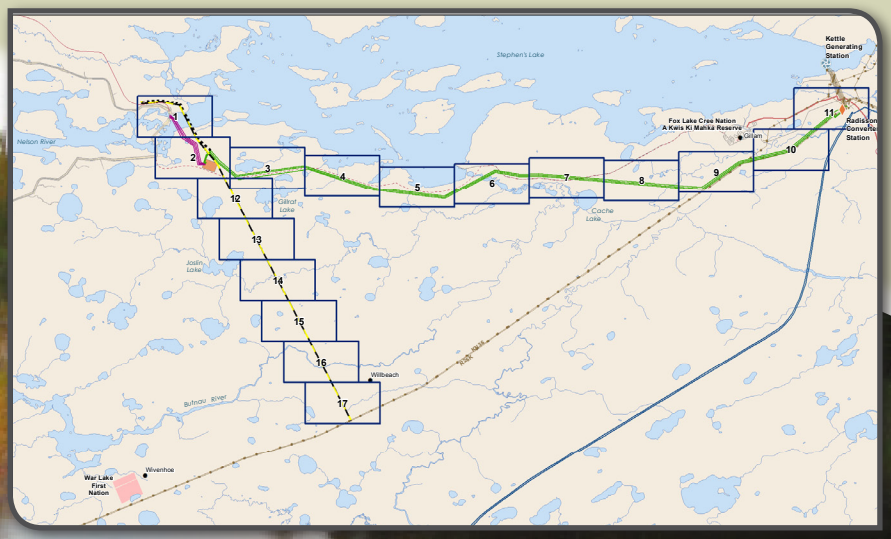
Manitoba Hydro

Keeyask Transmission Project

Construction Environmental Protection Plan

Construction Power, Generation Outlet and Unit Transmission Lines and Stations



Available in accessible formats upon request.

Document Owner
Licensing and Environmental Assessment Department
Transmission Planning and Design Division
Transmission Business Unit
Manitoba Hydro

Version – Final 5.0

List of Revisions

Number	Nature of Revision	Section(s)	Revised By	Date
Final 2.02	Updated the sensitive timing windows for birds table to reflect the time period found in licence conditions	Appendix D	Manitoba Hydro	20150506
Final 2.03	Updated the sensitive timing window for the clearing General Mitigation measure (PA 3.10) to reflect the time period found in licence conditions	Page 5-13	Manitoba Hydro	20150506
Final 2.04	Updated the Effective Period Column from the Buffer and Setbacks table as it conflicted with the clearing timing windows found in licence conditions for moose and nesting and migratory birds	Appendix E	Manitoba Hydro	20150506
Final 2.05	Added PC-1.28 in General mitigation under Access Roads and Trails regarding traffic control within an MIT right-of-way	Page 5-6	Manitoba Hydro	20150508
Final 2.06	Added "*Generator Registrations and Carrier Licensing Regulation"* to Licences and Permits in Appendix C	Appendix C	Manitoba Hydro	20150508
Final 3.00	Changed EC-3.01 and the description of when MBH will contact DFO	Page 5-21	Manitoba Hydro	20150723
Final 3.01	Updated PA-5.02 general mitigation Draining	Page 5-17	Manitoba Hydro	20150918
Final 3.02	Updated EC 3.01 general mitigation under Fish Protection	Page 5-21	Manitoba Hydro	20150918
Final 3.03	Adjusted wording for EC 9.04 and PA 3.10 to provide clarity to statements of timing windows in General Mitigation Tables	Page 5-44, Page 5-13 and Appendix D	Manitoba Hydro	20150810
Final 3.04	Updated the order of the Appendix to reflect the order of appearance in the document	All affected pages	Manitoba Hydro	20150810

Final 3.05	Added 'Section 2.6.2 – Encountering Unexpected Contamination'. Added Appendix G – Guidance For Contaminated Soils or Groundwater Identification and Disposal. Added "and record is kept (Appendix B)" to Construction Inspector duties table. Updated Table of Contents and Table of Appendices.	Page 1-5, page 2-7, and Appendix G	Manitoba Hydro	20150810
Final 3.06	Updating the amendment process diagram and process description	Section 1-2	Manitoba Hydro	20150918
Final 3.07	Added copy of the BPIII Licence to Appendix C	Appendix C	Manitoba Hydro	20150918
Final 3.08	Addition of a clearing guidance diagrams	Appendix J	Manitoba Hydro	20151103
Final 3.09	Reinstated PA 3.15 regarding flagging ESS	Page 5-13	Manitoba Hydro	20151103
Final 3.10	Correction in EC 9.04 and PA 3.10 in General Mitigation Tables "may be" should have been edited out	Pages 5-13,5-44	Manitoba Hydro	20151124
Final 3.11	Updated General Mitigation measure (MM-04) regarding community notification	Page 5-27	Manitoba Hydro	20151210
Final 4.0	Updated the General Mitigation measure EC-3.05, EC-9.10 to reflect the correct name of the permit required	Pg 5-21 and 5-44		
Final 4.01	Name change of Manitoba Conservation and Water Stewardship (MCWS) to Department of Sustainable Development (SD)	All applicable locations	Manitoba Hydro	20161031
	Separated Construction Inspector from Environmental Inspector in Roles and Responsibilities	All applicable locations	Manitoba Hydro	20161031
	Added Concrete Wash Water (EI-10), Potable Water (EI-11) and Wastewater (EC-8) to General Mitigation Tables	Page 5-15, 5-33 and EI-12	Manitoba Hydro	20161031
	Updated the name of the "Rehabilitation and Vegetation Management Plan" to "Rehabilitation and Invasive Species Management Plan"	All applicable locations	Manitoba Hydro	20161031

	In the Frameworks for Contractor Developed Plans removed the provision “or used as fill on site” when referring to disposal of concrete, (should be sent to landfill only)	Appendix I (Page 8)	Manitoba Hydro	20161031
	Replaced Waste Disposal Grounds Regulation (150/91, July 9 1991). Reference in the Waste Management Framework with (Waste Management Facilities Regulation 37/2016, Feb 23, 2016)	Waste Management Framework Appendix I (Page 3)	Manitoba Hydro	20161031
	Updated biosecurity protocol to (Rev 003092016) and added Cleaning and disinfecting protocols	Appendix F	Manitoba Hydro	20161031
	Updated Guidance for Contaminated Soils or Groundwater Identification and Disposal	Appendix G	Manitoba Hydro	20161031
Final 5.0	Added a general mitigation measure: All slip tanks are to have a double walled design and be designed for road use.	EI-5.33 Page 5-33	Manitoba Hydro	
	Added a general mitigation measure: When drawing water, ensure any pump intakes are appropriately screened with a large cylindrical or box-type screens to prevent harm to fish.	EC-3.07 Page 5-33	Manitoba Hydro	
	Added a general mitigation measure: The withdrawal of any water will not result in reduction in the wetted width of a stream, in order to maintain existing fish habitat.	EC-3.08 Page 5-33	Manitoba Hydro	
	Added a general mitigation measure: During construction activities the contractor must provide Manitoba Hydro representatives with full and unrestricted access to the ROW and all project related work areas so that inspections can occur	MM-16 Page 5-29	Manitoba Hydro	

	Added general mitigation measures: -When Elm trees are removed the stump must be debarked to the soil line or stump must be grinded or removed to flush or just below the soil line. -All Elm wood must be immediately disposed onsite by burning/chipping (<5cm) or transported to a designated elm disposal site. -Storing Elm wood firewood is illegal as it is a major contributing factor to the spread of Dutch Elm Disease.	PA-3.29-3.31 Page 5-14	Manitoba Hydro	
	All stockpiles or spoil piles shall be maintained as to minimize dust associated with wind erosion.	PC-2.25 Page 5-10 EC-2.05 Page 5.11	Manitoba Hydro	
	Vehicles hauling materials to or from the work site that have the potential for dust emissions should be hauled with the load enclosed by an anchored tarp, plastic or other material.	PC-2.26 Page 5-10 EC-2.06 Page 5.11	Manitoba Hydro	
	Addition of the statement: “The direction and guidance provided in this CEnvPP document applies to all lands related to the project both private land and crown land.”	Introduction, page 1-1	Manitoba Hydro	
	The addition of a Construction Matting Section of the General Mitigation measure tables	PA-11	Manitoba Hydro	
	Updates to the Reduced Risk Timing Windows for denning mammals from October to the end of June	Appendix D		
	Updated some of the wording found in the Heritage Section	Section 2.7.1	Manitoba Hydro	
	Added the mitigation measure “Will not apply herbicides for the purposes of initial clearing of vegetation on the Right of Way.” To the clearing general mitigation table	PA-3.27 Page 5-14	Manitoba Hydro	
	In Appendix C the following statement was added “Permits, Licenses and Approvals are the sole responsibility of those groups indicated in this table”	Appendix C	Manitoba Hydro	

	Additional paragraph under Birds and Habitat about Avian protection and associated Appendicies L to Q which aid Manitoba Hydro and Contractors with a mitigation approach for reducing risk to nesting birds during construction	Page 2-5, Appendices L to Q	Manitoba Hydro	20171003
	The addition of the "Rehabilitation and Invasive Species Management Plan"	Appendix R	Manitoba Hydro	20171003
	Rectified a numbering error. Concrete Wash Water was changed from EI-10 to "Concrete Wash Water and Waste EI-13) as it conflicted with an existing set of General mitigations (Waste Management EI-10)	Page 5-15	Manitoba Hydro	20171003
	Added "Ice Crossings will be constructed and maintained as per Contract specifications. Ice thickness will be checked regularly and posted."	PC-1.29 Page 5-6	Manitoba Hydro	20171003
	The addition of Directional Drilling Section in general mitigation measures	PA-12, Page 5-19	Manitoba Hydro	20171003
	Added "During frozen ground conditions hazardous waste can be stored temporarily for 60 days and only 30 days during non-frozen ground conditions before removal to a licensed or approved disposal site."	EI-4.27, Page 5-28	Manitoba Hydro	20171003
	Added" Wastewater will be removed from holding tanks when they are no more than 90% full by a registered sewage hauler and disposed of at a licenced wastewater treatment facility."	EI-12.03, Page 5-47	Manitoba Hydro	20171003
	Wording changes to PC-1.13 (Pg 5-5). EC-1.03 (Pg 5-7). EI-1.01 (Pg 5-8). PC-2.17 (PG 5.10). PA-2.01 and PA-2.10 (Pg 5-12). PA-3.20 (5-13). EI-5.01, EI-5.02,EI-5.04,EI-5.08, EI-5.16 (Pg 5-33). PC-8.09 (Pg 5-37). EI-10.02 (Pg 5-46). EC-9.06 (Pg 5-49).	All applicable	Manitoba Hydro	20171003

PREFACE

MANITOBA HYDRO'S ENVIRONMENTAL COMMITMENT

Manitoba Hydro is committed to protect and preserve natural environments and heritage resources affected by its projects and facilities. This commitment and a commitment to continually improve environmental performance is demonstrated through the company's Environmental Management System, which is ISO 14001 certified.

Environmental protection can only be achieved with the engagement of Manitoba Hydro employees, consultants, local communities and contractors at all stages of projects from planning and design through construction and operational phases.

As stated in the Corporate Environmental Management Policy:

"Manitoba Hydro is committed to protecting the environment by:

- *preventing or minimizing any adverse impacts on the environment, and enhancing positive effects*
- *continually improving our Environmental Management System;*
- *meeting regulatory, contractual and voluntary requirements*
- *considering the interests and utilizing the knowledge of our customers, employees, communities, and stakeholders who may be affected by our actions;*
- *reviewing our environment objectives and targets annually to ensure improvement in our environmental performance; and*
- *documenting and reporting our activities and environmental performance."*

Manitoba Hydro's environmental management policy has been used to guide the development of the environmental protection program for the proposed Project. Implementation of the program is practical application of the policy and will demonstrate Manitoba Hydro's dedication to environmental stewardship.

Manitoba Hydro recognizes the unique relationship Aboriginal communities have with their areas of use and is appreciative to all the communities who took time to share information about their history and culture as well as their valued knowledge and perspectives with regards to the Bipole III Transmission Project. Aboriginal Traditional Knowledge that has been shared assisted Manitoba Hydro in: developing a greater understanding of the study area; identifying potential Project effects; planning and designing the Project; and developing mitigation measures, which can be found throughout this document and other project environmental plans. Manitoba Hydro understands the importance of continuing to engage with Aboriginal communities and to work to address outstanding concerns.

Adaptive management is being implemented within the Environmental Protection Program to be responsive and adaptive to changes to the project and on the landscape, stakeholder and aboriginal concerns, as well as inputs from our inspection and monitoring programs.

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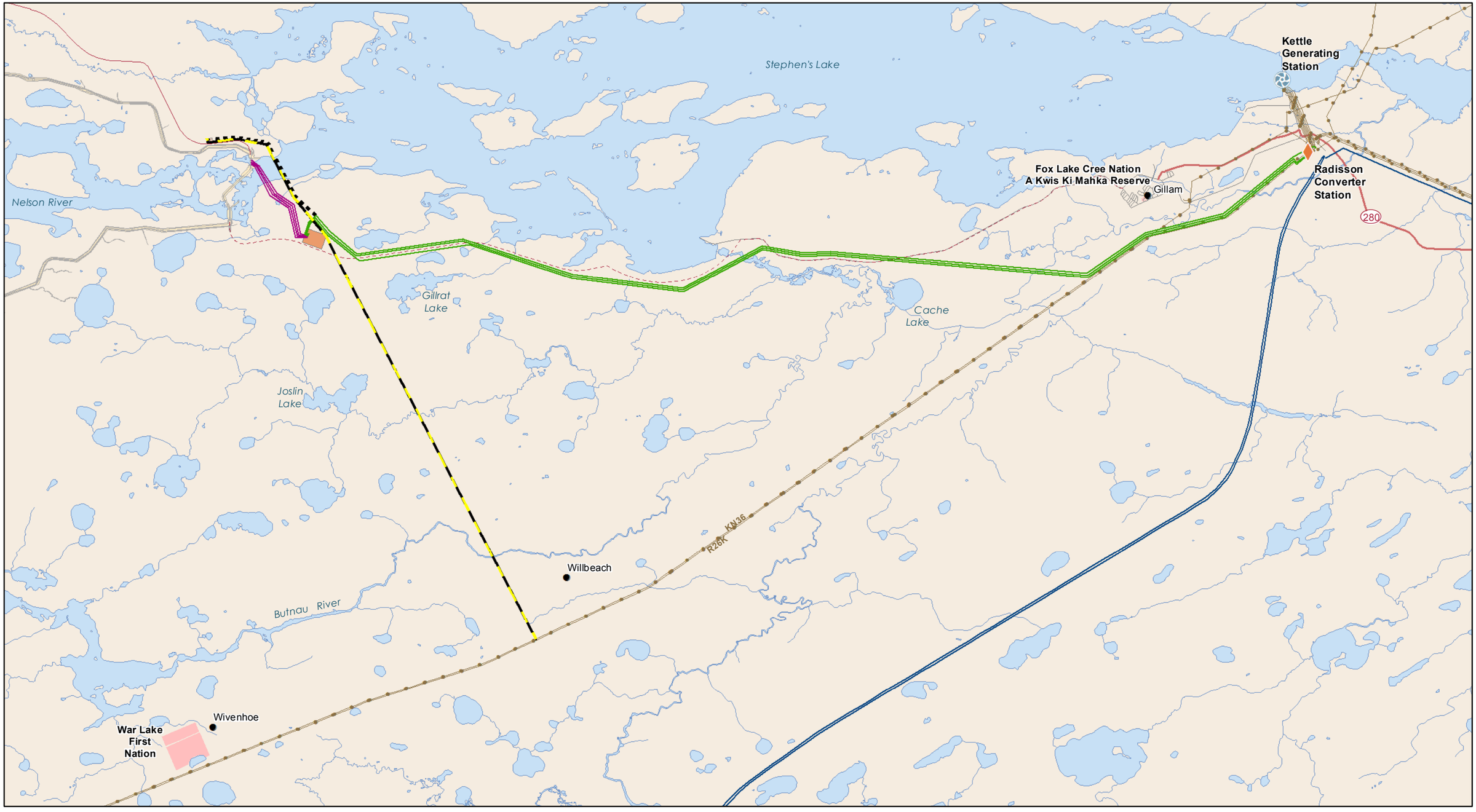
1.0 INTRODUCTION

The purpose of this Construction Environmental Protection Plan (CEnvPP) is to provide information that will guide contractors and field personnel while constructing the Construction Power, Generation Outlet and Unit Transmission Lines and Stations for the Keeyask Transmission Project (the 'Project') in a manner that meets environmental legislation requirements. The CEnvPP outlines the commitments and efforts that will be taken by Manitoba Hydro (MH) and contractors to protect the environment and mitigate potential environmental effects that may occur during construction of the Project. The use of environmental protection plans is a practical and direct implementation of Manitoba Hydro's commitment to responsible environmental stewardship.

This CEnvPP provides guidance for the implementation of environmental protection measures for the development of the Project's various components (Map 1). The primary function of the Project is to provide construction power and generation outlet transmission capacity for the proposed Keeyask Generating Station, located in northern Manitoba along the Nelson River at Gull Rapids upstream of Stephens Lake. The Project is located about 300 km northeast of Thompson (Manitoba) within the Split Lake Resource Management Area (Map 1).



Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, ProvMB, NRCAN
Date Created: April 01, 2014
Version: Final 1.0

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Legend

- Generation Outlet Transmission Lines
- Construction Power Line (KN36) Preferred Route
- Construction Power Line (Temporary)
- Unit Lines
- Construction Power Station Site
- Switching Station Site
- Keeyask Generation Infrastructure
- Converter Station
- Generating Station
- Bipole I and II (Existing 500 kV DC Line)
- Transmission Line
- North Access Road
- South Access Road (Proposed)
- First Nation

Keeyask Transmission Project
Construction Environmental Protection Plan
Region Overview

Map 1

PROJECT COMPONENTS

The Keeyask Transmission Project components are illustrated in Map 1. The site locations and routes reflect the preferred siting resulting from a review and evaluation of alternative sites and routes. The main Project components are described below.

Generation Outlet Transmission Lines

Three Generation Outlet Transmission Lines (GOT KR1 to 3) will transmit power from the 138 kV ac switchyard at the Keeyask Switching Station to the 138 kV ac Switchyard at the existing Radisson Converter Station. The three lines will typically be located in a single 200-m-wide corridor about 38 km long however, the width and configuration of the three lines in the corridor will vary.

Manitoba Hydro is proposing to prebuild one (KR1) of the three GOT lines from the Radisson Converter Station to the Keeyask Construction Power Station, as a source of backup construction power during the construction of the Keeyask Generation Station Project. Once construction of the generating station is complete, a portion of KR1 from the Construction Power Station back to the Keeyask Switching Station will be salvaged, and KR1 will be terminated into this Switching Station. The additional GOT lines (KR2 and KR3) will be built from the existing Radisson Converter Station 138 ac switchyard to the new Keeyask Switching Station.

Construction Power Transmission Line and Station

Construction power will be supplied by a 21-km, 138 kV Construction Power Transmission Line which will tap the Kelsey to Radisson (KN36) 138 kv transmission line between Ilford Station and the tap to Gillam Station. The tap point along KN36 is approximately 33 km from Ilford Station and 29 km from the Gillam Station tap. The width of the right-of-way will be 60 m for most of its length, except for the locations where the line will share a right-of-way with GOT lines

Unit Transmission Lines

Four 138 kV ac Unit Transmission Lines will transmit power from the seven generators located at the Keeyask Generating Station to the new Keeyask Switching Station. Three lines will be double circuit and one line single circuit to accept power from the seven generating station turbines. The four lines, each approximately 4 km long, will be located in a single 265-m-wide corridor.

Keeyask Switching Station

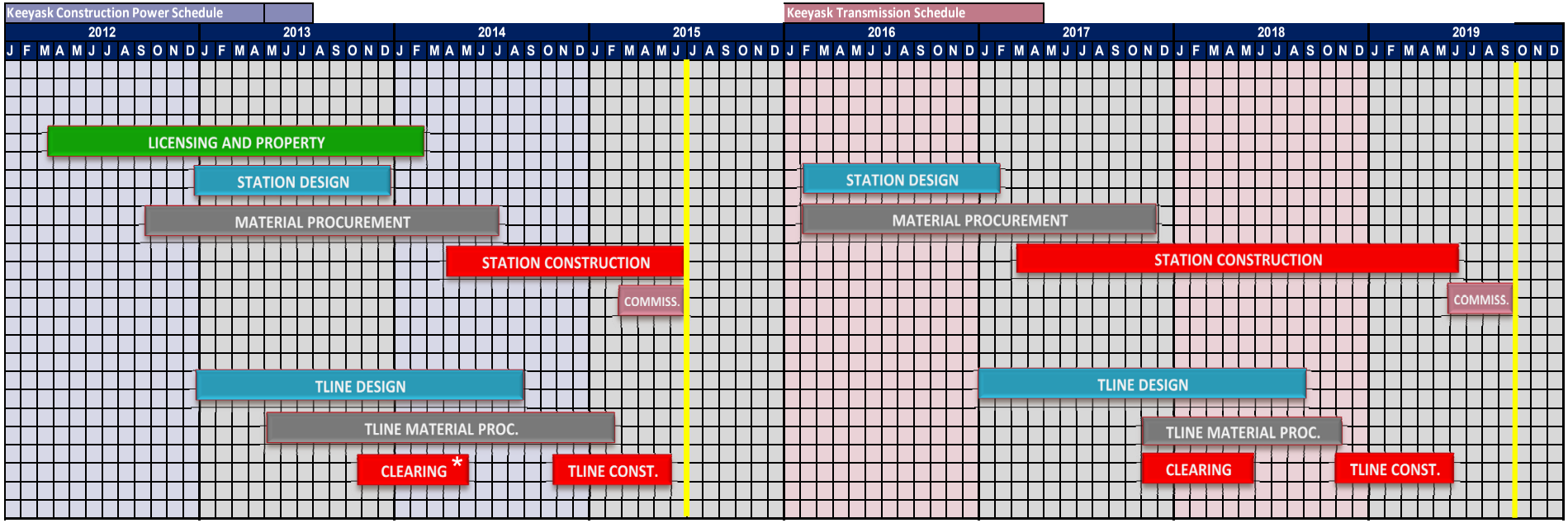
A new Keeyask Switching Station will accept power from the generating station via four Unit Transmission Lines from the generating station transformers and transfer that power to three Generation Outlet Transmission (GOT) Lines. The switching station will be located on the south side of the Nelson River. The purpose of the switching station is to provide the terminal facilities for the electrical connection to the Keeyask Generating Station, and to provide flexibility in switching load between incoming Unit Transmission Lines from the generating station to the Generation Outlet Transmission Lines going to Radisson Converter Station.

Construction Power Station

A new 138 kV to 12.47 kV permanent wood-pole/steel Construction Power Station, located on the north side of the Nelson River, will be needed for construction power. The Construction Power Station will be built on a 2.25-ha site that will be developed to accommodate three transformer banks T1-3 and will supply the necessary power (22 MVA) for the construction of the Keeyask Generating.

Clearing is proposed to start in the winter of 2014 as outlined in the construction schedule (Figure 1-1).

This document provides general and specific mitigation measures to reduce the potential for environmental effects that may occur during the Project's construction phase. It is designed to be a resourceful, user-friendly tool to guide onsite implementation of environmental protection measures. This document provides contractors and field personnel with details on 'where to' implement environmental protection measures. Where contractors have experience using other federally or provincially accepted methods of environmental protection, they are encouraged to discuss with the MH Environmental Inspector.



* This is the earliest that clearing could commense. However, exact start date is subject to regulatory approval of the Keeyask Generation Project

Figure 1-1: Construction Schedule

Document Amendment Process

To communicate the most up to date and current versions of Environmental Protection documents an amendment process has been established. This amendment process applies to both text (Part 1) and mapping (Part 2) documents. Throughout construction there will be changes and revisions to documents, these revisions are a result of errors and omissions or the ongoing adaptive management process to improve environmental protection measures. In addition, Manitoba Hydro's Licensing and Environmental Assessment Department must be notified of all field decisions and/or changes to a procedure outlined in the CEnvPP. Should an amendment be required, that amendment will be communicated to Manitoba Sustainable Development (SD) through the Environmental Approvals Branch to determine if SD's approval is required prior to issuance. Figure 1-1 illustrates the document amendment process, including loading amendments into the Environmental Protection Information Management System (EPIMS) so that users are notified of changes and the amendments can be distributed to them through Manitoba Hydro Staff.

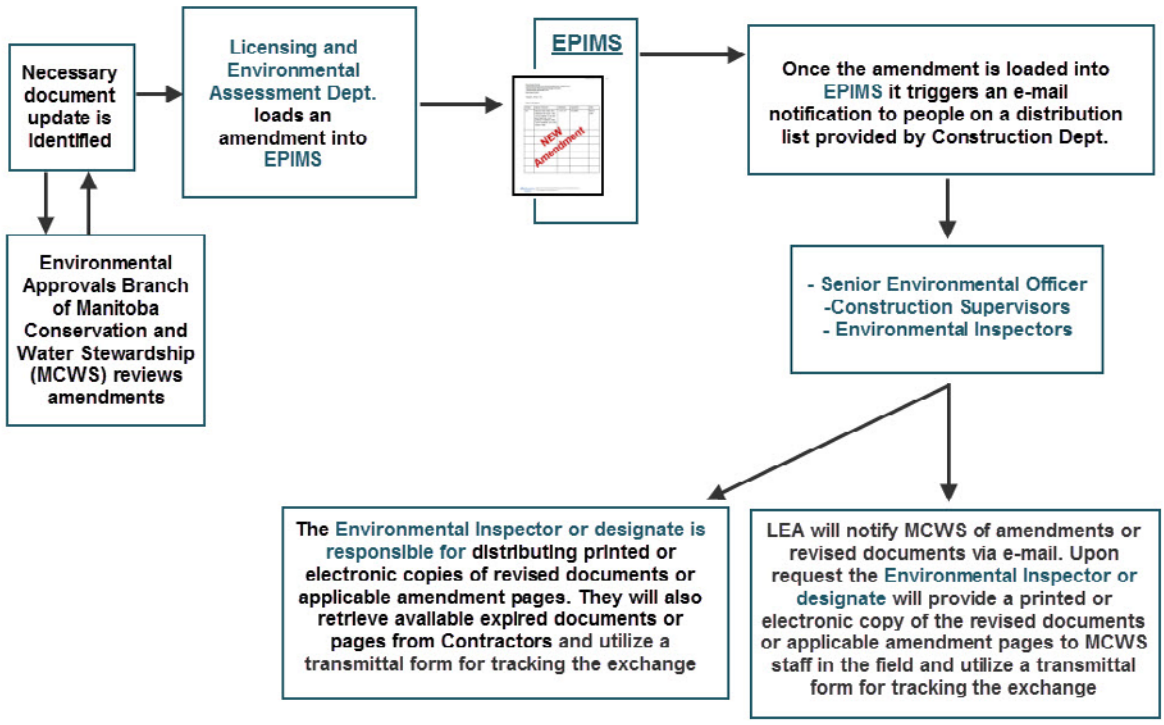


Figure 1-1: Document Amendment Process

Overview of Environmental Protection Plan

Part of Manitoba Hydro's commitment to environmental protection includes the development of a comprehensive Environmental Protection Program (EPP) for the Project. This program includes the development of a Project-Level Environmental Protection Plan (EnvPP) and Construction EnvPPs (CEnvPPs) specific to each major Project component (Figure 1-2). The Project-Level EnvPP contains general environmental protection information applicable to all project components, provides a foundation for developing component-specific CEnvPPs, and is intended for project managers and regulators. The CEnvPPs provide general and specific environmental protection information for project components and are intended for use by construction contractors and environmental staff.

A number of Environmentally Sensitive Sites (ESS) have been identified for the Project. ESS are locations, features, areas, activities or facilities that were identified in the Bipole III Transmission Project EIS to be ecologically, socially, economically or culturally important or sensitive to disturbance and require protection during construction of the project. The determination of ESS has included the consideration of Aboriginal Traditional Knowledge (ATK). Manitoba Hydro will continue to engage with stakeholders and aboriginal communities in efforts to continually update this plan with sensitive sites and current knowledge as it is shared.

Map sheets have been developed for the Project to present the location and spatial extent of ESS. Each map has corresponding tabular summary information including ESS feature information and relevant mitigation measures to address the potential environmental effects at each ESS site.

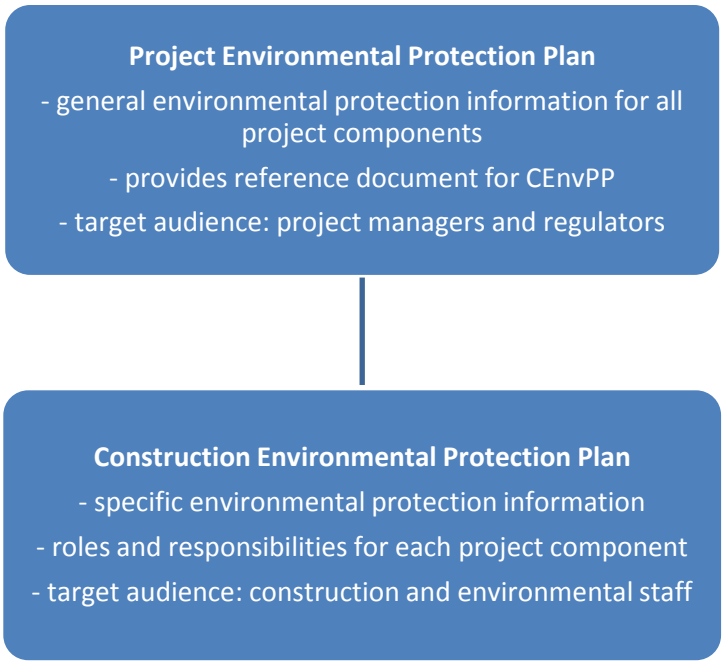


Figure 1-2: Relationship between Environmental Protection Documents

Roles, Responsibilities and Reporting

This section outlines the major roles and responsibilities of those involved in the implementation of the CEnvPP for the transmission components of the Project. A summary of roles and key responsibilities is found in Table 1-1. Communication and reporting on environmental issues, monitoring and compliance will be as outlined in Figure 1-3. A contact list for key staff involved in supporting this CEnvPP is found in Appendix A.

Table 1-1: Environmental Roles and Responsibilities of Personnel During the Construction Phase

Role	Key Responsibilities
Project Engineer	• Accountable for all aspects of their construction component in the Project • Oversees Construction Supervisors who are responsible for construction activities
Licensing and Environmental Assessment Department	• Provides advice and guidance on environmental protection matters. • Monitors inspection reports and monitoring information, and prepares annual report as per regulatory requirements. • Liaises with Manitoba Sustainable Development Licensing Approvals Branch.
Senior Environmental Assessment Officer	• Responsible for the implementation of Construction Environmental Protection Plan. • Liaises with Licensing and Environmental Assessment Department. • Liaises with Regional regulatory authorities and other regulatory authorities where required or applicable. • Provides advice and guidance to Construction Supervisors and Environmental Inspectors for non-compliance situations, environmental incidents and emergencies. • Issues Environmental Improvement and Stop Work orders for environmental non-compliance situations and incidents. • Supervises Environmental inspectors/monitors. • Provide Support and guidance to contractors regarding CEnvPP. • Responsible for implementing and ongoing compliance monitoring to ensure consistent and accurate reporting into the Environmental Protection Information Management System.
Construction Supervisor(s)	• Reports to the Project Engineer. • Reviews environmental inspection reports with the Construction Contractor, and ensures remedial actions or responses to non-compliance situations or incidents are implemented as required. • Works with the Senior Environmental Assessment Officer and Inspectors to ensure implementation of environmental protection. • Ensures that appropriate authorities are notified in emergency or incident situations. • Issues Environmental Improvement and stop work orders as required for non-compliance issues.

Role	Key Responsibilities
Environmental Inspector	• The Environmental Inspectors reports to the Senior Environmental Assessment Officer and provides advice and guidance to the Construction Supervisor. • Monitor the project for compliance of the CEnvPP, Environmental License and other environmental regulatory requirements. • Assist the Contractors Environmental Officer in ensuring that all necessary information is covered in the Contractors pre-project employee orientation and record is kept (Appendix B). • Conducts site inspections regularly and ensures reports are submitted to the Environmental Protection Information Management System. Both daily and weekly reports containing information on activities carried out, effectiveness of actions and outstanding issues are also submitted to Environmental Protection Information Management System. • Assists in developing solutions for environmental issues on-site with the Construction Supervisor and the Contractor and where applicable with the input from the Senior Environmental Assessment Officer. • Prescribes and ensures follow up mitigation measures are implemented. • Ensures all ESS sites are correctly identified, delineated and flagged/marked in the field.
Construction Inspector	• The Construction Inspector will carry out the duties of the Environmental Inspector when the Environmental Inspector is not on site. • Environmental Inspectors and Construction Inspectors work cooperatively to identify ESS site locations and ensure that prescribed mitigation is being implemented and meeting regulatory requirements.
Manitoba Hydro Safety, Health, Emergency Response Officers	• Responsible for ensuring implementation of Manitoba Hydro safety policies and programs at the various construction sites. The officers provide information and advice to the Construction Supervisor. • Conduct periodic site safety visits.

Role	Key Responsibilities
Construction Contractor(s) (Project Manager / Construction Supervisor)	• Accountable for all regulatory and environmental prescriptions (i.e., follow CEnvPP and mitigation measures prescribed). • Ensure all contractor project staff are adequately trained/informed of pertinent environmental requirements of the Project related to their position. • Report any discoveries of non-compliance, accidents or incidents to the Construction Supervisor. • Ensure that all remedial actions are carried out as per Manitoba Hydro instruction. • Ensure all discoveries of heritage resources, human remains, paleontological finds, environmentally sensitive sites, etc. are reported to the Construction Supervisor. • Responsible for other permits as outlined in Appendix C.
Construction Staff	• Accountable for all regulatory and environmental prescriptions (i.e., follow CEnvPP and mitigation measures prescribed). • Ensure adequately trained with respect to, and informed of pertinent, environmental requirements of the Project related to their position. • Report any discoveries of non-compliance, accidents or incidents to the Construction Supervisor. • Ensures that all remedial actions are carried out as per Manitoba Hydro instruction. • Ensures all discoveries of heritage resources, human remains, paleontological finds, environmentally sensitive sites, etc. are reported to the Construction Supervisor.
Construction Contractor's Environmental Officers	• Responsible for implementation, coordination and verification of pre-project employee environmental orientation. • Ensures that the contractor employees adhere to all aspects of the construction Environmental Protection Plan. • Provides information and advice to the Construction Contractor employees on environmental protection and safety matters. • Responsible for implementation of the emergency response and hazardous materials plans, and other related topics. • Liaises with Environmental Inspector and Hydro Field Safety Officers.
Environmental Monitor(s)	• Environmental Monitors conduct field monitoring activities as outlined in the monitoring plans (access, wildlife, vegetation monitoring). • Provide liaison opportunities for the communities and reports the protection and preservation of community natural resources. • Assists in the locating and delineating of environmentally sensitive sites. • Works with Environmental Inspector and reports to the Senior Environmental Assessment Officer.
Community Liaison	• Primary contact for disseminating information regarding this project to their community. • Developing project communication materials for their community. • Identifies community concerns and interests and communicates to Construction Supervisor.

Environmental Protection

Manitoba Hydro will provide copies of all available permits, licences, approvals and authorizations obtained for the Project to the Contractor. The contractor will provide Manitoba Hydro with copies of all available permits, licences, approvals and authorizations obtained for the Project. Electronic copies of all permits are available for download from the Environmental Protection Information Management System.

The Contractor will comply with the Environmental Protection Plans prepared for the Project, including mitigation measures identified during the environmental assessment and contained herein. Environmental aspects of the work including applicable licence/permit conditions will be discussed during the Pre-Job Meeting, Weekly Progress Meetings, and Daily Job Planning Meetings.

Without limiting or otherwise affecting the generality or application of any other term or condition of the Contract, the Contractor shall:

- Strictly comply with all Environmental Legislation and have suitable corrective and/or preventive measures in place to address any previous environmental warnings, fines or convictions; issued by regulatory agencies and/or Manitoba Hydro;
- Do or cause to be done all things required or ordered, to mitigate environmental damage caused, directly or indirectly, by itself or by its servants, agents, employees or Subcontractors, accidentally or as a result of practices that are in contravention of the Contract or any Environmental Legislation.

Dedicated On-Site Environmental Officer(s)/Supervisor(s)

Before commencing the on-site work, the Contractor shall identify its dedicated on-site Environmental Officer(s)/Supervisor(s), who shall attend the Pre-Job Meeting (Environmental Component) to review environmental matters for the work. The dedicated on-site contractor Environmental Officer(s)/Supervisor(s) shall be fully conversant with:

- Contractor's Environmental Practices and Policies.
- All applicable Environmental Legislation;
- The conditions of Project and Construction Environmental Protection Plans.

Environmental Improvement Orders

Failure to comply with the Environmental Protection section above or unsatisfactory performance in regards to any other environmental-related matter may result in Manitoba Hydro issuing Environmental Improvement Orders to the Contractor.

The Environmental Improvement Order, once communicated verbally or in writing is considered "effective immediately". Manitoba Hydro will establish a compliance date for each Environmental

Improvement Order issued. The Contractor must provide written documentation of the actions taken regarding the environmental improvement order as follows:

The Contractor shall:

- Within the expiry date of the period specified in the order or any extension thereof , prepare a written report on the measures taken to remedy the contravention and on any measures yet to be taken;
- Send a copy of the report to the Manitoba Hydro Representative who made the order;
- If applicable, provide a copy of the report to the employee(s) involved; and
- Review the contravention with all employees at regular weekly meeting and post in a prominent place at or near the workplace.

Manitoba Hydro Environmental Stop Work Order

Manitoba Hydro may issue an Environmental Stop Work Order where any activities which are being, or are about to be, carried on in a workplace, involve or are likely to involve an imminent risk of serious impact to the environment, or where a contravention specified in an Environmental Improvement Order was not remedied and warning was given. The Environmental Stop Work Order, once communicated verbally or in writing is considered "effective immediately", for any one or more of the following matters:

- The cessation of those activities;
- That all or part of the workplace be vacated;
- That no resumption of those activities be permitted by the Contractor.
- That a Manitoba Hydro issued stop work order remains in effect until it is withdrawn in writing by Manitoba Hydro.
- That Manitoba Hydro will not be held responsible for delays to the work or be required to compensate the contractor for any matters arising as a result of the Manitoba Hydro issued Environmental Stop Work Order.

Note: A Manitoba Hydro-issued Environmental Stop Work Order does not prevent the Contractor from completing any work or activity that may be necessary in order to remove the risk of injury referred to above.

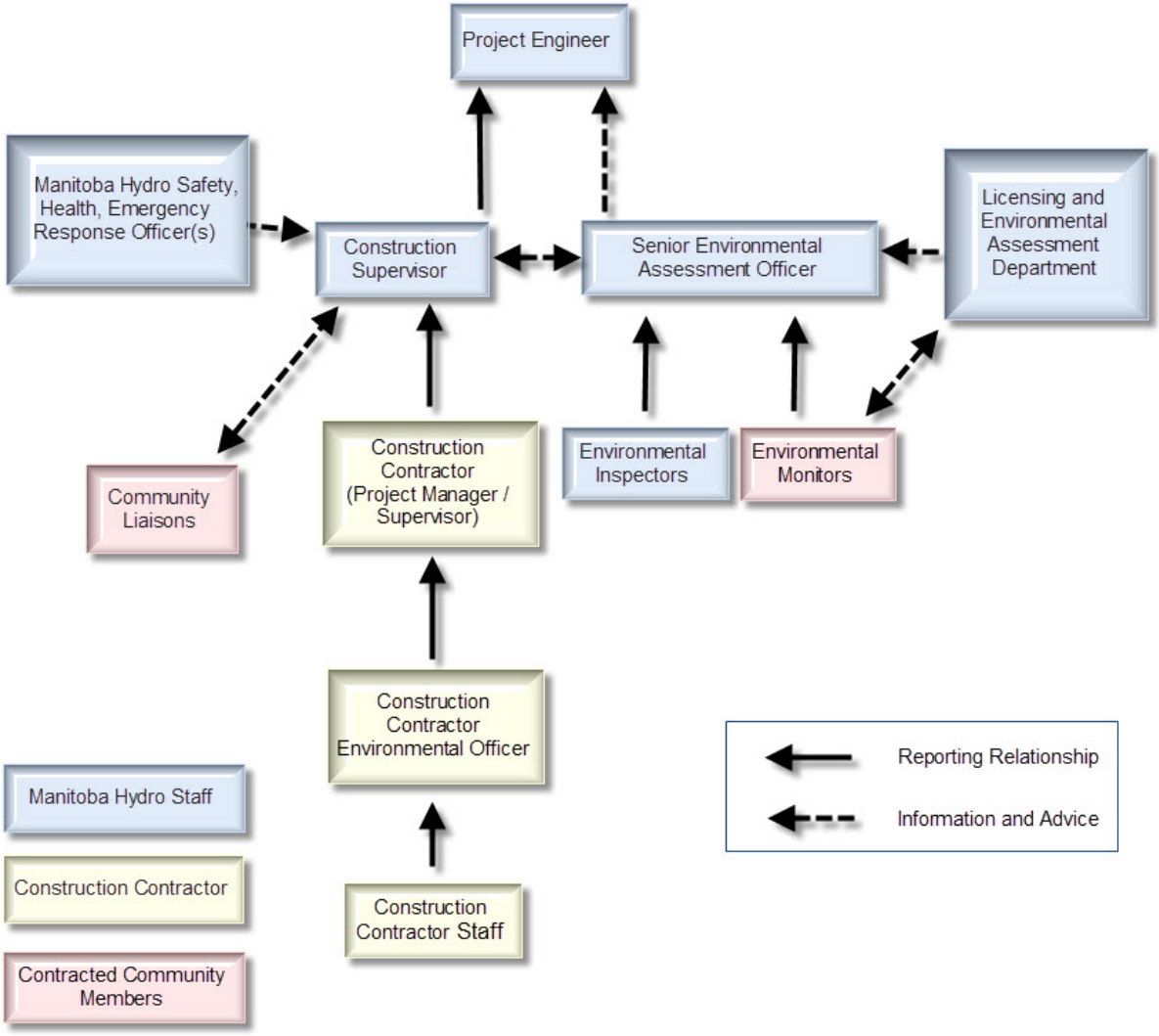


Figure 1-3: Environmental Communication Reporting Structure

Environmental Protection Information Management System

An Environmental Protection Information Management System (EPIMS) will provide a single interface to store all environmental documentation. It will be utilized by project staff to submit permits, inspection reports, plans, logs, checklists, etc. for the management of all environmental protection implementation, regulatory compliance and incident reporting. The EPIMS will be developed by Manitoba Hydro and be fully integrated with project communications, inspection, biophysical, socio-economic, and heritage monitoring.

Regulatory Requirements

All relevant regulatory approvals for the Project will be obtained by Manitoba Hydro prior to construction. All documentation will be kept on-site by both the contractor and Manitoba Hydro personnel. Manitoba Hydro requires that its employees and contractors comply with all Federal and Provincial Regulatory requirements relating to the construction, operations and decommissioning of its projects and facilities. All Project licences, approvals and permits obtained can be found in Appendix C: Environmental Licences, Approvals and Permits and EPIMS.

2.0 ENVIRONMENTAL CONSIDERATIONS

Important environmental considerations for pre-construction planning and construction activities are required at environmental sensitive sites (ESS), which include locations, features, areas, activities or facilities that were identified in the Bipole III Transmission Project EIS to be ecologically, socially, economically or culturally important or sensitive to disturbance. These ESS require protection and mitigation during construction. ESS include riparian areas, valued and protected vegetation, wildlife and habitats, cultural (heritage/archaeological and spiritual sites), unique terrain features, erosion- and compaction-prone soils, permafrost, and other important locations requiring specific protection (e.g., resource use, access).

Timing Windows

Soil

Construction in southern Manitoba will be carried out during times of the year that minimize excessive soil disturbance. Where needed, construction will take place during the winter months (November to March) under frozen and snow-covered conditions to minimize surface disturbance.

Permafrost (If applicable)

In regions contacting permafrost, Project activities will be scheduled between November 1st and April 30th under frozen ground conditions to minimize surface disturbance and permafrost degradation except at Construction Power Station, Converter Station and Camp project components where some permafrost melting may be required.

Wildlife

Appendix D outlines wildlife reduced risk work windows applicable to the Project. These windows are based on federal and provincial regulatory requirements as well as best management practices. Timing periods may be expanded or refined based on further data collection, transmission line final design and regulatory license and work permits to be issued for the project.

The recommended Reduced Risk Timing Windows table demonstrates periods of the year when wildlife species are sensitive to disruptive operations because of a sensitive lifecycle activity such as calving, nesting, and hibernation, etc. Appendix D is intended to assist in scheduling construction activities for the time of year when risks of adverse construction impacts are negligible. Where conflicting timing restraints with construction activities exist in a particular area, appropriate mitigation will be implemented to reduce effects.

Burning

Between November 16th to March 31st there is no requirement for a burning permit under the Wildfires Act. If buring is required outside of those dates (i.e. between April 1st and November 15th) a burning permit application is made to the local Manitoba Sustainable Development office. A copy of the burning permit must be on hand at all times while burning. All fires must be completely extinguished by March 31st.

Fish

Fish habitat can be adversely affected by in-stream work that occurs during certain periods in their life history or at certain life stages. Life history periods or life stages susceptible to disturbances from in-stream construction work include the following:

- Spawning and egg incubation;
- Movements to or from spawning or overwintering areas; and
- Egg and newly hatched fry.

Timing works to avoid sensitive life history periods or life stages is an effective means of mitigating adverse effects. All in-stream activities should be conducted during a timing window of at least risk to fish and fish habitat. Appendix D contains general recommended timing windows to avoid during construction.

Where applicable, site specific timing windows are prescribed in specific mitigation measures for each ESS.

Setbacks and Buffers for Wildlife and Anthropogenic Features

Setbacks and buffer distances from sensitive environmental features are provided in Appendix E.

These setback and buffers may be expanded or refined based on further data collection, transmission line final design, regulatory license and work permits to be issued for the project.

Setbacks are areas to be maintained from a given environmental feature where no work shall occur unless authorized by Senior Environmental Assessment Officer.

Buffers are work areas where restricted activities such as low disturbance clearing are permitted.

Where applicable, site specific setback and buffers are prescribed in specific mitigation measures for each ESS.

Riparian Management

Based on characteristics and qualities of waterbodies in, or near the project footprint, Contractors will need to modify land clearing, machinery passage and other construction activities, these sites will be identified on the Map Sheets of the Construction Section Mapbook "Part 2".

Riparian Buffers (as shown in Table 2-1) are applied to riparian habitats, which include, streams, rivers, lakes and wetlands/permafrost areas within the Project Footprint in which all shrub and herbaceous vegetation will be retained and all trees that do not violate Manitoba Hydro vegetation clearance requirements will be retained. For slopes greater that 50% site investigation and prescription by the Manitoba Hydro Senior Environmental Assessment Officer is required. **The Riparian Buffer is composed of two zones: a Management Zone (variable width based on Table 2-1) that allows equipment to conduct low ground disturbance clearing and a 7m Machine Free Zone which only allows reaching into zone with equipment but not entering the zone except at trail crossing (Figure 2-1).**

Table 2-1: Riparian Buffer Distances Based on Slope

Slope of Land Entering Waterway (%)	Width of Riparian Buffer (m)
10	30
20	40
30	55
40	70
50	85

Machine Free Zones are work areas where restricted activities such as low disturbance clearing are permitted by reaching into zone with equipment but not entering the zone. Where applicable, site specific setbacks are prescribed in specific mitigation measures for each feature.

Setbacks, Riparian Buffers and Machine Free zones distances from sensitive water features are provided in Appendix E. Setbacks are to be maintained from a defined riparian habitat where no work shall occur.

Boundaries of **Riparian Buffers** and **Machine Free Zones** are measured from the **Ordinary High Water Mark (OHWM)**. If the OHWM is unable to be determined, measure from the **tree line** (Figure 2-1). Setbacks (if required) are measured from the tree line or from a defined riparian boundary as delineated by an Aquatics Specialist.

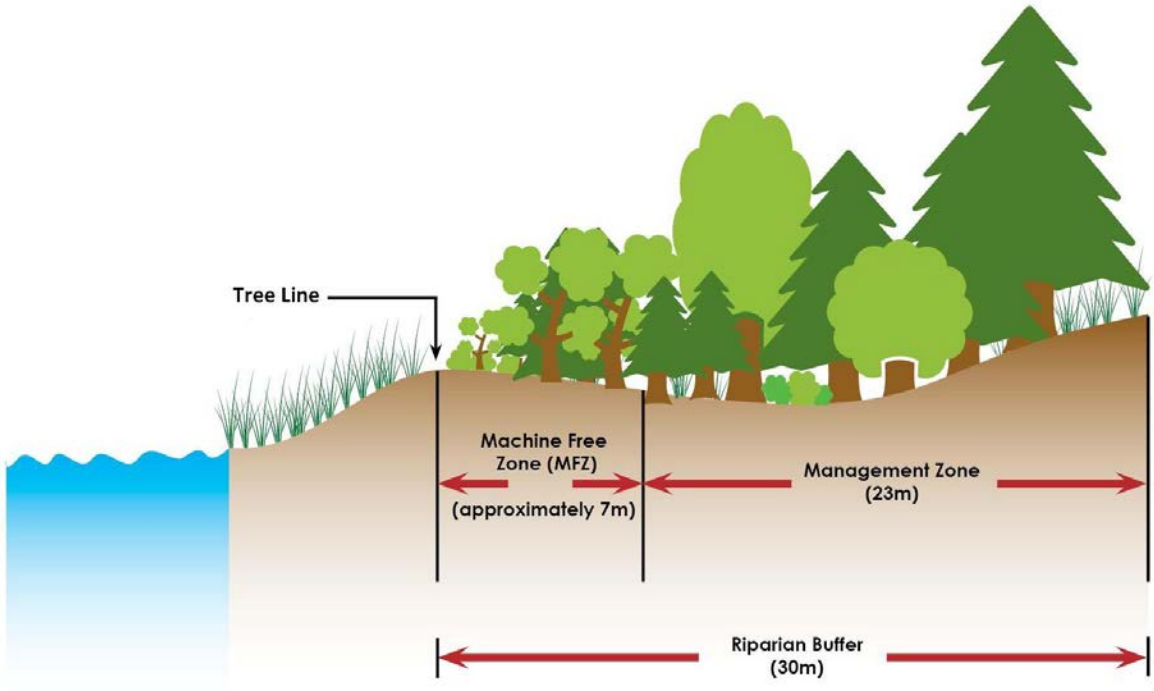


Figure 2-1: Example of Zones in a 30m Riparian Buffer

Riparian Mitigation

Activities associated with project construction pose a low risk to fish habitat. Because of this low level of risk, general mitigation measures will be applied to modify construction of overhead lines, temporary stream crossings, ice bridges and snow fills (Section 5.2). In addition to these general mitigation measures, Contractors will implement setbacks and buffers as indicated on Site-specific information found in the map sheets of the Construction Section Mapbook "Part 2".

Tower Foundations within Riparian Buffers:

In instances where tower placements require tower guy wires be located within a Riparian Buffer, a tracked excavator will be allowed to excavate the anchor foundation while minimizing ground disturbance as much as possible. The excavator must make one trail only and exit on that same trail. Each site where this occurs will be noted by Environmental Inspectors for monitoring by vegetation specialist the following season to determine if any further re-vegetation or rehabilitation is required.

Wildlife and Habitat

Birds and Habitat

Vegetation removal activities such as clearing and ground stripping can be destructive to birds and their habitat, such as tree and ground nests, as well as areas in which they find food (foraging areas). Birds and their habitat are particularly vulnerable during the breeding season when they mate, lay eggs and raise their young, as they are not able to relocate away from areas of disturbance. Migratory birds, such as geese, ducks and songbirds, and their habitat are protected by federal regulation, which prohibits killing, harassing or destroying the nests of these birds.

Potential effects of the project on birds include: mortality, habitat alteration and fragmentation, sensory disturbance, and disruption of movements. Increases in bird mortality can occur in a variety of forms including collisions with transmission wires and construction vehicles, electrocutions, increased predation and hunting. Bird-wire strikes are one of the most common causes of mortality for birds, particularly birds with short wings and large body masses. Collisions with wires are more likely over or near open water, the risk of collision would likely be greatest near rivers. As mitigation, bird diverters or aerial markers may be installed in high bird traffic areas.

Should construction activities be required breeding bird timing windows (see timing windows Appendix M) please refer to the General Mitigation Approach for Reducing Risk to Nesting Birds found as Appendix L. This decision tree will help to apply the appropriate approach and direct mitigation measures found in Appendices M-R. These documents will aid in identifying the level of disturbance, the breeding bird timing windows that apply, nest sweep and reporting procedures as well as what size a buffer is appropriate for each species identified. Through this process, Manitoba Hydro and its contractors will reduce the effects to birds and continue to meet regulatory compliance requirements and commitments to the public.

Reptiles/Amphibians

Areas where reptiles and amphibians, such as salamanders, skinks, frogs, and toads, mate and lay eggs (i.e., breed) are sensitive to ground disturbance. Heavy equipment traffic and ground clearing activities that coincide with breeding activities can have a measurable effect on local populations. Further, Manitoba is home to unique and endangered reptiles and amphibians, such as skinks (a lizard found primarily in the Spruce Woods region) and northern leopard frog (found throughout the province) that are protected by legislation and policy.
Potential Project effects on northern leopard frog and common snapping turtle during construction include habitat loss and alteration, which are threats to these populations. As these species are mainly found in riparian areas near large rivers, bodies of water or productive marshes, no habitat effects are anticipated with mitigation such as riparian buffers.

Mortality could increase in the Project Study Area during construction due to increased road traffic. Northern leopard frogs are particularly susceptible to road mortality during migration and dispersal. The majority of clearing and construction will occur in winter, low mortality effects are anticipated.

Mammals

Large-bodied mammals, such as caribou and moose, are considered sensitive to disturbance. Sensory disturbance from construction activity could result in a temporary loss of effective habitat and disruption of movement, as individuals will likely avoid the construction zone. The breeding grounds and habitat that support these species are important to maintaining their populations, which may be in decline. Provincial and federal regulation protects species that are considered rare or endangered and their habitat from disturbance. The risk of wildlife-vehicle collisions could increase due to a greater volume of traffic on roadways, increasing mortality of some mammal species, particularly larger ones such as white-tailed deer and moose. The right-of-way and access trails could facilitate movement and increase hunting efficiency for gray wolves and for other predators.

Agriculture

Agricultural Biosecurity

Manitoba Hydro's Agricultural Biosecurity Policy

Manitoba Hydro's Agricultural Biosecurity Policy was created to prevent the introduction and spread of disease, pests and invasive plant species in agricultural land and livestock operations. Manitoba Hydro employees and contractors will follow this corporate policy and the Transmission Business Unit Agricultural Biosecurity Standard Operating Procedures (SOP) found in Appendix F.

Manitoba Hydro staff and contractors have the potential to impact agricultural biosecurity through construction and/or maintenance activities requiring access to agricultural land. Acknowledging this risk, the purpose of the Agricultural Biosecurity Policy is to ensure that Manitoba Hydro staff and contractors take necessary precautions to protect the health and sustainability of the agricultural sector.

The Transmission SOP and the training associated with it apply to all the employees of Transmission as well as external individuals such as contractors or consultants who conduct work on behalf of the Transmission Business Unit. The SOP also includes procedures to provide guidance and direction to staff and contractors/consultants who may be required to enter agricultural land and the levels of cleaning necessary to reduce the likelihood of transport of invasive species, pests or disease.

Soils and Terrain

Soils

As the basis of natural, medicinal, spiritual and commercial vegetation, soils and their quality are an important part of ecosystem health and human wellbeing. The types of soil considered to be sensitive are topsoil (the thin, nutrient rich surface soil layer), permafrost (soil that remains frozen for more than one year) and soils susceptible to wind erosion. Soils are generally sensitive to loss by erosion or mixing with less suitable soils and quality degradation from compaction. In areas containing permafrost soils, compaction can impact their natural insulation causing the soil to become unstable. During construction, soil compaction and rutting can result from the movement of vehicles and equipment, storage of materials, and assembly and erection of towers. Effects of soil compaction and rutting can be mitigated by managing equipment traffic routes and activities for clearing of the transmission right-of-way (ROW), and installation of transmission towers to minimize the impact. Existing access routes are planned to be utilized wherever possible to avoid disturbing new areas.

Encountering Unexpected Contamination

Manitoba Hydro considers any of its electrical stations as potentially containing contaminated soils and/or groundwater; subsequently, there is potential to encounter contamination during construction activities. Contamination at Manitoba Hydro Stations may have resulted from historical spills or leaks of fuels, oils, lubricants, and coolants. Manitoba Hydro may conduct environmental site assessments at a Station any prior to construction to determine if contamination exists within the construction footprint. If contamination exists, Remedial Action Plans will be prepared.

There is also potential to encounter non-Manitoba Hydro owned sites that may contain contaminated soils and/or groundwater; however, due to the majority of Project routing transecting agricultural lands, the potential is low.

Please see Appendix G (Guidance for Contaminated Soils or Groundwater Identification and Disposal) for more info.

Terrain

Terrain refers to the surface form/shape of the land. Slopes that are steep and/or unstable are sensitive to becoming eroded and losing material if disturbed. These slopes often occur in riparian areas adjacent to streams where the eroded materials can affect the fish habitat and water quality. Other sensitive terrain features are landforms that are unique compared to the surrounding area. Being unique, these features often support a diversity of soils, plants and wildlife not found in the surrounding area. Unique terrain features are sensitive as they may be impaired or lost if disturbed or removed.

Cultural

Heritage

Archaeological sites, or sites where historic and pre-historic artifacts of human activity are found, are sensitive to disturbance and loss from ground disturbance activities, such as clearing and excavation. Artifacts may include tools and objects, such as arrowheads, pottery shards or bottles, or burial sites and human remains. These sites and objects are protected under legislation as a part of our common heritage. Manitoba Hydro is committed to protecting and preserving the environment including, cultural landscapes, and heritage resources affected by the Project. Sites identified as having spiritual or cultural importance through an ongoing First Nations and Metis Engagement Process (FNMEP) or other communications are considered sensitive to disturbance and should be respected for the values they have to communities.

The Cultural and Heritage Resources Protection Plan (CHRPP) is part of the Environmental Protection Program is found as an additional standalone document. The CHRPP sets out Manitoba Hydro's commitment to safeguard cultural and heritage resources and appropriately handle human remains or cultural and heritage resources discovered or disturbed during the construction of the project.

Access

Existing intersections, such as those for trails, provincial trunk highways (PTHs), provincial roads (PRs) and railways, are considered sensitive to change or conflicting land uses. As a fixed component of the larger transportation network, intersections are difficult to close or relocate. Use of trails is important for both recreational, commercial and subsistence hunters, gatherers and trappers. Ensuring there is safe access to these trails is important to minimize effects on resource users. In conjunction with mitigation measures a standalone document called the "access management plan" (AMP) has been developed to safeguard and support the preservation of environmental, socio-economic, cultural and heritage values within the Projects' area of direct impact in the creation of new access.

3.0 ENVIRONMENTAL PROTECTION PLAN ORIENTATION AND AWARENESS

Pre-Job Meeting (environmental component)

A pre-job meeting will be held between the Contractor (senior project staff including construction supervisors, environmental/safety officer) and Manitoba Hydro (senior staff including Project Engineer or designate, the Senior Environmental Assessment Officer, Construction Supervisor and the Environmental Inspector).

The environmental portion of this meeting will include the following:

- A review of Manitoba Hydro's Environmental Principles and all environmental specifications of the Contract;
- Transfer of further relevant information or precautions that Manitoba Hydro is aware of and which pertain to the job;
- Procedures/requirements for dealing with environmental stop work orders or improvement orders;
- Reporting of environmental incidents and emergencies;
- Documentation needs including the review of all pertinent forms (i.e. job planning form; environmental checklist);
- Requirement to educate/train all Project employees with respect to the requirements of the Construction EnvPP.

The Contractor shall communicate to all field supervisors, subcontractors and work crews the work specifications, environmental requirements and information provided during the pre-job meeting and notify the Senior Environmental Assessment Officer in writing when it has been completed.

Contractor Start-Up Meeting

A pre-work orientation meeting is held by the Contractor with field crews prior to the initiation of work to ensure that they are aware of the environmental requirements of work at that location. Should project conditions dictate a change in work location, another start-up meeting may be convened.

The Contractor is required to ensure minutes, attendance records, and all other pertinent information is recorded and distributed. Manitoba Hydro will attend and if asked could provide an overview of the environmental concerns/ESS.

In situations where a new employee joins the project, it is the responsibility of the Contractor's Environment Officer to ensure that that employee has been provided with the necessary information and/or training related to the environmental aspects of the project. The Contractor will be required to document all instances of new employees to demonstrate that they have received the necessary training.

Weekly Progress Meetings

Senior field staff will meet on a weekly basis to review and discuss progress to date and planned upcoming work. These meetings will also review environmental requirements of the job and environmental precautions necessary. Manitoba Hydro will be responsible for the maintenance of minutes/documents related to these meetings.

Daily Job Planning Meetings

Field crew job planning meetings will be held daily prior to the commencement of any work. The daily job-planning meeting will be used to review environmental requirements of the job and environmental precautions necessary. All job planning meetings, including the environmental content, shall be documented by the Contractor.

4.0 CONTRACTOR-DEVELOPED ENVIRONMENTAL MANAGEMENT PLANS

Construction contractors will be required to develop environmental management plans as part of the Environmental Protection Program for this project component. The frameworks for plans developed by the contractor for the construction period are outlined below:

1. Emergency Preparedness and Response Plan
   - The Contractor shall be responsible to develop and implement a specific Emergency Preparedness and Response Plan for its work. This plan will be included as Appendix H when approved by the Senior Environmental Assessment Officer.
2. Waste and Recycling Management Plan
   - The Contractor shall be responsible to develop and implement a specific Waste and Recycling Management Plan for its work. This plan will be based on the Waste and Recycling Management Plan Framework (Appendix I) and be included as Appendix H when approved by the Senior Environmental Assessment Officer.
3. Erosion and Sediment Control Plan
   - The Contractor shall be responsible to develop and implement site-specific Erosion and Sediment Control Plans for its work. These plans will be based on the Erosion and Sediment Control Plan Framework (Appendix I) and be included as Appendix H when approved by the Senior Environmental Assessment Officer.

5.0 ENVIRONMENTAL MITIGATION REQUIREMENTS

Contractors must follow all mitigation measures identified to protect the environment, including Environmental Sensitive Sites (ESS). Two types of mitigation measures must be followed:

- General Mitigation Measures apply to all Project areas.
- Specific Mitigation Measures apply to individual ESS.

Contractors will need to modify construction activities in accordance with **general mitigation measures (Section 5.2)** and **specific mitigation measures (see detailed maps and specific mitigation in the Construction Section Mapbook "Part 2").**

General Mitigation Requirements

Construction considerations required for all Project areas are considered general mitigation and are applicable to all construction areas. **There is overlap and duplication of mitigation measures amongst the above categories, this allows the user to look up the actions they must perform by different categories.**

The general mitigation measures are provided under the following five categories: 1) Management (MM); 2) Project Activity (PA); 3) Project Component (PC); 4) Environment Component (EC); and 5) Environmental Issue (EI), as follows:

(MM) Management environmental protection measures include management, contractual, administrative and other measures that are common to all environmental protection categories and topics.

(PA) Project Activity environmental protection measures include construction activities that are likely to cause direct environmental effects. Project activities are action words or phrases, that that are carried out during construction of the Project such as drilling, clearing, etc..

(PC) Project Component environmental protection measures relate to major components of the Project. The Project is very large and complex consisting of several major components including transmission lines, converter stations and ground electrode facilities, and involves access trails, stream crossings, construction camps, marshalling yards, etc.

(EC) Environmental Component protection measures include important or vulnerable components of the environment that are subject to environmental effects of the Project. Some environmental components are particularly vulnerable to construction of transmission lines, converter stations, ground electrode facilities and other project components and activities, and warrant separate consideration. Example environmental components include agricultural areas, fish habitat, heritage sites and wetlands.

(EI) Environmental Issue and Topic protection measures include important issues and topics identified for the Project. Environmental issues and topics include emergency response, erosion protection/sediment control, hazardous substances, petroleum products and soil contamination.

General Mitigation Tables

Access Roads and Trails (PC-1)

ID	Mitigation
PC-1.01	Access roads and trails no longer required will be decommissioned and rehabilitated in accordance with the Rehabilitation and Invasive Species Management Plan.
PC-1.02	Access roads and trails required for future monitoring, inspection or maintenance will be maintained in accordance with the Access Management Plan.
PC-1.03	Access roads and trails will be constructed to a minimum length and width to accommodate the safe movement of construction equipment.
PC-1.04	Access roads and trails will be located, constructed, operated and decommissioned in accordance with contract specifications.
PC-1.05	Access roads and trails will be provided with erosion protection and sediment control measures in accordance with the Erosion Protection and Sediment Control Plan.
PC-1.06	All season access roads will not be permitted within established buffer zones and setback distances from waterbodies, wetlands, riparian areas and water bird habitats.
PC-1.07	Approach grades to waterbodies will be minimized to limit disturbance to riparian areas.
PC-1.08	Bypass trails, sensitive sites and buffer areas will be clearly marked prior to clearing, to identify that prescribed selective clearing is to occur as per Map Sheets.
PC-1.09	Contractor will be restricted to established roads and trails, and cleared construction areas in accordance with the Access Management Plan.
PC-1.10	During winter construction, where necessary (i.e. unfrozen wetlands, creeks), equipment will be wide-tracked or equipped with high flotation tires to minimize rutting and limit damage and compaction to surface soils.
PC-1.11	Equipment, machinery and vehicles will only travel on cleared access roads and trails, and will cross waterways at established temporary and permanent crossings.
PC-1.12	Existing access roads, trails or cut lines will be used to the extent possible. Permission to use existing resource roads (i.e. forestry roads (North/South Jonas roads) will be obtained.
PC-1.13	MSD Work Permits will be obtained prior to the commencement of the project.
PC-1.14	No chemical melting agents are to be utilized.
PC-1.15	Only water and approved dust suppression products will be used to control dust on access roads where required. Oil or petroleum products will not be used.
PC-1.16	Public use of decommissioned access routes will be controlled through the Access Management Plan.
PC-1.17	Public use of project controlled access roads and trails during construction will be controlled through the Access Management Plans.
PC-1.18	Routing for access roads and trails should follow natural terrain contours to the extent possible and should be minimized adjacent to and approaching waterbodies.
PC-1.19	Surface water runoff will be directed away from disturbed and erosion prone areas but not directly into waterbodies.
PC-1.20	Vegetation control along access roads and trails will be in accordance with Rehabilitation and Invasive Species Management Plan.
PC-1.23	The Contractor shall check that rock utilized for access road construction does not have acid or alkali generating properties.
PC-1.24	All constructed access points onto Manitoba Infrastructure and Transport (MIT) roadways (Provincial Roads or Provincial Trunk Highways) will require a permit from MIT.
PC-1.25	Heavy equipment will not be allowed access to MIT roadways without the appropriate protection and permits.
PC-1.26	Access Roads and Trails that use or cross MIT roadways care will be taken to ensure excessive amounts of material are not tracked onto the roadway, with contractor being responsible for cleanup.
PC-1.27	Any temporary constructed access within an MIT roadway will need to be removed once the project is completed.
PC-1.28	All works undertaken within the MIT right-of-way (ROW) will adhere to the MIT traffic control policies.

Access Roads and Trails (PC-1)

PC-1.29	Ice Crossings will be constructed and maintained as per Contract specifications. Ice thickness will be checked regularly and posted.
PC-1.30	Required travel off existing roads will be minimized and restricted to previously designated and approved routes.

Agricultural Areas (EC-1) [If applicable]

ID	Mitigation
EC-1.01	All fences and gates will be left in "as-found" condition.
EC-1.02	Any necessary access on agricultural lands will be discussed in advance with the landowner.
EC-1.03	Construction areas and sites will be assessed for compaction and if required will be rehabilitated as per the Rehabilitation and Invasive Species Management Plan prior to returning them to agricultural use.
EC-1.04	Erosion protection and sediment control measures will be established before construction work commences in agricultural areas where necessary.
EC-1.05	Excess construction materials (i.e. waste, granular fill; clay) will be removed from construction sites and areas located on agricultural lands. Area will be restored to pre-existing conditions.
EC-1.06	Existing access to agricultural lands will be utilized to the extent possible.
EC-1.07	Required travel off existing roads will be minimized and restricted to previously designated and approved routes.
EC-1.08	Vehicular travel on agricultural lands will follow existing roads, trails and paths to the extent possible.
EC-1.09	Where access to agricultural land is necessary the Transmission Agricultural Biosecurity Standard Operating Procedure (SOP) must be followed.
EC-1.10	When construction activities take place through agricultural lands drainage patterns are not to be altered, any anticipated diversions of surface water will require authorization under The Water Rights Act. This applies to creating new drainage, blocking natural drainage or diverting flows around a site.

Aircraft Use (EI-1) [If applicable]

ID	Mitigation
EI-1.01	Contractors using aircraft will submit flight plans in advance of flying to the Project Manager or delegate during active construction periods.
EI-1.02	Fuel storage, handling and dispensing at aircraft landing areas will conform to provincial legislation and guidelines.

Blasting and Exploding (PA-1)

ID	Mitigation
PA-1.01	A communication protocol will be developed to notify affected parties of blasting operations and conductor splicing. Affected parties may include Manitoba Sustainable Development, RCMP, municipalities, landowners, and resource users.
PA-1.02	Blasting will be conducted and monitored in accordance with Fisheries and Oceans Canada Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters.
PA-1.03	Blasting will not be permitted around identified caribou calving habitats during calving season (May 1 to June 30).
PA-1.04	Blasting will not be permitted during timing windows established for sensitive bird breeding, nesting and brood rearing months.
PA-1.05	Explosives will be stored, transported and handled in accordance with federal requirements through the Explosives Act and Transportation of Dangerous Goods Act and provincial regulations stated in The Workplace Safety and Health Act.
PA-1.06	Implode Compression conductor splicing will be minimized to extent possible on weekends and after normal working hours in residential areas.
PA-1.07	Quarry blasting operations and conductor splicing will be scheduled to minimize disturbance to wildlife and area residents, and to ensure the safety of workers.
PA-1.08	The Blasting Contractor will be in possession of valid licenses, permits and certificates required for blasting in Manitoba.
PA-1.09	The Blasting Contractor will submit a Blasting Plan to the Construction Supervisor for review and approval prior to commencement of blasting operations.
PA-1.10	Use of ammonium nitrate and fuel oil will not be permitted in or near waterways. Only DFO approved explosives shall be permitted in or near waterways.
PA-1.11	Warning signals will be used to warn all project personnel and the public of safety hazards associated with blasting.
PA-1.12	Written and/or oral notification will be outlined in the Communication Plan prior to each blasting period.
PA-1.15	The Blasting Contractor shall check that blast rock does not have acid or alkali generating properties.

Borrow Pits and Quarries (PC-2)

ID	Mitigation
PC-2.01	Access to abandoned borrow pits and quarries will be managed in accordance with the Access Management Plan.
PC-2.02	All equipment and structures will be removed from borrow pits prior to abandonment.
PC-2.03	Borrow pits and quarries will be designed, constructed and operated in compliance with provincial legislation and guidelines.
PC-2.04	Borrow pits and quarries will not be located within 150 m of a provincial trunk highway or provincial road unless an effective vegetated berm is provided to shield the area from view.
PC-2.05	Borrow pits and quarries will not be located within established buffer zones and setback distances from identified Environmentally Sensitive Sites.
PC-2.06	Drainage water from borrow pits and quarries will be diverted through vegetated areas, existing drainage ditch(s) or employ a means of sediment control prior to entering a waterbody.
PC-2.07	Erosion protection and sediment controls will be put in place before borrow pit excavation commences, when required as determined by the Environmental Inspector.
PC-2.08	Fuel storage will not be permitted near stockpiles outlined in PC 5.21.
PC-2.09	Garbage, debris or refuse will not be discarded into borrow pits and quarries.
PC-2.10	Only water and approved dust suppression products will be used to control dust on access roads where required. Oil or petroleum products will not be used.
PC-2.11	Organic material, topsoil and subsoil with-in borrow pits and quarries will be stripped and stockpiled for use in future site rehabilitation.
PC-2.12	Previously developed borrow sites and quarries will be used to the extent possible before any new sites are developed.
PC-2.13	Signs will be posted at borrow pits and quarries to warn all persons of safety hazards.
PC-2.14	Surface drainage will be redirected away from the borrow pits and quarries before excavation commences.
PC-2.15	Vegetated buffer areas will be left in place when borrow pits are cleared in accordance with provincial guidelines.
PC-2.16	Vegetation control at borrow pits and quarries will be in accordance with the Vegetation Management Plan.
PC-2.17	Vegetation in active Manitoba Hydro permitted borrow pits and quarries will be maintained as per the Rehabilitation and Invasive Species Management Plan.
PC-2.18	Worked out borrow pits and granular quarries will be left with maximum 4:1 (horizontal to vertical) side slopes.
PC-2.24	The Blasting Contractor shall check that blast rock does not have acid or alkali generating properties.
PC-2.25	All stockpiles or spoil piles shall be maintained as to minimize dust associated with wind erosion.
PC-2.26	Vehicles hauling materials to or from the work site that have the potential for fugitive dust emissions should be hauled with the load enclosed by an anchored tarp, plastic or other material.

Built-up and Populated Areas (EC-2) [If applicable]

ID	Mitigation
EC-2.01	Construction activities and equipment will be managed to avoid damage and disturbance to adjacent properties, structures and operations.
EC-2.02	Mud, dust and vehicle emissions will be managed in a manner that ensures safe and continuous public activities near construction sites where applicable.
EC-2.03	Noisy construction activities where noise and vibration may cause disturbance and stress in built-up areas will be limited to daylight hours.
EC-2.04	All stockpiles or spoil piles shall be maintained as to minimize dust associated with wind erosion.
EC-2.05	Vehicles hauling materials to or from the work site that have the potential for dust emissions should be hauled with the load enclosed by an anchored tarp, plastic or other material.

Burning (PA-2)

ID	Mitigation
PA-2.01	All occurrences of uncontrolled burning or fire spreading beyond the debris pile will be reported immediately to Manitoba Hydro.
PA-2.02	Any residue or unburned materials remaining post-burn is not to encumber operations or re-vegetating activities.
PA-2.03	Burning of slash on permafrost soils should be avoided. If it is unavoidable, the utilization of other methods such as a metal container that can be removed from site.
PA-2.04	Burning of solid wastes including kitchen wastes and treated wood will not be permitted.
PA-2.05	Burning will be monitored to ensure that fires are contained and subsequent fire hazards are not present. Post season all burn piles will be scanned for hot spots using infrared scanning technology.
PA-2.06	Burning will not be carried out within riparian buffer zones or setbacks for stream crossings or waterbodies.
PA-2.07	A Burning Permit is required between April 1st and November 15.
PA-2.08	Debris and wood chip piles located near habitation or highways will only be burned when weather conditions are favorable to ensure the safe dispersal of smoke and in accordance with burning permits where applicable.
PA-2.09	Debris piles scheduled for burning will be piled on mineral soils where possible.
PA-2.10	Firefighting equipment required by legislation, guidelines, contract specifications and Work Permits will be kept on site and maintained in serviceable condition during burning.
PA-2.11	Slash will be piled in a manner that allows for clean, efficient burning of all material and on mineral soils where applicable (i.e. permafrost).
PA-2.12	Burning of any material is not permitted on Manitoba Infrastructure and Transport (MIT) roadway ROW's.

Clearing (PA-3)

ID	Mitigation
PA-3.01	Riparian Buffers shall be a minimum of 30m and increase in size based on slope of land entering waterway. (See Riparian Buffer Table in CEnvPP) Within these buffers shrub and herbaceous understory vegetation will be maintained along with trees that do not violate Manitoba Hydro Vegetation Clearance Requirements.
PA-3.02	Access to clearing areas will utilize existing roads and trails to the extent possible.
PA-3.03	All clearing and construction equipment is to remain within the bounds of access routes and the Project footprint identified.
PA-3.04	Areas identified for selective clearing (e.g., buffer zones, sensitive sites) will be flagged prior to clearing.
PA-3.05	Chipped or mulched material may be collected for use in construction areas and sediment/erosion control.
PA-3.07	Cleared trees and woody debris will not be pushed into or adjacent to standing timber, wetlands or waterbodies.
PA-3.08	Clearing activities will be carried out in accordance with contract specifications.
PA-3.09	Clearing and disturbance and equipment use will be limited to the project footprint and associated access routes.
PA-3.10	Clearing is allowed only within the Reduced Risk Time Period for Wildlife illustrated in Appendix D. If clearing within the Sensitive Time Period for Wildlife, further mitigation and approvals would be required.
PA-3.11	Clearing within environmentally sensitive areas, not designated for organic removal will be carried out in a manner that minimizes disturbance to existing organic soil layer.
PA-3.12	Construction vehicles where possible will be wide-tracked or equipped with high floatation tires to minimize rutting and limit damage and compaction to surface soils.
PA-3.13	Construction vehicles, machinery and heavy equipment will not be permitted in designated machine-free zones except at designated crossings.
PA-3.14	Danger trees will be flagged/marked for removal using methods that do not damage soils and adjacent vegetation.
PA-3.15	During clearing Environmentally sensitive sites, along the right of way will be clearly identified by signage or flagging
PA-3.16	In locations where grubbing and vegetation stripping is not required, existing low growth vegetation such as grasses, forbs and shrubs will be maintained to the extent possible; disturbance to roots and adjacent soils will be minimized.
PA-3.17	Machine clearing will remove trees and brush with minimal disturbance to existing organic soil layer using a shear blade "V" or "K-G" type blades, feller-bunchers, hydro ax and other means approved by the Senior Environmental Assessment Officer.
PA-3.18	Property limits, right-of-way boundaries, buffers and sensitive areas (where applicable) will be clearly marked with stakes and/or flagging tape prior to clearing.
PA-3.19	Selective clearing will be carried out in erosion prone areas. Low ground disturbance methods will be employed to minimize soil disturbance.
PA-3.20	Slash piles will be placed at least 15 m from forest stands. Wood may be bucked and piled in rows < 1 m and 2 m from the edge of the ROW, if not being burned.
PA-3.21	Slash piles will not be placed on the surface of frozen waterbodies and will not be located within established setbacks from waterbodies or within the ordinary high water mark.

Clearing (PA-3, Con't)

ID	Mitigation
PA-3.22	If extreme wet weather or insufficient frost conditions results in soil damage from rutting, and soil erosion is resulting in sedimentation of adjacent waterbodies, a stop work order may be issued.
PA-3.23	Trees containing active nests and areas where active animal dens or burrows are encountered will be left undisturbed until unoccupied.
PA-3.24	Trees will be felled toward the middle of rights-of-way or cleared area to avoid damage to standing trees. Trees will not be felled into waterbodies.
PA-3.25	Vegetation will be removed by mechanical means except where other selective clearing methods are stipulated at identified Environmentally Sensitive Sites.
PA-3.26	Where practical, merchantable timber will be salvaged and brought to market. As per Annual Harvest Plan, timber that is not salvaged will be piled and burned/chipped/mulched during frozen conditions in accordance with timing windows, or permit conditions.
PA-3.27	Will not apply herbicides for the purposes of initial clearing of vegetation on the Right of Way.
PA-3.28	If clearing is needed on a Manitoba Infrastructure and Transport (MIT) roadway ROW, clearance must be obtained from MIT in advance.
PA-3.29	When Elm trees are removed the stump must be debarked to the soil line or stump must be grinded or removed to flush or just below the soil line.
PA-3.30	All Elm wood must be immediately disposed onsite by burning/chipping (<5cm) or transported to a designated elm disposal site.
PA-3.31	Storing Elm wood firewood is illegal as it is a major contributing factor to the spread of Dutch Elm Disease.

Concrete Wash Water and Waste (EI-13)

ID	Mitigation
EI-13.01	Wash water and solid waste will not be discharged onto the ground at the project site.
EI-13.02	All concrete solid waste and wash water will be collected and removed from the project site by the concrete supplier or treated on site in an approved settling pond.
EI-13.03	High Density Polyethylene geomembrane liners and either earth or physical berms may be used for a temporary concrete washout for uncured or partially cured concrete.
EI-13.04	All water from chute washing activities will be contained in leak proof containers or in an approved settling pond.
EI-13.05	All water used for wash out purposes and associated activities will be disposed in an appropriately sized settling pond(s) treated to meet turbidity (Total Suspended Solids [TSS]) and pH requirements prior to discharge. Turbidity will be treated by settlement or filtration; pH will be treated by use of acid, dry ice, carbon dioxide gas or other methods.
EI-13.06	All water used for wash out purposes and associated activities will be treated to meet the Manitoba Water Quality Standards, Objectives, and Guidelines (Tier 1) for municipal wastewater effluents of 25 mg/L TSS prior to discharge.
EI-13.07	All water used for wash out purposes and associated activities will be treated to meet the Manitoba Water Quality Standards, Objectives, and Guidelines (Tier 3) for the protection of aquatic life for pH 6.5-9.0, prior to discharge.
EI-13.08	Cured concrete can be disposed of in non-hazardous waste containers and disposed of at a licensed facility.
EI-13.09	Any uncured and partly cured concrete will be kept isolated from watercourses/ditches.
EI-13.10	All grouting activities will adhere to the mitigations stated in EI-13.09 and EI-13.10.

Construction Camps (PC-3) [If applicable]

ID	Mitigation
PC-3.01	A food handling permit will be obtained from the local Public Health Inspector prior to the operation of kitchens.
PC-3.02	Animal-proof garbage containers and electric fencing along with regular removal of food waste to approved waste management facilities will be used to manage food waste in northern and rural areas.
PC-3.03	Construction camp sites will be kept tidy at all times. Waste materials including litter will be collected for disposal.
PC-3.04	Construction camps will be located based on criteria that consider soils, topography, land form type, permafrost, wildlife habitat and other environmental factors.
PC-3.05	Crown land permits will be obtained for construction camps as required.
PC-3.06	Erosion protection, sediment control and drainage management measures will be put in place prior to construction where applicable.
PC-3.07	Feeding or harassment of any wildlife is prohibited.
PC-3.08	Firebreaks will be constructed around camp locations where there is a risk of fire.
PC-3.09	Hunting and harvesting of wildlife by project staff will not be permitted while working on the project sites.
PC-3.10	Liquid and solid sewage wastes held in tanks will be removed in accordance with the solid waste management plan by a licensed contractor and taken to licensed or approved disposal areas.
PC-3.11	Problem wildlife will be reported immediately to the nearest Manitoba Sustainable Development office.
PC-3.12	Propane tanks for camp use will be stored in dedicated, secure areas at a safe distance from kitchen and sleeping quarters in accordance with provincial legislation and national codes.
PC-3.13	Sewage and grey water holding tanks will be sited in accordance with provincial legislation, and federal and provincial guidelines, and a minimum of 100 m from the ordinary high water mark of any waterbody.
PC-3.14	Sewage and grey water will be collected in holding tanks, sullage pits, chemical toilets or pit privies.
PC-3.15	Spill control and clean-up equipment and materials will be provided for construction camps in accordance with the Emergency Preparedness and Response Plan.
PC-3.16	The Environmental Inspector will inspect rehabilitated construction camps in accordance with the site Reclamation Plan to assess the success of re-vegetation and to determine if additional rehabilitation is required.
PC-3.17	Vegetation control at construction camps will be in accordance with the Rehabilitation and Invasive Species Management Plan.
PC-3.18	Waste and recyclables will be removed in accordance with the Waste and Recycling Management Plan to a licensed or approved waste management facilities site and/or recycling facility.
PC-3.19	Food, greases and wastes will be stored in sealed, air-tight containers and managed as per PA-3.2.

Construction Matting (PA-11)

ID	Mitigation
PA-11.01	Verify that mats are clean and free of soil, debris and plant material when they arrive for use on site.
PA-11.02	Mats cannot be constructed of chemically treated wood products.
PA-11.03	Three mats is the maximum number that can be stacked and used in one location.
PA-11.04	Follow the Agricultural Biosecurity Standard Operating Procedure which may dictate washing and disinfecting matting prior to moving it to a new project location.
PA-11.05	Visually inspect mats prior to mobilization to a new project location to ensure that no plants, soil or insects are present.
PA-11.06	Matting should not impede or redirect natural drainage patterns or water courses.
PA-11.07	Mat removal and close out should take place from the existing mat road, working in a backwards fashion.
PA-11.08	When mat removal is complete all matting debris will be cleaned up and removed material will be removed.

Demobilizing and Cleaning Up (PA-4)

ID	Mitigation
PA-4.01	Temporary buildings, structures, trailers, equipment, utilities, waste materials, etc. will be removed from construction areas and sites when work is completed.
PA-4.02	Construction access roads/trails that are no longer required will be decommissioned and rehabilitated to prevent access.
PA-4.03	Construction areas and sites will be rehabilitated and re-vegetated as appropriate immediately after demobilizing and clean-up.
PA-4.04	Construction areas no longer required will be demobilized and rehabilitated in accordance with Rehabilitation and Invasive Species Management Plan and/or provincial regulations (i.e. quarries and borrow sites).
PA-4.05	Petroleum product and other hazardous material storage areas will be cleaned up, assessed and, if necessary, remediated in accordance with provincial guidelines and Manitoba Hydro guidelines.
PA-4.06	Stream crossings and drainages will be left free of obstructions so as not to impede natural runoff.

Directional Drilling (PA-12)

ID	Mitigation
PA-13.1	A written directional drilling execution plan that meets or exceeds the requirements of CSA Z662, current edition will be prepared prior to the start of drilling.
PA-13.2	A frac-out contingency plan will be prepared that includes measures to stop work, contain the drilling mud and prevent its further migration into the watercourse.
PA-13.3	The geotechnical survey of the crossing will be reviewed prior to initiating drilling.
PA-13.4	The drill entry and exit points will be far enough from the banks of the watercourse to have minimal impact on these areas.
PA-13.5	A dugout/settling basin at the drilling exit site will be constructed to contain drilling mud to prevent sediment and other deleterious substances from entering the watercourse. If this cannot be achieved, silt fences or other effective sediment and erosion control measures will be installed to prevent drilling mud from entering the watercourse.
PA-13.6	Excess drilling mud, cuttings and other waste materials will be disposed of at an adequately sized disposal facility located away from the water to prevent it from entering the watercourse.
PA-13.7	The watercourse will be monitored to observe signs of surface migration (frac-out) of drilling mud during all phases of construction.
PA-13.8	Drilling equipment will be set up a minimum of 15 m from the edge of the watercourse; clearing or grading within this 15 m zone will not be permitted.
PA-13.9	When boring through rock, construct sump to handle drilling fluids prior to the start of boring
PA-13.10	Keep all material and equipment needed to contain and clean up drilling mud releases on site and readily accessible in the event of a frac-out.
PA-13.11	In the event of a frac-out, implement the frac-out contingency plan and notify all applicable authorities. Prioritize clean-up activities relative to the risk of potential harm and dispose of the drilling mud in a manner that prevents re-entry into the watercourse.
PA-13.12	Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with preferably native grass or shrubs.
PA-13.13	Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.
PA-13.14	Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.
PA-13.15	When obtaining water from fish bearing waterways all pump intakes will be screened according to the “Freshwater Intake End-of-Pipe Fish Screen Guideline” (DFO 1995).
PA-13.16	Water, to mix the drilling mud, either shall be brought in from off site and stored in tanks at the entry locations or be withdrawn only from streams within the same watershed area where it will be used.
PA-13.17	Water shall not be withdrawn from a watercourse until Manitoba Hydro has secured the proper permits, and they are available onsite during construction.

Draining (PA-5)

ID	Mitigation
PA-5.01	Construction activities shall not block natural drainage patterns.
PA-5.02	Culverts will be installed and maintained in accordance with Manitoba Stream Crossing Guidelines and relevant provincial and municipal acts, regulations and bylaws.
PA-5.03	Dewatering discharges from construction activities will be directed into vegetated areas, existing drainage ditch(s) or a means of sediment control at such a rate that will have adequate flow dissipation at the outlet to ensure it does not cause erosion at the discharge point or at any point downstream.
PA-5.04	Drainage water from construction areas will be diverted through vegetated areas, existing drainage ditch(s) or a means of sediment control prior to entering a waterbody.
PA-5.05	Erosion protection and sediment control will be provided in accordance with the Erosion Protection and Sediment Control Plan.
PA-5.06	Existing, natural drainage patterns and flows will be identified and maintained to the extent possible.
PA-5.07	No debris or slash is allowed to be placed in drainage channels/ditches.
PA-5.14	Flows to Manitoba Infrastructure and Transport (MIT) roadway drains and ditches will not be altered by construction (increased flow, de-watering and other flow effects) without department approval in advance.
PA-5.15	All drainage, natural or manmade that may deposit construction generated sediments on the MIT roadway right-of-way will managed through Erosion and Sediment Control Plans.

Drilling (PA-6)

ID	Mitigation
PA-6.01	Abandoned drill holes will be sealed with bentonite or other effective sealers to prevent interconnection and cross-contamination of ground and surface waters.
PA-6.02	Drilling activities in northern Manitoba will be carried out under frozen ground conditions to minimize damage to surface vegetation, soils and permafrost to the extent possible.
PA-6.03	Drilling equipment and machinery will not be serviced within 100 m of waterbodies or riparian areas.
PA-6.04	Drilling fluids and waste materials will be contained and not allowed to drain into waterbodies, riparian areas or wetlands.
PA-6.05	Drilling in environmentally sensitive sites, features and areas will not be permitted unless approved in advance by Environmental Inspector and mitigation measures are implemented.
PA-6.07	Drilling will not be permitted within established buffer zones and setback distances from waterbodies.
PA-6.08	Spill control and clean-up equipment will be provided at all drilling locations.
PA-6.09	The drilling contractor will ensure that equipment and materials are available on site for sealing drill holes.
PA-6.10	The drilling contractor will inspect drilling equipment and machinery for fuel and oil leaks prior to arrival at the project site, and will inspect for fuel and oil leaks and spills regularly.
PA-6.11	Where there is potential for mixing of surface and groundwater, precautions will be taken to prevent the interconnection of these waters.

Emergency Response (EI-2)

ID	Mitigation
EI-2.01	All fires will be reported in accordance with fire reporting procedures in the Emergency Preparedness and Response Plan.
EI-2.02	All spills at construction sites will be reported in accordance with provincial legislation and guidelines, and Manitoba Hydro Guidelines.
EI-2.03	All vehicles hauling petroleum products will carry spill containment and clean-up equipment.
EI-2.04	Clean-up and the disposal of contaminated materials will be managed in accordance with provincial guidelines and Manitoba Hydro guidelines.
EI-2.05	Emergency Preparedness and Response Plans and procedures will be communicated to all project staff and a copy will be made available at the project site.
EI-2.06	Emergency spill response and clean-up materials and equipment will be available at construction sites, marshaling yards, fuel storage facilities and standby locations.
EI-2.07	Fire extinguishers will be mounted on buildings at locations where they will be most readily accessible. Safety Officers will conduct annual inspections of fire extinguishers.
EI-2.08	Orientation for Contractor and Manitoba Hydro employees working in construction areas will include emergency response awareness.
EI-2.09	Post audit assessments will be carried out for all major spills and fires reported to ensure that procedures are followed and plans remain effective.
EI-2.10	Project emergency response and evacuation procedures in the Emergency Preparedness and Response Plan will be adhered to in the event of forest fires.
EI-2.11	Reasonable precautions will be taken to prevent fuel, lubricant, fluids or other products from being spilled during equipment operation, fuelling and servicing.
EI-2.12	Spill response and clean up equipment will be available for responding to releases for a site location.
EI-2.13	Temporary construction camps will have a designated fire marshal in accordance with the Emergency Preparedness and Response Plan.
EI-2.14	The Emergency Preparedness and Response Plan will be prepared by the Contractor, approved by the Construction Supervisor/Site Manager prior to construction and updated annually.
EI-2.15	The Manitoba Hydro hazardous materials incident report form will be completed when reporting a spill.
EI-2.16	The on-site Emergency Spill Response Coordinator will be notified of hazardous substance releases immediately in accordance with the Emergency Preparedness and Response Plan.

Erosion Protection and Sediment Control (EI-3)

ID	Mitigation
EI-3.01	Accumulated sediment will be removed from silt fences and other barriers in accordance with the Erosion Protection and Sediment Control Plan to ensure proper functioning.
EI-3.02	Construction activities will be suspended during extreme wet weather events where erosion protection and sediment control measures are compromised.
EI-3.03	Contractor specific Erosion Protection and Sediment Control Plans will be prepared by the Contractor, accepted by Manitoba Hydro prior to construction and updated annually.
EI-3.04	Erosion protection and sediment control installations will only be removed after disturbed areas are protected and sediments are disposed of in accordance with Erosion Protection and Sediment Control Plan.
EI-3.05	Erosion protection and sediment control measures will be left in place and maintained until either natural vegetation or permanent measures are established.
EI-3.06	Erosion protection and sediment control measures will be put in place prior to commencement of construction activities and will remain intact for the duration of the project.
EI-3.07	Orientation for Contractor and Manitoba Hydro employees working in construction areas will include erosion protection and sediment control techniques and procedures.
EI-3.08	The Contractor will be responsible for developing. implementing and maintaining Erosion Protection and Sediment Control Plans and procedures be put in place prior to commencement of construction activities.
EI-3.09	The Contractor will be responsible for modifying erosion protection and sediment control installations to ensure continued effectiveness.
EI-3.10	The Contractor will communicate erosion protection and sediment control information to all project staff and a copy will be made available at the project site.
EI-3.11	The Environmental Inspector will make regular inspections of erosion protection and sediment control measures to confirm implementation and continued effectiveness.

Fish Protection (EC-3)

ID	Mitigation
EC-3.01	When a work, undertaking or activity results in the deposit of a deleterious substance or creates the potential for such a deposit, Manitoba Hydro has a requirement to advise DFO of the situation
EC-3.02	Disturbances to waterbodies, shorelines, riparian areas, etc. will be rehabilitated immediately upon completion of construction activities.
EC-3.03	Erosion protection and sediment control measures will be put in place at all project locations where surface drainage is likely to flow into fish bearing waters.
EC-3.04	Fish and fish habitat will be protected in accordance with federal legislation and federal and provincial guidelines.
EC-3.05	Sustainable Development and Oceans Canada (DFO) will be notified if beaver dams must be cleared along rights-of-ways and along access roads and trails. A Beaver Dam Clearing Permit is required by Manitoba Sustainable Development.
EC-3.06	Project personnel will be prohibited from fishing at project locations or along rights-of-way.
EC-3.07	When drawing water, ensure any pump intakes are appropriately screened with a large cylindrical or box-type screens to prevent harm to fish.
EC-3.08	The withdrawal of any water will not result in reduction in the wetted width of a stream, in order to maintain existing fish habitat

Grading (PA-7)

ID	Mitigation
PA-7.01	A thick gravel layer (1.2 m) or compacted snow layer (0.6 m) will be used in temporary workspaces or marshaling yards located in permafrost areas where required to prevent damage to surface materials.
PA-7.02	Grading for gravel pads for construction areas and access roads will be limited to areas where it is needed for the safe and efficient operation of vehicles, machinery and construction equipment.
PA-7.03	Grading for site rehabilitation and restoration will be in accordance with the Rehabilitation and Invasive Species Management Plan.
PA-7.04	Grading will not be permitted within established buffer zones and setback distances from waterbodies.
PA-7.05	Grading will only be permitted within rights-of-ways and construction areas.
PA-7.06	Gravel pads will be graded so the surface runoff is directed away from waterbodies, riparian areas and wetlands.
PA-7.07	Required erosion protection and sediment control measures will be put in place prior to grading in accordance with the Erosion Protection and Sediment Control Plan.

Groundwater (EC-4)

ID	Mitigation
EC-4.01	Potable water samples will be collected every two weeks and submitted for analysis according to provincial sampling and analysis protocol.
EC-4.02	Well locations will be marked with flagging tape prior to construction.
EC-4.03	Where there is potential for mixing of surface and groundwater, precautions will be taken to prevent the interconnection of these waters.

Grubbing (PA-8)

ID	Mitigation
PA-8.01	Construction areas containing soil with high silt content, artesian springs or areas of previous erosion will receive special erosion protection and sediment control techniques.
PA-8.02	Construction areas requiring extensive grubbing will be stabilized as soon as possible to minimize erosion.
PA-8.03	Grubbing will be halted during heavy precipitation events when working in areas of finely textured soils.
PA-8.04	Grubbing will not be permitted within 2 m of standing timber to prevent damage to root systems and to limit the occurrence of blow down.
PA-8.05	Grubbing will not be permitted within established buffer zones and setback distances from waterbodies.
PA-8.06	Stockpiled materials from grubbing will not block natural drainage patterns.
PA-8.07	Unless required for the work, the extent of grubbing will be minimized to the extent possible.
PA-8.08	When not under frozen conditions, erosion protection and sediment control measures will be put in place prior to grubbing in accordance with the Erosion Protection and Sediment Control Plan.
PA-8.09	Windrows of grubbed materials will be piled at least 15 m from standing timber.
PA-8.10	If grubbing is needed on a Manitoba Infrastructure and Transport roadway (MIT) right-of-way, clearance must be obtained from MIT in advance.

Hazardous Materials (EI-4)

ID	Mitigation
EI-4.01	A Contractor specific Hazardous Substances Management Plan will be prepared by the Contractor, approved by the Construction Supervisor/Site Manager prior to construction and updated annually.
EI-4.02	Access to hazardous materials storage areas will be restricted to authorized and trained Contractor and Manitoba Hydro personnel.
EI-4.03	An inventory of WHMIS controlled substances will be prepared by the Contractor and maintained at each project site and updated as required by provincial legislation.
EI-4.04	Bulk waste oil will be stored in approved aboveground tanks provided with secondary containment in accordance with provincial legislation.
EI-4.05	Containers of hazardous materials stored outside will be labeled, weatherproof, placed on spill containment pallets and covered by a weatherproof tarp.
EI-4.06	Contractor personnel will be trained and certified in the handling of hazardous materials including emergency response procedures in accordance with provincial legislation.
EI-4.07	Contractor personnel will receive WHMIS training in accordance with provincial legislation.
EI-4.08	Controlled substances will be labeled in accordance with WHMIS requirements. Required documentation will be displayed and current Materials Safety Data Sheets will be available at each project site in accordance with the Hazardous Substances Management Plan.
EI-4.09	Empty hazardous waste containers will be removed to a licensed or approved disposal site by the contractor.
EI-4.10	Hazardous materials storage sites will be secured, and signs will be posted that include hazard warnings, contacts in case of a release, access restrictions and under whose authority the access is restricted.
EI-4.11	Hazardous materials will be adequately contained and will be protected from wind and rain to prevent deposition of fine particles or dust into watercourses through runoff.
EI-4.12	Hazardous materials and WHMIS inventories will be completed prior to construction. Inventories will be updated in accordance with regulatory requirements and Manitoba Hydro policies.
EI-4.13	Hazardous substances management procedures will be communicated to all project staff and a copy will be made available at the project site.
EI-4.14	Hazardous substances storage areas including coke materials for ground electrode facilities will be located a minimum of 100 m from the ordinary high water mark of a waterway and above the 100-year flood level.
EI-4.15	Hazardous substances will be transported, stored and handled according to the procedures prescribed by provincial legislation and at a minimum follow Manitoba Hydro policies.
EI-4.16	Hazardous waste materials will be segregated and stored by type.
EI-4.17	Indoor storage of flammable and combustible substances will be in fire resistant and vented enclosed storage area or building in accordance with national codes and standards.
EI-4.19	Non-hazardous products will be used in place of hazardous substances to the extent possible.
EI-4.20	Orientation for Contractor and Manitoba Hydro employees working in construction areas will include hazardous substance awareness.
EI-4.21	Pesticide storage will be in accordance with provincial legislation and Manitoba Hydro guidelines.
EI-4.22	The Contractor will be responsible for the safe use, handling, storage and disposal of hazardous materials including waste as well as procedures for emergency conditions in accordance with provincial and federal legislation and standards.
EI-4.23	The Contractor will monitor containers of hazardous substance containers regularly for leaks and to ensure that labels are displayed.
EI-4.24	The Environmental Inspector will make routine inspections of hazardous substance storage sites to ensure that environmental protection measures are implemented and effective.
EI-4.25	Waste oil will be transported by licensed carriers to licensed or approved waste oil recycling facilities.
EI-4.26	Wet batteries will be stored and transported to licensed or approved waste recycling facilities.
EI-4.27	During frozen ground conditions hazardous waste can be stored temporarily for 60 days and only 30 days during non-frozen ground conditions before removal to a licensed or approved disposal site.

Heritage Resources (EC-5)

ID	Mitigation
EC-5.01	All archaeological finds discovered during site preparation and construction will be left in their original position until the Project Archaeologist is contacted and provides instruction.
EC-5.02	Construction activities will not be carried out within established buffer zones for heritage resources except as approved by Project Archaeologist.
EC-5.03	Environmental protection measures for heritage resources will be reviewed with the Contractor and employees prior to commencement of any construction activities.
EC-5.04	Orientation for project staff working in construction areas will include heritage resource awareness and training including the nature of heritage resources and the management of any resources encountered.
EC-5.05	Orientation information will include typical heritage resource materials and reporting procedures.
EC-5.06	The Contractor will report heritage resource materials immediately to the Construction Supervisor will cease construction activities in the immediate vicinity until the Project Archaeologist is contacted and prescribes instruction.
EC-5.07	The Culture and Heritage Resource Protection Plan will be adhered to during preconstruction and construction activities.
EC-5.08	The Environmental Inspector will inspect borrow pits and other excavations regularly for the presence of heritage resource materials.

Management Measures (MM)

ID	Mitigation
MM-01	All licenses, permits, contracts, project specifications, guidelines and other applicable documents will be obtained and in the possession of both the Contractor and Manitoba Hydro prior to commencement of work.
MM-02	All project participants will ensure that project activities are carried out in compliance with applicable legislation, guidelines and, contractual obligations and environmental protection plan provisions.
MM-03	Environmental concerns will be identified and discussed at planning meetings on an as required basis.
MM-04	Manitoba Hydro will notify First Nation and Metis leadership of active construction schedules, to the extent possible, so that they can inform their members to reduce effects on hunting and gathering activities.
MM-05	Manitoba Hydro will contact local municipal authorities prior to project start-up.
MM-06	Manitoba Hydro will contact local resource users, lodge operators, outfitters and recreational resource users and associations to the extent feasible and practical prior to project start-up.
MM-07	Manitoba Hydro will contact Manitoba Sustainable Development and Forest Management Licence Holders prior to clearing regarding timber use opportunities.
MM-08	Manitoba Hydro will meet the Contractor at the beginning of each new contract to review environmental protection requirements including mitigation measures, inspections and reporting.
MM-11	Project construction update meetings will be held weekly for the ongoing review of environmental and safety issues.
MM-12	Relevant documents including licenses, permits, approvals, legislation, guidelines, environmental protection plans, orthophotos maps, etc. will be made available to all project participants.
MM-13	Response to enforcement actions by regulatory authorities will be in accordance with Manitoba Hydro policy P602.
MM-14	The Contractor will obtain all licenses, permits, contracts and approvals other than those that are Manitoba Hydro's responsibility prior to project start-up.
MM-15	The Contractor will review terms and conditions of all authorizations, contract specifications, agreements, etc. prior to project start-up or as authorization are acquired and will discuss any questions or concerns with Manitoba Hydro.
MM-16	During construction activities the contractor must provide Manitoba Hydro representatives with full and unrestricted access to the ROW and all project related work areas so that inspections can occur

Marshalling Yards (PC-5) [If applicable]

ID	Mitigation
PC-5.01	Contractor employees responsible for receipt and distribution of hazardous substances will be trained in handling and transportation of dangerous goods, and WHMIS.
PC-5.02	Emergency Preparedness and Response Plan and procedures for marshalling yards will be developed.
PC-5.03	Erosion protection, sediment control and drainage management measures will be put in place prior to construction.
PC-5.04	Fire breaks will be established a minimum of 6 meters around marshalling yards in areas where there is a risk of fire.
PC-5.05	Garbage and debris will be stored in approved containers, sorted for recycling and disposed of at a licensed or approved Waste Management Facilities site.
PC-5.06	Hazardous materials entering and leaving the marshalling yards will be inventoried and accounted for.
PC-5.07	Hazardous materials will be stored in accordance with provincial legislation, and provincial and national codes and standards.
PC-5.08	Marshalling yards will be located based on criteria that consider soils, topography, land form type, permafrost, wildlife habitat and other environmental factors.
PC-5.09	Marshalling yards will be located in existing clearings or natural openings.
PC-5.10	Marshalling yards will be located, constructed, operated and decommissioned in accordance with contact specifications and in accordance with the Rehabilitation and Invasive Species Management Plan.
PC-5.11	Once marshalling yards are no longer required, structures, equipment, materials, fences, etc. will be dismantled and moved to storage or a new location.
PC-5.12	Organic material, topsoil and sub-soil stripped during site preparation will be stockpiled separately for later use in site rehabilitation.
PC-5.13	Petroleum products will only be stored, handled and dispensed in designated areas within marshalling yards in accordance with provincial legislation and guidelines.
PC-5.14	Spill control and clean-up equipment to be located at designated areas within marshalling yards.
PC-5.16	Vegetation control at marshalling yards will be in accordance with Rehabilitation and Invasive Species Management Plan.
PC-5.17	Vehicle, machinery and equipment maintenance and repairs will be carried out in designated areas within marshalling yards.
PC-5.18	Hazardous waste materials, fuel containers and other materials will be stored in approved containers and transported to licensed or approved waste management facilities by a licensed carrier.
PC-5.19	Welding mats will be used to minimize the risk of fire.

Permafrost (EC-6) [If applicable]

ID	Mitigation
EC-6.01	Alterations to natural drainage patterns by rutting and scouring of surface materials in permafrost areas will be avoided to the extent possible.
EC-6.02	Construction activities in northern Manitoba will normally occur under frozen ground conditions during established timing windows to minimize disturbance and rutting.
EC-6.06	Environmental protection measures for permafrost areas located in site specific mitigation tables and maps will be reviewed with the Contractor and employees prior to commencement of any construction activities as well as the methods used to achieve them.
EC-6.07	Excavations of permafrost areas in northern Manitoba will be minimized to the extent possible.
EC-6.08	Permafrost areas in northern Manitoba will be identified and mapped in advance of project construction activities.
EC-6.09	Clearing activities will ensure that the top layer of vegetation and organic materials will be retained as an insulating layer in permafrost areas (i.e. no clearing down to the organic layer will be allowed).

Petroleum Products (EI-5)

ID	Mitigation
EI-5.01	Aboveground tanks will be equipped with overfill protection, spill containment and collision protection as per legislation.
EI-5.02	All aboveground petroleum product tanks with a capacity greater than 5,000 L will be registered with Manitoba Sustainable Development and have a valid operating permit.
EI-5.03	Construction, installation or removal of petroleum product storage tank systems will only occur under the supervision of a registered licensed petroleum technician.
EI-5.04	Containment measures, such as secondary containment (i.e., berms) will be used at all locations where stationary equipment is used.
EI-5.05	Contractors will inspect all mobile and stationary equipment using petroleum products on a regular basis to ensure that measures are taken immediately to stop any leakage discovered.
EI-5.06	Fuelling of equipment or portable storage tanks will be a minimum of 100 m from the ordinary high water mark of any waterbody.
EI-5.07	Fuelling operations require the operator to visually observe the process 100% of the time.
EI-5.08	Containment areas (berms/dykes/trays, etc.) will be dewatered after rainfall events and the containment water disposed of as specified in contract specifications.
EI-5.09	Once petroleum product storage areas are no longer required, a Phase I and where required a Phase II Environmental Site Assessment will be carried out to determine if remediation is required in accordance with national standards.
EI-5.10	Only approved aboveground petroleum storage tanks will be used during the construction phase of the project. No underground tanks will be permitted.
EI-5.11	Orientation for Contractor and Manitoba Hydro employees working in construction areas will include petroleum product storage and handling awareness.
EI-5.12	Petroleum product dispensing systems will be secured and locked by authorized personnel when not in use by authorized personnel.
EI-5.13	Petroleum product inventories will be taken weekly by the owner/operator on all aboveground tanks greater than 5,000 L and retained for inspection by Manitoba Hydro or Manitoba Sustainable Development upon request.
EI-5.14	Petroleum product storage containers in excess of 230 L will be located on level ground and will incorporate secondary containment with a capacity of 110% of the largest container volume. Water collected in the containment shall be removed regularly so as not to diminish the capacity of the containment.
EI-5.15	Petroleum product storage sites and mobile transportation units will be equipped with fire suppressant equipment and products.
EI-5.16	Petroleum product storage tanks will be fit with appropriate collision protection as per legislation.
EI-5.17	Petroleum product storage will be located a minimum of 100 m from the ordinary high water mark of waterbodies, riparian areas or wetlands.
EI-5.18	Petroleum products stored outside will be in waterproof and labeled containers, placed on spill containment pallets.
EI-5.20	Petroleum products will display required signage, placards and labeling, and will be transported, handled and stored in accordance with provincial legislation.
EI-5.21	Petroleum products will only be stored and handled within designated areas at construction camps and marshalling yards.
EI-5.22	Portable petroleum product storage containers will be placed on spill trays with a capacity of 110% of the largest container when not in use. Water collected in the containment shall be removed regularly so as not to diminish the capacity of the containment.
EI-5.23	Slip tanks and barrels will be securely fastened to the vehicle during transport and fuelling operations.
EI-5.24	Spill control and clean-up equipment and materials will be available at all petroleum product storage and dispensing locations.
EI-5.25	Spill trays will remain impervious at very low temperatures (-45 °C) and have accumulated precipitation removed regularly.

Petroleum Products (EI-5)

EI-5.26	The Contractor will be responsible for the safe use, handling, storage and disposal of petroleum products including waste as well as procedures for emergency conditions in accordance with provincial and federal legislation and standards.
EI-5.27	The Contractor will inspect all petroleum product storage tanks and containers regularly for leaks, and product inventories will be recorded and retained for inspection by Manitoba Hydro and Manitoba Sustainable Development.
EI-5.28	There will be no ignition sources in and adjacent to petroleum product storage areas.
EI-5.29	Transfer of petroleum products between storage areas and work sites will not exceed daily requirements and will be in accordance with provincial legislation and guidelines.
EI-5.30	Used petroleum products (including empty containers) will be collected and transported to a licensed oil recycling facility in approved storage containers.
EI-5.31	Vehicles hauling petroleum products will carry equipment and materials for emergency spill containment and clean-up.
EI-5.32	Warning signs will be posted in visible locations around petroleum product storage areas. Signs will indicate hazard warning, contact in case of a spill, access restrictions and authority.
EI-5.33	All slip tanks are to have a double walled design.

Potable Water (EI-11)

ID	Mitigation
EI-11.01	Drinking water holding tanks will be designed for potable water containment.
EI-11.02	Drinking water holding tanks will be cleaned and disinfected before use.
EI-11.03	Potable water used to fill the drinking water holding tanks will be in compliance with federal legislation.
EI-11.04	Potable water will be conserved by personnel at the site.
EI-11.05	Leaking fixtures will be repaired in a timely manner.

Rehabilitating and Re-vegetation (PA-9)

ID	Mitigation
PA-9.01	Construction areas no longer required will be re-contoured, stabilized, re-vegetated and restored to near natural conditions in accordance with Rehabilitation and Invasive Species Management Plan.
PA-9.02	Natural re-vegetation will be allowed to occur although active rehabilitation programs may be required at specific sites where erosion warrants seeding or planting.
PA-9.03	Organic material, topsoil and subsoil stripped from construction areas will be stockpiled and protected to be used for future site rehabilitation.
PA-9.04	Rehabilitation of construction areas will incorporate erosion protection and sediment control measures in accordance with the Erosion and Sediment Control Plan as required.
PA-9.05	Rehabilitation Plans will include objectives for restoration of natural conditions, erosion protection, sediment control, non-native and invasive plant species management, wildlife habitat restoration and restoration of aesthetic values as required.
PA-9.06	Where appropriate, regional native grass mixtures will be used to assist re-vegetation of disturbed areas to control erosion or prevent invasion of non-native species. The mixtures will not contain non-native or invasive species.

Rights-of-Way (PC-8)

ID	Mitigation
PC-8.01	Access to transmission line rights-of-way for clearing and construction will utilize existing roads and trails to the extent possible.
PC-8.02	Access to transmission line rights-of-way will be closed, signed and/or controlled in accordance with an Access Management Plan.
PC-8.03	Additional clearing outside established rights-of-way is subject to MCWS approval
PC-8.04	Clearing and disturbance will be limited to defined rights-of-way and associated access routes to the extent possible.
PC-8.05	Clearing of rights-of-way will occur under frozen or dry ground conditions during established timing windows to minimize rutting and erosion where applicable.
PC-8.06	Construction vehicles will be wide-tracked or equipped with high floatation tires to minimize rutting and limit damage and compaction to surface soils.
PC-8.07	Disturbed areas along transmission line rights-of-way will be rehabilitated in accordance with site Rehabilitation and Invasive Species Management Plan.
PC-8.08	Environmentally sensitive sites, features and areas will be identified and mapped prior to clearing.
PC-8.09	In situations where the ROW doesn't have completely frozen or dry ground conditions alternate products such as construction mats may be used as per the Contract Specifications.

Safety and Health (EI-6)

ID	Mitigation
EI-6.01	Orientation for Contractor and Manitoba Hydro employees working in construction areas will include safety and health awareness.
EI-6.02	Safety and health information will be posted at each project location and made available to all project personnel.
EI-6.03	Workplace safety and health committees will be established and safety meetings will be held as required by provincial legislation and Manitoba Hydro guidelines at all project locations.

Soil Contamination (EI-7)

ID	Mitigation
EI-7.01	A closure report will be prepared for completed remediation projects in accordance with provincial and Manitoba Hydro guidelines.
EI-7.02	A Remediation Plan will be prepared by the Contractor for sites contaminated by project activities and will remediate soils according to provincial standards.
EI-7.03	All spills and releases reported will be responded to in accordance with provincial legislation and guidelines and Manitoba Hydro guidelines.
EI-7.04	Any contaminated soil treatment areas must be designed and constructed to contain surface runoff and prevent leaching to soil and groundwater.
EI-7.05	Contractor personnel will take all reasonable steps to prevent soil, groundwater and surface water contamination.
EI-7.06	If contamination is suspected or evident, a Phase II Environmental Site Assessment will be carried out on previously used construction sites following Manitoba Hydro procedures where applicable.
EI-7.07	If laboratory results show that the soil is contaminated the soil must be treated on-site or transported to an approved landfill or land farm for remediation in accordance with a Remediation Plan.
EI-7.08	If laboratory results show that the soil is not contaminated then the soils may be used in accordance with contact specifications.
EI-7.09	Remediation Plans will be prepared by the Contractor and approved by the Construction Supervisor/Site Manager prior to implementation if remediation of contaminated soils is determined to be required.
EI-7.10	The Contractor will assess previously used construction sites for potential contamination following Canadian Standards Association Environmental Site Assessment (CSA Z768- 01 and Z769-00) procedures.
EI-7.11	The Contractor will carry out a CSA Phase II Environmental Site Assessment (CSA Z769-00) at abandoned construction camps, marshalling yards, petroleum product storage and dispensing areas and hazardous substance storage areas if contamination is suspected.
EI-7.12	The Environmental Inspector will inspect contaminated site assessment and remediation work regularly to ensure that environmental protection measures are implemented and effective.

Staging Areas (PC-5)

ID	Mitigation
PC-5.01	Contractor employees responsible for receipt and distribution of hazardous substances will be trained in handling and transportation of dangerous goods, and WHMIS.
PC-5.03	Erosion protection, sediment control and drainage management measures will be put in place prior to construction.
PC-5.04	Fire breaks will be established a minimum of 6 meters around staging and work storage areas where there is a risk of fire.
PC-5.05	Garbage and debris will be stored in approved containers, sorted for recycling and disposed of at a licensed or approved waste management facility site.
PC-5.06	Hazardous materials entering and hazardous wastes leaving the staging and work storage areas will be inventoried and provided to Manitoba Hydro.
PC-5.07	Hazardous materials will be stored in accordance with provincial legislation, and provincial and national codes and standards.
PC-5.08	Staging and work storage areas will be located based on criteria that consider soils, topography, land form type, wildlife habitat and other environmental factors.
PC-5.10	Staging and work storage areas will be located, constructed, operated and decommissioned in accordance with contact specifications and in accordance with the Rehabilitation and Invasive Species Management Plan.
PC-5.11	Once staging and work storage areas are no longer required, structures, equipment, materials, fences, etc. will be dismantled and moved to storage or a new location.
PC-5.12	Organic material, topsoil and sub-soil stripped during site preparation will be stockpiled separately for later use in site rehabilitation.
PC-5.13	Petroleum products will only be stored, handled and dispensed in designated areas within staging and work storage areas in accordance with provincial legislation and guidelines.
PC-5.14	Spill control and clean-up equipment to be located at designated areas within staging and work storage areas.
PC-5.16	Vegetation control at marshalling yards will be in accordance with Rehabilitation and Invasive Species Management Plan.
PC-5.17	Vehicle, machinery and equipment maintenance and repairs will be carried out in designated areas within staging and work storage areas.
PC-5.18	Hazardous waste materials, fuel containers and other materials will be stored in approved containers and transported to licensed or approved waste management facility by a licensed carrier.
PC-5.19	Welding mats will be used to minimize the risk of fire.
PC-5.20	The Site Environmental Officer will inspect rehabilitated staging and work storage areas in accordance with the site Rehabilitation and Vegetation Plan to assess the success of re-vegetation and to determine if additional rehabilitation is required.

Stream Crossings (PC-9)

ID	Mitigation
PC-9.01	Access road crossings will be at right angles to waterbodies to the extent possible.
PC-9.02	Riparian Buffers shall be a minimum of 30m and increase in size based on slope of land entering waterway. (See Riparian Buffer Table in CEnvPP) Within these buffers shrub and herbaceous understory vegetation will be maintained along with trees that do not violate Manitoba Hydro Vegetation Clearance Requirements.
PC-9.03	Construction vehicles, machinery and heavy equipment will not be permitted in designated machine-free zones except at designated crossings.
PC-9.04	Construction of stream crossings will follow the Manitoba Stream Crossing Guidelines For The Protection of Fish and Fish Habitat.
PC-9.05	Ice bridges are constructed of clean (ambient) water, ice and snow and snow fills are constructed of clean snow. Materials such as gravel, rock and loose woody material are NOT used. Crossings do not impede water flow at any time of the year.
PC-9.06	The withdrawal of any water will not exceed 10% of the instantaneous flow, in order to maintain existing fish habitat. Water flow is maintained under the ice, where this naturally occurs, and If water is being pumped from a lake or river to build up the ice bridge, the intakes are sized and adequately screened to prevent debris blockage and fish mortality.
PC-9.07	Where logs are required for use in stabilizing shoreline approaches, they are clean and securely bound together, and they are removed either before or immediately following the spring freshet.
PC-9.08	When the crossing season is over and where it is safe to do so, create a v-notch in the centre of the ice bridge to allow it to melt from the centre and also to prevent blocking fish passage, channel erosion and flooding. Compacted snow and all crossing materials will be removed prior to the spring freshet.
PC-9.09	No logs or woody debris are to be left within the water body or on the banks or shoreline where they can wash back into the water body.
PC-9.10	Grading of the stream banks for the approaches should not occur. Establish a single entry and exit. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage. Disturbance to riparian vegetation is minimized
PC-9.11	Fording should occur under low flow conditions, machinery fording a flowing watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and is to occur only if an existing crossing at another location is not available or practical to use. Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows and not in areas that are known fish spawning sites.
PC-9.12	Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding, the channel width at the crossing site is no greater than 5 metres from ordinary high water mark to ordinary high water mark.

Stripping (PA-10)

ID	Mitigation
PA-10.01	Construction areas containing soil with high silt content, artesian springs or areas of previous erosion will receive special erosion protection and sediment control techniques.
PA-10.02	Erosion protection and sediment control measures will be put in place prior to stripping in accordance with the Erosion and Sediment Control Plan as required.
PA-10.03	In areas of known salinity, excavated or stripped soil will be stored on liners or in designated areas were possible.
PA-10.04	Mineral topsoils and surficial organic materials should be stripped separately from subsoils, segregated, and stockpiled for later use in backfilling, contouring and rehabilitation. Soils should be replaced in the reverse order to which they were removed.
PA-10.05	Stockpiled materials from stripping will not block natural drainage patterns.
PA-10.06	Stripping in northern Manitoba will normally be carried out under frozen ground conditions during established timing windows to minimize rutting and erosion.
PA-10.07	Stripping will not be permitted within established buffer zones and setback distances from waterbodies except where approved in work permits, authorizations or contract specifications.
PA-10.08	The Contractor will stabilize construction areas requiring extensive stripping as soon as possible to minimize erosion.

Transmission Towers and Conductors (PC-10)

ID	Mitigation
PC-10.01	Areas where soil was disturbed will be stabilized and re-vegetated with low growth vegetation as soon as practical.
PC-10.02	During tower foundation excavation the duff layer and A horizon soils shall be stripped and stored separately from other soils. When back filling, these soils are to be replaced as the surface soils to encourage site re-vegetation.
PC-10.03	Excavations required for tower installations will be restricted to the minimum required footprint.
PC-10.04	The Construction Supervisor will issue a stop work order if extreme wet weather conditions result in soil damage from rutting and erosion is resulting in sedimentation of adjacent waterbodies.

Treated Wood (EI-8)

ID	Mitigation
EI-8.01	Salvage and disposal of treated wood products will be in accordance with Manitoba Hydro guidelines.
EI-8.02	Small quantities of surplus or unwanted treated wood products may be disposed of as domestic waste products at licensed or approved waste management facility sites.
EI-8.03	Treated wood products will not be used indoors and will not be burned.
EI-8.04	Treated wood will be delivered to project locations or construction sites on an as required basis to reduce storage time in the field.

Vehicle and Equipment Maintenance (EI-9)

ID	Mitigation
EI-9.01	An Emergency Preparedness and Response Plan and spill control and clean-up equipment will be provided at all designated vehicle, equipment and machinery maintenance areas.
EI-9.02	Vehicle, equipment and machinery maintenance repair procedures will include containing waste fluids and will use drip trays and tarps where required.
EI-9.03	Unnecessary idling of vehicles, equipment and machinery will be avoided to the extent practical.
EI-9.04	Vehicle, equipment and machinery maintenance and repairs will be carried out in designated areas located at least 100 m from the ordinary high water mark of a waterbody, riparian area or wetland.
EI-9.05	Vehicle, equipment and machinery operators will perform a daily inspection for fuel, oil and fluid leaks and will immediately shutdown and repair any leaks found. All machinery working near watercourses will be kept clean and free of leaks.
EI-9.06	Vehicles transporting dangerous goods or hazardous products will display required placards and labeling in accordance with provincial legislation and Manitoba Hydro guidelines.
EI-9.07	Vehicles, equipment and machinery must arrive on site in clean condition free of fluid leaks and weed seeds.
EI-9.08	Vehicles, equipment and machinery that carry fuel, hydraulic oil and other petroleum products will also carry spill control and clean-up equipment and materials.

Waste Management (EI-10)

ID	Mitigation
EI-10.01	A Contract specific Waste and Recycling Management Plan will be prepared by the Contractor, reviewed by the Construction Supervisor and Environmental Specialist prior to construction and updated annually.
EI-10.02	Animal-proof garbage containers and electric fencing along with regular removal of food waste to approved waste management facility grounds will be used to manage food waste in northern and rural areas.
EI-10.03	Construction sites will be kept tidy at all times and bins will be provided wherever solid wastes are generated.
EI-10.04	Indiscriminate burning, dumping, littering or abandonment will not be permitted.
EI-10.05	Kitchen wastes will be stored in closed containers to minimize wildlife interactions.
EI-10.06	Solid waste materials will be collected and transported to a licensed or approved waste management facility in accordance with the Solid Waste/Recycling Management Plan.
EI-10.07	Waste materials remaining at snow disposal sites after melting will be disposed of at a licensed or approved landfill.

Wastewater (EI-12)

ID	Mitigation
EI-12.01	All sewage haulers will be registered with the Province of Manitoba, Sustainable Development (SD). A copy of the hauler registration will be provided upon request.
EI-12.02	Wastewater holding tanks will be installed as per provincial legislation and regulation: • Be registered with Sustainable Development (SD) and installed by a certified installer • Be watertight with a minimum capacity of 4500 L • If prefabricated, conform to Canadian Standards Association Standard B66-00, Prefabricated Septic • Tanks and Sewage Holding Tanks and bear a valid stamp or mark indicating certification by the Association • Be constructed of concrete, fiberglass, polyethylene or other approved material • Be installed in accordance with the manufacturer's recommendation • Be protected from damage by equipment and vehicles by installing barricades • Be protected from freezing. If the tank is located above ground and in a heated building, a temperature alarm is required for winter operation • Be anchored in place when located in areas with a high water table • Be above the one hundred (100)-year flood mark • Be equipped with liquid level monitor and alarms • Have a covered, watertight, perpendicular access shaft that extends above the ground surface • Have a locked access prevention cover
EI-12.03	Wastewater will be removed from holding tanks when they are no more than 90% full by a registered sewage hauler and disposed of at a licenced wastewater treatment facility.

Wetlands (EC-8)

ID	Mitigation
EC-8.01	Clearing wastes and other construction debris or waste will not be placed in wetland areas. Existing logs, snags and wood debris will be left in place.
EC-8.02	Wetland areas will be prescribed riparian buffers in site specific mitigation tables in which understory low-growth vegetation will be maintained where possible. Environmental protection measures for working in and around wetlands will be reviewed with the Contractor and employees prior to commencement of any construction activities.
EC-8.03	Natural vegetated buffer areas of 30 m will be established around wetlands and riparian zones will be maintained to the extent possible.
EC-8.04	Project activities will avoid wetland areas to the extent possible. If avoidance is not practical, the extent of disturbance will be minimized. Disturbance of wetlands will only be carried out under frozen ground conditions.

Wildlife Protection (EC-9)

ID	Mitigation
EC-9.01	Any injured or killed wildlife encountered on the transmission line ROWs and associated access roads/trails will be reported to Manitoba Sustainable Development.
EC-9.02	Bird Diverters or aerial markers may be installed in high bird traffic areas.
EC-9.03	Boundaries of important wildlife habitats (i.e. Mineral licks and Stick nests) will be identified in mapsheets and flagged prior to clearing.
EC-9.04	Clearing is allowed only within the Reduced Risk Time Period for Wildlife illustrated in Appendix D. If clearing within the Sensitive Time Period for Wildlife, further mitigation and approvals would be required.
EC-9.05	Construction activities will not be carried out during prescribed timing windows for wildlife species.
EC-9.06	Animal-proof garbage containers and electric fencing along with regular removal of food waste to approved waste management facility will be used to manage food waste in northern and rural areas.
EC-9.07	Hunting and harvesting of wildlife by project staff will not be permitted while working on the project sites.
EC-9.09	Manitoba Sustainable Development will be notified if animal traps are encountered and must be removed for project activities.
EC-9.10	Manitoba Sustainable Development and Fisheries and Oceans Canada will be notified if beaver dams must be cleared along rights-of-way and access roads and trails.
EC-9.11	No firearms will be permitted at construction sites.
EC-9.12	Orientation for Contractor and Manitoba Hydro employees will include awareness of environmental protection measures for wildlife and wildlife habitat.
EC-9.13	Problem wildlife will be reported immediately to Manitoba Sustainable Development.
EC-9.14	Trails through or near important habitat types will be managed in accordance with the Access Management Plan.
EC-9.15	Trees containing large nests of sticks and areas where active animal dens or burrows are encountered will be left undisturbed until unoccupied. Artificial structures for nesting may be provided if unoccupied nests must be removed.
EC-9.16	Vehicles will not exceed posted speed limits and wildlife warning signs may be installed in high density areas and at known crossings locations as a result of wildlife monitoring.
EC-9.17	Where buffer zones or setbacks are not feasible for colonial waterbirds, bird deflectors will be placed on sky wires to improve visibility of the wires to birds and to minimize potential bird-wire collisions.
EC-9.18	Wildlife and wildlife habitat will be protected in accordance with provincial and federal legislation and provincial and federal guidelines.
EC-9.19	Wildlife will not be fed, befriended or harassed at construction areas.
EC-9.23	New occurrences of any listed rare, threatened or endangered species will be documented and provided to Manitoba Sustainable Development.
EC-9.21	Understory vegetation will be managed at access routes to limit line of sight.
EC-9.22	New by-pass trails and access routes will be sited where possible to utilize existing natural terrain features and existing vegetation to minimize line of site.
EC-9.23	New occurrences of any listed rare, threatened or endangered species will be documented and provided to Manitoba Sustainable Development.

6.0 MAP SHEETS AND MITIGATION TABLES

The map sheets and specific mitigation tables are presented in Part 2 in a "map book" format. There are eight separate mapbooks to serve each of the eight construction segments. Key index maps of each construction segment can be found in Appendix K. The map sheets provide an overview of Environmentally Sensitive Sites (ESS), while the associated mitigation tables provide specific mitigation requirements related to these ESS.

APPENDICES

APPENDIX A: CONTACT LIST

Contact	Name	Phone Number(s)
Construction Contractor		
Contractor Project Manager		
Contractor Field Lead		
Contractor Safety and Environmental Officer		
Manitoba Hydro		
Project Engineer		
Construction Supervisor		
Senior Environmental Assessment Officer		
Environmental Monitor		
Environmental Inspector		
Field Safety, Health and Emergency Response Officer		
Hazardous Materials Officer		
Area Spill Response Coordinator		
Emergency Response Services		
Project Archaeologist (Primary Contact)		
Archaeologist		
Manitoba Sustainable Development Contacts		
24 hr Environmental Emergency Response reporting line		1-204-944-4888 or Toll free at 1-855-944-4888
District Office		
First Nations and Metis Contacts		

APPENDIX B: ENVIRONMENTAL PRE-WORK ORIENTATION RECORD – ATTACH SIGNED COPY

Transmission Line and Civil Construction
Contractor Environmental Pre-job Orientation

The following information, rules and regulations will be reviewed at this pre-job meeting with the contractor and Manitoba Hydro Project Engineer and/or Construction Supervisor, and Senior Environmental Assessment Officer and/or Environmental Inspector.

The contractor shall perform all work in accordance with the contract and adhere to the requirements set out by the *Environment Act* licence, *Crown Lands Act* Work Permit, and the MH Environmental Protection Plan, as they apply. The contractor shall comply with the environmental statutes that pertain to the project, as set out by Federal and Provincial regulatory agencies. In addition, the contractor shall comply with the project's Environmental Protection Plan and licensing/permitting requirements if applicable.

Upon completion of the orientation, all individuals present at the orientation, both Manitoba Hydro and the contractor representatives, will sign this document.

Division: TRANSMISSION CONSTRUCTION AND LINE MAINTENANCE
Department: TRANSMISSION LINE AND CIVIL CONSTRUCTION
Project Name: _____
RFQ or PO No.: _____
Work Location: _____
Environment Act License #: _____
MB Con. Work Permit #: _____
Date (YYYY/MM/DD): _____

In accordance with the Workplace Safety and Health Act, the **Prime Contractor** designated for this project is:_____.

Manitoba Hydro Supervisor: _____email _____@hydro.mb.ca
Address: 3rd Floor, 820 Taylor Avenue, Winnipeg, Manitoba R3C 0J1
Phone Numbers Office: (204) 360 - _____ , Emergency: (204) ____-_____ Cell: (204) ____-_____

Manitoba Hydro Senior Environmental Assessment Officer: Fiona Scurrah email: FScurrah@hydro.mb.ca
Address: 3rd Floor, 820 Taylor Avenue, Winnipeg, Manitoba R3C 0J1 Phone: (204) 360-3048 Cell: (204) 918-3277

For any emergency situation (Fire, Accident, etc.) call _____ and relay the message including the location and the nature of the emergency. Radio System Control: 040, 050, or call: 474-3327, 474-3007.

Contractor Information:

Contractor:_____email: _____

Address: _____

Phone Numbers: Office (___) _____-_____ Emergency (___)____-_____ Cell (___) ____-_____

Contractor Representative:_____email: _____

Address: _____

Phone Numbers: Office (___) _____-_____ Emergency (___)____-_____ Cell (___) ____-_____

Contractor Environmental Representative: _____email:_____

Address: _____

Phone Numbers: Office (___) _____-_____ Emergency (___)____-_____ Cell (___) ____-_____

Please list proposed Sub-Contractors:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Construction Site/Designated Work Areas:

The area of work as described in the contract is to be considered a construction site and anyone in this area must adhere to all rules and regulations as outlined in this document.

Manitoba Hydro Job Construction Supervisor must be notified of any changes to the contractor supervisory, safety and environmental components.

LOCAL OR SITE CONDITIONS:

The following specific local or site conditions will apply (e.g.: Environmentally Sensitive Sites/Species, Restricted Areas, etc.)

Key Environmental Issues and Requirements Review:

(the environmental issues and requirements of the work as specified in the Environmental Protection Plan (EnvPP) and other environmental requirements (e.g., MB Conservation work permits; contract clauses)).

Pre-Job Orientation Check List

Check off all items that apply to the contracted work being done as they are discussed. If the item does not apply, mark "not applicable (N/A)". If for any reason an item marked N/A becomes applicable during the course of the contracted work, the contractor must inform the Project Engineer and/or Construction Supervisor.

ITEM#	ITEM	Yes	No	N/A
Key Environmental Issues and Requirements Review				
1.	Is there an EnvPP, environmental job plan or other environmental plan requirement for the work? ▪ others: _____ _____ _____			

ITEM#	ITEM	Yes	No	N/A
2.	Have the environmental requirements been reviewed with the contractor and the contractor's staff? (Use the checklist below to guide review and discussion)			
2.1	Soil Compaction. _____ _____ _____			
2.2	Vegetation disturbance or removal. _____ _____ _____			
2.3	Generation and disposal of hazardous substances _____ _____ _____			
2.4	Generation and disposal of waste _____ _____ _____			
2.5	Contaminated soil management _____ _____ _____			
2.6	Spill of hazardous substances _____ _____ _____			

ITEM#	ITEM	Yes	No	N/A
2.7	Fuel and flammable storage _____ _____ _____			
2.8	Dust generation / other air emissions _____ _____ _____			
2.9	Water quality – erosion and siltation _____ _____ _____			
2.10	Fish and Aquatic – Habitat alteration, disturbance or loss _____ _____ _____			
2.11	Wildlife and Bird – Habitat Alteration, Disturbance or Loss _____ _____ _____			
2.12	Disturbance to Heritage Resources / Archaeological Sites _____ _____ _____			
2.13	Visual Impacts / Noise Concerns _____ _____ _____			

ITEM#	ITEM	Yes	No	N/A
2.14	Property Considerations _____ _____ _____			
2.15	Disruption of Recreation Use _____ _____ _____			
2.16	Public Safety Concerns _____ _____ _____			
3.0	Permits and Approvals Information: Ensure the necessary environmental permits and approvals relating to the work have been obtained prior to starting work. ▪ Environmental Act Licence File # and/or MB Conservation Work Permit Number should be located on the front page of this document. ▪ DFO Notification ▪ Other: (need lines for writing) ▪ Have the permits, licenses and approvals obtained and / or checked? _____ _____ _____			
Emergency Response Plan / Oil and Chemical Spill Response Plan				
4.0	Has the Emergency Response Plan been reviewed and discussed? _____ _____ _____			
5.0	Has the spill response plan been reviewed and discussed? _____ _____ _____			

ITEM#	ITEM	Yes	No	N/A
6.0	Are there spill kits available on location and on each piece of equipment (As applicable)? _____ _____ _____			
7.0	Were environmental incident reporting procedures discussed? _____ _____ _____			
8.0	Has environmental competency been demonstrated? ▪ Demonstrated applicable environment training for appropriate crew members/supervisors ▪ Site Environmental Monitor to be on-site in lieu of training _____ _____ _____			

Date of contractor pre-job on-site employee safety and environment orientation meeting: _____
YYYY MM DD

REMARKS:

Any specific environmental concerns that are not mentioned here will be discussed at pre-job (TAILBOARD) meetings prior to the work being performed. (This would include such items as any Species at Risk species located on site, noxious weeds, migratory birds, etc)

The above items have been discussed and understood. Any questions relating to these items may be discussed further during the course of the contract.

_____ _____
OFFICER OR DESIGNATE (SIGN) YYYY MM DD
MANITOBA HYDRO SENIOR ENVIRONMENTAL ASSESSMENT

_____ _____
CONTRACTOR'S REPRESENTATIVE (SIGN) YYYY MM DD

All PARTIES involved in **THIS** Pre-Job Orientation will indicate they have participated and understand all items discussed (and if not are responsible for ensuring they understand compliance measures prior to going on the job site), by signing the document below:

Signature (print/sign)	Date: YY MM DD	Signature	Date: YY MM DD

Contractor Environmental Orientation Procedures

NOTE:
This sheet is not intended for the contractors. Tear off this sheet, follow the steps and recycle when all steps are complete.

1. Environmental Orientation Meeting is to be held with Contractor Supervisory staff prior to starting field work.

2. Ask all present to sign the attendance sheet. Retain attendance sheet and store appropriately.

3. Read each topic of the form out loud. Discuss each topic and answer question as necessary.

4. Fill in blanks as required.

5. Mark the appropriate boxes as either Yes, No, or N/A.

6. Pay particular attention to who shall be designated as Prime Contractor.

7. Sign the form. Have the form signed by the Contractor or delegate.

8. Distribution of Contractor Safety Orientation: Original plus 6 copies.
   Signed Original: to be kept in safety folder, on site with all other required documents, permits, etc.
   Copies to:
   Post on site,
   Project File,
   Contractor,
   Contract Supervisor,
   Environmental Representative (Contractor)
   Senior Environmental Assessment Officer (Fiona Scurrah)

APPENDIX C: ENVIRONMENTAL LICENCES, APPROVALS AND PERMITS

Table C-1: List of Potential Approvals required for Construction		
Approval required (Applicable Legislation / Regulation)	**Type of Approval needed**	**Responsibility**
Environment Act Licence (Class 3)	Licence	LEA
Crown Lands Act (Work Permit)	Permit	TLCC
Crown Lands Act (General Permit)	Permit	Property Dept.
Permit to cut timber on Crown Lands (Forest Act)	Permit	TLCC
Wildfires Act (Work Permit)	Permit	TLCC
Permit to burn wood (Wildfires Act) – outside of timing windows only	Permit	TLCC
Wildlife Management Area Permit (Wildlife Act)	Licence	LEA
Annual Harvest Plan (Environment Act Licence)	Forestry Branch Director Approval	TLCC
Storage and Handling of Gasoline and Associated Products Regulation, Generator Registration and Carrier Licencing Regulation (Dangerous Goods Handling and Transportation Act)	Permit	Contractor
Highways Protection Act	Permit	TLCC
The Heritage Resources Act (when required)	Permit	LEA
Rail line crossing at temporary access road intersections	Permit	Property Dept.
A permit from Manitoba Infrastructure and Transportation (MIT) is required for any construction above or below ground level that falls within 250 ft. of a Provincial Trunk Highway right-of-way edge or within 150 ft. of a Provincial Road right-of-way edge.	Permit	Property Dept.
Note: Permits, Licences and Approvals are the sole responsibility of those groups indicated in this table LEA – Manitoba Hydro Licensing and Environmental Assessment Department TLCC – Transmission Line and Civil Construction Department		

THE ENVIRONMENT ACT
LOI SUR L'ENVIRONNEMENT

Manitoba

LICENCE

Licence No. / Licence n° 3106

Issue Date / Date de délivrance July 10, 2014

In accordance with *The Environment Act* (C.C.S.M. c. E125) /
Conformément à *la Loi sur l'environnement* (C.P.L.M. c. E125)

Pursuant to Section 11(1) / Conformément au Paragraphe 11(1)

THIS LICENCE IS ISSUED TO : / CETTE LICENCE EST DONNÉE À :

MANITOBA HYDRO;
"the Licencee"

for the construction, operation, maintenance and decommissioning of the Keeyask Transmission Project, consisting of 22 km of a new 138 kV ac Construction Power transmission line, a new 138 kV ac to 12.47 kV ac Construction Power Station to be located north of the proposed Keeyask Generation Station, upgrades to the existing Radisson Converter Station, a new Keeyask Switching Station to be located south of the Nelson River, 4 km of four 138 kV ac Unit transmission lines that will transmit power from the proposed Keeyask Generation Station to the Keeyask Switching Station, and 38 km of three 138 kV ac Generation Outlet transmission lines that will transmit power from the new Keeyask Switching Station to the Radisson Converter Station, in accordance with the Proposal filed under *The Environment Act*, dated November 5, 2012, and additional information dated April 26, 2013, and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence:

"Director" means an employee so designated pursuant to *The Environment Act*;

"Environment Officer" means an employee so designated pursuant to *The Environment Act;*

"riparian area" means an area of land on the banks or in the vicinity of a waterbody, which due to the presence of water supports, or in the absence of human intervention

would naturally support, an ecosystem that is distinctly different from that of adjacent upland areas (*The Water Protection Act* 2005);

"waterbody" means any body of flowing or standing water, whether naturally or artificially created, and whether the flow or presence of water is continuous, intermittent or occurs only during a flood, including but not limited to a lake, river, creek, stream, and wetland (slough, marsh, swamp, etc.), including ice on any of them (*The Water Protection Act* 2005); and

"wetland" means land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation, and various kinds of biological activity which are adapted to a wet environment. They are generally less than approximately 2 metres in depth (National Wetland Working Group 1997).

GENERAL TERMS AND CONDITIONS

This Section of the Licence contains requirements intended to provide guidance to the Licencee in implementing practices to ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

Compliance

1. The Licencee shall adhere to the commitments made in the Proposal, supporting information filed in association with the Proposal, and plans submitted and approved pursuant to this licence during construction, maintenance, operation and decommissioning of the Development.

Additional Permits

2. The Licencee shall, prior to commencing construction of the Development, apply for and obtain all land tenure allocations and Work Permits as required from the appropriate Conservation and Water Stewardship district office and shall comply with the conditions of all permits.

Additional Reporting

3. The Licencee shall, in addition to any of the specifications, limits, terms and conditions specified in this Licence, upon the request of the Director:
   a) sample, monitor, analyse or investigate specific areas of concern regarding any segment, component or aspect of the Development for such duration and at such frequencies as may be specified;
   b) determine the environmental impact associated from the Development;

c) conduct specific investigations in response to the data gathered during environmental monitoring programs; or
d) provide the Director, within such time as may be specified, with such reports, drawings, specifications, analytical data, descriptions of sampling and other information as may from time to time be requested.

Environmental Inspection

4. The Licencee shall, during construction of the Development, employ qualified environmental inspectors to monitor the work on a daily basis to ensure that all the environmental practices outlined in the Proposal, supporting information, and the plans submitted pursuant to this Licence are carried out.

Reporting Format

5. The Licencee shall submit all information required to be provided to the Director or Environment Officer under this Licence, in writing, in such form (including number of copies) and of such content as may be required by the Director or Environment Officer, and each submission shall be clearly labelled with the Licence Number and Client File Number associated with this Licence.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

Notification

6. The Licencee shall, prior to beginning construction of the Development, provide notification to the Environment Officer responsible for the administration of this Licence of the intended start date of construction and the name of the contractor(s) responsible for the construction.

7. The Licencee shall, prior to construction, provide a copy of this Licence to the contractor(s) and subcontractor(s) involved in the Development.

Access Routes and Line of Sight

8. The Licencee shall not create or improve roads or short access routes for construction and/or maintenance of the Development without written approval from the Northeast Region Integrated Resource Management Team (IRMT) of Conservation and Water Stewardship.

9. The Licencee shall submit an access route inventory and decommissioning and rehabilitation plan for all access routes created or improved in association with the Development, upon completion of construction of the Development, as required by the Northeast Region IRMT.

10. The Licencee shall maintain existing vegetation screens at all points where the transmission right-of-way of the Development intersects an existing road or trail to limit the ability of humans to observe wildlife along the right-of-way.

11. The Licencee shall, during maintenance of the Development, to the extent possible without impeding maintenance activities, maintain natural re-growth of shrubs and other understory vegetation along the transmission line right-of-way to minimize the line of sight of hunters and predators.

Air Quality

12. The Licencee shall minimize the burning of slash generated during clearing of the Development where smoke may affect residences. In such cases, the Licencee shall dispose of slash using environmentally suitable methods such as mulching, where feasible.

Environmental Protection Plan

13. The Licencee shall submit an Environmental Protection Plan for the approval of the Director for the construction of the Development. This plan shall describe the approach to be used by the Licencee to ensure that mitigative measures are applied systematically, and in a manner consistent with the commitments made in the Proposal. Separate plans may be submitted for different components or phases of the Development. Specifically, the plan shall:
    a) describe the environmental management system;
    b) provide field construction personnel with clear instructions on the mitigation measures to be implemented and on the appropriate lines of communication and means of reporting to be followed throughout the life cycle of the project;
    c) summarize environmental sensitivities and mitigation actions and emergency response plans and reporting protocols.

Environmental Monitoring Plan

14. The Licencee shall prepare an Environmental Monitoring Plan to be undertaken in relation to the mitigation measures outlined in the Proposal and supporting information. The plan shall be submitted prior to November 30, 2014, for the approval of the Director, and:
    a) describe the protocol for reporting on compliance monitoring;
    b) describe the specific monitoring measures to be installed/undertaken;
    c) outline the communication and reporting protocol on implementation progress;
    d) define the parameters to be measured and the methods to be used to evaluate the environmental effects of the Development to pre-Development baseline conditions;

e) describe how the performance and effectiveness of the recommended mitigation measures will be evaluated during implementation; and
f) describe how adverse effects will be adaptively managed.

15. The Licencee shall implement the plans approved pursuant to Clauses 13 and 14 of this Licence.

Annual Reporting

16. The Licencee shall, during construction, report annually, before June 15th, to the Director on the results of environmental monitoring plans, as approved pursuant to Clause 14 of this Licence and include sufficient detail that assessments can be made as to the accuracy of predictions, success of mitigation actions and commitment to future actions. These reports will provide assessments of any trends detected over the entire reporting period. The annual reports shall be submitted for five years after completion of construction or as otherwise approved by the Director.

Dangerous Goods Storage and Handling

17. The Licencee shall comply with all the applicable requirements of:
    a) ***Manitoba Regulation 188/2001,*** or any future amendment thereof, respecting ***Storage and Handling of Petroleum Products and Allied Products.***
    b) *The Dangerous Goods Handling and Transportation Act*, and regulations issued thereunder, respecting the handling, transport, storage and disposal of any dangerous goods brought onto or generated at the Development; and
    c) The Office of the Fire Commissioner – Province of Manitoba.

18. The Licencee shall establish any fuel storage areas required for the construction and operation of the Development a minimum distance of 100 metres from any waterbody.

19. The Licencee shall, during construction and maintenance of the Development, operate, maintain, and store all materials and equipment in a manner that prevents any deleterious substances including fuel, oil, grease, hydraulic fluid, coolant, and other similar substances from entering any waterbody. An emergency spill kit for in-water use shall be readily available on site during construction.

Spill Response

20. The Licencee shall, in the case of physical or mechanical equipment breakdown or process upset where such breakdown or process upset results or may result in the release of a pollutant in an amount or concentration, or at a level or rate of release, that causes or may cause a significant adverse effect, immediately report the event by calling 204-944-4888 (toll-free 1-855-944-4888). The report shall indicate the nature

of the event, the time and estimated duration of the event and the reason for the event.

21. The Licencee shall, following the reporting of an event pursuant to Clause 20,
    a) identify the repairs required to the mechanical equipment;
    b) undertake all repairs to minimize unauthorized discharges of a pollutant;
    c) complete the repairs in accordance with any written instructions of the Director; and
    d) submit a report to the Director about the causes of breakdown and measures taken, within one week of the repairs being done.

22. The Licencee shall, in a manner approved by the Environment Officer, remove and dispose of all spilled dangerous goods.

23. The Licencee shall, following construction of the Development, verify that terrestrial contamination of the environment has not occurred in work areas of the Development. Any areas of contamination shall be remediated to the satisfaction of the Environment Officer.

Heritage Resources

24. The Licencee shall, during construction and operation of the Development, apply measures to protect heritage resources, as directed by the Historic Resources Branch of Manitoba Tourism, Culture, Heritage, Sport, and Consumer Protection.

Oil Containment Facilities

25. The Licencee shall, prior to commencement of construction activities for the oil containment facilities of the Development, submit to the Director the results of an Oil Containment Assessment. Oil containment plans and specifications, as recommended in the Oil Containment Assessment, shall be approved by the Director prior to the commencement of construction of the oil containment facilities of the Development.

26. The Licencee shall construct and install the oil containment equipment, as described in the Plans and Specifications approved by the Director, as required by Clause 25 of this Licence.

Onsite Wastewater Disposal

27. The Licencee shall, during construction of the Development, dispose of all wastewater from on-site sanitary facilities in accordance with ***Manitoba Regulation 83/2001***, or any future amendment thereof, respecting ***Onsite Wastewater Management Systems.***

Pesticide Application

28. The Licencee shall not use herbicides in association with the construction of transmission components of the Development unless there are no other feasible means available. If herbicides are used, the Licencee shall adhere to the ***Manitoba Regulation 47/2004,*** or any future amendment thereof, respecting ***Pesticides***.

Waste Disposal

29. The Licencee shall dispose of non-reusable construction debris and solid waste from the construction and maintenance of the Development at a waste disposal ground operating under the authority of a permit issued under ***Manitoba Regulation 150/91***, or any future amendment thereof, respecting ***Waste Disposal Grounds,*** or a licence issued pursuant to *The Environment Act*.

Water Crossings

30. The Licencee shall, during construction and maintenance of the Development, adhere to the general recommendations on design, construction, and maintenance of stream crossings as specified in the Manitoba Department of Natural Resources guidelines titled ***Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat, May 1996***, and the current versions of applicable federal Department of Fisheries and Oceans Operational Statements.

Riparian Areas

31. The Licencee shall, during construction and maintenance of the Development within riparian areas associated with fish-bearing and potentially fish-bearing waterbody crossings:
    a) maintain all existing low growth vegetation such as grasses, shrubs, and willows;
    b) clear trees that must be removed using only low impact methods including hand clearing;
    c) prohibit the application of herbicides;
    d) where natural revegation methods will be insufficient to stabilize disturbed soils, biodegradable erosion control materials and a seed mix native to the area will be utilized.
    e) where possible, maintain 15 metres of riparian area from the high water mark of 1st and 2nd order creeks, and 30 metres from the high water mark of 3rd order and higher streams and rivers;
    f) minimize in-stream construction time to reduce sedimentation;
    g) avoid use of organic soil, silt, or clay in temporary winter stream crossings; and
    h) remove all materials used in the construction of ice bridges from the watercourse or water body prior to spring breakup.

Sedimentation and Erosion

32. The Licencee shall, during construction and maintenance of the Development, take all appropriate measures to prevent erosion and the deposition of sediment into any waterbodies. Construction adjacent to waterbodies shall not occur during high rainfall events if construction activities will result in increased erosion and sediment disposition in the adjacent waterbody.

Instream Works

33. The Licencee shall only conduct construction activities in connection with the Development in fish bearing waters or potentially fish bearing waters in accordance with applicable federal *Fisheries Act* Authorizations. The Licencee shall notify Conservation and Water Stewardship, Fisheries Branch, if an application is made to the federal Department of Fisheries and Oceans to work outside the prescribed in-stream work timing windows.

Wetlands

34. The Licencee shall not, during construction, clear, compact, grade or fill any wetlands or native upland habitat, which are not required for the construction of right-of-way of the Development.

Wildlife

35. The Licencee shall only conduct clearing components of the Development between August 1 and April 30 of each construction year to avoid potential impacts to the nesting habitat for migratory birds and the calving and rearing habitat for caribou. Should any transmission line clearing be required outside of this period, the Licencee shall, prior to the construction activity, consult and reach an agreement with the Wildlife Branch regarding the location of any key wildlife habitats to be avoided including bird nesting and brooding areas, and obtain approval of the Director.

36. The Licencee shall not remove, destroy or disturb species pursuant to ***Manitoba Regulation 25/98***, or any future amendment thereof, respecting ***Threatened, Endangered and Extirpated Species***, and in the federal *Species at Risk Act*.

37. The Licencee shall, during construction and maintenance of the Development, take measures to prevent the introduction and spread of foreign aquatic and terrestrial biota.

38. The Licencee shall not, unless otherwise approved by Environment Canada under the federal *Migratory Birds Convention Act*, disturb active migratory bird nests during construction and maintenance of the Development.

39. The Licencee shall avoid when possible, during construction and maintenance of the Development, operating helicopters at low level near calving habitat from May 1 to June 30.

Revegetation

40. The Licencee shall, when natural re-vegetation methods are insufficient to revegetate soil in areas of the Development exposed by construction, a mixture of native or introduced grasses or legumes will be utilized. Native species shall be used to revegetate areas where native species existed prior to construction. Exposed areas shall be revegetated as quickly as possible following construction to prevent soil erosion and the establishment of noxious weeds.

Decommissioning or Alteration

41. The Licencee shall, prior to decommissioning of the Development, submit for approval of the Director, a decommissioning plan for the Development.

42. The Licencee shall implement the decommissioning plan as approved pursuant to Clause 41 of this Licence.

43. The Licencee shall obtain approval from the Director for any proposed alteration to the Development before proceeding with the alteration.

REVIEW AND REVOCATION

44. If, in the opinion of the Director, the Licencee has exceeded or is exceeding or has or is failing to meet the specifications, limits, terms, or conditions set out in this Licence, the Director may, temporarily or permanently, revoke this Licence.

45. If construction of the development has not commenced within three years of the date of this Licence, the Licence is revoked.

46. If, in the opinion of the Director, new evidence warrants a change in the specifications, limits, terms or conditions of this Licence, the Director may require the filing of a new proposal pursuant to Section 11 of *The Environment Act.*

Tracey Braun

Tracey Braun, M.Sc.
Director
Environment Act

File: 5614.00

APPENDIX D: TIMING WINDOWS

Project Wildlife Reduced Risk Timing Windows

Species	Sensitivity	January		Febuary		March		April		May		June		July		August		September		October		November		December	
Mammals	Denning Sites																								
Moose/Elk	Calving Sites																								
Caribou	Calving Sites																								
Amphibians/Reptiles	Breeding and Emergence																								
Bats	Hibernaculum																								
Birds	Breeding and Nesting																								
Fish	Spawning Areas																								

Reduced Risk Time Period for Wildlife

Sensitive Time Period for Wildlife

(Where construction activities occur during this period, mitigations measures will be prescribed on a site by site basis)

APPENDIX E: BUFFERS AND SETBACKS

Table E 1 Setbacks and Buffers

Feature	Activity	Non Frozen Ground Setback Distance (No work allowed)	Frozen Ground Setback Distance (No work allowed)	Vegetated Buffer Distance (Shrub and Herbaceous Vegetation Retained)	Rationale
Vegetation					
Plant Species at Risk	Tower Foundation Siting	100m	100m		Protect from disturbance
	Clearing And Construction	30m		30m	Protect from disturbance
	Maintenance	30m		30m	Protect from disturbance
	Access Trail	30m	30m		Protect from disturbance
Anthropogenic					
Recreational and Commercial Lots	All	50-200m	50-200m		Visual and aesthetic screening
Trapper's Cabins (Away from water)	All	50-200m	50-200m		Visual and aesthetic screening
Research and Permanent Sample Plots	All	100m	100m		Maintain integrity of research
Heritage and Cultural	All	Varies	Varies	Varies	Protect from Disturbance
Designated Recreational Trails	All	0-50m			Visual and aesthetic screening
Amphibians					
Northern Leopard Frog * (known breeding pond, watering site)	Tower Foundation Siting	30m	30m		Protect from disturbance
	Clearing And Construction	30m		30m	Protect from disturbance
	Maintenance	30m			Protect from disturbance
	Access Trail	30m	30m		Protect from disturbance
Plains Spadefoot Toad ** (known breeding, living, hibernating ponds)	Tower Foundation Siting	30m	30m		Protect from disturbance
	Clearing And Construction	30m		30m	Protect from disturbance

Table E 1 Setbacks and Buffers

Feature	Activity	Non Frozen Ground Setback Distance (No work allowed)	Frozen Ground Setback Distance (No work allowed)	Vegetated Buffer Distance (Shrub and Herbaceous Vegetation Retained)	Rationale
	Maintenance	30m			Protect from disturbance
	Access Trail	30m	30m		Protect from disturbance
Reptiles					
Garter Snake Hibernaculum	Tower Foundation Siting	200m	200m		Protect from disturbance
	Clearing And Construction	200m		200m	Protect from disturbance
	Maintenance	200m		200m	Protect from disturbance
	Access Trail	200m			Protect from disturbance
Northern Prairie Skink (burrow)	Tower Foundation Siting	200m	200m		Protect from disturbance
	Clearing And Construction	100m		100m	Protect from disturbance
	Maintenance	100m		100m	Protect from disturbance
	Access Trail	100m	100m		Protect from disturbance
	Maintenance	100m		100m	Protect from disturbance
	Access Trail	100m	100m		Protect from disturbance
Landforms					
Wetlands	Clearing And Construction	30m		30m	Protect from disturbance
	Maintenance	30m		30m	Protect from disturbance
	Access Trail	30m		30m	Protect from disturbance
	Hazardous Material Handling/Storage	100m	100m		Protect from disturbance
	Soil Stockpiles	30m		30m	Protect from disturbance
Unique Soil/Terrain Features	All Off ROW activities	100m			Protect from disturbance
Steep or Unstable Slopes	Establishment or use of borrow pits	100m	100m		Protect from disturbance

Feature	Activity	Non Frozen Ground Setback Distance (No work allowed)	Frozen Ground Setback Distance (No work allowed)	Vegetated Buffer Distance (Shrub and Herbaceous Vegetation Retained)	Rationale	
Mammals						
Mineral Licks	All	120m		120m	Protect from disturbance	
Occupied Mammal Dens	All	50m	50m		Protect from disturbance	
Invertebrates						
Ottoe and Uncas Skippers	All			30m	Protect habitat	

All measurements are from edge of feature

Table E - 2 Riparian Setbacks, Buffers and Zones

Feature	Activity	Setback (No work allowed)	Riparian Buffer	Machine Free Zone (No machines allowed except at trail crossing)	Rationale
Wetland / Lake / River / Creek / Stream					
Waterbodies/Fish Habitat Outside ROW	Clearing and Construction	15-30m			Protect from sedimentation and erosion
	Maintenance	15-30m			Protect from sedimentation and erosion
	Access Trail	15-30m			Protect from sedimentation and erosion
Waterbodies/Fish Habitat Inside ROW	Tower Foundation Siting	15-30m			Protect from sedimentation and erosion
	Clearing and Construction		30m	7m	Protect from sedimentation and erosion
	Maintenance		30m	7m	Protect from sedimentation and erosion

All zones and buffers are measured from Ordinary High Water Mark or defined riparian area by Aquatic specialist

APPENDIX F: N/A

APPENDIX G: GUIDANCE FOR CONTAMINATED SOILS OR GROUNDWATER IDENTIFICATION AND DISPOSAL

Guidance document for the Identification and Management of soils, surface waters or groundwater suspected to be impacted by Hazardous Materials

Objective

This guidance document has been developed to provide general information and direction on recognized methods considered acceptable by the regulatory agencies when contamination or suspected environmental impacts have been encountered. The information within this document is intended to assist frontline workers when conducting preliminary environmental site assessments or investigations of sites or lands where the quality of groundwater, surface water, sediments and/or soil have potentially or is suspected of being impacted or affected by hazardous materials as result of past or present usage of the site or land.

The guidance document has been developed as an informational reference tool only and is intended for frontline supervisors, inspection personnel, contractors and/or subcontractor working under contract or on Manitoba Hydro owned property that do not have formal training in Environmental Site Assessments or site investigations.

Identifying Impacted Surface Water/Groundwater or Soils,

Surface water, groundwater and Soils have known observable characteristics when they come into contact with some Hazardous Materials. For example water (surface or ground) that has been impacted by Petroleum Hydrocarbons - PHC's (such as electrical transformer oil, Fuels – such as diesel or gasoline, and/or lubricants) may have display an obvious hydrocarbon odour and/or multi colored 'sheen' that is typically visible to the naked eye and appear on the surface of the liquid (like a film or residue) and are typical indications that water has been impacted by PHC's.

Similarly soils that have been impacted with PHC's typically turn "grey-black" in color or become "stained" (see Photos 1 to 4) depending on weathering and they also typically have a strong PHC odour and appears unnatural compared to other native soils is exposed for comparison.

Water or soils exhibiting these types of observable characteristics should be documented (daily reports, photos, gps coordinates, ect.) and the project supervisor is to be notified as soon as practical. All work shall be halted in areas where suspected impacted/contamination exists until the project supervisor has been notified and no materials (soils, water, debris) suspected to be impacted by a Hazardous materials shall be permitted from the suspected area until the project supervisors has been notified and has granted approval to proceed.

All Manitoba Hydro properties are to be considered 'suspect' and may be impacted with various hazardous materials such as Petroleum Hydrocarbons (PHC), Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), and Glycols as a result of current and/or historical activities conducted on the site. Any excavated soils from Manitoba Hydro owned or leased properties must either be sampled prior to disposal at a licensed facility or directly transported to a licensed facility. MH corporate Environment department or Soils Remediation Dept. can be contact to assist in determining a suitable or Licenced disposal facility if required

Photo 1: Grey-black PHC, PAH, and/or PCB soil staining

Photo 2: Black PHC, PAH, and/or PCB soil staining

Worker Health and Safety

Workers who suspect they have encountered materials impacted by a hazardous material will need to assess what protective measures are required to further assess the site or manage the suspected impacts. This may include wearing appropriate personal protective equipment (PPE) if they are required to handle or manage the impacted materials/contamination (i.e. soils and /surface /groundwater).

Appropriate PPE will be dependent on the hazardous material or contaminant and contaminant concentration (if known), and may include but not be limited to: nitrile or rubber gloves, half or full mask respirator, safety boots, protective clothing, and protective eyewear.

A qualified environmental professional or consultant will engaged to confirm, and subsequently characterize the hazardous materials and assess the impact to the environment as required.

Communications / Notifications

If impacted/contaminated materials are encountered during construction, all personnel working within the suspected area are to immediately stop work, leave the suspect impacted/contaminated area, secure the site and notify the on-site environmental officer or project supervisor.

Additional notifications of the potential hazards would then be made to all applicable personnel as required.

Impacted Soil and Water Handling and Disposal

In the event that impacts or contamination as a result of hazardous materials is encountered or is suspected during construction the following measures should be taken to further protect worker health and safety:

- If possible limit personnel working within or around the impacted area until a further assessment is conducted..
- Secure the site or area suspected to be impacted or contaminated and keep unauthorized personnel out of the area (barriers may be required) until further assessment is conducted.
- Notify project supervisor and Site Environmental inspector to assist/initiate further site assessment process
- If impacted materials have been mobilized as part of the work or prior to identifying the impacts, then the material should be segregated and/or contained if at all possible, and all efforts to prevent further impacts or contamination shall be undertaken.

(Example – excavated soils suspected to be impacted shall be placed on an impermeable surface and covered to prevent precipitation run-off until the soils can be assessed for contaminants.)

- Soil and/or groundwater samples if required will be sent to a Canadian Association for Laboratory Accreditation (CALA) accredited Laboratory for waste characterization. (note MH Selkirk Laboratory has this capacity)
- Soils will be characterized for waste disposal and appropriate truck placarding. (as per the corporate policy and as per the MH Hazardous Materials Management Handbook)
- Contaminated soils and/or groundwater will be transported in accordance with the Manitoba *Dangerous Goods Handling and Transportation Act* and associated Regulations. As per MH - Hazardous Materials Management Handbook
- http://hrcs.hydro.mb.ca/wshcs/ws/we/Pages/HazardousMaterials.aspx
- Decontamination of equipment, as required.

Please note that prior to the disposal of soils confirmed to be impacted above the applicable regulatory criteria, current provincial legislation requires a 'Remedial Action Plan' to be submitted to the provincial regulator for their approval. In addition at the conclusion of the remedial activities, a closure report is also required to be submitted. The Remedial Action Plan(s) and Closure Report(s) will be in accordance with the Manitoba Contaminated Sites Remediation Act, and its associated regulations and guidance documents.

The above mentioned legislation and associated regulations mandate that a qualified Environmental professional is to conduct formal Environmental Site Assessments or Investigation and are required to follow an established guideline. As such if a site has been determined to be 'suspect' for contamination as a result of observations made using this guidance document then a qualified Environmental professional is required when conducting a formal site assessment that includes a Remedial Action Plan (RAP).

APPENDIX H: CONTRACTOR-DEVELOPED ENVIRONMENTAL PLANS

H.1 Emergency Preparedness and Response Plan

Attach Contractor developed Emergency Preparedness and Response Plan

H.2 Waste and Recycling Management Plan

Attach Contractor developed Waste and Recycling Management Plan

H.3 Erosion and Sediment Control Plan

Attach Contractor developed Erosion and Sediment Control Plan

APPENDIX I: FRAMEWORKS FOR CONTRACTOR-DEVELOPED ENVIRONMENTAL PLANS

I.1 Waste and Recycling Management Planning Framework

Introduction

The Bipole III Transmission Project (the Project) is a large scale development that has potential to generate a significant waste stream. To manage and reduce the amount of materials flowing from the construction of the Project, Manitoba Hydro will require Waste and Recycling Management Plans (W&R) plans from construction contractors in an effort to reduce the volume of materials going to landfill and facilitate reuse and recycling. Where applicable, the W&R Plan will also address wastes developed in the operation of work camps. This framework outlines the objectives, scope and materials to be covered in the W&R Plan required by each applicable Contractor for the construction of the Project.

Purpose of Framework

Manitoba Hydro recognizes the need to proactively address the issue of waste management. This document provides a framework to guide contractors in the preparation and implementation of a Waste and Recycling Management Plan, which is a crucial step in managing waste generation and disposal.

Objectives

Manitoba Hydro's objective for developing this Waste and Recycling Management Plan framework is to provide guidance to contractors in the development of a W&R Plan. The W&R Plan must contain the necessary components to meet regulatory requirements, applicable Acts and regulations, industry standards, and best practices in waste reduction, re-use and recycling for the Project.

The goal of the W&R Plan is to reduce the amount of waste disposed at landfills while optimizing waste reduction, reuse and recycling activities. To obtain this goal, W&R Plans will include strategies related to waste minimization and avoidance, appropriate waste treatment and the applicable handling, storage, collection, recycling and disposal of waste. This framework will outline and define Manitoba Hydro's expectations for a W&R Plan to the Contractor. Establishing these expectations and minimum requirements in a framework provides the Contractor with the opportunity to develop more efficient processes which will meet or exceed Manitoba Hydro's goals of waste reduction and prevention.

Definitions

For the purposes of developing a Waste and Recycling Management Plan, below are the definitions of waste and hazardous waste.

The Environment Act definition of waste is:

"waste" includes rubbish, litter, junk, or junked obsolete or derelict motor vehicles, or obsolete or derelict equipment, appliances or machinery; slimes, tailings, fumes, waste of domestic, municipal, mining, factory or industrial origin; effluent or sewage; human or animal wastes; solid or liquid manure; or waste products of any kind whatsoever or the run-off from such wastes.

The Dangerous Goods Handling and Transportation Act definition of hazardous waste is:

"hazardous waste" means a product, substance or organism that

a) is prescribed, designated or classified as hazardous waste in the regulations, or

b) by its nature conforms to the classification criteria for one or more classes of hazardous wastes set out in the regulations.

Plan Scope

Each W&R Plan must identify the nature of the waste generated by the contractor. Examples of waste that are expected to be produced by the Project and be covered by the W&R Plan are found in the following table. (Note: this is not an exhaustive list.)

Table I-1: Materials to be Covered by the W&R Plan

Category	Items
Hazardous waste	Motor oils, fuels, solvents, coolants, pesticides, other chemicals
Construction materials	Wood, aluminum, copper, steel, cardboard, plastic
Food services	Beverage containers (aluminum, plastic and glass), cardboard, boxboard, plastics, newsprint, office paper
Domestic solid waste	Organic material, non-recyclable waste
E-waste	Computers, circuitry, batteries
Construction equipment	Rubber tires, lead-acid batteries, hydraulic fluid, oil filters

For each waste item identified in Table I-1, the following is required:

- the waste management method to be employed (reuse, recycle, landfill);
- collection, handling, storage, treatment and transportation requirements;
- final destination (landfill, recycle depot, etc.); and
- Municipal approvals for waste destined to a licensed waste management facility or landfill.

Related Environmental Protection Program Documents

When contactors develop a Waste and Recycling Management Plan, the Construction Environmental Protection Plan and the Project Environmental Plan should be referenced as these plans include waste mitigation measures.

Waste Management

The Waste and Recycling Management Plan must provide a process to which a hierarchical approach is taken to waste management. The purpose of the hierarchy is to assess each waste item for opportunities to avoid waste, then opportunities to reuse, followed by opportunities to recycle prior to disposal. This hierarchy will be as follows:

- compliance with federal and provincial waste management legislation (i.e., Acts and Regulations);
- waste avoidance;
- waste re-use;
- waste recycling; and
- waste disposal (as a final option).

Prior to the start of construction, the Contractor must ensure that the waste waste management facility are willing and have the capacity to accommodate the projected waste volume. Waste management facility grounds must be registered with Manitoba Sustainable Development and be in accordance with the Waste Management Facilities Regulation 37/2016, Feb 23, 2016).

Waste Management Activities

The Waste and Recycling Management Plan must also include waste management activities to address the following:

- waste avoidance, reuse and recycling;
- waste segregation, storage and handling;
- waste transport and disposal;
- tracking of waste volumes produced;
- waste monitoring and reporting; and
- spill response and reporting as per Manitoba Hydro's Spill Response and Reporting Plan.

Due to the remoteness of some of the Project worksites there will be differing levels of waste segregation due to the logistical challenges of waste management during the construction of the Project. Table I-2 reflects the expected waste stream handling capabilities for typical project worksites.

Other Plan Considerations

- Waste kept on-site must be stored in such a way as to not pose health and safety risks.
- Recyclables destined for depots in major centers in Winnipeg or Thompson should be back-hauled to reduce transportation costs.
- Methods for disposal of cleared vegetation, including trees, shrubs and undergrowth resulting from clearing will be covered by the contract specifications.
- Waste excavated material will be reused wherever possible and waste material is to be disposed of by a licensed waste contractor. Stockpiles and waste that must be stored temporarily on site will be stored on existing cleared areas away from drainage channels and slopes.

Waste and Recycling Management Plan Approval

A detailed Waste and Recycling Management Plan must be developed by the contractor and submitted for approval by the Senior Environmental Assessment Officer in the Transmission Line Construction Department. The W&R plan must address all applicable issues and concerns identified in this Waste and Recycling Management Plan framework. The detailed W&R plan submitted by the contractor must include all actions needed to effectively implement the Waste and Recycling Management Plan and its waste management hierarchy.

Table I-2: Preferred Waste Management Methods

Category	Items	Preferred Waste Management Methods
Hazardous Waste	Motor oils, oil filters, lead-acid batteries, hydraulic fluid, fuels, solvents, coolants, pesticides, other chemicals and their containers	Separate hazardous waste materials by type and store them segregated from the waste stream in approved containers and containment areas.
		Ensure that staff handling wastes is trained in the handling and transportation of hazardous waste.
		Inventory and account for hazardous waste leaving collection areas.
		Transportation off-site by licensed regulated waste transporter and disposal off-site by a regulated waste receiver, for recycling or proper disposal.
Construction Materials	Aluminum, copper, steel, scrap conductors	Collected and segregated on-site, transported for off-site recycling.
	Wood - timber off cuts, pallets, wooden boxes	Minimize waste by producing or using only the amount necessary. Off cuts and pallets to be burnt on-site or disposed of in landfills licensed by MCWS with capacity to accept and separate construction wastes.
	Cardboard packing and boxes	Collected and recycled at landfill.
	Plastic bags and plastic packaging	Collected and disposed of at landfill.
Food Services (Non-Hazardous Waste)	Beverage containers (aluminum, plastic and glass,), cardboard, boxboard, plastics, newsprint, office paper	Collected and recycled.
Non-Hazardous Solid Waste	Grease trap wastes and organic food waste	Store materials in wildlife-proof waste containers or in secure location. Waste will be taken off-site for disposal.
Electronic Wastes	Computers, circuitry, etc.	Electronic waste will be stored and transported off-site to a licensed e-waste receiver for recycling or disposal.
Construction Equipment	Rubber tires	Tires will be stored and transported off-site to a licensed regulated waste receiver for recycling or disposal.

Table I-2: Preferred Waste Management Methods

Category	Items	Preferred Waste Management Methods
Excavated Material	Excess material removed during construction	Refill any excavations and spread any excess over the nearby area and allow to re-vegetate. Waste materials will be reused as much as practicable to construct, haul roads, pads, etc.
Waste Concrete	Footing pours	Minimize waste by producing only the amount necessary. Disposal in designated area(s) for concrete washout. Regularly break-up and remove hardened concrete for proper disposal in landfill.
Cleared Vegetation	Vegetation cleared during construction of yard sites, access roads and the right-of-way	Felling, chipping, mulching or burning. Salvage timber on Crown Land where practical and feasible. Follow burning procedures for non-salvaged timber. Vegetation mulch/chips may be retained on site for use in mitigation and site management works (e.g., erosion control). Mulch/chips may be utilized by local landowners where practical and feasible.

I.3 Erosion and Sediment Control Planning Framework

Introduction

Part of Manitoba Hydro's commitment to environmental protection includes the development of an Environmental Protection Program (EPP) for the Bipole III Transmission Project (the 'Project'). Aspects of this program include planning, monitoring and follow up for erosion and sediment control. This document provides the Framework for the development of Erosion and Sediment Control Plans (ESCP) by construction contractors for the project.

This Framework is intended to provide assurance to regulatory reviewers, environmental organizations, Aboriginal communities and the general public that commitments made in the Project Environmental Impact Statement (EIS) and Construction Environmental Protection Plans (CEnvPPs) will be implemented and monitored in a responsible and accountable manner.

Background

Land disturbing activities associated with the proposed construction of the Project may involve soil, rock, and vegetation removal. This surficial disturbance may result in soil erosion and/or sedimentation in the construction areas and beyond.

Erosion and sedimentation are naturally occurring processes involving the loosening, transport and deposition of soils. Erosion involves the wearing away of soil materials, caused by the action of wind or water, through detachment and transport of materials while sedimentation is the deposition of soil particles previously held in suspension by flowing water.

Water runoff is also part of the natural hydrological cycle, however, clearing, grading, and other construction activities that remove vegetation and compact the soil may result in increased runoff. Excessive runoff may cause erosion, sedimentation, or flooding.

Construction activities can result in a rapid increase in erosion and sedimentation rates that, if left uncontrolled, can reparably or irreparably harm the environment.

Purpose

It is important that land and water resources are protected from soil erosion. Manitoba Hydro recognizes the need to proactively address the issues of erosion and sedimentation. This document provides a framework to guide contractors in the preparation and implementation of an ESCP, which is a crucial step in managing and mitigating erosion and sedimentation.

Objectives

The objectives of the erosion and sediment control Framework are as follows:

- To provide a framework for erosion, sediment control and planning.
- To identify a process to develop an ESCP that meets regulatory requirements, industry standards and best practices.
- To provide guidance on the development of an ESCP that contains the necessary components to meet regulatory requirements, industry standards and best practices.

Roles and Responsibilities

The following table summarizes the roles and responsibilities of the main participants in the ESCP:

Manitoba Hydro	• Ultimate responsibility for ESC planning, design, implementation, inspection, monitoring, maintenance, operation, and decommissioning. • May delegate this responsibility to numerous design and construction professionals to construct/implement, maintain and inspect /monitor for the duration of the undertaking. • Signs agreements, approvals permits and Authorizations to which compliance is legally binding. • Ensure Contractors are aware of their responsibilities and are back charged for construction of ESC measures installed, maintained and specific restorations requirements. • Appoint an Environmental Inspector to confirm that regulatory criteria are being met by the ESCP.
Construction Contractor	• Erosion Protection and Sediment Control Plans will be prepared by the Contractor, approved by the Construction Supervisor and/or the Senior Environmental Assessment Officer and updated annually. • The Contractor will communicate erosion protection and sediment control information to all project staff and will ensure a copy of the Erosion and Sediment Control Plan will be made available at the project site. • The Contractor will be responsible for implementing and maintaining Erosion Protection and Sediment Control Plans and procedures. • The Contractor will be responsible for modifying erosion protection and sediment control installations to ensure continued effectiveness. • Vigilant for operation and maintenance of ESC measures. • Appoint a Construction Inspector to confirm that regulatory criteria are being met by the ESCP. • Respond promptly to feedback from the Environmental Inspector, Regulator, or Construction Supervisor.
Environmental Inspector	• Conduct regular monitoring of ESC measures to confirm proper implementation and effectiveness of controls. • Provide feedback to the Construction Contractor and the Licensing and Environmental Assessment Officer. • Document site inspections and corrective actions. • Maintain log books/ records.

Responsibilities for the development and implementation of an ESCP should be carried out in the order below:

- A project-specific Erosion Protection and Sediment Control Plan will be prepared prior to starting construction in erosion susceptible areas.
- Erosion Protection and Sediment Control Plans will be prepared by the Contractor, approved by the Construction Supervisor and/or the Senior Environmental Assessment Officer and updated annually.
- The Contractor will communicate erosion protection and sediment control information to all project staff and a copy of the Erosion and Sediment Control Plan will be made available at the project site.
- The Contractor will be responsible for implementing and maintaining Erosion Protection and Sediment Control Plans and procedures.
- The Contractor will be responsible for modifying erosion protection and sediment control installations to ensure continued effectiveness.
- The Contractor Environment Officer will conduct regular monitoring of erosion and sediment control measures to confirm implementation and continued effectiveness.
- The Manitoba Hydro Environmental Inspector will make regular inspections of erosion protection and sediment control measures to confirm regulatory criteria are being met.

Erosion and Sediment Control Plan Components

The plan should include both temporary and permanent ESC's. Temporary ESC's are those that are in place during the construction phase, or a portion thereof, when exposed soils are vulnerable to increased erosion rates and streams are at risk of sedimentation. Permanent ESC's are those that are to be maintained throughout the operational phase of the Project.

General environmental protection components pertaining to erosion protection and sediment control are listed below.

1. Phase construction to limit soil exposure.
2. Minimize needless stripping and grading.
3. Stabilize exposed soils immediately.
4. Protect waterways and stabilize drainage ways.
5. Protect steep slopes and cuts.
6. Install perimeter controls.
7. Employ advanced sediment settling controls.
8. Ensure contractors are trained in ESC plan, implementation, inspections, maintenance and repairs.
9. Adjust ESC plan at construction site, as required.

10. Assess effectiveness of ESC control measures regularly and after storms, and repair, replace or upgrade, as required.
11. Respond to Environmental Improvement Orders related to erosion and sediment control, as required, if issued by Manitoba Hydro.

Monitoring and Inspection

Monitoring and Inspection is necessary to ensure the effectiveness of the plan. It provides confirmation of proper implementation and effectiveness of environmental protection measures, therefore contributing to the overall success of a project. Manitoba Hydro will provide Environmental Inspectors prior to the start of the Project to conduct inspections of environmental components (soil and water) targeted for protection by erosion and sediment control measures in order to confirm that regulatory requirements are being achieved. Post-construction monitoring is often required to ensure the restoration, stabilization, and required monitoring of constructed features/habitats is established.

It is the duty of the contractor to ensure that the erosion and sediment control measures are properly installed, well maintained and functioning as intended on a daily basis. The ESCP should provide the framework for the inspection, maintenance including the need for repair, and record-keeping procedures during all stages of construction. The effectiveness of the ESCP depends directly on the frequency of monitoring and what actions are taken to address any failures that may occur. Documentation of all monitoring activities should be kept by the Contractor for a minimum of one (1) year after the development is substantially completed.

An effective construction monitoring program should include the following:

1. Construction drawings detailing the erosion and sediment controls installed which is updated through the construction period.
2. High risk areas should be identified on these drawings and routinely evaluated.
3. During inactive construction periods, where the site is left alone for 30 days or longer, monthly monitoring should be conducted.
4. All damaged ESC measures should be repaired and/or replaced.
5. A monitoring schedule will be drawn up to include times, areas and person(s) responsible.

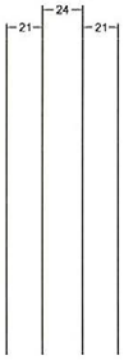
APPENDIX J:CLEARING GUIDELINE DIAGRAMS

GENERAL

- Shearblade the full 66m ROW width

- Rake and pile minimum 15m from standing timber for burning

PERMAFROST

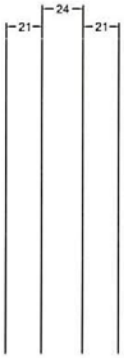


- Shearblade 12m on both sides of centerline
- Low disturbance clearing outside of the center 24m area -- trampling, hand clearing, feller buncher, hydro axe

- Rake and pile material from the 24m centerline where needed -- no raking outside of the middle 24m area

- minimum 15m from standing timber for burning -- use nearest tower site if needed

CARIBOU



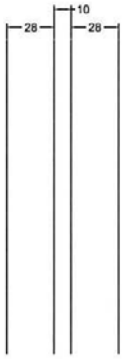
- Shearblade 12m on both sides of centerline

- Selective clearing of danger trees (>5m) or potential danger trees outside of the center 24m area -- hand clearing, feller buncher, hydro axe

- Rake and pile material from the 24m centerline where needed -- no raking outside of the middle 24m area

- minimum 15m from standing timber for burning -- use nearest tower site if needed

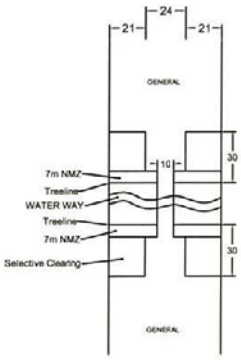
HARVEST



- Shearblade centerline for access

- Feller bunchers and skidders to harvest and stack timber for processing

WATER CROSSING



- Shearblade 12m on both sides of centerline up to the 7m NMZ
- 10m max width through NMZ and across the channel

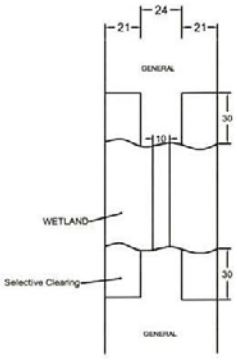
- ONLY hand clearing or reaching in with the feller buncher allowed in the NMZ

- Select clearing outside of the center 24m area in the buffer zone -- trampling, hand clearing, feller buncher, hydro axe

- skid and pile material from the buffer zone where needed -- no raking

- minimum 15m from standing timber and 100m from the buffer zone for burning

WETLAND



- Shearblade 12m on both sides of centerline up to wetland area

- Select clearing outside of the center 24m area within the buffer zone -- trampling, hand clearing, feller buncher, hydro axe

- Rake and pile material from the 24m centerline where needed -- no raking outside of the middle 24m area

- minimum 15m from standing timber for burning

Note: Riparian Buffers for Water Crossings and Wetlands are a minimum of 30m but increase in size based on slope of land entering waterway. (See Riparian Bufffer Table in CEnvPP)

Note: These diagrams are to be used as a field guideline only on how to perform clearing in certain ESS types. They do not cover all scenarios. Please note that all mitigation measures must be adhered to as outlined in the EPP.

APPENDIX K: CONSTRUCTION SECTION INDEX MAPS

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APPENDIX L: GENERAL MITIGATION APPROACH FOR REDUCING RISK TO NESTING BIRDS

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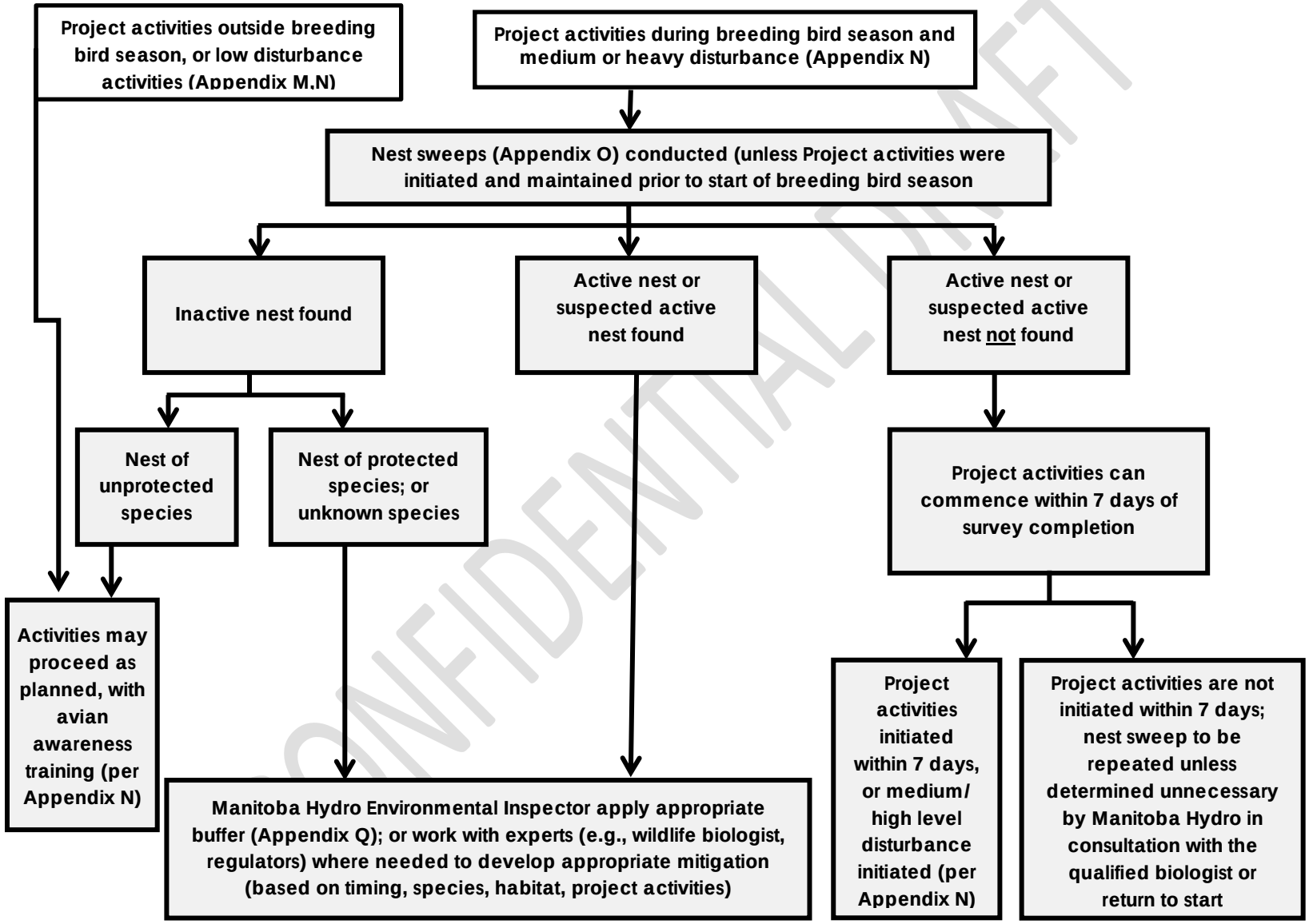
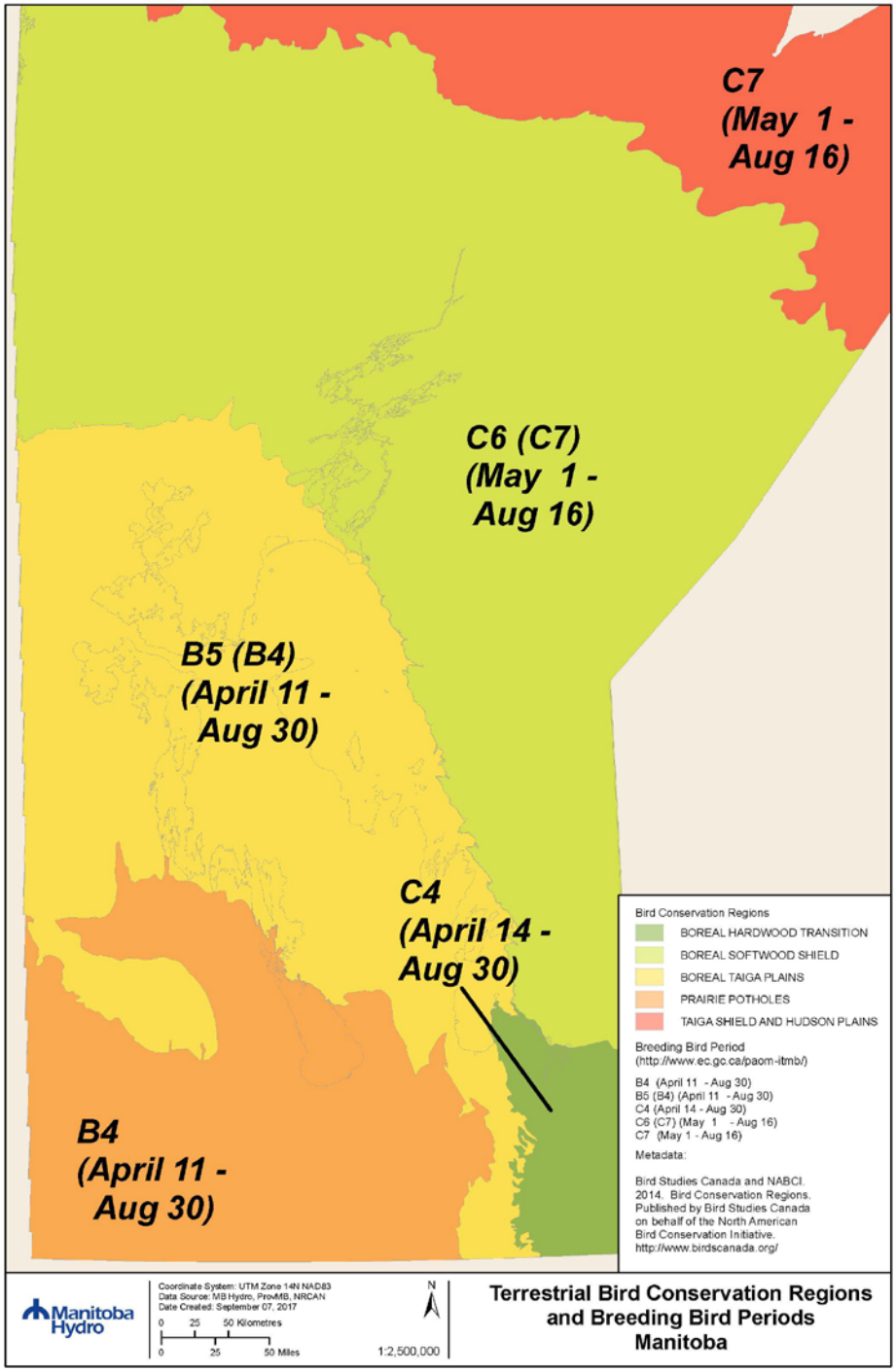
Appendix L: General Mitigation Approach for Reducing Risk to Nesting Birds



APPENDIX M: TERRESTRIAL BIRD CONSERVATION REGIONS, BREEDING BIRD PERIODS FOR MANITOBA

Manitoba Hydro

Appendix M: Terrestrial Bird Conservation Regions, Breeding Bird Periods* for Manitoba – Adapted from Environment and Climate Change Canada



* dates should be considered as guidelines.

APPENDIX N: DETERMINING DISTURBANCE LEVEL FOR NESTING BIRDS DURING BREEDING BIRD SEASON

Manitoba Hydro

Appendix N: Determining Disturbance Level for Nesting Birds during Breeding Bird Season

Activity	Disturbance Level	Training	General Mitigation
• Foot Traffic; • Vehicle/Equipment (<1 ton or UTV/ATV) : one round trip (two passes); • Herbicide application (spot) with flex track vehicle	Low	General Avian Awareness: • basic bird biology • nesting characteristics • Regulations	Operator and applicators remain vigilant for any possible bird nesting activity, provide 5 m berth
• Vehicle/Equipment (<1 ton or UTV/ATV) : three or more passes • Sustained activity for <4 hours; • Limbing; • Testing/treating of poles; • Danger tree removal; • Removal of soil and/or brush	Moderate	General Avian Awareness: • basic bird biology • nesting characteristics • Regulations; and Consult Manitoba Hydro Environmental Officer	Nest sweeps protocol as per Appendix O Appendix L: General Mitigation Approach
• Vehicle/Equipment (>1 ton) • Sustained activity for >4 hours • Brushing; • Hand felling; • Mowing; • Mulching; • Mechanical tree felling; • Road Construction;	High		

APPENDIX O: MANITOBA HYDRO NEST SWEEP PROTOCOL

Manitoba Hydro

Appendix O: Manitoba Hydro Nest Sweep Protocol

Birds may nest on the ground, others nest in shrubs and/or trees, while other nest along the edges of water bodies. In general, lands under agricultural cultivation or other regular disturbance will not support nesting birds and will not require a nest sweep. Nest sweeps are too be conducted on lands having potential to support bird nesting. Birds may nest on the ground, others nest in shrubs and/or trees, while other nest along the edges of water bodies. Qualified biologist from Manitoba Hydro, a contractor, or consultant are to complete nest sweeps no more than 7 days before disturbance activities. To complete a nest sweep:

- Nest sweeps are to be done on foot and can be completed from sunrise until 1800 hours, however birds are most active from sunrise until 1000 hours. Nest sweeps will be discontinued during high winds or precipitation as birds are less active.
- In advance of any medium or heavy disturbance activity (Appendix N) walk the entire area, ensuring full coverage. Recommended spacing between parallel transects is approximately 10 m, but surveyors may reduce this spacing as necessary.
- Walk slowly, observing from ground-level, to the tops of the trees.
- If a nest is suspected to be nearby based on bird behavior (e.g. acting strange/aggressive or agitated vocalizations), try to locate the nest location.
- If the nest is found, mark the location with flagging tape (tie the flagging tape to a tree or other landmark several meters away). Record the following information on the flagging tape: location of the nest including UTM coordinates, type of bird (songbird, waterfowl, or raptor) and the date.
- If the bird species and the corresponding necessary buffer cannot be readily determined, establish a temporary minimum 30 meter “no clearing” buffer around the nest site.
- Once the bird species has been determined, an appropriately sized “no clearing” buffer must be setup around the nest location. Consult regulatory guidelines (MH Avian Protection Plan - Appendix Q – select the most appropriate buffer) or contact a Manitoba Hydro environment officer or environmental.
- Use flagging tape or appropriate signage to mark the required buffer around the nest location.
- Enter each nest observation into the nesting bird collection form (Appendix P) and include what actions were taken or what actions are recommended**.
- Continue nest sweep until the entire area scheduled for clearing has been adequately searched.
- For sites with a high variability of habitat types or a high abundance of birds detected, searchers are encouraged to engage a qualified biologist* to assist with the nest search. If no nests were found, proceed with clearing.

* Personnel from Manitoba Hydro or consulting company with expertise in wildlife biology.

** If a nest was found, there are two options:

- Defer disturbance within the required buffer. Activity can recommence after breeding bird nesting season, as described by regulators (MH Avian Protection Plan - Appendix M).

- Check the nest again seven (7) days from the day it was found to see if eggs have hatched and birds have left. If there is no sign of activity, complete another foot patrol of the buffer area. If no nests are found, proceed with activity. If after (7) days, the nest is still occupied, continue checking at seven (7) day intervals (Appendix O).

APPENDIX P: BIRD NESTING COLLECTION FORM

Manitoba Hydro

Appendix P:

Nesting Bird Collection Form (start sheet(s) for each new Location)

Name(s):	Date:

Location and general description of ROW area to be surveyed (i.e. S1 between towers 1234-1280 near Holland, MB):

Habitat (photo # and description):	Temperature:	Wind	Noise	Precipitation	Cloud Cover	Weather (description):
		Calm	None	None	0 - 25%	
		Light Air	Low	Haze/Fog	25 - 50%	
		Light Breeze	Moderate	Drizzle	50 - 75%	
		Gentle Breeze	High	Rain	75 - 100%	

GPS Tracks should be recorded by each member on the survey and submitted with the daily reports.

Observation	Time	UTM Zone	Easting	Northing	Species	Status of Nest/Parents	Mitigation Applied	GPS Photo	Comments
(Nest/Territory)	(HH:MM:SS)	(14/15)	635401	5568325	(if not able to identify provide written description of nest site and surroundings)	Status (under const/# eggs /# hatchlings) Parents (/incubating/feeding)	(flagging an appropriate buffer, alerting appropriate Environmental Supervisor)	(Photo #)	Any Comments regarding the site

APPENDIX Q: GENERAL BREEDING BIRD BUFFER GUIDELINES

Manitoba Hydro

Appendix Q:

Manitoba Hydro Breeding Bird Buffer Guidelines

Key	
	Manitoba Conservation Data Centre specified
	100-200 m Buffer
	50 m Buffer
	25 m Buffer

Species	Scientific Name	SARA (schedule & status)	COSEWIC (status & date assessed)	Habitat	Minimum Suggested Buffer (Meters)	Incubation Time (days)	Estimated Time to Leaving Nest or Fledging after hatching (Days)	**Jurisdiction for Birds** (F=Federal migratory, P=Provincial year-round resident), Nests = Provincial legislation for Herons, Eagles and others
Alder Flycatcher	*Empidonax alnorum*				25	12-14	12-15	F
American Bittern	*Botaurus lentiginosus*			Emergent-dominated wetlands	25	24-28	1-4	F
American Coot	*Fulica americana*			Emergent-dominated wetlands	25	21-25	1-4	F
American Crow	*Corvus brachyrhynchos*				25	15-18	28-35	F
American Dipper	*Cinclus mexicanus*				25	13-18	12-14	F
American Goldfinch	*Spinus tristis*				25	10-12	12-14	F
Green-winged Teal	*Anas c. carolinensis*				25	20-24	1-4	F
American Kestrel	*Falco sparverius*			Forest clearings, grassland, or pasture	25	29-30	30	F
American Pipit	*Anthus rubescens*				25	13-15	12-14	F
American Redstart	*Setophaga ruticilla*				25	12-14	12-14	F
American Robin	*Turdus migratorius*				25	12-14	12-14	F
American Three-toed Woodpecker	*Picoides dorsalis*				25	12-14	18-23	P
American Tree Sparrow	Spizella arborea				25	12-14	12-14	F
American white pelican	Pelecanus erythrorhynchos			isolated islands	1000	30		F
Arctic Warbler	Phylloscopus borealis				25	12-14	12-14	F
Bald Eagle	*Haliaeetus leucocephalus*			forests near water	1000	28-35	35-49	P
Baltimore Oriole	*Icterus galbula*			Forest, deciduous	25	12-14	12-14	F
Band-tailed pigeon	*Patagioenas fasciata*	Special Concern -1	Special Concern	Riparian Forest;Pasture/Old Field;Cultivated Field;Deciduous/Broadleaf Forest;Conifer Forest	25			
Bank Swallow	*Riparia riparia*		Threatened (Apr 2013)	Rivers	300	14-16	17-18	F
Baird's Sparrow	*Ammodramus bairdii*	Special Concern -1	Special Concern	Native grass prairie	500	11-12	8-11	F
Barn Swallow	*Hirundo rustica*		Threatened (May 2011)	Forest clearings, grassland, or pasture	150	13-17	17-18	F
Barred Owl	*Strix varia*			mature forest	1000	28-33	28-35	P
Barrow's Goldeneye	*Bucephala islandica*			Open water wetlands or riparian	25	28-44	1-4	F

Manitoba Hydro Breeding Bird Buffer Guidelines

Key	
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	100-200 m Buffer
	50 m Buffer
	25 m Buffer

Species	Scientific Name	SARA (schedule & status)	COSEWIC (status & date assessed)	Habitat	Minimum Suggested Buffer (Meters)	Incubation Time (days)	Estimated Time to Leaving Nest or Fledging after hatching (Days)	**Jurisdiction for Birds** (F=Federal migratory, P=Provincial year-round resident), Nests = Provincial legislation for Herons, Eagles and others
Bay-breasted Warbler	*Setophaga castanea*			Forest, coniferous	50	12-14	12-14	F
Belted Kingfisher	*Megaceryle alcyon*			Open water wetlands or riparian	25	22-24	27-29	F
Black Swift	*Cypseloides niger*			Riparian areas and forest; streams	25	24-27	12-14	F
Black Tern	*Chlidonias niger*			Open water wetlands or riparian	25	17-22	12-14	F
Black-and-white Warbler	*Mniotilta varia*				50	10-12	12-14	F
Black-backed Woodpecker	*Picoides arcticus*				25	12-14	21	P
Black-billed Magpie	*Pica hudsonia*				25	16-21	12-14	P
Black-capped Chickadee	*Poecile atricapillus*				25	11-13	12-14	P
Blackpoll Warbler	*Setophaga striata*					11-13	12-14	F
Black-throated Green Warbler	*Setophaga virens*			Forest, mixed wood; riparian	50	11-13	12-14	F
Blue Jay	*Cyanocitta cristata*				25	16-18	17-21	P
Blue-headed Vireo	*Vireo solitarius*				25	12-14	12-14	F
Blue-winged Teal	*Anas discors*			Open water wetlands or riparian	25	22-27	1-4	F
Bobolink	*Dolichonyx oryzivorus*		Threatened	forage crops	400	12	11-12	F
Bohemian Waxwing	*Bombycilla garrulus*				25	13-15	17-21	P
Boreal Chickadee	*Poecile hudsonicus*				25	14-18	12-14	P
Boreal Owl	*Aegolius funereus*			Forest, coniferous	1000	28-30	28-35	P
Brewers Blackbird	*Euphagus cyanocephalus*				25	11-17	12-16	F
Brewer's Sparrow	Spizella breweri				25	12-14	12-16	F
Broad-winged Hawk	*Buteo platypterus*			Forest, deciduous	200	28-31	28-35	F
Brown Creeper	*Certhia americana*			Forest, coniferous	25	14-18	12-16	P
Brown-headed Cowbird	*Molothrus ater*				25	10-13	12-16	F
Buff-brested Sandpiper	*Calidris subruficollis*	Special Concern-1	Special Concern (2012)	Stop-over sites, short grass	200	23-25	18-20	F
Bufflehead	*Bucephala albeola*				25	28-33	12-14	F
Burrowing owl	*Athene cunicularia*	Endangered-1	Endangered	pasture	500	28	21	F
Calliope Hummingbird	*Stellula calliope*				25	15-16	12-14	F
Canada Goose	*Branta canadensis*				25	25-30	1-2	F
Canada Warbler	*Cardellina canadensis*	1-Threatened (Feb 2010)	Threatened (Mar 2008)	Forest, mixed wood	450	11-13	12-14	F

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Canvasback	*Aythya valisineria*			Open water wetlands or riparian	25	23-29	1-4	F
Cape May Warbler	*Setophaga tigrina*			Forest, coniferous	50	11-13	12-14	F
Cassin's Finch	*Carpodacus cassinii*				25	12-14	12-14	F
Cedar Waxwing	*Bombycilla cedrorum*				25	12-16	12-14	F
Chestnut-collared longspur	*Calcarius ornatus*	1-Threatened	Threatened	mixed grass prairie	650	11		F
Chestnut-sided Warbler	*Setophaga pensylvanica*				25	11-14	12-14	F
Chimney swift	*Chaetura pelagica*	1-Threatened	Threatened	anthropogenic	300			F
Chipping Sparrow	*Spizella passerina*				25	11-14	12-14	F
Clay-colored Sparrow	*Spizella pallida*				25	10-12	12-14	F
Cliff Swallow	*Petrochelidon pyrrhonota*			Open water wetlands or riparian	25	14-16	12-14	F
Common Goldeneye	*Bucephala clangula*			Open water wetlands or riparian	25	28-33	1-2	F
Common Grackle	*Quiscalus quiscula*				25	12-14	12-14	F
Common Loon	*Gavia immer*				50	26-31	1-2	F
Common Merganser	*Mergus merganser*				25	28-35	1-2	F
Common Nighthawk	*Chordeiles minor*	1-Threatened (Feb 2010)	Threatened (Apr 2007)	Forest clearings, grassland, or pasture	300	19-20	17-18	F
Common Raven	*Corvus corax*				25	18-21	12-14	P
Common Redpoll	*Acanthis flammea*				25	10-11	9-14	P
Common Yellowthroat	*Geothlypis trichas*				25	11-14	12-14	F
Connecticut Warbler	*Oporornis agilis*			Forest, deciduous	50	11-14	12-14	F
Dark-eyed Junco	*Junco hyemalis*				25	11-14	12-14	P
Double-crested cormorant	*Phalocrocorax auritus*			aquatic	750			F
Downey Woodpecker	*Picoides pubescens*				25	11-14	12-14	P
Dusky Flycatcher	*Empidonax oberholseri*			Forest, coniferous	25	12-16	12-14	F
Dusky Grouse	*Dendragapus obscurus*			Shrubland or young forest	25	25-26	1-4	P
Eastern Kingbird	*Tyrannus tyrannus*			Open water wetlands or riparian	25	16-18	12-14	F
Eastern screech owl	*Megascops asio*			tree cover	500	26-30		P
Eastern whip-poor-will	*Antrostomus vociferus*	1-Threatened	Threatened	open woodland	300	19-21		F
Eastern wood-pewee	*Contopus virens*		Special Concern	clearings, forest edges	300	12-13		F
European Starling	*Sturnus vulgaris*				0	N/A	N/A	P
Evening Grosbeak	*Coccothraustes vespertinus*			Forest, mixed wood	25	12-16	12-14	P
Ferruginous hawk	*Buteo regalis*	1-Threatened	Threatened	open country	1000	32-33		P
Flammulated owl	*Psiloscops flammeolus*	1- Special Concern	Special Concern		50			
Fox Sparrow	*Passerella iliaca*				25	12-14	12-14	P

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Golden Eagle	*Aquila chrysaetos*			Cliffs	1000	41-45	45-81	F
Golden-crowned Kinglet	*Regulus satrapa*				25	14-15	12-14	P
Golden-crowned Sparrow	*Zonotrichia atricapilla*				25	11-14	12-14	F
Golden-winged warbler	*Vermivora chrysoptera*	1-Threatened	Threatened	open woodland	450	10-11		F
Grasshopper sparrow	*Ammodramus savannarum*			open grassland, prairie	400	11-13		F
Gray Jay	*Perisoreus canadensis*				25	16-18	22-24	P
Great Blue Heron	*Ardea herodias*			Forest, mixed wood	750	25-30	49-81	P
Great Gray Owl	*Strix nebulosa*			Forest, mixed wood	1000	28-30	28-35	P
Great Horned Owl	*Bubo virginianus*			Forest, mixed wood	100	28-35	28-35	P
Greater Scaup	*Aythya marila*			Open water wetlands or riparian	25	24-28	1-4	F
Greater Yellowlegs	*Tringa melanoleuca*			Open water wetlands or riparian	25	20-24	1-4	F
Grebes				Colonial nesting sites	200			F
Green-winged Teal	*Anas crecca*				25	20-24	1-4	F
Gulls/Terns				Colonial nesting sites	500			F
Hairy Woodpecker	*Picoides villosus*				25	11-15	28-30	P
Hammond's Flycatcher	*Empidonax hammondii*				25	12-16	12-14	F
Harlequin Duck	*Histrionicus histrionicus*			Open water wetlands or riparian	100	27-30	1-2	F
Hermit Thrush	*Catharus guttatus*				25	12-14	12-14	F
Herons spp.				Nesting Colony	500			F
Hoary Redpoll	*Acanthis hornemanni*				25	9-12	12-14	P
Hooded Merganser	*Lophodytes cucullatus*				25	32-33	1-4	F
Horned Grebe	*Podiceps auritus*		Special Concern (Apr 2009)	Open water wetlands or riparian	400	22-25	1-4	F
Horned Lark	*Eremophila alpestris*			Alpine, subalpine	25	11-12	12-14	F
House Finch	*Carpodacus mexicanus*				25	12-14	12-14	F
House Sparrow	*Passer domesticus*				0	N/A	N/A	P
House Wren	*Troglodytes aedon*				25	12-16	12-14	F
Killdeer	*Charadrius vociferus*			Forest clearings, grassland, or pasture	25	22-28	1-2	F
Le Conte's Sparrow	*Ammodramus leconteii*			Emergent-dominated wetlands	25	12-14	12-14	F
Least Flycatcher	*Empidonax minimus*				25	12-17	12-14	F
Least Bittern	*Ixobrychus exilis*	Threatened-1	Threatened		200			F
Lesser Scaup	*Aythya affinis*			Open water wetlands or riparian	25	21-28	1-2	F
Lesser Yellowlegs	*Tringa flavipes*				25	22-23	1-2	F
Lincoln's Sparrow	*Melospiza lincolnii*				25	12-14	12-14	F
Loggerhead shrike prairie subspecies	*Lanius ludovicianus excubitorides*	1-Threatened	Threatened	open woodland	500	16		F
Long-eared Owl	*Asio otus*				200	26-28	28-35	P
MacGillivray's Warbler	*Geothlypis tolmiei*				25	11-12	12-14	F
Magnolia Warbler	*Setophaga magnolia*				25	11-14	12-14	F
Mallard	*Anas platyrhynchos*				25	26-30	1-2	F
Marsh Wren	*Cistothorus palustris*				25	12-16	12-14	F

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Merlin	*Falco columbarius*				25	28-32	29	F
Mountain Bluebird	*Sialia currucoides*				25	12-14	12-14	F
Mountain Chickadee	*Poecile gambeli*				25	11-12	12-14	P
Mountain White-crowned Sparrow	*Zonotrichia l. oriantha*				25	11-14	12-14	F
Mourning Warbler	*Geothlypis philadelphia*			Forest, mixed wood	25	12-14	12-14	F
Nashville Warbler	*Oreothlypis ruficapilla*				25	11-12	12-14	F
Nelson's Sparrow	*Ammodramus nelsoni*			Open water wetlands or riparian	50	11-12	12-14	F
Northern Flicker	*Colaptes auratus*				25	11-16	24-27	F
Northern Goshawk	*Accipiter gentilis*				200	36-41	12-14	P
Northern Harrier	*Circus cyaneus*			Forest clearings, grassland, or pasture	100	28-36	12-14	F
Northern Hawk Owl	*Surnia ulula*			coniferous or mix forest near open areas	1000	25-30	25-30	P
Northern Pintail	*Anas acuta*			Open water wetlands or riparian	25	22-25	1-2	F
Northern Pygmy-owl	*Glaucidium gnoma*			Forest, coniferous; forest, mixedwood	200	29-30	28-35	P
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*			Open water wetlands or riparian	25	11-14	18-21	F
Northern Saw-whet Owl	*Aegolius acadicus*				100	26-28	28-35	P
Northern Shoveler	*Anas clypeata*				25	21-27	1-2	F
Northern Shrike	*Lanius excubitor*				25	15-16	20-21	F
Northern Waterthrush	*Parkesia noveboracensis*				25	11-14	12-14	F
Olive-sided Flycatcher	*Contopus cooperi*	1-Threatened (Feb 2010)	Threatened (Nov 2007)	Forest, coniferous	300	14-17	12-14	F
Osprey	*Pandion haliaetus*				200	35-40	36-42	P
Ovenbird	*Seiurus aurocapilla*				25	11-14	12-14	F
Pacific Wren	*Troglodytes pacificus*					12-16	12-14	F
Pacific-slope Flycatcher	*Empidonax difficilis*			Forest, coniferous	25	14-16	12-14	F
Peregrine Falcon	*Falco peregrinus*	1-Threatened (May 2003)	Special Concern (Apr 2007)		1000	28-32	35-42	P
Philadelphia Vireo	*Vireo philadelphicus*			Shrubland or young forest	25	11-14	12-14	F
Pied-billed Grebe	*Podilymbus podiceps*			Open water wetlands or riparian	25	23-27	1-2	F
Pileated Woodpecker	*Dryocopus pileatus*			Forest, deciduous	25	15-18	24-28	P
Pine Grosbeak	*Pinicola enucleator*			Forest, deciduous	25	10-12	12-14	P
Pine Siskin	*Spinus pinus*			Forest, coniferous	25	11-14	12-14	P
Piping plover	*Charadrius melodus melodus*	E-1	Endangered		400	25-27	Jan-00	F
Purple Finch	*Carpodacus purpureus*			Forest, coniferous	25	11-14	12-14	F

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Red Crossbill	*Loxia curvirostra*			Forest, coniferous	25	12-18	12-14	P
Red-breasted Merganser	*Mergus serrator*			Open water wetlands or riparian	25	29-35	1-2	F
Red-breasted Nuthatch	*Sitta canadensis*			Forest, coniferous	25	11-14	12-14	P
Red-breasted Sapsucker	*Sphyrapicus ruber*			Forest, deciduous	25	12-14	24-27	F
Red-eyed Vireo	*Vireo olivaceus*			Forest, deciduous	25	11-14	12-14	F
Redhead	*Aythya americana*			Open water wetlands or riparian	25	23-29	1-2	F
Red-headed woodpecker	*Melanerpes erythrocephalus*	1-Threatened	Threatened	open woodland	200	12-14		F
Red Knot	*Calidris canutus rufa*	E-1	Endangered	Stop-over sites	200	20-22	1-Feb	F
Red-naped Sapsucker	*Sphyrapicus nuchalis*			Forest, deciduous	25	12-14	24-27	F
Red-necked Grebe	*Podiceps grisegena*			Open water wetlands or riparian	25	20-23	1-2	F
Red-necked Phalarope	*Phalaropus lobatus*		Special Concern	Open water wetlands or riparian	25	17-21	1-2	F
Red-tailed Hawk	*Buteo jamaicensis*				100	30-35	42-46	F
Red-winged Blackbird	*Agelaius phoeniceus*			Open water wetlands or riparian	25	11-14	12-14	F
Ring-necked Duck	*Aythya collaris*			Open water wetlands or riparian	25	23-29	1-2	F
Rose-breasted Grosbeak	*Pheucticus ludovicianus*			Forest, deciduous	25	12-14	12-14	F
Ross's Gull	*Rhodostethia rosea*	Threatened-1	Threatened		1000	19-22	19-22	F
Rough-legged Hawk	*Buteo lagopus*			Alpine, subalpine, grassland, pasture	200	30-35	42-46	F
Ruby-crowned Kinglet	*Regulus calendula*				25	12-14	12-14	F
Ruby-throated Hummingbird	*Archilochus colubris*				25	11-16	12-14	F
Ruffed Grouse	*Bonasa umbellus*			Forest, mixed wood	25	21-28	1-4	P
Rufous Hummingbird	*Selasphorus rufus*			Forest, coniferous; Riparian areas and forest	25	12-14	12-14	F
Rusty Blackbird	*Euphagus carolinus*	1-Special Concern (Mar 2009)	Special Concern (Apr 2006)	Open water wetlands or riparian	300	12-18	12-14	F
Sandhill Crane	*Grus canadensis*				100	28-32	1-4	F
Savannah Sparrow	*Passerculus sandwichensis*				25	11-14	12-14	F
Say's Phoebe	*Sayornis saya*				25	12-14	12-14	F
Sharp-shinned Hawk					100	34-35	21-28	F
Sharp-tailed Grouse	*Tympanuchus phasianellus*			Forest clearings, grassland, or pasture (25m for a nest and 1000m for a lek)	25	21-28	1-4	P
Short-eared Owl	*Asio flammeus*	1-Special Concern (Jul 2012)	Special Concern (Mar 2008)	Alpine, subalpine, grassland, pasture	500	25-29	28-35	F
Snow Bunting	*Plectrophenax nivalis*				25	10-16	12-14	P
Snowy Owl	*Bubo scandiacus*			Forest clearings, grassland, or pasture	N/A	N/A	N/A	F

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Solitary Sandpiper	*Tringa solitaria*				25	23-24	17-20	F
Song Sparrow	*Melospiza melodia*				25	12-14	12-14	F
Sora	*Porzana carolina*				25	18-20	1-4	F
Spotted Sandpiper	*Actitis macularius*				25	20-24	1-4	F
Sprague's Pipit	*Anthus spragueii*	1-Threatened	Threatened	open grassland	650	12-14	12-14	F
Spruce Grouse	*Falcipennis canadensis*				25	21-24	1-4	P
Steller's Jay	*Cyanocitta stelleri*				25	16-18	16	P
Surf Scoter	*Melanitta perspicillata*			Open water wetlands or riparian	25	25-30	1-4	F
Swainson's Hawk	*Buteo swainsoni*				200	28-32	21-28	F
Swainson's Thrush	*Catharus ustulatus*			Forest, mixed wood	25	12-14	12-14	F
Swamp Sparrow	*Melospiza georgiana*				25	12-15	12-14	F
Tennessee Warbler	*Oreothlypis peregrina*				25	11-14	12-14	F
Townsend's Solitaire	*Myadestes townsendi*			Alpine, subalpine	25	12-14	12-14	F
Townsend's Warbler	*Setophaga townsendi*				25	12-14	12-14	F
Tree Swallow	*Tachycineta bicolor*			Open water wetlands or riparian	25	12-16	12-14	F
Trumpeter Swan	*Cygnus buccinator*				1000	32-37	1-4	F
Tundra Swan	*Cygnus columbianus*			Open water wetlands or riparian	100	31-40	1-4	F
Turkey Vulture	*Cathartes aura*				100	38-41	60-84	F
Upland Sandpiper	*Bartramia longicauda*			Forest clearings, grassland, or pasture	50	21-27	30-31	F
Varied Thrush	*Ixoreus naevius*				25	12-14	12-14	F
Vaux's Swift	*Chaetura vauxi*			Forest, coniferous; Forest, deciduous	25	18-20	12-14	F
Vesper Sparrow	*Pooecetes gramineus*			Forest clearings, grassland, or pasture	25	11-14	12-14	F
Violet-green Swallow	*Tachycineta thalassina*			Meadows; open woodlands; wooded canyons	25	12-14	12-14	F
Warbling Vireo	*Vireo gilvus*				25	12-14	12-14	F
Western Bluebird	*Sialia mexicana*				25	12-14	12-14	F
Western Grebe	*Aechmophorus occidentalis*			Open water wetlands or riparian	50	23-24	1-4	F
Western Kingbird	*Tyrannus verticalis*				25	18-20	12-14	F
Western Meadowlark	*Sturnella neglecta*				25	12-16	12-14	F
Western Palm Warbler	*Setophaga palmarum*				25	12-14	12-14	F
Western Tanager	*Piranga ludoviciana*				25	12-14	12-14	F
Western Wood-Pewee	*Contopus sordidulus*			Forest, coniferous;	25	12-14	12-14	F
White-breasted Nuthatch	*Sitta carolinensis*				25	12-14	12-14	P
White-crowned Sparrow	*Zonotrichia leucophrys*				25	11-14	12-14	F
White-throated Sparrow	*Zonotrichia albicollis*				25	11-14	12-14	F
White-winged Crossbill	*Loxia leucoptera*				25	12-14	12-14	P
Whooping Crane	*Grus americana*	Endangered-1	Endangered	Staging Area	750			F
Willow Ptarmigan	*Lagopus lagopus*				25	21-22	1-4	P

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Manitoba Hydro Breeding Bird Buffer Guidelines

Key	
	Manitoba Conservation Data Centre specified
	100-200 m Buffer
	50 m Buffer
	25 m Buffer

Species	Scientific Name	SARA (schedule & status)	COSEWIC (status & date assessed)	Habitat	Minimum Suggested Buffer (Meters)	Incubation Time (days)	Estimated Time to Leaving Nest or Fledging after hatching (Days)	Jurisdiction for Birds (F=Federal migratory, P=Provincial year-round resident), Nests = Provincial legislation for Herons, Eagles and others
Wilson's Phalarope	*Phalaropus tricolor*			Open water wetlands or riparian	25	18-21	1-4	F
Wilson's Snipe	*Gallinago delicata*			Emergent-dominated wetlands; riparian areas and forest	25	18-21	1-4	F
Wilson's Warbler	*Cardellina pusilla*			Shrubland or young forest	25	11-14	12-14	F
Winter Wren	*Troglodytes hiemalis*				25	12-16	12-14	F
Yellow Rail	*Coturnicops noveboracensis*	1-Special Concern (Jun 2003)	Special Concern (Nov 2009)	Emergent-dominated wetlands	350	16-18	1-4	F
Yellow Warbler	*Setophaga petechia*			Forest, deciduous; young/disturbed; riparian; willow	25	11-14	12-14	F
Yellow-bellied Flycatcher	*Empidonax flaviventris*				25	12-16	12-14	F
Yellow-bellied Sapsucker	*Sphyrapicus varius*				25	11-14	25-29	F
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*			Open water wetlands or riparian	25	11-14	12-14	F

APPENDIX P: REHABILITATION AND INVASIVE SPECIES MANAGEMENT PLAN

Manitoba Hydro

REHABILITATION AND INVASIVE SPECIES MANAGEMENT PLAN

MANITOBA HYDRO TRANSMISSION PROJECTS

March 2016

PREFACE

MANITOBA HYDRO'S ENVIRONMENTAL COMMITMENT

Manitoba Hydro is committed to protect and preserve natural environments and heritage resources affected by its projects and facilities. This commitment and a commitment to continually improve environmental performance is demonstrated through the company's Environmental Management System, which is ISO 14001 certified.

Environmental protection can only be achieved with the engagement of Manitoba Hydro employees, consultants, local communities and contractors at all stages of projects from planning and design through construction and operational phases.

As stated in the Corporate Environmental Management Policy, Manitoba Hydro is committed to protecting the environment by:

- *preventing or minimizing any adverse impacts on the environment, and enhancing positive effects*
- *continually improving our Environmental Management System*
- *meeting regulatory, contractual and voluntary requirements*
- *considering the interests and utilizing the knowledge of our customers, employees, communities, and stakeholders who may be affected by our actions*
- *reviewing our environment objectives and targets annually to ensure improvement in our environmental performance*
- *documenting and reporting our activities and environmental performance*

Manitoba Hydro's environmental management policy has been used to guide the development of environmental protection programs for proposed projects. Implementation of the program is practical application of the policy and will demonstrate Manitoba Hydro's dedication to environmental stewardship. Part of Manitoba Hydro's commitment to environmental protection includes rehabilitation and invasive species management.

Document Owner
Licensing and Environmental Assessment Department
Transmission Planning and Design Division
Transmission Business Unit
Manitoba Hydro

Version – Final 1.0

List of Revisions

Number	Nature of Revision	Section(s)	Revised By	Date

TABLE OF CONTENTS

1. Introduction

The purpose of this Rehabilitation and Invasive Species Management Plan is to provide information that will guide contractors and field personnel during project construction, maintenance, and decommissioning in a manner that meets the Manitoba Hydro's Environmental Management Policy and project commitments.

This Rehabilitation and Invasive Species Management Plan provides a framework of rehabilitation and invasive species management for Manitoba Hydro transmission projects, which cross diverse regions of Manitoba from the Boreal Forest in the north to agricultural and developed areas in the south. There are unique situations which are dependent on the region and site conditions, however this plan is meant to deliver information for all applicable areas.

What is Rehabilitation and Invasive Species Management?

Rehabilitation is the process of returning the land in a project area to a condition compatible to its former state after development has disturbed the land. Invasive species management is the process of managing the invasive species growing in the project area through a variety of methods. Invasive species are plants, animals or other organisms that are growing outside of their country or region of origin and are out-competing or even replacing native organisms. Since they come from ecosystems in other parts of the world,"unwanted invaders" escape their natural enemies. They have a distinct advantage over our native species whose populations are kept in check by native predators, competitors, or disease.

Reasons for rehabilitation and invasive species management may include:

- reducing the risk of erosion
- controlling the spread of invasive plants
- reducing access
- reclaiming land
- improving aesthetics
- restoring ecosystem function

Project components that may require Rehabilitation and Invasive Species Management

The main project components that may require rehabilitation and invasive species management include the following:

- right-of-ways (RoWs)
- access trails and roads
- borrow pits and quarries
- material placement areas
- marshalling yards
- construction camps
- station sites

Potential disturbances that may require Rehabilitation and Invasive Species Management

Some potential disturbances that require rehabilitation and invasive species management include the following:

- vegetation clearing at stream crossing
- rutting of access trail or RoW
- erosion at stream bank or ditch
- hazardous releases
- invasive species

Tree control programs on transmission line RoWs, such as winter shearing, mowing, hand cutting, and herbicide treatments are not discussed in this document. Tree control programs are detailed in Manitoba Hydro's ***Transmission Line and Transmission Station Vegetation Management Practices*** publication.

2. Rehabilitation Methods

2.1 Erosion and Sediment Control

Project activities may result in the disturbance or removal of topsoil and modification of the landscape. Where possible, removal of ground plant cover and soil disturbance should be minimized during project activities. Vegetation provides a protective cover for underlying soil and reduces surface runoff. Removal of vegetation cover exposes soil and can result in soil losses from wind and water erosion. In locations of rapid run-off, runnels may develop. Soil erosion near watercourses can reduce water quality by causing sedimentation, resulting in a reduction of aquatic ecosystem health.

Erosion control of disturbance sites may be necessary prior to re-establishment of vegetation. Erosion control prescriptions will vary considerably based on the conditions found at the site. The goal of erosion and sediment control is to create a self-supporting habitat, which is resilient to natural disturbance without further assistance. Erosion control can exist in several forms**.**

Methods to reduce soil erosion include the following:

- **Mulch** - Finely chopped organic or biodegradable material (e.g. wood fibre, wood chips).
- **Fibre blanket** – Rolled blankets to assist vegetation establishment used commonly on channels and slopes.
- **Silt fence** - Permeable fabric barriers anchored into the ground to collect sediment.
- **Rip-rap** – Rock protection used to line channel banks and slopes.
- **Gabions** - Wire baskets filled with rock to protect slopes.
- **Check dams** - Small dams constructed across channels to reduce flow velocity (e.g. rock, wood, sand bag).
- **Barriers** - Straw bales, brush or rock secured to reduce storm water runoff.
- **Soil tackifier** – Adhesive spray to stabilize soils prone to erosion (e.g. stockpiles).
- **Cover crop** – Early crop planted to stabilize the ground.
- **Planting/seeding** – Vegetation to provide cover and stabilize the ground.

2.2 Site Preparation

Site preparation for rehabilitation may vary with site conditions. Site preparation methods will depend largely on the degree of disturbance, soil conditions, and existing vegetation remaining and regenerating in sites.

Site preparation options include the following:

- **Contouring** - Site preparation may involve contouring of an area where a disturbance has occurred (e.g. borrow pits) prior to implementing other efforts.
- **Addition or removal of topsoil** - Where topsoil has been removed for project activities, site preparation should involve the replacement of topsoil. The salvage of topsoil is a priority that should be considered in the planning stages of a project. Topsoil is the uppermost layer of soil that is important for nutrient cycling and is a source for native plants. The amount of topsoil required for replacement should ideally match the depth of topsoil as to what was there before, or a minimum depth of 30cm. Effective topsoil management is an essential component of rehabilitation success.
- **Grading of ground material** - Site preparation may involve grading of soils where a disturbance has occurred (e.g. rutting). On terrain with slopes, it is recommended that grading occur across a slope to reduce erosion, and grading of materials should not result in slopes steeper than a 5:1 ratio.
- **Soil de-compaction -** Equipment continually driving over an area may result in compaction. Soil compaction is the squeezing together of soil particles, reducing the space available for air and water. Site preparation may involve treatment for soil compaction prior to re-establishment of vegetation by light discing or tilling to avoid loss of soil moisture and soil structure.
- **Seedbed Preparation** – Site preparation may also include preparing the seedbed prior to revegetation to enhance germination success. Seeding options discussed below.

2.3 Revegetation

Revegetation is the process of plants growing again on land previously disturbed. This may be a natural process by plant colonization and succession or an artificial accelerated process (e.g. seeding, planting) designed to repair a disturbance to the landscape.

In some locations, natural regeneration is a viable means of rehabilitation by natural seeding, sprouting, suckering or layering of vegetation. Where conditions are ideal regarding topography, slope, moisture, time of year, and condition of surrounding vegetation, natural regeneration may be the preferred method. Where conditions are not ideal for natural recovery, rehabilitation should involve artificial regeneration by planting or seeding.

2.3.1 Planting Options

Options for rehabilitation by planting include the following:

- **Tree seedlings** – Tree seedlings may be obtained as either bare root or containerized stock. Bare root stock need to be handled carefully while in storage and during planting,

and exposed roots can dry out quickly. Containerized stock provides root protection and increased flexibility as to timing of planting. Spacing for seedlings can be variable. Seedlings are recommended for large-scale plantings. Common seedlings for rehabilitation may include jack pine, white and black spruce, and balsam fir.

- **Transplanting -** Transplanting is a form of artificial regeneration where plants are removed from one location and planted in another. Transplanting is a useful means of re-establishing native species quickly. Preferably, transplanting should occur from similar habitats and nearby sources to increase growing success. Vegetation transplanted in disturbed sites may increase the rate of natural regeneration by capturing seeds and organic material from surrounding plant cover. Transplanting is a recommended method for vegetation rehabilitation near watercourse crossings. Species such as hybrid poplar and willow cuttings are commonly planted because of their good rooting ability and fast growth rate.
- **Sprigging** - Plant sections cut from rhizomes or stolons that include the vegetation crowns and roots. Sprigging can be an effective method for disturbed and erodible stream crossing sites.

2.3.2 Seeding Options

Options for rehabilitation by seeding include the following:

- **Drill Seeding** - Drill seeding involves a tractor-pulled seed drill. In larger areas, equipment can furrow soil, plant seed and pack soil over seed in one pass. Native seed drills are most efficient and accurate at placing seed. Drill seeding should be done into well-cultivated soil, free of lumps and debris, and firmly roller packed.
- **Broadcast seeding** - Broadcast seeding is accomplished by dispersing seed by machine or hand. Broadcasting is effective where the access of large machinery is not possible or recommended, although requires the use of more seed. An attempt should be made to incorporate the seeds into the soil as an additional step after broadcasting.
- **Hydroseeding** - Hydroseeding is a method that uses a slurry of seed, mulch, water and tackifier which is transported by a water tank that may be mounted on a truck or trailer and sprayed over prepared ground. Hydroseeding is an alternative to traditional broadcasting or drilling seeding.

2.4 Other Important Considerations and Options

2.4.1 Ecological Context

Rehabilitation prescription needs to be appropriate for the site under consideration. Manitoba is comprised of six ecozones representing large generalized ecological units characterized by interactive and adjusting abiotic and biotic factors. Selecting vegetation for rehabilitation needs to be suitable to the site. Appendix D identifies characteristic vegetation of Manitoba's ecozones.

2.4.2 Using Native Species

Native species are plants occurring within their historic range bounded by the dispersal potential of the plant. These species are favoured for rehabilitation for several reasons, including ecological

compatibility, palatability, and adaptation to local soils and climate. Using local native species for rehabilitation is a well established method that makes ecological and economic sense. Native plant material should be used for rehabilitation of a disturbance area where the goal is to re-establish a native plant community.

2.4.3 Seed Mix Recommendations

It is more important to use the correct species, rather than the prescribed seed rates. This section identifies native seed mixes for disturbances in Manitoba. Establishing long-term plant communities requires forethought as to appropriate species to use. Actual amounts of species present in a seed mix may vary depending upon seed availability. The best adapted species will result from seed collections in the region. Species listed in Appendix E can be chosen as a baseline mix and are generally commercially available. Both upland and lowland mixes are provided for northern, west central, and southern Manitoba. Species listed in Appendix F are commercially available in Manitoba and may be added for diversity.

2.4.4 Commercial Seed and Plant Providers

Purchasing native seed from commercial providers is a practical option for large rehabilitation sites. In response to demand for genetically diverse native seed for rehabilitation projects, native seed producers have become increasingly common. Where seed will be purchased, the following information should be considered:

- Species selection for seeding should be undertaken in conjunction with recommended seed mixes, generally with a dominance of native graminoids and subdominant native broadleaf herbs.
- Seed acquisition should be determined through consultation with a vegetation specialist, using ready available native local seed, wherever possible.
- Forage grasses should not be seeded as they are developed for maximum forage production, and may destroy habitat by taking over native plant communities.
- The genetic origin of the seeds should be from Manitoba or nearby provinces, from a similar region.
- Commercial seed providers should produce certificates of analysis from an accredited laboratory that provides seed purity and germination values.

2.4.5 Seeding Dates

There are two timing windows for seeding. The preferred time to seed occurs during the spring as soon as the ground has reached a desirable temperature ($5^{o}C$) and the danger of a killing frost has past. The second and less successful time is dormant seeding in the fall once the ground temperature has lowered to $5^{o}C$, where seeds will germinate the following growing season. For sites with a high risk of erosion, seeding could occur at anytime.

2.4.6 Rates for Seeding

Seeding rates can vary depending on method of seeding and applicator. Seeding rates may need to be adjusted for wind loss, animal consumption, slope, seed weight, germination rate, annual survivorship, and intended density of mature plants. General seeding rates include the following:

- drill seeding <15 kg/ha
- broadcast seeding 30 to 85 kg/ha
  - broadcast seeding involves scattering of seed manually by hand (or hand-held seeder) or mechanically.
- hydroseeding 75 to 100 kg/ha
- cover crops 2.2 to 5.5 kg/ha (seeded lightly to reduce competition with native species)

The seeding rate calculation for a species that occupies 10% of a seed mix (e.g. 84 kg/ha) includes the following: 84 kg/ha x 0.10 = 8.4 kg/ha

2.4.7 Rates for Planting Tree Seedlings

Spacing of tree seedlings can be variable within disturbance areas. In general, spacing to achieve about 2,500 seedlings per hectare requires spacing of 2.1 m between rows and 1.8 m between seedlings. At this level of spacing, most equipment will be allowed to move between rows without damaging trees. Manitoba Conservation and Water Stewardship should be consulted to determine spacing requirements for large scale rehabilitation.

Transplanting cuttings such as poplar or willow species can be used. Cuttings should be a minimum length of 30 cm and buried in the ground at least half its length. Cuttings are most successfully transplanted in the spring and fall. Both poplar and willow species have good propagation success because of their rooting ability and are desirable for erosion control.

2.4.8 Fertilizers

Fertilizers can be added to the soil to supply one or more plant nutrients essential to the growth of plants. Fertilization may improve productivity of a rehabilitation effort during early growth stages. Applying excessive amounts of fertilizer can have negative environmental effects (e.g. seed damage, run-off, encourage invasive species, etc.). The storage, handling, and application of fertilizers are legislated in Manitoba (The Water Protection Act, The Pesticides and Fertilizers Control Act). This legislation is intended to protect Manitoba's water quality. It is important to consult this legislation prior to applying nutrients to rehabilitation sites.

3. Invasive Species Management

Many species in Manitoba are so common now that they are often mistakenly considered native. These species have become widely naturalized through intentional and accidental introductions. Invasive species reduce biological diversity and threatened native ecosystems. Examples of invasive species in Manitoba include purple loosestrife, ox-eye daisy and leafy spurge. Plants listed by the Invasive Species Council of Manitoba are provided in Appendix G, and these species should be watched for closely. All contractors and field personnel should comply with the *Manitoba Noxious Weeds Act*.

Once invasive species become established control measures can be costly to implement. Therefore, a successful invasive plant control strategy should involve taking preventative measures, early detection, and rapid management response.

3.1 Prevention

An initial step in controlling invasive plant species is preventing their establishment. Prevention is relatively cost-effective when compared to invasive species control and management efforts. Preventative measures include the following:

- Education on how to identify invasive species and infestations.
- Clean and wash equipment and boots before entering and leaving a site to prevent transport of seeds.
- Use materials from a weed-free source (e.g. topsoil or aggregate).
- Rehabilitate promptly when a soil disturbance occurs.
- Design seed mixes with species that have differing growth forms to occupy the variety of niches available, and seed native species known to be competitive.
- Record early detection of invasive species problem areas on adjacent lands.
- Avoid driving or walking through areas of invasive species.
- Placing barriers between the invasive seed source and the site.

3.2 Management Options

Management options to control invasive plant species include the following:

- **Manual control**, hand-pulling or hand-slashing weeds, can be effective for smaller infestations and in environmentally sensitive sites where herbicide use is not an option. Species should be placed in a tightly sealed bag and burned when conditions are appropriate.
- **Mechanical control**, such as mowing and burning, can be effective for larger infestations. All equipment should be cleaned prior to being transported to other areas to prevent the spread of species.
- **Chemical control** will often be the most effective and economical option for invasive species. Where herbicides are used for invasive species control, refer to the ***Pesticide Application Requirements for Manitoba Hydro Employees and Contractors*** document. This publication is designed to provide regulatory and applicator licensing information; technical guidance; safety requirements and check lists for line managers responsible for pesticide application for the purpose of ensuring compliance with legal requirements and Manitoba Hydro policies. In addition, it will provide information for the purpose of ensuring consistent pesticide management at all Manitoba Hydro facilities thereby ensuring pesticide management is carried out in such as way that resulting environmental impact is minimal.
- **Biological control**, can be an ecologically sustainable practice using insects and diseases but should be considered a long-term management strategy.
- **Native species competition**, control by desirable plants through competition of resources.

3.3 Treatment Options for Common Species

The following identifies an overview of treatment options for some common invasive species. Refer to the Invasive Species Council of Manitoba website for further details regarding treatment options.

Leafy Spurge

- Manual control (hand-pulling) is effective for small infestations.
- Mechanical control (mowing) will reduce the plants ability to seed but has little long-term effect on the plant.
- Chemical control is effective in spring and fall.
- Biological control is considered a long-term management strategy.
- A combination of control measures in an integrated approach is recommended for this species.

Common Tansy

- Manual control (hand-pulling) is effective for small infestations.
- Mechanical control (mowing) will reduce seed production but requires repeat treatment.
- Chemical control is effective.
- Biological control is anticipated to be an effective measure for this species in the future.
- Native species competition has been effective for small infestations.

Scentless Chamomile

- Manual control (hand-pulling) is effective for small infestations.
- Mechanical control (mowing) is effective but requires repeat treatment.
- Chemical control is effective. Earlier applications have greater success.
- Biological control has had some success.
- Native species competition has been effective.
- A combination of control measures in an integrated approach is recommended for this species.

Purple Loosestrife

- Manual control (hand-pulling) is effective for small infestations.
- Chemical control is effective in uplands. No herbicides are currently approved in Canada for treatment near or in water.
- Biological control is the most effective measure for large infestations near water.

Ox-eye Daisy

- Manual control (hand-pulling) is effective for small infestations, if the roots are removed.
- Mechanical control (mowing) stimulates shoot growth and requires repeat treatment.
- Chemical control is effective.

Sweetclover

- Manual control (hand-pulling) is effective for small infestations, if the roots are removed.
- Mechanical control (mowing) should occur before seed production.
- Chemical control is effective.
- Native species competition has been effective as part of a management strategy including native seeding, burning and mowing.

Canada Thistle

- Manual control (hand-pulling) is effective for small infestations, if the roots are removed.
- Mechanical control (mowing) is effective but requires repeat treatment.
- Chemical control is effective.

4. Environmental Monitoring

Environmental monitoring is an important component for rehabilitation and invasive species management. Monitoring will verify the implementation and effectiveness of rehabilitation measures and invasive species management. Successful rehabilitation of disturbed areas will be defined by the establishment of native species, no evidence of erosion, and resilience to the disturbance. The following should be completed during environmental monitoring of disturbance areas:

- Disturbance areas should be inspected frequently in the first year and monitored annually thereafter until vegetation re-established.
- Monitoring should include an assessment of erosion control.
- Monitoring should include an assessment of vegetation to ensure plant growth.
- Monitoring should be conducted by Manitoba Hydro inspectors and/or vegetation specialists.
- Problem areas should be reported as soon as possible to Manitoba Hydro so further rehabilitation and invasive species management can be implemented.

5. Maintenance

Environmental monitoring will determine if maintenance activities are required. Maintenance activities may include additional erosion control, re-seeding or further plantings, protection from browsing, and invasive species control. Maintenance activities will help to minimize damages and keep rehabilitation costs down.

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Appendix A. Rehabilitation Checklist

Date (yyyy mm dd)	
Name of recorder	Company (*if different from Manitoba Hydro*)
Location GPS	
Project	
Description of disturbance (*type*)	
Size of disturbance (m^2 *or ha*)	
Severity of disturbance *(e.g. erosion is occurring, disturbance is stable)*	
Slope of site (level 0-0.5%, nearly level 0.5-2.5%, very gentle to gentle 2-9%, moderate 10-15%, strong 16-30%, very strong to steep 31-100%)	
Moisture conditions (*dry, moist, wet*)	
Post disturbance soil conditions (*e.g. mineral soil is exposed*)	
Post disturbance vegetation conditions (*e.g. vegetation is removed or little is remaining*)	
Surrounding vegetation (*e.g. grassland, forest, riparian, wetland*) and species if known	
Adjacent land uses (*e.g. agriculture*)	
Photographs	
Remarks	

Appendix B. Manitoba Hydro's Agricultural Biosecurity Policy.

Manitoba Hydro's Agricultural Biosecurity Policy was created to prevent the introduction and spread of disease, pests and invasive plant species in agricultural land and livestock operations. Manitoba Hydro employees and contractors will follow this corporate policy and the Transmission Business Unit Agricultural Biosecurity Standard Operating Procedures (SOP).

Manitoba Hydro staff and contractors have the potential to impact agricultural biosecurity through construction and/or maintenance activities requiring access to agricultural land. Acknowledging this risk, the purpose of the Agricultural Biosecurity Policy is to ensure that Manitoba Hydro staff and contractors take necessary precautions to protect the health and sustainability of the agricultural sector.

The Transmission SOP and the training associated with it apply to all the employees of Transmission as well as external individuals such as contractors or consultants who conduct work on behalf of the Transmission Business Unit. The SOP also includes procedures to provide guidance and direction to staff and contractors/consultants who may be required to enter agricultural land and the levels of cleaning necessary to reduce the likelihood of transport of invasive species, pests or disease.

Appendix C. General Strategies for Sites Requiring Large Scale Rehabilitation.

Marshalling Yards, Construction Camps, and Station Sites

- Construction areas no longer required will be assessed for rehabilitation requirements immediately after demobilization and clean-up. Rehabilitation may not be required for areas that will return to original use or continue to be utilized by other entities (i.e. gravel pit used as a marshalling yard).
- Assess the site for potential contamination from hazardous substances (i.e. fuel and oils).
- If contamination is located, follow steps outlined below under contaminated sites.
- Implement erosion and sediment control as required.
- Implement measures of site preparation as required (e.g. topsoil replacement, grading).
- Use topsoil that has been stripped and stockpiled for site rehabilitation and seedbank.
- Where topsoil is required but unavailable, topsoil will be imported from clean sources.
- Where required, appropriate seed mixes and plantings should be used.
- Seed areas using appropriate seeding method (e.g. broadcasting, drill seeding).
- Implement preventative measures to reduce the spread of invasive species.
- Artificial revegetation should occur in spring or late fall.
- Sites will be monitored and maintained as required (e.g. erosion control, re-seeding, invasive species control etc.).

Borrow Pits, Quarries and Material Placement Areas

- Construction areas no longer required will be assessed for rehabilitation requirements. Rehabilitation may not be required for areas that will return to original use or continue to be utilized by other entities (i.e. quarry utilized by Gravel Contractor).
- Contour site to achieve desired slope no steeper than 5:1 ratio.
- Replace stockpiled overburden.
- Implement erosion and sediment control as required.
- Implement additional measures of site preparation as required (e.g. grading, de-compaction).
- Where topsoil is required but unavailable, topsoil will be imported from clean sources.
- Where required, appropriate seed mixes and plantings should be used.
- Seed areas using appropriate seeding method (e.g. broadcasting, drill seeding).
- Consult with the regional forest office if large scale imported seedling planting needs to occur to discuss species and planting requirements.
- Implement preventative measures to reduce the spread of invasive species.
- Artificial revegetation if required should occur in spring or late fall, where practical.

- Sites will be monitored and maintained as required (e.g. erosion, re-seeding, invasive species etc.).

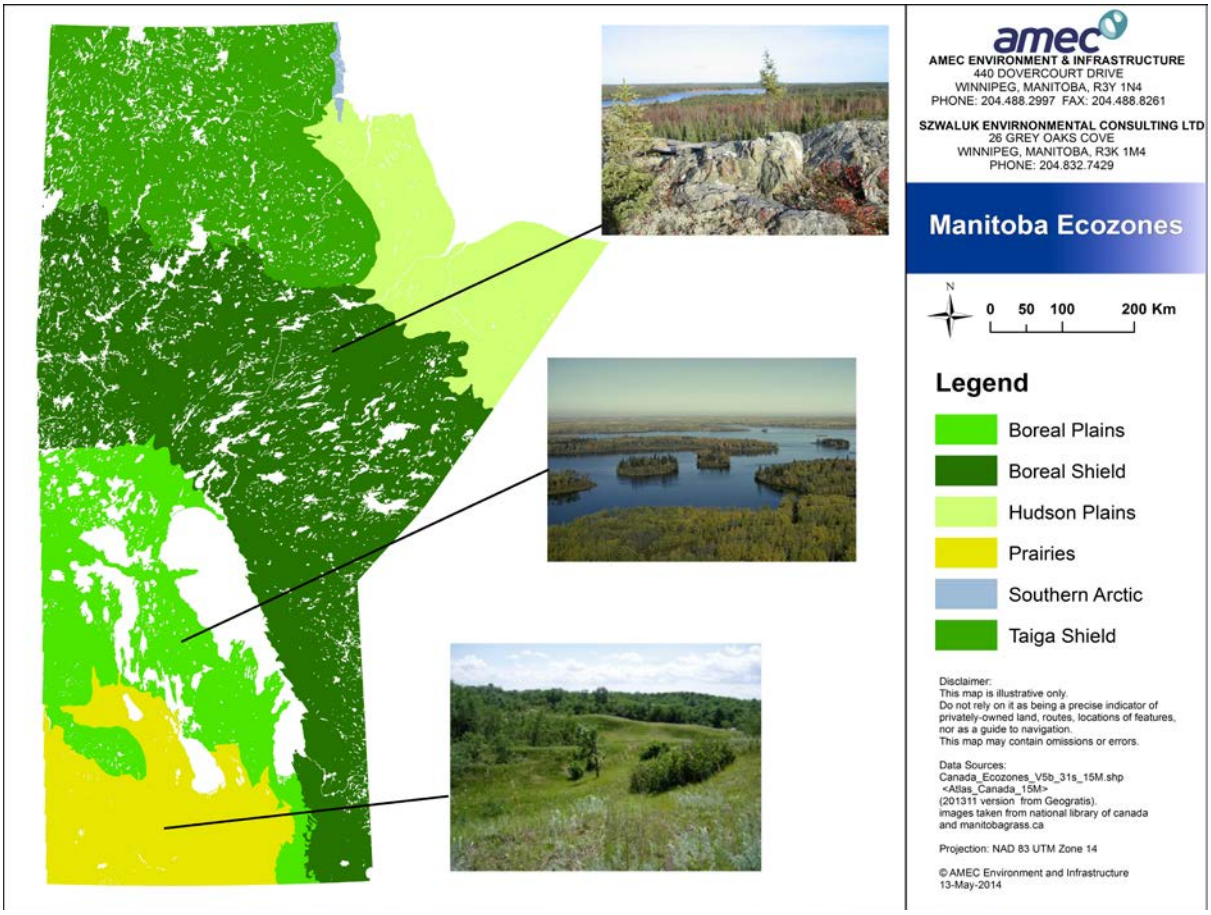
Contaminated Sites and Hazardous Releases

- Hazardous substances will be subject to provincial and federal workplace hazardous materials information system regulations and guidelines, the Manitoba Workplace Safety and Health Regulation, and will be managed in accordance with Manitoba Hydro's ***Hazardous Materials Management Handbook***.
- If a release occurs, releases are to be reported using the Hazardous Materials Incident Report (Form 2875) in accordance with the Manitoba Hydro reporting protocol (***Hazardous Materials Management Handbook***).
- An environmental specialist will determine the extent and type of contamination.
- Clean up all visible signs of the release by treatment on site or transportation to an approved location for remediation.
- Sampling results will indicate whether clean up is sufficient.
- Implement erosion and sediment control as required.
- Implement measures of site preparation as required (e.g. topsoil replacement, grading).
- Where topsoil is required but unavailable, topsoil will be imported from clean sources.
- Where required, appropriate seed mixes and plantings should be used.
- Seed areas using appropriate seeding method (e.g. broadcasting, drill seeding).
- Implement preventative measures to reduce the spread of invasive species.
- Artificial revegetation if required should occur in spring or late fall.
- Sites will be monitored and maintained as required (e.g. erosion control, re-seeding, invasive species control etc.).

Appendix D. Characteristic vegetation of Manitoba's ecozones.

Manitoba Ecozone	Characteristic Vegetation
Southern Arctic	Occasional forest stands, dwarf birch, willows, ericaceous species, various herbs, mosses and lichens.
Hudson Plains	Black spruce, white spruce, tamarack, ericaceous shrubs, sedges, mosses and lichens. Closer to the coast there are marine marshes, shallow fens, and extensive mud flats with little vegetation.
Taiga Shield	Black spruce, white spruce, tamarack, and ground cover of dwarf birch, willows, northern Labrador tea, cotton grass, mosses, and lichens. Paper birch, balsam poplar and trembling aspen may be found. Bog and fen complexes are present.
Boreal Shield	Single-species forest stands, or mixed stands of white and black spruce, balsam fir, tamarack and jack pine. White birch, trembling aspen, and balsam poplar can be found. Understory is dominated by shrubs, forbs and lichen cover over bedrock outcrops.
Boreal Plains	White spruce, black spruce, jack pine and tamarack are the main coniferous species, while deciduous trees include white birch, trembling aspen and balsam poplar
Prairies	Predominantly agricultural crops and rangeland. Stands of trembling aspen, balsam poplar and bur oak occur.

Source: Smith et al. (1998).



Appendix E. Recommended baseline native seed mixes.

Common Name	Scientific Name	Percent in Mix (Total 100%)
Northern Manitoba - upland mesic to dry soils		
Short-leaved Fescue	*Festuca brachyphylla*	10
Canada Wild Rye	*Elymus cananadensis*	20
Tickle-grass	*Agrostis scabra*	10
Hairy Wild Rye	*Leymus innovatus*	20
June Grass	*Koeleria macrantha*	10
Rocky Mountain Fescue	*Festuca saximontana*	10
Richadson Needle Grass	*Achnatherum richardsonii*	15
Common Vetch	*Vicia americana*	5
Northern Manitoba – lowland wet meadow soils		
Fowl Blue Grass	*Poa palustis*	30
Marsh or Northern Reed Grass	*Calamagrostis canadensis* or *C. stricta*	10
Slough Grass	*Beckmannia syzigachne*	50
Tufted Hairgrass	*Deschampsia caespitosa*	10
West Central Manitoba - upland mesic to dry soils		
Tickle-grass	*Agrostis scabra*	10
Big Bluestem	*Andropogon gerardii*	20
Purple Prairie Clover	*Dalea purpurea* var. *purpurea*	5
Canada Wild Rye	*Elymus canadensis*	30
Hairy Wild Rye	*Leymus innovatus*	10
Rocky Mountain Fescue	*Festuca saximontana*	5
Awned Wheatgrass	*Elymus trachycaulus* spp. *subsecundus*	10
June Grass	*Koeleria macrantha*	5
Common Vetch	*Vicia americana*	5
West Central Manitoba - lowland wet meadow soils		
Slough Grass	*Beckmannia syzigachne*	50
Marsh or Northern Reed Grass	*Calamagrostis canadensis* or *C. stricta*	5
Tufted Hairgrass	*Deschampsia caespitosa*	30
Baltic Rush	*Juncus arcticus* var. *balticus*	5
Fowl Blue Grass	*Poa palustis*	10
Southern Manitoba - upland mesic to dry soils		
Awned Wheatgrass	*Elymus trachycaulus* spp. *subsecundus*	10
Big Bluestem	*Andropogon gerardii*	30
White Prairie-clover	*Dalea candida*	5
Purple Prairie Clover	*Dalea purpurea* var. *purpurea*	5
Canada Wild Rye	*Elymus canadensis*	20
June Grass	*Koeleria macrantha*	5
Little Bluestem	*Schizachyrium scoparium*	10
Indian Grass	*Sorghastrum nutans*	10
Common Vetch	*Vicia americana*	5
Southern Manitoba – lowland wet meadow soils		
Slough Grass	*Beckmannia syzigachne*	50
Marsh or Northern Reed Grass	*Calamagrostis canadensis* or *C. stricta*	10
Tufted Hairgrass	*Deschampsia caespitosa*	10
Fowl Blue Grass	*Poa palustis*	10
Prairie Cord Grass	*Spartina pectinata*	20

Appendix F. Selection of plant species commercially available for rehabilitation.

Scientific Name	Common Name	Seed	Seedling
Abies balsamea	Balsam Fir		X
Achnatherum hymenoides	Indian Rice Grass	X	
Achnatherum richardsonii	Richardson Needle Grass	X	
Agrostis scabra	Tickle-grass	X	
Andropogon gerardii	Big Bluestem	X	
Arctagrostis latifolia	Polar Grass	X	
Astragalus canadensis	Canada Milkvetch	X	
Beckmannia syzigachne	Slough Grass	X	
Bouteloua curtipendula	Side-oats Grama	X	
Bouteloua gracilis	Blue Grama	X	
Bromus anomalus	Nodding Brome	X	
Bromus ciliatus	Fringed Brome	X	
Buchloe dactyloides	Buffalo Grass	X	
Calamagrostis canadensis	Marsh Reed Grass	X	
Calamagrostis stricta ssp. *inexpansa*	Northern Reed Grass	X	
Calamolvilfa longifolia	Sand Grass	X	
Carex bebbii	Bebb's Sedge	X	
Dalea candida	White Prairie-clover	X	
Dalea purpurea var. *purpurea*	Purple Prairie Clover	X	
Deschampsia caespitosa	Tufted Hairgrass	X	
Distichlis spicata	Alkali Grass	X	
Elymus alaskanus ssp. *latiglumus*	Alaska Wild Rye	X	
Elymus canadensis	Canada Wild Rye	X	
Elymus glaucus	Smooth Wild Rye	X	
Elymus lanceolatus ssp. *lanceolatus*	Thickspike Wheatgrass	X	
Elymus lanceolatus ssp. *psammophilus*	Sand-dune Wheatgrass	X	
Elymus trachycaulus	Slender Wheat Grass	X	
Elymus trachycaulus spp. *subsecundus*	Awned Wheatgrass	X	
Elymus virginicus	Virginia Wild Rye	X	
Festuca brachyphylla	Short-leaved Fescue	X	
Festuca halii	Plains Rough Fescue	X	
Festuca saximontana	Rocky Mountain Fescue	X	
Glyceria grandis	Tall Manna Grass	X	
Helianthus maximiliani	Narrow-leaved Sunflower	X	
Hesperostipa comata ssp. *comata*	Spear Grass	X	
Hesperostipa curtiseta	Western Porcupine Grass	X	
Juncus arcticus var. *balticus*	Baltic Rush	X	
Koeleria macrantha	June Grass	X	
Leymus innovatus	Hairy Wild Rye	X	
Nassella viridula	Green Needle Grass	X	
Panicum virgatum	Switch Grass	X	
Pascopyrum smithii	Western Wheat Grass	X	
Picea glauca	White Spruce		X
Picea mariana	Black Spruce		X
Pinus banksia	Jack Pine		X
Pinus resinosa	Red Pine		X
Pinus strobus	Eastern White Pine		X
Poa alpina	Alpine Blue Grass	X	

Scientific Name	Common Name	Seed	Seedling
Poa glauca	Glaucous Spear-grass	X	
Poa palustris	Fowl Blue Grass	X	
Poa secunda ssp. *secunda*	Curly Bluegrass	X	
Populus spp.	Hydbrid Poplar		X
Pseudoroegneria spicata ssp. *spicata*	Bluebunch Wheat Grass	X	
Quercus macrocarpa	Bur Oak		X
Salix spp.	Hybrid Willow		X
Schizachyrium scoparium	Little Bluestem	X	
Scolochloa festucacea	Sprangletop	X	
Sorgastrum nutans	Indian Grass	X	
Spartina gracilis	Alkali Cord Grass	X	
Spartina pectinata	Prairie Cord Grass	X	
Sporobolus cryptandrus	Sand Dropseed	X	
Thuja occidentalis	Eastern White Cedar		X
Trisetum spicatum	Spike Trisetum	X	
Vicia americana	Common Vetch	X	

Appendix G. Invasive species listed by the Invasive Species Council of Manitoba. Refer to Invasive Species Council of Manitoba Field Guide (2013) and website for identification.

Scientific Name	Common Name
Alliaria petiolata	Garlic Mustard
Arctium minus	Common Burdock
Berteroa incana	Hoary Alyssum
Bromus japonicus	Japanese Brome
Bromus tectorum	Downy Brome
Butomus umbellatus	Flowering Rush
Campanula rapunculoides	Creeping Bellflower
Carduus nutans	Nodding Thistle
Cirsium arvense	Canada Thistle
Cirsium vulgare	Bull Thistle
Convolvulus arvensis	Field Bindweed
Cynoglossum officinale	Hound's Tounge
Echium vulgar	Blue Weed
Eichhornia crassipes	Water Hyacinth
Euphorbia esula	Leafy Spurge
Fallopia japonica	Japanese Knotweed
Gypsophila paniculata	Baby's Breath
Heracleum mantegazzianam	Giant Hogweed
Hesperis matronalis	Dame's Rocket
Hieracium aurantiacum	Orange Hawkweed
Hypericum perforatum	St. John's Wort
Impatiens glandulifera	Himalayan Balsam
Jacobaea vulgaris	Tansy Ragwort
Knautia arvensis	Field Scabious
Leucanthemum vulgare	Ox-eye Daisy
Linaria dalmatica	Dalmatian Toadflax
Linaria vulgaris	Yellow Toadflax
Lychnis alba	White Cockle
Lythrum salicaria	Purple Loosestrife
Matricaria perforata	Scentless Chamomile
Odontites serotina	Red Bartsia
Onopordum acanthium	Scotch Thistle
Phalaris arundinacea	Reed Canary Grass
Phragmites australis spp. *australis*	Invasive Phragmites
Ranunculis acris	Tall Buttercup
Rhamnus cathartica	European Buckthorn
Saponaria officinalis	Bouncing Bet
Saponaria vaccaria	Cow Cockle
Sonchus arvensis	Perenial Sow Thistle
Tanacetum vulgare	Common Tansy
Tribulus terrestris	Puncture Vine
Typha angustifolia and *Typha x glauca*	Narrow-leaved and Hybrid Cattail
Vicia cracca	Bird Vetch

Note: Listed species are category 2 species (localized presence in Manitoba) listed by the Invasive Species Council of Manitoba. Invasive species also are listed under The Noxious Weeds Act of Manitoba.