the region; however, Contractors will use temporary construction camps to supplement

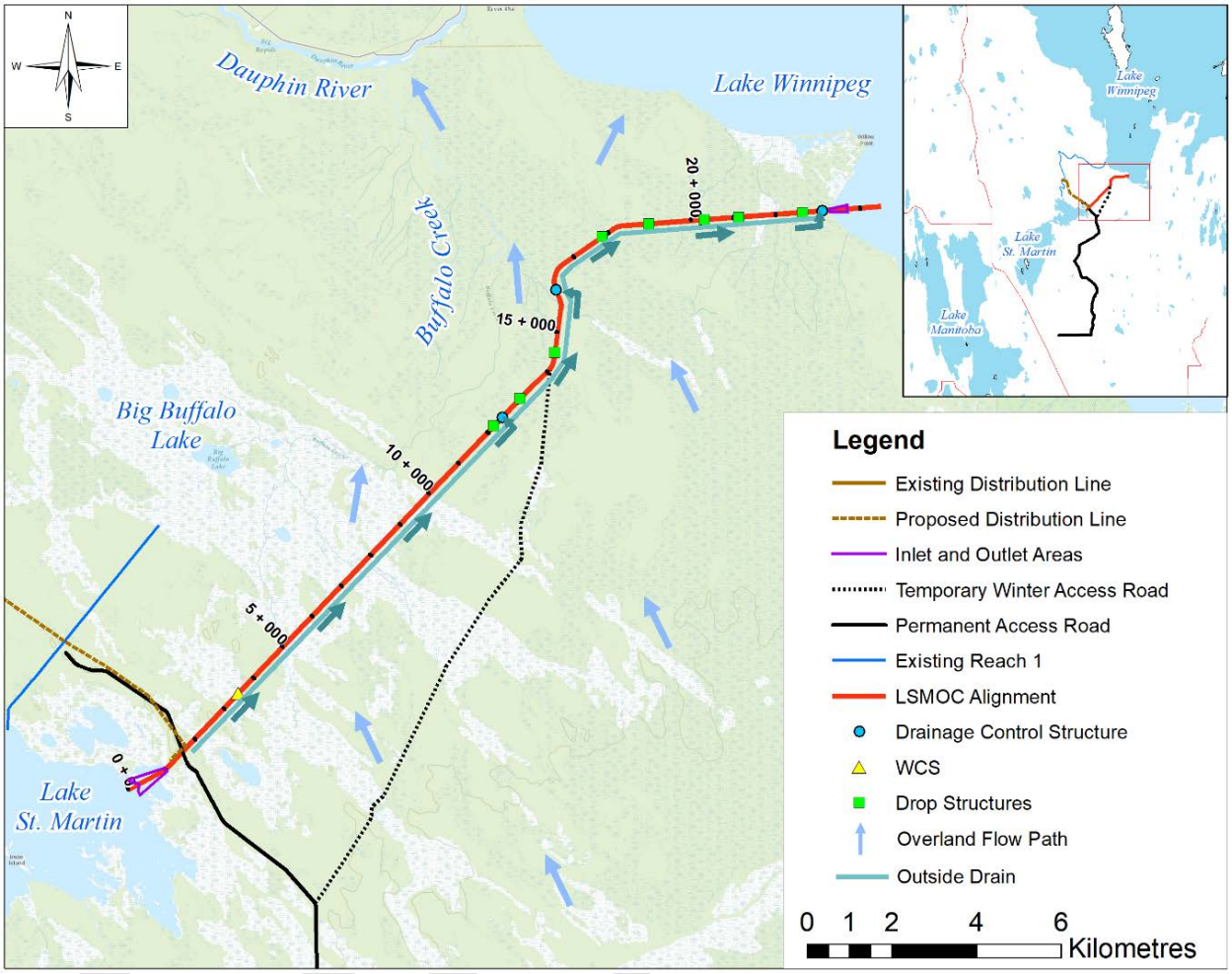
accommodations when the LMOC Project workforce exceeds available capacity. Construction camps could include dormitories with washroom and laundry facilities, kitchen and dining facility, office space, water and sewage storage units, parking spaces, and electrical generator units. Contractor staging areas will be used to store materials, maintain and assemble equipment, and administer work on the LMOC Project. Camps and staging areas will be located within the ROW wherever feasible. The location, number, size and details of any camps and work areas will be verified during detailed design.

1.1.2 Lake St. Martin Outlet Channel

The LSMOC is to address the Province's commitment to permanently enhancing Lake St. Martin outlet capacities, working in conjunction with the LMOC to better regulate water levels on these lakes and help reduce the effects of future flood events.

The LSMOC Project consists of an approximately 23 km long outlet channel, with the inlet positioned at the east end of Lake St. Martin and outlet south of Willow Point on Sturgeon Bay of Lake Winnipeg. A plan showing the LSMOC and key project infrastructure is provided in Figure 3. Additional details can be found in the Lake Manitoba and Lake St. Martin Outlet Channels Project EIS.

Figure 3: LSMOC Project Area

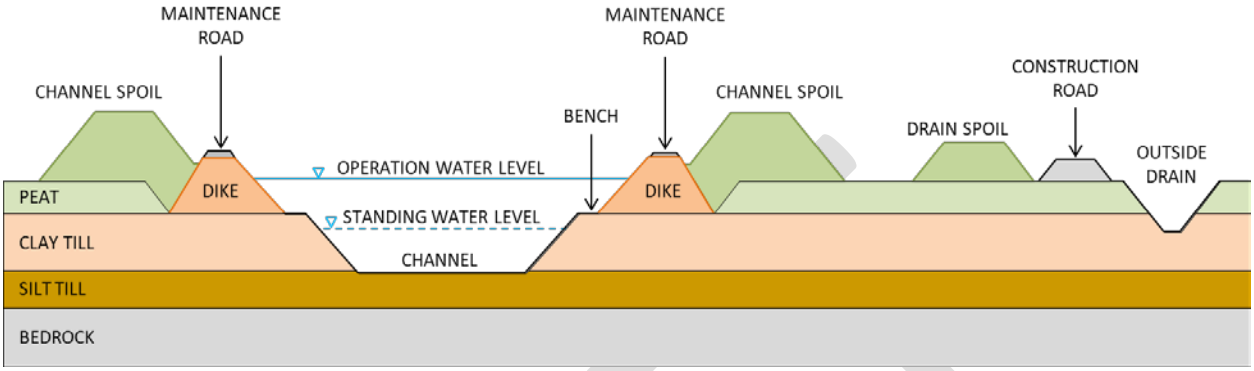


The LSMOC will have a capacity of 326 m^3/s at a Lake St. Martin south basin water level of 244.14 m, which is estimated to be a 1:35 year event and shown as the Operation Water Level in Figure 2. Additionally, the LSMOC is designed to convey flow up to 460 m^3/s, which is the Inflow Design Flood (IDF), estimated to be a 1:1,000 year flood event, considering the intent of the Canadian Dam Association Dam Safety Guidelines.

The channel will have an invert elevation of about 241 m at Lake St. Martin and about 213 m at Lake Winnipeg and is designed to limit erosion. The design is based on a trapezoid shaped channel with a flat base approximately 42 m wide, 6 to 8 m depth and 4H:1V to 4.5H:1V side slopes. Embankment dikes will be constructed on both sides of the channel offset 5 m from the top of the channel excavation (i.e. 5 m bench). A maintenance road will be constructed on top of the dikes and spoil piles will be located behind the dikes on either side of the channel. An outside drain and temporary construction road will also be constructed and located on the east side of the channel. The outside drain will consist of a 4 m wide channel with 4H:1V side slopes to collect surface water runoff on the east side of the project. Three Drainage Control Structures will

allow flows in the outside drain to discharge into the LSMOC. A typical cross section of the channel is provided on Figure 4.

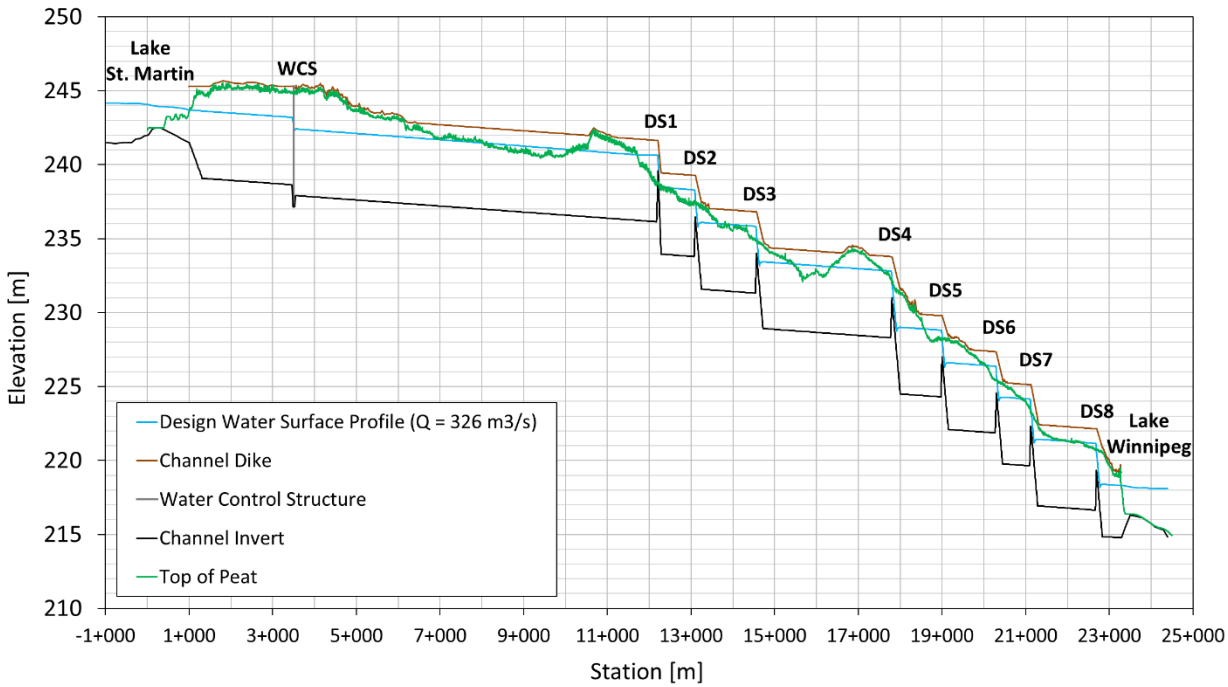
Figure 4: Typical Cross Section of the Lake St. Martin Outlet Channel



Inlet and outlet works will be required to allow for a smooth discharge transition from LSM to the channel and from the channel to Lake Winnipeg. The hydraulic profile of the channel will require the lake bottoms to be excavated at the channel inlet and outlets to match proposed channel invert elevations. The excavations will be tapered over a short distance out from shoreline to meet natural lake bed elevations. At the outlet, rock jetties will be situated over the first 100 m distance to reduce the potential for debris accumulation and sediment deposition within the excavation limits from littoral drift during non-operation of the channel.

The LSMOC will include eight (8) drop structures to safely dissipate energy along the LSMOC so that the excavated channel can have suitably mild slopes to reduce velocities and prevent erosion (Figure 5). The drop structures will be constructed of rockfill, with a sheet pile cutoff at the upstream crest. The high velocities and elevation difference through the drop structures will prevent the movement of fish in the upstream direction from Lake Winnipeg. However, since fish may be able to move downstream into the LSMOC from Lake St. Martin when the control structure gates or stoplogs are open and the channel is in operation, so that fish are not killed the drop structure design criteria considers that fish must be able to over-winter within or escape from the LSMOC as much as practical post-flooding when the control structure gates are closed. Near the drop structures, the minimum water depth during non-operation, shown as the standing water level in Figure 4, will be at least 2.0 m to maintain a pool of water below the surface ice cover during the winter, to minimize potential impacts to aquatic habitat (fish). A base flow will be provided through the water control structure to maintain appropriate water quality conditions (oxygen levels).

Figure 5: Profile of the LSMOC Showing Locations of the Drop Structures



A WCS is required to control flows through the LSMOC while ensuring that Lake St. Martin water levels remain within their planned range. The WCS will be constructed near the inlet, although the exact location will be confirmed at Detailed Design. It will also act as a bridge to provide access to both sides of the channel. The preliminary design of the WCS consists of two (2) 9 m wide sluice bays with vertical lift gates, guides and sill beams for upstream and downstream stoplogs, and a stilling basin with baffle blocks and end sill. An ancillary building providing an enclosed space will also be constructed in proximity to the WCS to house the mechanical and electrical systems. It is currently planned that the structure will be capable of being remotely operated and will require permanent communication services.

Permanent electrical service is required for power at the WCS to electrically raise and lower the gates, as well as to heat an appropriate number of gates to maintain winter operation capability. The permanent power loads of the WCS are estimated between 450 to 550 kW. A 15 km long 24 kV overhead distribution line is proposed to service the control structure. The distribution line will extend from an existing 24 kV line which runs along PR 513 to a 600 V pad-mount transformer at the water control structure location. A 250 kVA (600 V, 3P) diesel genset along with local controller will be installed as an emergency backup source at site. The distribution line alignment will require a 30 m wide Right of Way (ROW).

The LSMOC will be accessed using the existing winter road that is being upgraded as a separate project to provide permanent access to the Emergency Outlet Channel. Temporary access routes may be required from the construction access road along the channel length for access to quarries and borrow areas, laydown areas, construction camps and other areas required for the LSMOC. These may range from rough trails where

vegetation may be removed or snow compacted to service roads that are cleared, grubbed, graded, compacted and gravelled to support heavy construction vehicle movement (ex: quarry access).

Temporary construction camps and contractor staging areas will utilize disturbed areas and existing facilities wherever possible. Construction camps are expected to be required to accommodate over 100 workers. Construction camps of this size typically include dormitories with washroom and laundry facilities, kitchen and dining facility, office space, water and sewage storage units, parking spaces, and electrical generator units. Communications services will also be required. Contractor staging areas will be used to store materials, maintain and assemble equipment and administer work on the LSMOC Project. Several locations are currently under consideration; however, the exact location, number, size and details will be verified during detailed design.

1.2 Project Location

The LMOC is located within the Rural Municipality of Grahamdale in Manitoba's Interlake Region, approximately 220 km northwest of the City of Winnipeg (Figure 1). It will run from Watchorn Bay on Lake Manitoba northeast to Birch Bay on Lake St. Martin and will primarily be located on private agricultural lands that will be purchased. There are more than 60 residences within 3.0 km of the LMOC, the nearest of which is approximately 0.5 km from the proposed channel. The communities of Moosehorn and Pinaymootang First Nation (FN) are located approximately 10.9 km and 9.3 km respectively, from the LMOC. The channel intersects portions of 26-8-W1, 27-8-W1, 28-8-W1, and 29-8-W1. The approximate UTM coordinates (North American Datum 1983) Zone 14 U are 5681518 N 529841 E for the inlet and 5704032 N 534074 E for the outlet.

The LSMOC is located approximately 220 km northwest of the City of Winnipeg in Manitoba's Interlake Region between the northeastern most extent of Lake St. Martin and Sturgeon Bay on Lake Winnipeg (Figure 3). This area is currently considered semi-remote as road access is seasonal, with the nearest permanent residence located approximately 6.1 km from the channel in Dauphin River FN. Dauphin River FN and Lake St. Martin FN reserve boundaries are located approximately 4.6 km and 12.0 km respectively, from the LSMOC. The LSMOC will occur entirely within Crown land, which is located within the area covered by Treaty No. 2. The channel intersects portions of 32-5-W1, 32-6-W1, 33-5-W1 and 34-4-W1. The approximate UTM coordinates (North American Datum 1983) Zone 14 U are 5738284 N 557122 E for the inlet and 5751400 N 572725 E for the outlet.

1.3 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 (the Agency) 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*, *Navigation Protection Act*, *Migratory Birds Convention Act* and *Species at Risk Act* (SARA).

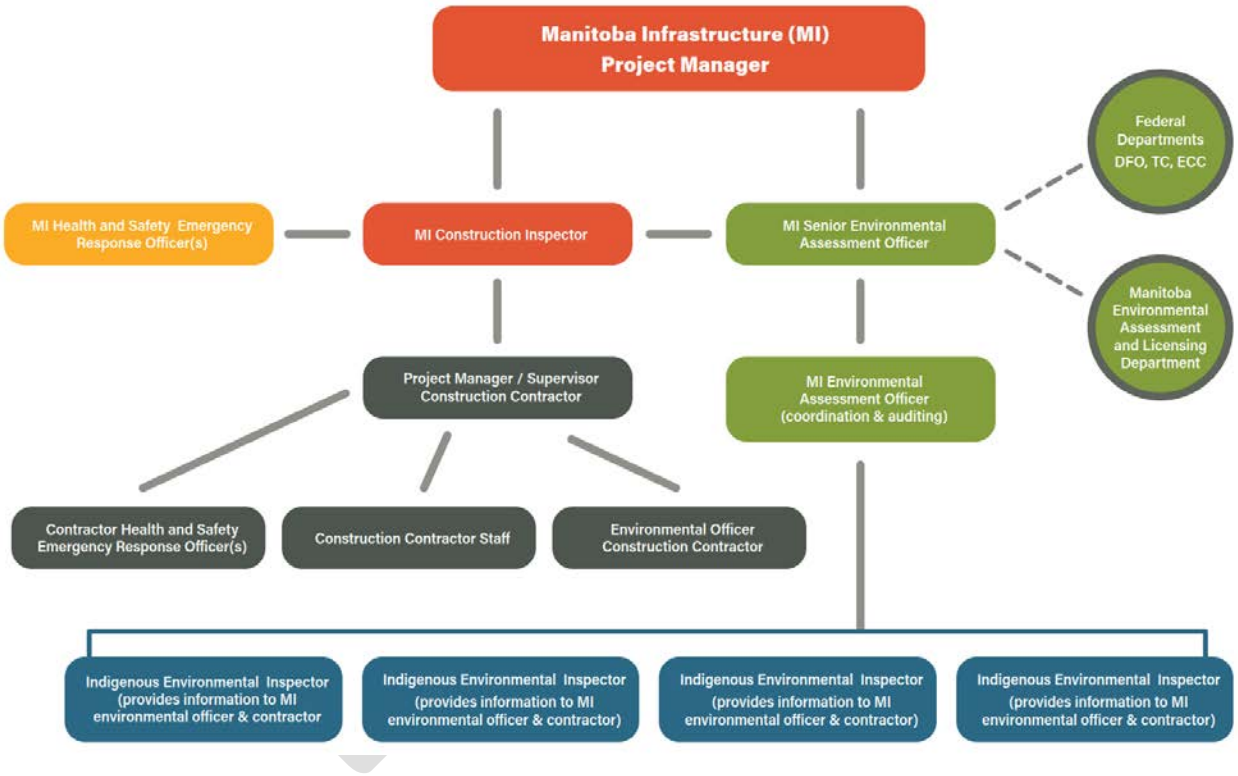
The proposed Project is considered a 'Class 3' development under the *Classes of Development Regulation* (164/88) of *The Environment Act* (Manitoba) and therefore requires an Environment Act Licence. Manitoba Conservation and Climate's (MCC, formerly Manitoba Sustainable Development) Environmental Approvals 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 will be required under several acts to address various Project activities, such as *The Crown Lands Act* (camp development on provincial Crown lands), *The Mines and Minerals Act* (quarry development), *The Wildfires Act* (burning) and *The Dangerous Goods Handling and Transportation Act* (petroleum storage tanks).

While field investigations have been on-going to support design of the LMOC and LSMOC, no construction work or site preparation activity is to begin without having obtained the proper federal and provincial permits or authorization for the work. Federal and provincial legislation relevant to the proposed Project is summarized in Appendix 1.

2.0 PRIMARY RESPONSIBILITIES

All parties involved in this project need to be aware of their responsibilities in order to ensure that the CEMP is implemented and, therefore, maximize environmental protection during construction. The primary responsibilities of MI as the Proponent and Project Manager, the Contract Administrator (design engineers and technical assistance) and the Contractor are listed in the following sections. The overall Project organization structure during construction, outlining the communication between MI, the federal and provincial regulators, construction Contractor and Indigenous Environmental Inspectors, is shown in Figure 6. The Contract Administrator, while not shown in Figure 6, would work and communicate with the MI Project Manager.

Figure 6: Project Construction Organization Structure



2.1 Manitoba Infrastructure

As the proponent of the project, MI will be responsible for incorporating the appropriate environmental protection measures, including BMPs, into the design of Project components. Construction contract specifications will detail the technical design as well as Project-specific restrictions respecting how the work is

to be completed. All relevant plans, such as the PERs and management plans, will be among the information that will accompany the tender document(s) to be provided to prospective Contractor(s).

MI will be the overall project manager, responsible for implementing, monitoring and amending the environmental aspects of the Project. The MI Project Manager will coordinate with an on-site MI Construction Inspector, or designated alternate (reference to the Construction Inspector throughout the rest of the document also refers to a designated alternate), who will oversee daily activities. Both of these individuals 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 CEMP:

- Liaise with the Federal Responsible Authorities and Manitoba Regulators concerning authorization requirements, monitoring and follow-up.
- Provide approval, based on discussions with MI Environment, in cases where a Contractor suggests methods to achieve a particular goal or objective that differ from their original site plan.
- Obtain the *Fisheries Act* authorization from the Department of Fisheries and Oceans Canada (DFO), as required, for in-water or near water work.
- Obtain the *Navigation Protection Act* permit/authorization from Transport Canada, as required, for the construction of permanent or temporary waterbody crossings and/or other in-water structures.
- Obtain the required *Water Rights Act* authorization from Manitoba Water Stewardship for de-watering and the associated Live Fish Handling Permit (Assuming de-watering and/or fish/mussel salvage will be required (see Section 5.5).

The Construction Inspector will report regularly to the Project Manager. Any information that is to be distributed to the Technical Support Team and other essential MI representatives will be forwarded from the Project Manager for distribution. The Construction Inspector 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 Contractor of appropriate environmental requirements, and provide them a copy of relevant permits/authorizations.
- Review and evaluate this CEMP.
- Confirm that site specific plans outlined by the Contractor are appropriate and environmentally responsible.
- Monitor the work site and document through daily inspection forms to ensure that the PERs, environmental specifications and environmental management measures are implemented and that the site is maintained in accordance with the Contract Documents.
- Conduct an environmental audit of the construction work being done.
- Summarize the findings of routine environmental monitoring and environmental audits of the work site in an inspection report to be retained on file and provided to MI Environment to submit to the designated regulator(s) throughout the construction phase.

- Frequently meet with the Contractor and require that regular updates be provided regarding progress on the environmental components of the work.
- Initiate and hold meetings as required to advise the 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 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 the Contractor fails to take appropriate timely measures to protect the environment, or fails to correct recurring deficiencies, direct the Contractor to suspend work until the appropriate measures have been met, and immediately contact the Project Manager.

2.2 Contract Administrator

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

- Be familiar with the appropriate environmental requirements applicable to construction of the Project.
- 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 Construction Inspector with monitoring the work site to ensure the Contractor implements environmental management measures and maintains the site in accordance with the Contract Documents.
- Confirm that required reports received from the Contractor are forwarded to the Project Manager.
- While on site, notify the Construction Inspector 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 Construction Inspector and the 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

The project Contractor(s) will take the lead role of implementing the environmental management measures during the construction activities as outlined in this CEMP, the associated plans and established through the Contract Documents. The Contractor will also be responsible to provide site specific planning (e.g., location of laydown areas) in writing in advance of starting construction for MI approval. This information will be described in detail and thereby augment the EPP and other plans (e.g., PERs) that collectively describe how to

build the Project, with information on sites to avoid or provide specific measures. To ensure environmental protection during construction the Contractor 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 MI for compliance and record keeping purposes.
- Develop submittals for the CEMP in accordance with the related Contract Documents, including the PERs, and permits/authorizations associated with the work.
- Requests for a change in environmental management measures initiated by the Contractor shall be forwarded to the Construction Inspector for submission to MI. MI Environment will need to approve these changes based on discussions with the Federal Responsible Authorities and Manitoba Regulators.
- Provide training for staff and ensure Subcontractors are trained and empowered to identify, address and report potential environmental problems. Training and orientation sessions shall be documented, and copies provided to MI for their records and to document compliance with the EIS.
- Confirm that Subcontractors are familiar and comply with the related Contract Documents.
- Provide the Construction Inspector and/or Project Manager, and the Contract Administrator with the identity of the dedicated environmental coordinator and other knowledgeable individual(s) who will act as the on-site emergency response coordinator(s). They will liaise closely with the Construction Inspector and MI Environment staff and ensure environmental permits and requirements are adhered to. They will also have the authority to redirect manpower to respond to non-compliance, a spill or environmental emergency.
- 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 MI in a timely fashion.
- Immediately report environmental incidents (e.g., spills, species at risk [SAR], nuisance wildlife, aquatic invasive species, wildfires) to the Construction Inspector so that the proper authorities can be notified, and provide a copy of the incident report to the Construction Inspector. The Contractor will also be responsible for meeting reporting requirements for permits they hold.
- Take action when it is identified that violation of an environmental regulation or a considerable impact to the environment will occur, such as work shut down, in consultation with the Construction Inspector and/or Project Manager.
- Attend meetings initiated by the Construction Inspector and/or 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.

3.0 ACTIVITY DESCRIPTION

Construction of the Project will involve vegetation clearing and grubbing; excavation of peat, till and rock material; rock blasting and crushing at quarries; material hauling; placement and grading of dike structures and spoil material; revegetation; pile driving; sheet pile installation; installation of groundwater aquifer depressurization wells; and pouring concrete. The till material excavated during construction will be utilized to construct dikes along both sides of the channels where existing ground levels are low. Excavated material not used for dike construction will be spoiled adjacent to the channels within the ROW. Limestone rock riprap will be extracted most likely from existing quarry areas (to be confirmed during detail design stage) and will be used in several locations to mitigate against erosion including at the inlet, outlet, bridges, WCS and drop structures.

Construction and material details will be in accordance with the Contract Specifications and Drawings. The limits of the clearing will be restricted to the approved areas. Any land outside of these areas shall not be altered without precise direction from the Project Manager. A schedule outlining the physical activities required for completion of the Project is being developed as part of detailed design.

3.1 Control Measures

Standards have been established to ensure on-site activities are carried out with due regard for the environment. The following items summarize general environmental protection measures that will be applied on this Project, some of which are described in greater detail in the supporting management plans.

- Prior to commencement of the site work, a pre-construction meeting shall be held between MI, the Contract Administrator and the Contractor to discuss environmental concerns, laws, rules, regulations, and permits applicable to the project area.
- The MI Project Manager will rely on the Construction Inspector or Contract Administrator to monitor the implementation of this CEMP.
- Equipment mobilized from outside the project area shall arrive on the site in a clean condition and will be kept in good working order and free of fuel, oil or fluid leaks and/or potential for leaks (for example, cracked or worn hoses). Machinery that is found to be leaking fuel, oil or other fluids will be moved off the work site immediately for repair.
- Work activities shall be confined to the designated site area.
- Efforts shall be made to prevent and control contamination of waterbodies.
- Exhaust and engine systems of equipment and vehicles shall be in good working condition and free of dried grass and other combustibles.
- Fire extinguishers will be available for fighting fires. The authorities having jurisdiction shall be notified immediately should a fire occur. All equipment and personnel shall be made available to control a fire. No fires shall be permitted unless approved by the site supervisor and with a burn permit, where required.
- Oil changes, refueling and lubricating of equipment shall be conducted in designated areas a minimum of 100 m from waterbodies to minimize the potential for water pollution. All reasonable precautions

shall be taken to ensure that refueling only takes place within an area approved by the Project Manager. These designated areas will be kept clear of snow and/or miscellaneous materials to allow for clear access and routine inspection and leak detection. Drip trays shall be placed under equipment being repaired or refueled and trays shall be cleaned after each use. Spent oils, lubricants, fuels and filters, etc., shall be collected and either recycled or disposed of at an approved location according to the hazardous materials guidelines and the PERs.

- Materials required for spill containment and clean up will be available at work sites and designated areas. Vehicles will carry materials and equipment for emergency spill containment.
- In the event of an unexpected occurrence of an environmental incident or uncovering of a heritage resource, the worker/subcontractor shall immediately notify the Construction Inspector. Additional follow-up will be required to involve an archaeologist or other specialist that can make a determination on the proper mitigation measure to take (e.g., recover an artifact).

4.0 POTENTIAL ENVIRONMENTAL EFFECTS

MI submitted an EIS for the proposed Lake Manitoba and Lake St. Martin Outlet Channels in March 2020. The identification and assessment of potential environmental effects and associated mitigation measures to manage adverse effects, which are detailed in the EIS, have been preliminarily summarized in this CEMP. This CEMP is a working document, currently in a preliminary stage, that will be updated to incorporate additional environmental effects and mitigation measures that may be identified when the EIS is finalized, public and Indigenous input is obtained and licencing and approval conditions are received. This CEMP focuses on managing environmental effects during construction and, therefore, only the potential adverse effects associated with construction are included as summarized below.

- 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. Construction 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 construction 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.
- Construction of 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.
- Construction of the channels will result in changes in local drainage areas and drainage patterns. LSMOC will intercept surface water drainage from the upper reaches of the Buffalo Creek system, as well as some areas of ephemeral streams and wetlands. LMOC will block existing surface water drainage paths from the portion of the watershed located to the west of the LMOC.
- Clearing, excavation and other Project construction 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 water bodies which can negatively affect fish and fish habitat. Further, construction of the inlet and outlet structures and excavation of the lake beds 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).
- Fish habitat may be permanently altered or destroyed during construction. Additionally, fish health and mortality could potentially be affected during construction activities within or near water through the potential release of deleterious substances to streams and lakes adjacent to or downstream of the channels.
- The Project may facilitate conveyance of invasive or undesirable aquatic species, such as common carp, zebra mussel, spiny water flea and toxic algae. Aquatic invasive species could be transported to and

spread in the Project area on machinery and equipment used in water during construction activities. The introduction and spread of invasive species can reduce the diversity and populations of native species and can modify habitat.

- The loss and disturbance of vegetation and wetlands associated with clearing activities will change the landscape, community and species diversity and allow for the introduction and potential spread of invasive plant species. Granular construction material and equipment used for construction activities can be a source of non-native and invasive plant species, which can displace native plant communities and modify vegetation composition and structure in the area.
- The project site preparation and construction phases will result in changes to the physical landscape, including habitat fragmentation, alteration and loss. Numerous migratory birds and SAR have the potential to breed in the habitat types within the Local Assessment Area (LAA) and will be affected by the habitat loss or alteration resulting from Project construction. The Project has potential to affect federally designated critical habitat of two bird SAR: eastern whip-poor-will and red-headed woodpecker. Eastern whip-poor-will critical habitat is located within the LSMOC ROW at the inlet and red-headed woodpecker critical habitat is located along the PR 239 realignment. Both species are listed as Threatened and are protected federally and provincially under SARA and *The Endangered Species and Ecosystem Act*.
- During construction, there is potential for increased wildlife mortality risk. Ground-nesting birds and species with decreased mobility (e.g., amphibians, small mammals) are most susceptible to direct mortality during site preparation as individuals may be unable to escape construction activities. Land clearing could also put bat maternity roosts at risk, particularly in areas where large diameter trees are removed for LSMOC. Construction of Project components by excavation and earth moving have the potential to increase wildlife mortality risk because individuals, particularly small mammals such as mice and voles and amphibians, may be crushed by equipment, or become entrapped in open excavations. Increased traffic volumes during construction activities has the potential to result in increased mortality risk to wildlife, including migratory birds, due to potential vehicle collisions in the LAA.
- Site preparation and construction activities have the potential to affect a change in wildlife movement by creating physical and sensory (noise, vibration and light) barriers. During construction, noise and activity associated with heavy equipment and personnel is anticipated to deter wildlife from using or crossing the active construction portions of the LMOC and LSMOC Project Development Area (PDA) for the short-term. The LSMOC will bisect a potentially sensitive terrestrial corridor between large patches of contiguous habitat and may present a semi-permeable barrier for marten dispersal.
- Project construction activities have the potential to affect recreational land use. Channel excavation for the ROW may physically interfere with snow mobile activities and limit the ability of recreationalists from accessing recreation areas. Construction of the channel inlet and outlet has the potential for interference with recreational fishing.
- The Project will potentially impact traditional use areas for hunting, trapping, fishing and gathering in the vicinity of LSMOC. The habitat fragmentation and loss, sensory disturbance and wildlife mortality associated with LSMOC construction activities, as previously described, could temporarily and permanently displace some wildlife and movement patterns that could result in a reduction of hunting

and trapping success rates. Additionally, the presence of construction workers could result in an increase in competition for species harvested by Indigenous commercial fishers and anglers.

- Ground-disturbing Project activities, such as vegetation clearing and excavation, as well as development of temporary construction camps, staging areas and access roads, 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 storage of combustible materials or wastes, operation of internal combustion engines (e.g., vehicles, heavy equipment) and the presence of workers during Project construction, brush and wildfires could be ignited. In particular, the accumulation of slash during clearing 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.

5.0 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 construction phase of this Project. They are consistent with the MI Lake Manitoba and Lake St. Martin Outlet Channels – Project Environmental Requirements. As previously noted, these management and protection measures will be supported by several specific or targeted management plans that provide greater details and have been submitted as separate documents. Unless otherwise stated, these measures also apply the PR 239 realignment and other temporary works associated with the Project.

5.1 Atmospheric Environment

Increased dust is not a concern during winter construction activities; however, summer construction activities shall be conducted by methods that minimize the raising of dust. The Contractor shall implement dust control practices during construction activities such as excavation, and transporting of materials, to ensure containment and collection of dust and other particulate matter. Vehicles used to haul materials to or from the work site shall 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 shall 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. The application of dust suppressants, such as water, shall be limited to the roadway, driveway or designated area. The amount of dust suppressant applied should not exceed the minimum amount required to effectively suppress dust and will be monitored to ensure 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 construction vehicle emissions, engines and exhaust systems will be properly maintained, vehicle idling times and cold starts will be reduced to the extent possible. Additionally, the use of a work camp will reduce emissions associated with transportation of staff to and from the construction site during.

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 construction. 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 construction. 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 on wildlife are described in Section 5.8.

To limit potential effects from the use of the mobile lighting during construction full cut-off luminaire will be used wherever possible to reduce glare, light trespass, and sky glow from the Project lighting. Lighting procedures will be designed to avoid excessive use of the mobile flood lighting units and reduce potential

effects by turning off lighting when they are not required. As much as is possible, lighting will be located such that unavoidable light spill off the working area is not directed toward possible receptors.

5.2 Soil

Soil quality in the PDA may be adversely affected during construction 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. If a spill should occur, the Contractor 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 5.11 and 5.12 of this CEMP.

5.3 Groundwater

5.3.1 Background

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.

5.3.2 Potential Changes

Construction of the LMOC and LSMOC 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 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 excess confined bedrock aquifer pressures are elevated relative to the thickness of the confining till and silty clay aquitard units, and in particular during channel excavation and unloading of the confining aquitard units, 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 to the channel excavation area(s). The creation of new groundwater discharge pathways into the channels will locally increase the direct connection of exfiltrating groundwater to channel surface water, originating from the underlying bedrock aquifer.

5.3.3 Management Measures

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

Active depressurization of high groundwater pressure with temporary groundwater depressurization systems pumping from bedrock wells are anticipated to be required to facilitate excavation of the LMOC as well as foundation excavations for construction of the WCS and bridge footings. The relief of artesian pressure along the LMOC will locally depressurize the carbonate aquifer. The zone of influence will expand over a limited distance and domestic water supply well pressure, as well as artesian-dependent well 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 artesian-dependent well operations.

Excavation of the LSMOC will be done in stages with an initial central drainage channel to control and direct areas of groundwater discharge and allow for controlled pressure relief of the bedrock aquifer groundwater system. This passive depressurization will minimize the potential for uncontrolled discharge in large areas of the LSMOC base, in particular closer to the sideslopes, whose stability conditions are most sensitive in terms

of overall channel excavation. Active depressurization of high groundwater pressures with temporary groundwater depressurization systems pumping from bedrock wells are anticipated to be required to facilitate deep foundation excavations for construction of the WCS and potentially the sheet pile cutoff at drop structures. The relief of artesian pressure along the LSMOC will locally depressurize the carbonate aquifer, however, the zone of influence will expand over a limited distance, with no potential to affect domestic water supply wells and the regional recharge-discharge relationships will remain the same.

Groundwater quality in the project area may also be adversely affected during construction 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, the Contractor 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 5.11 and 5.12of this CEMP.

Groundwater quality will be monitored in regular intervals during and after the construction phase of the Project as described in the GWMP. This level of monitoring falls outside of the mandate of the CEMP; however, will occur concurrently and continue beyond the construction phase of the project (see Section 8.1).

5.4 Surface Water

Surface water management measures that will be implemented to manage drainage and 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 shall be implemented to prevent the introduction of sediment, as described in the SMP. The Contractor shall not block or impede drainage outside the limits of construction and staging areas without written authorization from the Project Manager.

Repurposing of the emergency outlet channel to allow additional flows to the Buffalo Lakes and Buffalo Creek from Lake St. Martin could potentially replace flows lost from interception of wetland flows to the creek due to the LSMOC. This is still being investigated as a potential future offsetting project that would require discussions with regulators and additional approvals.

Groundwater from the construction depressurization will need to be discharged to a suitable drainage course. The options for the LMOC could include existing municipal drains, existing lakes or Birch Creek, Watchorn Creek or the outside drain being constructed on the west side of the channel if available at that stage. The options for the LSMOC could include existing lakes and creeks or the outside drain being constructed on the east side of the channel. The quality of the groundwater from the bedrock aquifer is expected to meet surface water guidelines, but it will be tested prior to initiating discharge each year to confirm this.

Surface water quality in the project area may be adversely affected during construction 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 surface water), provide spill clean-up equipment and materials, and provide an emergency (spill) response plan. If a spill should occur, the Contractor 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 Section 5.11 and 5.12 of this CEMP.

Water quality will be monitored in regular intervals during and after the construction phase of the Project as described in the SWMP and AEMP. This level of monitoring falls outside of the mandate of the CEMP; however, will occur concurrently and continue beyond the construction phase of the project (see Section 8.1).

5.5 Erosion and Sediment Control

Erosion and sediment control 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 SMP. These temporary measures are in addition to the various permanent mitigation measures that were built into the channel design such as the rock jetties, drop structures, and riprap armoring in areas along the channel that are susceptible to erosion. Establishing and maintaining vegetative cover on the slopes, embankments and adjacent perimeter drainage ditches will also provide permanent mitigation against erosion damages from flooding and heavy precipitation. These measures consider the drainage management for the Project to facilitate their intended purpose to minimize and mitigate the transport and deposition of sediment beyond construction areas and into off-site receiving water bodies.

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.

Sedimentation from the erosion of exposed soils can negatively influence fish and fish habitat. To mitigate this effect, 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 construction to prevent undesirable soil movement or soil releases and discharges to a waterbody. 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. 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.

When de-watering is required on site, as part of the water management plans, sediment ponds shall be constructed. Discharge from construction activities shall be diverted into a sediment pond to allow suspended material to settle out before the water re-enters a natural waterbody. All pump discharge points

shall be lined with clean rock or other acceptable flow dissipating applications to prevent erosion and the release of suspended sediments. The Contractor shall take necessary precautions to ensure contaminants (including sediments) do not enter Lake Manitoba, Lake St. Martin, Lake Winnipeg or other surrounding waterbodies during the construction process.

5.6 Fisheries and Aquatic Ecosystem

Construction of the channels may permanently alter or destroy fish habitat, particularly associated with the excavation of the lake bed at the inlet and outlet, construction of the rockfill groynes at the LSMOC inlet and outlet; blockage of drainage courses and creeks along the channel length; changing groundwater inflows to water bodies adjacent the channel; and potentially increasing sediment transport and deposition. The LMOC and LSMOC will however create approximately 72 and 100 ha, respectively of new fish habitat that will help to mitigate permanent alteration of destruction of fish habitat. 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 and once received will be incorporated into the final CEMP. However, standard advice typically issued with a project Authorization would still be applicable for reducing potential effects during project construction. Environmental measures likely to be expressed by DFO, some of which are contained within the PERs, may include the following:

- Work shall 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 regulations to reduce the risk of increasing dispersal of invasive aquatic species. In particular 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.
- Activities related to the project shall 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 shall be taken to ensure 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 shall be conducted in a manner to prevent the entry of deleterious substances into the surface water.
- Removal of riparian vegetation shall be kept to a minimum to help maintain the stability of waterbody banks. The area over which vegetation in riparian vegetation areas is removed shall affect no more than one third (1/3) of the total woody vegetation in the ROW within 30 m of the ordinary high-water mark of a waterbody. Clearing within 30 m of a waterbody shall be done by hand and vegetative root masses found within the waterbody banks shall 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 shall be installed where required to ensure disturbed areas are not subject to erosion prior to the establishment of vegetation. These measures are to be inspected regularly to

ensure 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.

- The work area for construction of the inlet and outlet shall be isolated from the adjoining waterbody using appropriate methods (turbidity curtain, temporary cofferdam, etc.). Isolated areas should be the minimum area required to safely complete the construction activities.
- If required, de-watering of a cofferdam area shall 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 shall 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.
- Debris and material shall be removed from the ice cover (over waterbodies) on an on-going basis, and disposed of in an appropriate landfill or other location.
- Implementation of an Emergency Response Plan for spills including educating the workforce and maintaining accessible spill control and clean-up equipment.
- Appropriately sized rock riprap will be used for armouring areas vulnerable to erosion and scour.

Water quality will be monitored in regular intervals during and after the construction phase of the Project as described in the SWMP and AEMP. This level of monitoring falls outside of the mandate of the CEMP; however, will occur concurrently and continue beyond the construction phase of the project (see Section 8.1).

5.7 Vegetation

Clearing along the LMOC, the new PR 239 alignment, and LSMOC will entail the loss of existing native upland vegetation, primarily dense coniferous and mixedwood forest, and wetland area. Mitigation to reduce the adversity of this effect includes clearly staking or marking the work area to restrict clearing and grubbing to the construction or contract limits. In particular the EPP will identify any environmentally sensitive sites that need to be avoided or mitigated as part of the construction. The Contractor shall not remove vegetation or excavate outside the limits of construction and staging areas without written authorization from the Project Manager.

Clearing and grubbing for the LMOC and LSMOC is expected to primarily occur in the winter months, in particular in wetlands it will occur during dry or frozen conditions whenever possible. The topsoil (i.e., the organic layer) along both channels will be salvaged and temporarily stockpiled to be used as a seed bed to spread over the containment dikes and areas to be re-vegetated as described in the Revegetation Management Plan. Temporary staging areas will be located in the ROW wherever feasible and leaving short shrubs and herbaceous, graminoid and non-vascular cover in place to promote recovery of native vegetation. As part of the Access Management Plan construction related traffic will be restricted to the Project ROW and

associated access routes. Removal of riparian vegetation will be minimized, to help maintain the stability of waterbody banks. 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).

As a component of the erosion and sediment control program, during construction, temporary seeding of topsoil stockpile areas is required if it will not be used to re-vegetate disturbed areas within the same growing season. Areas disturbed during construction activities will be leveled to natural or pre-existing grade and slope and then re-vegetated. Where seeding is not required, temporary site locations will be left in a manner which promotes natural re-vegetation of the site.

Construction activities including excavation, transportation of materials and blasting (if required) may result in increased fugitive dust, which can settle on vegetation in the study area resulting in impaired growth and development. Mitigation measures to control dust are outlined in Section 5.1.

To control the spread of invasive species during construction, weed areas identified in the Revegetation Management Plan will require treatment prior to construction, as well as weed maintenance treatment of topsoil stockpiles. Equipment will need to be clear of debris and weeds prior to coming on to the construction site and will be inspected prior to work commencing. The weed control program will continue after construction in accordance with monitoring and maintenance measures outlined in the Revegetation Management Plan.

5.8 Wildlife

Given the availability of suitable habitat and known occurrences of SAR within the LAA, the SAR most likely to be affected by the direct loss or alteration of habitat are: northern leopard frog, least bittern, and yellow rail in wetlands; short-eared owl and bobolink in grasslands; bank swallow and common nighthawk in quarries; and bats, eastern whip-poor-will, red-headed woodpecker, and olive-sided flycatcher in forests. Both eastern whip-poor-will and red-headed woodpecker are Threatened species protected federally and provincially under SARA and *The Endangered Species and Ecosystem Act*.

Key mitigation to reduce the adversity of wildlife habitat fragmentation and loss during construction includes restricting clearing and grubbing to the construction or contract limits unless otherwise approved. In accordance with the *Migratory Birds Convention Act* to avoid impacts to migratory birds including eastern whip-poor-will and red-headed woodpecker, tree and brush clearing 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. In the event that quarry or borrow sites need to be reinstated 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 Construction Inspector will be contacted.

Measures to protect large nests of sticks, active dens, burrows or other sensitive wildlife features, if encountered, will be applied as per guidance described in the EPP. No blasting will be permitted within approximately 1 km of known sensitive wildlife habitat during critical lifecycle periods. Additionally,

appropriate terrestrial buffers as identified in provincial guidelines will be adhered to. As described in the Revegetation Management Plan, areas disturbed during construction will be revegetated to restore wildlife habitat with consideration for sediment control and invasive plant species management. 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.

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. Contractors will be required to keep construction camps and 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. Employees, workers and other staff will not hunt, trap or harass wildlife and gates or other barriers will be installed to limit public from accessing the LMOC and LSMOC ROWs.

While sensory barriers to wildlife movement will be temporary during construction 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.

5.9 Land and Resource Use

Routing of the channels included the consideration of recreation and tourism. No lodges, campgrounds, resorts or cottages are traversed by the channel alignments. Mitigation to address potential Project effects on recreational land use and tourism includes restricting clearing and excavation to the limits of construction and staging areas. Additionally, MI will provide Project development information on the MI website.

To mitigate potential Project effects on resource use, MI will communicate the schedule of Project activities throughout the construction phases to affected stakeholders, recreational users/organizations, local resource users and MCC Regional representatives. In particular, 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. Construction workers will not hunt, trap or harass wildlife on the construction sites. No person will remove, disturb, spring or in any way interfere with a trap set out lawfully by another person for the purpose of taking furbearing animals.

5.10 Heritage Resources

As an outcome of the Heritage Resource Impact Assessment conducted, a Heritage Resources Protection Plan has been prepared specifically to deal with potential effects to heritage resources. It outlines measures to mitigate effects to cultural and heritage resource. If heritage resources, or objects thought to be heritage resources, are discovered during site preparation and construction the Historic Resources Branch (of the Manitoba Sport, Culture and Heritage Department) will be informed immediately. The Contractor will cease construction activities in the immediate vicinity of the heritage resources, protective barriers will be placed

around heritage resource sites and heritage resources discovered will be left in their original position until the Project 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. An appropriate ceremony will be held prior to commencement of construction under the direction of local Indigenous groups.

5.11 Materials and Waste Management

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 shall 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 shall be handled according to *The Dangerous Goods Handling and Transportation Act* and Regulations. The Contractor shall have on-site staff that are trained and certified in the handling of the dangerous/hazardous goods being utilized on site.

Fuel storage shall 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. Construction equipment will arrive on site in a clean condition and shall be kept in good working order free of external fluid leaks, grease and oil. Equipment working at the construction site 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.

The Contractor shall 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 shall not be mixed and waste materials and refuse shall be removed and disposed of promptly in a manner that will not contaminate the surrounding

area. Effort shall 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. The construction area shall be kept clean and orderly during and at completion of construction. At no time during construction shall 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 shall 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. All 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 shall 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 shall 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 shall 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 shall be at approved hazardous waste facilities.

5.12 Emergency Spill Response and Reporting Procedures

Emergency Response Procedures (ERP) refer to spills, accidents, or malfunctions involving the release of fuels, dangerous goods or hazardous materials/waste. Due care and caution shall be taken to prevent spills. In the event of a release during Project construction, Contractors 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 shall be kept on site. A Workplace Hazardous Materials Information System (WHMIS) file shall be maintained on site for the hazardous materials at the work area. Prior to commencement of the work, Safety Data Sheets (SDS) shall be submitted to the Project Manager for hazardous materials to be used on site. The Contractor shall provide training for staff and ensure 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 shall 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 Contractor shall immediately report any reportable spills to MCC's Accident Reporting Line at (204) 944-4888 pursuant to *Manitoba Environmental Accident Reporting Regulation* 439/87. The Contractor shall report spills to the Project Manager within 24 hours, whether it was necessary to report the spill to MCC or not. A follow-up report shall 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 construction, including an emergency spill kit for in water use. Each machine working on site shall 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 Construction Inspector and/or Contract Administrator will inspect storage areas to ensure requirements are being met.

5.13 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 Contractors will have to adhere to, that describe measures to address burning and brush disposal. An evacuation and emergency preparedness plan addressing wildfires shall be implemented and submitted by the Contractor prior to commencing construction. On-site personnel will be trained in fire prevention, including proper disposal of hot or burning material and designated smoking areas, and response.

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, which ensures that materials are stored in the right place and do not accidentally spill and cause fire. A primary zone will be established around camp sites and other longer-term temporary structures associated with construction and 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 shall be in good working condition and free of dried grass and other combustibles. Fire extinguishers shall be available in heavy and light construction 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 land owned or occupied for construction purposes. No fires shall be started without first taking sufficient precautions to

ensure that the fire can be kept under control. Burning or smoldering matter will not be placed where it may cause a fire to spread. Brush pile burning will be located far enough away from the ROW edge to avoid damaging uncleared vegetation, and where feasible, will be located on mineral (sand and gravel) or previously cleared areas. Fires will be completely extinguished after burning of slash and burn piles 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 MCC and the conditions imposed by the burning permit will be adhered to.

In the event that a wildfire occurs, it shall be immediately reported to MI and to MCC at 1-800-782-0076. All construction and related activities taking place in the vicinity of a wildfire shall cease until advised by the Engineer 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.

6.0 COMMUNICATION

6.1 Pre-Job Briefings

A 'pre-job' briefing will be held at the start of the first day that a worker/subcontractor commences work on site. The meeting is intended to review the activities that the worker/subcontractor will be participating in and to express potential health, safety, and environmental issues related to their proposed work.

6.2 Project Meetings

Early and ongoing communication between MI and the Contractor is expected. Regular weekly progress meetings will be held to review aspects of the project's progress. The Construction Inspector will be responsible for providing appropriate up to date descriptions of adherence to, and the effectiveness of, environmental management measures outlined in this CEMP.

6.3 Stakeholder Communication

The primary line of communication to project stakeholders will be through the MI Project Manager, in addition to Project development information provided on the MI website. When and if required, the Contract Administrator will be responsible for developing submissions on environmental matters and issuing to MI Technical Support Staff and the Project Manager for distribution to project stakeholders and government agencies. In the case of a spill requiring notification under the Manitoba reporting regulations, reporting will occur as specified in Section 5.12.

7.0 TRAINING

The Contractor shall provide mandatory training and awareness sessions for their entire workforce and subcontractors prior to the start of construction, and to new personnel before they begin work. All employees involved in the storage, handling and use of dangerous goods and fuels shall 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. All training and orientation sessions shall be documented and issued to MI for their records and submission to regulators where required.

The purposes of the training and orientation sessions is to ensure personnel working on the contract are aware of and understand the environmental provisions of the contract documents including relevant drawings, specifications and Contractor submittals and updates. This orientation is intended to cover a number of topics that are considered important to the newly arrived workers. In particular, the contents of this CEMP will be reviewed to ensure that environmental protection measures are followed throughout the project. Topics of particular 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 the management of resources encountered

The Contractor shall 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 shall 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.

8.0 MONITORING

Monitoring and reporting are critical elements of this CEMP as a method to verify that the environmental management measures outlined in Section 5.0 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 potential unforeseen adverse environmental effects. MI (Project Manager/ Construction Inspector/Technical Support Team), the Contract Administrator and the Contractor each have responsibilities for monitoring and reporting, as previously outlined in Section 2.0 and shown in Figure 6. More details characterizing the monitoring and follow-up are described in the Environmental Management Program Framework.

8.1 Monitoring

Monitoring includes surveillance to document progress in construction, identification of problems, issues and concerns, and environmental effects not predicted in the EIS. Throughout construction of the channels, the Construction Inspector shall monitor the work activity on a daily basis to ensure adherence to, and the effectiveness of, environmental management measures outlined in this CEMP 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 and wildlife throughout the construction phase and operation of the Project where required to fulfill conditions of environmental approvals.

8.2 Reporting

On a daily basis, the Construction Inspector will use the Environmental Daily Inspection Checklist (Appendix 2) to ensure mitigation methods outlined in this CEMP are, when applicable, regularly adhered to. Any request for a change in environmental management measures or contract restrictions initiated by the Contractor shall be submitted to the Project Manager. The Construction Inspector, with assistance from the ER, will complete a Weekly Environmental Inspection Form (Appendix 2) during their site visits. The form will summarize information including, but not limited to;

- a description and status of construction activities
- a description and status of environmental protection measures (in particular erosion and sediment control)
- any deficiencies, issues or complaints and the corrective action to be taken
- environmental incident(s) reported
- summaries of key correspondence;
- site photos documenting the 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 Construction Inspector, 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 Construction Inspector will keep an Environmental Incidents Running Record Form (Appendix 2) on site which identifies each incident that occurred 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 Construction Inspector will immediately report to the proper authorities, and provide a copy of the incident report to the Project Manager. As noted in Section 5.12, a follow-up report shall be provided to the Director of MCC, at their request, for a 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.

Upon completion of the construction components of the project, copies of the environmental reports will be submitted to the Technical Support Team. These reports will be summarized by the Technical Support Team and an overview document of construction activities and related environmental concerns and mitigation actions will be prepared for submission to the Project Manager and, if required, submission to Provincial/Federal Authorities.

8.3 Record Keeping

Record keeping includes maintaining files and documentation related to environmental management measures and associated monitoring and reporting. Copies of permits, approvals, or other authorizations required in order for the work to proceed shall be retained on site, along with other approvals, monitoring and compliance/enforcement orders from regulatory authorities. If an order is submitted directly to the Contractor, the Contractor shall notify MI in writing and provide copies of the correspondence between the regulator and the Contractors as it will have implications to Environmental Assessment conditions reporting. The Contractor shall provide the Project Manager and the Contract Administrator with the identity of knowledgeable individual(s) who will act as the on-site emergency response coordinator(s) with the authority to redirect manpower to respond to a spill or environmental emergency. Additionally, the Contractor shall provide the identity of an environmental coordinator capable of redirecting work to address non-compliance issues. As a general requirement, work shall be photo-documented and notification of the work will be provided to MI on a monthly basis for record keeping purposes.

The Contractor shall 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 protection measures is documented. The Contractor shall maintain a copy of these records for a minimum of five (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:

- all accidents, spills, leaks, and releases and the reporting and clean-up procedures used
- any 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

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	• An Act to require the development and implementation of a Federal

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
	the goals of this Act.	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. • 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.	• 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 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,

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
		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.
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.	• Classifies developments and identifies requirements for provincial licencing and environmental assessment. • Defines the application fees. • Defines information required to apply for licensing under

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
	126/2010. • Onsite Wastewater Management Systems Reg. 83/2003.	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.	• N/A	• Any activities associated with combustible materials.

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
c. F80		• Provides for control of activities regarding the prevention, detection and extinguishment of fires. Work camp occupancy permit required.
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.

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
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.
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.	• N/A	• Outlines a framework for the use and administration of

Act	Regulations/Policy with Potential Project Implications	Regulatory Objectives, Project Linkages and Permits
W70		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.
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

(This will be included once developed during Detailed Design)